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## Jason 1 nears December launch

Mike Davis, left, Jason 1 launch vehicle engineer, and Tom Shain, logistics and operations engineer, are helping to prepare the satellite for its Dec. 7 launch.

### *t h e* E A R T H



Photo by Scott Michel

**T**ESTING OF THE ONBOARD INSTRUMENTS AND control systems for Jason 1 satellite have been successfully completed. All multi-layer insulation, or thermal blankets, are installed and secured for flight. Jason 1 is now in its flight configuration, set for a Dec. 7 launch from Vandenberg Air Force Base in California.

Jason 1 is the first follow-on to the highly successful Topex/Poseidon mission, which has been flying since 1992. Topex/Poseidon measured ocean surface topography to an accuracy of 4.2 centimeters (1.7 inches), enabled scientists to forecast the 1997-1998 El Niño, and improved understanding of ocean circulation and its effect on global climate.

A few weeks after launch, Jason 1 will raise itself into the same orbital altitude as Topex/Poseidon's—1,337 kilometers (830 miles)—then will move in close behind its predecessor, trailing by about 500 kilometers (300 miles).

Topex/Poseidon and Jason 1 will fly in line together, making nearly simultaneous measurements. The science team will compare the data to make sure the instruments are calibrated exactly. This procedure is expected to take about six months, after which Jason 1 will assume Topex/Poseidon's former flight path and the older satellite will move into a parallel ground track midway between two Jason 1 ground tracks.

Weighing 500 kilograms (about 1,100 pounds), Jason 1 is one-fifth the size of Topex/Poseidon. Jason 1 will complete an orbit around Earth approximately every 112 minutes. While Jason 1's mission is designed to last three years, it carries enough propellant for five years.

The mission is a joint project between NASA and the French space agency Centre National d'Etudes Spatiales (CNES). Following launch, initial checkout will be performed by CNES in France, then operations will be transferred to JPL. The project manager is Gary Kunstmann.

Jason 1 carries five instruments: the Poseidon 2 altimeter, the spacecraft's main instrument, to measure altitude; a microwave radiometer to measure atmospheric water vapor; and three precision location-finding instruments. Jason 1 altimeter data will be part of a suite of data provided by other JPL-managed ocean missions—the Grace mission will use two satellites to accurately measure Earth's mass distribution, and the QuikScat scatterometer mission will measure ocean-surface winds.

For images, animations and other information on the mission, log on to <http://topex-www.jpl.nasa.gov/mission/jason-1.html>.

## Study shows fault moving faster than expected

By Enrico Piazza

Scientists at JPL and UCLA have concluded that earthquake fault zones in California's eastern Mojave Desert are moving in different ways than they expected.

For years researchers were aware that movement in the southern California shear zone was distributed over a 100-kilometer-wide (60-mile) area. However, they assumed that deep below the surface the Blackwater Little Lake and the Garlock faults were creeping steadily, something that the new study seems to contradict.

A paper with the findings is in the Nov. 1 issue of the journal *Geology*.

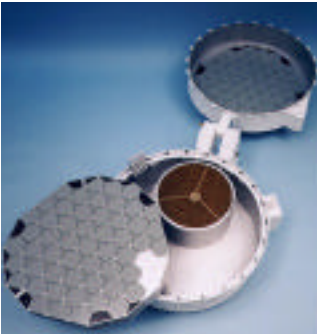
"The most exciting thing is we discovered something we didn't expect. We were looking for deformation on the Garlock fault, but we saw in the image a concentration of shear along the Blackwater Little Lake fault, which cuts the Garlock fault at a right angle," said Dr. Gilles Peltzer, a UCLA professor and JPL research scientist who is the lead author of the study. "Radar interferometry has been applied previously to the study of earthquakes, and what we are imaging here is the surface strain field produced by the slow creep occurring at depth on active faults between earthquakes."

The new findings indicate that more than half of the right-lateral motion of the Eastern California shear zone is sharply concentrated along the Blackwater Little Lake fault system. The rapid strain accumulation observed along the fault system indicates that the fault is building up stress in the shallow crust at a rate three times faster than the rate inferred from geological observations. This may be the manifestation of stress transfer between the Garlock fault and other faults in the Mojave area, in particular those that produced the magnitude 7.3 Landers earthquake in 1992 and the magnitude 7.8 Owens Valley earthquake in 1872.

Scientists arrived at the conclusion after studying radar interferometry data collected by satellites over the last eight years.

## Genesis prepares for science mission

By Martha Heil



Genesis' sample-return capsules.

### *t h e* S O L A R S Y S T E M

The JPL-managed Genesis spacecraft, launched on Aug. 8, will soon arrive into orbit around its destination—Lagrange 1, a point in space between Earth and the Sun. The spacecraft is now preparing to begin its science mission on Nov. 16.

Project managers are monitoring the temperature of the battery inside Genesis' sample-return capsule to make sure that long-term heating does not impair its performance when the capsule returns samples of the solar wind to Earth in September 2004. Although the battery is likely to become hotter than originally expected, the flight team has a number of options for managing the battery's temperature, and they do not expect the issue to affect the mission.

The mission's science requirements call for 22 months of solar

wind particle collection. "In our current plan, Genesis will meet and exceed that goal, collecting up to 26 months' worth of solar wind particles," said Project Manager Chet Sasaki of JPL.

The temperature of the lithium-dioxide battery is currently at 23 degrees Celsius (73 degrees Fahrenheit), within the range anticipated by spacecraft designers. A radiator device intended to shield the battery is not working as well as expected, however, and the battery is likely to heat up to 42 degrees Celsius (108 degrees Fahrenheit). Mission managers consider this temperature to be within acceptable limits. They note that similar batteries have been maintained at 60 degrees Celsius (140 degrees Fahrenheit) for 15 months without impairing their perfor-

mance. Ground tests are being conducted on lithium batteries to measure their durability at various temperatures.

The Genesis project team has been attempting to bake potential contaminants off the battery's radiator by heating the area. They are doing this with the spacecraft's sample return backshell opened just enough to allow gas trapped inside the capsule to escape, while still avoiding exposure to the Sun.

Following arrival into orbit around the Lagrange 1 point, Genesis will deploy its collector arrays in early December and begin collecting particles of the solar wind that will imbed themselves in specially designed high purity wafers.

For more information, go online to <http://genesismission.jpl.nasa.gov>.



# News Briefs



Kathryn Weld

**Weld receives legislative honor**  
KATHRYN WELD, manager of the Mission Systems Engineering Section 314 has received a commendation from the California state legislature.  
State Senator JACK SCOTT and Assembly members CAROL LIU and DARIO FROMMER presented Weld with a 2001 Women in Business certificate of recognition in a mid-October ceremony that honored the achievements of 20 women statewide. Weld was honored in the “Women in Science and Technology” category.  
Other Women in Business awards bestowed by the legislature include Most Inspirational, Community Service, Empowerment and Businesswoman of the Year (small business and corporate categories).  
Weld has been the manager of the Mission Systems Engineering Section since 1998. The section, with 180 engineers and support staff, supports many of JPL’s planetary and Earth science projects in post-launch operations. The section also leads the pre-launch systems engineering and development of the Mission Operations System for future missions such as the Space Infrared Telescope Facility, Space Interferometry Mission, Mars Exploration Rover and Mars Reconnaissance Orbiter and Gravity Recovery and Climate Experiment.

**Williamson wins new JPL award**  
The Engineering and Science Directorate last month presented RICHARD WILLIAMSON of Section 344 with JPL’s first Contract Technical Manager of the Year Award.  
A 34-year JPL veteran, Williamson received a certificate of recognition and a bonus. He is currently project element manager/procurement lead for \$150 million of contract work on the Mars Exploration Rover.  
Williamson previously worked on the X2000 project. With the Mars Exploration Rover program, he has implemented a standardized set of contract documentation.  
“People recognize Rich for his exemplary reputation to address complex development problems with tight schedules,” noted R. LLOYD KEITH, manager of Section 344.  
Williamson is also involved as a mentor to less experienced contract technical managers as part of an ongoing series of four-day workshops.



Richard Williamson

**Vision test for robotic eye doctor**  
A five-minute vision test developed by a JPL physicist and using a laptop computer with a touch-sensitive screen can be used on Earth and in space to help diagnose the onset of eye diseases and even certain types of brain tumors.  
With one eye covered, a person sits in front of a computer screen divided into a grid. The subject stares at a central spot on the touch-sensitive

screen and, using a finger, outlines missing areas of the grid. The computer records, processes and displays a 3-D image of the subject’s visual field. The test for each eye takes about four to five minutes.  
“As NASA moves forward to establish a permanent presence in space, this may be considered a breakthrough step for the creation of an autonomous onboard physician,” said DR. WOLF-GANG FINK, senior member of the technical staff. “It is a non-invasive, quick and easy process that gives astronauts and physicians on the ground an almost instant auto-diagnosis. This type of technology will be useful for long-term space missions where early detection and advance monitoring will be key to the health of the astronauts.”  
Fink, a visiting research assistant professor of ophthalmology at USC, developed the test as part of his post-doctoral research while at Caltech with colleague Dr. ALFREDO SADUN, professor of ophthalmology at USC.  
This tool has been undergoing testing in clinical trials that began last year at the Doheny Eye Institute, Keck School of Medicine at USC. Trial results show that the screening test helps detect a variety of eye conditions, such as glaucoma and macular degeneration, the two leading causes of blindness. Early detection of these conditions and appropriate treatment are crucial in preventing further loss of sight.  
Caltech has filed a full patent on the screening test, and several companies have expressed interest in licensing the technology that may become commercially available as early as next year. Future uses envisioned are: monitoring the effects of intracranial pressure elevation in low-gravity environments and evaluation of possible stroke onset and of acute and chronic stroke conditions. Funding for this project was through a grant from the National Science Foundation, Arlington, Va.

**Honor Awards nominations open**  
Nominations are now being accepted for the 2002 NASA Honor Awards, which recognize individuals and teams who make outstanding contributions to the NASA mission. JPL employees are invited to nominate individuals or groups for this award. Nominations should be submitted to the cognizant line manager of the nominated person or team.  
Award criteria, categories and nomination forms are available from the Employee Services and Recognition home page at <http://eis/sec614/reward> by clicking on NASA Honor Awards. Each “Director for” will schedule his/her internal process to ensure that the directorate’s final recommended nominations will be submitted to MONICA GARCIA, mail stop T1720-B, by Wednesday, Nov. 21.

## SIRTF science center dedicated

Caltech has dedicated the Space Infrared Telescope Facility (SIRTF) Science Center on campus. The Science Center will be responsible for all aspects of the science operation for the observatory.

