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I n s i d e

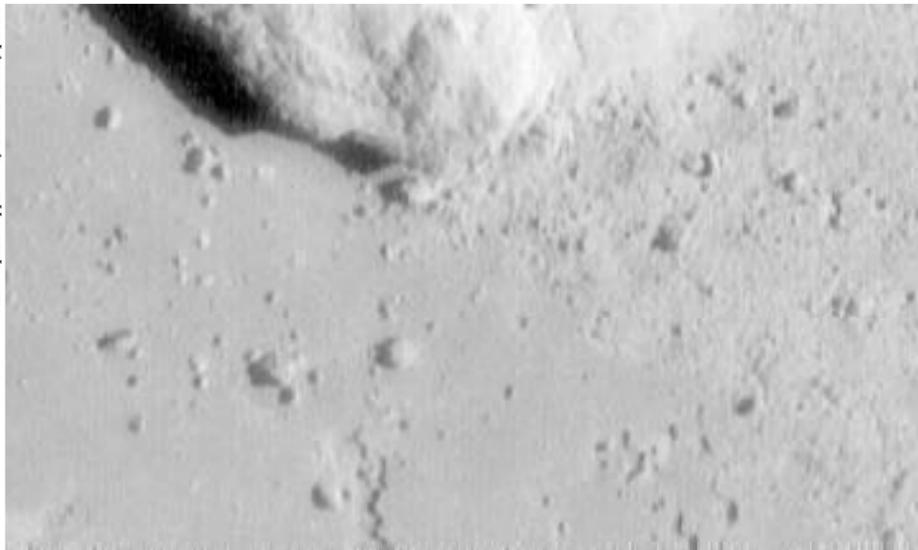
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Lab navigates first asteroid landing

By Martha Heil and Mark Whalen

The last image from NEAR Shoemaker was snapped a mere 120 meters (394 feet) from Eros' surface. The potato-shaped asteroid is shown in fill size at right.

Johns Hopkins Applied Physics Laboratory photos



a JPL navigation team made history February 12, when it guided the NEAR Shoemaker spacecraft to a controlled landing on asteroid Eros, the first time such a maneuver has been attempted.

The spacecraft, built and managed for NASA by the Johns Hopkins Applied Physics Laboratory (APL) in Laurel, Md., slowly descended to Eros' boulder- and crater-strewn surface at 12:01:52 Pacific Standard Time. Through five engine burns in the hours leading up to the landing, it had slowed to a gentle speed of between 1.5 and 1.8 meters per second (less than 4 mph) just before finally coming to rest after a journey of 3.2 billion kilometers (2 billion miles).

"It could be the softest landing of all time," said NEAR Mission Director Dr. Robert Farquhar of APL, who noted that landings on the Earth's moon, Venus and Mars were accomplished at slightly higher speeds.

"For a spacecraft that was not designed as a lander, the landing came off extraordinarily well," said Dr. Bobby Williams of JPL's Navigation and Flight Mechanics Section, leader of the navigation team. "It's a testament to the hard work of the APL team and the JPL navigation team."

He said one of the major challenges in landing the spacecraft involved the asteroid's unusual shape. The potato-shaped

Eros is about 32 kilometers (20 miles) across, or about the size of New York City's Manhattan Island. Eros rotates around its shortest axis every five hours and 16 minutes, and the successful landing placed NEAR Shoemaker near the asteroid's south pole.

Since a landing on such a small body had never been tried before, the navigation team had to change the mathematical models it used as the spacecraft drew closer to the asteroid, Williams said, noting that the team received verification Monday that the models they were using would work correctly.

At JPL, tension and anticipation filled a small and crowded control room in Building 301 as the navigation team guided the spacecraft slowly to asteroid.

The success of the landing, and the spacecraft's continuing communications with controllers via NASA's JPL-managed Deep Space Network, astounded even the most optimistic of scientists and engineers associated with the mission.

"Unbelievable," was how deputy navigation team chief Jim Miller of JPL described

the landing and the fact that the spacecraft is still alive and communicating with Earth.

NEAR Shoemaker project managers at APL said Wednesday that communications with the spacecraft continue. The team will extend operations through Feb. 24 to gather data from the spacecraft's gamma ray spectrometer, which will track the abundance of elements on the surface of the asteroid.

The NEAR Shoemaker navigation team at JPL also included Miller, Bill Owen, Mike Wang, Cliff Helfrich, Peter Antreasian and Steve Chesley, Eric Carranza and John Bordi. JPL's Dr. Donald Yeomans serves as the mission's radio science principal investigator, and JPLers Jon Giorgini and Alex Konopliv are team members.

The last image from NEAR Shoemaker was snapped a mere 120 meters (394 feet) from the asteroid's surface and covers an area 6 meters (20 feet) wide. As NEAR Shoemaker touched down, it began sending a beacon, assuring the team that the small spacecraft had landed gently. The



signal was identified by radar science data, and about an hour later was locked onto by DSN antennas, which monitored the spacecraft until Feb. 14.

The spacecraft spent the last year in a close-orbit study of asteroid 433 Eros, a near-Earth asteroid that is currently 316 million kilometers (196 million miles) from Earth. During that time it collected 10 times more data than originally planned and completed all its science goals before attempting its descent to the asteroid.

