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T H E M E E A R T H

RECENT NASA AIRBORNE MEASUREMENTS AND A NEW REVIEW OF SPACE-BASED MEASUREMENTS OF THE THICKNESS OF EARTH'S POLAR ICE SHEETS CONCLUDES THEY ARE CHANGING MUCH MORE RAPIDLY THAN PREVIOUSLY BELIEVED, WITH UNKNOWN CONSEQUENCES FOR GLOBAL SEA LEVELS AND EARTH'S CLIMATE.

Rapid changes seen in Earth's polar ice sheets

By Alan Buis

Airborne measurements allow views of the frozen world on a grander scale

LARGE SECTORS OF ICE in southeast Greenland, the Amundsen Sea Embayment in West Antarctica and the Antarctic Peninsula are changing rapidly by processes not yet well understood, said researchers Dr. Eric Rignot of JPL and Dr. Robert Thomas of EG&G Services at NASA's Wallops Flight Facility, Wallops Island, Va. Their study, published last month in the journal *Science*, reviews progress in measuring changes in ice sheet thickness based upon technical advances and observations made over the past decade.

"Earth's polar ice sheets are changing over relatively short time scales, that is, decades versus thousands of years," Rignot said. Thomas added that today's more precise, widespread measurements tell us rapid changes are common. "These observations run counter to much accepted wisdom about ice sheets, which, lacking modern observational capabilities, was largely based on 'steady-state' assumptions," Thomas said.

"Remote sensing is allowing researchers to look at polar processes on continental scales and in greater detail than before," said Dr. Waleed Abdalati, Cryospheric Program manager at NASA Headquarters. "Closer examination using even broader advanced remote sensing techniques, including NASA's upcoming Ice, Cloud and Land Elevation Satellite, the

Rignot said understanding how polar ice sheets evolve is vital to society. "The Antarctic and Greenland ice sheets together hold enough ice to raise sea level by 70 meters (230 feet)," he said. "Even a small imbalance between snowfall and discharge of ice and melt water from ice sheets into the ocean could be a major contributor to the current sea level rise rate of 1.8 millimeters (0.07 inches) a year and impact ocean circulation and climate. During past periods of rapid deglaciation, ice sheet melting raised sea level orders of magnitude faster than today. This is the real threat of the ice sheets."

Rignot and Thomas' review summarizes current progress for two methods of measuring changes in ice sheet thickness: the mass budget method, which compares losses by melting and ice discharge with total net input from snow accumulation; and measuring elevation changes over time. These methods use various space remote sensing resources, such as laser and radar altimetry, the Global Positioning System and InSAR.

The review reports Greenland's ice sheet is losing 50 cubic kilometers (12 cubic miles) of mass a year due to rapid thinning near its coasts. That's enough to raise sea level 0.13 millimeters (0.005 inches) annually. "Rapid coastal thinning cannot be explained by a few warm summers and is attributed to a dynamic ice sheet response," Rignot said. "A possible contributor to the observed trend is increased lubrication from additional surface melt water reaching glacier beds through crevasses and moulins."

Rignot says the mass balance in Antarctica is much harder to calculate because the ice sheet is far larger, more remote and not well covered by existing key satellites. The researchers calculated net ice gains or losses for 33 Antarctic glaciers, including 25 of the 30 largest ice producers.

The West Antarctic ice sheet was found to be thickening in the west,

thinning rapidly in the north, and probably losing mass overall by roughly 65 cubic kilometers (roughly 15.5 cubic miles) a year, enough to raise sea level by about 0.16 millimeters (0.006 inches) a year. InSAR observations show several major glaciers that are accelerating and contributing to sea level rise. Radar altimetry shows ice shelves in the Amundsen Sea Embayment are rapidly thinning, possibly in reaction to a warmer ocean, as suggested by recent oceanographic data. Melting of ice shelf bottoms is far larger than expected here due to intrusion of warm water on the continental shelf, implying a larger interplay of ice and ocean in ice sheet evolution.

Rignot said little is known about the mass balance of Antarctic Peninsula mountain glaciers, which receive a

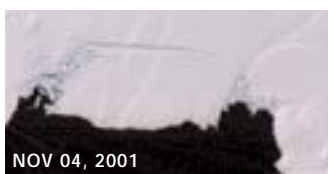
"Earth's polar ice sheets are changing over relatively short time scales, that is, decades versus thousands of years"

— Dr. Eric Rignot



quarter of Antarctica's snow accumulation. The peninsula has warmed 2 to 3 degrees Celsius (3.6 to 5.4 degrees Fahrenheit) over the past 50 years, causing rapid thinning, enhanced melting and rapid disintegration of its ice shelves. The peninsula is a unique laboratory to determine whether retreating ice shelves can induce faster ice sheet flow and raise global sea level, a hypothesis formulated decades ago but still disputed. Recent results show large glacier acceleration in response to ice shelf collapse. If ice shelves do buttress glaciers, the Antarctic ice sheet's contribution to sea level rise could be much larger in the future than previously believed.

Illustrations related to this study may be viewed at <http://www.jpl.nasa.gov/images/earth/antarctica>.



Top: The Larsen B ice shelf, a floating ice mass on the eastern side of the Antarctic.

Above: Sequence shows the break-off of a large tabular iceberg from the Pine Island Glacier in West Antarctica.

Gravity Recovery and Climate Experiment and Europe's planned Cryosat mission—combined with widespread interferometric synthetic aperture radar (InSAR) data, ice thickness surveys and ground-based measurements—will enable us to estimate ice sheet mass balance for Greenland and Antarctica even more precisely."

News Briefs



Mariner 2 team member during maneuvers.

Comets break up far and near

Some comets may break apart over and over again in the farthest reaches of the solar system, challenging a theory that comets break up only occasionally and not too far from the Sun, says JPL senior research scientist DR. ZDENEK SEKANINA.

A system of comets called "sungrazers," named for their orbit that closely brushes the Sun, reveals important clues about how these bodies break up. Most sungrazing comets are tiny—the smallest could be less than 10 meters (30 feet) across—and move in a highway-like formation of comets that pass near the Sun and disintegrate.

Sekanina reports in the Sept. 10 issue of the *Astrophysical Journal* that many sungrazer comets arrive at the Sun in clusters and on parallel paths. He emphasizes that such tiny fragments would have disintegrated if they had come so close to the Sun on an earlier trip. Therefore, the parents of these tiny sungrazers must have broken up after their previous encounter with the Sun and continued to break up far from the Sun on their journey through the solar system.

Sekanina's sungrazer studies challenge an earlier theory that the only place these comets break up is very close to the Sun, as the strong pull of its gravity cracked their loosely piled chunks of dust and ice. The gradual, continuing fragmentation gives birth to all the sungrazers, the most outstanding examples of splitting comets.

"Astronomers never before realized that there could be a fairly orderly pattern in breaking up, so that one comet cascades into large families of smaller comets, and that this process could be an important part of a comet's natural life cycle," Sekanina said.

For more information, log on to http://www.jpl.nasa.gov/releases/2002/release_2002_170.html.

Women's Club offers activities

The Caltech Women's Club is sponsoring a number of get-togethers at Tournament Park that are available to JPL staff.

Preschool Playgroup for children ages 1-4 is held Tuesdays from 10 a.m.

to noon. The group offers crafts, song and story time, free play, and exploratory learning for toddlers and preschoolers, and also offers a supportive environment for parents and caregivers to observe and interact with their child. For information, call JULIA KENNEFICK at (818) 792-7808.

Wednesdays in the Park from 10 a.m. to noon provides conversation and camaraderie for the grownups and playtime for infants thru school-age children. Meet people and share practical information about services and activities available for families. For information, call IRENE LOCHER at (818) 584-5828.

Family Potluck in the Park for new and returning families will be held Sunday, Sept. 29, from 4 to 7 p.m. The club will provide the plates, cups, utensils and drinks; bring your family and a potluck dish. A clown performs at 5 p.m., and a bounce house will be available. For information, contact LAURIE CLARK-KLAVINS at (626) 355-3874 or lcklavins@hotmail.com.

To find out more about the club, plan to attend their first Welcoming Coffee for the 2002-03 year on Friday, Sept. 27, 9 to 10:30 a.m. at Caltech's Winnett Lounge. For information, call TEMA HALPERN at (818) 952-6214.

Calling all Mariner 2 team members

The Public Services Office is trying to locate members of the Mariner 2 project for a special JPL event in December.

Mariner 2, the first spacecraft to fly by another planet, launched in August 1962 and flew by Venus on Dec. 14 of that year. The JPL event will commemorate the Venus encounter.

Mariner 2 team members are asked to call Public Services at (818) 354-0112.

Join the band

JPL staff members interested in joining the Caltech Concert Band or Caltech Jazz Band are invited to contact band director WILLIAM BING at wbing@caltech.edu. The first rehearsal is Thursday, Oct. 3, in Caltech's Beckman Auditorium.

For further information, check out the band's website at www.music.caltech.edu/band-intro.html.

Four JPL employees have been selected to participate in the fiscal year 2003 Software Architect Program.

Administered by the Center for Space Mission Information and Software Systems, the program's new participants are Leonard Charest (Section 368), John Diehl (382) and Yu-Wen Tung (368). Michael Heflin (335) is this year's alternate.

The Software Architect Program is a half-time, one-year paid internship intended to help train JPL's next generation of software architects, system engineers and managers. Participants will receive instruction in concepts, principles, and state-of-the-art methods in software architectures. On-the-job training and mentoring will take place in a variety of organizations to expose participants to software architectures and mission domains at JPL, and to foster communication and cooperation among them.

Charest is a knowledge engineer and the configuration manager for Mars Exploration Rovers' Activity Plan Generation tool (a ground-based science activity planning tool). He earned his bachelor's degree in computer science from Rensselaer Polytechnic Institute and has been at JPL for eight years.



Leonard Charest



John Diehl



Yu-Wen Tung



Michael Heflin

Diehl is the software lead for the imaging science subsystem and visual infrared mapping spectrometer (VIMS) instrument for the Cassini Ground Data System. He is also a systems engineer for the Cassini Multimission Image Processing System. He has a master's degree in mathematics from Pennsylvania State University and 12 years of experience at JPL.

Tung is the acting software chair on the Advanced Projects Design Team (Team X) of the Project Design Center. He has a doctorate in computer engineering from USC and has been with JPL for 10 years.