The JPL-managed SIRTF, scheduled for launch in July 2002, is an infrared telescope that will study the early universe, young galaxies and forming stars, and will detect dust discs around stars, considered an important signpost of planetary formation.  
SIRTF will be the last of NASA’s four “Great Observatories” that are designed to crack the mysteries of the cosmos. SIRTF will join the Hubble Space Telescope and the Chandra

X-Ray Observatory in space. Each of these observatories looks at different kinds of light along the electromagnetic spectrum, which ranges from the visible to the infrared.  
The SIRTF observatory will fill an important gap in wavelength coverage—the thermal infrared—that is not available from ground-based observatories. By seeking this infrared light, SIRTF will be looking for such objects as brown dwarfs and super planets, along with newly born planetary systems that may exist around other stars in our Milky Way galaxy.  
For more information about SIRTF, visit <http://sirtf.caltech.edu>.

# Special Events Calendar

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

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

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

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

Sat., Nov. 10–Sun., Nov. 11  
*The Notebook of Trigorin*—Tennessee Williams’ adaptation of Chekov’s *The Sea Gull* will be presented by Theater Arts at Caltech at 2 p.m. in Dabney Lounge. Admission price is to be determined. Call (626) 395-4652.

Monday, November 12  
Caltech Ballroom Dance Club—The second in a five-week series of samba classes will be held from 7:30 to 9 p.m. in Winnett Lounge, followed by a half-hour practice session. Cost: \$8 per lesson. Contact Megan Knight at [knight@its.caltech.edu](mailto:knight@its.caltech.edu) or visit <http://www.its.caltech.edu/~ballroom>.

Caltech Management Association—JPL Deputy Director Eugene Tattini will present “An Illinois General in King Charles’ Court: Perspectives on Technology Management” at 4:45 p.m. in von Kármán Auditorium. Tattini will review past and current technology management practices of the Department of Defense, give his impression of the appropriateness of current NASA and JPL management practices, and compare JPL and Department of Defense practices. Tattini will also suggest areas in which he believes JPL management techniques could be improved. For Caltech Management Association membership (\$10 per year for JPL and Caltech personnel) information, call Priscilla Frascchetti at ext. 4-4964.



Tuesday, November 13  
Blood Drive—Held in von Kármán Auditorium from 10 a.m. to 4 p.m. Sign-up sheets are available at Occupational Health Services (Building 310-202) and online at [http://eis/medical/blood\\_form.html](http://eis/medical/blood_form.html). Last-minute signups will be taken at von Kármán at your preferred time (be prepared to wait a little longer). To change an appointment, call the Pasadena Red Cross at (626) 960-6956, ext. 224.

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

Wednesday, November 14  
Blood Drive—Held in von Kármán Auditorium from 7 a.m. to 1 p.m. See Nov. 13 listing for more details.

Caltech Ballroom Dance Club—The second in a five-week series of amateur-taught waltz classes will be held from 7:30 to 9 p.m. in Winnett Lounge. Cost: \$1 per lesson. Contact Megan Knight at [knight@its.caltech.edu](mailto:knight@its.caltech.edu).

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

JPL Toastmasters Club—Meeting at 5 p.m. Guests welcome. Call Joy Hodges at ext. 4-7041 for location.

“The Quantum-Classical Transition on Trial: Is the Whole More Than the Sum of the Parts?”—Dr. Hideo Mabuchi, assistant professor of physics at Caltech, will give a free lecture at 8 p.m. in Caltech’s Beckman Auditorium. For information, call (626) 395-4652.

Thursday, November 15  
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.

Native American Heritage Month—“Last of the Dogmen,” starring Tom Berenger and Barbara Hershey, will be shown at 5 p.m. in von Kármán Auditorium. In this western/fantasy, a Montana bounty hunter discovers a Native American mystery in the wilderness. Rated PG.

Parent Support Group—Steve Degelsmith of the Employee Assistance Program will speak on “Managing Holiday Stress” at noon in the 167-111 Wellness room.

Social Security—A representative is available from 9:30 to 11:30 a.m. in the 167 cafeteria. No appointment is needed.

Saturday, November 17  
Caltech Concert Band—A free concert will be performed at 8 p.m. in Caltech’s Beckman Auditorium. The program will include music of Gershwin, Sousa and Beethoven. For information, call (626) 395-4652.

Sat., Nov. 17–Sun., Nov. 18  
*The Notebook of Trigorin*—Tennessee Williams’ adaptation of Chekov’s *The Sea Gull* will be presented by Theater Arts at Caltech at 2 p.m. in Dabney Lounge. Admission price is to be determined. For information, call (626) 395-4652.

Monday, November 19  
Caltech Ballroom Dance Club—The third in a five-week series of samba classes will be held from 7:30 to 9 p.m. in Winnett Lounge, followed by a half-hour practice session. Cost: \$8 per lesson. Contact Megan Knight at [knight@its.caltech.edu](mailto:knight@its.caltech.edu) or visit <http://www.its.caltech.edu/~ballroom>.

Native American Heritage Month—Tony Hull of Section 387 will present “A Navajo Solstice Site in Chaco Canyon, NM: rock art, ethnography and observation,” at noon in von Kármán Auditorium. The talk will describe an ongoing survey in a remote part of Chaco Canyon, a World Heritage Site. Slides will be presented on the survey, the site, and show a winter solstice sunrise event, suggestive of previously undocumented Navajo calendric use of rock art. Hull is co-investigator at this New Mexico site, and is also does field work and analysis in California with the UCLA Rock Art Archives. For information, call Vena Pontiac at ext. 3-2637.

Tuesday, November 20  
A Conversation With John Hume—The co-winner of the 1998 Nobel Peace Prize for his efforts to find a peaceful solution to the conflict in Northern Ireland will lecture at 8 p.m. in Caltech’s Beckman Auditorium. Admission is free. Call (626) 395-4652.

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

Wednesday, November 21  
Caltech Ballroom Dance Club—The third in a five-week series of amateur-taught waltz classes will be held from 7:30 to 9 p.m. in Winnett Lounge. Cost: \$1 per lesson. Contact Megan Knight at [knight@its.caltech.edu](mailto:knight@its.caltech.edu).



Photo by Herb Shoelbridge / Caltech

From left: JPL Director Dr. Charles Elachi; Dr. Thomas Soifer, SIRTF Science Center director; Caltech President Dr. David Baltimore; and Dr. Edward Weiler, associate administrator for NASA’s Office of Space Science, dedicate the new facility.



# Tattini settles in as Lab's new deputy director

## GENERALLY SPEAKING

By Mark Whalen



This summer, JPL welcomed Air Force Lt. Gen. Eugene Tattini as its new deputy director. Before joining the Lab, Tattini led one of the United States' largest organizations responsible for developing and fielding military space missions. He spoke with Universe about his first impressions of the Lab.

**Y**ou were involved most recently with managing launch systems and satellites. What attracted you to JPL?

I've been in military space in one assignment or another for almost 15 years, including three assignments at the Los Angeles Air Force Base, Space and Missile Systems Center in El Segundo. There I got exposed to the civil space program, which is NASA, and to the commercial space program, which is mostly telecommunications. So I've been able to keep abreast of who the industry leaders are. And, I have always known that in terms of technology and high-quality engineering and science, JPL has always been at the forefront.

I knew several Air Force reserve officers who worked at JPL. I also had a friend who was a contractor here at the Lab. So the more I talked to folks about JPL, the more interested I got in the job.

I consider myself very fortunate to have been selected as the deputy director. This is a job that comes open only once or twice a decade.

**You've been at JPL for about four months now. How is your orientation going? What has impressed you the most?**

During my first 90 days, about half the time was spent with Larry Dumas, and while I feel that I'm certainly a long way from understanding everything that goes on here, I'm beginning to relate to the organization's objectives and the management structure. And I'll become even more comfortable as time goes on.

What impresses me the most is the difficulty of projects we take on at JPL. They're both technically and programmatically hard, and to a lesser degree politically difficult as well. The fact that we are doing these missions in-house is something that I was not used to. In the military we were engineering and program managers, while here at JPL we're not only engineering and program managers, we're also the designers and builders. That has really impressed me.

The caliber and enthusiasm of the people here are even higher than what I expected.

**How exciting was it for you to witness the success of Mars Odyssey's orbit insertion last month?**

It's hard to put in words the feeling of absolute joy you experience when the creativity, engineering excellence and dedication of hundreds of people come together in exactly the right way. Just being in the Mission Support Area and watching our team react to their success was a privilege for me.

**What is your impression of the Lab's facilities?**

I'm a long way from having been in every building yet. But from what I've seen, some of our facilities are fantastic. And we have a new building under construction, and another in the planning stages. But at the same time, we have some "high-tech" labs in some very old facilities. That's why some of my emphases will be on housekeeping and good safety practices.

**How will your strengths and experience best benefit the Lab? Have you been able yet to formulate some short-term goals?**

My background is in program management and business; I'm not a graduate engineer. I know that I will be working closely with Tom Gavin (Associate Director, Flight Projects and Mission Success) and his group, and will help Charles and Tom streamline things like project management, cost effectiveness and acquisition, and make them work more effectively.

I also have a goal to make the institution run smoothly and unburden people from worrying about a lot of "administrivia"—so they can concentrate on their primary missions, and what they get paid to concentrate on.

**The deputy director's job has been described as JPL's "general manager" or "chief operating officer." How do you see your role—as more of a manager or a leader?**

Traditionally, the deputy director has been "Mr. Inside," while the director has been "Mr. Outside." However, Charles has asked me to do more external relations—with NASA Headquarters, with JPL's non-NASA customers such as the Department of Defense, including the Defense Advanced Research Projects Agency (DARPA), and other federal defense agencies.

I shared a joke with Dr. Elachi: he's going to teach me a little bit about science, I'm going to teach him a little bit about how to be a general, and we're going to make a great team.

**Are there major differences in the way the military and NASA/JPL manage their budgets?**

In many respects it's the same. We both go through the Office of Management and Budget and the congressional committees. There's the friendly competition among the NASA centers, depending on what their missions are; it's the same with the Air Force and our competition with the other branches of the military. But at the same time, how we execute those dollars is considerably different. We are more streamlined here at JPL than at the Pentagon.

Our challenge will be how we continue to pursue excellence with the money that NASA Headquarters gives us.

**Since Sept. 11, JPL staff have been on a heightened state of alert. How would you assess the efforts to make the Lab more secure?**

I have been in the forefront with our security and facilities people since the unfortunate incidents, to try to achieve the proper balance between taking care of the safety and security of our workforce and allowing employees enough flexibility to do their job as effectively and efficiently as possible. We've been experimenting with it, and have received a lot of good suggestions from the workforce.

My hat goes off to (Security and Protective Services Office Manager) Joe Charles and all of the Wackenhut personnel who provide security. They, along with our facilities and fire department staff, have done an absolutely outstanding job.

