

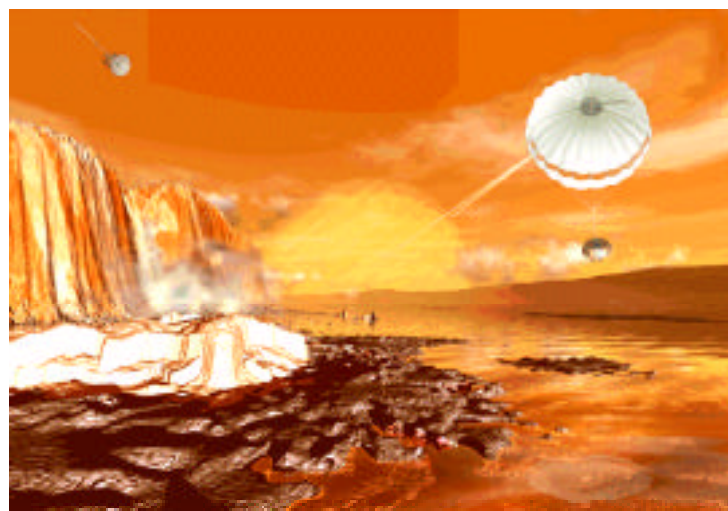
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i b e m e
SOLAR SYSTEM

Revised plan for Cassini, Huygens announced

By Guy Webster

Artist's rendering shows the parachuted descent of the Huygens probe, which will now take place seven weeks later than originally planned.



Managers for the international Cassini mission to Saturn have announced a revised plan to work around a telecommunications problem and avoid loss of scientific data after the spacecraft drops the Huygens probe to descend to the surface of Titan, Saturn's biggest moon, in 2005.

The new plan will change the originally planned date and geometry for the part of the mission in which the Huygens probe will parachute into the thick atmosphere of Titan. The new date will be Jan. 14, 2005, seven weeks later than originally planned. The plan will also position the Cassini orbiter farther away during that descent.

After six months of analysis by the European Space Agency's and NASA's joint Huygens Recovery Task Force, senior management from both agencies and members of the Cassini-Huygens scientific community have endorsed the mission modifications. The analysis was undertaken after the telecommunication problem was identified last autumn.

"This recovery plan will allow us to meet all of the mission's scientific objectives," said Bob Mitchell, Cassini program manager at JPL. "It has the additional advantage of giving us a close look at Titan before releasing Huygens."

"This recovery plan will allow us to meet all of the mission's scientific objectives. It has the additional advantage of giving us a close look at Titan before releasing Huygens."

— Bob Mitchell, Cassini program manager

The Cassini-Huygens mission was launched in 1997. Engineers last year identified a design flaw in the Huygens communication system. Without a change in flight plans, the Huygens receiver would be unable to compensate enough for the Doppler shift in radio frequency between the signal emitted by the probe and the one received by the orbiter. A Doppler shift happens when the distance between a transmitter and receiver is changing, and Cassini originally would have been rapidly approaching Titan during Huygens' descent. This would have resulted in the loss of important data from the probe during its trip through Titan's atmosphere.

When Cassini arrives at Saturn in July 2004, it will, within its first seven months there, complete three flybys of Titan instead of two as originally planned. Then, in February 2005, Cassini will resume the rest of its four-year prime mission as originally planned, studying the planet and its rings, moons and magnetic environment. The changes to the mission plan will use about one-fourth to one-third of Cassini's reserve supply of propellant. The reserve supply is carried for unforeseen needs such as this and for possible use if the mission were to be extended beyond 2008.

"In any complex space mission, problems may arise," said John Credland, head of the European Space Agency's Space Science Projects Department. "The measure of an organization is the manner in which it recovers."

Last week, European Space Agency Director of Science Dr. David Southwood and NASA Associate Administrator for Space Science Dr. Edward Weiler gave the go-ahead for Cassini and Huygens teams to implement the recommendations of the Huygens Recovery Task Force.

To ensure that the pioneering probe returns as much data as possible, the plan shortens Cassini's first two orbits around Saturn and adds an additional orbit that provides the required new geometry for Huygens' descent to Titan. Cassini's arrival date at Saturn on July 1, 2004 remains unchanged. However, its first flyby of Titan will now occur on Oct. 26, 2004, followed by another on Dec. 13. The Huygens probe will be released toward Titan on Dec. 25 for an entry into the moon's atmosphere 22 days later.



Shrouded in an orange haze, Titan is one of the most mysterious objects in our solar system. It is the second largest moon (after Jupiter's Ganymede) and the only one with a thick atmosphere. The atmosphere excites scientific interest, since it may resemble that of a very young Earth.

To reduce the Doppler shift in the signal from Huygens, Cassini will fly over Titan's cloud tops at an altitude of about 65,000 kilometers (40,000 miles), more than 50 times higher than formerly planned. The new plan also calls for several modifications to ensure maximum efficiency of the Huygens communications system. These include pre-heating the probe to improve tuning of the transmitted signal, continuous commanding

by the orbiter to get the best possible performance by the receiver, and changes in the probe's on-board software.

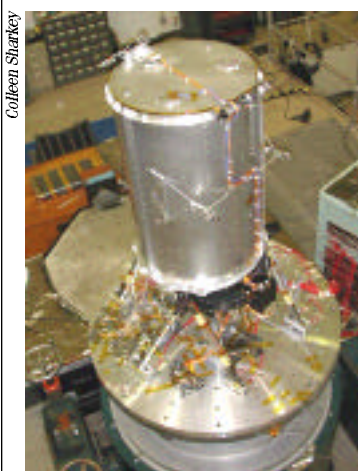
"I am very happy that we have found a good engineering solution," said Kai Clausen, the European Space Agency's integral project manager and co-chairman of the task force. "But a lot more work still needs to be done. Now we need to complete the detailed design, implementation, validation and testing over the next few years."

"There are still some small uncertainties, for example the exact definition of the landing site, but these are minor problems," said Dr. Jean-Pierre Lebreton, ESA's Huygens project scientist.

i b e m e
STARS AND GALAXIES

Galex continues environmental tests

The Galaxy Evolution Explorer as shown undergoing vibration tests at JPL in June.



The JPL-developed Galaxy Evolution Explorer, a telescope that will map the history of star formation in the universe, going 80 percent of the way back to the Big Bang, continues environmental testing in preparation for its launch next spring.

Random vibration testing of the instrument (which contains the telescope) was completed last week at JPL. "We modified the primary structural support of the instrument by softening the three support bipods that attach to the

spacecraft bus," said Project Manager Dr. Jim Fanson. "This was done in order to alter the structural dynamic properties of the instrument and reduce the telescope vibration response level, which we deemed to be too high from earlier testing."

Previously, optical and thermal-vacuum tests were conducted.

Fanson said the plan is to deliver the instrument to Orbital Sciences Corp. in Germantown, Md. for integration with the spacecraft bus on Sept. 1. "After that we will

perform a series of satellite level environmental tests," he said.

Galaxy Evolution Explorer will survey the sky using the ultraviolet part of the light spectrum, and will observe hundreds of thousands of galaxies. "We think the universe is about 13 billion years old, so we'll be studying galaxies and stars across about 10 billion years of cosmic history," Fanson said. "Our goal is to determine how far away each galaxy is from us and how fast stars are forming in each galaxy."

News Briefs



Larry Dumas



Ed Caro

Dumas, Caro get NASA's highest honor

JPL Deputy Director LARRY DUMAS, and ED CARO, chief engineer for the Shuttle Radar Topography Mission (SRTM), have been awarded NASA's Distinguished Service Medal.

The June 21 ceremony at NASA Headquarters cited Dumas for his distinguished leadership and significant management contributions to the success of the Lab's robotic exploration of the solar system.

Caro received the award for distinguished service throughout his career in furthering the NASA mission through extraordinary engineering contributions and interpersonal effectiveness. He was the chief engineer on almost all NASA space radar missions, and the intellectual inventor of the SRTM. Caro retired from JPL in September 2000, after 42 years of service.

JPL's recently retired director, DR. ED STONE, was also given the Distinguished Service Medal, although a scheduling conflict prevented him from attending the awards ceremony.

The medal—the highest honor that NASA confers—is awarded to any person in federal service who, by distinguished service, ability, or courage, has personally made a contribution representing substantial progress to the NASA mission in the interests of the United States. The contribution must be so extraordinary that the other forms of recognition by NASA would be inadequate.

Maleki garners IEEE honor

Senior Research Scientist DR. LUTE MALEKI, technical group supervisor of the Quantum Sciences and Technology Group, has been honored by the Institute of Electrical and Electronics Engineers (IEEE) "for outstanding contributions and scientific leadership in the development of a wide range of atomic clocks and oscillators supporting the U.S. space program."

Maleki received the I.I. Rabi award at the IEEE's International Frequency Control Symposium. The award recognizes outstanding contributions related to the fields of atomic and molecular frequency standards, and time transfer and dissemination.

Maleki has been at JPL since 1979. His group's areas of research include the development of atomic frequency standards and atomic sensors; cryogenic oscillators; photonics frequency generation and distribution systems; and investigations of the noise and stability properties of radio frequency and optical frequency sources.

Miller receives AIAA award

JAMES MILLER of the Navigation and Mission Design Section 312 has received the 2001 Mechanics and

Control of Flight Award from the American Institute of Aeronautics and Astronautics (AIAA) for his "contributions to astrodynamics and space exploration, particularly for being the technical innovator of the navigation system used to implement the first asteroid orbiter."

Miller was lead technical engineer for navigation of the Near Earth Asteroid Rendezvous (NEAR) mission, completed earlier this year. His other work experience at JPL includes guidance and control analysis on the Mariner Mars 1969 mission, control and trajectory optimization for the Viking mission, navigation analysis and system design for the Galileo mission and proposed Comet Rendezvous Asteroid Flyby mission.

He graduated from Carnegie Mellon University in 1961 with a bachelor's degree in electrical engineering.

Trosper gets scholar-athlete honor

JPL engineer JENNIFER HARRIS TROSPER has been inducted into the Verizon Academic All-America Hall of Fame in New York City.

The Hall of Fame honors former college scholar-athletes who have excelled in their professions and have made substantial contributions to their communities.

Trosper is the project systems engineer for JPL's Mars Exploration Rover mission, which in 2003 will send two rovers to Mars to search for evidence of liquid water that may have been present in the planet's past.

At JPL since 1990, Trosper is a graduate of the Massachusetts Institute of Technology, where she lettered in volleyball all four years.

IT symposium proves a success

In-situ mission simulation, nanoscale electronic devices, scientific animation techniques and the InterPlanetary Network were among the topics presented at JPL's first Information Technology Symposium, held on May 9.

Sponsored by Institutional Computing and Information Systems and the Center for Space Missions Information and Software Systems (CSMISS), the event showcased the accomplishments and capabilities of the Lab's information Technology community. Sixty-five papers and 20 posters were presented. Approximately 300 people attended.