Heflin has a doctorate in physics from the Massachusetts Institute of Technology and is a co-patent holder of the award-winning GPS-Inferred Positioning System and Orbit Analysis Simulation Software (GPSY) software package developed at JPL. He has been with the Lab for 12 years.

Correction

An article in the Aug. 30 issue of Universe on the third quarter Service Awards indicated an incorrect date for the ceremony. Recipients attended a luncheon in their honor on Sept. 12.

Special Events Calendar

Ongoing Support Groups

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

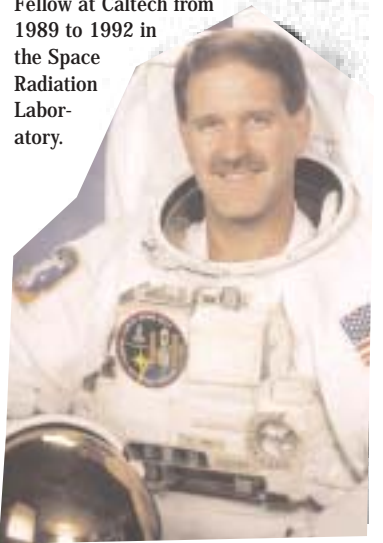
Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (The Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

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

Gay, Lesbian and Bisexual Group—Meets the first 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.

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.

"From Caltech to Low Earth Orbit: New Eyes for Hubble"—Astronaut Dr. John Grunsfeld will speak at 11:30 a.m. in von Kármán Auditorium in talk sponsored by the Caltech Management Association and the JPL Space Flight Awareness Program. Grunsfeld, the only Caltech faculty member to have flown in space, was a Senior Research Fellow at Caltech from 1989 to 1992 in the Space Radiation Laboratory.



Saturday, Sept. 21

JPL Family Day—Astronaut Dr. John Grunsfeld will appear in von Kármán Auditorium during morning hours of the event, which runs from 10 a.m. to 3 p.m. Free lunch will be served in the mall, and numerous Lab facilities will be available for touring. Tickets are required of JPL staff and their guests, and must be picked up by Sept. 13. For more information, call Nancy Kapell, ext. 4-9432.

Wednesday, September 18

JPL Fishing Club—A full-day tuna trip is planned aboard the 85-foot Eldorado out of Long Beach Sportfishing. The cost is \$110 per angler. The boat departs 9 p.m. Tuesday, Sept. 17, returning 8 p.m. Wednesday. For reservations or information, call Chris O'Connor at ext. 4-5725.

Thursday, September 19

JPL Stories—Alice Fairhurst, former career development and mentoring coordinator, will present "Careering through JPL" at 4 p.m. in the JPL Library, west end of Building 111. The JPL Stories program, sponsored by the Library, Archives, and Records Section, celebrates the Lab's unique environment and history, and provides an informal way for JPLers to share their stories with each other. For more information, call Teresa Bailey, ext. 4-9233.

Saving for Education—This TIAA/CREF workshop, held from 1 to 3 p.m. in Building 180-101, focuses on Golden State Scholarshare, the State of California's official 592 higher education savings plan. This is a great way for individuals to save for higher education with after-tax contributions that earn on a tax-free basis. Share the gift of education with a family member.

Social Security—A representative will be available for one-on-one counseling. For an appointment, call the Benefits Office at ext. 4-3760.

TIAA/CREF Enrollment Meeting—This workshop, held from noon to 1 p.m. in Building 180-101, is designed to assist employees newly eligible for the Caltech/JPL TIAA/CREF retirement plan with selection of investment options and the completion of their enrollment forms.

Thurs.-Fri., Sept. 19-20

Von Kármán Lecture Series—Senior research scientist Dr. Lute Maleki will present "A Unified View of the Universe" Thursday in von Kármán Auditorium and Friday at Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. Both lectures begin at 7 p.m. Maleki will discuss how various developments in the arts have contributed to the field of physics. For more information, see <http://www.jpl.nasa.gov/events/lectures/sep02b.html> or call Public Services at ext. 4-0112.

Friday, September 20

British Invasion—Fairport Convention, which combines rock and roll with British traditional music, and British folk music band Equation at 8 p.m. in Caltech's Ramo Auditorium. Tickets are \$18 for adults, \$10 for youth. For information, call (626) 395-4552.

Sunday, September 22

The Secret Origins of the Bible—Author Tim Callahan will speak at this Skeptics Society-sponsored event at 2 p.m. in Caltech's Baxter Lecture Hall. Donation: \$8 for members, \$5 for nonmembers. For information, call (626) 395-4552.

Wednesday, September 25

Investment Advice—A Fidelity representative will be available for one-on-one counseling in T1720-131. To schedule an appointment, call Fidelity at (800) 642-7131.

JPL Toastmasters Club—Meeting at 5 p.m. in the 167 conference room. Call Roger Carlson at ext. 4-2295 for information.

Thursday, September 26

Estate Planning Workshop—You've have worked hard for what you have, now learn how to preserve as much of your assets as possible. This Fidelity workshop from 10 a.m. to noon in Building 180-101 will cover estate planning tools, implications of beneficiary designations, and how the newest tax legislation can help protect your estate. Seating is limited. For a reservation, call Fidelity at (800) 642-7131.

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

JPL Stories—"The True Story Behind the Mars Pathfinder Success" will be presented by Rob Manning (Pathfinder flight system chief engineer), Brian Muirhead (flight system manager and project manager), and Richard Cook (mission manager), from 4 to 5 p.m. in the Library, Building 111-104. This talk was rescheduled from last month. For questions about the JPL Stories series, call Teresa Bailey at ext. 4-9233.

Friday, September 27

Investment Advice—A TIAA/CREF representative will be available for one-on-one counseling. To schedule an appointment, contact TIAA/CREF online at tiaacref.com or at (877) 209-3140, ext. 2614.

Lab proposals selected for development

Five chosen in Earth science technology

Five proposals from JPL were among those selected last month by NASA for the component technology development program in support of the Earth Science Enterprise. The Advanced Component Technology Program will provide core component and subsystem technology developments that will enable new science measurements and visionary concepts.

The Office of Earth Science awarded 14 proposals, for a total value over a three-year period of approximately \$13 million, through the Earth Science Technology Office at Goddard Space Flight Center, Greenbelt, Md. The five JPL investigators and their proposals are:

Tien-Hsin Chao (Electro-Optic Imaging Fourier Transform Spectrometer); Wendy Edelstein (Ultra-High Efficiency L-Band Transmit/Receive Modules for Large Aperture Scanning Antennas); Lute Maleki (Quantum Gravity Gradiometer for Sub-Surface Mapping); Alina Moussessian (T/R Membranes for Large Aperture Scanning Antennas); and Simon Yueh (Compact, Lightweight Dual-Frequency Microstrip Antenna Feed for Future Soil Moisture and Sea Surface Salinity Missions).

The objectives of the Advanced Component Technology Program are to identify, develop and demonstrate component and subsystem technologies that reduce the risk, cost, size and development time for Earth-observing instruments, platforms and information systems, and enable new Earth-observation measurements. Critical to this design is the relationship between the various technology development programs that the Earth Science Enterprise has available to enable missions. Within this development environment, the Advanced Component Technology Program is complementary to the Instrument Incubator Program for instruments and the New Millennium Program for space flight validation. The overall program is designed to bring components and subsystems to a demonstrated technology readiness level for infusion into a future science mission.

For more information, log on to http://research.hq.nasa.gov/code_y/nra/current/NRA-02-OES-01/winners.html#Top.

Three awarded for in-space propulsion

In the future, NASA's fleet of robotic spacecraft might cruise among the planets like sailboats in space, or perhaps they will be propelled from planet to planet by advanced ion engines.

NASA's Office of Space Science announced in late August that those technologies and other advanced propulsion ideas have been selected for development as part of a suite of in-space propulsion technologies. Development of these technologies will provide giant steps in capability for NASA to conduct future planetary missions, especially to the outer planets of Jupiter and beyond.

Three principal investigators from JPL were among those chosen by NASA: James Polk (Development of a 65 cm, 20 kW, Xenon Ion Thruster); Jack Mondt (Segmented Thermoelectric Multicouple Space Reactor Power System); and Bobby Williams, (Development of an Integrated Set of Solar Sail Simulation Tools).

The awards, part of the In-Space Propulsion Program, cover four propulsion technology areas: aerocapture, high-power electric propulsion for nuclear systems, power conversion technologies for nuclear electric propulsion, and solar sails.

Beginning in fiscal year 2003, the propulsion technologies unique to nuclear power systems will be managed under NASA's Nuclear Systems Initiative, including the high-power electric propulsion and power conversion technologies.

The total anticipated budget for high-power electric propulsion and power conversion in fiscal 2002 is \$1 million, \$16 million in fiscal 2003, and \$16 million in fiscal 2004, contingent on budget approval. Total anticipated budget for proposed work in the aerocapture and solar sail areas under the In-Space Propulsion Program in fiscal 2002 is \$2 million, \$17 million in fiscal 2003, and \$18 million in fiscal 2004, contingent on budget approval.

For more information about these technologies, visit <http://spacescience.nasa.gov/news/index.htm>

LAST MONTH, after meeting with the California Department of Fish and Game concerning the deer population on Lab property, JPL management made a commitment to better inform the JPL community about co-existing with wildlife on Lab.

Encounters between humans and wildlife are usually due to changes in wildlife habitat, which have often been rapid and continual. Replacement of forest lands with commercial and residential areas creates an "edge" habitat for deer and other wildlife. The Laboratory is one such area where humans have to learn to share the land with the deer. Each year in the U.S., however, an estimated 200 people are killed and 29,000 injured in deer-vehicle collisions.

Here are some tips to be used at the Lab—and at home—to avoid hitting a deer:



Photo courtesy of Nigel Angold

- Be aware that there is wildlife on Lab at all times.
- Watch for deer and other wildlife at dawn, dusk, and the first few hours of darkness.
- Be particularly cautious in mid-to-late-fall, as this is deer-breeding season.
- Heed "deer crossing" warning signs and reduce speed.
- If you see one deer cross, expect others.
- At night, watch for reflection from headlights when driving a car. Headlights reflect in the eyes of the deer, often appearing to be glowing red orbs.
- If a deer "freezes" in the headlights of your car, stop and try turning your lights off and on.
- The speed limit on Lab for cars and bicycles is 20 mph on the site and 10 mph in the parking lots.