Eric Fuller, the emergency preparedness administrator, also helped the effort on Sept. 11 by getting our emergency operations center up and running, and getting the Lab's emergency response team organized very quickly.

**From what you've observed, what is the Lab's outlook for the near future?**

When the JPL strategic plan is rolled out early next year it will give all of us a good idea of where Dr. Elachi wants the Lab to go in the next half-decade. It is a good vision; we've worked hard at that plan and have included many people's ideas from throughout the scientific and engineering communities.

**Are you enjoying the job so far?**

I'm having a ball; I haven't regretted for one second the decision I made in coming here. But I've often wondered what the people here at JPL think of me—at the end of the day, that's what really matters.





*Classified ads will be available the day before Universe is published, at*

**http://dailyplanet**

*JPL's online news source*

View this and previous issues of Universe online

**http://universe.jpl.nasa.gov**

#### Editor

Mark Whalen

#### Design & Layout

Adriane Jach, Audrey Steffan/  
Design Services

#### Chief Photographer

Bob Brown/Photo Lab

#### Advertising

Susan Braunheim-Kalogerakos

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#### Notice to Advertisers

Advertising is available for JPL and Caltech employees, contractors and retirees and their families. No more than two ads of up to 60 words each will be published for each advertiser. Items may be combined within one submission. Ads must be submitted on ad cards, available at the ERC and the Universe office, Bldg. 186-118, or via e-mail to [universe@jpl.nasa.gov](mailto: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.

## Passings

**DR. MICKEY ALPER**, 71, retired manager of the Institutional Computing and Information Services Office 170, died of cancer Oct. 11.

Alper joined JPL in 1955 as a senior engineer in the Structures and Dynamics Research Group. He later became supervisor of that group, followed by a number of increasingly responsible management positions at the Lab. Beginning in 1976, Alper managed JPL's Solar Energy Program for nine years. He was named ICIS manager in 1988, and served in that role through 1994. Alper worked on the Director's Office staff through his retirement in 1996.

Alper is survived by his wife, Marcia, four children and two grandchildren. Services were held at Mount Sinai Memorial Park in Burbank.



Dr. Mickey Alper

## Letters

Thanks to all our friends and colleagues at JPL for the support, words of encouragement and prayers during the recent passing of our father. Your thoughtfulness and kindness is very much appreciated. Thanks to ERC for the beautiful plants.

Cory Stevens and Mary Kunstler

Thanks for the wonderful send-off retirement party and the nice gift. JPL has been a great place to work for me and my family and I remain very enthusiastic about JPL's future. I will miss my many friends and am grateful for their support over the years.

Sverre Eng, Division 34

My family and I would like to thank all my friends and coworkers for their support and sympathy on the recent death of my father.

Charles Budney

I would like to thank my friends in JPL and my co-workers in the Transmitter Engineering Group for their expression of sympathy over the recent illness and passing of my father. My thanks also to the ERC for the beautiful plant sent to our home.

Yakov Vodonos

A note of thanks to all who shared in my retirement festivities . . . before, during and after the fact. You provided me many wonderful send-offs, especially the late-afternoon get-together at Mijares. It was a very special event for me and I will always remember what a great time we had. I cherish the many valued friendships I've enjoyed across the years and look forward to continuing them during my "Retiree" years. My gratitude and best wishes to you all.

Nancy Short

## Classifieds

#### For Sale

BASEBALL CARD COLLECTION, 150K or more, 300 + Nolan Ryan, posters, balls, \$1,000/obo; WOOD STOVE, antique 'artic', \$600/obo. 626/285-3066.

BEDROOM SET, girl's, in white and pink wood, 7 matching pieces, stacking bunk beds, 5-drawer chest, desk, hutch, chair and 2 mattresses, very good cond., one owner, originally from Kid's Room, whole set \$450/obo. 790-9772.

BIKES, men's Diamondback Apex mtn. bike, 20" frame, 21-speed, \$50; women's Diamondback hybrid, 18-speed, \$40; SOFA, slip-covered sofa, exc. cond., \$75. 626/794-8720, Andy or Lisa.

BLOCK SALE, several homes in the 2100 blk. of Oakdale St., Pasadena 91107 (south of Del Mar - btw. Allen & S. Madre Blvd.) will be offering artifacts from their homes and garages in various stages of arrested decay, 9 - 4 p.m., Sat. Nov. 10. 626/795-5235.

CHINA CABINET, 1950s Drexel mahogany, e-mail for photo [lelson@altavista.com](mailto:lelson@altavista.com), \$600 cash and carry. 353-9367.

COOLERS, Coleman, two, 25" x 36", gd cond., \$15/ea.; SHOVELS, 6, compact, sq.

point, \$5/ea.; FIREPLACE SCREEN/ accessories, black, \$50/all; CARPET SHAMPOOER, manual brush & handle, never used, \$5. 626/357-8210.

DAYBED w/trundle unit, white metal frame w/porcelain knobs, used 1 year, pastel plaid bedspread, 2 king shams, sheet set and 2 curtain valances, mattresses not included, \$199/all. 626/447-1888.

DESK, wood, executive style, 60 x 34, 3 drawers on right, 2 on left, locking center drawer, \$75/obo. 323/256-0445.

DINING TABLE, w/6 matching chairs, rectangular temper glass top, smoke color, chairs, contemporary style, \$55; SOFA & MATCHING CHAIR, light color fabric, no stains, well-maintained, contemporary style, bonus 2 free coffees, \$100. 626/688-7334.

DRYER, Kenmore, 7 years old, works great, \$100. 626/447-6423.

EXERCISE MACHINE, Ab Rocker, Body by Jake, \$25. 626/398-4960.

EXERCISER, Sharper Image Health Rider, exc. cond., \$175. 790-4860.

GATE, wrought iron, painted black, 1.5 yr. old, 4-ft wide, 7-ft tall, curved top, with 9 in-side vertical bars spaced 4", comes with standard lock, hinge bar and locking bar, \$80/obo. 626/791-6101.

GUITAR, Martin 00016, Auditorium model, original owner, immaculate condition, hard shell case, solid spruce top, bracing 1/4" scalloped, hand carved, back & sides are solid mahogany, fingerboard and bridge are East Indian rosewood, 25.4" scale length, \$875/firm. 626/688-7400.

HIGH CHAIR, Graco Neat Seat, adjustable high chair, \$35; BED, Sealy Posturpedic queen mattress/box spring w/bed frame, \$150; BEDDING, bed skirt, comforter, Euro shams, \$40. 626/355-1245.

PAINT, 12 gallons, SWD brand #1929, 100% Acrylic elastomeric roof coating/paint, color is white, extra heavy, industrial duty and quality, super high hide paint, excellent for all uses but formulated specifically for outdoor roof, wall, etc coverage, fresh in unopened, sealed pails, excess from current project, \$150/obo. 249-3633.

PERSONAL ORGANIZER/accessories: Handspring Visor Deluxe, used <10 hours, \$129; CAMERA, for Visor, used 1X, half price, \$55; screen protectors, plastic, to protect visor from scratches, 10 for \$9.99; back up expansion card, never used, \$29; deluxe metal stylus, multi colored, metal, stylus for visor or palm, pack of 10, \$9.99; leather case, new deluxe, for palm or visor, \$19.99; extra cradle, for visor, \$19.99. 366-6134.

PHOTOGRAPHIC DRY MOUNTING PRESS, for permanently mounting black and white and color prints onto photo mounting boards, Technal Mdl 550, handles any size prints thru 16" x 20", using dry mounting tissue, Seal Tac Iron included, works perfectly, \$135. 909/624-6970.

PLANTS, two purple Wisteria trees in 5-gal plastic pots, \$15/each/obo. 626/791-6101.

PUPPIES, half Lab/Golden Retriever mix, half Dalmatian, 4 black, 7 black and white with spots, both long and short hair, \$25/ea. 626/448-5957.

PRINTER, HP, 5L, laser printer, good cond., \$25/obo. 626/794-8720, Andy or Lisa.

REFRIGERATOR, 7 yrs. old, Sears Kenmore, 22 cu. ft., frost-free, top freezer, beige, w/ice maker, 33 W x 66 H x 31 D, \$250; SOFA BED, Krause, custom queen, w/soft colors, beige, seafoam and rose, innerspring mattress, \$300; CRIB, Ragazzi, convertible to toddler bed, natural wood with sapphire trim, mattress, matching changing table, attaches to dresser top (dresser not included), \$300. 895-1714 or [universe@siryl.com](mailto:universe@siryl.com).

REFRIGERATORS, G.E., one is beige, 17 yrs. old, side by side, \$100, other is white, 15 yrs. old, \$100; DINING ROOM TABLE, with leaf, cherry wood tops, black legs, good cond., \$150; SOFA/SLEEPER, makes into queen size bed, abstract black, blue and mauve design, good cond., \$300; BICYCLES, four, children's, \$15/ea. 626/357-8210.

TABLE, drafting, full size commercial, with 1 filing drawing, 2 small drawers and a long drawer for drawings, steel construction and has a good surface, comes with drafting arm \$50. 909/283-3910.

TENT, great for hunters and fishermen, 3-man, 9 x 9 x 7 ft., heavy duty canvas, rain and snow proof, very good cond., \$225 value, sell \$65; SPEAKER CABINET, very large, 30 x 21 x 17 inches, 4.5 cu. ft., finished blond wood, with 12-inch JB Lansing speaker, \$40. 626/793-1895.

VACUUM CLEANER, Prolux/Electrolux, heavy duty; w/long, heavy-gage cord and bags, \$100. 626/398-4960.

WASHING MACHINE, Magic Chef brand, white, 20-lb. capacity, 3 wash speeds, 8 wash cycles, perfect cond., \$80. 626/688-7334.

WEDDING GOWN, Mori Lee designer, scalloped neckline, short capped sleeve, satin bodice overlaid w/lace & re-embroidered appliques, trimmed with sequins, pearls, deep V-back meets satin bow at waist, no train, purch. late 2000, worn once, clean, sz. 12, fits 5'8", picture at <http://www.morileeinc.com/catalog/C2001S5pix1.html>, \$199/obo. 241-3779.

#### Vehicles/Accessories

'01 CHEVROLET Suburban LS, 9K mi., full power, leather, moonroof, OnStar, MSRP \$40K, T.O.P. of \$649 / 65 mo. 626/398-8679, eves.

'90 CHEVROLET Lumina minivan, 8 passenger, red w/gray interior, interior in great shape, good running cond., tinted windows, \$2,500/obo. 626/794-4921.

'98 DODGE Stratus, 58K mi., new tires, vg cond., clean, am/fm, cassette, auto, a/c, \$10,000. 626/303-5174, Joe.