Among the keynote talks were those by GAEL SQUIBB, director for InterPlanetary Network and Information Systems; TOM RENFROW, Chief Information Officer; DR. WILLIAM WEBER, director For Engineering and Science; and DR. RICHARD DOYLE, leader of CSMISS and the Division 36 manager. Presentation abstracts, slides and videos are online at http://icis.jpl.nasa.gov/IT_Symposium/index.html.

Special Events Calendar

Ongoing Support Groups

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

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

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

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

Parent Support Group—No meetings are scheduled for July; next meeting is Aug. 16. For location, call the Employee Assistance Program at ext. 4-3680.

Senior Caregivers Support Group—No meetings are scheduled for July or August; next meeting is Sept. 6. For time and location, call the Employee Assistance Program at ext. 4-3680.

Tuesday, July 10

JPL Genealogy Club—Noted speaker and author Barbara Renick will present a program on the most useful sites and online tools for family history research at this special meeting date, at noon in Building 301-271.

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

Wednesday, July 11

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

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

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

Thursday, July 12

JPL Stories—DJ Byrne of Section 366 will present "Shadow Systems: Collaboration Strikes Back" at 4 p.m. in the Library, west end of Building 111. He will lead a story circle, where people who have built or benefited from shadow systems are invited to share their tales about how they

changed the Lab when no one was looking—when innovation from the trenches took JPL's culture off the established path to create workable solutions.

Tuesday, July 17

Investment Advice—TIAA/CREF will hold individual counseling sessions from 9 a.m. to 3 p.m. in T-1720. For an appointment, call (877) 209-3140, ext. 2614, or log on to www.tiaa-cref.org.

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

TIAA/CREF Enrollment Meeting—For employees newly eligible to participate in the retirement plan. Investment options and assistance in the completion of the enrollment forms will be available. To be held from noon to 1 p.m. in Building 180-101.

TIAA/CREF Investment Workshop—Scott Budde, director of CREF investments, will present "Ignoring the Noise: An Analysis of Stock and Fund Returns" from 10 to 11:30 a.m. in von Kármán Auditorium. Topics will include Dual Investment Management Strategy (active vs. index management), short-term vs. long-term perspective on risk and return in equity markets, causes of volatility in the market, how to approach equity investing, and qualities to look for in an investment management company.

Wednesday, July 18

Investment Advice—Fidelity and TIAA/CREF will hold individual counseling sessions from 9 a.m. to 3 p.m. in T-1720. For an appointment with Fidelity, call (800) 642-7131. For TIAA/CREF, call (877) 209-3140, ext. 2614, or log on to www.tiaa-cref.org.

Thursday, July 19

Von Kármán Lecture Series—"Mars Exploration: From the Vikings to the 21st Century" will be presented by Dr. John Callas, Mars Exploration Rover Science Office manager, at 7 p.m. in von Kármán Auditorium. Open to the public.

Friday, July 20

Von Kármán Lecture Series—"Mars Exploration: From the Vikings to the 21st Century" will be presented by Dr. John Callas, Mars Exploration Rover Science Office manager, at 7 p.m. in The Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.

WFPC2 images baffle scientists

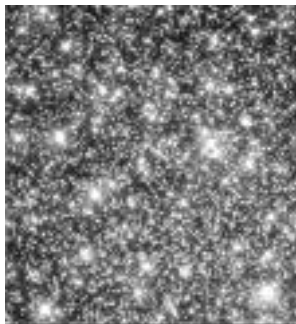


Photo: Space Telescope Science Institute

The Wide Field Planetary Camera 2 imaged these bodies in the globular cluster M22 by the way their gravity bends the light from background stars, a phenomenon called microlensing.

Scientists are mystified by what may be unexpected, wandering, planet-sized objects.

A new image taken by the Wide Field and Planetary Camera 2 (WFPC2) aboard NASA's Hubble Space Telescope implies the presence of these objects. The image is available at <http://oposite.stsci.edu/pubinfo/latest.html> and <http://www.jpl.nasa.gov/images/wfpc>.

The camera was designed and built by JPL. If confirmed, the new information could yield new insights about how stars and planets formed.

In results published in June in the journal *Nature*, the scientists report six unusual "microlensing" events inside the globular cluster M22. Microlensing occurs when a background star brightens momentarily as a foreground object drifts by. The gravitational field of the object amplifies light from a distant background star in the huge central bulge of our galaxy. The objects believed to cause these events are too dim to be seen directly.

The unusually short period (less than 20 hours) over which these microlensing events occurred indicates that the mass of the intervening objects could be as little as 80 times that of Earth. If confirmed, these bodies would be the smallest celestial objects ever seen beyond our solar system that are not orbiting any star.

Theoretically, these objects might be planets that were gravitationally torn away from parent stars in the cluster. However, they are estimated to make up as much as 10 percent of the cluster's mass—too numerous to be wandering, "orphaned" planets.

Because these findings are so surprising, the astronomers caution that they must be confirmed by follow-up Hubble observations.

"Scientifically, this Hubble result is one of many indirect measurements suggesting that planets are lurking out there in the galaxy," noted Dr. Karl Stapelfeldt of Division 32, an astronomer on the WFPC2 Science Team. "This is the first result suggesting that planets can be found in association with stars much older than the Sun. In this case the planets would have to be 'free floating,' meaning they have been stripped away from their parent stars and follow their own independent paths within the star cluster.

"Results like these continue to build the case for obtaining direct images of extrasolar planets," Stapelfeldt said. "No current telescope is capable of imaging planets like ours circling other stars, but NASA's Origins program is working to make this possible in the not-too-distant future."

"These results are early indications that there are sure to be more surprises as we begin to study nearby planetary systems in greater detail," added Dr. John Trauger, WFPC 2 principal investigator. "The recent result in M22 suggests we need to revise our understanding of planet formation.

"The Hubble Space Telescope was not designed for direct detection of planets," Trauger said. "Instead, this will be accomplished by a new generation of space telescopes that build upon our experiences with Hubble, possibly within this decade. And JPL will likely be in the forefront of these new planet-finding missions, both in

terms of Terrestrial Planet Finder and possible precursor missions."

The new Hubble image includes an inset photo showing the entire globular cluster of about 10 million stars. Globular cluster M22 is about 60 light-years wide. A light-year equals about 9.5 trillion kilometers (5.9 trillion miles). The image was taken in June 1995 by the Burrell Schmidt telescope at the Case Western Reserve University's Warner and Swasey Observatory on Kitt Peak in Arizona.

Additional information about the Hubble Space Telescope is online at <http://www.stsci.edu>. More information about WFPC2 is at <http://wfpc2.jpl.nasa.gov>.

The Space Telescope Science Institute in Baltimore manages space operations for the Hubble Space Telescope for NASA's Office of Space Science.

Correction

A News Briefs article in the June 8 issue of Universe highlighted winners of NASA's 2001 George M. Low Award for Quality and Technical Performance. The article failed to include that Swales Aerospace of Beltsville, Md., was this year's winner in the small business-product category. Swales has supported numerous JPL missions and projects through its Pasadena office since 1997. The company currently has a contract with JPL with a maximum value of \$34 million.

YOUTHFUL EXUBERANCE

By Derek Blackway

After breezing through high school, 18-year-old couldn't wait to explore space

When phoning JPL summer intern Aubrey Watson at her office, it was not surprising to hear the voice recording announcing that she was busy on the other line.

Between graduating high school a year early, finishing her freshman year at Arizona State University and interning at JPL under Mars Odyssey support, Watson has had her hands full – and she just turned 18.

Transferring from a high school in Idaho as a sophomore, Watson finished her senior year at Corona del Sol High School in Tempe, Ariz., when she was 16 years old, all the while aiming to become an astronaut.

"High school was not challenging enough," said Watson. "I was bored."

Beginning in elementary school and continuing through high school, she immersed herself into space exploration. She got involved in projects ranging from the Mars In-Situ Propellant Experiment curriculum to acting as a laboratory assistant for Dr. Laurie Leshin, an associate professor of geological sciences at ASU.

It was when working with Leshin that Watson decided to graduate early.

As a result of her experience working at JPL, Watson is considering double-majoring in aerospace along with geology.

Watson's interest in space is steadfast, and has been ever since she was 11 years old.

"If I'm not doing something involved in space, I lose interest," she said.

While in the sixth grade, Watson's passion for space was ignited by two factors: ice skating and the movie "Apollo 13".

She was impressed by the dedication the ice skaters displayed by starting their profession at such a young age, and resolved that beginning a career at an early age was the smartest decision she could make. She was an 11-year-old girl who felt like she was wasting time by not getting started in

a career of her own. "I wanted to start working towards something substantial," Watson said. Shortly thereafter, she found her inspiration for her interest in space after watching "Apollo 13." The rest is history, or would future be a better word?

It was difficult for Watson to get involved with space programs at such a young age. "I've always been the youngest one," she said. "No one would really take me seriously when I told them my career goals."

Although battling against her younger age, Watson's encouragement to face her fears derives from her mother's continuing support.

Watson's mom, Sheri Klug, a Mars outreach coordinator at ASU for grades K-12, emboldens Watson to "get over it," whenever it would be easy for her fears to get the best of her.

With that strong support behind her, it is evident that "determination is no problem for me," Watson said. "The only thing stopping you is your mind."

As for her experience at JPL, "There is a team atmosphere here. I love it. I can learn so much from the people with whom I am working. It's an amazing place."

Until she graduates, Watson will delve into as many aspects of the Mars Exploration Program as possible. Her plan is to be able to understand the different components of a mission regardless of which field she decides to keep as her career. However, the main theme resonating in anything she does is the desire to never get bored.

"I want always to be doing something that makes me say, 'Wow.'"

Photo of Aubrey Watson by Dutch Slager / JPL Photo Lab

"Aubrey focuses like a laser beam when she targets her goal. She has made a wonderful contribution to our group and she reminds me of why I'm teaching."

— Dr. Laurie Leshin, Arizona State University professor

"Dr. Leshin was the first one who exposed me to the research environment," Watson said. She enjoyed working with Leshin and resolved to attend ASU after she finished high school.

"Aubrey focuses like a laser beam when she targets her goal," Leshin said. "She has made a wonderful contribution to our group and she reminds me of why I'm teaching."

Dissatisfied with the slow pace of high school, added with her vehement desire to propel into space science, she went to her counselors seeking early graduation advice. It turned out that she was already on her way to being eligible to graduate early. She completed the necessary classes and graduated the day after she turned 17.

Her goals were set early. But how she was going to reach them had yet to be revealed. She was going into ASU as a freshman, but did not know what she wanted for a major. She decided to give geology a try, because "it made sense." After completing an honors geology course with Leshin at ASU, she realized that she loves the subject and will stay with it as her major. Her minor will be in astronomy.

