

# universe

Jet Propulsion Laboratory

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## Lander, orbiter under study for Mars '03



Artist's drawing of the Mars Mobile Lander, one of two concepts being considered for a 2003 launch. The Mars Surveyor Orbiter is also being studied.

In 2003, NASA may launch either a Mars scientific orbiter mission or a large scientific rover that will land using an airbag cocoon, like that used on JPL's 1997 Mars Pathfinder mission. The two concepts were selected from dozens of options that had been under study. NASA will make a decision on the options, including whether or not to proceed to launch, in early July.

Dr. Firouz Naderi, manager of the Mars Program Office at JPL, said two "fast-track" Phase A studies are underway. David Lehman is leading a review for the orbiter concept, which is expected to be completed July 6 or 7. The lander concept study, led by Peter Theisinger, is expected to be completed July 10 or 11.

In the studies, the teams also will evaluate risk, cost, and readiness for flight, allowing 36 months of development leading

to a May 2003 launch date. Reports will be submitted for review to Mars Program Director Scott Hubbard at NASA Headquarters. Dr. Ed Weiler, NASA's associate administrator for space science, will make the final decision of which mission—if any—to launch in the 2003 opportunity. If selected, the cost of the 2003 mission will be about the same as the Pathfinder mission (adjusted for inflation).

Naderi said that if the orbiter concept is selected, it would be developed by Lockheed Martin Astronautics in Denver. Should the lander be selected for the 2003 launch opportunity, JPL would develop it.

Naderi said he hopes for a decision by July 14 or shortly thereafter. "We believe both mission concepts are doable," he noted, adding that it is unlikely that neither concept will be selected.

"Our budget will support only one of these two outstanding missions, and it will be a very tough decision to make," Weiler said.

The Mars Surveyor Orbiter is a multi-instrument spacecraft similar in size to the currently operating Mars Global Surveyor. It is designed to recapture all the lost science capability of the Mars Climate Orbiter mission as well as to seek new evidence of water-related materials. The orbiter's mission will be to study the Martian atmosphere and trace the signs of ancient and modern water. Its instruments potentially will include a very high-resolution imaging system, a moderate-to-wide-angle multicolor camera, an atmospheric infrared sounder, a visible-to-near-infrared imaging spectrometer, an ultraviolet spectrometer, and possibly a magnetometer and laser altimeter. Telecommunications relay equipment that could be used to support Mars missions for 10 years also would be included.

The rover is based on the Athena rover design, which already has been operated in field tests and previously was considered for the canceled 2001 lander mission. The concept being proposed for the 2003 mission involves packaging the 130-kilogram (286-pound) rover in a system similar to the 1997 Mars Pathfinder structure, which would be cushioned on landing by airbags. Unlike the 1997 mission, however, the four-petal, self-righting enclosure would serve only as a means to deliver the rover to the surface and not function as a science or support station.

After landing, the Mars Mobile Lander would serve as a self-contained mission, communicating directly with Earth or with an orbiting spacecraft band as the rover traverses the Martian terrain. The rover would be capable of traveling up to 100 meters (109 yards) a day, providing unprecedented measurements of the mineralogy and geochemistry of the Martian surface, particularly of rocks, using a newly developed suite of instruments optimized to search for clues about ancient water on Mars. The mobile surface-laboratory will be able to gain access to a broad diversity of rocks and fine-scale materials for the first time on the surface of Mars, in its search for evidence of water-related materials. The rover's mission would last for at least 30 days on the surface.



Galileo acquired the images in this mosaic of Hi-iaka Patera (the irregularly shaped, dark depression at the center of the image) and two nearby mountains on Nov. 25, 1999.

## Galileo finds colorful surprises at Io

Detailed analysis of Jupiter's moon Io reveals a colorful, active world full of surprises, according to five reports published in the May 19 issue of *Science*, and based on new results from JPL's Galileo spacecraft and the Hubble Space Telescope.

The reports describe giant, erupting plumes migrating with lava flows, red and green deposits that change as unstable sulfur compounds condense from huge

plumes, and mountains that may split and slide sideways for hundreds of kilometers, or miles.