'00 FORD Explorer XLT, white w/gray leather interior, V6, automatic, new tires (2K mi.),

20K mi., all power, running boards, tow package, luggage rack, 6-disc changer, AM/FM/ cass./CD in-dash, moon roof, reverse sensing system, power front buckets, 5 yr./60K warranty, \$25K. 562/938-8983.

'00 FORD Mustang GT convertible, silver with black leather interior, loaded, 17-inch wheels, V8, 55,000 mi., mostly freeway, exc. cond., \$20,000/obo. 429-9026.

'95 FORD Windstar LX, loaded including quad captain's chairs and rear air, 78,000 mi., runs great, \$9,800. 626/447-6423.

'92 GMC Suburban 1500, 4 w/d, tow package, a/c, am/fm/cassette, CD player, phone, new tires, well maintained, body/interior in good cond., \$9,900/obo. 626/799-3587.

'96 HOLIDAY Rambler Endeavor LE RV, gas model, Ford chassis, 460 c.i., 34' 6" long, leather driver/passenger seats, rearview TV, dual ducted roof a/c, cultured marble counter tops, 19" color TV LR & 13" color TV BR, 13' slide-out dining room/living room, 8 cu. ft. refrigerator, 2-way gas/electric, 1 cu ft microwave, VCR switch box for front/rear TV, 7.0 KW Onan generator, 15,000 miles, 4SRL637, \$56,500. 626/797-9103.

'97 HONDA Accord EX coupe, 2 dr., automatic, 4-cyl, 2.2. liter Vtec, 73,200 miles, dk. grn., tan interior, a/c, ps, pw, pdl, tilt whl, cruise control, am/fm, cd, dual air bags, ABS (4-wheel), power seat, sliding sun roof, alloy wheels, fun car, exc. cond., \$11,895/obo. 909/305-1111, Victoria.

'97 JETSKI, Tigershark package, 2 & 3 seater, Ziemann trailer with storage box, all accessories, low hours, garage stored, purch. new in 1999, [davis26@attglobal.net](mailto:davis26@attglobal.net) for photos, \$8,195/obo. 909/340-0736.

'97 NISSAN Altima, black cherry, 49K mi., good cond., regular oil and maintenance, orig. owner, AM/FM cassette, air, good tires, tilt wheel, cruise control, pwr. windows, \$7,500/obo. 626/359-0076, Evora.

'91 NISSAN Maxima, 124,000 mi., orig. owner, never in an accident, great mechanical condition, new battery, very reliable transportation, \$3,700/obo. 310/474-0619.

'89 NISSAN King Cab, power windows/locks/ mirrors, air, 133K freeway mi., alloy wheels, \$3,400. 843-5984.

'93 PONTIAC TransAm, 5.7 L, V8, LT1, 6-spd. manual, burgundy, full power, cruise, a/c, am/fm cass., 103K mi., exc. cond., \$6,500/obo. 395-4131 or 626/927-3323, Elsa/Austyn.

'97 TOYOTA Avalon XLS, maroon, w/tan leather interior, 4 dr., automatic, loaded, power windows, doors, moonroof, etc., exc. cond., \$19,990/obo. 985-2510.

'92 TOYOTA Corolla, good cond., well-maintained, 4-speed, am/fm radio, a/c, 110K miles, \$3,200. 562/402-4870.

'91 TOYOTA Camry Wagon Deluxe, V6, exc. cond. in and out, auto, a/c, orig. owner, \$4,700/obo. 548-5656.

'87 TOYOTA Corolla FX, hatchback, 106,000, new engine & transmission, new upholstery, very good cond., Hertz 1st owner, I'm the 2nd, complete records available, \$2,000. 626/793-2246 or [lord\\_91106@yahoo.com](mailto:lord_91106@yahoo.com).

'87 TOYOTA Corolla, 2-door sedan, a/c, sunroof, power steering, tilt wheel, cruise, w/four brand new Michelin tires, single owner, perfect running condition, \$1,500/obo. 626/794-4921.

'00 VW Jetta, like new, must sell, silver, 5 speed, power everything, keyless entry with alarm, cruise control, moon roof, premium sound-8 speakers, dual air bags, new ABS brakes, new tires, \$16,500. 661/273-4074, Joy or Steve.

'86 VOLVO 240 DL wagon, gold, 2.4L engine, new auto. trans., Aircro, AM/FM stereo, power lock, new electrical wiring, new tires, recent tune-up, well maint., reliable for family and outdoors, \$2,500/obo. 626/796-0639.

#### Wanted

ANTIQUe LINENS, white on white, hand embroidered, preferably monogrammed (any monogram), must be in exc. cond. 980-1638.

BABYSITTER, part time, for a 3-year-old boy in Altadena, one day a week, mother with child OK. 626/791-0585, Ulvi or Ayse, eves.

CHILD CARE, after school, homework help for 3rd and 4th grader, plus light housekeeping; in La Crescenta; some local driving also needed. 249-1583 Terri.

FALLEN TREES, for firewood, La Crescenta, La Canada, Tujunga. 353-9367.

HOST FAMILIES for Caltech international students for Thanksgiving Day. 626/395-6330, Tara Tram or [taratram@caltech.edu](mailto:taratram@caltech.edu).

LAKE ARROWHEAD HOUSE or condo, 3 bd., to rent from Aug. 3-10, 2002. 626/405-0220.

SHOPPERS, Elks Ladies will sponsor "Shop Till You Drop", Nov. 28, 5:30-8 p.m., Arcadia Elks Lodge, 27 W. Huntington Dr., free admission, latest winter / Christmas fashions from Nordstrom's, Macy's, Robinson's-May, Bloom-ingdale's; 50-70% off store prices, sizes 4-24; new girls' dresses, accessories; proceeds donated to disabled children in CA and Hawaii. 626/447-2025.

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

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

#### Free

KITTEN, black and white, wandered into our yard and never left, spayed female, all shots, healthy, no fleas, ~6 mo. old. 626/287-9433.

KITTENS, black tuxedo silver striped tabby to good home, healthy, friendly, and disease-free, pictures at [seal\\_68@yahoo.com](mailto:seal_68@yahoo.com). 249-8611, Jerry or Carole.

SINKS, blue bathroom or small kitchen. 626/794-0081, Bonnie.

WASHER/DRYER, Maytag, both older models, dryer works great, washer tub is unbalanced

and we will probably send to trash soon, take one or both. 790-3854.

#### For Rent

ALTADENA house, 1 mile from JPL, 2 bd., beautiful hardwood floors, wood-burning fireplace, French doors, remodeled kitchen and bathroom, dishwasher, a/c, washer/dryer negotiable, detached 2-car garage, gated back yard with patio, \$1,400. 626/791-7081.

ALTADENA, room in Rubio Canyon area, private residence, kitchen & laundry OK, no smoking, no pets, \$400. 626/797-8082.

ALTADENA, full-furn. rm., full house privileges including washer and dryer, separate phone line, but all other util. included, female preferred, \$400. 626/798-2112.

GLENDALe, studio apt. attached to home, 1 ba., separate kitchen, nice safe neighborhood, walking distance from Galleria, 8 mi. from JPL, no pets, \$585 plus electric and gas, water included. 323/256-0535.

LA CRESCENTA, 1-bd. guesthouse, priv. entr. & parking, patio/garden, fridge, laundry, cent. a/c, full bath, quiet safe neighborhood, no smoking/pets, single person only, basic cable/utills. included, credit check, \$695. 957-2173.

MONROVIA, 1-bd. guest house plus large bonus building with hookups; very private, clean and quiet; water, trash and gardener included; avail. Nov. 15; \$750. 626/357-6955.

MONTROSE, large 2 bd., 2 full ba., townhome, 2-car garage, near JPL, 2735 Piedmont Ave, \$1,200. 800/205-5009, x222.

PASADENA, 5 minutes from Caltech, 1 bd. with private ba., available in new 2 bd., 2.5 ba., duplex townhome, garage, patio, new carpet, fireplace, \$650. 626/796-8709.

SOUTH PASADENA, unfurn. bedroom in 2-bd. apt., share ba. w/professional, female roommate; rest of place is furnished, cat, quiet and convenient location, 10 min. to JPL, no smoking, no deposit, \$525, utilities included. 626/379-0967, Naz.

#### Real Estate

ALTADENA, extremely charming, Tudor-style house, 3 bd., 1.75 ba., beautiful h/w floors, 1,272 sq. ft., detached 1-car gar., 5,200 sq. ft. lot., built 1927, vg shape, bolted, 4.5 mi. to JPL, pics at [www.ktb.net/~alexmhouse.html](http://www.ktb.net/~alexmhouse.html), \$265K. 626/794-9874.

EAGLE ROCK, historic ridgetop home, incredible views, 7 mi. to JPL, 1 bd., den can be extra bd., 1.75 ba., secluded park-like setting on 16,200 sq. ft. double lot, 1,100 sq. ft + 400 sq. ft. detached studio w/balcony, + 400 sq. ft. basement, 2-car gar., 4 patios, oak floors, cent. a/c, rock t/p, \$357,000. 323/550-8701.

LANCASTER home, 4 bd., 2.5 ba., 1,700 sq. ft., 3-car garage, new carpet, tiled kitchen & baths, fully landscaped w/auto sprinklers, 9,000 sq. ft. lot, RV-access potential, wood moldings and blinds, ceiling fans, safe and quiet neighborhood, JPL vanpool area, \$136,500. 661/940-5890.

PARK CITY, Utah timeshare, 1 bd., 1 ba., one floating week/year, 2001 not used yet, exchange at other resorts (RCI): pool, exercise facilities, sauna, fireplace, great skiing; orig. price \$8,000, sell \$3,000. 790-7934, eves.

PASADENA, executive condo next to Caltech, totally remodeled 2 bd., +1.75 ba., 1,200 sq. ft., newly refinished hardwood floors in dining room, newer appliances, carpet & paint, large balcony, just redone, overlooking beautiful trees, top floor unit in park-like setting, walk to Caltech & S. Lake Ave, nice pool and spa, \$259K. 626/585-9048.

#### 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, excellent view. 248-8853.

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

MAMMOTH, Chamonix condo, at lifts 7, 8, 16, 17, walk to Canyon Lodge; 2 bd., 2 full ba., sleeps 6, fully equipped edc. kitchen, w/microwave & extras, t/p and wood, color TV, cable FM stereo, newly redecorated and refurbished, VCR, o/d Jacuzzi's; sauna, game, rec. & Indry rms.; conv. to shops, lifts, special events; daily/weekly rates, special midweek rates. 249-8524.