Deer are responding to changes in their environment initiated by human beings by adapting to live in the human environment. It is our responsibility to understand this and realize they are a part of the JPL environment.



Photos by Tom Wynne / JPL Photolab

Deer are very often seen on the mall (top) and in the hills, but can sometimes be seen in the most unexpected places on Lab, such as the stairs (above) or roof (bottom) of Building 111.



LAB · ORATORY

SEPTEMBER

1962

"Joyce Anderson and Joanne McMaster (r) are introduced to Lab by Fred Vogel, Supervisor, Automotive Repair Shop and Dispatch Office. The distaff additions to Transportation alternate driving "Joyce Anderson and Joanne McMaster (r) are introduced to Lab by Fred Vogel, Supervisor, Automotive Repair Shop and Dispatch Office. The distaff additions to Transportation alternate driving the Visitor Bus, which shuttles visitors from the parking lot to the main gate, and chauffeuring, making 'short haul' deliveries and pickups on Lab. The girls, making a neat appearance in their JPL uniforms, are a welcome addition to the Lab."

40 years ago...

Lab hosts Japanese minister

JPL Deputy Director Eugene Tattini presents a gift to Takashi Aoyama during the latter's visit to JPL Aug. 30.

Takashi Aoyama, senior vice minister of the Japanese Ministry of Education, Culture, Sports, Science & Technology, dropped by JPL last month during a visit to Los Angeles.

The request for the visit came from the Los Angeles Office of the National Space Development Agency (NASDA) of Japan and from the ministry through NASA Headquarters. The ministry supervises NASDA and provides most of their funds. Aoyama's responsibilities include science and technology issues, including space issues. He is in charge of the merger of three space-related institutes in Japan; the merger is expected next year.

While at JPL, Aoyama received an overview of the Lab from JPL Deputy Director Eugene Tattini and discussed Earth science with Earth and Science and Technology Director Dr. Diane Evans. The minister also had a close-up look at the Lab's scatterometer projects, Mars Exploration Rover, Microdevices Laboratory, Life Detection Science and Technology Program, and Space Flight Operations Facility.

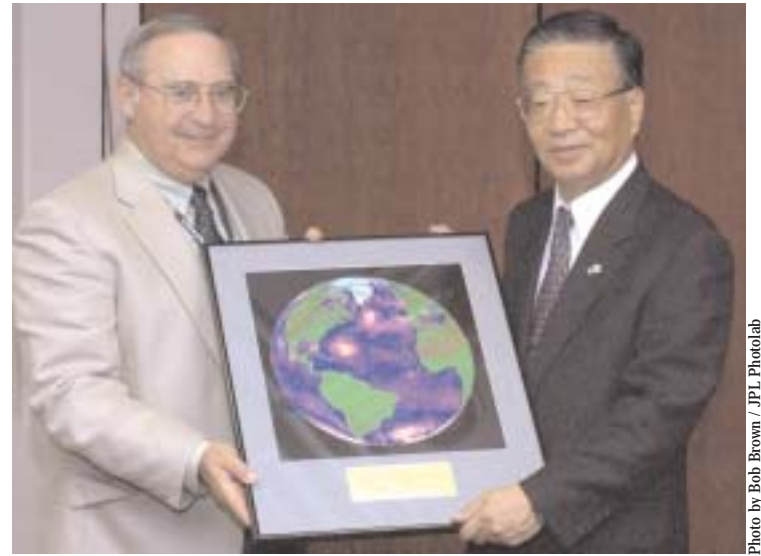


Photo by Bob Brown / JPL PhotoLab

DailyPlanet

Online for the JPL community

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>

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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 JPL Store 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.

Letters

I would like to thank all of my friends and colleagues once again for the present of a cruise when I retired as Director last year. Alice and I have just returned from exploring Alaska's inside passage. It was even more beautiful and relaxing than we imagined. I look forward to seeing many of you during my continuing visits to JPL as Voyager continues its journey toward interstellar space. Again, thank you.

Ed Stone

I would like to thank my co-workers and the ERC for the kindness expressed at the recent passing of my father. You've helped my family and me through a tough time.

Leo Bister

Classifieds

For Sale

AMPLIFIER for bass guitar, Sunn Beta Bass (stage amp), good condition, with foot-pedal remote, \$150. 626/798-0226.

BARBECUE GRILL, George Foreman's, indoor/outdoor electric, brand new, never used; 17.5" cooking surface, nonstick, coated for quick easy clean-up, fat drain tray; \$60. 502-0768.

BATTERY BACKUP, for PC, brand new APC ES Series, model no. BE350U, \$28. 956-3745, Steve.

BIKE TRAILER, 2 kids size, excellent cond., bought in summer 2001, \$80. 626/584-1164.

BIKES: boy's \$45, girl's \$15, both vg cond.; COLLECTOR PLATES, 20 - 25, porcelain, \$50 for the set. 626/359-7666.

BUNK BED: white, metal; with 2 twin mattresses, excellent condition, \$175/obo. 957-8463.

CAMERA EQUIPMENT, Canon, AE-1 program body - black, assorted lenses (fd series) and accessories, exc. cond. 626/355-0944.

CHAIRS, kitchen, vg cond., \$8. 248-4647.

CLARINET, Yamaha YCL-20 resinite, good playable condition, \$300/obo, list \$600;

CASUAL DINING TABLE (60" by 30") and 6 chairs, all sturdy, \$120. 952-8455.

COFFEE MAKERS: Krups 10-cups, white/gray, like new, \$40/obo; Braun 10-cups, white/black, like new, \$30 obo. 626/791-6101.

CONCERT TICKETS: Jimmy Buffett, Thurs., Oct. 3, Verizon Amphitheater, Loge 8, Row LL, Seats 835 & 836, \$73/ea. 661/254-6445.

CONTRACTOR EXAM TAPES, w/manual; for C5, C6 & B1; Calif. licenses in woodworking, law and gen. contractor, \$150. 249-6071.

CRIB, Childcraft, oak, with mattress; drawers under bed; detachable headboard/storage unit allows simple conversion into regular bed; exc. cond., \$150. 952-3130.

DRYER, electric, GE "Profile," 3-wire 204 or 280 volts, never used, \$100. 541-9646, Stacy.

DRYER, Kenmore electric, requires 220v outlet, series 70 Super Capacity Plus, 3 years old, exc. cond., retails for \$400, sell for \$195. 626/301-0010.

ENTERTAINMENT BOOKS, 2003 San Gabriel Valley, \$20; other areas available; proceeds donated to a non-profit organization to help supply needs for low-income families. 626/797-1310, leave message.

FURNITURE: 1 large entertainment unit, solid oak, good cond., size 60"W x 60"H x 20"D, \$250/obo; 1 set of hutches, two pieces with glass windows, mirror and lights, great for china display and storage, size 41"W x 75"H x 17"D for \$250/ obo; 1 recliner, blue color, hardly used, in excellent cond., 36"W x 36"H x 43"D, for \$150/firm. rabinina@att.net for picture. 248-8179.

HEALTH EQUIPMENT, electric scooter, 4 wheel, slightly used, looks new, rt. and left side controls, can disassemble to fit in trunk, orig. \$2,200, sell \$800. 790-6060.

KITCHEN DOORS, 2, from So. Pas. mansion, solid wood, elaborate decoration, beveled glass, no finish on wood, \$1,200/obo. 626/287-9433.

KITCHEN TABLE, ceramic top with oak legs and solid oak chairs (6), barely used, \$250. 541-9646, Stacy.

MISC.: bed frame / mattress set, twin, \$15; push mower, manual, \$25; lawn chairs (2), \$3/ea.; air mattress, \$2; headboard, maple,

\$5; men's golf and dress shoes, sz. 12-13, \$3/ea. 248-4647.

PIANO, electric, excellent condition, Technics, short keyboard, three voices, floor model with bench, good spring action, MIDI in/out/thru, built-in amplifier and speakers, \$450. 626/798-0226.

RADIATOR, Delonghi, oil filled, almost new timer control with 96 settings, automatic room-monitoring thermostat, 3 variable heat settings for energy efficiency, \$40; VACUUM CLEANER, Kenmore \$90; MONITOR, almost-new Smile, 15 inches, flat screen color, non-interlaced, power saving, outstanding condition, 1280-1024 high resolution, micro-processor user control, \$80; BED, queen sz., \$175. 626/304-0207; e-mail: popescu@ociw.edu.

REFRIGERATOR, GE, 17 yrs. old, beige, side by side, \$75; SOFA, makes into queen sz. bed, abstract black/blue/mauve design, gd. cond., \$300; LADDER, \$50; BIKES, 4, children's, need TLC, \$15/ea. 626/357-8210.

REFRIGERATOR, GE, works perfectly, off white, \$80/obo. 626/287-9433.

SCANNER, brand new Visioneer OneTouch 5800 USB 48-bit color, 600 x 1200 dpi, supports Windows 98/2000/Millennium/XP, \$37. 956-3745, Steve.

SHIRTS: new men's long sleeve, 17 neck, 34.5 sleeve, \$7, Hawaiian, L & XL, \$8/ea.; SLACKS, 42 & 44, \$10; SPORTCOATS, 44 & 46, \$10-\$15/ea.; COFFEE TABLE, 52" x 23," black onyx on brass frame, \$30/obo. 790-6060.

SOFA, off-white cotton, 6 sectional plus ottoman, good condition, \$450. 790-7982.

SUBWOOFERS & AMP, pair of MTX TS82 truck/car 8" subwoofers and Road Gear 80W 2Ch. amp, mint cond., \$100/obo. 626/296-9186.

SWIVEL CHAIR + COMPUTER DESK (L: 32.5," W: 19.5," H: 29.5") with pull-out keyboard and integrated shelf, brand new, \$40. 626/564-8483, Chris Dumas.

TABLE SAW, Black & Decker 8", powerful 1 HP induction motor, cuts 2x4 at 45 degrees and 90 degrees, owner's manual and book, \$100. 323/256-0535, Lucia.

TREES: fish tail, 6' tall, \$80/obo; ficus, braided, in 30" plastic pot, >10' tall, \$250/obo; ceramic bowl, gray, 2' diameter with planted geraniums, \$40/obo. 626/791-6101.