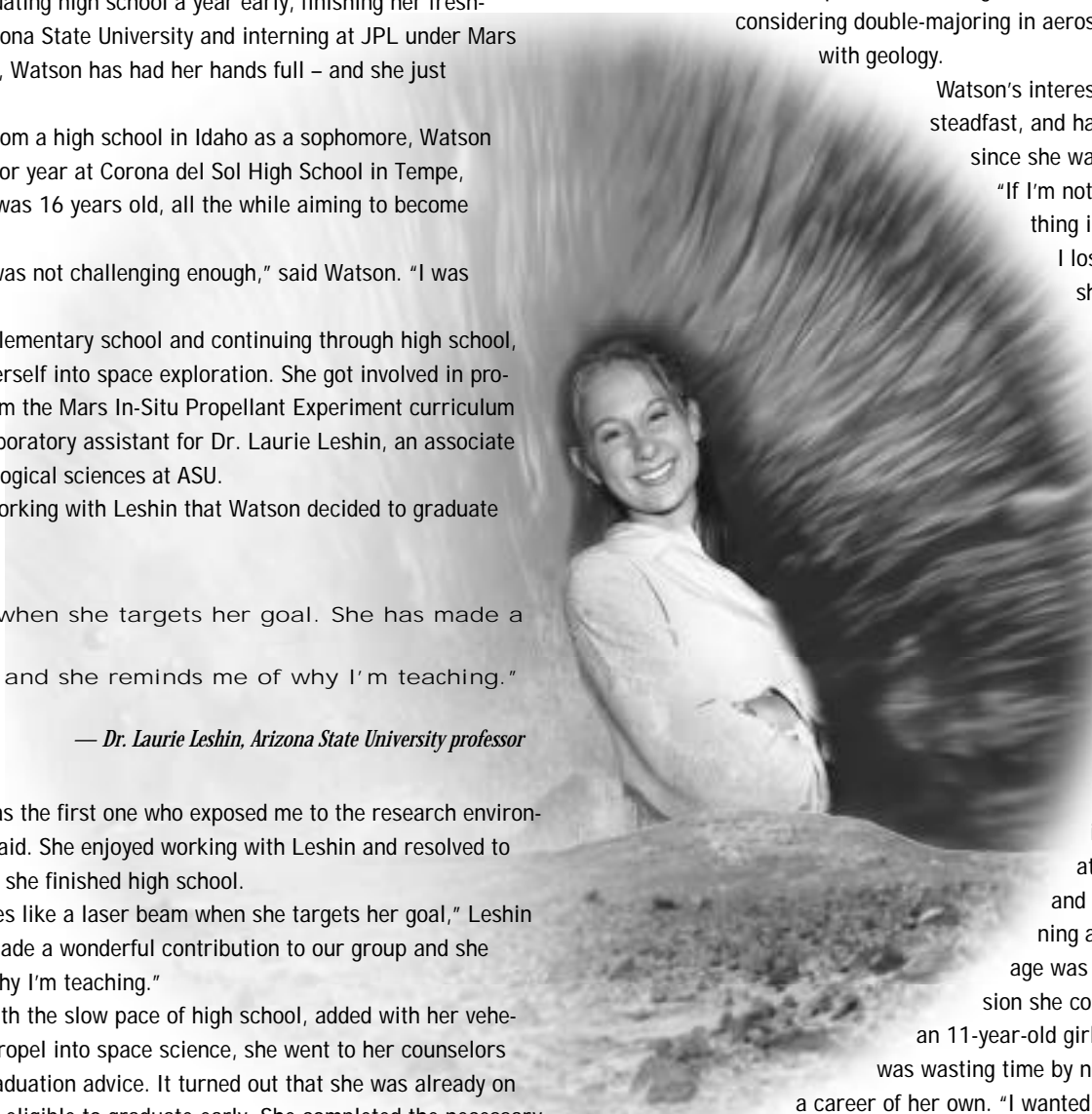
She had always wanted to go to other planets, but upon her exploration of geology, she now looks at Earth in a different light. She finds it fascinating to be able to identify Earth's geological features and piece together the past of a given area based on its natural composition. Geology further fueled her passion for learning about planetary composition.

At a chance meeting while attending ASU, Watson met JPL's David A. Spencer, mission manager for 2001 Mars Odyssey. Upon learning of Watson's desire to become an astronaut, Spencer and Watson maintained correspondence over the months. When summer came around, she was offered the internship.

Now, here at JPL, she's working with Mars Odyssey mission operations and just started 2003 Mars landing-site support, dealing with landing ellipses and Mars Orbiter camera data.

Working part time under Mars Program Landing Site Project Scientist Dr. Matt Golombek, Watson is plotting Mars Orbiter camera high-resolution images on potential landing ellipses for the Mars Exploration Rovers.

"Aubrey has a good feel for the software," Golombek said.



Native American educators go back to school

By Carolina Martinez

In an exercise to teach students how constellations are named, teachers worked inside a plastic "planetarium" at JPL's Educator Resource Center, where they poked small holes in the structure to create stars.

A group of 17 elementary and secondary school teachers from Native American reservations learned about some of JPL's most exciting missions during a two-week educational workshop ending June 22. Teachers from four different school districts—three in New Mexico and one in Arizona—learned how to involve their students in the wonders of space exploration while preserving and celebrating their rich Native American traditions.

The workshop at the JPL Educator Resource Center in Pomona brought together two different worlds that view the stars differently. For one, the stars are a source of spiritual guidance, and for the other they are a means to learn more about age-old questions such as

"Where did we come from?" and "Are we alone?"

"Our role is to help teachers come up with a plan that they can take back to their classroom," said Gene Vosicky, the center's administrator. "Together, we work to answer questions and figure out ways to incorporate space science and technology into their curriculum."

The primary goal of the workshop was to develop an action plan that supports standards-based teaching and learning in mathematics, science, technology and geography. Scientists, educators and engineers from JPL served as guest speakers. Tours of a botanical garden, an observatory and NASA Dryden Flight Research Center were also part of the workshop.



Bob Brown/JPL Photo Lab

Retirees

The following employees retired in July:

Tin Dao, 26 years, Section 331; Alice Fairhurst, 10 years, Section 197; David Farless, 34 years, Section 312; Jay Lieske, 34 years, Section 312.

Passings

RICHARD ABRAHAMSON, 75, a retired contract administrator in Section 622, died of Alzheimer's disease June 6 at a convalescent hospital.

Abrahamson joined JPL in 1967 and retired in 1989. He is survived by four children, five grandchildren and one great grandchild.

Burial was at Sunset Hills Memorial Park in Apple Valley.

ELMER HASTINGS, 72, a retired printing supervisor in Section 642, died of cancer June 8.

Hastings worked at the Lab from 1965-92. He is survived by five children and 14 grandchildren.

Memorial services were held June 14.

E. LORRAINE BRAKEBILL, 80, a former executive secretary in the Director's Office who retired in 1992, died of cancer June 10.

Services were private.

PAUL BROER, 60, a former software engineer in Section 345, died of brain cancer June 12.

Broer's work included testing flight sequences for Galileo operations as well as re-programming duties to help repair the spacecraft's antenna. He left JPL in 1999.

Services were held June 30 at Throop Unitarian Universalist Church in Pasadena.

SONIA KHATRI, 36, a communications engineer in Section 366, died of cancer June 14 at her home in Canyon Country.

Khatri had worked at JPL since 1989. She is survived by her son, Viraj, and her parents.

Services were held June 18 at Crawford Mortuary in Northridge.

ELAINE EVANS, 65, an administrator in Section 220 who had been on long-term disability, died of cancer June 23 at her home in Glendora.

Evans joined the Lab in 1979. She is survived by her husband, Robert; nine children, 14 grandchildren and 1 great grandchild.

Burial was at Oak Dale Mortuary in Glendale.

JAMES BLAIN, 62, a retired member of the information systems staff in Section 311, died of cancer June 24.

Blain worked at JPL from 1986-98. He is survived by sons James and Enrique, daughter Maria, and three grandchildren.

Services were private.

JOHN O'KANE, 72, a retired maintenance electrician in Section 662, died of heart failure June 25.

O'Kane joined the Lab in 1967 and retired in 1992. He is survived by sisters Mary and Isabel O'Kane, and Kathleen O'Hagan.

Burial was at Calvary Cemetery in Santa Barbara.

Letters

My wife and I extend our thanks to the ERC for the beautiful flowers sent following the death of my father. We also thank my friends and colleagues in Section 344 and elsewhere in the JPL family for their many expressions of sympathy and support.

John and Greta Davidson

Thank you, colleagues and ERC, for the lovely plant you sent after my brother's passing.

Jay Braun and family

Classifieds

For Sale

AIRLINE TICKET, round trip, anywhere Southwest flies, must complete travel by Aug. 12, 2001, \$300. 626/355-3886, Rosemar y.

AUDIO COMPONENTS: ADC Soundshaper 90 stereo equalizer; Onkyo P-3300 wireless remote preamp; Onkyo M-5300 stereo pwr. amp (150 watts/8 ohms); Onkyo T-4000 quartz synthesized stereo tuner; Pioneer CLD-1070 Laser Disc player, best offer. 626/791-7928, Michael.

BEDROOM SET, girl's, charming, including headboard, twin bed w/practically new matr. canopy, dresser, mirror nightstand + access., all matching, \$600. 626/791-1581.

BIKE, road, specialized, 1991 Allez, lg. carbon fiber frame, Suntour 12-speed shifters, very light & stiff, both triathlon & standard drop bars, look pedals, \$300 firm. 626/794-0886, Ted.

BIKE, mountain, 21 spd., Shimano equipped, 24" frame, nearly new, used little, cost \$135 new, must sacrifice, \$80/obo. 661/297-0219.

BOOTS, hiking, Vasque Clarion, new, ladies size 7, orig. \$150, sell for \$75. 626/798-6248.

BUNK BED, solid pine, \$150. 248-2931.

CAMERA, Nikon N70 (body only), orig. box & owner's manual, extra battry., \$225. 989-1388.

CAR SEATS, 2 Evenflo infant seats, luggage style handles, Looney Tunes characters, exc. cond., \$28/ea. 626/443-9774, Eve.

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

COFFEE TABLE, with 6 sectional tables, oval, black, table-top recalls, garden scene with 5 lady figurines with their musical instruments, handcrafted in mother-of-pearl, around a hand-painted Chinese pagoda, rim and sides are handpainted with gold details, 50" x 30" x 20", comes with 3/8" glass to protect the delicate figurines, \$150/obo. 626/683-0706.

COMPUTER, Apple iBook, blueberry, 300MHz, 96MB, SDRAM, 3.2G HD, 24 x CD, 56K modem, exc. cond., graphite-colored case, \$850. 249-0183, eves.

COMPUTER, Mac Power PC 6400, 180 MHz, monitor & printer, \$200/obo. 626/798-0329.

COMPUTER DESK, 6 months old, exc. cond., burnt sienna wood color veneer, on wheels, keyboard tray, lots of storage, must sell, \$50. 626/798-5222.

COMPUTER MONITOR, color, 21", Avitron AV-21TF, purchase price \$1,000, two months old, sell for \$400. 790-3854, Carol.

KITCHEN CABINET with stainless steel sink, chrome faucet and spray, white formica cabinet with 3 doors and 1 drawer, 39" H x 52" W x 26" D, \$65. 626/798-0329.