For mission updates, images and other information, log on to <http://near.jhuapl.edu>.

Global Surveyor celebrates transition

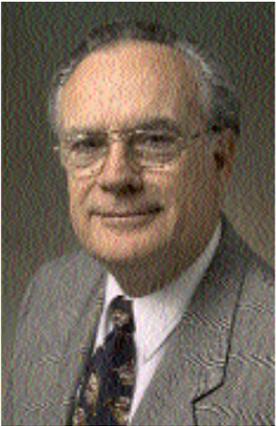
Extended mission begins for Mars orbiter

Dutch Stager / JPL photo



JPL's Mars Global Surveyor spacecraft, which has been in orbit since 1997, ended its primary mission Jan. 31 and immediately began an extended mission through April 2002. Among those celebrating in von Kármán Auditorium were, from left, Dr. Michael Malin, principal investigator for the Mars orbiter camera; Dr. Jim Garvin, Mars program scientist at NASA Headquarters; and Dr. Arden Albee, Global Surveyor project scientist.

News Briefs



Larry Dumas

Dumas to retire later this year

JPL Deputy Director LARRY DUMAS has announced that he will retire sometime this year.

With the announcement last month that DR. CHARLES ELACHI will become JPL's new director May 1, Dumas, who will turn 65 in October, said he will remain at the Lab during the transition.

"With the pending change in Directors I want to time my departure such that I can best help in this transition," Dumas stated in a memo to employees. "Charles has asked me to stay on for a time after May 1 to help with the transitional workload and provide continuity in the Director's Office. My date of retirement will depend on the specifics of the transition plan for the new Deputy, to be worked out after that individual is named.

"I intend to stay focused on doing everything I can to ensure a great send-off for ED [STONE] and successful start for JPL's new Director and Deputy Director, as I'm sure you will as well," Dumas said.

JPL, Aerospace Corp. to collaborate

JPL and the Aerospace Corporation have signed a memorandum of understanding that will foster collaboration on defense, civil, and commercial business and establish a roadmap for future collaborative endeavors.

The agreement, signed Jan. 16 by JPL Director DR. EDWARD STONE and Aerospace president DR. BILL BALLHAUS, enables the two organizations to partner on NASA, civil, commercial, and national-security space programs of mutual benefit. The partnership is expected to benefit both organizations by enhancing mission success through the efficient use of scarce resources and rapid infusion of revolutionary technologies, by enabling cross-program knowledge and the sharing of lessons learned, and by increasing the opportunity to broaden the business base.

"Working together, both organizations offer the potential to form a national center for space technology and engineering," said ALFRED PAIZ of JPL's Air Force and NOAA Program Office. "Pooling our resources will provide our NASA and Department of Defense customers with a powerful capability in spacecraft system engineering, technology infusion and project management. Beginning this month, we look forward to learning about our mutual capabilities and working out the specific areas of collaboration."

Lab will mentor engineering partner

JPL recently established a mentor-protégé agreement with Applied Sciences Laboratory Inc., which has provided thermal engineering services to the Laboratory since 1996.

ASL is termed a certified small

disadvantaged business by the U.S. Small Business Administration. "Much like JPL encourages individual mentoring, NASA's Office of Small and Disadvantaged Business Utilization encourages NASA's prime contractors to mentor Small Disadvantaged Businesses, Small Woman Owned Businesses, Historically Black Colleges or Universities, or Minority Institutions," said GEORG SIEBES of Division 35, the contract technical manager.

The agreement was developed by JPL's Business Opportunities Office. Examples of the assistance JPL will provide ASL include:

- Support in the achievement of ISO 9000 certification;
- Mentoring and transfer of expertise in areas such as thermal/mechanical design, thermal/structural analysis, system thermal vacuum testing and mission operations;
- Transfer of its mechanical engineering processes. JPL's Mechanical Design, Build, Assemble and Test process is the core process applicable to the current partnership.

The goals of the agreement, Siebes said, include increasing ASL's ability to make system-wide design trades and optimizations, and providing ASL with a well-balanced portfolio of mechanical engineering process capabilities to help them compete with best-in-class companies in the future.

ASL-supported projects at JPL include Mars Exploration Rover, Tropospheric Emission Spectrometer, Galaxy Evolution Explorer, SeaWinds and Solar Probe.

ASL was a finalist in last year's George M. Low Award competition, NASA's premier recognition for contractors that demonstrate an exceptional level of quality.

Acquisition Division surveys customers

In an effort to improve customer service, JPL's Acquisition Division will conduct its first-ever Labwide customer survey this month.

The survey will be mailed to more than 3,000 customers of the division. Some employees will be asked to participate in more in-depth interviews, targeted at specific areas.

Survey data will be used to help the division establish and prioritize goals and better partner with its diverse customer base, said Division Manager STAN JANKOWSKI.

Once data has been tabulated and analyzed, the division will provide feedback to survey respondents on the overall results. "Acquisition wants to be a 'customer-obsessed' organization and needs everyone's help to achieve that," Jankowski said.

For those who want to participate in the survey but did not receive one, call JEAN WALKER at ext. 4-5620.

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.

End of Life Issues and Bereavement—Meets the second Monday of the month at noon in Building 111-117. Call the JPL Employee Assistance Program at 4-3680.