MAMMOTH, Courchevel, fully equipped unit 2 bd., 2 ba., sleeps 6, short walk to Canyon Lodge and ski lifts, available for Thanksgiving weekend. 661/255-7958.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, sleeps 6-8, fully equipped kitchen incl. microwave, D/W, pool, priv. lanai, slps. 4, 4/15-12/14 \$105/nite/2, 12/15-4/14 \$120/nite/2, \$15/nite/add'l person. 949/348-8047.

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, in beautiful setting, located at beachside, with barbecue, pool, spa, game room, and great ocean view, easy walk to pier and restaurants, sleeps 6, weekly or monthly. 909/981-7492, Darlene or [dhaughe@yahoo.com](mailto:dhaughe@yahoo.com).

PALM DESERT, exquisite, 2 bd., 2 ba. villa, approx. 1,500 sq. ft, for vacation or long term, newly remodeled, with sky light, patio & 2-car garage, conveniently located across from the Living Desert, great private, secure resort, with tennis courts, pool, spas and clubhouse facilities. 909/620-1364.



# Cassini to search for gravity waves

By Guy Webster

The Cassini spacecraft, below, will soon begin an experiment to measure gravity waves, which may give scientists another window into the universe. At right is one of two advanced water vapor radiometers at the Deep Space Network facility in Goldstone that will support the experiment.



KSC-97PC-1273



BARELY PERCEPTIBLE FLUCTUATIONS *in the speed of a distant JPL spacecraft coasting away from Earth could provide science’s first direct detection of gravitational waves, a basic feature of how the universe behaves.*

A 40-day search beginning Nov. 26 will use the Cassini spacecraft and specially upgraded ground facilities of the Deep Space Network. “We’ve tried this before with other spacecraft, but this time we have new instrumentation on the spacecraft and on the ground that gives us 10 times the sensitivity,” said JPL astronomer Dr. John Armstrong. “We’re able to measure the relative velocity between Earth and Cassini with exquisite accuracy.”

Cassini’s speed relative to Earth will vary during the 40 days, but will typically be about what it would take to zip from New York to Chicago in five minutes. In contrast, this experiment aims to measure any speeding up or slowing down by about what it would take to travel the thickness of a nickel in an hour.

Gravitational waves are ripples in the fabric of space and time that are set off by accelerations of massive bodies, such as black holes or supernovas. Albert Einstein theorized they exist, and indirect evidence confirmed his prediction in the 1970s.

“Gravitational waves are at the frontier of astrophysics. There’s no question they exist, but they have not yet been detected directly,” said Armstrong, leader of an international team that has been preparing for years to do this search.

“Gravity waves can give us another window into the universe, the way Galileo’s telescope did in the 17th century and radio telescopes did in

the 1940s,” said JPL’s Randy Herrera, lead operations engineer. The ability to detect gravitational waves could lead to using them as a way to study black holes and other massive phenomena, he added.

Cassini is in a quiet cruise phase of its mission, 11 months past Jupiter but still more than 30 months from its destination at Saturn. The researchers will use radio transmissions between Cassini and Earth to search for gravitational waves measurably warping space between the two. The transmissions reveal velocity changes by the Doppler effect, the same phenomenon that raises the pitch of an approaching train’s whistle or lengthens the light waves from a receding galaxy. If gravitational waves within a particular range of long wavelengths are passing through our solar system, they will alternately stretch and compact space in a way that would rhythmically affect the Earth-to-Cassini distance.

Italian scientists Dr. Bruno Bertotti of the University of Pavia and Dr. Luciano Iess of the University of Rome are co-leaders of the experiment. Italy’s national space agency, Agenzia Spaziale Italiana, provided crucial equipment aboard Cassini enabling the gravitational-wave experiment to use higher-frequency radio transmissions than have been used in earlier gravitational-wave searches with JPL’s Galileo, Mars Observer, Ulysses and Mars Global Surveyor spacecraft. The higher frequency suppresses noise from the solar wind, allowing more precise measurements of velocity changes.

JPL engineers have carefully instrumented a large dish antenna at the Deep Space Network’s Goldstone complex near Barstow, Calif., to send and receive the higher frequencies with unprecedented Doppler sensitivity. The upgrade includes refined pointing capability needed to exploit the higher frequencies, said Sami Asmar, supervisor of JPL’s Radio Science Group. Other new equipment at Goldstone will allow researchers to correct for the atmosphere’s distortion of radio transmissions and thus improve the search’s performance.

The experiment will use links at lower radio frequencies between Cassini and Deep Space Network antennas near Madrid, Spain, and Canberra, Australia. This will enable around-the-clock observations. Taking data with independent equipment at three sites will help discriminate subtle instrumental effects from signals that might be gravitational waves.

The scientific importance of detecting gravitational waves has also prompted ground-based projects, most notably the highly sensitive Laser Interferometer Gravitational Wave Observatory, coordinated by Caltech and the Massachusetts Institute of Technology. The two approaches complement each other because the Cassini experiment is sensitive to million-fold longer wavelengths of gravitational waves than the ground-based laser interferometers are, Armstrong said.

The Cassini experiment is timed so that Earth is on a line between the Sun and the spacecraft, minimizing noises on the radio link. Measurements taken during the 40 days will take several months to analyze. The experiment will be repeated twice more in the next two years when the spacecraft’s position will make the measurements sensitive to gravitational waves from different directions in the sky.

Information about the Cassini-Huygens mission is available online at <http://www.jpl.nasa.gov/cassini>.

## Goldin’s successor nominated

JPL Director Dr. Charles Elachi informed Laboratory staff Thursday of NASA’s announcement that President George W. Bush intends to nominate Office of Management and Budget Deputy Director Sean O’Keefe to be the agency’s next administrator.

O’Keefe previously served as professor of Business and Government Policy at Syracuse University. In the early 1990s, he served as



Sean O’Keefe

Secretary of the Navy.

Following this announcement, retiring Administrator Daniel Goldin issued the following statement.

“I would like to offer my congratulations to Sean as he begins the nomination process to become NASA’s next Administrator. I look forward to assisting in the transition of my leadership of America’s space program to Sean.

“Nearly 10 years ago, I accepted a job that was the fulfillment of a lifelong dream. I’m sure that Sean must feel the same excitement and anticipation I first felt when I was nominated as Administrator.

“I feel blessed to have had the unique opportunity to serve the people of this nation in an area so tied to the hopes and dreams of all

Americans. I hope that Sean will feel equally blessed when he assumes his new job. The President has nominated a man of intelligence, energy and deep integrity. I wish Sean well.

“The President intends to nominate Sean to what I feel is the best job in the world, leading a team made up of the best people I’ve had the privilege to know. There is no more dedicated group of people serving any agency in the federal government. I am sure NASA’s creative and diverse workforce will give Sean the same outstanding support it’s given me these many years.”

President Bush’s statement, as well as more information on O’Keefe, is available online at <http://www.nasa.gov>.



# News Briefs



Tom Frascchetti

## Genesis begins science mission

JPL's Genesis spacecraft has successfully entered into orbit around the balanced-gravity point Lagrange 1, where it will collect solar wind particles.

On Nov. 16, engineers sent a final command to the spacecraft to begin operating its hydrazine thrusters, putting the spacecraft into its final orbit to begin the particle-gathering phase of the mission. The orbit is at a point where the gravity of Earth and the Sun are balanced.

"The mission operations team did a great job, the orbit insertion went off exactly as planned, and we're in our 30-month science collection orbit," said Project Manager CHET SASAKI. "The spacecraft is in perfect health and we're ready to move into the next phase of its mission."

At the end of this month, Genesis will open its collector arrays and begin to monitor and collect the solar wind ions flowing from the outer layer of the Sun. The samples of solar wind returned by Genesis will help scientists understand how the solar system evolved.

In September 2004, Genesis will return to Earth and release a capsule containing the samples. That capsule will be caught in mid-air by a helicopter.

## Frascchetti is new ESD deputy

THOMAS FRASCCHETTI has been appointed deputy director for the Engineering and Science Directorate.

Frascchetti joined JPL in 1983 as deputy task manager for the Airborne Surveillance Sensor Evaluation Testbed. In 1985, he became the supervisor of Division 38's Optics and Integration Group. He was reassigned to the Microwave Observational Systems Section in 1986 and managed the section from 1989-92. Later that year, he became deputy manager for Division 38. Frascchetti then served as division manager from 1995-98 before assuming the role as project manager for the Space Interferometry Mission.

He earned a bachelor's degree in electrical engineering from Cal Poly Pomona and a master's from Cal State Los Angeles.

## 'Tumbleweed' rover receives honors

The JPL/USC team that developed the "Tumbleweed" inflatable rover has received a "Best of What's New" Award from Popular Science magazine.

The award, in the Aviation & Space category, is profiled in the December 2001 issue of the magazine.

The rover is a large, beachball-like device that holds a central payload by means of a series of tension cords. JPL

is presently conducting both analytical and experimental investigations of the capabilities of Tumbleweed rovers, with emphasis on Martian applications. A quarter-scale model is now being tested for ability to climb over rocks and to determine its speed as a function of wind velocity and inflation pressure. Its ability to climb hills is also being evaluated.

For more on the rover, visit [http://www.jpl.nasa.gov/adv\\_tech/rovers/summary.htm](http://www.jpl.nasa.gov/adv_tech/rovers/summary.htm).

## Space Place site now en Espa ol

NASA's popular educational Web site, Space Place, has announced a new Spanish-language version for children and their families.

The Web site at <http://spaceplace.jpl.nasa.gov> and its new Spanish companion at <http://spaceplace.jpl.nasa.gov/espanol> serve children 8 to 13 years of age. The site contains approximately 40 activities, including games and "amazing facts" about space, Earth and NASA.

The 2000 census data shows that Spanish is the primary language for more than 27 million people living in the U.S. Of those, nearly 13 million feel they do not speak English very well.

"This Web site is dedicated to reaching that audience," said DR. JEFFREY ROSENDHAL, education and outreach director of NASA's Office of Space Science. "NASA is committed to explaining the results of its programs to the entire American public in all its diversity."

The Space Place site launched in early 1998 and continues to add new activities every month. Its educational value has been recognized by the National Science Teachers Association, the International Technology Education Association, Griffith Observatory in Los Angeles, the Los Angeles Times, USA Today and several children's educational Web sites.

## Section 514 hosts workshop

Section 514 will host the Microelectronics Reliability and Qualification Workshop Dec. 11 and 12 at the Hilton Hotel in Pasadena. The purpose of the workshop is to provide a forum for open discussion in all areas of microelectronics reliability and qualification for high reliability and commercial applications.

The format will consist of eight main technical sessions. Two keynote speakers each day will discuss latest results or work in progress in all areas of microelectronics device reliability and qualification methodologies.

For registration and schedules, log on to <http://parts.jpl.nasa.gov>.

# 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.

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

Senior Caregivers Support Group—Meets the first Thursday of the month at noon. For location, call the Employee Assistance Program at ext. 4-3680.

