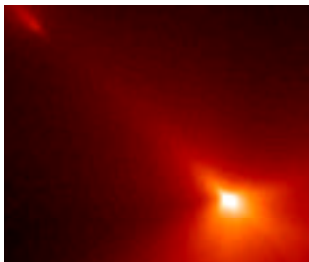


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What are the odds? Ulysses meets Hyakutake

By Jane Platt



The Ulysses spacecraft unexpectedly passed through the tail of Comet Hyakutake, above.

during an unplanned rendezvous, JPL's Ulysses spacecraft found itself gliding through the immense tail of Comet Hyakutake, revealing that comet tails may be much, much longer than previously believed.

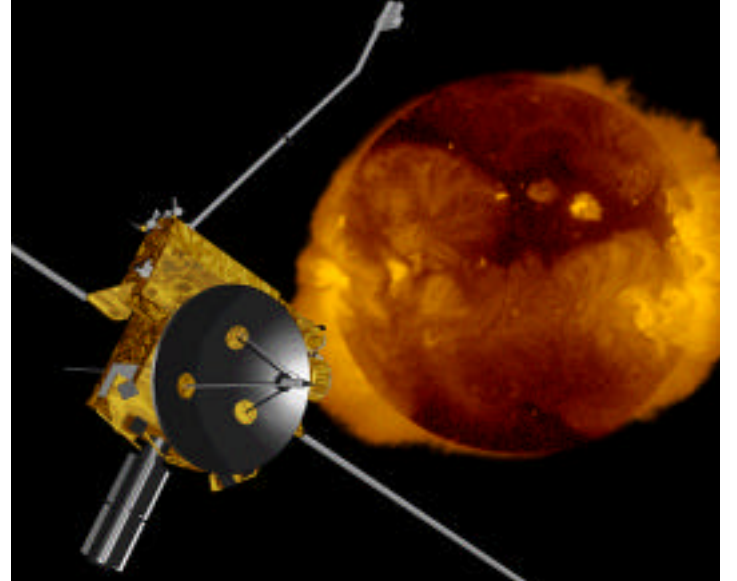
"The odds that Ulysses' flight path would intersect the comet tail were probably less likely than someone breaking the bank at Monte Carlo," said Ulysses Project Scientist Dr. Edward Smith of JPL, the co-investigator for its magnetometer instrument. Before the unexpected encounter, Ulysses was hundreds of millions of kilometers, away from Comet Hyakutake and far beyond the visible tail.

"This tail extends half a billion kilometers (more than 300 million miles). That's more than three times the distance from the Earth to the Sun" said Dr. Nathan Schwadron of the University of Michigan, a member of one of two Ulysses teams that made the discovery independently of one another. Findings from both teams appear in the April 6 issue of the journal Nature.

"This makes it the longest comet tail ever recorded," said Dr. Geraint Jones from Imperial College, London, of the Ulysses magnetometer team.

Comet Hyakutake, one of the brightest comets of the 20th century, made a dazzling nighttime appearance in the spring of 1996, when it made a close pass by the Sun. While Ulysses was cruising through space studying the solar wind on May 1, 1996, its data suddenly went wild for a few hours. For example, the solar wind seemed to almost disappear and was replaced by gases not normally found in the solar wind, and the magnetic field in the solar wind was distorted. Since Ulysses scientists were not looking for comets, they did not realize the significance of the data right away.

"The discovery was made quite by accident, a bit like finding a needle in a haystack when you weren't even looking for a needle in the first place," said Dr. George Gloeckler of the University of Maryland, principal investigator of the Ulysses solar-wind ion-composition spectrometer team. The instrument studies the content and electrical charge of ion-



ized gases. While his team detected ions typically found in comets, the magnetometer team observed magnetic field directional changes like those associated with comet tails.

Comets are of great interest, because they may be the frozen leftovers of the birth of our solar system. They could hold clues to the formation of Earth and life, since one theory holds that comets "seeded" Earth and other planets with the building blocks of life.

Comets are made of dirty ice, and as they approach the Sun and heat up, they emit gas and dust, forming gas and dust tails. The gas slows the solar wind and the portion of the magnetic field near the comet. The parts of the magnetic field farther from the comet continue to travel rapidly past it. Magnetic fields can be stretched like rubber bands. The magnetic field is draped around the comet and stretches out behind it in a hairpin shape.

Gavin named to head new directorate; Naderi will lead Mars program



Tom Gavin



Dr. Firouz Naderi

JPL Director Dr. Edward Stone has announced the appointment of Thomas Gavin to the position of director for Space Science Flight Projects (400), and Dr. Firouz Naderi as manager of the newly created Mars Program Office at JPL.

Gavin has been the deputy director for Space and Earth Science Programs since 1997. He received his bachelor of science degree in chemistry from Villanova University in 1961 and joined JPL the following year to work on the Mariner Project. He was the mission assurance manager for both the Voyager and Galileo Projects. In 1990, he was appointed spacecraft system manager for the Cassini mission and remained in that position until the successful launch of the spacecraft in 1997.

Gavin received NASA's Exceptional Service Medal in 1981 for his work on Voyager, NASA's Medal for Outstanding Leadership in 1991 for Galileo, and NASA's Outstanding Leadership Medal in 1999 for Cassini. In 1997, he received the Aviation Week and Space Technology magazine's Laurels Award for outstanding achievement in the field of space.

Naderi had been the manager of NASA's Origins Program since 1996. He joined JPL in 1979 and has served as program manager for space science flight experiments

and project manager for the NASA Scatterometer project. In addition, he was program manager at NASA Headquarters for the Advanced Communications Technology Satellite program and at JPL for the Mobile Satellite program.

Of his new position, Naderi noted, "With a program of this complexity, the challenge is half technical and half sociological. My office will need to make sure the interfaces between JPL, NASA Headquarters and outside industry work extraordinarily smoothly." Within JPL, he stressed the need for cohesion between the Mars program and other organizations, particularly the new Space Science Flight Projects Directorate.

Naderi noted the importance of "shared expectations" with Scott Hubbard, the new Mars Program director at NASA Headquarters. Hubbard will oversee the development and implementation of the long-term strategy for the robotic exploration of Mars, as well as for the program's architecture and management of related funding. Naderi's office will serve as the single point of contact for NASA Headquarters at JPL for all Mars exploration efforts.

A native of Iran, Naderi holds three degrees in electrical engineering: a bachelor's from Iowa State University and a master's and doctorate from USC.

Directorates reorganize; deputies named

Concurrent with the appointments of Gavin and Naderi, three JPL managers have been named deputy directors.

Larry Simmons, program manager for the Space Infrared Telescope Facility (SIRTF), retains that position and has been named deputy director for Space and Earth Science Programs. Simmons will also serve as acting manager of the Origins Program.

Chris Jones, former manager of the Mars Surveyor Program Office, has been named deputy director for Space Science Flight Projects, and Telecommunications and Mission Operations Directorate (TMOD) Program Manager Richard Coffin has been appointed deputy director for TMOD.

In light of the recent announcement that operations management for space science missions will be carried out by TMOD, the following organizations have been transferred from the Space and Earth Science Programs Directorate to TMOD.

- Mars Surveyor Operations Office (707) is renumbered 907.
- Stardust Project Office (755) is renumbered 908.
- Deep Space One Project Office (756) is renumbered 909.

In addition, a number of organizations have been transferred from the Space and Earth Science Programs Directorate into the new Space Science Flight Projects Directorate (400).

- X2000/MDS Integrated First Delivery Project Office (751) is renumbered 460.
- Outer Planets/Solar Probe Project Office (752) is renumbered 470.
- Mars Surveyor 2001 Project Office (754) is renumbered 410.
- Mars Micromissions/Mars Network Project Office (757) is renumbered 440 and renamed Mars TeleSat Project.
- Genesis Project Office (758) is renumbered 480.
- Deep Impact Project Office (759) is renumbered 490.
- Space Infrared Telescope Facility (SIRTF) Project Office (762) is renumbered 450.
- Galaxy Evolution Explorer (GALEX) Project Office (768) is renumbered 406.
- Muses-CN Project Office (7961) is renumbered 405.

News Briefs



Dr. Parvin Kassaie

The challenge of finding habitable, Earth-like planets "is like trying to locate a firefly next to the beam of a brilliant searchlight."

*Dr. Charles Beichman
Terrestrial Planet Finder
project scientist*



*Artist's concept of the
Terrestrial Planet Finder*

Educational Affairs manager named

DR. PARVIN KASSAIE has been named manager of JPL's Educational Affairs Office 185, a section of the Office of Communications and Education (180).

Kassaie will oversee the Educator Resource Center, Learning Technologies Project, pre-college and university programs, minority science and engineering initiatives, and a number of other educational and outreach efforts on Lab.

Previously, Kassaie worked for nine years at the UCLA Center for Experiential Education and Service Learning, where her work involved both K-12 and university activities. She has also served as an advisor to government officials involved in statewide California educational issues regarding systemic educational reform.

She said in addition to continuing to focus on issues in California, her other goals include closer collaboration with outreach, and creating new opportunities for researchers in social sciences and humanities to become engaged with JPL.

Kassaie holds a bachelor's degree in sociology and urban studies from Cal State Northridge and master's and doctorate degrees in sociology from USC.

Lab trains teachers to train teachers

JPL trained 33 educators from 22 states to inspire and educate other teachers to share the wonders of the solar system with students during a Solar System Educators Institute on Lab March 26 through 29.

The educators, taking part in the Solar System Educator Fellows program, learned techniques for training other teachers to use current space missions to help kids learn math and science. Back in their home states, each educator will train approximately 200 additional colleagues.

NASA/JPL missions participating in the institute include Cassini, Stardust, Deep Impact, Galileo, the Mars Exploration Program, the Outer Planets/Solar Probe Program, and the Deep Space Network.

Twenty-five additional educators will be selected to take part in another Solar System Educators Institute at JPL Aug. 1-5. The Solar System Educators Institute program is managed by Space Explorers Inc., DePere, Wisc., and the Virginia Space Grant Consortium, Hampton, Va., as an element of NASA's Office of Space Science Education and Public Outreach Program.

Planet Finder contracts awarded

JPL has awarded contracts to four industrial-academic teams to design Terrestrial Planet Finder, an ambitious mission in the Origins Program that will look for possible life-supporting planets around other stars.

The teams, which will spend the next two years developing mission concepts, are led by Ball Aerospace of Boulder, Colo.; Lockheed Martin Space Systems of Sunnyvale; TRW of Redondo Beach; and SVS, Inc. of Albuquerque, N.M. About 75 scientists from 30 universities and research institutions, 16 industrial firms, and two NASA centers are represented on the teams.

The challenge of finding habitable, Earth-like planets "is like trying to locate a firefly next to the beam of a brilliant searchlight," said Terrestrial Planet Finder Project Scientist DR. CHARLES BEICHMAN of JPL.

The solution depends on developing a whole suite of challenging technologies, including those necessary to fly several 3.5 meter (137-inch) telescopes in a formation so precise that their positions will be known to a fraction of a centimeter, even though the space between them will span a few football fields. The mission's success will also depend on the ability to cancel out a star's glare so that a planet 1 million-times fainter can be seen, and will require instruments so sensitive that they can identify the presence of life-sustaining chemicals on a planet up to 50 light years away from Earth.

Terrestrial Planet Finder is planned

for launch in 2012. Over a five-year period, it will take a look at 250 stars to determine which ones may have orbiting, life-sustaining planets.

SRTM astronauts to visit April 20

Members of the astronaut crew that flew onboard Space Shuttle Endeavour for JPL's Shuttle Radar Topography Mission (SRTM) are scheduled to visit the Lab April 20 to present a briefing on the mission and meet JPL staff.

Astronauts DOMINIC GORIE, JANET KAVANDI, KEVIN KREGEL, GERHARD THIELE and JANICE VOSS will show a video presentation from 11 a.m. to noon in von Kármán Auditorium, and will greet JPLers in the mall until 12:30 p.m.