Gay, Lesbian and Bisexual Support Group—Meets the first and third Fridays of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

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

Senior Caregivers Support Group—Meets the first Tuesday of the month in Building 167-111. For information, call the Employee Assistance Program at ext. 4-3680.

Friday, February 16

Caltech-Occidental Concert Band—A free concert will be held in Occidental's Thorne Hall at 8 p.m. Call (323) 259-2785.

Odadaa—This group from Ghana, which combines African percussion with vocals, dance and colorful costumes will perform at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$22, \$18 and \$14. For information, call (626) 395-4652.

Friday, Feb. 16–Sunday, Feb. 18

Othello—This Theater Arts at Caltech production will be presented in Caltech's Ramo Auditorium at 8 p.m. Friday and Saturday, 2 p.m. Sunday. Tickets are \$15. For information, call (626) 395-4652.

Tuesday, February 20

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

Wednesday, February 21

Investment Advice—Fidelity will hold one-on-one counseling sessions in Trailer 1720-131 from 9 a.m. to 3 p.m. Call (800) 642-7131 for an appointment.

"Planetary Phrenology: The Lumps and Bumps of the Earth"—SRTM Project Scientist Dr. Michael Kobrick of JPL will lecture at 8 p.m. in Caltech's Beckman Auditorium. Free admission. For information, call (626) 395-4652.

Thursday, February 22

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

Friday, February 23

Travel Office Closure—The Travel Reservations Office in Building 241-208 will be closed all day during construction. The office will conduct business as usual from temporary offices in Building 241-226 from Feb. 26 through March 2.

Travel Film—*South African Safari* will be presented at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$9 and \$7. Call (626) 395-4652.

Friday, Feb. 23–Sat., Feb. 24

Winter Concert—The Caltech Glee Clubs will perform at 8 p.m. in Caltech's Dabney Lounge. Free

admission. For information, call (626) 395-4652.

Friday, Feb. 23–Sun., Feb. 25

Othello—This Theater Arts at Caltech production will be presented in Caltech's Ramo Auditorium at 8 p.m. Friday and Saturday, 2 p.m. Sunday. Tickets are \$15. For information, call (626) 395-4652.

Saturday, February 24

Les Ballets Trockadero DeMonte Carlo—This all-male comic dance company that performs pieces from classic ballets will appear at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$32, \$28 and \$24. For information, call (626) 395-4652.

Tuesday, February 27

Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) Workshop—Today is the first day of the workshop, to be held in von Kármán Auditorium from 8 a.m. to 5 p.m. and will continue through March 2. JPLers considering attending are asked to register; registration and agenda information are available online at <http://makalu.jpl.nasa.gov/html/workshop2001.html>. Call Valentina Grigoryan at ext. 4-5615.

Blade Runner—This film is part of *The Future of the Universe* science fiction film series and will be followed by a panel discussion. To be held at 7:30 p.m. in Caltech's Beckman Auditorium. Free admission. Call (626) 395-4072.

Electronic Publishing and Web Application Demos—Representatives from Adobe Systems Inc., and Interwoven Corp. will give presentations in Building 180-101. At 9:30 a.m. will be Motion Graphics and Animation with After Effects; at 10:30 will be Video Capture and Editing with Premiere 6.0; and at 11:30 will be GoLive and Collaborative Web Site Creation.

Harpichord Concert—Jennifer Paul will perform a free program at 8 p.m. in Caltech's Dabney Lounge. For information, call (626) 395-4072.

Wednesday, February 28

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, March 1

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

Friday, March 2

A Centennial Celebration of Linus Pauling—A symposium honoring the 100th anniversary of the birth of the Nobel Prize-winning scientist will be held from 10 a.m. to 3:30 p.m. in Caltech's Beckman Auditorium. Admission is free. Call (626) 395-6024.

Fri., March 2–Sun., March 4

Othello—This Theater Arts at Caltech production will be presented in Caltech's Ramo Auditorium at 8 p.m. Friday and Saturday, 2 p.m. Sunday. Tickets are \$15. For information, call (626) 395-4652.

Saturday, March 3

Rainforest Odyssey—In a program designed for children, the David Taylor Dance Theatre explores the magic, mystery and fragility of South America's rain forests and the Amazon's indigenous peoples. To be held at 2 p.m. in Caltech's Beckman Auditorium. Tickets are \$10 for adults, \$5 for children. For information, call (626) 395-4072.

Singer-turned-educator reaches out



JPL Director Dr. Edward Stone chats with singer Buffy Sainte-Marie during her visit to the Lab last month.

Buffy Sainte-Marie, a Native American folk singer who in recent years has turned her energies to education, met with JPL education and outreach staff last month to share her perspectives on educating children.

A native of Canada, Sainte-Marie was raised in Maine and Massachusetts. She was a teacher before becoming a singer in the 1960s, when as a college student she became known as a writer of protest songs and love songs. In later years, when her son was in fifth grade, she started to write her own curriculum from a Native American perspective after becoming dissatisfied with her son's fifth-grade curriculum on Native Americans—calling it "dead text."

Sainte-Marie's *Science: Through Native American Eyes* is the first interactive multimedia CD-ROM that meets American national content standards for middle-school science while addressing scientific concepts—such as friction and sound—from within Native American culture. It is targeted for grades 5 and up.