MISC: dining set, Italian marble, w/6 chairs \$1,800; grandfather clock, antique, needs minor repair, \$800. 626/441-0150.

PIANO, Login & Co, 1920s era upright, gd. for beginners, pd. \$1,385, make offer. 951-8888.

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

SAW, Craftsman, 10" radial arm, on movable stand, little use, gd. cond., \$225. 352-0075.

SAW, Skilsaw table saw, 10 inch, new \$100; ROUTER, Black & Decker, 11 amp, new, \$130; FUTON, \$50; LOVESEAT, \$70; MATTRESS SET, Cal-king, pillow-top, \$500; BED, Cal-King, pine 4 poster, \$400. 626/797-6737.

SLEEPING BAG, A16 mummy, blue, 4 season, \$25. 989-1388.

STORAGE BUILDINGS, (2) 8' x 16', wood frame, sliding, portable, \$4,000 new, \$995/ea. 562/699-8687.

TABLE dinette, square glass top, 5' x 5', w/metal feet and 4 matching chairs, \$700/obo; BAR STOOLS, four matching, metal frame, all in superb condition, \$300/obo. 626/398-3480.

TELESCOPE, Meade 10-inch Schmidt-

Cassegrain, model 2120, quartz optics, bought in 1988, good cond., declination motor and focus motor included, \$800/obo. 626/798-8369.

WEDDING GOWN, Mori Lee designer, scalloped neckline, short capped sleeve, satin bodice overlaid with lace and re-embroidered appliques, trimmed with sequins, pearls, deep V-back meets satin bow at waist, no train, http://www.morileeinc.com/catalog/C2001S5pix1.html for picture, purchased late 2000, worn once, clean, size 12, fits 5' 8", \$199/obo; ACCESSORIES, matching head crown piece, three-tier veil, petticoat, \$90. 241-3779.

WEDDING GOWN, Moonlight designer, shown in Bride's Magazine, beautiful off-the-shoulder gown, Basque waist, illusion fitted point, stain/organza & Alencon lace, Cathedral train, pearl & sequin beading, http://www.moonlight-bridal.com/asps/gowndetail.asp?gno=JW3004 for picture, purchased late 2000, worn once, clean, size 14, fits 5' 8" or shorter, \$199/obo; ACCESSORIES, matching head crown piece, 3-tier veil and petticoat, \$90. 241-3779.

Vehicles/Accessories

'83 BUICK Regal, V6, auto, nice, only 68,000 miles, \$2,000. 848-2922.

'99 FORD Mustang, 27K mi., automatic, like new, \$12,500/obo. 310/556-2723.

'97 FORD F150 XLT Supercab, 4.8 L, V8, white, auto, a/c, power locks/windows/steering, cruise control, towing package, bed liner, exc. cond., 48K mi., \$13,500/obo. 626/429-3830.

'96 FORD Explorer XLT, only 48K mi., "cream puff" leather, exc. cond., all pwr., windows, door locks/seats, cruise control, roof rack, front/rear a/c, alloy whls, 6 cyl., white, loaded, \$14,500/obo. 310/451-5919.

'94 FORD Explorer Sport, 5 spd., 4 w/d, 96K mi., black, gray leather, all power, 10-disk CD, alarm, alloy wheels, 5 new tires, \$7,000/obo. 323/655-5864.

'91 FORD T-Bird, V8, 34,800 mi., new front brakes, tires & battery, interior and exterior vg cond., drive to appreciate, \$4,000. 951-3467.

'85 FORD Bronco II XLS, 4 x 4, 2 dr., 5 spd., recently rebuilt 2.8L V6, new exhaust & catalytic converter at time of rebuild, rebuilt carb, brand new tires & spare, reg'ed & smogged til Jan '02, must sell, \$1,850/obo. 626/791-7219, 7-10 p.m., Khee or kheechean@earthlink.net.

'67 FORD Mustang, 390, 4 spd., S code, new paint & interior, orig. LA model, 80% restored, runs great, \$9,000/obo. 626/339-9353, Greg.

'89 MAZDA MX-6, red, good cond., 134K mi., \$2,500. 540-1008.

'93 PLYMOUTH Voyager mini-van, blue, new transmission, new tires, new brakes, 94K miles, \$4,500/obo. 626/857-1854, eves.

'92 SATURN coupe, exc. cond., 68K mi., moving to Hawaii, must sell, \$4,500/obo. 790-6261.

'88 SEA RAY boat, 23'uddy cabin, 185 orig. hrs., 5.7 liter motor, mercruiser outdrive, new upholstery, ship to shore radio, live bait tank, \$11,000/obo. 626/339-9353, Greg.

'00 TOYOTA Corolla CE, mint cond, 4 dr., auto, a/c, pwr/l windows/locks, cassette, grn. w/gray interior, 14K mi., \$11,900/obo. 310/915-5991.

'93 TOYOTA Camry LE, dark green, 112K mi., fully automatic, a/c, exc. cond., \$5,700/obo. 626/294-0049, eves.

'90 TOYOTA 4Runner SR5, 4 X 4, V6, auto, pwr. windows, door locks, sunroof/moonroof, tilt wheel, a/c, am/fm stereo/cass., CD, running boards, roof rack, 117K mi., gold w/tan interior, runs great, very clean, \$6,500. 626/852-0589.

'88 TOYOTA 4Runner SR5, V6, a/c, p/w, PIAAs on grill/guard, runs great, 152K mi., am/fm w/ cassette, flip up sunroof, \$5,900. 626/791-0075.

Wanted

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

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

TO RENT condo or house: French engineer + spouse and 2 children at JPL for 1 year, starting in Aug., furn. or not. 561 27 47 85 (France) or philippe.crebassol@cnes.fr.

VANPOOL RIDERS from Littlerock/Palmdale to JPL/Caltech. Ext. 3-3790 or 661/944-2448.

Free

PATIO BLOCKS, 100. 626/445-2616, Shari.

For Rent

ALTADENA house, 1 bd., 1 ba., large front yard, on cul de sac; water, garbage and gardener included, \$800. 626/798-3640.

ARCADIA, lg. studio, detached, separate entry, furn., kitchen, laundry facilities, no pets, non-smokers, shared utilities, \$850. 626/441/0041.

EAST PASADENA, charming house, 2 bd., 2 ba., 2 extra rms. for office use, hardwood flrs., f/p, 2-car gar., Indry, 3 window air conditioners, \$1,200. 626/794-3906.

LA CANADA guest house, 2 bd., 1 ba., close to school, \$950. 952-8638, after 6 p.m., Susan.

LAS VEGAS, Desert Shores, 7613 Sea Cliff Way, 1 story, 2 bd., 2 ba., unfurnished house, gard/appls incl., 1 yr. lease, no pets, \$1,000 + dep. 661/254-6134.

PASADENA, nice townhouse, btwn. Old Town & Caltech, 2 level, 2 bd., 2.5 ba., washer/dryer in unit, f/p, cent. a/c, storage, hardwood flrs., 2-car carport, patio, approx. 1,300 sq. ft., from 8/1, \$1,600. 626/792-1709, Robert or Laryssa.

PASADENA, charming 2 story English, 3 bd., 2 ba., l/r, formal d/r, cozy f/p, laundry rm., large backyard, pool, patio, built-in-BBQ, wood deck, nice landscape, avail. from 8/01, \$1,350, includes pool & gardener. 626/574-7027, eve.

PASADENA, nice home for lease, near Caltech, 3 bd., 2 ba., service porch with wash/dry hook-ups, nice front & back yd., flowers & fruit trees, avail. Aug. 1, \$1,200 + security deposit. 626/794-0455.

PASADENA apt., nr. PCC, 2 bd., + den, 2.5 ba., townhouse style, blt.-in range & oven, refrig., disposal, crpts., drapes/blinds, a/c, 2 fireplaces, cvrd. parking, laundry, \$995. 790-7062.

PASADENA, room in a 4-bd., 2-ba. apt., furnished, parking space, close to Caltech & PCC, \$495 + util. 626/351-9641.

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

Real Estate

ALTADENA condo, minutes from JPL, 2 bd., 1.75 ba., nice closets with organizers, f/p, cent. a/c, community pool, storage rm., 2-car garage/carport, tile counter top and marble floor in kitch., lg. patio with landscape, planters & oriental garden w/waterfall and spa, end unit with windows on 3 sides, sale by owner, \$154,000. 626/398-1988, Beverly.

PASADENA, 2 bd., 1.75 ba., 1 level condo, S. Lake Ave., lg. l/r, f/p, & wet bar, formal d/r, lg. kitch. w/bfast rm., laundry area, cent. heat/air, new a/c unit, new l/r & d/r hrdwd. floors, new stove, fridge, m/wave, new paint, 1 walk-in + 3 closets, new marble entry & bath granite floors, security bldg., subterr. storage & parking, htd. pool/Jacz., \$315,000. 626/793-3561.

Vacation Rentals

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

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

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

HAWAII, Lahaina, Maui, 1,500 sq. ft. condo on beach, 2 bd., 2 ba., sleeps 6, lanai, 2 pools and spa, tennis, restaurant, bar on site, golf nearby, avail. 2/2-2/9/02 and possibly other dates, \$1,500. 626/797-6737.

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

LAKE TAHOE condo, North Shore, 2 bd., 2.5 ba., slps. 6, pool, priv. beach, all amenities, convenient loc., avail. Aug., weeks only, special JPL discount. 626/355-3886, Rosemary or Ed.

MAMMOTH, Chamonix condo, 2 bd., 2 full ba., sleeps 6, fully equipped kitchen, incl. microwave & extras, f/p & wood, color TV, VCR, cable, FM stereo, pool & sun area, o/d Jacz., sauna, game, rec. & laundry rms., play & barbecue areas, conv. to lifts, shops, hiking, summer events, daily/wkly, rates. 249-8524.

MAMMOTH, Courchevel, fully equipped unit, 2 bd., 2 ba., sleeps 6, summer rates for summer activities, fishing, mountain biking, hiking. 661/255-7958.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully eq'd p'kitch. incl. microwave, D/W, cable TV, VCR, phone, balcony w/mtn. view, Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc. 626/798-9222 or 626/794-0455.

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

PACIFIC GROVE hse, 3 bd., 2 ba., f/p, cable tv/vcr, stereo/CD, well-eqpd, kit w/microw, beaut. furn: close to golf, bchsn, 17 Mile Dr., aquar., Cannery Row. JPL discount. 626/441-3265.

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

VENTURA beach cottage, 3 bd., 1 ba., slps 6-8; TV, VCR, CD player, phone, washer/dryer, backyard BBQ; short walk to beach and Marina Park. 248-0521.