Improvements noted on ELIAS

The Electronic Labwide Information Access System (ELIAS), JPL's internal Web site, is undergoing a redesign effort, some features of which are already in effect.

The site is available at <http://elias.jpl.nasa.gov> or by clicking on the words "Jet Propulsion Laboratory" on the external JPL home page (<http://www.jpl.nasa.gov>).

The new "JPL Basics" section toward the bottom of the home page offers the following features:

- JPL Online Yellow Pages, with search and update capabilities
- JPL Online Phonebook: a direct link to employee phone numbers, e-mail addresses, locations, mail stops, badge numbers and organizations
- Interactive maps of JPL: zoom in on a specific building or area of the Lab; printable maps are available
- Timecard log-in: a feature useful for traveling JPLers
- JPL Conference Rooms: provides room number and capacity, as well as a contact name for reservations
- Integrated Help Services: a portal to the services provided by all of JPL's different groups and divisions, including contact names and phone numbers.

Another new category is a collection of links called "JPL News," which includes recent news and announcements from the Director's Office as well as an online version of This Week and copies of recent e-mailings to all personnel.

The ELIAS redesign effort, led by JAYNE DUTRA of Section 389 under the auspices of JPL's Knowledge Management Project, also includes renovations of the search engine and user interface with the eventual goal of implementing a Labwide portal in the fall.

For more information, call Dutra at ext. 4-6948 or customer service representative CHARLOTTE MARSH at ext. 3-4504, or send an e-mail.

Internship deadline extended

The deadline for applications to the two-year JPL Architect Development Program internship has been extended to Friday, April 21.

Those interested must submit a current resume and a one- or two-page letter of interest, including why you should be considered for the class of 2002. Concurrence by your division manager is required. Send to MARIA RAYGOZA, HR Staffing, mail stop T-1720-C.

For more information or to start the application process, visit the ADP Web site at <http://eis/adp>, or contact BILL CHRISTENSEN at ext. 4-2096.

Cyclists can join Caltech group

JPL staff who bicycle to work are invited to register at Caltech's Cyclo-commuters Web site (<http://www.its.caltech.edu/~cyclocom>).

A random drawing is held monthly for a \$30 gift certificate to a local bike store, and long-distance riders can log in their miles for a chance to win additional prizes every six months.

The group will sponsor Commuter Fair Day on May 19, which will include free bike tune-ups.

For more information, contact Cyclocommuter coordinator LAUREL MARTIN at (626) 395-6868 or laurel@caltech.edu.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meeting at 11:30 a.m. Mondays, Tuesdays, Thursdays (women only) and Fridays. Call Occupational Health Services at ext. 4-3319.

Codependents Anonymous—Meets 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 employee assistance counselor Cynthia Cooper at ext. 4-3680 or Randy Herrera at ext. 3-0664.

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

Senior Caregivers Support Group—Meets the second and fourth Wednesdays of the month at 6:30 p.m. at the Senior Care Network, 837 S. Fair Oaks Ave., Pasadena, conference room #1. Call (626) 397-3110.

Saturday, April 15

Battlefield Band—The Scottish band will perform Celtic music using a blend of bagpipes, guitar, cittern, synthesizer, fiddle and vocals. Held at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$25, \$21 and \$17. Call (626) 395-4652.

Sunday, April 16

Chamber Music—The Skampa Quartet and baritone Christopheren Nomura will perform at 3:30 p.m. in Caltech's Beckman Auditorium. Tickets are \$25, \$21, \$17 and \$13. Call (626) 395-4652.

Tuesday, April 18

Help for Caregivers of the Elderly—Adria Emberson of the Huntington Hospital Senior Care Network will discuss how to assess, plan and manage the needs of an aging family member; caregiver responsibilities; family relationships and how to care for yourself while caring for the senior in your life. To be held at 11:45 a.m. in von Kármán Auditorium. The talk is hosted by JPL's Employee Assistance Program, which is also interested in starting a monthly senior caregivers' support group on Lab. Call ext. 4-3680.

Investment Advice—Fidelity representative Jason Rasmussen will hold a workshop on the basics of investing from noon to 1 p.m. in the 167 cafeteria's northeast corner. Included will be a broad overview of the financial markets, basic investment building blocks such as stocks, bonds, mutual funds and annuities, basic terminology and concepts and hands-on exercises. Rasmussen will also be available for one-on-one counseling. To schedule an appointment, contact Fidelity at (800) 642-7131.

Retirement Information—Cindy Wilson of TIAA/CREF will conduct an information meeting for all employees who have completed or will soon complete their eligibility requirement for retirement plan participation, or for new hires eligible to join the retirement plan. Assistance in completing applications and investment option information will be available. To be held at noon in Trailer 1720.

Wednesday, April 19

JPL/Caltech Flying Club—The spring membership meeting will be held at 7:30 p.m. in 269 Lauritsen Hall at Caltech. Greg Feith of the National Transportation Safety Board will give a presentation on accident investigations. The meeting is open to anyone with an interest in aviation including those who want to learn to fly. Call Bob Ferber at ext. 4-3463 or Peter Gluck at ext. 4-9425.

Remote Access—Bill Vlahos of Section 366 will discuss how to get the most out of dial-in and Virtual Private Network access services to the JPL network. The JPL remote access service handles more than 25,000 sessions and 1.5 million online minutes per month for its 2,700 users. Held at noon in von Kármán Auditorium.

Thursday, April 20

JPL Astronomy Club—Meeting at noon in Building 198-109.

"The Importance of Fatherhood in Our Culture"—Rick Kidd, a Sierra Madre-based marriage and family counselor who specializes in the needs of school-age children, is the school counselor at St. Marks Elementary School in Altadena. He will speak at noon in Building 167-111.

Von Kármán Lecture Series—Dr. Michael Shao will describe the Space Interferometry Mission, whose scientific goal is to find new planets that are about the size of Earth and in an orbit that can potentially support life. Held at 7 p.m. in von Kármán Auditorium. Open to the public.

Friday, April 21

JPL Hiking Club—Meeting at noon in Building 303-209.

Von Kármán Lecture Series—Dr. Michael Shao will describe the Space Interferometry Mission, whose scientific goal is to find new planets that are about the size of the Earth and in an orbit that can potentially support life. Held at 7 p.m. in The Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.

Saturday, April 22

Irish Songs—Singer/songwriter Eileen McGann will appear at 8 p.m. in Caltech's Dabney Lounge. Tickets are \$12 for adults, \$4 for children under 12. Call (626) 395-4652.

Monday, April 24

"Women and Investing"—Certified financial planners Sharon Sherbert and Kenneth Marinace will conduct a seminar at noon in the Building 167 conference room. Sponsored by the Director's Advisory Council for Women.

Wednesday, April 26

JPL Toastmasters Club—Meeting at 5:30 p.m. in the Building 167 conference room. Guests welcome. Call Mary Sue O'Brien at ext. 4-5090.

Thursday, April 27

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

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

JPL Stories—Retiree Al Hibbs will present "JPL and the Space Program—How it Began and How We (With the Help of the Russians) Began It" at 4 p.m. in the customer services area of the Library, west end of Building 111, room 104. For questions about the story series or participation information, call Teresa Bailey at ext. 4-9233.

Saturday, April 29

Toying With Science—The scientific principles of gravity and leverage, simple machines, human imagination and more will be explored at 2 p.m. in Caltech's Beckman Auditorium. Presented in collaboration with Pasadena's Kidspac Museum. Tickets are \$10 for adults, \$5 for children. For information, call (626) 395-4652.

Lab research helps track arctic ozone loss

By Mary Beth Murrill

The colorful appearance of these polar stratospheric clouds over Kiruna, Sweden, on Jan. 27 is due to the small size of their droplets and their high altitude, approximately 21,300 meters (70,000 feet). The small droplets in the clouds result in separation of light of different colors due to refraction of sunlight. Their high altitude allows for full solar illumination for up to 20 minutes following sunset at the ground. These clouds, which have long been called "Mother of Pearl" by Scandinavians, participate in a chain of events that leads to ozone depletion by human-produced chlorine.



A team of JPL and other atmospheric researchers just back from an international science expedition to study atmospheric ozone in the Arctic reports that ozone losses of more than 60 percent occurred in the Arctic stratosphere this winter (1999-2000), one of the coldest winters on record.

The NASA-sponsored SAGE III Ozone Loss and Validation Experiment (SOLVE) was motivated in part by concerns that the increase in the amount of greenhouse gases might lead to a cooling of the polar lower stratosphere, which could lead to more frequent polar stratospheric clouds and enhanced ozone depletion. Data collected by the research team will greatly improve scientific understanding of the role of global temperature change in the destruction of ozone.

The Earth's ozone layer protects Earth's life from the harmful effects of the Sun's ultraviolet radiation. Chemicals used in refrigerants, aerosol propellants and plastic foams were discovered in the 1970s to be destroying Earth's ozone layer. Since that time, production of the most harmful chemicals has been limited or halted in an effort to stop the destruction of the ozone layer.

High-altitude clouds (at about 18 kilometers or 70,000 feet) that exist only at the poles are called "polar

stratospheric clouds." They play a unique role in atmospheric ozone loss. The visually beautiful, opalescent clouds form only at the cold temperatures found at the poles. These clouds help trigger the conversion of chlorine from relatively non-reactive forms into chlorine monoxide, which, in combination with sunlight, destroys ozone.

The buildup of greenhouse gases in the lower atmosphere acts like a blanket that traps heat nearer to Earth's surface and can lead to colder conditions in the upper atmosphere. Long-term temperature records show evidence of cooling of the stratosphere at mid-latitudes. However, computer simulations suggest this cooling mechanism should only have a small effect on the polar stratosphere.

Recently, however, scientists have become concerned that circulation changes in the stratosphere, perhaps related to the build-up of greenhouse gases, may be responsible for the recent spate of cold Arctic winters.

"The polar stratospheric clouds covered a larger area, and persisted for a longer period of time, than for any other Arctic winter during the past 20 years. These conditions heighten our concern regarding possible couplings between climate change and stratospheric ozone depletion," said JPL ozone researcher Dr. Ross Salawitch. Even

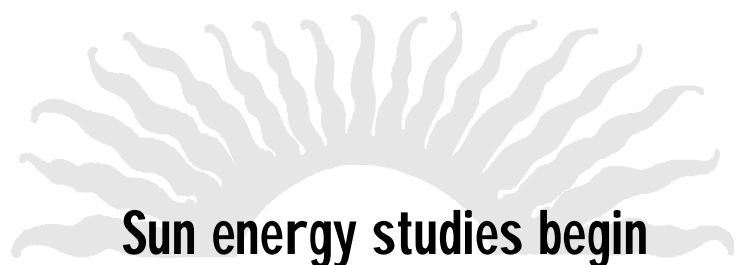
as the amounts of stratospheric chlorine and bromine decline, "the chemical depletion of Arctic ozone would still be prolonged if temperatures in the Arctic continue to decline."

The new findings bolster views that the ozone layer is sensitive to temperature as well as ozone-destroying chemicals.

The U.S. portion of the effort involved a high-altitude balloon from JPL and two aircraft from NASA/Dryden Flight Research Center in California, including a DC-8 and an ER-2—the civilian variant of Lockheed's U2 reconnaissance aircraft. (The flight over Russian territory during the experiment was the first flight over the former USSR by a such an aircraft since U.S. pilot Francis Gary Powers' U-2 was downed during the Cold War.)

The U.S.-sponsored team joined with a European Union-sponsored Third European Stratospheric Experiment on Ozone to obtain measurements of ozone and other atmospheric gases and particles using satellites, airplanes, balloons and ground-based instruments. JPL and Caltech instruments were used on each of the high-altitude balloon and aircraft platforms.