Sainte-Marie's Cradleboard Teaching Project (<http://www.cradleboard.org>) has planned 14 more core-curriculum CDs. In the next one, her goal is to help kids explore careers in science, astronomy and ecology.

As an outgrowth of her JPL visit, Cassini, Outer Planets/Solar Probe and others in JPL's space and Earth science education and public outreach will be forming a team and structuring a symposium with Sainte-Marie—to be held either on Lab or at a tribal college—to plan JPL roles for working with the Cradleboard Teaching Project, said Terri Formico of the Cassini Outreach Office. The focus will be on the astronomy and native plant components of Sainte-Marie's next CD-ROM.

Sainte-Marie will also be working with equal opportunity officers at NASA centers, as well as JPL's diversity manager, to recruit Native American scientists and engineers for her next CD-ROM project, Formico said.

"A small group like my own can really accomplish some wonderful things with the help of experts like you (at JPL)," Sainte-Marie told the gathering.

TRANSITION

Over the next three months, Dr. Charles Elachi

LEADERSHIP

by Mark Whalen



plans to hear the perspectives of all Lab employees

DR. CHARLES ELACHI, APPOINTED LAST MONTH AS JPL'S NEW DIRECTOR UPON THE RETIREMENT OF DR. EDWARD STONE, WILL TAKE OVER THE POSITION MAY 1. HE DISCUSSED WITH UNIVERSE HIS PLANS FOR THE TRANSITION.

QUESTION Often, when a new leader takes over an organization, immediate or near-term changes are expected. Will there be major differences in terms of policies or in the way the Laboratory operates?

A During this three-month transition period until I take over the director's job I will provide every employee an opportunity to give me his or her views. I would like to hear their perspectives—on the issues, challenges and roadblocks they see in their day-to-day work. And it's my intent, based on that input, to do what's necessary to make JPL as efficient and as streamlined as possible. If change is needed, we will do it. If change is not needed, we won't do it. But I'm withholding judgment until I hear from the employees.

QUESTION That is a very ambitious goal—there are more than 5,000 employees here. How will you go about accomplishing this?

A I will give every organization a block of hours during which I can meet with employees, some in large groups, some in small groups. At the end, I will hold a couple of meetings in von Kármán Auditorium for any employees who have not had the chance to interact with me. But the focus will be on the smaller groups, which will provide me with better interaction with employees.

QUESTION Have you planned any short-term or long-term goals?

A In early May, I intend to present both—long-term and near-term goals—during my first 100 days. I look at this as a team effort; that's why I look forward to hearing from employees over the next three months—because it's going to require all of us to set the goals and then to accomplish them together.

QUESTION With the new Bush administration in the White House and the possibility of new political appointments at NASA, do you believe there might be significant changes in the direction of the agency, and in turn, JPL?

A In my experience, the space science and Earth science programs have gotten continuous support from Congress and the American people in general. And all of the administrations in the White House in the past—particularly in the recent past—have been very supportive of the space program, because it provides scientific benefits, exploration benefits, and educational benefits. The American people have seen the value of the space program through contributions to knowledge, education and the advancement of technology. Kids are excited about science and technology. Based on all of this, I think NASA's mission—and particularly the kinds of things JPL does—will get a lot of public support. So I expect that we will have strong support from the new administration.

QUESTION Is the Lab headed in the right direction in terms of the missions it is working on and pursuing?

A I think the vision and direction are the right ones; I don't think there will be major change. Over the past decade we have laid out for ourselves a long-term strategy where, effectively, JPL is leading the nation in exploration of our and neighboring solar systems. We'll be looking at other stars to see if there are solar systems around them, which is what the Space Infrared Telescope Facility, Space Interferometry Mission and Terrestrial Planet Finder will be helping us do; exploring our own solar system with the Mars and outer planets programs; and trying to understand how life has evolved and if life exists outside of our own planet. At the same time, we will apply that knowledge and technology to monitoring our Earth, particularly in oceanography, solid Earth and atmospheric sciences.

QUESTION Larry Dumas has recently announced his plans for retirement, but he also stated that he would stay on as Deputy Director after May 1 to help with the transitional workload and to provide continuity in the Director's Office. Have you set a timetable to select a new Deputy Director? What about other organizational changes?

A As for deputy director, we plan to do a national search—both external and internal—similar to the way the director's position was decided. There will be a search committee that will include representatives from JPL, from the campus, the Caltech Board of Trustees and others. I think JPL deserves the best the country can offer.

I hope this will be done in a timely fashion, and Larry has been kind enough to be flexible in his retirement date so that we have a smooth transition. I'm also benefiting a lot from Ed Stone's arrangement for the transition period; this arrangement gives me enough time to really understand some of the issues I might not have been familiar with. I think having a smooth transition and an overlap is very important.