Galileo observations of Prometheus reveal a volcanic field similar to Hawaii's volcanoes, but more active and much larger. Prometheus features an 80-kilometer-tall (50-mile) plume of gas and particles erupting from near the end of the lava flows, like where Hawaiian flows enter the ocean. This is Io's most consistently active plume. Its size and shape have remained constant since at least 1979, but the plume location wandered about 85 kilometers (53 miles) to the west between 1979 and 1996.

"The main vent of the volcano didn't move, but the plume did," said Dr. Rosaly Lopes-Gautier of JPL, lead author of one of the reports.

"This type of behavior has never been seen on Earth," said Dr. Susan Kieffer of Kieffer Science Consulting, Inc., Ontario, Canada, lead author of a *Science* report. Kieffer and her colleagues suggest that the Prometheus plume is fed when a "snowfield" of sulfur dioxide and/or sulfur vaporizes under the lava flow and material erupts through a rootless conduit in the flow.

By combining Galileo and Hubble Space Telescope results, sci-

tists have learned more about the role of sulfur in Io's volcanoes. While Galileo carried out the first of three recent Io flybys in October 1999, Hubble scanned Io with its ultraviolet spectrograph to measure the composition of gases escaping from volcanoes. Hubble detected a surprise—a 350-kilometer-high (220-mile) cloud of gaseous sulfur in the plume ejected by the volcano Pele. The sulfur gas is a specific type, with sulfur atoms joined in pairs, that had never before been seen on Io; it is stable only at the very high temperatures found in the throats of Io's volcanoes.

## Stone to retire next year



Dr. Edward Stone

Dr. Edward Stone, who has served as director of JPL since 1991, last week announced his intention to retire from the Laboratory sometime next year.

Caltech President Dr. David Baltimore has convened a committee to search for Stone's successor.

Stone, who will turn 65 next January, told JPL staff in a memo that his stepping down was "in keeping with the long-standing tradition of directors doing so during their 65th year."

Concurrent to Stone's retirement from JPL, he will also leave his position as Caltech vice president. He plans to return to full-time teaching and research in Caltech's Physics, Mathematics and Astronomy Division.

During Stone's tenure, Baltimore said, the director "has faced an incredible array of diffi-

cult challenges. In his typically effective manner, Ed took on these formidable tasks and successfully shepherded JPL through an era of tremendous change."

"I hope to appoint a new JPL director early enough to ensure a smooth transition of leadership and continued, effective operation of the Laboratory," Baltimore added.

"I want you to know that I will be fully engaged here at the Lab in the months ahead," Stone told employees. "There is exciting work before us all, and I look forward to those challenges with continuing enthusiasm."

Search committee members are: Admiral Bobby Inman, private investor (chair); Dr. Fred Culick, Caltech professor of mechanical engineering and professor of jet propulsion; Dr. William Jenkins, Caltech vice president for

business and finance; Kent Kresa, chairman, president and chief executive officer, Northrop Grumman Corp.; Dr. John Ledyard, Caltech professor of economics and social sciences; Dr. Ruben Mettler, retired chairman and CEO, TRW Inc.; Dr. Anneila Sargent, Caltech professor of astronomy and director of Owens Valley Radio; Dr. Rochus Vogt, Caltech professor of physics; Dr. William Weber, JPL director of engineering and science; Dr. Albert Wheelon, member of the Caltech Board of Trustees; Gayle Wilson, nonprofit consultant; Thomas Schmitt, Caltech assistant vice president for human resources; and Mary Webster, executive assistant to the president and secretary, Board of Trustees.

In addition to Wheelon, other committee members from the Caltech Board of Trustees are Inman, Kresa, Mettler and Wilson.

## News Briefs



*Fires in Los Alamos,  
N.M. as imaged by MISR.*

**MISR images Los Alamos fire**  
The fire that has raged out of control this month near Los Alamos, N.M., was captured May 9 in a series of images by the JPL-managed Multi-angle Imaging Spectro-Radiometer (MISR) on NASA's Terra satellite.