## Wednesday, November 21

Caltech Ballroom Dance Club—The third installment of a five-week series of amateur-taught waltz classes will be held from 7:30 to 9 p.m. in Winnett Lounge, followed by a half-hour practice session. Cost: \$1 per lesson. Contact Megan Knight at [knight@its.caltech.edu](mailto:knight@its.caltech.edu) or visit <http://www.its.caltech.edu/~ballroom>.

## Monday, November 26

Caltech Ballroom Dance Club—The fourth in a five-week series of samba classes will be held from 7:30 to 9 p.m. in Winnett Lounge, followed by a half-hour practice session. Cost: \$8 per lesson. Contact Megan Knight at [knight@its.caltech.edu](mailto:knight@its.caltech.edu) or visit <http://www.its.caltech.edu/~ballroom>.

Music of Beethoven and Prokofiev—Deborah Buck, violin, and Robert Theis, piano, will perform a free concert at 8 p.m. in Caltech's Dabney Lounge. For information, call (626) 395-3609.

## Tuesday, November 27

"BEAM: A Pioneering Tool for Spacecraft Health Maintenance"—Ryan Mackey of Section 367 will discuss Beacon-based Exception Analysis for Multimissions, an ongoing JPL project designed to provide fault-detection capability to a broad variety of space hardware, from the Deep Space Network to self-directing spacecraft. He will explain how this system is intended to reduce operator workload and downlink requirements, enhance spacecraft safety and science data return, and simplify construction of fault monitors. Held at noon in the Building 167 conference room.

## Wednesday, November 28

Caltech Ballroom Dance Club—The fourth installment of a five-week series of amateur-taught waltz classes will be held from 7:30 to 9 p.m. in Winnett Lounge, followed by a half-hour practice session. Cost: \$1 per lesson. Contact Megan Knight at [knight@its.caltech.edu](mailto:knight@its.caltech.edu) or visit <http://www.its.caltech.edu/~ballroom>.

JPL Toastmasters Club—Meeting at 5 p.m. Guests welcome. Call Joy Hodges at ext. 4-7041 for location.

## Thursday, November 29

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

JPL Stories—Bill O'Neil, Galileo Science and Mission Design Manager, will present "From Pasadena (uh, La Canada-Flintridge) to Jupiter Against All Odds: A Brief History of the Trajectory of Galileo's Launch Date Moving Through Virtually the Entire Decade of the 1980s" from 4 to 5 p.m. in the Library, Building 111-104. For the flyer, log on to <http://beacon.jpl.nasa.gov/WhatsNew/Stories/O'Neil.pdf>. For

questions about the JPL Stories series or participation information, call Teresa Bailey at ext. 4-9233.

Von K rman Lecture Series—Dr. Charles Beichman, chief scientist of the Origins Program, will present "The Hunt for Earth-like Planets" at 7 p.m. in von K rman Auditorium. Open to the public. For more information, see <http://www.jpl.nasa.gov/events/lectures/nov01.html>.

## Friday, November 30

Von K rman Lecture Series—Dr. Charles Beichman, chief scientist of the Origins Program, will present "The Hunt for Earth-like Planets" at 7 p.m. in the Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.

## Saturday, December 1

Shirley Jones—A medley of holiday and musical favorites will be presented at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$29, \$25 and \$21. For information, call (626) 395-4652.

## Sunday, December 2

Caltech-Occidental Symphony Orchestra—The program is to be announced for this 3:30 p.m. concert in Caltech's Ramo Auditorium. Admission is free. For information, call (626) 395-4652.

The Valencia Trio—Flutist Janice Tipton, oboist Allan Vogel and guitarist Jack Sanders will appear at 3:30 p.m. in Caltech's Dabney Lounge. Admission is free. Call (626) 395-4652.

## Monday, December 3

Caltech Ballroom Dance Club—The final class in a five-week series of samba lessons will be held from 7:30 to 9 p.m. in Winnett Lounge, followed by a half-hour practice session. Cost: \$8. Contact Megan Knight at [knight@its.caltech.edu](mailto:knight@its.caltech.edu) or visit <http://www.its.caltech.edu/~ballroom>.

## Tuesday, December 4

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

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

## Wednesday, December 5

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

Caltech Ballroom Dance Club—The final class in a five-week series of amateur-taught waltz classes will be held from 7:30 to 9 p.m. in Winnett Lounge, followed by a half-hour practice session. Cost: \$1 per lesson. Contact Megan Knight at [knight@its.caltech.edu](mailto:knight@its.caltech.edu) or visit <http://www.its.caltech.edu/~ballroom>.

## Thursday, December 6

Caltech Engineering Design Contest—Devices designed and built by teams of undergraduate students will compete at 2 p.m. in Beckman Auditorium. For more information, visit <http://www.design.caltech.edu/courses/ME72>.

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

## Fri., Dec. 7-Sat., Dec. 8

Holiday Concert—The Caltech's Men's and Women's Glee Clubs will perform music of the holiday season at 8 p.m. in Dabney Lounge. Admission is free. For information, call (626) 395-4652.

## Monday, December 10

Tax Deferred Annuity Open House—Representatives from TIAA/CREF and Fidelity will be available from 9 a.m. to 3 p.m. in the 167 cafeteria to answer questions.

# With JPLers' help, robots battle

More mentors signing on to help high school competition

By Stephenie Lievense



Photo by Bob Brown / JPL Photolab

JPLers look on as students compete in a Nov. 7 robotics scrimmage on the mall.

The JPL mall was transformed into a robotics competition playing field Nov. 4, as dozens of JPLers got caught up in the excitement and those who mentored these student-teams were caught up with pride.

The competition pitted students in the 2001 Southern California For Inspiration and Recognition of Science and Technology (FIRST) Southern California regional. Last year, 33 JPL employees served as mentors to competing schools, and the need for mentors in 2002 is even greater.

To date, more than 60 teams have signed up to compete in the event. All mentors who helped last year have committed to be involved again, and 19 more JPLers signed up at the scrimmage to work with local teams to conceive, develop and build a functioning robot that can achieve specific tasks. In the spring the teams will compete against other regional schools that will lead to spots in the national finals.

Chuck Bergh, a member of the JPL technical staff who mentored the Archer School for Girls, found that mentoring is a rewarding and positive experience. "I make time for this because I know I'm getting back so much more than I'm giving," he said. Added Ayanna Howard, who mentored the King Drew Magnet team, "I was able to watch kids get excited about engineering to the extent that one of our senior team members decided not to go to a community college, but to go to a University of California campus, and major in mechanical engineering. I feel like I had something to do with that."

If you're interested in volunteering, e-mail Joe Bishop, call him at ext. 4-9539 or attend an information meeting Nov. 30 at 10 a.m. in von K rman Auditorium. You can also sign up online at <http://first-robotics>.



1981



By Enrico Piazza and Annie Richardson

**B**irth of a Geological Tool  
Researchers in 1981 gained the first indication of ancient river channels beneath the sands of the Sahara Desert without the use of picks or shovels. Amazingly, nobody even had to walk on the sand of the hot African desert. Instead, the channels were found by researchers analyzing data from a radar instrument on the then-new technological wonder, the Space Shuttle Columbia.

Launched Nov. 12, 1981, the Shuttle Imaging Radar-A flew as an idea and an assemblage of spare parts from the 1978 SeaSat Synthetic Aperture Radar (SeaSat SAR), the first ever Earth-orbiting satellite designed for remote sensing of Earth's ocean.

"It was just a fluke," recalls JPL Director Dr. Charles Elachi, who was SIR-A principal investigator.

The radar onboard the shuttle was comprised of a single-frequency, single-polarization antenna capable of acquiring imagery at only one angle. Yet, the results were proof that certain radar frequencies could actually take images from as deep as 3 meters (9 feet) below the sand.

Also onboard the same payload as SIR-A was the JPL-developed Shuttle Multi-Spectral Infrared Reflective Radiometer, which detected hydrothermally altered rocks from space. The success of this instrument proved a boon to the field of imaging spectroscopy, leading to the development of such instruments as the Near-Infrared Mapping spectrometer on Galileo, the Visible and Infrared Mapping Spectrometer on Cassini and the Airborne Visible InfraRed Imaging Spectrometer.

#### Building a Better Radar

The success of the SIR-A mission paved the way for a follow on, SIR-B. In designing it, scientists tried to improve the quality of the images by building an instrument capable of collecting data at more than one angle. Scientists were aware of a relationship between the intensity of the image and the incidence angle of the radar at the surface of Earth.

Comparing data collected by SIR-A and SeaSat SAR, it was clear that not all terrains were easily mapped with just one angle. To address the problem, the SIR-B antenna was designed to be mechanically tilted. SIR-B launched Oct. 5, 1984, aboard the Space Shuttle Challenger for an eight-day mission. An international team of investigators led by Elachi conducted experiments in geology, oceanography, calibration techniques and other scientific areas.

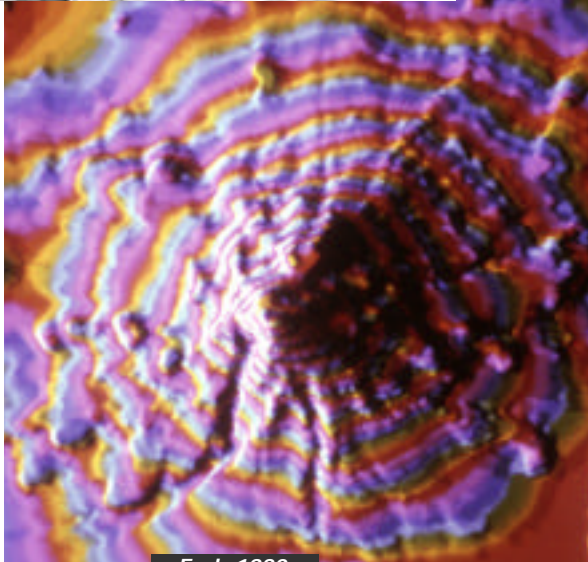
The antenna design allowed images to be acquired at several different angles. Multiangle images could be used to generate perspective views such as these of Mt. Shasta in California.

Because of technical issues involving communication malfunctions, NASA granted another go to the team. However, after the 1986 Challenger disaster, a planned re-flight of SIR-B was aborted and the entire shuttle program placed on hold.

#### Back on the Space Shuttle

By the time the shuttle program resumed operations in 1988, JPL had developed a third set of instruments in the Shuttle Imaging Radar series. A cooperative project of NASA, the German Space Agency and the Italian Space Agency, SIR-C/X-SAR was the third radar to be flown on a space shuttle.