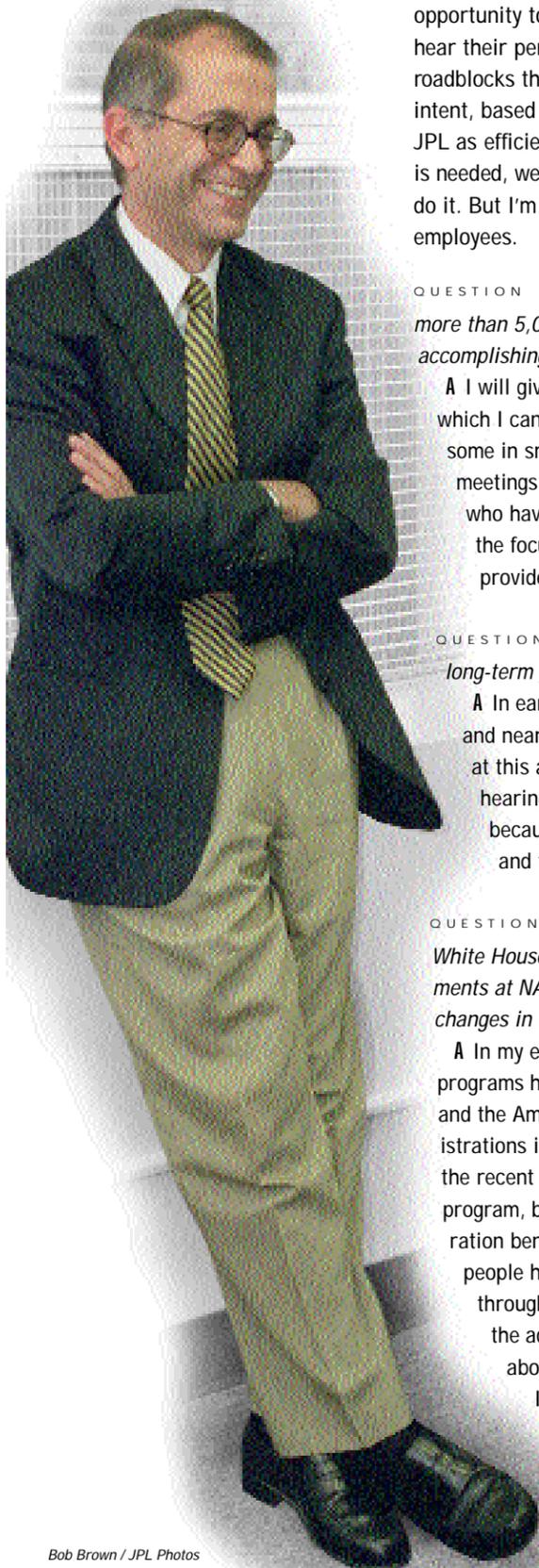
QUESTION What kind of employee related-programs and initiatives do you believe are necessary or do you want to implement?

A Employees are JPL's biggest asset, and they will be my first priority, my second priority and my third priority. We need to make sure that we have the right training available, so that our employees are always on the leading edge; to provide them with the tools and capabilities to do their jobs successfully; we need to hire the best and most talented employees; and we need to make sure we have exciting jobs. That's one of the things I want to learn over the next few months: what excites the people of JPL?—we will capitalize on those things—and what are the things that frustrate people the most, so we can fix them?

QUESTION How would you describe JPL and its people to someone who has never heard of the Lab?

A I would tell them I consider JPL to be a national treasure—and it's not the buildings. It is the employees and their experience. The nation has entrusted us in exploring our and neighboring solar systems. This is a great privilege and honor. That's why I've said I think we've got the best jobs in the world. Every day I look forward to coming to work here. We have the best employees that you can find anywhere.

This is a place for innovation, for boldness, for excitement and exploration.



Candidates sought for software architecture program

JPLs Center for Space Mission Information and Software Systems (<http://csmis.jpl.nasa.gov>) is developing a Software Architect Program that will help train the next generation of software architects who will design and implement software for future JPL missions.

Software architects will provide a system-level view of software across a project or program. They will help ensure that a consistent software architecture is utilized across missions, that software components fit together, and that the appropriate methodologies, tools, practices and technologies are applied and utilized. They will be an important part of the interface between technical (software engineers, software developers and testers, data engineers, data archive team, etc.) and managerial (customers, managers, scientists, hardware engineers, mission architects, etc.) considerations for a project or program.

The Software Architect Program will be a half-time, one-year paid internship. At least two candidates will be chosen each year to partici-

pate. The training, internship, and other activities are funded by the center.

Applicants must be full-time, benefit-based JPL employees, possess a bachelor's degree or equivalent and have a minimum of five years of work experience that includes a significant software engineering background and/or flight project experience.

To apply, candidates must submit a resume and a one- or two-page letter, with concurrence by their division manager, stating their JPL career interest in the program. These two documents should be sent to deputy center leader Sven Grenander, mail stop 301-280, by Friday, March 16.

As a component of this program, the center will offer an annual course on software architecture. This course will expose students to the concepts, principles, and state-of-the-art methods in software architectures, including domain-specific software architectures, architectural styles, architecture description languages, soft-

ware connectors, dynamism in architectures, and architecture-based testing and analysis. This course is offered to the full JPL technical community. Prospective candidates for the program can receive credit towards completion by registering for the first offering, which runs for 10 consecutive Friday afternoons from Feb. 16 through April 20. Registration is available at the Education and Training Web site (<http://hr.jpl.nasa.gov/et>) by clicking the "Course Listing/Enrollment" link and selecting "Center for Space Mission Information and Software Systems" from the course catalog.