The true-color images covering north-central New Mexico capture the bluish-white smoke plume of the Los Alamos fire, just west of the Rio Grande river. The middle image is a downward-looking or "nadir" view taken by MISR. As the satellite flew from north to south, the instrument viewed the scene from nine different angles. The top image was taken by

the MISR camera looking 60 degrees forward along its orbit, whereas the bottom image looks 60 degrees aft.

The fire plume stands out more dramatically in the steep-angle views.

MISR scientists use these angle-to-angle differences to monitor particulate pollution and to identify different types of haze. Such observations allow scientists to study how airborne particles interact with sunlight, a measure of their impact on Earth's climate system. The images are about 400 kilometers (250 miles) wide. The images are available at <http://www.jpl.nasa.gov/pictures/misr>.

### Acquisition Division manager named

STANLEY JANKOWSKI has been appointed manager of the Acquisition Division.

Jankowski, who has more than 20 years of experience in operations and supply chain management in support of space, defense, and commercial programs, joins JPL from Raytheon Corporation's Electronic Systems Segment, where he served as operations director, managing key procurement, material, and logistics functions.

Jankowski also was a member of the Lean Aerospace Initiative, a consortium of 40 companies affiliated with the Massachusetts Institute of Technology, whose goal is to identify and promote best practices within the aerospace industry and its suppliers.

In his new position, Jankowski will have responsibility for the Laboratory's purchasing, subcontracting and acquisition services.

### Halpern honored by Headquarters

DR. DAVID HALPERN, a senior research scientist in Research Element 3237 and manager of the Climate Variability Program (7312), recently received a NASA Special Service Award for initiative and superb accomplishments during the International Year of the Ocean.

Halpern, who has worked at JPL since 1986, received the award at NASA Headquarters from Dr. Ghasssem Asrar, associate administrator for Earth Science.

### Dumas named Patriot of the Year

JPL Deputy Director LARRY DUMAS was earlier this month named Patriot of the Year by the Pasadena Chamber of Commerce.

The award honors a local citizen for

their contribution to maintaining the spirit of patriotism in the community.

Dumas received the award during ceremonies at von Kármán Auditorium that also recognized outstanding achievements of junior cadets from the Reserve Officer Training Corps (ROTC) at Blair, Muir and Pasadena High Schools.

### Summer employee/teacher honored

Christine S. Ruiz Aguilera, a JPL summer employee and mathematics and computer science instructor at Moorpark College, has been named Most Distinguished Faculty Chair for the 1999-2000 academic year.

Members of the college's academic senate selected Aguilera in recognition of her teaching skills and organization of a campus program designed to encourage female students to major in math and the sciences. In addition, the committee honored her for the work she has done on space exploration at JPL. For the past 10 years during her summer breaks, Aguilera has helped develop software tools for NASA's Mission Control and the Mars Global Surveyor teams.

Aguilera, who has taught for the past 28 years, is the first woman to hold the post.

### Huge Mars photo archive available

More than 20,000 images of Mars taken by JPL's Mars Global Surveyor spacecraft are now available in a Web-based photo album—the single largest one-time release of images for any planet in the history of solar system exploration.

The archive of images covers one Mars year (687 Earth days), beginning in September 1997 with pictures taken during the aerobraking phase and extending through August 1999. Many of the pictures have such high resolution that objects on the surface the size of a school bus can be seen.

The archive can be found at [http://www.msss.com/moc\\_gallery](http://www.msss.com/moc_gallery). A subset of the images can be seen at <http://photojournal.cgi-bin/PIADBSearch.pl?NewReleases>.

### Board finds cause of HESSI mishap

The High Energy Solar Spectroscopic Imager (HESSI) spacecraft was damaged March 21 during pre-flight vibration tests because of a malfunction in the vibration test system at JPL, according to a NASA review board.

The damage was caused when the test device, called a "shaker," delivered approximately 20 G's, 10 times the appropriate level for the test, to the spacecraft. (A "G" is a unit of force equal to the gravity exerted on a body at rest.) As a result, the spacecraft's structure was damaged and three of the four solar arrays were severely damaged.