VACATION CLUB MEMBERSHIP, Silverlakes, Calif., resort, golfer's dream, 4 weeks free golf anytime each year at private PGA-rated course with driving range and putting greens, 2 bd. condo for up to 6 people, two lakes, many amenities, less than 2 hours from Pasadena, exchange rights with 3,000 resorts, reduced to sell due to illness, \$15,000. 805/967-7725.

YARD SALE, multi-family, 900 E. Poppyfields Dr., Altadena; Sat. Sept. 14, 8 a.m.-2 p.m., lots of good stuff.

Vehicles / Accessories

BRAKE PRESSURE BLEEDER, 2-gal. capacity, tool & adapter tray w/casters, includes adapter to cast iron master cyl., VW/Honda, exc. cond., \$180. 249-6071.

CAMPER SHELL for Chevy S10 or similar, gray, 7-ft. bed, good condition, needs painting, \$150/obo. 626/798-0432.

'93 CHEVY 1/4 ton pick-up, teal green, 2-door, extended cab, short bed; Duratrunk and liner, towing and 5th wheel ready; good cond., 70,000 mi., \$8,000. 661/297-8544.

'88 CHEVY Suburban Silverado 4X4, white, dual a/c, vg cond., bought 9 yrs. ago from orig owner, power windows, cruise control, 10 CD changer, \$5,000. 626/577-2882.

'01 FORD Escape XLT, 4x4, 3.0L V6, all options except side step bars, mocha int/ext, 2 new tires, service contract, 28K mi., exc. cond., \$18,500/obo. 626/584-3841.

'99 FORD Taurus wagon, metallic silver, great spacious family car, 12-valve V6 3.0L engine, 79K miles, exc. cond., \$8,300/obo. 626/584-1164.

'97 FORD Explorer XLT, only 41K miles, exc. cond., new tires/brakes, garage parked, am/fm/cassette, a/c, power seats/windows, all dealer servicing, very clean, gold color, \$10,500. 626/355-5631, Tim O'Donnell, after 5:30 p.m.

'95 FORD Clubwagon, 5.7L, 167K mi., 4 speed auto with overdrive, loaded, tow package, meticulously serviced, very clean, \$8,000/obo. 909/593-8950.

'95 FORD Taurus GL, V6, 3.0, only 66,000 miles, dual airbags, automatic, a/c, am/fm cassette, power windows, power mirrors, cruise control, keyless entry, tinted glass, exc. cond., Carfax report available, \$3,600/obo. 818/248-6919 or 323/442-6672, mktameesh@yahoo.com.

'68 FORD Mustang Classic Calif. Special GT/CS, hi-perf. 302 cid, 75K orig. miles, auto, fac. a/c, ps, am radio, metallic gold paint, black interior, GT hood, trunk, fogs and wheels, no rust, turns heads, \$13,250/obo. 626/963-5727.

'65 FORD 250 pickup, custom cab camper

special, in running cond. but needs work, orig. owners manual, \$1,000/obo. 626/798-0432.

'00 HONDA Odyssey 2000 LX, beige, auto, a/c, 44,800 miles, exc. cond., \$19,000. 626/447-0466.

'91 HONDA Civic DX, 5-speed man., air, am/fm stereo/cassette, org. paint/int., new tires, new catalytic converter, \$4,000/obo. 213/229-2980, Hunaid.

'97 INFINITI J30t, exc. condition, 58K miles, \$15,900. 562/498-1097.

'94 INFINITI J-30, orig. owner, 110,000K, recent full maintenance, inc. major tune-up, timing belts, seals, water pump, trans. service, etc.; full power, loaded w options, air, leather, sunroof, ABS, alarm, AM/FM/CD/tape, \$9,000/obo. 661/424-1420.

'01 ISUZU Rodeo LS, 4x4, V6, PS, PW, PD, dark green, gray interior, 25,000 miles, factory warranty, \$23,000/obo. 626/304-0279, Vince or vink@ociw.edu.

'99 JEEP Wrangler SE, exc. condition, black, soft top, under 23K miles, 4 WD, 5 speed, plus extras, just reduced to \$10,000. 957-7742.

'93 JEEP Grand Cherokee, auto, 4WD, 4 dr., V8, pwr. windows/locks, CD, 4-wheel ABS, leather interior, tinted windows, fog lamps, 88,000 mi., \$8,400/obo. 323/661-9068.

'91 JEEP Cherokee, Laredo package, 4x4, blue exterior, beige int., 149,041 mi., 4.0L straight 6, pwr. windows/doorlocks/seats/mirrors, cruise contr., tinted windows, tow pkg., alarm, AM/FM CD player w/removable face & premium sound, Smittybilt running boards, alloy wheels, 3" Rancho suspension lift w/shocks, borla exhaust header, roof rack, new battery; very well maint. w/maint. records; see to appreciate, photo: <http://www.alumni.caltech.edu/~tracy/jeepp.jpg>, \$4,500/obo. 626/798-3566.

'88 MAZDA Protégé LX, silver, 52K mi., manual trans., 10-disc CD changer, dual airbags, pull-down back seats, a/c power windows/locks, runs perfect, all maint. documents avail. 626/683-9951, Caroline.

'95 MERCEDES-BENZ C-280, exc. cond., automatic, ABS, a/c, power locks/windows/mirrors/seats, AM/FM/cassette/CD, white, 54,000 mi., \$17,500/obo. 323/254-5685.

'00 SATURN SC2, 32,500 miles, ps, a/c, CD, pd, pl, alarm, auto, exc. cond., Kelley book retail \$12,005, wholesale \$10,045, sell \$10,995. 909/596-3501, Donna.

'94 SATURN, 4 dr. SL1 sedan, dk. green color, outstanding cond. (service only at Saturn dealer), car history provided, smog check performed, mileage 128K, a/c, airbag, 4 cyl. 1.9L, 5-spd. transmission, am/fm stereo, 85 HP, EPA mileage (city/hwy): 28 mpg/37 mpg. \$2,900. 626/304-0207, popescu@ociw.edu.

'99 SUBARU Outback 4-dr. red wagon; all-whl drv., 5 spd., 33K mi. a/c, cruise, CD, roof rack, tow hitch; \$15,500. 626/447-6655, eves/wkends.

'02 TOYOTA Camry DLX, 4 cyl., 4 dr., front side & curtin airbags, 4 whl. ABS disk brakes, sunrf, 6 CD chgr, A/C, 2K miles, \$24,100/obo. 626/794-0073.

'00 TOYOTA Camry LE, 4-dr. sedan, 4 cyl., 2.2L, auto, 35K miles, a/c, c/c, power everything, am/fm/CD/cass., pwr. driver seat, tilt wheel, runs great, beautiful, see pictures at ERC, \$14,500 firm. 626/536-9500.

'99 TOYOTA Solara SLE V6, 2 dr., black interior/ext., sunroof, spoiler, lthr bucket seats, a/c, am/fm/stereo/cass./CD, power windows/locks/mirrors/seats, cruise control, tilt whl., driver & pasngr airbags, anti-lock brakes, 86,000 mi., immac. cond., \$15,500/obo. 626/967-3200.

'96 TOYOTA Corolla DX, auto, 23K mi., power windows/locks, spoiler, a/c, exc. cond., \$5,000. 909/599-3230.

'95 TOYOTA Camry LE, white, beautiful condition, well maint., new tires, one owner, kept in garage, 93K miles, \$7,000 firm. 547-4522.

'88 TOYOTA Corolla, exc. cond., auto, new battery/tires/smog, stereo, \$2,600. 626/379-3503.

'74 VESPA moped, 2 stroke, street legal, running cond., \$1,200/obo. 661/250-7849.

'01 VW Beetle GLS, silver/black leatherette, 5 spd, pwr locks/windows/mirrors, cruise, alloys, am/fm cass., CD changer, fog lights, ABS, remote keyless entry, 10K miles, \$16,800. 626/449-0997.

Free

CAT, gray tabby female, 1 year old, spayed, very sweet, not dog-friendly; KITTENS, 4 adorable Tabby, healthy & friendly. 626/287-9433.

PLAY SET, wooden bolt together structure for climbing/swinging, play; original quality commercial set, children have long outgrown; still standing and structurally sound; some TLC and it can serve again; yours to disassemble and cart away. 249-3633, eves.

Wanted

ARTHRITIS PATIENTS invited for free one-year, 6 visit Pasadena research clinical trial, age

50-plus, leave phone no., address for mailing, 626/403-6312, Marilyn.

FITNESS STEP, for step aerobics; large Reebok or equivalent. 626/345-0681.

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

VOLLEYBALL PLAYERS, coed, no beginners please, Tuesday nights 8 - 10:00 at Eagle Rock High School, \$3/night. 956-1744, Barbara.

For Rent

ALTADENA condo for lease, minutes from JPL, 2 bd., 1 3/4 ba., nice closets with organizers, fireplace, central a/c & heat, community pool, storage room, and 2-car garage (carport), tile counter top and marble floor in kitchen, large patio with landscape, planters and oriental garden with waterfall and spa, end unit (with windows on three sides), cable on; by owner, \$1,200. 626/398-1988.

ALTADENA house, 3 bd., 1 ba.; living, dining, kitchen, laundry, fireplace, wood floors, large fenced yard, attractive Swiss-cottage style, 2-car garage, back yard patio enclosure, \$1,700. 323/871-1043, Kathy.

ALTADENA, 1940s bungalow house, unfurnished, 3 bd., one full & two 1/2-baths, living room and detached office, venting skylights in kitchen and office, refrigerator, stove, dishwasher, clothes washer and dryer included, wood-burning fireplace, quiet neighborhood next to mountains and hiking trails, less than 10 minutes from JPL, \$1,850, flexible lease. 323/309-8953, Marcia.

PASADENA, room in a beautiful house above Eaton Canyon Golf Course, ideal for a very quiet and neat lady; private bedroom, private beautifully remodeled bathroom, private entrance and kitchenette; access to washer, dryer, and treadmill; \$595. 626/798-4056.

PASADENA, near Colorado and Madison, 2 bd., 2 patios, new appliances, washer & dryer, pool, \$1,695. 626/798-3969.

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 LR w/FP, end unit, frml DR, hdwd. flrs., immac. cond., close to schls. \$1,750. 626/396-9024.

SUNLAND, fully furnished room in condo; share kitchen, bath and laundry; garage parking, A/C, fireplace, pool, Jacuzzi, tennis court; 10 miles to JPL; prefer upper classman/grad student, non-smoking; security deposit + references, must like dogs; \$450. 352-3112.