The center seeks candidates with strong technical and problem-solving skills, leadership in technical innovation, communication and mentoring skills, and software engineering, software management and/or flight project experience.

All candidates will be informed of the selection decisions by the end of April.

For more information, contact program coordinator Brian Vickers at ext. 3-0877.

Letters

I would like to thank my friends and coworkers, past and present, for their sympathy and support at the passing of my mother. Many of you knew her, for she was very much a part of my life. I'd also like to thank my friends for the beautiful floral/plant tribute and relaxation kit, as well as the ERC for the beautiful plant.

Jan D. Berkeley

Words fail me when attempting to express my feelings regarding my retirement luncheon. Of the many cherished memories of the good times I've had at JPL, this is without doubt the most salient. For those who organized and attended the luncheon I offer my sincerest gratitude. The gift was outstanding. Thank you for sharing this special occasion with me.

Burk Brancheau

I'd like to express my warmest thanks to all of my friends and coworkers for your support and condolences following the loss of my grandfather. I'd also like to thank the ERC for the beautiful plant. Sincerely,

Kari Magee

Laurie and I would like to thank our friends and co-workers for their kind thoughts, prayers and support during the recent passing of her grandmother and my mother, Rose Gelsinger. She was such a sweet, kind and gentle lady and will be remembered with love by all that knew her. Thank you also, to the ERC for the lovely plant sent in her memory.

Laurie Guay and Joan Taylor

Retirees

The following employees retired in February:

Thomas Sorensen, 43 years, Section 340; James Stephens, 40 years, Section 323; Burk Brancheau, 39 years, Section 310; James T. Evans, 39 years, Section 352; David Rice, 36 years, Section 351; Richard Wallace, 35 years, Section 311; Robert Thomas, 32 years, Section 336; Ralph Reid, 31 years, Section 261; Jack Rhoads, 31 years, Section 341; Barbara Short, 30 years, Section 781; Paul Esposito, 28 years, Section 261; Sue Officer, 20 years, Section 387; Arthur Vaughan, 15 years, Section 385; Patricia Detweiler, 11 years, Section 350; Arlene Minuskin, 11 years, Section 330.

Passings

WALTER TISDALE, 71, a retired electrical engineer, died Jan. 15 of complications due to an aortic aneurism.

Tisdale joined JPL in 1963 and retired in 1987. He is survived by daughters Karan Rivera and Cindy Vann, and two grandchildren. Services were private.

LEOTA WAYNESMITH, 93, retired from Section 721, died of pneumonia Feb. 1. Waynesmith joined the Lab in 1958 and retired in 1972. She is survived by daughter Deborah and son Gary. Services were private.

DONALD STELMA, 85, a retired technical writer specialist in Section 641, died of heart failure Jan. 31.

Stelma worked at the Lab from 1958-1981. He is survived by daughters Paula Dupree and Susan Lee Stelma.

Services were held at Veterans National Cemetary in Riverside.

Classifieds

For Sale

BED FRAME, queen, oak frame, Thomasville Shakers collection, purchased new for about \$500 four years ago, exc. cond., (our upgrading to a king bed is the reason for selling), located in Altadena, \$200/obo. 626/791-0585.

BEDROOM FURNITURE: dresser w/mirror and 2 matching nightstands; dresser: 70" W x 30" H w/9 drawers, nightstands are 26" W x 23" H w/2 drawers, all for \$225/obo. 626/914-7853.

BREAST PUMP, Medela Pump-in-Style, excellent condition, was \$279, now \$150. 626/850-4378.

CARPET/RUG, old, Armenian, famous colorful "Karabach" design, made in early 1900s of wool, no chem. colors, all natural heavy carpet, 10 ft. long, 5 ft. wide, looks great in hallway or bedroom, appraised by a specialist from \$1,500 to \$1,700, sell for \$1,200. 626/960-6076, Ana.

CLAY POTS, round, large (2-ft and 3-ft diam.), \$50/obo/ea. 2', \$60/obo/ea. 3'. 626/398-3480.

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

COMPUTER, IBM Aptiva, 500 Mz, 10 GB hard drive, 40 x CD ROM, 64 MB memory, 56K modem, all for \$400. 626/914-1237, Gene.

COMPUTER, 66 MHz 486-DX2, 16 MB RAM, color monitor, 400 MB hard drive, floppy disk, mouse, keyboard, Windows 3.1, Word 6.0, \$150. 626/797-3310, evenings & weekends.

DIET TAPES, Jenny Craig, set of 14, \$50; **COMPUTER PWR. CONT. CTR.**, 5 pwr switches + 1 master sw., 5 surge-protected outlets + 2 modem/fax/phone jacks, new, \$20; **ORGAN**, Yamaha 415 electr. console w/13 pedals, 3 keyboards, 144 rhyth. patterns, pd. \$7,500, sacrifice for \$3,000. 790-3899.

FILE CABINET, 2-drawer, solid oak, raised panel, legal sz, very heavy, exc. cond., \$175. 626/795-5235.

HORN, baritone, Olds Ambassador, brass with mouthpiece and case, good condition, \$400. 626/798-5324.

LATHE, metalworking, Sears model 10107043, 1930s vintage, 115v 1/2 hp, 1450 RPM, 42" long on sturdy metal stand, 20 cutting tools w/screw thread cutter, extra chuck, numerous precision tools, instruction book, \$1,600/obo. 310/838-3519.