Mishap Board Chairman Denny Kross, manager of engineering systems at NASA's Marshall Space Flight Center, Huntsville, Ala., said a misalignment between two pieces of the test stand led to an abnormally high level of static friction (what engineers call "stiction"). The computer used to control the test then tried to compensate and induced too large a shock into the satellite.

*Contributed substantially to the NASA mission.*

Janis Research Company, FACET Cryostat Development Team, Lockheed Martin Astronautics Stardust Team.

### Group Achievement Award

*Given in recognition of an outstanding accomplishment that has been made through the coordination of many individual efforts and has contributed substantially to the accomplishment of the NASA mission. This award may be used to recognize the accomplishments of either a total government employee group or, as a team award, a group comprised of both government and nongovernment personnel.*

Acquisition Strategic Partnering

Team, Atmospheric Laser Spectroscopy Group, Cassini Flight Team, Cross-Enterprise Technology Development Program Team, Deformable Flat Plate/Array Feed Compensation System Team, Exploration Technology Rover Task Team, Galileo Flight Team, ISO 9001 Implementation Team, Mark IV Interferometer Team, Mars Global Surveyor Science Teams, NASA/Air Force Research Laboratory Strategic Partnership Team, Palomar Adaptive Optics System Development Team, Quick Scatterometer Mission Team, Remote Agent Experiment Flight Team, Southern California Integrated GPS Network Team, Stardust Project Team, Team for the NASA/JPL Educator Resource Center and Applied

## Special Events Calendar

### Ongoing Support Groups

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

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

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

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

### Senior Caregivers Support Group

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

Thursday, June 1

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

Sat., June 3-Sun., June 4

JPL Open House—The annual event will be open to the public from 9 a.m. to 5 p.m. both days. To avoid traffic congestion in the west lot, JPL personnel are encouraged to park in the east lot, where trams will be available for transportation to on-Lab locations. For information, call the Public Services Office at ext. 4-0112.

**Open  
House**

Friday, May 26

CISSR Speaker Series—Jack Jones, principal engineer in the Science and Technology Development Section 354, will demonstrate Mars solar-heated hot-air Montgolfiere balloons and a Mars inflatable "monster" rover at 1:30 p.m. in Building 157-102. Space is limited. If more than 30 people sign up, a second tour will be scheduled at a later date. RSVP to Ellie.Trevarthen@jpl.nasa.gov or call ext. 4-0147.

Von Kármán Lecture Series—Dr. John Trauger, principal investigator for the Wide Field and Planetary Camera 2, one of the Hubble Space Telescope's five premier science instruments, will discuss "The Hubble Space Telescope: Ten Years in Flight" at 7 p.m. in The Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.

Tuesday, May 30

CISSR Seminar Series—Dr. Mark Yim, senior member of the research staff at Xerox Palo Alto Research Center, will present the current state of the PolyBot project, which has demonstrated 10s of modules locomoting over rubble, steps, pipes, etc., as well as manipulating a variety of objects. This system has several potential space applications, including planetary exploration and space station maintenance. To be held at 10:30 a.m. in Building 306-400.

Tuesday, June 6

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

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

Wednesday, June 7

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

Prostate Cancer Screening—The Cancer Detection Center will conduct screening for men 40 and over at Occupational Health Services, Building 310-202, at the corner of Surveyor and Explorer Road. A limited number of screenings will be scheduled from 8:30 a.m. to 12:30 p.m. and 12:45 p.m. to 3:15 p.m., and will be given on a first-call basis. The screening will consist of a questionnaire, digital rectal examination and a prostate specific antigen, followed up with a letter explaining the results. The cost is \$25, payable at the time of the screening. To schedule an appointment, call ext. 4-3320.

Technology Classroom, Pomona; 34-meter Array Implementation Team, TMOD Sequence Adaptation Team, 2MASS Team.

### Exceptional Engineering Achievement Medal

*Awarded for unusually significant engineering contributions toward achievement of the NASA mission. This award may be given for individual efforts or applications of engineering principles or methods that have resulted in a contribution of fundamental importance in this field or have significantly enhanced understanding of this field.*

Richard Goldstein.