DailyPlanet
online for the JPL community

Classified ads will be available the day before Universe is published, at <http://www.jpl.nasa.gov/dailyplanet>

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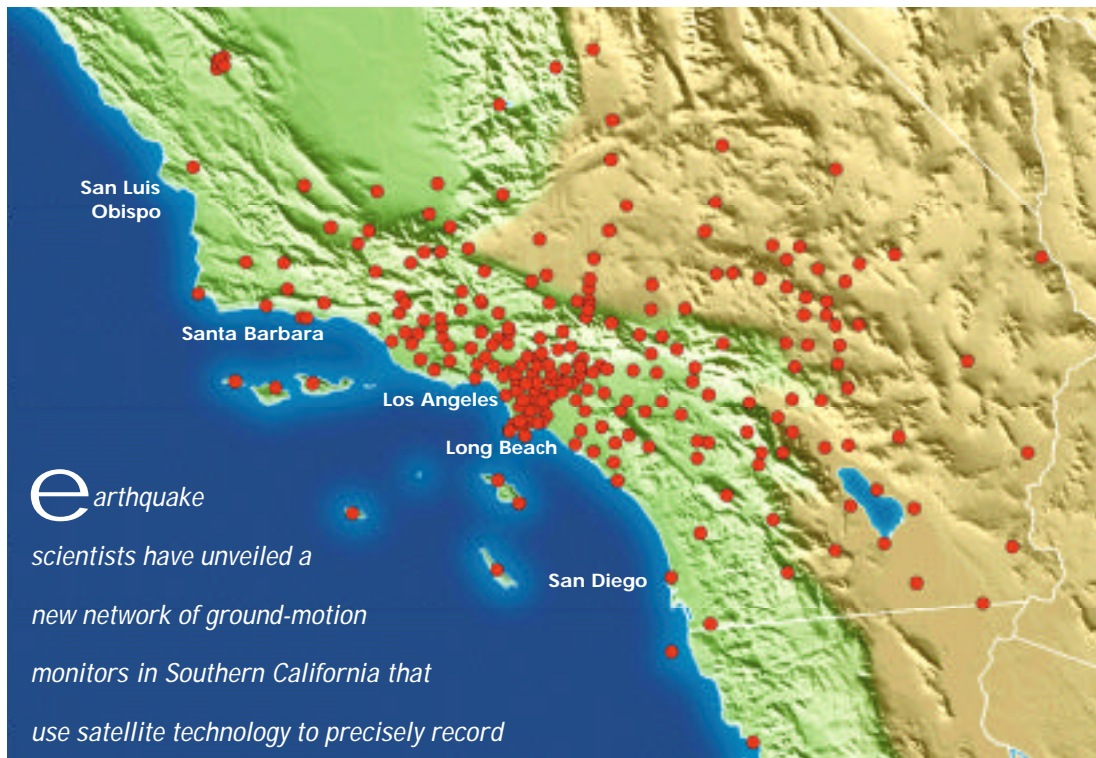
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Quake-monitoring network unveiled

JPL a key player in developing array throughout Southern California

By Mark Whalen

Locations for GPS earthquake monitoring stations include, at left, Elysian Park, near downtown Los Angeles; Joshua Tree National Park; bottom center; and along the Glendale Freeway in Glendale, right. At top center, near the GPS station in Glendale is an instrument connected to a laser strainmeter, embedded in the freeway to measure how much stretching or compressing is taking place.



Southern California Earthquake Center

earthquake
scientists have unveiled a new network of ground-motion monitors in Southern California that use satellite technology to precisely record

millimeter-level motions of the Earth's crust. JPL is one of the major partners and leaders in the development of the network.

Unlike other earthquake networks that record shaking, the Southern California Integrated GPS Network tracks the slow motion of Earth's crust by using signals from the Global Positioning System (GPS)—a constellation of satellites, originally designed for military navigation, that are used to determine precise locations on the ground. With the new network, the link between the motions of the plates that make up Earth's crust and the resulting earthquakes is now being observed continuously by an array of GPS stations operating across Southern California and northern Baja California—one of the world's most seismically active and highly populated areas. On July 2, the 250th station in the network was installed at Joshua Tree National Park.

The GPS network is jointly operated and managed by JPL, the Scripps Institution of Oceanography at UC San Diego and the U.S. Geological Survey, under the umbrella of the Southern California Earthquake Center, a science and technology center for the National Science Foundation. Major funding for the network has been provided by NASA, the W.M. Keck Foundation, the National Science Foundation and the U.S. Geological Survey.

Dr. Frank Webb of the Tracking Systems and Applications Section 335, the network's program manager at JPL, is a member of the network's Executive Committee, representing the Laboratory and the Satellite Geodesy and Geodynamics Systems Group. He noted that the \$20 million project was spurred by the 1994 Northridge earthquake. At that time, less than five continuously operating GPS stations existed in Southern California. JPL, with support from NASA, led the initial efforts to build the network up to 250 stations.

"Decades ago, NASA began looking at the plate motions by using large radio telescopes around the world," he said. "With investments by NASA in GPS technology at JPL, we improved the necessary ground systems and processing capability to the point that motions as small as a millimeter (about one twenty-fifth of an inch) per year can be observed with lower cost and easier-to-place GPS instruments, allowing us to deploy a dense geodetic network that is giving us a much sharper picture of the tectonic deformation that occurs across the faults in Southern California."

Over the last seven years, the network has grown rapidly from only a few stations in 1994, about 50 in 1998, to 250 at present. Almost all stations have been placed on public lands, such as schools and parks. Many of them are located on the facilities of public agencies that will benefit from seismic studies and on property used by organizations that rely on GPS for surveying. The Metropolitan Water District, for example, has allowed stations to be placed near pumping plants aside aqueducts and uses the data for surveying and monitoring the deformation around dams, aqueducts and aquifers.

The locations secured at community colleges and schools have provided additional benefits, in many cases becoming a focal point for students interested in learning science. "JPL has also developed

an educational module, with CD-ROMs and other materials, to teach kids about earthquakes and the GPS technology," Webb said.

Using the network's data to measure deformation of Earth's crust—which can occur as the sudden movement along faults during earthquakes or as the slow distortion of the ground between earthquakes—scientists can investigate the processes that control how strain builds up slowly over time before being released suddenly during earthquakes. The accumulated strain is directly related to earthquake potential, and measurement of it contributes to earthquake hazard assessments that help motivate people to prepare for earthquakes.

With the completion of this phase of the network, Dr. Ghassem Asrar, associate administrator for Earth science at NASA, noted, "Southern California becomes the premier laboratory for earthquake research in the nation." Research using the network's data, he said, will provide other government agencies, states, and local communities with new knowledge of these dangerous events.

Along those lines, the new GPS network, together with the Southern California Earthquake Center, has led efforts to develop interagency partnerships. Webb said researchers in the

Pacific Northwest, Nevada, Utah and Northern California's Bay Area "have seen our success, and now there are several similar arrays in North America."

Dr. Margaret Leinen, assistant director for geosciences at the National Science Foundation, noted that the new GPS network was "a model for interagency collaboration and for the leadership needed to get a big project like this done."

As a result of these successes, scientists are planning even bigger arrays across all of western North America. The GPS network has already begun to provide valuable earthquake-related data to scientists, surveyors, utilities, emergency planners, government agencies and others. The data are freely available over the Internet (www.scign.org). The majority of the hundreds of data users are scientists working in universities and government agencies around the world.

For more information about the Southern California Earthquake Center and the Southern California Integrated GPS Network, visit www.scec.org or www.scign.org.



Photo courtesy of Southern California Earthquake Center



Bob Brown / JPL Photo Lab

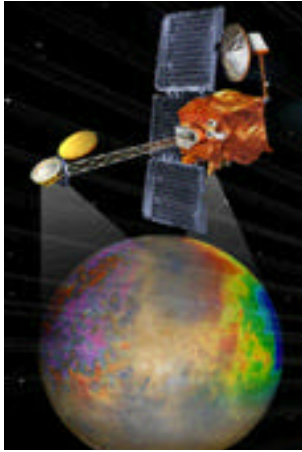


Bob Brown / JPL Photo Lab



Photo courtesy of Southern California Earthquake Center

News Briefs



Launched April 7, the 2001 Mars Odyssey spacecraft is now more than halfway to Mars.

Odyssey more than halfway to Mars

At 8:30 a.m. Pacific time July 16, JPL's 2001 Mars Odyssey spacecraft passed the halfway point on its journey to Mars. Monday marked 100 days since Odyssey's launch and now less than 100 days remain until its Oct. 24 arrival at the Red Planet.

"Odyssey is now closer to Mars than Earth," said DAVID A. SPENCER, the Odyssey mission manager at JPL. "The spacecraft is healthy and all systems are looking good. Planning for Mars approach and orbit insertion in October is our primary focus right now."

The navigation team reports the spacecraft is right on course. To date, the Deep Space Network has taken 11 separate measurements using the so-called delta differential one-way range measurement, a technique that uses two ground stations to determine the angular position of the spacecraft relative to the known position of a quasar. The measurements provide the navigation team with an additional source of information, adding confidence to their estimates of the Odyssey flight path.

As of Monday, Odyssey was 45.8 million kilometers (about 28.5 million miles) from Earth and 30 million kilometers (about 19 million miles) from Mars, traveling at a velocity of 26 kilometers per second (58,000 mph) relative to the Sun.

Viking celebrates 25th anniversary

Twenty-five years ago, on July 20, 1976, NASA's Viking 1 lander soft-landed on the surface of Mars, becoming the first successful mission to land on the Red Planet, as well as the first successful American landing on another planet.

With a second lander later joining the first on the surface and with two orbiters circling the planet, the Viking project changed our understanding of that alien world. Its treasure trove of images and data covering the entire Martian globe remains a valuable scientific resource for the study of Mars.

"JPL designed and built the two Viking orbiters and we are extremely proud of the Lab's history with Project Viking," said DR. FIROUZ NADERI, manager of the Mars Exploration Program at JPL. "The success of that mission set the stage for our current and future slate of spacecraft."

NASA's Langley Research Center was responsible for managing Project Viking, and in April 1978 turned the project over to JPL.

Deadline nigh for research proposals

The pre-proposal deadline for fiscal year 2002 Director's Research and Development Fund proposals is Friday, July 27.

This deadline is for major "Lab thrust" proposals only (either for the current astrobology topic or for additional topics). This pre-proposal will be reviewed by the Science and Technology Management Council, which will provide guidance to the investigator on whether

they should proceed to submit a full proposal.

Proposers should send a hard copy of one-page pre-proposals to CRAIG SCHLUE at mail stop 241-242 as well as an e-mail copy to him. The pre-proposal should contain the Lab thrust addressed, a list of investigators, total budget, technical background, work to be performed, and anticipated results and value to the thrust area.

The Director's Research and Development Fund supports research in innovative science and breakthrough technologies. It encourages university collaborations and cross-pollination between technical divisions to enhance JPL's skill base. Since space missions are fundamentally limited by technology, any breakthrough technology offers a possibility of bypassing today's limitations and leads to revolutionary, highly innovative improvements in space science and missions.

Full proposals for both Lab thrusts and seed efforts for innovative science and breakthrough technologies are due Sept. 7. For more information, log on to <http://drdf.jpl.nasa.gov>.