This radar had an impressive list of characteristics. For the first time, the synthetic aperture radar on board was fully polarimetric—that is, capable of collecting information at any polarization, vertical or horizontal. In addition, the antenna was electronically steerable and operated at three frequencies.



Early 1980s

NASA rewarded the team with two flights in 1994, one in April and one in October. This allowed investigation into the radar's response to seasonal changes.

The multi-parameter images were combined and enhanced to produce some of the most spectacular radar images ever seen.

#### Ultimate Mapping Machine

But JPL scientists and engineers were not quite done in their search for the ultimate mapping machine. Since radar's ability to image day or night and through cloud covers had been well proven, to make an even better mapping tool they build the longest rigid structure ever to fly in space: a 60-meter (200-foot) boom. In February 2000, the Shuttle Radar Topography Mission circled Earth for 10 days mapping 80 percent of the world's land area. The resulting high-resolution, 3-dimensional topographic map will further our understanding of our planet and has a host of Earth science applications.

"From a geological point of view, the ability to compare the 3-dimensional shapes of mountain ranges throughout the world will lead to a quantum leap in our understanding of how mountains grow and are eroded," said Dr. Tom Farr, SRTM deputy project scientist. "There are several active San Andreas-size fault zones throughout the world that have never been mapped and we know very little about."

The greatest benefits to be gained from SRTM data lie in the facts that, for the first time, the same instrument has mapped the whole planet, and in a short period of time—thus increasing the accuracy of the results.

"SRTM data will be a base map for all sorts of applications, not the least of which will be monitoring the earth's crust for motions related to earthquake and volcanic activity and subsidence," Farr said.

For more information, visit the Shuttle Radar Topography Mission website at <http://www.jpl.nasa.gov/srtm>

or go to the imaging radar site at <http://southport.jpl.nasa.gov>



2000

1981

The SIR-A team from 20 years ago. JPL Director Dr. Charles Elachi, then the principal investigator of the mission, is shown to the left of center, holding model.

Early 1980s

Early 1980s simulated radar interferogram of Mt. Shasta, by Dr. Michael Kobrick.

2000

The San Gabriel Valley is shown in this SRTM image taken in February 2000. JPL is circled.



# Senior research scientists named

From left: Chief Scientist

Dr. Tom Prince, Larry

Matthies, Ronald Pogorzelski,

Eugene Serabyn, Colin

Williams, JPL Director

Dr. Charles Elachi.



Dr. Colin Williams (367) was honored in recognition of his research in quantum computing, quantum information theory, artificial intelligence and computer science.

The senior research scientist title was established to give special recognition and promotion of outstanding individual research achievers. Eligibility is established by

the demonstrated ability to meet the research requirements typical for appointment as full professor at a leading university, as evidenced by outside peer review, and also depends upon the individual's active participation in programs related to JPL's research and institutional goals.

DailyPlanet

Online for the JPL community

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http://dailyplanet

JPL's online news source

View this and previous issues of Universe online  
http://universe.jpl.nasa.gov

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Mark Whalen

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Adriane Jach, Audrey Steffan/  
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Susan Braunheim-Kalogerakos

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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.

Six JPL employees have been appointed Senior Research Scientists.

Dr. Yoseph Bar-Cohen (Section 354) was honored in recognition of his specialty in nondestructive evaluation for flaw characterization and materials properties determination.

Dr. Gloria Manney (3272) was appointed in recognition for her research specialty in Stratospheric Dynamics and Transport.

Dr. Larry Matthies (345) was recognized for his research in computer vision in the field of robotics.

Dr. Ronald Pogorzelski (336) was honored in recognition of his research in electromagnetics/antennas.

Dr. Eugene Serabyn (3231) was appointed in recognition of his astronomy research specialty in Astrophysics at infrared to millimeter wavelengths.

## Passings

**JAMES INGOLDSBY**, 89, retired from JPL's Procurement Division, died Aug. 21 at his Texas home.

Ingoldsby retired in 1974 after working for the Lab for nine years. He is survived by his wife, Joan.

## Letters

Thanks to all of those folks who participated in my retirement events. Especially to the Division 32 and 387 and other folks who put on swell events.

Dave Norris

I would like to thank my friends and coworkers for their support and expressions of sympathy following the recent passing of my mother. Also, thanks to the ERC for the plant sent to my home.

Darrell Davidson

## Retirees

The following JPL employees retired in November: Wayne Arens, 46 years, Section 344; Marshall Gram, 44 years, Section 352; Edith Huang, 35 years, Section 366; Francis Mathur, 31 years, Section 341; Claude Hildebrandt Jr., 30 years, Section 312; Michael Martin, 28 years, Section 389; Richard McKinney, 26 years, Section 387; Sverre Eng, 21 years, Section 340; John Genofsky, 17 years, Section 387; Belinda Wilkson, 16 years, Section 369; Larry Ruple, 13 years, Section 357.

## Classifieds

### For Sale

BABY ITEMS, like new, Graco 2-spd swing, \$40; Cosco pack-&-go playard w/tent, \$40; baby monitor with 2 receivers, \$20; plus numerous infant toys. 626/351-9117.

BED, queen-size box spring and mattress, Simmons Beautyrest, exc. cond., \$200. 626/355-3886, Rosemary and Ed.

BED FRAMES, dbl, \$20; CA King bed frame, \$35. 909/305-1512, Heather.

BIKE, 1991 Allez, large carbon fiber frame, Suntour 12-speed shifters, very light and stiff, both triathlon and standard drop bars, Look pedals, \$300. 626/794-0886, Ted.

BREAST PUMP, new Medela Pump N' Style, travelers style, attachments still in plastic, bought for \$277, sell \$145. 909/946-6723, call before 8 p.m.

CD PLAYER, virtually unused Akai model CD-A70, single CD, with 3-beam laser pick-up, random play, repeat memory, skip search, full-function remote control, \$65. 353-6369, eves.

CHINA CABINET, 1950s Drexel mahogany, lelson@altavista.com for photo, \$600 cash and carry. 353-9367

COMPUTER, 1.1 GHz, Athlon Tbird, ATX 300 case, Windows NT/98, ATI Rage Pro 32MB, TV tuner card, 3com LAN, DVD, Super disk 120MB floppy, 30GB HD, can load Windows ME/2000, very fast and new, \$700/obo. 249-6786.

COOLERS, Coleman, two, 25" x 36", good cond., \$15/ea.; SHOVELS, six, compact, square point, \$5/ea.; FIREPLACE SCREEN/ACCESSORIES, black, \$50/all; CARPET SHAM-POOER, manual brush and handle, never used, \$5; BICYCLES, four, children's, \$15/ea. 626/357-8210.

DESK, solid oak, roll top, like new, 52" long x 46" high x 20" deep, best offer. 790-0297.

DESK, executive size, walnut finish, \$75; SWIVEL CHAIR, \$15; FILE CABINET, five-drawer, steel, \$60. 626/351-8198.

EXERCISE EQUIPMENT, Tunturi stationary

bike, exc. cond., \$50. 626/449-6799, after 8 p.m., Bob.

FUTON, with rosewood frame, queen size, by Ikea, \$100; TV/VCR STAND, rosewood, with glass doors, good cond., \$30. 626/351-9117.

GARDEN HOSE HOLDERS, new, black ironwork, holds up to 100-ft hose, \$60/obo; new, aluminum, holds up to 75-ft hose, \$50/obo. 626/791-6101.

LOVESEAT, quaint, camel back, pastel yellow with blue pinstripes, two matching pillows and armrest covers. \$50. 626/798-0329.

PERSONAL ORGANIZER, new Handspring Visor Deluxe, \$129; accessories: camera, new, \$49; expansion card, new, backup for Visor, \$29; stylus, pack of 10 extra deluxe, multi colored metal, Visor or Palm, \$9.99; case, new deluxe leather case for Palm or Visor, \$19.99; cradle, extra USB, for Visor, \$19.99; PHONE, deluxe Nokia 6100 series for AT&T network, free case, \$129; batteries, for Nokia phones, save over 1/2, \$19. 366-6134.

PLANTS, two 6-ft.-high purple Wisteria vines in 5-gal plastic pots, \$15 ea/obo; two 6-ft-high Wisteria vines in 25-gal plastic pots, \$20 ea/obo; two orange Pansies in 1-ft ceramic bowls, \$5 ea/obo; two Jasmine bushes in 5-gal plastic pots, \$10 ea/obo, two red Banana plants in 5-gal plastic pots, \$15 ea/obo. 626/791-6101.

PRINTER, Apple LaserWriter Select 310, complete with software, manual and cables, good cond., \$60. 790-5012.

REFRIGERATORS, G.E., one is beige, 17 yrs. old, side by side, \$100, other is white, 15 yrs. old, \$100; DINING ROOM TABLE, w/ leaf, cherry wood tops, black legs, gd cond., \$150; SOFA/SLEEPER, makes into queen size bed, abstract black, blue and mauve design, good cond., \$300. 626/357-8210.

SATELLITE SYSTEM, complete, big backyard dish, General Instrument 2650R, receiver, video cipher II, digital audio plus remote control and G.I. 2000 PS antenna positioner power supply, \$650/obo. 626/794-0577.

TABLE, dining, round, 36" diam., oak finish, pedestal type, matcher ladder back chairs, \$75; BAR STOOLS, set all wood with swivel seats, \$50/pair. 899-6248, leave msg.

TABLE, dining, beautiful, rectangular, wood, oval/rounded corners, w/extension leaf & 6 matching chairs, black with cherry top, seats six comfortably even without leaf, almost new, immaculate condition, bought 2 years ago for \$1,300, sell \$500. 626/683-0706.

TABLES, three, dark walnut, exc. cond., one small octagonal end table, one medium square end table and one large octagonal coffee table, \$325/obo; BENCH, oak, w/tapestry seat, \$30/obo. 248-7097.

TOOLS, Shopsmith table saw, drill press, band saw, lathe in 1 compact unit, incl. accessories and manuals, \$400. 626/852-9731.

WASHING MACHINE & DRYER, both work fine, must pickup near Allen/Walnut in Pasadena, \$40/obo each. 626/584-1933.

WEDDING GOWN, Mori Lee Designer, scalloped neckline, short capped sleeve, satin bodice overlaid with lace and embroli-dered appliqués, trimmed with sequins, pearls, deep V-back meets satin bow at waist, no train, pic: http://www. morileeinc.com/catalog/C2001S5pix1.html, purchased late 2000, worn once, clean, size 12, fits 5' 8" or smaller, \$199/obo. 241-3779.

WHEELCHAIR, power, Everest & Jennings, exc. cond., easy-to-use joystick, foot rest, removable battery for travel. 626/798-0033.

### Vehicles/Accessories

'87 ACURA Integra LS hatchback coupe, 2D, 153K miles, good cond., 5-speed manual, moon roof, a/c, cassette deck, graphic equalizer, \$1,900. 249-8735.