*Continued on page 4*

## NASA bestows annual honor awards to JPLers



David Halpern

JPL employees, contractors and partners were recognized by NASA for their outstanding work over the past year as the Laboratory held the agency's annual Honor Awards ceremony May 16.

JPL Director Dr. Edward Stone, Deputy Director Larry Dumas and NASA Deputy Associate Administrator for Space Science Dr. Earle Huckins presented 92 awards to teams and individuals.

Following is a list of those receiving Honor Awards:

### Public Service Group Achievement Award

*Given to a group of nongovernment employees in recognition of an outstanding accomplishment that has*

### Contributed substantially to the NASA mission.

Janis Research Company, FACET Cryostat Development Team, Lockheed Martin Astronautics Stardust Team.

### Group Achievement Award

*Given in recognition of an outstanding accomplishment that has been made through the coordination of many individual efforts and has contributed substantially to the accomplishment of the NASA mission. This award may be used to recognize the accomplishments of either a total government employee group or, as a team award, a group comprised of both government and nongovernment personnel.*

Acquisition Strategic Partnering

Team, Atmospheric Laser Spectroscopy Group, Cassini Flight Team, Cross-Enterprise Technology Development Program Team, Deformable Flat Plate/Array Feed Compensation System Team, Exploration Technology Rover Task Team, Galileo Flight Team, ISO 9001 Implementation Team, Mark IV Interferometer Team, Mars Global Surveyor Science Teams, NASA/Air Force Research Laboratory Strategic Partnership Team, Palomar Adaptive Optics System Development Team, Quick Scatterometer Mission Team, Remote Agent Experiment Flight Team, Southern California Integrated GPS Network Team, Stardust Project Team, Team for the NASA/JPL Educator Resource Center and Applied

Technology Classroom, Pomona; 34-meter Array Implementation Team, TMOD Sequence Adaptation Team, 2MASS Team.

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Richard Goldstein.

*Continued on page 4*



# DOING THE RIGHT THING

*Lab policies promote diversity, affirmative action in hiring and employment*

*By Mark Whalen*

JPL'S DIVERSITY PROGRAM OFFICE is responsible for administering the Laboratory's equal opportunity and affirmative action programs, which are mandated under a federal executive order covering government contractors. Employees have asked about the role of this office and JPL's commitment to affirmative action. Ozell Grissom, the manager of the Diversity Program Office, and JPL Deputy Director Larry Dumas talk about these important issues with Universe.

**Q What are the trends in the employment of women and minorities at JPL?**

Dumas: Currently the Lab population is about 28 percent women and 26 percent ethnic minorities, and those percentages have increased overall since we first began keeping records in the 1960s. This trend reflects the increased availability of women and minorities in the workforce from which we draw our employees, as well as the effect of the Lab's affirmative action programs.

**Q What is affirmative action and what are the Lab's affirmative action responsibilities?**

Dumas: Various federal laws impose nondiscrimination and affirmative action obligations on federal contractors, such as the Lab. The Lab is legally obligated to not discriminate against employees or applicants because of race, color, religion, sex, national origin, disability and other protected categories; and to take affirmative action to ensure that applicants and employees are employed without regard to such factors.

We do this not just because of legal requirements, but because it's the right thing to do.

**Q Who is responsible for ensuring that the Lab complies with these requirements?**

Dumas: It is everyone's responsibility to ensure that discrimination does not occur in our workplace.

Ed Stone and I hold managers responsible for ensuring nondiscrimination and taking affirmative action. All the direct reports to the director and me have as part of their Employee Contribution and Planning (ECAP) performance evaluation how they're doing on diversity in their organizations. We expect that kind of performance evaluation to be carried out at all levels of management.

Grissom: We recommend that managers communicate to their organization the importance of affirmative action and that we must comply with it, the same as we are required to do in the areas of safety, health, security and other contractual requirements.