Depression, alcohol screening available

JPL's Employee Assistance Program is offering employees, and the adult members of their families, an opportunity to take a free, anonymous and confidential telephone and on-line screening for depression and alcohol problems. The program is designed to help individuals recognize the signs of depression and alcohol misuse and learn how and where to get help.

Both illnesses are highly prevalent and can be treated. Between 17 million and 20 million Americans experience depression each year. More than 14 million Americans have an unhealthy relationship with alcohol. And for some, alcohol use is connected to underlying problems like depression.

To participate in the screening, call (800) 390-7302 or log on to www.mentalhealthscreening.org/screening, where the password is HEALTH.

Symptoms of adult depression include persistent sad or empty mood; loss of interest or pleasure in ordinary activities; changes in appetite or sleep; decreased energy or fatigue; inability to concentrate or make decisions; feelings of guilt, hopelessness or worthlessness; and thoughts of death or suicide.

Alcohol warning signs to consider:

- Has anyone close to you ever worried or complained about your alcohol use?
- Have you ever tried to quit or cut down with only temporary success?
- Have you ever wondered whether you have an alcohol problem?

For more information on the screening, or on depression and alcohol misuse, call the Employee Assistance Program at ext. 4-3680. If you or a loved one has scored positive on the screening, you are encouraged to call the EAP office for a referral, or call your health-care provider.

Special Events Calendar

Ongoing Support Groups

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

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

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

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

Parent Support Group—No meetings are scheduled for July; next meeting is Aug. 16. For location, call the Employee Assistance Program at ext. 4-3680.

Senior Caregivers Support Group—No meetings are scheduled for July or August; next meeting is Sept. 6. For time and location, call the Employee Assistance Program at ext. 4-3680.

Friday, July 20

Coping With Chronic Health Problems—Dr. Janet Kramer, director of the Wellness Community in Pasadena, will speak at noon von Kármán Auditorium on the impact of illness on the patient and family; how it can affect work; methods for coping with the stress it creates; and minimizing the impact on family. For questions, call the JPL Employee Assistance Program, ext. 4-3680.

"Understanding via the Visualization of Large, Earth Science Data Sets"—This presentation from 3 to 4:15 p.m. in von Kármán Auditorium will include: Amazonian forests and wetlands as viewed by synthetic aperture radar and airborne digital videography, by Dr. Bruce Chapman of JPL and Dr. Laura Hess of UC Santa Barbara; the geological history of San Diego, by professor Pat Abbott, San Diego State University; and "Lewis and Clark: Search for the NorthWest Passage," by Dr. David Curkendall of JPL and Abbott. Sponsored by Institutional Computing and Information Services and the Office of Communications and Education.

Von Kármán Lecture Series—"Mars Exploration: From the Vikings to the 21st Century" will be presented by Dr. John Callas, Mars Exploration Rover Science Office manager, at 7 p.m. in The Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.

Wednesday, July 25

Investment Advice—Fidelity will hold individual counseling sessions from 9 a.m. to 3 p.m. in T-1720. For an appointment, call (800) 642-7131.

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

Thursday, July 26

Eudora Solutions—Help Desk personnel will demonstrate Eudora capabilities that can save PC and Mac users time and work more efficiently. The focus will be on solutions to problems frequently encountered by those who use Eudora on institutional e-mail servers. To be held at noon in von Kármán Auditorium.

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

Friday, July 27

Caltech Folk Music Society—Irish band Danú will appear in Caltech's Dabney Lounge at 8 p.m. The seven-member group features accordion, fiddle, Uilleann pipes, bodhran, flute, bouzouki, and guitar, and the music is an assortment of jigs, polkas, reels and songs. Tickets are \$15 for adults and \$4 for children under 12 and are available in advance and at the door. For information, call (626) 395-4652 or check the Folk Music Society Web site at <http://www.cco.caltech.edu/~folkmusi>.

Wednesday, August 1

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

Thursday, August 2

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

JPL Stories—Mariner 10 mission analyst Donna Shirley will discuss the mission, also known as Venus/Mercury 1973, in "Perils of Pauline—or Failing All the Way to Mercury (3 times)" at 4 p.m. in the customer service area of the Library, west end of Building 111, room 104. For questions about the JPL Story series or to participate, call Teresa Bailey at ext. 4-9233.

Friday, August 3

"The Quest for Mission Success: the Clementine Mission"—Dr. Trevor Sorensen, former Clementine Lunar Mission Manager, will speak from 1:30 to 3 p.m. in the Building 167 conference room. Sponsored by the Reliability Engineering Office 513.

70-day Jupiter movie pulls patterns out of chaos

By Guy Webster

Right: Jupiter as imaged by Cassini on Jan. 15 during the spacecraft's flyby on the way to Saturn.

1 b e S O L A R S Y S T E M

A kaleidoscopic movie made from about 1,200 Jupiter images taken by the JPL-managed Cassini spacecraft reveals unexpectedly persistent polar weather patterns on the giant planet.

Long-lived storms and globe-circling belts of clouds are familiar features around Jupiter's midsection, easily seen even in still pictures. Closer to the poles, though, still images show widespread mottling that appears chaotic.

"You'd expect chaotic motions to go with the chaotic appearance, but that's not what we see," said the planetary scientist who put the movie together, Dr. Ashwin Vasavada of Caltech. "The movie shows that the small spots last a long time and move in organized patterns."

Cassini shot the images in infrared light to cut through Jupiter's upper haze and show the clouds underneath in black and white. The movie clip combines those images taken over a span of 70 days into a sequence less than a minute long.

The version centered on the north pole and another version showing the entire planet are available online at <http://www.jpl.nasa.gov/videos/jupiter> and from the Cassini imaging science team's site at <http://ciclops.lpl.arizona.edu>.

Caltech planetary scientist Dr. Andrew Ingersoll, a member of the Cassini imaging team, said the movie also gives insight into storms' duration in Jupiter's high latitudes. "There are thousands of storms there the size of the biggest storms on Earth," he said. "Until now, we didn't know the lifetime of those storms." The movie shows thousands of spots bumping into each other but generally moving together within each band of latitude. The spots occasionally change bands or merge with each other, but usually they last for the entire 70 days. Each spot is an active storm in Jupiter's atmosphere.

"The smaller and more numerous storms at high latitude share many of the properties of

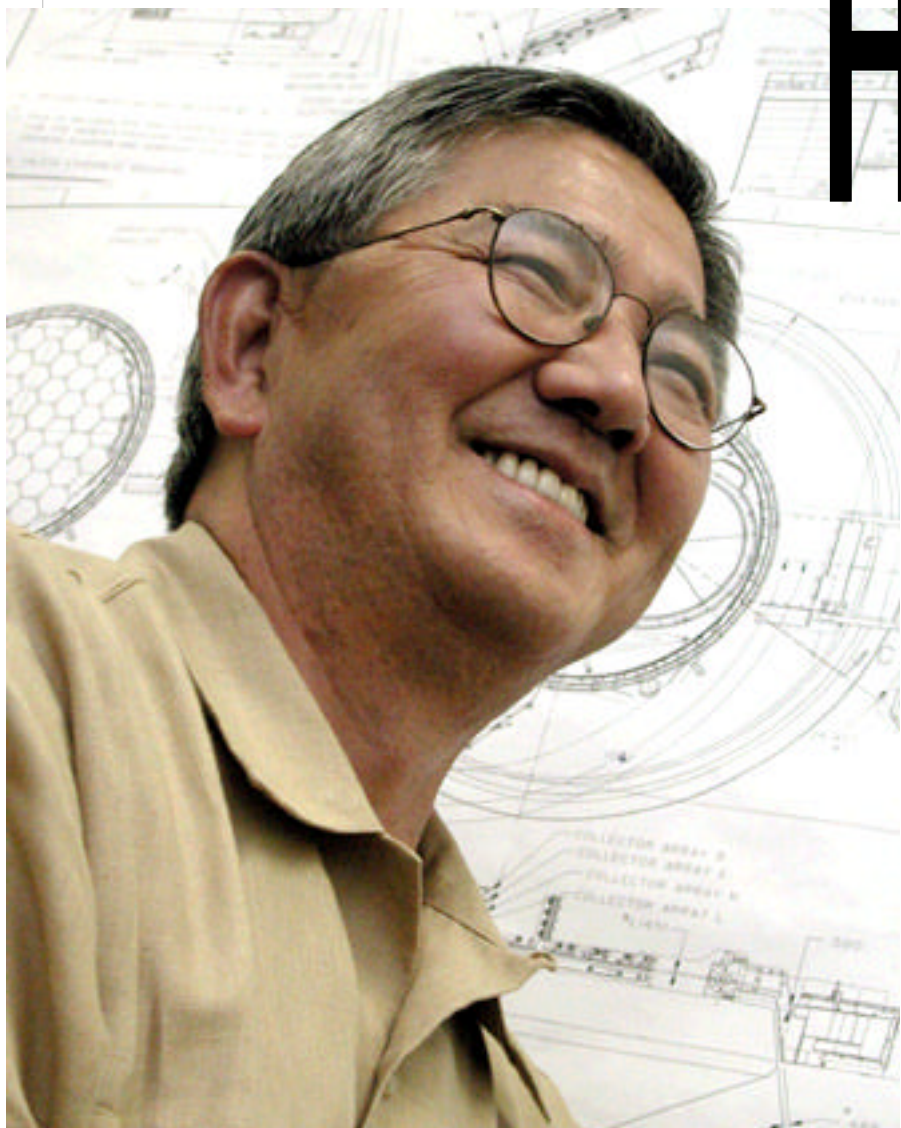


their larger cousins like the Great Red Spot at lower latitudes," Ingersoll said.

The mystery of Jupiter's weather is why the storms last so long. Storms on

Earth last a week before they break up and are replaced by other storms. The new data heighten the mystery because they show long-lived storms at the highest latitudes, where the weather patterns are more disorganized than at low latitudes.

"Perhaps we should turn the question around and ask why the storms on Earth are so short-lived," Ingersoll said. "We have the most unpredictable weather in the solar system, and we don't know why."



HERE COMES THE SUN

By Martha Heil and Mark Whalen

Genesis, set for a July 30 launch, will bring the solar wind to Earth for a dramatic helicopter capture

JPL's next robotic space explorer

is ready to do a little sunbathing on a mission to catch a wisp of raw material from the luminous celestial body around which the Earth and other planets revolve.

The Genesis mission, set for launch July 30 from Florida's Cape Canaveral Air Force Station, is designed to collect pieces of the Sun and return them to Earth. The mission is expected to capture about 10 to 20 micrograms of the solar wind, made up of isotopes (charged particles) expelled by the Sun.

The particles, about the weight of a few grains of salt, will be returned to Earth with a spectacular mid-air helicopter capture in 2004. Scientists will preserve this treasured smidgen of the Sun in a special laboratory for study. The researchers hope to answer fundamental questions about the exact composition of our star and the birth of our solar system.

Chet Sasaki, a veteran of more than 20 years at JPL who has always aspired to manage a major project, is getting his first opportunity to do so, with a first-of-its-kind and possibly history-making endeavor.