Real Estate

PASADENA, Rose Bowl area, 1910 Craftsman/Victorian transitional, 5 bd, 2 ba., lg. attics, Cal basement, dual zone a/c, large kitchen, formal lr, dr, many built-ins, fully restored & upgraded, walk to Old Town, Rose Bowl parks, 10 min to JPL, \$585K. 626/584-3841.

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.

HAWAII, Maui condo, NW coast, ocean front view, 25 ft. fr. surf, 1 bd w/loft, compl. frn. 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, 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, fish ponds, close to Mammoth Creek, JPL discount. 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 rm., great ocean view, easy walk to pier & restaurants, slps 8, avail. weekly or monthly. 909/981-7492 or dhaug@yahoo.com, Darlene.

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

PARK CITY, Utah, Dec. 17-24, Park Regency; fully equipped condo within minutes to skiing at Brighton, Solitude, Alta, Snowbird and Deer Valley; \$550. 897-1203.

PUERTO VALLARTA, Villa del Mar, lg. studio, sleeps 4, rms. have microwave, kitch., phones, cable TV, priv. patio; 3 pools, 3 restaur., spa, priv. beach, charming town, top-rated resort; avail only 12/28/02 - 1/4/03, on-site New Year's Eve Fiesta, see http://www.myuvc.com/puerto_vallarta.shtm. 541-1340.

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.

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Lab confirms Earth orbit of Apollo rocket stage

By Guy Webster

Object escaped from Earth orbit in 1971

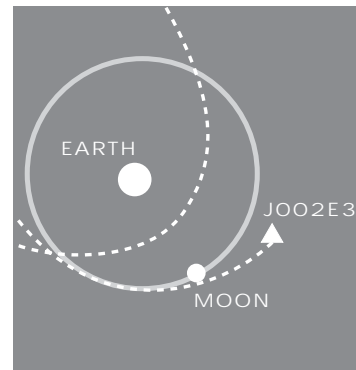
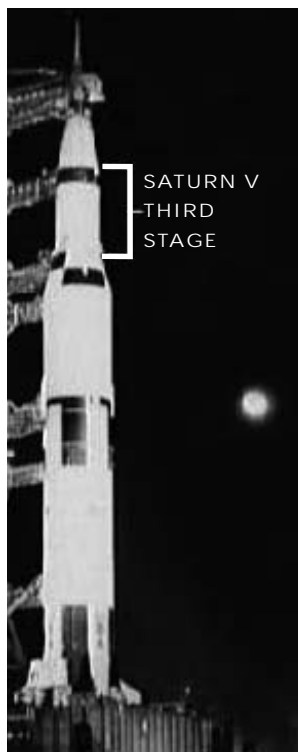
JPL scientists have confirmed the first known capture of an object into Earth orbit from a Sun-centered orbit, thanks to continuing observations of what is most likely the long-lost third stage of a 1969 rocket to the moon.

"(Two weeks ago) we didn't know for sure that it had been captured, and now there's no doubt that it was captured in April of this year," said Dr. Paul Chodas of the Near-Earth Object Program Office at JPL. "What's more, we are virtually certain that it originally escaped Earth orbit in March 1971 and that it will escape again next June. It's only a temporary visitor."

The object, named J002E3, was discovered Sept. 3 by Canadian amateur astronomer Bill Yeung, observing from El Centro, Calif. Increasingly precise orbital calculations made possible from a second week of positional observations have nearly ruled out any chance the object will hit the moon or enter Earth's atmosphere before it departs Earth orbit, Chodas said. Calculations made about a week after the discovery left higher impact possibilities, but now the chances of impact are less than 1 percent at either the moon or Earth, and a third week of observations will likely push the odds to zero. The object is too small to be considered hazardous, in any case.

More than 100 measurements of the object's position have now been reported from more than a dozen amateur astronomers, said JPL's Dr. Steven Chesley. The two weeks of movement tracked by those observations make up about a sixth of one orbit around Earth. Scientists can extrapolate the object's path for years into the future and years into the past from that short arc. "The observations coming in are from a loosely organized network of dedicated amateur observers. Their data have been vital in determining this object's past and future paths," Chesley said.

The object escaped from Earth orbit in March 1971, Chodas said. That fits its most likely identity as the third stage of the Saturn rocket that took Apollo 12 astronauts to the moon in November 1969. The 18-meter-long (60-foot-long) third stage was last seen in an elongated 43-day orbit around Earth, not much different from J002E3's current orbit. It probably completed nine or 10 Earth orbits, then swung far



enough toward the Sun to be pulled into a Sun-centered orbit, he said. The transition happened through a special "portal" located at the L1 Lagrangian point, where the gravitational pulls of the Sun and Earth are approximately equal.

Analysis by researchers from the University of Arizona and the Massachusetts Institute of

Technology suggests that J002E3's surface is white paint rather than more asteroid-like material. If it is not from the Apollo 12 rocket, some less likely possibilities are one of the four 7-meter-long (22-foot-long) panels that enclosed lunar modules from six Apollo missions or rocket stages from Soviet or U.S. unmanned lunar missions. Those are less likely because they seem too small to match the object's observed brightness, and they are not known to have been left in orbits that could have escaped Earth. Additional observations in coming weeks may pin down the identification.

After J002E3 escaped Earth's gravity in 1971, it raced Earth in circles around the Sun, but it had an inner lane, so it completed 33 solar orbits in the time it took Earth to complete 31. In 1986, the object lapped Earth on the inside, too far away to be snagged by Earth's gravity. This year, it was about to lap Earth again but passed too close to the L1 portal and Earth captured it.

The transition between Earth-centered dynamics and Sun-centered dynamics has been understood theoretically for years and has been used for designing orbits of some spacecraft, but this is the first time a capture into Earth orbit has been confirmed, Chodas said. Comet Shoemaker-Levy 9, which struck Jupiter in 1994, made this kind of transition into Jupiter's orbit several decades earlier. JPL's Genesis spacecraft, currently collecting samples of solar-wind material near the L1 point, will use a similar maneuver for a low-energy return to Earth with the samples in 2004.

Earth won't have seen the last of J002E3 when this peripatetic bit of space junk escapes after its sixth orbit in mid-2003. It will shift from solar orbit to Earth orbit again in decades ahead. "This type of orbit can't last very long," Chodas said. "That's one reason it would be very unlikely to find an asteroid with an orbit like this." Within several thousand years, the object will likely end its travels by hitting the moon or Earth. That is not cause for concern, though. Five rocket stages like the Apollo 12 third stage were crashed into the moon intentionally as part of seismic research, and several others harmlessly disintegrated when they re-entered Earth's atmosphere.

Images of J002E3's calculated path are available at <http://neo.jpl.nasa.gov>.

NASA advisory group meets on Lab



Photo by Dutch Sliger / JPL Photolab

During their Sept. 10-11 visit to JPL, members of the NASA Advisory Council gather for a close-up look at the Mars Exploration Rovers, being readied in the Spacecraft Assembly Facility for next year's flight. The council, which provides the NASA administrator with advice on NASA programs and issues, meets four times each year and has met every four or five years at JPL, the last time being in 1998. Most of the council's agenda during their Lab visit concerned International Space Station research maximization and prioritization. Members also received an overview of JPL activities and the Mars Program in particular, including a briefing on the Mars Student Imaging Project, a science education program funded by NASA and JPL, and operated by Arizona State University, that gives students the opportunity to study planetary geology using Mars Odyssey's visible-light camera.

News Briefs



Dr. Charles Elachi

Elachi wins Takeda award

JPL Director DR. CHARLES ELACHI has been named one of the winners of this year's Takeda Awards for his work in developing spaceborne radar instruments to monitor the global environment. The awards, established last year by the Takeda Foundation of Japan, honor individuals who demonstrate outstanding achievements in the creation and application of new engineering knowledge to benefit human needs.

Elachi shares his prize for work benefiting the environment with two Japanese researchers.

As a researcher, Elachi is perhaps best known for his role in the development of a series of imaging radar systems for the space shuttle that allow scientists to penetrate clouds and even the top layers of soil in arid regions, offering scientifically fruitful hints of what lies underneath.

Elachi has participated in a number of archaeological expeditions in the Egyptian desert, the Arabian Peninsula, and the western Chinese desert in search of old trading routes and buried cities using satellite data. He has served as principal investigator on numerous NASA projects and is currently team leader of the Titan radar experiment on the Cassini mission to Saturn.

Elachi will receive half of a monetary award of 100 million yen (about U.S. \$833,000); the other half will be shared by his Japanese co-honorees. The awards will be presented at a ceremony Nov. 20 in Tokyo.

The Takeda Foundation, established in 2001 by Ikuo Takeda, founder of instrument manufacturer Advantest Corp., also announced two other awards honoring researchers working in electronics and life sciences.

Tavormina wins Women at Work honor

DR. ANN TAVORMINA, manager of the Exploration Systems Autonomy Section, has been named a winner of the 2002 Medal of Excellence Award by Women At Work, a Pasadena-based non-profit job and career resource center.

Tavormina joined JPL in 1987. Prior to her current position, she served as the Magellan mission planning team chief, Magellan deputy mission director and Flight Engineering Office manager, and Cassini mission operations manager. She has managed Section 367 since November 1999.

Her recent outreach and community services activities include speaking at the inaugural Sally Ride Science Club's Los Angeles Science Festival for girls in 6th to 8th grade at Caltech in March; lecturing on planetary exploration at JPL's Bring Your Child to Work Day in April; and participating in a live webcast for the IBM EXploring Interests in Technology and Engineering (EXITE) camp in Atlanta in July.

Businesses throughout the Los Angeles area honor women employees through the Women at Work award. At JPL, nominations are submitted by the Director's Advisory Council for Women. Out of the 16 women nominated for this award, Tavormina's nomination



Dr. Ann Tavormina

was endorsed unanimously by the selection committee.

Tavormina will receive the award at a ceremony at the DoubleTree Hotel in Pasadena on Oct. 24.

Super-accurate atomic clock developed

Building upon more than a decade of work on a frequency standard called the linear ion trap, the JPL Frequency Standards Laboratory has developed and installed a new trapped ion atomic clock for the U.S. Naval Observatory in Washington, DC. Recent JPL innovations are expected to provide 20 times improved stability over previous trapped ion clocks, resulting in a clock that's effective stability is equivalent to about one minute in 10 billion years—the approximate age of the universe.