LIVING ROOM SET, from Ikea, "Bonde," birch, ent. unit holds 32" TV & accessories, 2 curio cabinets/doors, 1 storage cabinet/dr. w/adjustable shelves, 1 coffee tbl, 1 side tbl, exc. cond., can deliver, all for \$850/obo. 909/482-4425.

LUMBER, from dismantled double gar. dr., approx 130 sq. ft. of 1"x10"x16" shiplap, (8 ea.) 2"x4"x8", (2 ea.) 2"x4"x16", all for \$80. 626/797-6644.

MICROWAVE OVEN, Quasar, humidity sensor, \$50. 352-3588.

MONITOR, Sony Trinitron Multiscan 100ES, 14-inch, \$100/obo. 714/963-4665, evenings.

PHOTOGRAPHIC ENLARGER, Omega D2, for 4x5 negs, complete w/4x5 negative carrier, fine 6-element 150/5.6 lens & condenser syst., for both B&W and color, w/filters, rugged all-metal construction, excellent, \$200. 909/624-6970.

SEWING MACHINE, Pfaff Creatove 1471, w/ access. & instruct. manuals, electronic mach. w/ dual feed mechanism, \$425/ obo. 792-8685, eves.

SKI BOOTS, Salomon Evolution 72L, ladies size 6.5, vg cond., \$80/obo. 714/ 963-4665, eves.

SNOW BOOTS, women's sz. 8, tan color, great for ski trips, only used once, \$15. 714/903-8888.

SOFA, tapestry material, floral, exc. cond., oak trim. \$375. 626/334-1535, after 6 p.m.

SOFA AND LOVESEAT, top-grain leather, excellent cond., walnut brown, very soft, w/cleaning kit, can deliver, \$950/obo. 909/482-4425.

SUITCASE, large, soft cover, \$25; **SCUBA TANK**, \$50; **CAR VACUUM**, \$5. 957-4292.

TABLE, dinette, square, glass top 5'x5' w/metal feet and 4 matching chairs, \$800/obo; **BAR STOOLS**, four matching, metal frame, all in superb condition, \$400/obo. 626/398-3480.

TABLES: 48" round solid oak w/24" leaf w/2 arm chairs & 4 reg. chairs, \$450/obo; 36" round harvest table, \$100/obo. 248-1856, Gordon.

TELEVISION, 50" RCA Home Theater big screen, exc. cond., crisp, clear picture, audio/video input, great sound, must sell, <http://members.xoom.com/thecoverups/bigscreen.html>, \$800/ obo. lundeensr@altavista.com or 626/379-0971.

THEATER TICKETS, Romeo & Juliet, 2 tickets + parking pass, Ahmanson Theater, 3/15/01, 8 p.m., \$80. 790-8523.

WASHER/DRYER, Maytag matching set, exc. condition, gas dryer, both for \$350. 259-5526.

WET SUIT, men's jacket + Farmer John's, Body Glove, size large, \$40; **SWIM FINNS**, heavy duty, \$20. 626/794-2431.

WHEEL BARREL, med. sz., \$20. 626/303-1927.

Vehicles/Accessories

'92 ACURA Legend LS, 4-dr. sedan, beige/gold, alw. garaged, exc. cond., serv. records, 84K mi., ABS, Acura/Bose music syst., theft deterrent, auto climate cont., leather interior, cruise cont., moon roof, \$11,500. 236-4869, after 5 p.m.

'72 AIRSTREAM Trailer, 27', tub, refrig., a/c, stove, water heater works, heater nds. replacing, full length awning, \$5,000/obo. 626/391-7066.

'00 BMW 328i, automatic, pwr leather seats, CD player, am/fm stereo, auto. rain sensor, moon-roof, power everything, premium pkg., 12,000 miles, a/c, like new, \$33,000. 909/599-3230.

'97 CHEVROLET Tahoe, 2 dr., all leather interior, tow pkg, am/fm radio, CD player, pwr. seats, windows, 16" wheels, custom paint, low mileage, \$20,000/obo. 626/914-1237, Gene.

'90 CHEVROLET Corsica LT, black ext./gray int., 4 dr., V6, p/w, p/l, cruise, a/c, spoiler, 146,000 mi., gd. cond., Kelley Blue Book \$3,300, must sell, \$2,800/obo. 626/915-8893, Becky.

'92 CHRYSLER Le Baron, 4 dr., new paint & tires, auto, a/c, p/w, p/d, p/s, cruise, cass., exceptionally clean, 73K miles, \$5,200. 957-7554, Bob.

'69 DATSUN 1600, classic sports car, white w/ black removable top, runs gd., new clutch/tires/brakes, needs loving home, \$3,000/obo. 323/663-6404.

'96 FORD Cobra Mustang SVT conv., 5 spd., all black, lthr. int. stereo w/CD changer, security alarm w/LoJack, clean, well-maint., exc. cond., no modifications to body or engine, garage kept w/cover, less than 27K miles, \$21,000/obo. 626/379-1540.

'94 FORD Club Wagon XLT, 12-pass. van, 5.8L, V8, 76K m., a/c, pwr. everything, ABS, alarm, am/fm cass., prem. sound, tow pkg., recent tires/front brakes/shocks, exc. cond., \$12,000/obo. 790-3217.