**Q "Diversity" seems to go beyond affirmative action. What's that all about?**

Grissom: As the Lab's manager of diversity, my major goals are to foster an inclusive environment where differences and similarities of individuals are valued and respected, so that the talents and capabilities of our diverse workforce are fully utilized. The Diversity Office works to create an environment where effective communication, cooperation and collaboration among all employees allow them to contribute productively to JPL's missions.

The Management Oversight Group for Affirmative Action (MOGAA), which is chaired by Larry Dumas and includes other Executive Council members, looks at the Lab's affirmative action efforts and tries to increase diversity awareness on Lab. A good example of our efforts to improve management's commitment to diversity is through discussion at section managers' and group supervisors' workshops.

Lab management can only do so much. Groups such as the Advisory Council for Women (ACW) and the Advisory Council for Minority Affairs (ACMA) also have helped. People are being informed about educational reimbursement programs, courses offered on Lab, and other things employees can take advantage of to make themselves more marketable for internal promotions.

Dumas: The input and assistance of these groups in the area of diversity has been very helpful to the director and me. These organiza-

tions have a longstanding record of accomplishment, and have helped the Executive Council and senior management to understand the needs and concerns of the women and minority communities at JPL. I would like to acknowledge and thank them for their assistance.

Equally important, I personally have found that the things that are helpful for women and minority employees are also helpful for everybody else here, and in that way these organizations have been helpful in improving the quality of life generally here at JPL.

**Q What does JPL do to increase its diversity in recruitment efforts?**

Grissom: For new hires, supervisors working in conjunction with human resources recruiters can ensure that job searches cover a wide variety of sources for qualified applicants. Frequently, managers are aware of specialty groups that the recruiter may not know about, but which would be a good source of candidates. The recruiter will ensure that these groups are included in recruitment efforts.

We also now have an automated resume scanning system, which automatically reviews resumes and provides recruiters with resumes that may meet a job's particular requirements. After an initial computer search, the recruiter reviews the resumes to ensure candidates meet job requirements. This process has helped us to identify qualified candidates who otherwise might not have come to our attention.

Dumas: But we don't just wait until a position is open. The Lab supports a variety of programs to increase representation of women and minorities in the engineering and science fields. We also maintain extensive college recruitment programs to identify well-qualified candidates available for positions that we fill from schools.

It's efforts such as these that have helped improve representation of minorities and women.

**Q Does JPL use a quota system to hire or employ minorities?**

Dumas: No. Federal regulations that govern JPL do not allow quotas. The only time you see quotas is when there are court-imposed sanctions against an employer.

**Q What about the passage of Proposition 209 in California, which some believe has allowed organizations to stop recruiting minorities?**

Grissom: Some people think that as a result of the passage of Prop 209, affirmative action died. But in fact, because we are governed by federal laws relating to affirmative action, Prop 209 has had no impact on our requirements or our activities.

Dumas: The Lab is committed to conducting all its activities in a way that does not discriminate. Our recruitment and selection efforts are geared to finding a diverse applicant pool and hiring and promoting the best-qualified candidates. We take our affirmative action efforts seriously and are committed to working towards a truly representative workforce.

**Q How can interested employees get more information, or help out?**

Dumas: They can speak with Ozell or Alicia Gary in his office, or with any of the members of ACW, ACMA, or the minority affinity groups sponsored by ACMA. The chairpersons of these groups are:

Tom May, ACMA; Pat Westerlund; ACW; James Black, African American Resource Team; Toby Solorzano, Amigos Unidos; and Regina Sakurai, Asian American Council.

Every division-level organization has an affirmative action representative, and they would also be a good source of information. Supervisors or managers are another source of information or names of persons to contact.

"The Lab is committed to conducting all its activities in a way that does not discriminate. Our recruitment and selection efforts are geared to finding a diverse applicant pool and hiring and promoting the best-qualified candidates."

— Larry Dumas,  
JPL deputy director

**AWARDS** *continued from page 2*

**Exceptional Scientific Achievement Medal**  
*Awarded for unusually significant scientific contributions toward achievement of the NASA mission. This award may be given for individual efforts that have resulted in a contribution of fundamental importance in this field or have significantly enhanced understanding of this field.*

Joan Feynman.