"This mission will be the Rosetta Stone of planetary science data, because it will show us the foundation by which we can judge how our solar system evolved," Sasaki said. "The samples that Genesis returns will show us the composition of the original solar nebula that formed the planets, asteroids, comets and the Sun we know today."

"Genesis will return a small but precious amount of data crucial to our knowledge of the Sun and the formation of our solar system," said Dr. Donald Burnett of Caltech, principal investigator and leader of the mission. "Data from Genesis will provide critical pieces for theories about the birth of the Sun and planets."

In October 2001, Genesis will have traveled to a point about 1.5 million kilometers (about 1 million miles) away from Earth—about 1 percent of the way toward the Sun—where gravitational and centrifugal forces acting on the spacecraft are balanced, known as the Lagrange 1 point, or L1. Genesis will then be well outside Earth's atmosphere and magnetic environment, which will allow it to gather pristine samples of the solar wind.

The spacecraft carries four scientific instruments: bicycle-tire-sized solar-wind collector arrays, made of materials such as diamond, gold, silicon and sapphire, designed to entrap solar wind particles; an ion monitor, which will record the speed, density, temperature and approximate composition of the solar wind; an electron monitor, which will make similar measurements of electrons in the solar wind; and an ion concentrator, which will separate out and focus elements in

the solar wind like oxygen and nitrogen into a special collector tile.

Sample collection will conclude in April 2004, when the spacecraft returns to Earth. Genesis will be the first mission to return a sample of extraterrestrial material since the Apollo 17 mission to the moon in 1972.

In September 2004, the solar samples will be returned in a dramatic helicopter capture. As the Genesis return capsule parachutes toward the ground at the U.S. Air Force's Utah Testing and Training Range, a helicopter will catch it on the fly to prevent the delicate samples from being disturbed by the impact of a parachute landing.

"A number of tests showed that the hardware was survivable for a landing under the right conditions, but the right conditions might not necessarily exist," Sasaki said. "For example, some of the solar-wind samples might have damage from micrometeorites, so we wanted to minimize the damage to the samples. But once the canisters enter re-entry mode, they are safe."

The samples will be taken to NASA's Johnson Space Center in Houston, where the collected materials will be stored and distributed for analysis. Scientists anticipate that, in addition to today's capabilities, new analytical techniques developed in coming decades can be used to study the solar matter returned by Genesis.



Data analysis will be performed much like was done on the moon rocks, Sasaki said, where scientists will submit proposals to do the research.

"Not all facilities and capabilities for sample-return analysis have been developed yet," he said. "One of the benefits of the sample return mission is we can keep on developing instrumentation for analysis. Three years from now we'll have better capabilities than we do now;

10 years from now we'll have even better capabilities. The idea is not to squander your resources before the analysis technology is developed."

Researchers believe the surface of the Sun, from which the solar wind originates, has preserved the composition of the solar nebula from which all the different planetary bodies formed. Study of Genesis' samples is expected to yield the average chemical composition of the solar system to greater accuracy. It will also provide clues to the evolutionary process that has led to the incredible diversity of environments in today's solar system.

"Scientists do know which materials are most abundant in the solar system," Sasaki said. "What they don't know quantitatively are the isotopic ratios of the different elements and, with high precision, the elemental abundances. We've created some super-pure material to be the collectors or the containers of the solar wind, and we expect a full range of elements; in fact, the entire periodic table. The distribution of the elements will be the discoveries."

Genesis is sponsored by NASA's Discovery Program, which competitively selects low-cost solar system exploration missions with highly focused science goals.

Additional information is available online at <http://genesismission.jpl.nasa.gov>.

Genesis Project Manager Chet Sasaki says the mission will be "the Rosetta Stone of planetary science data, because it will show us the foundation by which we can judge how our solar system evolved." Genesis' solar-wind collector arrays, left, are made of materials such as diamond, gold, silicon and sapphire.

NOVA awards



The following employees received recognition as winners of JPL's Notable Organizational Value Added (NOVA) awards for July and August. Organization numbers represent the NOVA unit in which the nomination was made.

For more information on the awards, log on to <http://eis/sec614/reward/nova01.html>.

Section 100: Ruben Becerra, Thomas Berry, Carlolina Carnalla-Martinez, Jayne Dutra, Vance Heron, Elizabeth Herrera, Douglas Hughes, Scott Hulme, Kristina Kim, Vicki Laidig, Carmen Lam, Stephanie Lear, Sauwan Leung, Charlotte Marsh, Angela McGahan, Joon Park, Iris Pedrosa, Robert Powers, Paul Ramirez, Michael Razeggi, Charles Rhoades, Vic Rodriguez, Myriam Ruiz, Daniel Sedlacko, William Seixas, Rachel Skinner, Nicole Thai, Beth Verish, Alice Wessen, Mark Whalen.

Section 220: Florencio Cunanan, Robert Hanna, Jienming Jou, Linda Kang, Krishna Kunamaneni, Dennis Lo, Sella Moursalian, Vuong Phan, Haiyan Wang, Beth Wilson, Sahar Yousef.

Section 260: Steve Alfery, Leslie Berridge, Margaret Cooper, Carolina Coppolo, Jeff Cornish, Adolfo Delgado, Diane Garinger, Richard Hillquist, Christine Horowitz, Bill Kert, Stan Packard, Geoffrey Pomeroy, Lorraine Reeves, Michele Schneider, Christine Zuro.

Section 270: Rose Ackerley, Sandra Menotti,

Devin Simmons, Carolyn Squillace, Marc White, Linda Worrel.

Section 311: Robert Carnright, Sandra Dawson, Govind Deshpande, George Fox, Janis Graham, Edward Greenberg, Jairus Hihn, Michele Johnson, Greg Kazz, Barnwell Legge, Frances Mulvehill, Robert Oberto, Thomas Pastorius, Tamara Roust, Troy Schmidt, James A. Smith, Shirley Stroup, Carlos Velez Jr., Keith Warfield, James Wood, Diane Wright.

Section 314: Kerry Erickson, Brian Hammer, Nora Mainland, Albert Nakata, Mark Rokey, Donald Royer, Marla Thornton, Ricardo Torres, Bruce Waggoner.

Section 334: Torry Akins, Janice Ball, William Fiechter, David Imel, Charles T C Le, Marsha McGhee, Gary Hamilton, Gregory Neumann, Leslie Nguyen, Theresa Pace, Patricia Rollins.

Section 335: James Border, Susan Finley, Charles Goodhart, Byron Iijima, Christopher Jacobs, Andre Jongeling, Gabor Lanyi, Stephen Lowe, Sumita Nandi, Jean Patterson, Timothy Rogstad.

Section 336: Brian Cook, Joyce Donato, Frank Ott, Ernest Stone.

Section 344: Anwar Akhtar, David Calkins, Kenneth Crabtree, Dwight Geer, John Gilbert, Charles Hand, Mitra Hartmann, Pooya Iranpour, Keizo Ishikawa, Alfred Khashaki, Martin Le, Yee Lee, Misrahim Morales, Minnie Perry, Julianne Romero, Donald Schatzel, Carl Steiner, Stephen Tseng, Frank Zee.

Section 345: James Alexander, Harry Balian, Edward Barlow, David Bayard, Dhemetrio Boussalis, William Breckenridge, Jay Brown, Paul Brugarolas, Larry Chang, Hari Das, Chris Granger, Fred Hadaegh, Robert Ivlev, Bryan Kang, Danny Lam, Edward Mettler, Mauricio Morales, Scott Peer, Marco Quadrelli, Frederick Serricchio, George Sheasby, Joel Shields, Gurkirpal Singh, Samuel Sirlin, John Spanos, Arthur Thompson, Edward Tunstel, Charles Vanelli, Matthew Wette, Edward Wong.

Section 346: Bruce Bumble, Rebeca Chacon, Jacob Chapsky, Stephanie Cowans, Debra Cuda, Serge Dubovitsky, Pierre Echternach, Pawan Gogna, Virginia Guzman, Alexander Ksendzov, Annette Laster, Henry Leduc, Carol Lewis, John Liu, Kamjou Mansour, Suzanne Martin, Kihon Megerian, Annie Murray, Sekharipuram Narayanan, Patricia Patterson, Daniel Pinion, Judith Podosek, Yueming Qiu, Don Rafol, Carl Ruoff, Adriana Wall, Emily Wesseling, William West, Victor White.

Section 349: Peyton Bates, Elisa Garcia, Marian Meridieth, Matthew Mori, Jerry Mulder, Tran Ngo-Luu, Heather Parsons, Mau-Huu Tran, Flora Yang.

Editor's note: Due to space limitations, the remainder of NOVA winners for July and August will be published next month.

Passings

EUGENE HEADRICK, 81, a retired senior test mechanic in Section 352, died of emphysema June 25.

Headrick worked at the Lab from 1946-84. He is survived by his wife, Norma, daughter Judy Reid, two grandchildren and two great grandchildren. Services were private.

ERHARD BURKERT, 81, a retired senior engineer in Section 511, died of congestive heart failure June 30.

Burkert joined JPL in 1977 and retired in 1985. He is survived by his wife, Doris, six children, 17 grandchildren and 1 great grandchild. Services were private.

THOMAS TESAREK, 67, a retired member of the engineering staff in Section 333, died of cardiac arrest June 30 at his home in Victorville.

Tesarek worked at JPL from 1978-99. He is survived by his wife, Sandra, seven children and six grandchildren. Services were private.

ROBERT WHITCOMB, 85, a retired member of the technical staff in Section 201, died of heart failure June 30.

Whitcomb joined the Lab in 1962 and retired in 1987. He is survived by daughters Cheryl and Karen. Services were private.

Corrections

In the July 6 issue of Universe, two articles in the Passings column require clarification.

The article reporting the passing of Elmer Hastings should have indicated that he joined JPL in 1960 and that his cause of death was heart failure.

The article reporting the passing of James Blain should have indicated that he is survived by his wife, Pilar, as well as his children and grandchildren.

Classifieds

For Sale

AIR CONDITIONER, window mounted, G.E., 8,000 BTU, like new, hardly used, \$175. 626/794-8737.

AIR CONDITIONER, window, Fedders, 10,000 BTU, clean, exc. cond., 12 months old, fits windows up to 39" wide, \$150. 626/796-4218.

AIRLINE ticket, round trip, anywhere Southwest flies, must complete travel by Aug. 8, 2001, \$300/obo. 626/355-3886, Rosemary.

BABY ITEMS: "holders," Bellini crib, "Milano," natural wood, \$150; Graco Tot-Loc 2-pc. infant car seat, base + carrier, \$50; misc. other items incl. booster seat, soft carriers, table clip-on infant chair. 709-0208.

CELL PHONE, Audiovox 4000, two, inc. car & home chargers, headset and case, \$75/both. 362-7187.

COFFEE, top of the line 100% pure Kona,

hand-picked from top quality trees, 100% sun dried, rich, dark roast, ltd. supply, discounted 45% at intro price of \$21/lb. 626/584-9632.