Most of the measurements were made near Kiruna, Sweden with additional measurements made from a network of stations at mid- and high- northern latitudes. Observations obtained from JPL's Microwave Limb Sounder satellite instrument provided a global perspective.



Sun energy studies begin

The Active Cavity Irradiance Monitor Satellite on April 3 began taking raw science measurements of the Sun's total energy output following successful pointing of the spacecraft and its instrument.

The satellite, launched Dec. 20, 1999, is in a Sun-synchronous orbit at an altitude of about 695 kilometers (429 miles). It measures "solar irradiance," or the total amount of the Sun's energy that enters Earth's atmosphere-ocean system. The mission is part of a multi-decade effort to understand variations in the Sun's output and resulting effects on Earth.

"All systems are go and operating within specifications," said Project Manager Ron Zenone of JPL. "We look forward to extending the scientific database on solar measurements."

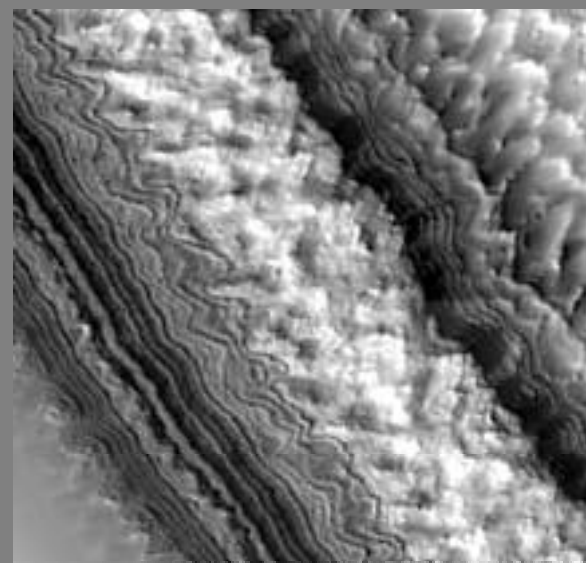
Since its launch from Vandenberg Air Force Base, many in-flight characterization tests of the spacecraft and instrument have been conducted. The

performance of the spacecraft's attitude-control subsystem, which governs its orientation in space, was adjusted through changes to flight software to improve attitude stability.

The program's next milestone is a review of spacecraft operations. The manufacturer of the spacecraft, Orbital Sciences Corp., McLean, Va., is currently operating the satellite. Following a successful "hand-over" review, satellite operations will be taken over by JPL for the five-year mission.

Previous measurements have demonstrated that the total radiant energy from the Sun was not a constant. However, the solar variability was so slight (0.1 percent) that continuous monitoring by state-of-the-art instrumentation is necessary. Researchers theorize that as much as 25 percent of the anticipated global warming of Earth may be solar in origin.

Mars' south polar layered terrain unexplained



New images from JPL's Mars Global Surveyor may help scientists understand what materials make up the exotic, multi-layers of the South Pole. Scientists theorize that the thickness and the composition of the layers in Mars' south polar region could hold a record of climate change in a way that is similar to how years of drought and years of plentiful rain change the width of rings in a tree trunk on Earth. The layers may be made up of frozen carbon dioxide, water ice and fine dusts that have been eroded over time. Mars Global Surveyor images are available at <http://www.msss.com>.

Passings

MALVIN YEATER, former assistant Laboratory director for the Office of Technology and Applications Programs and manager of JPL's All Source Analysis System Development Project, died of a heart attack March 22. He was 68.



Malvin Yeater

A native of Iowa, Yeater joined JPL in 1964 as a development and systems engineer for the Deep Space Network. He progressed to positions of increasing responsibility and in 1987 was named project manager for ASAS, which was sponsored by the Department of Defense. From 1991 to his retirement in 1993, he served as assistant Lab director for TAP.

Yeater is survived by his wife, Gladys, son Andrew and daughter Ann. Services were private. Memorial contributions are requested to the theatre group Fabulous Monsters, Robert Prior, Director, 4401-1/2 Westdale, Los Angeles, 90041.

ROBERT HAGOOD, 53, a senior engineering assistant on long-term disability from Section 382 since 1991, died of complications from multiple sclerosis Jan. 8.

Hagood joined the Lab in 1977. He is survived by his wife, Susan, of Section 312 and cousin Judi (Hagood) Dedmon of Section 644.

Services will occur in space from Vandenberg Air Force Base by Celestis Inc. of Houston. Cabot & Sons of Pasadena handled arrangements.

Letters

Thank you for the plants. Your expression of sympathy brought us comfort. Please accept our heartfelt thanks.

Richey Martin & family

Love begins with a smile, grows with a kiss, ends with a tear. The sudden loss of my younger brother has left me with a heavy heart. Through the kindness of my friends and co-workers at JPL, the burden of loss has been eased. A special thanks to Section 262 for the cards and letters, to Section 265 for the beautiful bouquet, to the ERC for the lovely plant: a living reminder of my brother Rick.

Take a moment each and every day to express your love to family and friends. I loved my brother and didn't tell him often enough.

Cindy Stewart

To all our friends at JPL . . . my family and I thank you for all your good wishes and great send-off at my recent retirement. Your thoughtfulness is truly appreciated.

John Ashlock

Classifieds

For Sale

AIR COMPRESSOR, Dayton Speedaire, industrial duty, 1 hp, exc. cond., \$250. 626/398-0921.

AVIATION EQUIP., all lightly used; headsets, Telex ANR 4000 active noise cancelling, \$225; AvComm & Softcomm passive noise cancelling, \$35/ea.; radio, Sporty's 760 ch., handheld, VOR capability, headset, a/c adapt., \$150; flight case, Ig., Jeppesen, 4 binders, \$50; jacks, aircraft, pr., PA-28 or PA-24, \$200. 772-7611, Steve, 10am-7pm only.

CAMERA, Sony Mavica, dig., 10X zoom, new cond., orig. \$499 + tx., sell \$339; REMOTE, new, for all Sony components incl. big screen, \$19; SHARING DEVICE, Belkin, 4 to 1 peripheral w/gold IEEE cable, orig., \$99, sell \$49; CABLE, new, high speed, for ATA66 HD, orig., \$20, sell \$7; CDs, new, HP, recordable, \$2. 366-6134.

BED, child's, solid oak, infant to adult, changing table converts to desk, drawers, \$350. 957-8463.

BED SET, twin day bed w/hideaway folding twin bed underneath, cream, ornate, tubular metal head/side/footboard, 4 tubular pillows, bedspread, pillowcases, etc., \$275. 363-1328.

BICYCLES, 2, 12-spd., \$30 & \$50; POOL PUMP, gas w/1.5" fire hose, \$35; LAMP w/shade, Czech. crystal, \$60; ROTO-TILLER, Massport, \$95; ENGINE STAND, prof. qual., \$95; TYPEWRITER, Olympia, elec. wide carriage, \$40; BEDROOM SET, dresser, end tbls, lamps, & dbl. sz. headbd./matt., \$335; CHAIR, cane-back, needs recaning, \$30. 790-7220.

CHAIR & LOVE SEAT, antique, Victorian, ladies, hand-carved circa 1860, velvet, needs some work, \$1,500 firm. 626/355-8409.

COFFEE TABLE & matching end table, oak; ROCKING CHAIR, bamboo. 626/359-7666.

COMFORTER, Fieldcrest, dust ruffle, pillow sham set, full sz., exc. cond., \$30; STEAM IRON, GE Power Spray, vg cond., \$15; FLOOR LAMP, black base & pole, off-white shade, gd. cond., \$12. 626/577-8107.

COMPUTER, Mac, 7100/66 MHz 540 MB HD, 32 MB RAM, \$14; ZIP DRIVE, Mac, SCSI, \$40; MONITOR, Apple, 15", multiscan, \$50. 790-7220.

DAYBED w/2nd trundle bed below, \$25; DRYER, electric, apt. sz., \$30; WASHING MACHINE, Hotpoint, 15 yrs. old, \$25. ted1110@earthlink.net.

DESK, lg., 59"x30"x30", 2 dr. & 2 file cabinets, \$80. 626/564-8483, Chris.

EXERCISER, Nordik Track, unused, orig. \$900, \$500/obo. 957-3022, eves.

FILING CABINET, lg., 2 dr., oak, 37"Wx23"Dx28"H, \$75. 548-8454, Molly.

FUTON, wooden, bi-fold, w/thick qn.-sz. mattress, exc. cond., \$200. 550-1405.

GLASS INSERTS, 4, leaded table-tops, for coffee & end table, 20"x24" w/14"x18" beveled glass, \$10 ea. 626/303-1927.

LAWNMOWER, Craftsman rotary, \$50. 626/303-1927.

LAWNMOWER, Honda, commercial snapper, 5 hp gas eng., rear bag, \$300/obo. 626/584-3204 day, 909/592-0780 eve/weekend.

MISC. tools: gardening equip., sawing mac., furn., antique stove, refrigerator, stove, misc. clothes, 2 chest of drawers, black leather suit, coat, skirt, jacket, toys, brick-a-brac, etc. 626/794-0455, Oli.

MOVING SALE, sacrificed prices; TV tbl, wht., \$15; bookshelves, black, easy to disassemble, \$20; lamp, desk, \$8; bed & matt., qn. sz., \$40; vacuum cleaner, \$30; table, wht., \$30; chairs, 4, black, \$5 ea.; phone, 9 mo. old, \$10; all VG cond. 626/683-3451.

POOL, Doughboy, 16' dia., great cond., ladder, pump, cover, acces., \$1,500/obo. 249-9534.

PUPPIES, Jack Russell Terrier, long & short coats, white/black & tri colored, M/F, vaccinations & dewormed, exc. line, received best care, \$500-550. 626/796-7941.

PUPPIES, Springador Retrievers, great for whole family, hunting fanatics too, blk., w/ white markings, mother is Springer Spaniel (akc), father is Labrador Retriever (fence jumper), born March 6, ready for Easter, \$30 ea. to cover declaw removal/first shots, health papers incl., in Barstow off I-15, open to delivery. 760/252-2792, leave msg.

SKATEBOARD, Deck, Blind, model: 9 Lives, 1/2 price, \$25; SNAKE, pet, beautiful red-tailed boa, price negotiable to good home. 952-8455.

SEWING MACHINE, older Kenmore in cabinet, gd. cond., \$40. 951-3467.

SOFA, 90"x36", dark green plaid, hrdwd. trim, 3 cushions, 2 pillows, exc. cond., \$200/obo. 626/358-0443.

SOFA, black leather, 85", \$295; LOVE SEAT, 63", black leather, \$195; BUREAU, 5 drwr., rock maple, 50x33x19, \$125; COMFORTER, qn. sz., Sheridan, duvet cover w/match. pillows/shams, \$150; BED SKIRTS, 2, ecur, \$25; TV CART w/2 drawers, \$20; COMPUTER/PRINTER, Mac Powerbook 145B, \$95, Mac Laserwriter 300, \$195. 626/793-3561.

SOFA & LOVE SEAT, white, camel back, like new, \$200; BIRD CAGE, round, on pedestal, \$30. 909/596-9007.

TABLE, kitch., lg., wooden, formica-topped w/butcher-block pattern, useful for lg. family, 55" across top, matching Lazy Susan for kitch. dining, you p/u, \$25. 909/981-7492, Jim or Darlene.

TELEPHONE, cellular, StarTac 7000g, 1.9pcs, in box w/instr., extra batt., \$275. 548-8454, Molly.

TELEPHONE ANSWERING MACHINE, GE, black, single microcass., voice time/day stamp, hardly used, \$20/obo, 626/844-4383.

YARD SALE: Sat., 4/22, 8 a.m.-3 p.m., 236 E. Palm Ave., Monrovia; microwave, gas lawnmower (nds minor rep.), new whitewash pine coffee tbl & 2 side tbls, comp. equip., books, furnishings, no junk.

Vehicles / Accessories

'95 ACURA Legend LS coupe, 2 dr., black, auto, 104K mi., mint cond., black leather, sunroof, heated seats, alloy wheels, CD changer, remote keyless entry, \$17,000/obo.