'94 FORD Escort wagon, black, exc. running transp. car, luggage rack + more, low mileage, see to appreciate, selling below Blue Book, make offer. 323/663-6404.

'91 FORD Mustang coupe, 5L eng., 90K mi., auto, recent tires & brakes, a/c, am/fm cass., pwr. windows/doors, white exterior, red/black int., well maintained, \$6,000. 626/355-4445, Art.

'91 HONDA Accord LX coupe, white, auto, a/c, pwr. windows/door lock, tinted windows, spoiler, security alarm, well maintained, 151,000 mi., \$4,500/obo. 562/945-6488 or 714/372-1976.

'89 MAZDA 626 LX, 120K miles, p/s, p/b, p/w, a/c, am/fm/cassette/eqizr, silver/gray, 1 owner, \$4,200 Blue Book, \$2,450. 626/797-5807.

'90 NISSAN 300 ZX 2+2, fast, sky blue, auto, t-tops, p/s, p/w, a/c, perf. maint. record, amazingly clean, 178K mi. but it doesn't look like it, just had 60K maint. done, \$8,000/obo. 249-1337.

'71 OLDSMOBILE Cutlass Supreme, a/c, p/s, p/b, 350 cid, 94,000 orig. miles, orig. owner, very clean \$4,000/obo. 626/284-3068, eves.

'67 PLYMOUTH Barracuda Formula S fastback, runs, \$2,500/obo. 626/291-2990.

'90 PONTIAC Transport 7-passenger van, red exterior and gray interior, \$3,000. 626/850-4378 day or 909/598-0065 after 7 p.m.

'80 PONTIAC Grand Prix, runs well, auto, new battery, 100 k+ mi., needs some work, \$1,250/obo. 626/398-6564.

'91 TOYOTA Camry DX, Blue, 4 cyl., 113K mi., excellent condition, clean, 4 door, sunroof, automatic, p/w p/l, am/fm, CD, a/c, \$5,600/ obo. 626/284-4694.

Wanted

CRAFTSPEOPLE interested in collaboration and exchange of ideas. aghands@aol.com or 323/662-4089, Peter.

MENTOR for 2 La Canada High School students to assist with research for their AP Environmental Science class, studying harmful effects of aerodynamic objects to the environ. 790-7934.

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

SOCCER PLAYERS, adult female, to form a new Glendale Parks and Recs. league. 249-2990, Tracy, eve.

VOLLEYBALL PLAYERS, coed, all levels of play, every Tues. night 8-10 at Eagle Rock High School, \$3/night. 956-1744, Barbara.

For Rent

ALTADENA, large house to split, lg. master bd. & ba., big living rm., dining rm., new kitchen, den, 3 bd., laundry rm., detached garage, shade trees, big yard, weekly gardener and water paid, a mile from JPL, 5 minutes from Old Town, \$650 + utilities. 626/791-2332, Dave.

LA CANADA FLINTRIDGE, room, private bath, kitchen privileges, pool, BBQ, off-street parking, woody area. 790-1280.

LA CRESCENTA, cozy 2-bd. house w/pool, private, high above Foothill, \$1,450. 952-6007.

MONROVIA, room in a house, private bath, full privileges, 12 miles from JPL, no pets, \$475. 626/358-7728, after 7 p.m.

PASADENA, lg. unfurn. house, 3 bd., 2 ba., office, den, large pool, 2 miles from Caltech, \$2,200. 310/823-1194 or solver@iccas.com.

PASADENA, back house studio apartment, 3 miles from JPL, \$500. 626/797-3714 or 626/485-0017.

PASADENA apt. to share, fully furnished, 4 bd., 2 ba., 1/2 mile to Caltech, utilities included, \$495. 626/351-9641.

Real Estate

SIERRA MADRE, 2,350 sf home on 18,400 sf lot: 2 lg. bd., lg. lr, dr, fr., office/br & more; new a/c & furnace, new w/w carpets & paint; \$449,000. 702/655-5949.

Vacation Rentals

BIG BEAR cabin, quiet area near village, 2 bd., sleeps 8, completely furnished, f/p, TV/VCP, \$75/night. 249-8515.

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

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

HAWAII, Kona, on 166 feet of ocean front on Keahou Bay, private house & guest house, comfortably slp. 6, 3 bd., 2 ba., rustic, relaxing & beautiful, swimming, snorkeling, fishing, spectacular views, near restaurants, golf courses 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, microwave, 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 ARROWHEAD house, 4 bd., 2 1/2 ba., sleeps 10, quiet, secluded, relaxing, snowy, woody area of Cedar Glen, pictures/rates at http://www.highcountryrentals.com/cedar_run.html, JPLers book directly w/owner for 2 week-ends for 1+ cleaning fees, \$370/weekend. 626/403-0446, owner.

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

OCEANSIDE, 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, bches, 17 Mile Dr. Aquarium, Cannery Row, JPL discnt. 626/441-3265.

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

SAN FRANCISCO, Nob Hill honeymoon suite, sleeps 2 max, full kitch., maid service, concierge, \$125/nite; \$750/wk, reserve early. 626/254-1550.

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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.

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