CEMETERY LOTS, Rose Hills Whittier, 2 side-by-side, "Poplar Lawn" near Japanese Gardens, \$1,500/ea or \$2,500/both. 626/296-3782.

DAY BED, twin, and mattress, used for only 6 months, exc. cond., black metal with a moon, sun, and star on backboard with gold accents, will e-mail photo upon request, \$150. 626/688-7659, leave msg.

BOOKCASE, white, tall, adj. shelves, from Plummers, \$20; ROTISSERIE/GRILL, Farberware, \$25. 790-3543.

EXERCISE EQUIPMENT, low-impact Elliptical Exercise Machine ProForm, 485 E Model 927, bought new last year from Sears for \$390, like new, \$200/obo. 626/284-4694. LUGGAGE CARRIERS, rooftop, Sears fiberglass, \$50; SOFT CARRIER, new, \$20. 626/797-6982.

MINERAL COLLECTION, quartz, etc., left over from 1978 science fair display, \$75 for everything or call for price per mineral. 626/403-0025.

MONITOR, 17 inch, 0.26 mm dot pitch Viewsonic Optique V775, sharp image and text, right up to 1152 x 864 at 85 Hz, cannot display blue (appears black) and has a greenish tint, reds, yellows, and greens show up, in original box with 15-pin cable and power cord, \$40. 626/683-0706.

MOVING SALE, living & dining room furniture, all like-new, exc. cond., Italian travertine dining set w/8 chairs, 4-piece sofa set, matching coffee and 2 side tables, leather sofa & love seat. 547-6347, Noushin.

NOTEBOOKS, Fujitsu 655TX, Pentium 150 MMX, 80MB RAM, 1.3 GB HD, 12.1" active matrix screen, built-in 33.6 fax/modem, external floppy drive, dual lithium ion battery, ultrathin about 1", 4.4 lbs, 3 units available, \$250/ea. 626/308-2163.

PALM 100, handheld, brand new, in original packaging, retail \$120, will sell \$100. 661/257-4350.

PIANO, Clavinova digital, Yamaha CLP 411, 3 yrs. old, exc. cond., black, \$1,900/obo. 626/333-8310.

PLAYER PIANO, 1920s, Henderson w/Gulbranson player, older restoration, \$1,200/obo. 626/797-8562.

PRINTER, HP LaserJet II, incl. manuals cables, etc., \$200/obo. 323/665-3439.

SOFA, sectional sleeper, makes into queen-size bed, attractive abstract water color design in cream, aqua, mauve, great condition, \$350; COFFEE TABLE, white oak finish, with glass panels, like new, \$100; see photos at ERC or call for e-mail photo. 830-8993, eve & wkend, 903-8979, cell.

TABLE, dinette, square glass top 5' x 5' w/metal feet and 4 matching chairs, \$700/obo; BAR STOOLS, four matching bar stools, metal frame, all in superb condition, \$300/obo. 626/398-3480.

TREADMILL, Pro-Form foldway space saver, 2.5 HP w/power incline, automatic workout programs, 10 mph, like new, \$295. 626/286-1883.

WASHER, Whirlpool compact automatic, moveable/portable installation, exc. cond., 18 months old, ideal for apartment/condo, cost \$500, sell for \$200/obo. 626/796-4218.

WASHER/DRYER SET, GE Premier Line, 3 yrs. old, matched white set, huge capacity, cost \$1,000, sell for \$600. 790-6185, Tim or capttrs@aol.com.

WET SUIT, men's size large, jacket and Farmer John pants, Body Glove, \$20/ea; SWIM FINS, heavy duty, \$15. 626/794-2431. WHEELCHAIR, power, Ezerest & Jennings, exc. cond., 9 mo. old, almost new, used only inside, \$3,500/obo. 626/798-0033, Denise.

Vehicles/Accessories

'97 DODGE Stratus, 83,500 mi., a/c, auto, power doors/windows/mirrors, radio/cassette, ABS, silver, exc. cond., orig. owner, \$6,200. 367-1063.

'97 FORD F150 XLT Supercab, 4.8L, V8, white, automatic, a/c, power locks/windows/steering, cruise control, towing package, bed liner, exc. cond., 48K mi., \$13,500/obo. 626/429-3830.

'97 FORD Mustang, red, 46K mi., auto, pwr. win/door, sporty looking with rear spoiler, \$10,750. 626/856-8723.

'96 FORD Escort LX, exc. cond., 5 spd., 2 dr., 57,000 miles, a/c, am/fm/cassette, exterior red, interior gray, \$5,900/obo. 909/980-3508.

'93 FORD Aerostar van, green w/gray interior, 109K mi., a/c, clean, good cond., \$3,100. 626/301-9965.

'93 HONDA Nighthawk, 750 cc, 4 cyl., new Plexifairing 3 Corbin seat, very clean, dependable, \$2,400/obo. 367-0969.

'95 JEEP Wrangler Rio Grande, 4 cyl., 52K mi., pearlstone/tan, soft top, ARB rear locker and air comp, BFG A/Ts, exc. cond., \$11,500. 626/351-1335.

'90 NISSAN 240SX SE Fastback, 5 spd., flip-up sunroof, power steering, tilt wheel, cruise, AM/FM stereo, single owner, well-maintained, all records, runs/handles great, 100K mi., good cond., \$3,600/obo. 323/467-4742.

'91 SUBARU Loyale 4D wagon, 149K miles, 5 spd., 2 w/d, must sell, very well maintained, a/c, power locks/steering/windows, CD, alloy wheels, tilt wheel, Yakima roof rack, new tires, new clutch, recently repaired transmission, a/c & timing belt, runs great, call for digital pictures, Kelly Blue Book \$3,755, sell for \$2,900/obo. 507-5632 or 626/379-0969.

'91 TOYOTA Corolla Deluxe, metallic blue, 4-dr. sedan, 5 spd., 4 cyl., 1.6L, a/c, 134K mi., good cond., all maintenance records, \$3,500/obo. 626/578-7587.

'89 TOYOTA short bed pickup truck, 4-spd. manual, 115K mi., exc. cond., very well maintained, a/c, Sony AM/FM/CD, \$3,600. 248-7796.

Lost & Found

FOUND: Motorola cell phone in Building 144. Contact Geoff Laugen at 4-9350 (144-118) to claim.

Wanted

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

HOUSING, visiting scientist w/family looking for furnished house/apt. for month of Aug. Ext. 4-7391 or 562/693-2986.

MOTORSCOOTER, Vespa or Lambretta, any year or condition, running or not, for JPL student employee. newwave101@yahoo.com or 323/721-5584, Dorian.

POOL TABLE, used, good cond. 909/468-5907.

SHOPPERS: "Shop Til You Drop," Wed., July 25, 5:30 to 8 p.m., Arcadia Elks Lodge, 27 W. Huntington Dr., no admission, fashions from Nordstrom, Macy's, Robinsons-May, Bloomingdale's, 50-70% off store prices, nothing over \$33, sz. 4-24, handbags, scarves, jewelry, girl's clothing, all proceeds donated to disabled children in CA & Hawaii. 626/445-2025.

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

Free

CHISENBOP BOOKS (Korean counting method) and records, 45s, children's songs. 626/403-0025.

For Rent

GLENDALE house to share, exclusive location, large furnished room, central courtyard w/fountain, deck w/gazebo, bathroom with garden view, complete house privileges, no smoking/ drinking, \$700. 246-4750.

MONTROSE studio apt., detached, 10 min. from JPL, \$485. 626/445-0884.

NORTH ALHAMBRA, borders South Pasadena, 2 bd., 1 ba., upstairs rear unit apartment, kitchen furnished with all appliances, all utilities incl., very private, avail. 8/15, \$1,200 + \$1,200 dep. 626/570-6123.

PASADENA home, 3 bd., 1.75 ba., .5 blk north of Colorado, near PCC, avail. 8/1, \$1,500. 590-2793, Dorothy.

PASADENA, nr. Lake and 210 fwy, 2 bd., 1 ba., in a 4plex unit, spacious and clean, \$795. 952-5568.

PASADENA, room in a furnished 2-bd. apt. near Lake Ave. district, treetop and mt. view surroundings, tree-lined street, near shopping, PCC, Caltech, underground secured parking, laundry facility, pool, utilities paid, female preferred, \$500 + \$300 deposit. 626/796-8982 or 626/399-6072, cell.

SUNLAND/TUJUNGA townhome, 2 bd., 2 ba., spacious 2-story with mt. view, roof deck, central air, built-ins and 2-car garage, freshly painted and new carpets, \$1,195. 952-5568.

Real Estate

GLENDORA, 3 bd., 2 ba., family room, custom built-in kitchen, new tile floors in kitchen and bathrooms, hardwood floors in living room and dining area, central air, f/p, 1,560 sq. ft., move-in condition, detached 2-car garage, built-in spa and fruit trees, \$244,500. 949/500-3404 or 626/331-0407.

MONROVIA, beautiful ranch home in the foothills, 4 bd., 1.75 ba., fabulous city lights/mountain views from every room, secluded 18,000 sq. ft. lot, professional landscaping, pool, spa, gazebo, fountain, many fruit trees, office/laundry room in basement with access to garden/pool, newly remodeled kitchen with maple cabinetry and granite countertops, professionally decorated, immaculate, entertainer's delight, \$535,000. 626/351-9117.

Vacation Rentals

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

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

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

HAWAII, Maui condo, NW coast on beach w/ocean view, 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 \$105/nt./2, 12/15-4/14 12/nt./2, \$10/nt. add'l person. 949/348-8047.

LAKE TAHOE, North Shore condo, 2 bd., 2.5 ba., sleeps 6, pool, private beach, all amenities, convenient location, available August, weeks only, special JPL discount. 626/355-3886, Rosemary/Ed.

MAMMOTH townhouse, 2 bd. + lg. loft, sleeps 8, beautiful and comfortable, spa, pool, gameroom; rent 4 nights, get 2 nights free w/JPL discount (until 9/1/01). 626/794-6860.

MAMMOTH, Chamonix condo, 2 bd., 2 full ba., sleeps 6, fully equipped elec. kitchen, incl. microwave & extras, f/p & wood, color TV, VCR, cable FM stereo, pool & sun area, game rec. & laundry rms., sauna, play & BBQ areas, o/d Jacuzzi, conv. to shops, hiking, lodge, summer events, daily/weekly rates. 249-8524.

MAMMOTH, Courchevel, fully equipped unit, 2 bd., 2 ba., sleeps 6, summer rates for summer activities, fishing, mountain biking, hiking. 661/255-7958.

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

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

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

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

DailyPlanet
news for the JPL community

Classified ads will be available the day before Universe is published, at <http://www.jpl.nasa.gov/dailyplanet>

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Advertising is available for JPL and Caltech employees, contractors and retirees and their families. No more than two ads of up to 60 words each will be published for each advertiser. Items may be combined within one submission. Ads must be submitted on ad cards, available at the ERC and the Universe office, Bldg. 186-118, or via e-mail to universe@jpl.nasa.gov. Ads are due at 2 p.m. on the Monday after publication for the following issue.

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