'93 ACURA Vigor GS sedan, white/black lthr, auto, sunroof, \$10,500/obo. 626/793-3561.

'91 BUICK Century, limited ed.; 130K mi.; gd. cond. a/c, pwr./win./steer./seat/dr. locks,

tilt wheel, cc: am/fm stereo, premium sound, \$2,499. 626/836-5706, Mike.

'79 CADILLAC Coupe de Ville, new/trans./tires, gd. eng., smogged, \$500/obo. 626/966-2904.

'97 CHEVROLET Tahoe 2 dr., 4 w/d, lthr seats, am/fm, cass./CD, pwr./seats/win., tow pkg., new tires. exceptional paint, custom grille/body, 44K mi., \$25,000/obo. 626/914-1237.

'93 CHEVROLET Lumina APV van, green/gray, V6, 3.1L, auto, 7 bucket seats, 5 removable, a/c, rear air, cc, am/fm/tape w/CD jack, pwr./steer./win./locks, tilt whl., ABS 4-whl. braking, privacy glass, very gd. cond., 93K mi., \$7,500. 909/981-7492, Jim or Darlene.

'91 CHEVROLET Corvette, blk/blk, sharp, glass roof, a/c, pwr. steer./win/dr. locks, tilt wheel, cc, am/fm cass., premium sound, ABS, leather, dual pwr. seats, alloy wheels, 122K mi., \$10,490. 909/374-2426.

'84 CHEVROLET Silverado, 3/4 ton pickup, 454 CI eng., rack, AT, PW, a/c, Sony radio, clean, runs gd., \$2,900. 957-8463.

'95 FORD Mustang, 3.8L V6, 5 spd. manual, 52K mi., silver, a/c, pwr. everything, cc, stereo, CD/cass., dual airbags, no wrecks, \$8,500/obo. 249-0038.

'89 FORD Pony Escort, 2 dr., blue, manual, 126K mi., gd. cond., all orig., no accidents, \$1,000/obo. 805/523-7246.

'72 FORD Thunderbird, classic, auto, V8, white leather int., VG cond., \$1,800/obo. 626/359-8840.

'96 HONDA Accord EX, exc. cond., 5-spd., 4 dr., dark green, 64K mi., new tires/brakes, all pwr., sunroof, orig. owner, 6-disk CD w/ prem. sound, \$13,500/obo, 626/836-9254.

'94 HONDA Civic DX coupe, red, air, alarm, tint, 5 spd., exc. cond., 121K mi., \$5,500. 626/445-0052.

'83 HONDA dirt bike, new tires/tubes/fork seals, runs gd., current reg., \$500. 626/744-5378.

'82 HONDA motorcycle, CT110, \$900. 790-7220.

'90 KAWASAKI, Jet Ski JS650-A4 650SX w/trailer, 2-cyl., \$1,200. 661/255-8216.

'86 TIOGA motor home, sleeps 6, roof air, TV antenna, 2 eating areas, clean in & out, under 30K mi., exc. cond., \$13,500/obo. 353-0267.

TIRES, Good Year Wranglers, less than 100 mi., LT 245 / 75R16, \$200. 626/395-6142, Terry.

'00 TOYOTA Corolla LX, 4 dr., forest green, auto, cc, air, pwr./win./locks, daytime running lights, 8K mi., medical emerg. necess. selling this wonderful, new car, \$15,455, or assume lease, \$255/mo. 249-4561.

'96 TOYOTA Celica GT liftback 3 dr., exc. cond., one owner, loaded, auto, a/c, pwr./win/dr./steer., tilt whl., cc, am/fm/cass, 12-CD, 8-sprk. w/amp, ABS, moonroof, rear spoiler, alloy whls., alarm, sports pkg., very clean, low mi., must see, \$14,600. klochko_v@hotmail.com, 989-6152.

'91 TOYOTA pickup, std. bed, 5 spd., 4 cyl., exc. cond., am/fm/cass., bedliner, rebuilt engine still under warr., orig. owner w/maint. records, 217,000 miles, \$3,950/obo. 909/865-8782.

'87 TOYOTA Camry, 4-dr. sedan, dk. grey, new trans/brakes/water pump/timing belt/wheel bearings, more, great cond., retired educator, Santa Monica, 93K mi., \$4,550. 310/393-1951, Nadiamusicdoc@juno.com

'87 TOYOTA pickup, unusual, 1-ton cap. compact, std. trans., a/c, bedliner, ~188K mi., gd. body, very gd. int., great engine, \$2,000/obo. 772-7611, Amy or Steve.

'91 VW Jetta, white, 4 dr., auto, Wolfsburg Ed., a/c, upgraded Pioneer speakers, Sony pull-out cass/am/fm, 149K mi., exc. cond., super-clean, \$3,200/obo. 714/903-8888.

'90 VOLKSWAGEN Jetta, 4-dr. sedan, 5 spd., a/c, sunroof, pwr. locks, tilt steer. new tires/batt., metallic green ext., gray int., well maint., 80K mi., \$3,500. 626/577-9105.

Wanted

HOUSE/DOG SITTER, Altadena for vacationing retirees in June/July, 2 Dobermans need walk-ing daily, 4 mi. to JPL. 626/797-0294, Angie.

SNOWBOARD for child about 4'6" tall, boots, about sz. 4 or 5. 952-8455.

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

TO RENT bachelor apt. or guest house in La Canada/Pas. area to responsible, quiet 18 y.o. male, up to \$650. 800/733-3380 x114 days. 909/823-4711 eves, Bill Osmond.

TO RENT, near Pas., 1 or 2 bd. house/guest home/apt.; stable, friendly JPL'r & student; prefer cent. air/heat, patio, closet space, under \$800. 626/796-5046.

TO RENT, small house or townhouse in or near Pasadena, one clean, responsible person plus dog & cat. 353-9404.

Lost & Found

Lost: Silver loop earring w/freshwater pearl, btwn. east lot & Bldg. 168 on 3/28. Ext. 4-1147.

Lost: Diamond earring, in Bldgs. 241, 171 or 202 on 3/29. Ext. 4-4359, 626/357-3904.

Free

DOG, rescued, beaut. black lab/chow mix, 2-3 yr. old male, trained, healthy/shots, needs loving family, grt companion. 661/257-5817.

KITTENS & mom cat rescued from L.A. streets, felv negative, 1 grey female, 1 grey male, 1 black male, calico mom, to loving home, all homes screened & require follow-up visit, donation suggested to local cat rescue group and to cover shots and fixing, avail. May 1. 626/792-8272.

KITTENS, 10 wks. old, black, gray & white, very healthy/playful, mother & father known and healthy. 248-2855, Dave & Kelly.

For Rent

ALTADENA, charming 2 bd., 1 ba. house near Christmas Tree Lane, hrdwd. floors, f/p, refrigerator, stove, washer/dryer, fenced backyard, fruit trees, \$1,400, incl. water/gardener/trash, negotiable. 626/794-9579.

ALTADENA, share charming 2 bd. house in quiet nbhd., Altadena Estate area nr NY Dr./Allen: huge yd, patio, off-st. parking, garage, storage, all privileges, util. pd., \$575. 626/797-3354 or bpeterson@huntington.org.

MONTRROSE cottage, 5 min./JPL, \$475. 626/ 445-0884.

PASADENA, short-term condo lease, 3-12 mos., 1,000 sq. ft., fully furn., 1 bd., gar., patio, laundry, 1 block from Caltech, \$1,095 +\$120 util. 626/285-0730.

SYLMAR, dream rent/option to buy, spacious brand new home, 4 bd., 3 1/2 ba., 11 rms., 2,500 sq. ft., Jacuzzi tub, 2 story, mtm. views, gated community w/pool, \$2,500. 626/584-6526, Fred.

Real Estate

LA CANADA, 4 bd., 2 ba., c/a, LC schools, 1996 remodel, laundry rm., walk-in closets, newly painted, move-in ready, \$435K. 952-2581.

LA CRESCENTA, 4 bd., 4 ba., 2,150 sq. ft. house, upstairs master suite, f/p, c/a, 2-car gar., lemon & plum trees, quiet nbhd., 5 mi./JPL, gd. nearby schools, photos at home.earthlink.net/~lyldar, seek 7/1 closing, \$425K. 957-3022 eves.

LAKE ISABELLA-area weekend cabin,one room with woodburning stove, refrig, electric range, microwave, fully carpeted, electricity, telephone, security shutters, plus 10x12 storage bldg or bunkhouse, on 3/4 acre high above Kelson Creek, panoramic view, \$27,000. (760) 379-7602

PASADENA bungalow home, nr JPL/ Caltech, f/p, wood flr., nice kitch., lots of storage, master bd., full ba., laundry rm., huge gar. w/working shop area, huge backyard w/fruit trees/flowers, see to appreciate, as is, \$185,000. 626/794-0455, Ollie or Bill.

Vacation Rentals

BIG BEAR cabin, quiet area near village, 2 bd., sleeps 8, F/P, TV, VCP, completely furn., \$75/nt. 249-8515.

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

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

HAWAII, Kona, on 166 ft. of ocean front on Keauhou Bay, priv. house & guest house, comfortably sleeps 6, 3 bd., 2 ba., rustic, relaxing & beaut., swim, snorkel, fish, spec-tac. views, near restaur., golf courses, other attractions. 626/584-9632.

HAWAII, Maui condo, NW coast, on beach w/ocean vw., 25 ft. fr. surf, 1 bd. w/loft, compl. furn., phone, color TV, VCR, microw., d/w, pool, priv. lanai, slps. 4, 4/15-12/14 rate \$100/nite/2, 12/15-4/14 rate \$115/nite/2, \$10/nite add'l. person. 949/348-8047.

HAWAII, W. Maui luxury condo, just N. of Kaanapali bch., ocean-front loc., fully furn. lv. rm., 2 bd., kitch., \$140/day/2. 805/646-0810.

LAKE TAHOE, west shore @ Homewood in Chamberlands, close to northern ski areas: Squaw, Alpine Meadows, etc., assn. pool/tennis, private beach, 3 bd. + loft, 2 ba., slps. 8, linens provided, full kitch. & laundry, TV/VCR, wood stove, 2 day min., JPL disc., \$75 cleaning fee. 626/585-0321, Bob or Nicole.

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

MAMMOTH, Chamonix condo, at lifts 7, 8, 16, 17; walk to Warming Hut, 2 bd., 2 full ba., sleeps 6, fully equip. elec. kitch. w/microw. & extras, f/p & wood, color TV, VCR, cable, FM stereo, o/d Jacuzzis, sauna, game, rec. & laundry rms; convenient to lifts/shops/events, special midweek rates, summer rates begin May. 249-8524.

PACIFIC GROVE house, 3 bd., 2 ba., f/p, cable tv/vcr, stereo/CD, well-eqpd. kitch. w/microw, beaut. furn., close to golf, bches., 17 Mile Dr, Aquarium, Cannery Row, JPL disc. 626/441-3265.

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

SOUTH LAKE TAHOE KEYS waterfront, 4 bd., 3 ba., 1 bd. & liv. rm. upstairs, hcp. access fair, slps. 12+ /f/p/s, decks, gourmet kitch., boats, TV's, VCR, stereo, assn. in & outdoor pools, beach, tennis, 10 min./ski/casinos/ golf; wine country, 3-day min., \$1,195/wk. [1 June-15 Sept; 22 Nov-1 April], \$595/wk. low seas., + \$90 cleaning. 949/515-5812.