The instrument, based on mercury ions, will be measured with a large ensemble of atomic clocks operated to form a very stable, continuous time-scale at the U.S. Naval Observatory, which serves as the center of all U.S. Department of Defense timekeeping and supports the needs of the Global Positioning System. During this evaluation, the ion clock will also be used as a frequency reference for transcontinental time and frequency transfer comparisons to be performed between the Observatory and the only other ion clock of its kind, located at JPL.

Retiree group gets NASA funding

The Volunteer Professionals for Medical Advancement, a group of retired JPL engineers and scientists who have applied their technical expertise to medical research projects, has received a one-year grant from NASA's Bioastronautics Research Division.

VPMA founder and director HERMAN BANK said the \$15,000 grant will help expand the group's reach nationwide. The group will make presentations on its activities to retiree centers, various major hospitals and major medical foundations, and Bank encourages retired technologists to donate their time to form VPMA centers in their own communities.

The group has been responsible for a number of medical advancements, including preliminary design of an automated oxygen enrichment system for premature babies; solving a blood clot problem found with a stent that could cause heart attacks; and creation of an advanced-database private computer network for pediatricians.

For more information, call Bank at (626) 798-3748.

Secretaries' mentoring group to meet

The Office Professional Mentoring Group is organizing the next mentoring session for JPL secretaries. Participants can learn from others—and share their own experiences—while being supported and guided by mentors who have a wealth of experience.

Applications for the program can be found at <http://hr/officepros>. Send applications to JOY HODGES, 301-486, no later than Friday, Oct. 11. For more information, call her at ext. 4-7041.

JPL employees, contractors and partners were recognized by NASA for their outstanding work over the past year as the Lab held the agency's annual Honor Awards ceremony Sept. 24.

Following is a list of recipients. For more detailed information, log on to <http://techinfo.jpl.nasa.gov/jpl/awards>.

Public Service Group Achievement Award

Boeing Integrated Defense Systems, Lockheed Martin Astronautics.

Group Achievement Award

2001 Mars Odyssey Project Team, Airborne Visible and Infrared Imaging Spectrometer (AVIRIS) Team, Cassini Jupiter Flyby Team, Cassini Radio Science Ground System Development Team, Contractor Purchasing System Review Team, Deep Space 1 Beacon

Monitor Experiment Team, Deep Space 1 Comet Team, Deep Space Mission System Information Technology Security Team, Delta-DOR Implementation Team, Dynamics Simulator for Entry, Descent, and Surface Landing Team, Frequency and Timing Monitor and Control Upgrade Team, Genesis Project Team, Geographic Synthetic Aperture Radar Team, JPL Cryobot Team, JPL Project Formulation Support Team, Mars Theme Education and Public Outreach Team, Near-Earth Asteroid Tracking Team, Safe Rover Navigation Team, Space Interferometry Mission Beam Launcher Development Team, SIM System Testbed Team, Space Link Extension Development Project Team, Stardust Camera Anomaly Team, Ulysses Nutation Operations Team, Web Interface for Telescience Team.

Public Service Medal

Robert Berry.

Special Events Calendar

Ongoing Support Groups

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

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

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

Gay, Lesbian and Bisexual Group—Meets the first 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 3-0664.

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, September 27

Investment Advice—A TIAA/CREF representative will be available for one-on-one counseling. To schedule an appointment, go online to tiaacref.com or call (877) 209-3140, ext. 2614.

Sunday, September 29

Caltech-Occidental Chamber Orchestra—A double bass concerto titled "Fables, Farewells and Flashbacks" will be performed at 8 p.m. in Caltech's Ramo Auditorium. Admission is free. For information, call (626) 395-4552.

Tuesday, October 1

Health and Safety Faire—To be held from 10 a.m. to 1:30 p.m. on the mall and in von Kármán Auditorium. More than 30 health care agencies and four insurance carriers will provide information, massage, and organic farm produce. Health screenings will include body fat, blood pressure, cholesterol, colon cancer and derma skin scan. The Occupational Safety Office will provide information on laser safety, bicycle safety, ergonomics, monitoring equipment, pre-operational safety reviews, job hazard analysis and communication, chemical hygiene, fall protection, radiation, signs, inspections, lockout/tagout, safety early reporting system, and mishaps. Inclement weather would move the event to Thursday, Oct. 3.

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

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

Wednesday, October 2

Associated Retirees of JPL/Caltech—Meeting at 10 a.m. at the Caltech

Credit Union, 528 Foothill Blvd., La Cañada.

Thursday, October 3

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

Friday, October 4

Michael Andrew and Swingerhead—This ensemble performs music reminiscent of the 1940s and '50s, featuring cha-cha, mambo, surf and lounge, and will appear at 8 p.m. at Caltech's Beckman Mall, where a dance hall will be set up. Tickets are \$15 for adults, \$5 for youth high school age and under. For information, call (626) 395-4652.

Saturday, October 5

Paris Combo—This retro-cabaret ensemble performs blues, swing, gypsy, flamenco and North African music, and will appear at 8 p.m. at Caltech's Beckman Mall, where a dance hall will be set up. Tickets are \$15 for adults, \$5 for youth high school age and under. For information, call (626) 395-4652.

Tuesday, October 8

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

Wednesday, October 9

"Countering Terrorism: The Role of Science and Technology"—Caltech chemistry professor Dr. Jack Beauchamp will lecture at 8 p.m. in Beckman Auditorium. Admission is free. For information, call (626) 395-4652.

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

JPL Toastmasters Club—Meeting at 5 p.m. in the 167 conference room. Call Roger Carlson at ext. 4-2295 for information.

"The Voyager Journeys to Interstellar Space"—Voyager Project Scientist and former JPL Director Dr. Ed Stone will lecture at 8 p.m. in Caltech's Beckman Auditorium. Admission is free. For information, call (626) 395-4652.

Saturday, October 12

The Reduced Shakespeare Company—The great literary works of the world are condensed into only two hours, beginning at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$29, \$25 and \$21, youth high school age and under, \$10. For information, call (626) 395-4652.

Sunday, October 13

Chamber Music—The Takacs String Quartet will perform at 3:30 p.m. in Caltech's Beckman Auditorium. Tickets are \$29, \$25, \$21 and \$17. For information, call (626) 395-4652.

Bayard, Todd Bayer, Shyamkumar Bhaskaran, Scott Bolton, L. Alberto Cangahuala, Gregory Fleisch, Mark Gatti, Earl Hansen, Eleanor Helin, Scott Hensley, Veljko Jovanovic, Anne Kahle, Carl Kloss Jr., Nancy Leon, Lynn Lowry, Paul Maker, Farzin Manshadi, John Martonchik, Jeffrey Mellstrom, Brian Paczkowski, David Perz, Moshe Pniel, Richard Rainen, Marc Rayman, Paul Rosen, Robert Werner.

Outstanding Leadership Medal
M. Mark Colavita, Charles Elachi, Susan Kurtik, George Pace, Bobby Williams. *Note:* Dr. Elachi's award was presented at NASA Headquarters this past summer.

Exceptional Scientific Achievement Medal
Gilles Peltzer, James Williams.

Exceptional Service Medal
Charles Avis, Scott Bowdan, William Breckenridge, Robert Bunker, Stanley Butman, Bradley Compton, David Crisp, Khanara Ellers, John Fleener, David Fulton, Mary Ann Gero, Roger Gibbs, Kathleen Hahn, Kathleen Hardcastle, Ralph Kahn, James McClure Jr., Susan Paradise, Donald Rapp, Ronald Reeve, Antonio Sanders, S. Terese Smith, Mike Smyth, Michael Stoloff, Eric Suggs, Padma Varanasi, John M. Walsh.

Exceptional Achievement Medal
Christoph Adami, Magdy Bareh, David

Correction

Images on page 1 of the Sept. 13 issue of Universe showing ice breaking off from the Pine Island Glacier in Antarctica should have been credited to the Multi-angle Imaging SpectroRadiometer (MISR) program.

NASA bestows annual Honor Awards

NEW POLICY
SEEKS A MORE EQUITY-
BASED APPROACH

Redrawing the Lines for Parking

JPL HAS

ALWAYS FACED PARKING CHALLENGES due to space limitations. An extensive review of on-Lab parking eligibility criteria was recently completed. The Executive Council examined a range of proposals and approved changes to the existing on-Lab parking policy. The new policy is driven largely by the establishment of the new Senior Career Level A designation. The changes, although significant for some, will not affect the majority of the Laboratory population. The new policy will be implemented January 6, 2003.

The parking eligibility changes represent a philosophical change from a longtime practice of not taking away on-Lab parking privileges once

Administrator IV, and most Senior A designations, will now be eligible for on-Lab parking. Currently eligible positions of Managers I, II, and III and Principal are not affected, as are employees with 25 years or more of continuous service. Current practices for carpools, vanpools and motorcycles remain the same.

A new alternative, which will take effect in 2003, will provide approximately 300 employees with on-Lab parking privileges through a performance-based allocation system administered by each Directorate. In addition, to give more people at JPL a chance to park on-Lab, a lottery will be held. Most JPL employees who do not have on-Lab parking will be eligible for a lottery that will provide 100 on-Lab parking spaces. The winners will have on-Lab parking for a specific workday each week for an entire year, thus netting 500 winners

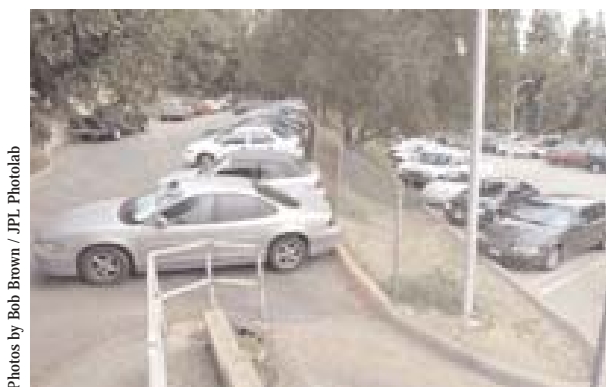
Another way employees and contractors can qualify for on-Lab parking is through carpool and vanpool arrangements. Individuals interested in more information should contact the Rideshare Office at ext. 4-RIDE. Additionally, the Lab is looking into increasing the frequency of shuttle service and extending service hours during peak usage times.