'95 BMW 325is, automatic, gray mtic w/blk. lthr. interior, sunroof, brd. computer, factory alarm sys. and keyless entry., 72K, 1 owner, exc. cond., \$17,800/obo. 626/584-9503.

'83 BMW 633csi, black, orig. paint, well maintained, good records, \$5,000. 626/836-3931.

'95 DODGE Grand Caravan LE, white, vg cond., orig. owner, \$5,400/obo. 626/449-5821.

'99 FORD Mustang, white, exc. cond., 40K mi., orig. owner, leather interior, CD, cruise control, 100K bumper to bumper, like new, \$13K. 909/971-9405, eve.

'93 FORD Escort LX Wagon, white, V4 1.9L, 5 spd., a/c, pwr. steering, AM/FM/cassette, roof rack, 1st owner, well maint, 99.5K miles, exc. cond., \$3,500. 790-8760, Kevin.

'91 FORD Explorer XLT, 4 w/d, 4 dr., a/c, 2-year-old transmission, exc. cond., \$4,500. 952-5626.

'90 FORD F150 XLT Lariat, 4 X 4, extended cab, 85,000 miles, 5.8, V8, auto, a/c, loaded with many extras, \$6,950. 626/963-3704.

'86 FORD E150 van, 125,000 mi., queen bed, sink, icebox, closet, captain's chairs, V8, a/c, all power, trailer tow (never used), good cond.,

well maintained, orig. owner, \$3,300. 805/376-2873.

'97 HONDA Accord coupe, pearl black, auto, a/c, power, everything in perfect cond., orig.l owner, prem. Alpine sound syst. w/2 amplifiers & dual 12" JL audio sub, new 17" chrome Italian wheels, top-of-the-line alarm/ auto engine start, many other extras, super clean interior, owner holds title, orig. stock wheels and tires included, see to believe, \$14,000/obo. 714/325-0658, Steven, lv. msg.

'99 HONDA Civic EX, exc. cond., loaded, moon-roof, AM/FM CD, a/c, cruise, power windows/ door locks, keyless entry, dual air-bags, ABS, 89K mi., all fwy, maintained continuously, new transmission, runs great, great mileage, \$13,500. 661/400-4434, Wendy.

'97 HONDA Accord EX coupe, 2 dr., automatic, 4 cyl., 2.2. L vtec, 73,200 mi., drk grn, tan interior, a/c, p/s, p/w, pdl, tilt whl, cruise cont., am/fm, CD, dual airbags, ABS 4 wheel, sliding sunroof, alloy whls., very economical, good cond., \$10,895/obo. 909/305-1111, Victoria.

'91 HONDA Civic DX, 4-dr sedan, 120K mi., orig. owner, white w/blue interior, gd. cond., automatic, a/c, power-assisted steering, AM/FM stereo, \$3,500. 626/969-2134, eve.

'99 JEEP Wrangler, black, soft top, 23K mi., exc. cond., \$12,000/firm. 957-7742.

'90 NISSAN 240SX SE Fastback, red, 5 speed, flip-up/removable sunroof, power steering, tilt wheel, cruise, AM/FM stereo, single owner, all records, 100K mi., good cond., \$3,500/obo. 323/467-4742.

'84 NISSAN pickup, deluxe heavy duty long bed, lt. blue, V4, 5 speed, a/c, power steering/tilt, AM/FM/cassette, shell, bed liner, 81.7K miles, well-maintained, good cond., \$1,700. 790-8760, Kevin.

'94 SATURN, 5 sp., 140K mi., \$2,950. 957-3675.

'96 SAAB 900S, dark green with beige interior, 75M, orig. owner, exc. cond., all maint. records, 5 spd., a/c, factory stereo, alloy wheels, \$12,000/obo. 310/306-7319, Mike.

'73 PONTIAC Lemans, 30K miles on new engine, new paint, new interior, gd cond., orig. owner, exc. transportation car, \$1,000/obo. 626/966-2904, after 6 p.m., weekdays.

'91 RANGE ROVER County Limited Edition, ABS, 4 w/d, must sell, \$7,500/obo. 626/799-9347, Maria@mail.pacificnet.net.

'95 TOYOTA Previa LE S/C, ABS, dual air bags, power locks/windows/steering, a/c, CD player, seats 7, must sell, \$10,000/obo. 626/799-9347, or Maria@mail.pacficnet.net.

'93 TOYOTA Tercel, 37,000 mi., 2-dr sedan, a/c, 4 brand new Michelin tires, single owner, perfect running cond., \$6,000/obo. 626/794-4921.

'90 TOYOTA Camry, 165K mi., gd cond., 1 owner, air, auto, white, \$1,750/firm. 790-3802.

'88 TOYOTA Camry, 254K mi., 5 spd. manual, 4 dr. sedan, a/c, cruise control, am/fm, good cond., runs well, \$1,350. 626/821-1001.

'87 TOYOTA Corolla, 2-dr. sedan, a/c, sun-roof, pwr steering, tilt wheel, cruise, 4 brand new Michelin tires, single owner, perfect running cond., \$1,500/obo. 626/794-4921.

'91 VOLVO 740, blue sedan, 132,500 miles, \$4,900/obo. 957-7382, Eric.

'01 VOLKSWAGEN Jetta GL, 23K mi., auto, CD changer, a/c, exc. cond., silver/black, \$13,500. 909/599-3230.

'00 VOLKSWAGEN Jetta, like new, must sell, silver, 5 sp., pwr everything, keyless entry w/alarm, moonroof, prem.sound syst., 8 speakers, cruise cont., dual airbags, ABS brakes, black interior, new brakes & tires, \$16,500. 661/273-4074, Joy or Steve.

### Wanted

ANTIQUE LINENS, white on white, hand embroidered, preferably monogrammed (any monogram), must be in exc. cond. 980-1638.

DRAFTING TABLE with arm or parallel straight edge; will pay up to \$60. 626/797-1673, Anthon.

FALLEN TREES for firewood, La Crescenta, La Canada, Tujunga. 353-9367.

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

WINE GOBLETS, Fostoria-Navarre, Clear-Magnum Red, 7 1/2 inches tall, need two to complete set. 909/985-7058.

### Free

BED, twin metal frame & box spring, gd. cond., pick up in Agoura Hills. 597-8009.

### For Rent

ALTADENA, room in Rubio Canyon area, private residence, kitchen & laundry OK, no smoking, no pets, \$400. 626/797-8082.

ALTADENA, room, share bath and kitchen; pool; utility included; \$375 + \$100 deposit. 626/402-9775, pager.

LA CANADA/FLINTRIDGE, separate sm. rm. with bathroom, walking distance to JPL, gated separate entrance, a/c, micro-wave, fridge, partially furnished, temporary OK, very private, all util, pd, \$650. 790-1893.

LAKE VIEW TERRACE townhouse, 2 bd., 2.5 ba., enclosed 2-car garage, large complex, avail. after Jan. 1, can see with appointment, quick access to freeway, 20 min. from Lab, \$1,350. 899-6248.

MONTROSE apt., charming, 2 bd., 1 ba., a/c, garden, off-st. pkgng., Indry., trash/wtr./grdnr. pd., 10 min. JPL, walking dist. to Montrose Mall, \$925. 248-4637.

PASADENA townhouse, 290 S. Morengo Ave., near Old Town, like new, 3 bd., 2 1/2 ba., 1,700 sq. feet, 2-car attached garage, private patio, pool and spa for the complex, \$2,200. 213/680-0337, Ken.

PASADENA, spacious 2-story condo, 3 beds, 2.5 baths, prestigious community, beaut. inter., bright kitch., prof. landscape, ctrl. air & heat, close to shop., cozy LR w/FP, end unit, frml dr, hdwd. flrs., immac. cond., close to schls., \$1,750. 626/396-9024.

PASADENA apt. to share, fully furnished, 4 bd., 2 ba., .5 mi. to Caltech, laundry, parking, \$495 + util. 626/351-9641.

SIERRA MADRE, 2 bd., 1 ba., quiet, 6-unit bldg, walk to village, lower unit, \$850. 626/355-7318.

SOUTH PASADENA, studio apt, 1718 Hunt-ington Dr. betw. Marengo & Milan Sts, fully furnished, utilities paid, car space, laundry, no pets, non-smoker, \$750. 626/792-9053, Marilyn or Ray.

SPARR HIGHTS, single furn. guesthouse, man pref., 10 min. to JPL, util. paid, clean, quiet, no pets, no smoking; stove, ref., microwave: \$525. 248-0869, 8-10 a.m. or 5-8 p.m.

### Real Estate

COVINA condo, Stonebridge Community, 4900 N. Grand Ave., 2 bd., 2 full ba., walk-in closets, split level, separate dining area, fireplace, high ceilings, newer flooring & carpet, lots of windows w/treatments, patio open to lush landscape, big complex w/2 community pools/spas/waterfalls & streams, includes washer & dryer, built-in security system & microwave, \$148,000. 626/966-5892, Max Hrogland.

MAMMOTH LAKES condo unit, 1 bd. + loft, 2 ba., exc. cond, newly redecorated & return., floor-to-ceiling fireplace in lv. rm, balcony offers superb view of Mammoth Mtn., all elec. kitchen, desirable location in complex, close to Canyon Lodge, rental income potential, \$189,500. 249-8524.

### 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, excellent view. 248-8853.

HAWAII, Kona, ocean front on Keauhou Bay; house & guest house comfortably slp 6; 3 bd., 2 ba.; rustic, relaxing & beautiful; swimming, snorkeling, fishing, spectac. view; nr. restaur., 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, micro-wave, d/w, pool, priv. lanai, slps. 4, 4/15-12/14 \$105/nite/2, 12/15-4/14 \$120/nite/2, \$15/nite/add'l person. 949/348-8047.

MAMMOTH, Chamonix condo; 2 full ba., slps 6; newly refurn., fully equipped elec. kitch., w/microwave & extras, fp & wood, color TV, cable, FM stereo, VCR; o/d Jacz., game, rec. & Indry rms.; conv. to Canyon Lodge, shops, lifts, special events; daily/ weekly rates, special midweek rates. 249-8524.

MAMMOTH, Courchevel, fully equipped unit, 2 bd., 2 ba., sleeps 6, a short walk to Canyon Lodge and ski lifts. 661/255-7958.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, sleeps 6-8, fully eqpd 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.

PACIFIC GROVE hse, 3 bd., 2 ba., fp, cable tv/vcr, stereo/CD, well-eqpd kit w/microw, beaut. furn, close to golf, bches, 17 Mile Dr., Aquarium, Cannery Row, JPL discont. 626/441-3265.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 28-hole golf course 6 mi. away, priv. secure parking. 626/794-3906.