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Notice to Advertisers

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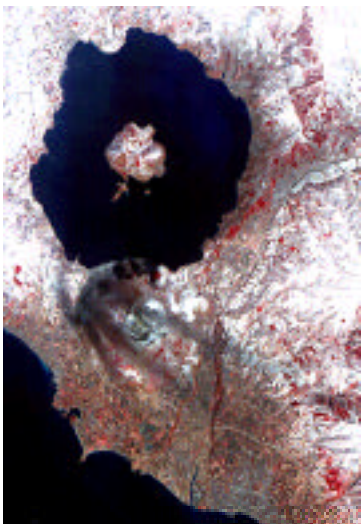
Ads must be submitted on ad cards, available at the ERC and the Universe office, Bldg. 186-118, or via e-mail to universe@jpl.nasa.gov.

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.

News Briefs 2	Reward and Recognition 4
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Two JPL instruments help Terra monitor Earth



On April 3, JPL's ASTER instrument captured this visible-to-infrared image of the currently active Mt. Usu volcano in Japan, which lies on the south shore of Lake Toya. The three dark streaks starting on the northwest flank of the volcano are ash deposits from the plume three days earlier.

After a picture-perfect launch into space last December, NASA's premier Earth Observing System satellite, Terra, has completed on-orbit checkout and verification and is "open for business."

Two of the Terra instruments—the Multiangle Imaging SpectroRadiometer (MISR) and the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER)—are managed by JPL.

Terra, an international mission and part of NASA's Earth Sciences Enterprise, is opening a new window to the Earth and is providing daily information on the health of the planet. The first images from the five instruments aboard Terra were released April 19, and can be viewed at <http://photojournal.jpl.nasa.gov/new> and <http://www.jpl.nasa.gov/pictures/terra>.

Terra is the first satellite to monitor daily—and on a global scale—how the Earth's atmosphere, lands, oceans, solar radiation and life influence each other. Terra's wide array of measurements will give a comprehensive evaluation of the Earth as a system and will establish a new basis for long-term monitoring of the Earth's climate changes.

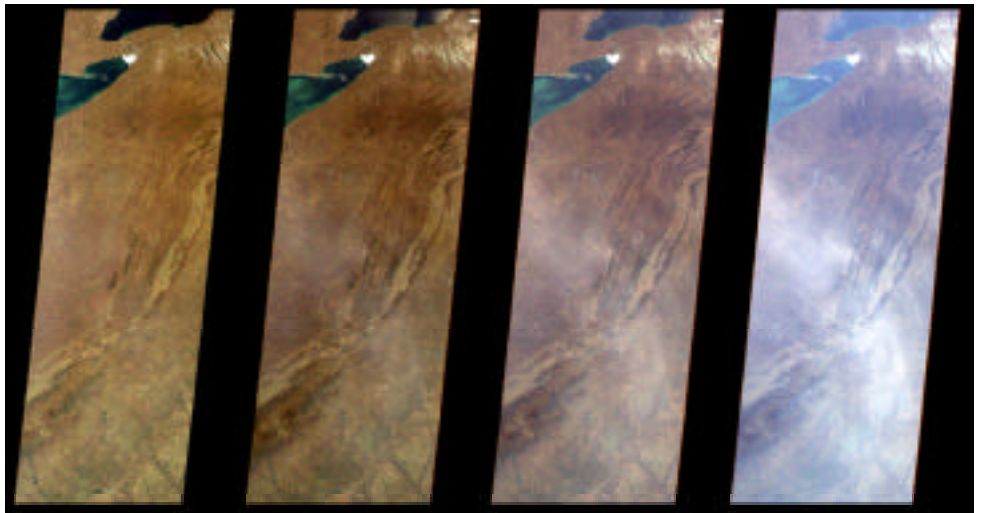
"Terra is measuring and documenting the Earth's vital signs, many of them for the first time," said Dr. Yoram Kaufman, Terra project scientist at NASA's Goddard Space Flight Center, Greenbelt, Md.

MISR Principal Investigator Dr. David J. Diner of JPL noted that the unique capabilities of the instrument include nine onboard cameras, which provide forward, downward and aftward views of the Earth. He said it takes seven minutes for any area to be imaged at all angles.

"The quality of the MISR images has been stunning," Diner said. "The images have a lot of detail, and I and the rest of the team are just thrilled at what we've seen. JPL has done a terrific job."

MISR's digital cameras capture images to a resolution as small as 275 meters (900 feet), or "about the size of a sports stadium," he said. The instrument produces images in four colors at every angle.

Beginning at the end of May, Diner said, routine postings of data and images will be released by the Atmospheric Sciences Data



Downward-looking view of the eastern United States, stretching from Lake Ontario to northern Georgia and spanning the Appalachian Mountains, as imaged by

MISR. As the slant angle increases, the line-of-sight through the atmosphere grows longer, and a pall of haze over the Appalachians becomes progressively more apparent.

Center at NASA's Langley Research Center (<http://eosweb.larc.nasa.gov>), where sample data have been posted so far. The first in-flight calibration of the instrument's data is expected to be completed around that time.

Among the new data MISR will provide for Earth scientists are partitioning of energy and carbon between the land surface and the atmosphere, and the regional and global impacts of different types of atmospheric particles and clouds on climate.

ASTER, a cooperative effort between NASA and Japan's Ministry of International Trade and Industry, serves as Terra's "zoom lens" and will obtain high-spatial-resolution global, regional and local images of the Earth in 14 colors, or spectral bands. Its primary goals are to characterize the Earth's surface; study processes that influence habitability at human scales, such as urbanization and desertification; and to monitor dynamic events, such as volcanic eruptions and advances or retreats of glaciers.

In that regard, Dr. Ann Kahle of JPL, the U.S. ASTER science team leader, noted that the instrument has imaged the currently active Mt. Usu volcano in Japan. Dark streaks from the April 3 image indicate ash deposits from the plume three days earlier. She said the ASTER team "will continually monitor the volcano at every opportunity to look for further signs of

unrest and to map damage" during its eruption.

ASTER consists of three separate subsystems, measuring in the infrared in the visible, shortwave and thermal spectral regions. Its spatial resolution of 15 meters (49 feet) and its stereo imaging allows scientists to determine elevation with an accuracy of 10 meters (33 feet). The ASTER science team is composed of members from the United States, Japan, France and Australia.

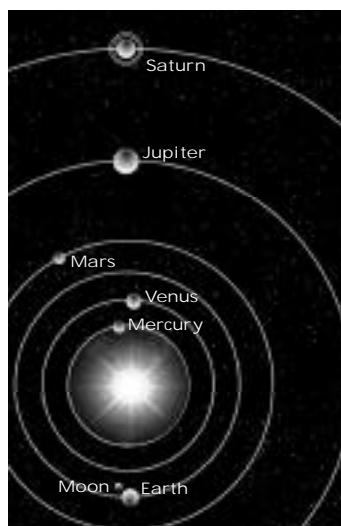
"Terra data, along with other measurements from surface-based and aircraft instruments, provide much-needed inputs for Earth science models," Kaufman said. "This ultimately will enable scientists to more accurately predict future climate change."

Many scientists believe that to successfully build predictive computer models of complex Earth interactions they must clearly understand global climatic processes and parameters. The Terra team estimates that the scientific community will complete the first Earth-system models making full use of Terra data by 2005.

The Earth Observing System series spacecraft are the cornerstone of NASA's Earth Science Enterprise, a long-term, coordinated research effort to study the Earth as a global system and the effects of natural and human-induced changes on the global environment.

Rare planetary alignment coming in May, but will be tough to see

By Gia Scafidi



Frank Scuratano

Graphic shows the expected alignment of planets on May 5.

For the first time in 38 years, the Earth, the moon and all five naked-eye planets (Mercury, Venus, Mars, Jupiter and Saturn)

will come into approximate alignment with the sun on May 5. The celestial phenomenon is expected to take place at 1:08 a.m. PDT.

According to JPL astronomer Dr. Don Yeomans, the same planets and the Sun (but not the moon) are expected to become even closer on May 17 at 3:30 a.m. PDT.

Although it has been rumored that planetary tidal forces will cause Earthly disasters as a result of the proximity of the cosmic bodies, there is no scientific evidence to back such claims. In fact, scientists and researchers are certain that the alignment will have no discernible effect on the world whatsoever.

"Tidal force depends on distance

and mass—but especially distance," said John Mosley, an astronomer at the Griffith Observatory. "If all the planets were to align perfectly, their gravity would raise the ocean tides by one twenty-fifth of one millimeter." Tidal effects do not automatically multiply with a precise geometrical configuration.

Yeomans added, "A baseball held at arm's length would have a tidal effect millions of times stronger than does Mars at its closest."

Unfortunately, due to the Earth's position, we will not be able to see the planetary alignment. The Earth and the moon happen to be on the opposite side of the Sun from the other planets. Consequently, the

five naked-eye planets will be aligned in the direction of the Sun, making them impossible to see through the sun's glare.

However, the moon, Mars and Venus may be bright enough and far enough away from the sun to be detected in the sky. If so, Venus could be seen in the eastern dawn sky and the moon and Mars in the western sky right after sunset.

Although planetary alignments are unusual, they are not unheard of. Studies shows that various planetary groupings have taken place in 1962 and 1988. However, scientists believe that the next alignment comparable to the upcoming May 5 event will not happen again until March 20, 2675.

News Briefs



Dr. Myles Standish

Standish honored for astronomy

JPL astronomer DR. E. MYLES STANDISH has received the American Astronomical Society's Brouwer Award for excellence in dynamical astronomy.

The award cited Standish leading the development of the JPL planetary ephemerides, which provide international standards for spacecraft navigation, almanacs, historical astronomy, solar system tests of gravity theories, pulsar timing and quantitative studies of long-term solar system dynamics.

Standish, who came to JPL in 1972, has provided the planetary ephemerides to all JPL flight projects since the 1973 flight of Pioneer 10 to Jupiter. The JPL planetary ephemerides are used in the Astronomical Almanac, a widely used reference work for astronomers.

Standish earned bachelor's (1960) and master's (1962) degrees from Wesleyan University and a doctorate from Yale University in 1967, where he taught until joining JPL.

The award, the highest possible achievement for work in this area, honors Standish's career achievements and was recently bestowed by the society's Division of Dynamical Astronomy. He will be honored at the division's next meeting in spring 2001.

New Jupiter moon images released

Lava flows, cliffs and depressions from collapsed volcanic eruptions are seen in new images of Jupiter's moon Io, taken during the Galileo spacecraft's most recent flyby on Feb. 22.

A trio of newly released Galileo images of three of Jupiter's small moons are also available online.

All of the new moon images can be found at <http://www.jpl.nasa.gov/pictures/jovianmoons>.

The new Io pictures give scientists more information to help them in their ongoing quest to understand the rampant, fiery volcanic activity on Io and its similarities to past and present volcanism on Earth.

Images of Thebe, Amalthea and Metis—three of the planet's four innermost moons—show very irregular shapes on those bodies, indicating they've been bombarded by comets and asteroids. When these tiny moons are hit, dust is kicked off their surface, which ultimately contributes to the formation of the rings around Jupiter.

Solar system's largest volcano shown

A new image from JPL's Mars Global Surveyor spacecraft shows a close-up view across the summit of Olympus Mons, the largest volcano known in our solar system.

Olympus Mons is not an active volcano and the image shows that the area around the summit is covered by fine dust and pocked by small impact craters. It is roughly the height of three Mount Everests and is nearly 550 kilometers (340 miles) across. Despite its great height, the slopes of this volcano are only a few degrees—a person would not really climb Olympus Mons, but simply walk uphill toward its summit.

The Global Surveyor image is available at <http://mars.jpl.nasa.gov/mgs>.

911 is now JPL's emergency number

JPL's new emergency phone number is 911. Dialing the number connects Laboratory staff with the new dispatch center located in Building 310, the Emergency Services Facility, and will alert emergency response to medical/ambulance, fire/rescue, security violations and hazardous materials calls.

JPL Emergency Preparedness Administrator ERIC FULLER noted the features of the new computerized system:

- Emergency dispatch operators have taken an intensive, three-week state-certified 911 dispatch course.
- The 911 operator instantly receives the phone number, building and room number of the caller, and can simultaneously dispatch the needed resources while talking to the caller about the nature of the emergency.
- To assist callers, the operator has an electronic library of emergency situations; for example, "chest pains."