Whenever parking is discussed, the question regularly raised is whether or not present parking capacity can be increased. JPL's Facilities Division is currently developing a Facilities Master Plan, which includes expanding parking capacity over the next 10 years. The plan should be completed by the end of the calendar year. As Facilities Division Manager Bruce Fischer said:

"Turning a plan into a physical reality requires funding for infrastructure development. This funding has been difficult to obtain over the past few years." For the foreseeable future, JPLers will need to manage within the existing, finite surface parking area currently available.

Employees who are affected by the upcoming changes in parking will be notified as part of annual salary review discussions. The new parking eligibility rules will take effect on Jan. 6. This implementation schedule was specifically selected in order to give those employees who are most affected by the changes in parking eligibility ample time to make necessary changes in their work schedule, or find a carpool.

The revised parking requirements will be available soon on JPL Rules! at <http://rules.jpl.nasa.gov>.



Photos by Bob Brown / JPL Photolab

an individual had been given access. The new policy seeks to be a more equity-based approach aimed at providing on-Lab parking to individuals in some of the most important and complex positions. "Management recognizes that all JPL employees and affiliates make significant contributions to the Laboratory's goals, but with limited space, not everyone can park on-Lab," said Sue Henry, deputy director for Business Operations and Human Resources.

Under the new policy, employees classified in the positions of Fellow, Chief Scientist for a Directorate, Chief Technologist for a Directorate, Chief

for a 100-space lottery. Implementation details are being worked.

Who will no longer be eligible for on-Lab parking? Folks most often referred to as "grandfathered" employees. These JPLers at one time became eligible for on-Lab parking, but never had the drive-on privilege revoked even though they may no longer qualify. Interim Employment Program participants will no longer have on-Lab parking. Retirees will be asked to park in the visitor annex area. Also, the current system of on-Lab parking eligibility—such as expeditor, special project, special visitor, and medical passes—is currently under review.

ELIGIBLE FOR ON-LAB PARKING

- Fellow
- Chief Scientist for a Directorate
- Chief Technologist for a Directorate
- Administrator IV
- Most Senior A designations
- Managers I, II, and III
- Principals
- Employees with 25 years or more of continuous service
- Carpools
- Vanpools
- Lottery winners

INELIGIBLE FOR ON-LAB PARKING

- "Grandfathered" employees: JPLers who at one time became eligible for on-Lab parking, but never had the drive-on privilege revoked even though they may no longer qualify
- Former managers not presently classified to meet new criteria
- Division-level secretaries
- Interim Employment Program participants
- Retirees

New portal helps you surf JPL online

By Mark Whalen



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>

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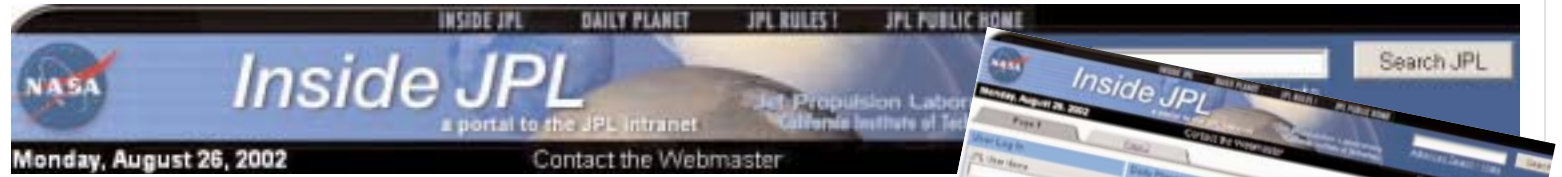
Universe is published every other Friday by the Office of Communications and Education of the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109.

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 JPL Store 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.



Having trouble negotiating your way through JPL's myriad online resources? Help has arrived.

Inside JPL, the customizable portal to the JPL intranet, is now available to organize the online resources that match individual job requirements and personal preferences. Located at <http://insidejpl>, the new site can help JPL staff easily find everything from timekeeping to cafeteria menus, employee contact information to JPL Rules!

The portal acts as an "electronic gateway" that makes it easy for users to find and organize links and applications they use most often. Boxes within the portal's main page, called data channels, deliver dynamic information supplied by various "publishers" on Lab. Examples of data channels include the Daily Planet, New Business Systems, the JPL Library, and Labwide Announcements.

The JPL Web Space Directory is sure to be a key data channel for many users. The directory includes easy-to-find links for such areas as employee resources, missions and projects, institutional news and events, JPL organizations, and more. Significant JPL sites are represented within the directory in a streamlined organizational hierarchy that facilitates quick access to online data and applications.

In addition to browsing the directory, users seeking information will be able to search the JPL intranet with the new institutional search engine based on Google technology. The Google search engine can be used to search both internal JPL web space and external World Wide Web sites.

By entering the JPL user name and password, employees can customize

their portal page by selecting the data channels they would like to display.

They can also specify how they would like channels configured on the page, and can edit individual channels to add links. More details are found at the User Login data channel. For those who need help, use the online help manual in the portal or contact the development team by using the e-mail link on the top banner.

Inside JPL was developed by the JPL Knowledge Management Project as a next-generation replacement for the Electronic Labwide Information Access System (ELIAS) under the sponsorship of the Institutional Computing and Information Services (ICIS) Program. Sometime during fiscal year 2003, Inside JPL will replace ELIAS completely.

Jayne Dutra, a member of the JPL Knowledge Navigation Team, said future portal enhancements may include data channels specifically for directorates, divisions or projects, and supporting JPL teams in online collaboration activities.

For more information about Inside JPL or to set up a demo for your next group meeting, contact call Dutra at ext. 4-6948.

Retirees

The following JPL employees retired in September:

William Melbourne, 46 years, Section 330; Hershah Fitchugh, 45 years, Section 313; Rodney Stanley, 39 years, Section 216; Ronald Ploszaj, 36 years, Section 160; Patricia McLane, 35 years, Section 215; Elena Pestano, 31 years, Section 212; William Chitty, 30 years; Section 352; Steve Kuan, 28 years, Section 216; Carol McGowan-Hanewinkel, 26 years, Section 372; Donald Dunn, 24 years, Section 387; Stanley Packard, 22 years, Section 263; James Shmitka, 20 years, Section 357; Boyd Davis, 18 years, Section 214; Billie Ottenfeld, 18 years, Section 215; Ronald Heuerman, 17 years, Section 332; David Fort, 15 years; Laura Chin-Loy, 13 years; Section 244; Lynn Gref, 13 years, Section 810; Lillie Varnado, 10 years, Section 214.

Letters

I would like to thank my extended JPL family, especially Section 272, for your generosity and kind words during the recent passing of my mother. You have made it a little easier to get through a difficult time.

Denise Dean

Passings

PHILIP STANTON, 61, a retired engineer in Section 333, died of colon cancer Sept. 17.

Stanton joined JPL in 1977 and retired in 2000. He is survived by his mother, Alice; sisters Kathleen, Judy and Diana; and brothers Tony and Doug.

Services were held Sept. 23 at Holy Cross Cemetery in Culver City.

BARBARA ANDERSON, retired from the Lab's contract accounting group, died of a granular cell tumor Aug. 10. Anderson worked at the Lab from 1973-93.

Classifieds

For Sale

BATTERY BACKUP, for your PC/server, brand new American Power Conversion ES Series, model no. BE350U, \$28. 956-3745. Steve. BEDROOM SET, 6 pc., Italian imported, headboard, 2 nt. stands, 5-drawer chest, 9 drawer dresser & mirror, \$450. 323/256-0535. Lucia. BIKES: boy's, exc. cond. \$45; girl's, good cond. \$15; PLATES, 20-25 porcelain collector, \$50. 626/359-7666. BIKE SHORTS, ladies, Canari, medium, large, \$15/ea.; BIKE TOP, ladies, Danskin, red and

purple w/rear pockets, large \$10/ea., both worn once or twice. 897-1203.

CEMETERY PLOTS, 5, at Rosehills, Garden of Autumn on developed land, willing to split up, valued at \$2,100/ea., sell for \$1,800. 909/986-4611, evenings.

CHAIR, recliner, motorized lift with heat & massage, remote controls, great for the elderly, like new, used only a few times, orig. cost \$1,000, sell for \$400. 909/971-0086.

COFFEE MAKERS, Krups 10-cups, white/gray, like new, \$40 obo; Braun 10-cups, white/black, like new, \$30 obo. 626/791-6101.

COMPUTER, Compaq P-400, with monitor, 128 MB RAM, 6.4 GB HD, new 56K modem, \$395. 951-0000, Nik.

COMPUTER DESK, ample storage and place for printer / CPU. 841-3551.

CRIB, portable Graco Pack & Carry, with sun canopy, exc. cond., \$65; DOG HOUSE, Igloo, large, \$45. 626/798-6248.

DESK, solid light cherry, 40 x 70 inches, six drawers, exc. cond., \$150. 626/458-5410.

DRYER, Kenmore, electric (requires 220v outlet), series 70 Super Capacity Plus, 3 years old, exc. cond., retails for \$400, sell for \$195. 626/301-0010.

GARDEN COMPOSTERS and EQUIPMENT: Biostack, Smith & Hawken, 28" x 40" x 28", \$40; Soil Saver, 28" x 28" x 28", \$30; both are black and have lids; hand mower, Great States, \$15, fertilizer/lawn seed spreader, Scotts, \$20. 626/303-3390, before 6 p.m.

GENERATOR, Coleman 2250W portable 120V@18.75A, like new, less than 20 hours usage, \$200. 909/971-0086.

GUITAR, Takamine, acoustic G series, vg cond., strap but no case, \$75. 249-2420.

JEWELRY, diamonds: stud earrings, .89 ct., \$300; earring jackets, .24 ct., \$250; necklace, pendant, .25 ct., \$250; Lladro collector Christmas bells, 10 avail., \$15/ea. 626/798-2531.

LOVE SEAT, leather, claret in color, newly purchased from Robinsons-May, brand new in package, purchased for \$1,088.88 + tax, sell for \$850; RECLINER, fabric, dark green, 3 yrs, \$120; RECLINER, leather, black, 4 mo. old, from Best Buy from \$110 + tax, sell for \$65. 626/462-9597 or 626/298-1017.

MINI DISC PLAYER, with record capability, Sony, remote, 10 blank discs, great sound, tiny, mint cond., \$175/obo. 687-8627, Alberto.