The computer will display a "procedures" prompt so the operator can direct the caller on what to do until help arrives. It also gives emergency staff instant connection to outside help.

Other information that can be displayed to the operator about the caller's location includes, for example, whether the area contains flight hardware or hazardous materials. The caller may also want rescue staff to know in advance of the victim's medical conditions such as heart disease, diabetes, etc. More information on this feature will be available soon.

"This 911 system is the latest in high-tech emergency systems and will greatly assist in on-Lab emergencies," Fuller said, adding that the dispatch center has redundant systems in case of failure.

There will be a Lab-wide distribution of 911 stickers to be placed on all telephones. For those who need stickers, contact Fuller at ext. 4-1091. The old 3-3333 emergency system number will still work but will not display caller address and will be removed sometime in the near future.

Non-polluting chip-stripper developed

JPL has co-developed a new robotic device that safely strips paint from the hulls of ships without polluting the environment.

The system could revolutionize paint removal in the shipping industry. Current sandblasting methods potentially can contaminate waters surrounding harbors.

JPL developed the new technology as a partner in the National Robotics Engineering Consortium, a NASA, industry and university partnership to develop new industrial products and services from technologies that help solve key problems and reinvigorate the U.S. robotics industry.

Dr. NEVILLE MARZWELL, who heads Advanced Concepts and Technology Innovations at JPL, manages the Lab's efforts in the consortium. Other partners are Carnegie Mellon University in Pittsburgh and UltraStrip Systems, Inc., Stuart, Fla.

The technology consists of an automated robotic device that is magnetized to the ship, a set of high-pressure jet streams, and a controller that helps the robot navigate along the surface of the ship. The water is filtered and then reused, while the paint residue is collected in a container and can then be disposed of safely. Using this method, no toxic dust or paint flakes are generated to pollute nearby areas or to be inhaled by system operators.

"Robotics technology developed at the various NASA centers has resulted in new products ranging from automated harvesting, coal mining, earth moving, and material transport to robotic inspection and repair for gas pipelines, and agricultural spraying, to name a few," said Marzwell.

Next blood drive coming in May

The next JPL/Red Cross blood drive will be held in von Kármán Auditorium May 16 from 10 a.m. to 4 p.m. and May 17 from 7 a.m. to 1 p.m.

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

If you have not signed up ahead of time, or wish to change your appointment, call the Pasadena Red Cross at (626) 799-0841, ext. 630.

Clarification

An article in the April 14 issue of Universe on the Ulysses mission should have stated that JPL manages the mission, and that it is a joint venture between NASA and the European Space Agency. The spacecraft was built by Dornier Systems for the European Space Agency. The suite of instruments is evenly divided between NASA-funded and ESA member states-funded investigators.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meeting at 11:30 a.m. Mondays, Tuesdays, Thursdays (women only) and Fridays. Call Occupational Health Services at ext. 4-3319.

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 employee assistance counselor Cynthia Cooper at ext. 4-3680 or Randy Herrera at ext. 3-0664.

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

Senior Caregivers Support Group—Meets the second and fourth Wednesdays of the month at 6:30 p.m. at the Senior Care Network, 837 S. Fair Oaks Ave., Pasadena, conference room #1. Call (626) 397-3110.

Saturday, April 29

Toying With Science—

The scientific principles of gravity and leverage, simple machines, human imagination and more will be explored at 2 p.m. in Caltech's Beckman Auditorium. Presented in collaboration with Pasadena's Kidspace Museum. Tickets are \$10 for adults, \$5 for children. For information, call (626) 395-4652.



Sunday, April 30

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

Monday, May 1

Caltech Ballroom Dance Club—The first of a five-session class in beginning nightclub two-step will be held from 7:30 to 9 pm in the campus' Winnett Lounge. Cost: \$30. Refreshments and dance practice time are provided after class. Call Don at 626/791-3103.

JPL 2000 Lecture Series—Ken Jezek, director of the Byrd Polar Research Center at Ohio State University, will discuss the Antarctic Mapping Mission at noon in von Kármán Auditorium.

Tuesday, May 2

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

JPL Genealogy Club—Meeting at noon in Building 301-169.

Wednesday, May 3

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

Caltech Ballroom Dance Club—The first of a five-session class in beginning salsa will be held from 7:30 to 9 pm in the campus' Winnett Lounge. Cost: \$1 per lesson.

Refreshments and dance practice time are provided after class. Call Don at 626/791-3103.

"Images of the Early Universe"—Caltech physics professor Dr. Andrew Lange will give this free lecture at 8 p.m. in the campus' Beckman Auditorium. For information, call (626) 395-4652.

JPL Bicycle Club—Meeting at noon in the Building 167 cafeteria.

Thursday, May 4

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

Friday, May 5

National Anxiety Disorders Screening Day—Licensed Clinical Social Worker Jane Berwick will present a seminar designed to help employees deal with issues such as fear, anxiety, stress, nervousness, worry and feeling overwhelmed. To be held at noon in the Building 167 conference room.

Fri., May 5–Sat., May 6

Capitol Steps—This group of current and former congressional staffers that performs musical satire on issues of the day will appear at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$32, \$28 and \$24. For information, call (626) 395-4652.

Saturday, May 6

Caltech Ballroom Dance Club—A free mid-term ballroom dance party with refreshments will be held from 8 p.m. until midnight in the dining area of Avery Center. Call Don at 626/791-3103.

Tuesday, May 9

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

Wednesday, May 10

AFS Quick Start Session for Windows NT—Jeff Sachs of Section 366 will provide an overview of the benefits of using the AFS distributed file system to manage your computer files, including setting up group space, accessing data, publishing Web pages, and more. At noon in the Building 167 conference room.

JPL Toastmasters Club—Meeting at 5:30 p.m. in the Building 167 conference room. Guests welcome. Call Mary Sue O'Brien at ext. 4-5090.

JPL 2000 Lecture Series—Shuttle Radar Topography Mission Project Scientist Dr. Mike Kobrick will speak at 11 a.m. in von Kármán Auditorium.

Music on the Mall—

The Jimmy Owens Jazz Ensemble will perform beginning at noon.



Friday, May 12

Finland: Land of Contrasts—This travel film will be shown at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$9 and \$7. For information, call (626) 395-4652.

Fri., May 12–Sat., May 13

Spring Concert—The combined Caltech Glee Clubs and the Caltech-Occidental Chamber Orchestra will perform a program to be determined at 8 p.m. in Ramo Auditorium. For information, call (626) 395-4652.

SRTM astronauts salute Lab mission to map Earth in 3-D

By Mark Whalen

Shuttle Radar Topography Mission astronauts

Janice Voss, left, and Gerhard Thiele sign

autographs for JPL staff and visitors during

their April 20 visit to the Laboratory.



Bob Brown/JPL Photo

Five of the astronauts from the space shuttle crew that carried JPL's Shuttle Radar Topography Mission (SRTM) came to the Laboratory April 20 to revisit the highly successful project and salute those who made it happen.

After attending SRTM science briefings, Endeavour astronauts Dominic Gorie, Janet Kavandi, Kevin Kregel, Gerhard Thiele and Janice Voss met with and signed autographs for first-grade students from Andrew Jackson Elementary School in Altadena, who followed the mission from start to finish. The crew then presented an overflow audience in von Kármán Auditorium with a slide show and video of their 11-day flight in February, and later signed autographs for JPL staff in the mall.

(The sixth crew member, Mamoru Mohri of the Japanese Space Agency, has returned to Japan and did not attend.)

The huge amount of data returned from the mission represents a giant leap forward in our knowledge of Earth's surface. The mission has produced unrivaled 3-D images of the Earth's surface, which will be used for a wide variety of ecological, geological, meteorological, sociological and civil engineering projects affecting the lives of hundreds of millions of people for decades to come.

Kregel, the mission commander, presented JPL Director Dr. Edward Stone with a plaque of recognition. Later, he thanked JPL for the opportunity to fly the mission, telling the audience, "If it weren't for the smart people here thinking up missions like this, we wouldn't have a job."

The astronauts shared many breathtaking images from their journey, in which they witnessed 16 sunrises and sunsets daily. Included were sharp images of land features such as an impact crater in Quebec and Alaska's Aleutian Islands, as well as human structures such as the Egyptian pyramids.

SRTM Project Scientist Dr. Mike Kozick called the SRTM data "a national treasure." He noted that data from the mission filled 330 tapes, each of which took half an hour to complete. He said a single tape would hold enough data to map 3 million square kilometers (1.16 million square

miles), roughly the land surface area of India.

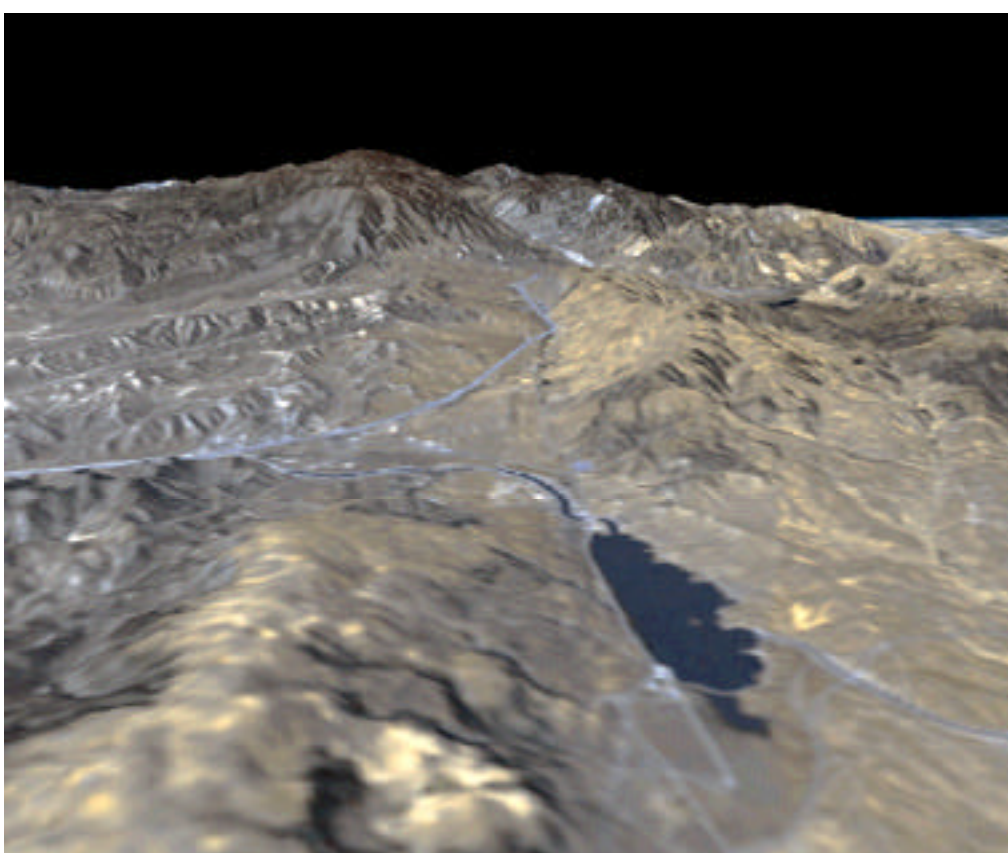
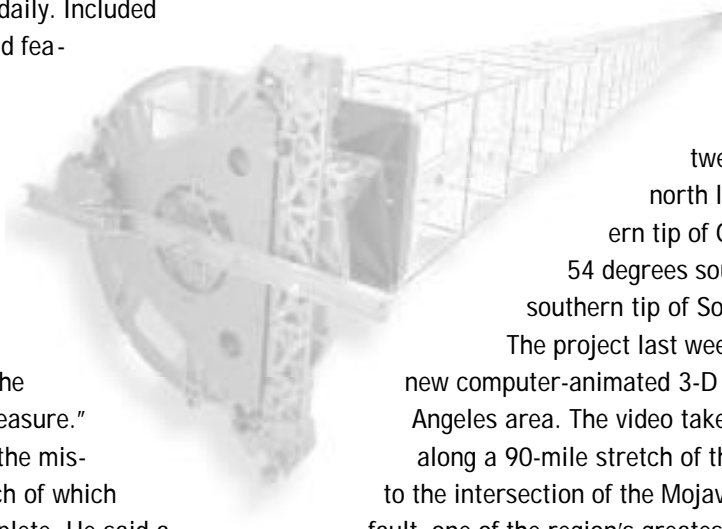
Two copies of each of the data tapes are now being copied for the mission archives.

The mission used a 60-meter long (200-foot) antenna boom—the largest structure ever extended from the shuttle—to gather mapping data over almost 80 percent of the total land mass of the

Earth. The mission covered 99.96 percent of the

target area, between 60 degrees north latitude (the southern tip of Greenland) and 54 degrees south latitude (the southern tip of South America).

The project last week also released a new computer-animated 3-D flyover of the Los Angeles area. The video takes viewers zooming along a 90-mile stretch of the San Andreas fault to the intersection of the Mojave Desert's Garlock fault, one of the region's greatest quake hazards. Stills from the video are online at <http://www.jpl.nasa.gov/pictures/srtm>.



Mission finds fault in radar image

This 3-D image created with data from JPL's Shuttle Radar Topography Mission prominently shows the San Andreas Fault at lower right. The data will be used by geologists studying fault dynamics and landforms resulting from active tectonics. This segment of the fault lies west of the city of Palmdale. Quail Lake Reservoir sits in the topographic depression created by past movement along the fault, which is the active tectonic boundary between the North American plate on the right and the Pacific plate on the left. Relative to each other, the Pacific plate is moving away from the viewer and the North American plate is moving toward the viewer along what geologists call a right lateral strike-slip fault. This area is at the junction of two large mountain ranges, the San Gabriel Mountains on the left and the Tehachapi Mountains on the right. Interstate 5 is the prominent linear feature starting at the left edge of the image and continuing into the fault zone, passing eventually over Tejon Pass into the Central Valley.

Service awards

Reminder

The Award for Excellence Ceremony will be held on May 11 at 2 p.m. in the mall. All employees are invited, but seating is limited. For information, visit the Reward and Recognition home page at <http://eais/sec614/reward>.

View this and previous issues of Universe online

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

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Notice to Advertisers

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.

The following employees were first quarter 2000 recipients of Service Awards for 20 or more years of employment.

40 years: Robert Leland, Anthony Pearson, William Spuck III.

35 years: Kenneth Bartos, Stephen Bridges, Gerald Humphrey, Donald Royer, Larry Simmons.

30 years: Thomas Bicknell, Richard Brace, Geraldine Bridges, Philip Callahan, Veronica Carter, Luis Constenla, Elaine Dobinson, Arthur Freiley, Gene Goltz, Dimitri Papanastassiou, Robert White.

Passings

GRACE LEMON, 78, a retired senior technical typist in the former Section 648, died of respiratory arrest March 24 at her home in Palm Desert.

Lemon joined JPL in 1967 and retired in 1986. She is survived by five daughters and three sons.

Services were held at Rose Hills MemorialPark in Whittier.

RAYMOND HUMMEL, 82, a retired security guard in Section 613, died of leukemia March 30.

Hummel worked at the Lab from 1962-82. He is survived by three sons and five grandchildren.

Private services were held in Porterville, Calif.

CAL PORTIS, 87, a retired maintenance electrician in the former Section 650, died of eliofemoral thrombosis March 31.

Portis joined the Lab in 1966 and retired in 1979. He is survived by his daughter Marylyn, four grandchildren and four great grandchildren.

Services were private.

Letters

The family of Malvin Yeater would like to thank his many friends at JPL for the flowers, cards and notes expressing sympathy to us at this difficult time. Your care and concern is appreciated.

Gladys Yeater

There are not enough words to express my appreciation to those of you who provided so much comfort and support during Bob's long illness and after his passing. I will cherish the memories of our picnics on the lawn outside Building 126; his 2 o'clock calls to see how my day was going; his practical jokes that he'd play on Facilities personnel; and his love for the work he did at JPL. Again, my sincerest thanks to all.

Susan Gilbert-Hagood

Bob Hagood was my friend and my cousin. He truly enjoyed his work at JPL and the people who worked with him. Thank you to all who have supported Susan and me through this very trying time. We miss him very much.

Judi (Hagood) Dedmon

Dear JPL friends: I wish to express my thanks and appreciation for your the kind words and thoughts given by my co-workers and friends on the passing of my grandmother. I would also like to thank the ERC for the thoughtful plant sent in her memory. Your sympathy and kindness is deeply appreciated.

Tracy Feehan

Classifieds

For Sale

AMPLIFIER, Fender Blues deluxe tweed series, less than 1 hr. playtime, w/cover, \$375. 249-2357.

AQUARIUM, seasoned saltwater, 30 gal., Eclipse II sys., black stand, heater, thermometer, filter, lights, \$400 as is, except for livestock, ready to go, substrate & live rock, or convert to fresh water. 583-4717, Gaby.

BABY ITEMS: 3 car seats, basinette, clothes, etc.; FURNITURE: pics., stools, curtains, rugs,

25 years: Peyton Bates, Robert Carlson, Roger Diehl, Michele Fowler, Fred Hammer, Lawrence Hawley, Michael Jahan, Terry Linick, Daniel McCleese, Stephen Slobin, Stephen Synnot, Harry Woo.

20 years: Juan Ayon, Janis Chodas, Elaine Corl, Cindy Cornish, Margaret Easter, Donald Ebbeler, Bruce Fischer, Sven Grenander, Gaylord Hammerwold, Walter Hoffman, Ann Ibaoven, William Imbriale, Robert Jarnot, Quiesup Kim, Violet Kitts, Anita Lacroix, Robert Leland, Todd Litwin, Mario Loo, Gregory Lyzenga, Jan Magee, Larry Meeks, Stephen Mitch-ell, Phillip Morton, Robert Nelson, Michael Nieto, Edith Nir, Carol Oken, Charles Presley, Phuong Reder, Betty Rippey, Socorro Shiraishi, Robert Spero, Jean Walker, Linda Worrel, Thomas Wynne.

artifacts, vases, bedding, pillows, clothes. 626/398-1988, Beverly Drane.

BABY ITEMS: crib w/matt., Child Craft, solid dark cherry, exc. cond., \$275/obo; BASSINETTE, Kolcraft Royal Suite, rocking, pop out casters, dark blue & white, exc. cond., \$75/obo. 626/397-7897.

BEANIE BABIES/BUDDIES, buy whole set & save, \$5-\$20/obo. 661/288-1279, Patti Reed. BED, brass, ornamental, king sz. w/frame, \$100; BAKERS' RACK, custom-built for TV/stereo/speakers/etc., \$300; RADIOS, antique, free-standing, Stromberg-Carlson & Tempo Tune w/78 rpm record changer, 30s/40s era, \$1,000 ea./obo. 323/464-2762.

BEDROOM SET, match. solid pine cargo 6-dr. chest, 2 side tables, king headboard, desk & shelf unit, \$500; SOFA, 7.5 ft., quality upholstery, off white, 12 decorator pillows, \$600; TABLE, oak drop-leaf w/4 chairs, \$125; STEREO CABINET, 80" solid walnut contemp. w/speakers, moving, \$125. 626/564-0168. BICYCLES, 2, 12-spd., \$30 & \$50; POOL PUMP, gas, 1.5" fire hose, \$35; LAMP w/shade, Czech. crystal, \$60; Honda CT110 Trail Bike, \$900; ROTO-TILLER, Massport, \$95; ENGINE STAND, prof. qual., \$95; TYPEWRITER, Olympia, elec. wide carriage, \$40; BEDROOM SET, dresser, end tables, lamps, dbl. sz. headboard & matt., \$335; CHAIR, cane-back, needs recaning, \$30. 790-7220.

BREAD MACHINE, DAK, auto, cylindrical container, 1.5 lb. loaf, \$25/obo. 909/592-0780.

CAGE, rabbit, conn. to winter quarters, water btls./food/misc, \$25. 952-8032.

CAMERA, Leica Z2X compact, silver, date stamp, \$275. 626/795-8340.

COUCH, beaut. mint green, white rattan armrests, camel back, exc. cond., like new, match. pillow, pd. \$800, sell \$400. 626/798-8071.

FOOD PROCESSOR, Cuisinart, w/blades, exc. cond., pd. \$200, sell \$100. 626/798-8071. DINING/BREAKFAST NOOK, L-shape bench style w/storage, \$100. 249-6629.

EXERCISER, Nordik Track Medalist ski-simulator, unused, orig. \$900, sell \$500/obo. 957-3022 eves.

LAWN MOWERS, Honda, commercial snapper, 5 hp, gas eng., rear bag, \$300/obo; MOTOR, B&D, cordless, 3.5 hp, 2 yrs. old, \$150/obo. 626/584-3204 day, 909/592-0780 eve/wkend. LAWN MOWER, Kato Pro-Master 20" front-throw, reel-type pwr., oldie but goodie, recent tune, runs well, \$75/obo. 352-7321.

LUGGAGE: hard-sided, men's Samsonite, dark brown, 27", \$30; 21", \$5; women's American Tourister, red, 27", \$40; 24", \$30; Bel-Aire, It. brown, 22", \$20. 626/577-8107.

MISC.: microwave, Kenmore, lg. countertop, \$35; fan, standing, \$10; evaporative cooler, mobile, \$20; exercise climber, Precor 730e dual-action, \$100; lawnmower, B&D elect. rotary, \$20; tree trimmer, Wen elect., \$20; yard trimmer, B&D elect., bump-feed, moving, \$15. 626/564-0168.

MISC.: Refrigerator, stove, table, chairs, sofa, misc. tools, garden. equip, old Singer sawing mac., 2 antique cooking stoves, furn., misc. clothes, leather skirt, suit, coat jacket sz. 7, beaut. 6 pc. French antique bedrm. set, head & foot board, 2 side night tables, vanity w/folding mirrors, armoire w/mirror, must see, sacrifice. 626/794-0455, Oli.

MONITOR, 14" CTX VL400, max. res. 1024x768, 28mm, new in box, \$100/obo. 909/489-8305.

MOVING SALE: washer & dryer, Whirlpool, \$300/pr.; refrigerator, side-by-side, 3 drs. access to ice/water/ice cubes, \$200; sofa, chairs, beds, etc. 409-9249.

OPERA TICKETS, 2, Founders Circle, to Britten's Billy Budd, @ the L.A. Opera, Sat., June 3, 7:30 p.m., \$137/ea. 323/724-4365. ORGAN, Yamaha 415 elect. console, 13 pedals, 3 keyboards, 144 rhythm patterns, pd. \$7,500, sacrifice \$3,000; DIET TAPES, Jenny Craig, set of 14, \$50; POWER CONTROL CENTER for computer, 5 pwr. + 1 master switch, 5 surge-protected outlets + 2 modem/fax/phone jacks, new, \$20; SPRINK-LER VALVE ADAPTERS, Lawn Genie, model 756LG 3/4, new, \$10 ea. 790-3899.

PIANO, bench, Wuriltzer, beaut., med. oak, full keyboard, living rm. qual., perfect cond., 10 yrs. old, \$1,800. 805/527-7017.

POOL, Doughboy, 16' dia., great cond., ladder, pump, cover, access., \$1,500/obo. 249-9534. SOFA BED, \$150; TABLE, coffee, \$75; TV, color, \$75; AIR COMPRESSOR, \$100; FLOOR JACK, \$25, all exc. cond. 626/793-7879. SOFA & LOVE SEAT, qn. sleeper, \$200; TABLES, coffee/sofa & end, matching, oak/glass, \$100. 367-0969.