MONITOR, IBM or Compaq, 17", \$95. 951-0000, Nik.

OVEN/MICROWAVE COMBO, Thermador, 21 cu. ft., side-by-side refrig., GE, gas cooktop, Chambers, & ventilating hood; all in exc. cond.; being replaced by new appliances in a soon-to-be-remodeled kitchen; best offer. 248-9561.

PIANO, Yamaha upright in polished ebony, exc. cond., \$2,000. 626/303-1927.

PLAYHOUSE, complete w/kitchen, seats, & table, working door, perfect for 2-yr-old girls & up, perfect cond., \$100. 626/794-4921, Bert.

SCUBA EQUIPMENT: full wetsuit, step in jacket, men's XL, size 7, 180-200 lbs, suitable for diving in California, \$95; tank, alum., 80 cu. ft., never used, \$80; steel 95 cu. ft. at 2650 psi, \$95; steel 72s, \$60. tcf@aprelix.com.

SURFBOARD, 7'1", Rusty Minigun, \$100; VCR, Panasonic, \$20; DVD, Philips \$100; BRIEF-CASE, Zero-Halliburton, \$200; BED SHEETS, full sz., cotton, Ralph Lauren, \$20; PHONE, rotary, Pac Bell, white, \$10. 626/844-9228.

TREES: fish tail, 6' tall, \$80/obo; Ficus, braided, in 30" plastic pot >10" tall, \$250 obo; Ceramic bowl, gray, 2' diameter with planted geraniums, \$40 obo. 626/791-6101.

VACATION CLUB MEMBERSHIP, Silver Lakes, Calif. resort, up to 4 wks free golf each yr. at priv. PGA-rated course w/driving range/putting greens, 2-bd. condo for up to 6, 2 large lakes, many amenities, less than 2 hrs. from Pasadena, exchange rights w/3,000 resorts, reduced to sell due to illness, \$15,000. 805/967-7725.

WALKING JOINTER, for grooving joints in concrete slabs and walkways, 1/2" radius, with 6 ft. extension, new, \$45. 249-6071.

WASHER, Whirlpool, 2.5 cu. ft., 1 year old, like new, barely used, exc. cond., shipped by buyer, \$230. 323/8991688.

WASHER/DRYER, Kenmore, electric 220v dryer, 4 years old, great cond., extra large capacity, can deliver if close to Arcadia area, \$200/both. 626/582-8562, Eric.

WASHER/GAS DRYER, stacked, Kenmore, x-large capacity, white, used one year, over \$1,000 new, sell \$475. 626/836-4767.

Vehicles / Accessories

'89 ACURA Legend coupe, great cond., single owner, dark green w/gold trim, pwr. win/locks, sunroof, AM/FM cassette, 95K mi., \$6,250/obo. 626/355-5939.

'96 CHEVROLET Tahoe LT, 4WD, auto, tow pack, alloy wheels, leather, gold color, loaded, 95,000 mi., \$11,000. 626/332-2320.

'93 CHEVROLET Cavalier RS, convertible, red, auto, power windows/doors/locks, must sell, \$2,500/obo. 626/357-4849, Tony.

DIAGNOSTIC SCANNER, for domestic vehicles, from 1981-94, bi-directional capabilities, LED display, all cables and manual, exc. cond., \$275. 249-6071.

'68 FORD Mustang Classic Calif. Special GT/CS, hi-perf. 302 cid, 75K orig. mi., auto, fac. A/C, PS, AM radio, metallic gold paint, black interior, GT hood, trunk, fogs and wheels, no rust, turns heads, \$13,250/obo. 626/963-5727.

'97 HONDA Valkyrie motorcycle, exc. cond., very clean, many extra chrome parts, garage kept, low mileage, leather bags. 957-2852.

'94 HONDA Nighthawk 250cc, 2,500 mi., exc. cond., kept in garage, \$1,500. 562/693-1136.

'91 HONDA Civic DX, 5 spd. man., air, AM/FM stereo/cassette, org. paint/int., new tires, \$4,000/obo. 213/229-2980, Humaid.

'88 HONDA Accord LXI hatchback coupe, silver-gray with brown interior, a/c, pwr. windows/mirrors, AM/FM/cassette stereo, 5-spd, good cond. \$2,000. 661/299-4999.

'94 INFINITI J-30, orig. owner, recent major maintenance, inc. tune-up, new timing belts, new alternator, seals, water pump, trans. service, etc; full pwr., loaded w/ options, leather, sunroof, ABS, alarm, air, Bose AM/FM/CD/tape, 111K mi. \$8,500. 661/424-1420.

'91 INFINITI G-20, Sunroof, air, auto, cassette/stereo, \$2,100. 957-3675.

'95 MERCEDES-BENZ C280, exc. cond., automatic, ABS, a/c, power locks/windows/mirrors/seats, AM/FM/cassette/CD, white, 54,000 mi., \$17,500/obo. 323/254-5685.

'94 NISSAN Quest XE minivan, gold, original owner, mint condition, 140K mi., V6 3.0 L engine, full maint. records, new tires, ABS brakes, full power, am/fm/cassette, automatic, towing package, tinted windows, alloy wheels, roof rack, \$6,000/obo. 248-2395.

'96 OLDSMOBILE Cutlass Supreme SL, 4 dr. sedan, white, 3.1L V6, auto, 95K, \$5,000. 626/798-5110, Rich or Priscilla.

'98 RANGE ROVER, 51K mi., extended full warr., grn., w/cream int., \$29,750. 626/798-2531.

'98 TOYOTA Camry LE, exc. cond., automatic, a/c, power locks/windows, sage, 1 yr. of warranty remaining, 63,000 mi., Blue Book value \$12,960. 626/797-6388.

'94 TOYOTA Camry LE, beige, automatic, 4-door, dual air bags, a/c, AM/FM/cassette, pwr. steering/locks/windows/mirrors, tilt wheel, cruise cont., exc. cond., one owner, very low mi. 47K, \$6,800. 468-6558.

'01 VOLKSWAGEN Beetle GLS, silver/black leatherette, 5 spd., pwr. locks, windows, & mirrors, cruise, alloys, AM/FM cass., CD changer, fog lights, ABS, remote keyless entry, 11K mi., \$16K. 626/449-0997.

Wanted

ARTHRITIS PATIENTS, invited for free one-year, 6 visit Pasadena research clinical trial, age 50-plus, Marilyn. 626/403-6312, leave phone no., address for mailing.

HOUSING, Caltech grad, starting as a JPL postdoc in Oct., seeking a 2-bedroom apt. in Pasadena, preferably not too far from Caltech, or a small 2-bedroom home in the Pasadena area, unfurnished or furn. 626/296-3271.

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

VOLLEYBALL PLAYERS, coed, no beginners please, Tues. nights 8 to 10:00 at Eagle Rock High School, \$3/night. 956-1744, Barbara.

WAREHOUSE, non-profit Foothill Unity Ctr. in Monrovia needs donated space from Nov. 1-Dec. 27, preferably in Monrovia/Duarte/Arcadia area; will be used for storage/distribution of Thanksgiving food boxes, Xmas food boxes/ gifts collected from the community. 626/358-3486 or 626/797-1310, Betty McWilliams.

Free

CATS: gray tabby, female, found, 1 yr old, very sweet, spayed, not dog-friendly; rescued healthy male, 9 wks. old, fluffy gray Tabby, litter trained, very cute; mama kitty, 1 yr. old, short hair, gray Tabby, spayed, healthy, litter trained. 626/287-9433.

FIREWOOD, elm. 352-9288.

REFRIGERATOR, 17.1 cu. ft. top freezer, off-white color, works great, can deliver near Arcadia area. 626/582-8562, Eric.

RUBBLE ROCK, turned up from backyard in foothill area, several different sizes, you haul. 957-7623 or erik@hovland.org.

For Rent

ALTADENA, 1-bd. guesthouse, fenced yard, secure, clean quiet, washer/dryer, Florencia area, above E. lot, walk to JPL must like dogs, \$495 + 1/3 utilities, \$600 security deposit. 626/794-6076.

LA CANADA, private rm. in home, with private bath, off-st. parking, BBQ, pool, full kitchen priv., wash/dry, etc., \$450-util. 952-5430.

PASADENA, charming 2 bd., 1 ba., nr. Christmas Tree Lane, with large fenced lot, ideal for young JPL family, includes gardener, \$1,300. 210/647-7735 or 218/887-7735.

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 1/2 w/FP, end unit, firm. d/r, hdwd. flrs., immac. cond., close to schls. \$1,750. 626/396-9024.

PASADENA, townhouse to share, will have own master bd. & office, very spacious, close to JPL and Old Town, \$600. 626/818-7455.

PASADENA apt., 1 bd., 1 ba., everything completely new, walking dist./PCC; stove, refrigerator & basic util. included, \$925. 590-2793.

Real Estate

N. MONROVIA home, quiet cul-de-sac, 4 blks. north of Foothill, 3 bd., 2.25 ba., lv. rm. w/ vaulted ceiling & skylights, fireplace, dining room + breakfast nook, master suite w/dressing area/vanity, plenty closet space, 1,615 sq. ft., central heat/air, 2-car attached garage, new roof, beautifully landscaped, priv. backyard, auto sprinklers, \$479K. 415-3814.

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.

HAWAII, Kauai, 1 bd. condo w/full kitchen, on beach, tennis courts, pool, spa, nr. shopping, restaurants, 1 week (8 days 7 nights), \$550. 626/568-3215.

HAWAII, Kona, ocean front on Keauhou Bay, house / guest house comfortably sleep 6, 3 bd., 2 ba., rustic, relaxing & beautiful, swim-ming, snorkeling, fishing, spectat. view, near restaurants, golf & 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, jackandrandy@cox.net.

INCLINE VILLAGE timeshare, near Tahoe, large 2 bd., 2 ba., full-size condo. 909/986-4611, evenings.

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, fish ponds, close to Mammoth Creek, JPL discount. 626/798-9222 or 626/794-0455.

OCEANSIDE condo, fully furn., 2 bd., 2 ba., fireplace, full ktch., quiet, relaxing, beautiful beachside setting; BBQ, pool, spa, game rm.; great ocean view, easy walk to pier & restaurants, sleeps 8, avail. weekly or monthly. 909/981-7492 or dfhaug@yaho.com, Darlene.

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

ROSARIO 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.