SOFA, slip-covered, exc. cond., oatmeal background w/pale pink roses, 2 cush., 4 pillows, \$200. 626/794-8720 Andy or Lisa.

SPEAKERS, vintage, JBL signature series, 12" mod. D131, 1-recone, 1-orig., \$180/pr. firm. 249-2357.

STEREO, Honda stock, digital am/fm receiver, memory resets, cass./CD player compatible, \$15. 248-8103, Mike.

NOVA awards

The following employees were awarded JPL's Notable Organizational Value-Added (NOVA) awards in February:

Section 261: Mary Johnson, Kirk Bilby, Joseph Kelley, Wendelin Donahue, Stephen Mitchell, Patricia Parrett, Dan Low, Virginia Trester, Leslie Berridge.

Section 262: Michele Schneider, Robert Bertsch.

Section 263: James Curtis.

Section 265: Steve Simpson.

Section 314: Weni Chang, Paul Fieseler,

Jerod Gross, Taifun O'Reilly, Jeanne Rademacher, Kathryn Schimmels, John Sisino, Reid Thomas, Steven Wissler.

Section 344: Greg Pixler.

Section 368: Joseph Witt, Harry Woo.

Section 387: Sunant Katanyoutanant, Steve Labrecque, Enrique Villegas.

The following employees were awarded NOVAs in March:

Section 252: Mary Romejko.

Section 333: Richard Cirillo Jr.

Section 344: Annie Aroyan, Nanor Avedikian, Didier Keymeulen

Alan Lee, Mohammad Mojarradi,

Lori Slayton, Karl Strauss, Richard Williamson, Ricardo Zebulum.

Section 366: David Childs, Tommy Dearmond, David Gilliam, Robert Lubold, Ralph Ridley, William Seixas, Thomas Wolfe, Kaythya Zamora-Diaz.

Section 380: Jennifer Jubilado,

Arthur Lane.

Section 383: Alireza Azizi, Stephen Guiwits, Peter Halverson, Philip Irwin, Denise Jones, Jennifer Logan,

Elizabeth McKenney, Robert Spero.

Section 387: Michael Brenner.

Section 388: Robert Deen, Janet Fung.

STROLLER, Rite Start sit & ride tandem, \$90/obo; THULE RACK, \$35, photos of both at <http://go.to/~mj.661/263-2760>, Mark.

TABLE, work, folding, wall-mount/pull-down, hollow dr., 36"x80", hinged at 26"/54", 2 drop-down legs hidden in 54" fold-up pos., now bolted to 30"x5.5"x1.5" wood mount, exc. cond., \$25/obo. 909/593-4046 (La Verne).

TABLES: maple, tea, \$100/obo; coffee, wicker, \$10; end, (2) wicker, \$10 ea.; round, whitewash, 4 chair, \$50; LAMPS, table, \$10 ea.; STEAMER/rice cooker, \$10; BLENDER, \$5; TABLE, . 661/288-2262.

Vehicles / Accessories

'85 CADILLAC, 2-dr. hrtdtop., 90K mi., clean, orig. owner, must sell, \$3,500. 909/593-7550 or 909/732-4482.

'95 CHEVROLET truck, 5 spd., 2 dr., V6, std. cab, white, a/c, am/fm/CD, new speakers/clutch, bedliner, tow pkg., 82K mi., \$10,500/obo. 626/914-1044.

'89 CHEVROLET Suburban, 3/4 ton, 4x4, hvy. duty tow pkg., "barn" drs., gd. cond., \$8,000. 626/337-1432.

'96 DODGE Grand Caravan SE, teal, 3.3L auto, dual sliding drs., front/rear air, 63K, photos at <http://go.to/~mj.112,450>. 661/263-2760, Mark.

'81 FIAT Spider 2000 conv., runs gd., all around gd. shape, \$2,250. 323/225-1732.

'95 FORD Escort, 80,000 mi., 5 spd., exc. cond., \$5,500/obo. 957-5592.

'95 FORD Mustang, 3.8L V6, 5 spd. manual, 52K mi., silver, a/c, pwr. everything, cc, stereo, CD/cass., dual airbags, no wrecks, \$8,300/obo. 249-0038.

'83 HONDA dirt bike, model CR80R, new tires/tubes/fork seals, runs gd., current reg., \$500. 626/744-5378.

'98 JEEP Grand Cherokee 4x4, auto, a/c, CD player, 10K mi., tow bar, s/r, very clean, \$15,500/obo. 982-9337.

'97 JEEP Wrangler SE, red, 4WD, P/S, P/B, airbags, Kenwood stereo/cass., sound bar, Lo-Jack, ignition cut-off, 31"x10.5" tires, aly. rims, 25K mi., under transf. warr., exc. cond., \$14,250/obo. 248-8103, Mike.

'97 NISSAN pickup 4x4 shortbed, diamond plate toolbox, bedliner, prem. whls., a/c, p/s, am/fm/CD ster. cust. paint, 4 cyl., 2.4L, 5 spd. manual, 55K mi., blue book April 2000 \$10,680/obo. 661/248-5285, Barbara Manhoff.

'90 PONTIAC Grand Prix LE coupe, red/ silver, V6, auto, air, pwr. everything, tilt whl., s/r, aly. whls., 80K mi., gd. cond., \$4,300. 790-6952.

'75 SEARS AL boat, 13' Evenrude, 10 hp, fish finder, trailer, \$550/obo. 661/724-1338.

'89 TOYOTA Camry, white, 96K mi., exc. cond., a/c, auto, pwr. w/l/s, am/fm, cc, \$5,499. 626/579-7403.

'82 VOLKSWAGEN camper, rebuilt eng., 1 owner, \$4,800. 626/281-8954.

Wanted

BABYSITTER to care for 20 mo. old toddler at his Altadena home, M/W/F only, 8:30 a.m.-6 p.m. 626/791-0585, Ulvi or Ayse.

GRADUATES, Belmont H.S., L.A., yrs. '57-'62. 956-1744, Barbara.

ROOMMATE for charming old Tujunga house, 2 lg. bd. (hardwd. flrs.), lg. closets, 1 lg. ba., access to rest of house incl. kitch., laundry, offst. prking, yd.; seek prof., non-smoker, no pets; \$500 incl. util. 353-3568, Lorianne.

SECURITY GATES, toddler, or light umbrella stroller. 626/794-2196.

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

TO RENT furn., 1 bd./studio from end of May to end of July, summer grad. student researcher. 303/492-8274, Moriba.Jah@Colorado.edu.

VOLLEYBALL PLAYERS, coed, all levels of play, Tues. nts., 8-10, Eagle Rock H.S., \$3/nt. 956-1744, Barbara.

Free

CAT, female calico, 8 mo. old, fixed, all shots, friendly, playful. 626/614-1012, 626/287-9433.

DOG, German shepherd, 5 yr. old neutered male needs gd. home, obedience trained, loves people/children, dislikes cats, requires very secure yard. 626/798-6248.

DOG, Lab mix puppy, black, female, 8 mo. old, found abandoned in apt., cat friendly, all shots, house trained, smart, great family pet, to gd. home. 626/614-1012, 626/287-9433.

HAMSTER, female, 3 mos. old, brown/white, cage incl. 790-7934.

For Rent

ALTADENA condo lease, 2 bd., 1 3/4 ba., mins./JPL, nice closets w/organizers, f/p, c/a, comm. pool, storage rm., 2 car gar., carport,

tile counter top & marble flr. in kitch., lg. patio, landscape: planters/oriental garden/waterfall/ spa, end unit, wins. on 3 sides, \$1,200, by owner. 626/398-1988, Beverly Drane.

ALTADENA, 3 bd., 2 ba., executive home, pool, \$1,450. 626/793-2686, Ms. Crisp.

LA CRESCENTA house, above Foothill Blvd., 3 bd., 1 1/2 ba., formal dining rm., breakfast area, f/p, fenced yd., detached 2-car gar., near library/schools, fairly new paint, gardener pd., \$1,300 security dep. 626/585-5313, Yue-Hsin Chen.

S. PASADENA, fully furn. studio apt., nice area, 1718 Huntington Dr., btwn. Marengo & Milan Sts., car space, laundry fac., no smoke/pets, util. pd., \$565. 626/792-9053, Marilyn.

SYLMAR, dream rent/buy option, 4 bd., 3 1/2 ba., 11 rms., 2,500 sq. ft., f/p, Jacuzzi tub in master ba., comm. pool, 20 mi. from JPL, use 3 mos. rent to pay closing, \$2,500. 626/584-6526, Fred.

TUJUNGA, 2 lg. bd. & ba. in charming old house; access to rest of house incl. kitch., laundry, offst. prking, yd.; seek prof., non-smoker, no pets; \$500/single, \$600/couple, incl. util. 353-3568, Lorianne.

Real Estate

LA CANADA, 4 bd., 2 ba., c/a, LC schools, '96 remodel, walk-in closets, newly painted, move-in ready, \$435K. 952-2581.

LA CRESCENTA, 4 bd., 4 ba., 2,150 sq. ft. house, upstairs master suite, f/p, c/a, 2-car gar., lemon/plum trees, quiet nbhd., 5 mi./JPL, gd. nearby schools, photos at home.earthlink.net/~lydlar, seek 7/1 closing, \$425K. 957-3022 eves.

LA CRESCENTA, 2-story, 5 bd., 2,75 ba., mtn./city vw, h/w flr., marble f/p, 2,196 sq. ft. liv. space, 500 sq. ft. encl. patios for den/fam. rm., 7,800 sq.ft. backyd., grass/8 fruit trees, front & backyd gardens/sprinklers, c/a/h, newer d/w, Gld. schools, newer roof, 2-car attach. gar., \$449K/obo. 249-2889.

PASADENA bungalow home, near JPL/ Caltech, f/p, wd. flr., nice kitch., lots storage, master bd., full ba., laundry rm., huge gar. w/working shop area, huge backyd. fruit trees/flowers, see to appreciate, as is, \$185,000. 626/794-0455, Ollie or Bill.

PASADENA, executive condo, total remodel, 2 bd., 2 ba., 1,200 sq. ft., new kitch., h/w din. rm. floors, newer carpet/paint, top unit in park-like setting, walk to Caltech/Lake Ave., nice pool/spa, \$198K. 626/585-9048.

Vacation Rentals

BIG BEAR cabin, walk to village, 2 bd., slps. 8, compl. furn., f/p, TV/VCR, \$75/nt. 249-8515.

BIG BEAR LAKE cabin, nr. lake, shops, village, forest trails, 2 bd., slps. up to 6, f/p, TV, VCR, phone, microw., BBQ, more, JPL disc. from \$65/nt. 909/210-9182.

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

HAWAII, Maui condo, NW coast, on beach w/ocean vw., 25 ft. fr. surf, 1 bd. w/loft, compl. furn., phone, color TV, VCR, microw., d/w, pool, priv. lanai, slps. 4, 4/15-12/14 rate \$100/nite/2, 12/15-4/14 rate \$115/nite/2, \$10/nite add'l. person. 949/348-8047.

LAKE TAHOE, north shore, 2 bd., 2-1/2 ba., sleeps 6-7, private sandy beach, pool, great loc., all amenities, hike/golf/fish, 2 mi. to casinos, JPL disc. summer wkly rate, \$650. 626/355-3886, Rosemary or Ed.

MAMMOTH, Chamonix condo, at lifts 7, 8, 16, 17: walk to Warming Hut, 2 bd., 2 full ba., sleeps 6, fully equip. elec. kitch. w/microw. & extras, f/p & wood, color TV, VCR, cable, FM stereo, pool & sun area, o/d Jacuzzi's, sauna, game, rec. & laundry rms, play & BBQ areas, convenient to hiking, slopes/lifts/shops/ events, summer rates begin May. 249-8524.