**Exceptional Service Medal**

*Awarded for significant, sustained performance characterized by unusual initiative or creative ability that clearly demonstrates substantial improvements or contributions in engineering, aeronautics, space flight, administration, support, or space-related endeavors that contribute to the NASA mission.*

Phillip Barela, Gary Beaner, Richard Benson, Martha Berg, Steve Chien, Richard Cofield IV, Cynthia Cooper, R. Scott Dunbar, Linda Facto, Thomas Fouser, Bruce Goldstein, Cecilia Guiar, Curt Henry, William Heventhal III, Alan Hoffman, Ulf Israelsson, Robert Jarnot, Jeremy Jones,

Charles Kaczinski, Sunjay Moorthy, Timothy Pham, Herbert Pickett, Mary Reaves, David Rogstad, Robert Ryan, John Smith Jr., Robert R. Smith, Julie L. Webster, Aimee Whalen.

**Exceptional Achievement Medal**

*Awarded for significant, specific accomplishment or contribution clearly characterized by a substantial and significant improvement in operations, efficiency, service, financial savings, science or technology that contributes to the NASA mission.*

Arthur Amador, Ralph Basilio, Leo Bister, James Bock, James Border, N. Talbot Brady, John Casani, Moustafa Chahine, Artur Chmielewski, Steven Collins, Z. Nagin Cox, Richard Dekany, William Curt Eggemeyer, Daniel Eldred, Suzanne Frederick, Taeha Goodrich, James Huddleston, Kent Kellogg, Satish Khanna, P. Douglas Lisman, Earl Maize, Anthony Martin, Virgilio Mireles, Alex Moncada, Tracy Neilson, Stephen Proia, Stephen Prusha, Laurence Reinhart, J. Edmund Riedel, John Slonski Jr., Tony K.T. Tang, F.H. Jim Taylor, E. Eilene Theilig, Wu-Yang Tsai, Glenn Tsuyuki, Barbara Wilson, Carroll Winn.

**Outstanding Leadership Medal**

*Awarded for notably outstanding leadership that has had a pronounced effect upon NASA technical or administrative programs. The leadership award may be given for an act of leadership or for sustained contributions based on an individual's effectiveness as a leader, the productivity of the individual's program, or demonstrated ability to develop the administrative or technical talents of other employees.*

James Graf, David Halpern.

**Distinguished Public Service Medal**

*Awarded to any individual who is not an employee of the federal government or was not an employee of the government during the period in which the service was performed. The award is granted only to individuals whose distinguished accomplishments contributed substantially to the NASA mission. The contribution must be so extraordinary that other forms of recognition by NASA would be inadequate. This is the highest honor that NASA confers to a nongovernment individual.*

Jacques Blamont [Centre National d'Etudes Spatiales - CNES], John Reppy [Cornell University].

*View this and previous issues of Universe online*

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

**Ad deadline extended**

*Due to the Memorial Day holiday on May 29, the deadline for ads for the June 9 issue of Universe has been extended to Tuesday, May 30 at 2 p.m.*

**L etters**

I want to thank the wonderful people in Division 180 for the deep concern, especially the hugs. The plant from ERC is lovely. They were all very much appreciated when my grandmother went to be with the Lord on April 28. She left many beautiful memories that will live on with my family and me.

Sherri Rowe-Lopez

Thank you to the ERC for the lovely plant sent for the passing of my father. And thanks to all of our friends at JPL for the support and expressions of sympathy.

Bob and Darlene Hall

Dear JPL friends and colleagues: Thanks for your thoughtfulness and support on the recent passing of my mother. The ERC plant, your cards, and charitable contributions to her favorite organizations are appreciated.

Charles D. Norton

**P assings**

**LARRY GOODMAN**, 47, a security officer in Section 665, died of natural causes May 9 at his home in Pomona.

Goodman had worked at JPL for eight years. He is survived by his wife, Teresa, and sons Mario and Anthony. Services and burial were held May 20 in Memphis, Tenn.

**C lassifieds****For Sale**

**AIR CONDITIONER**, win. unit, Panasonic, 115V, 620W, 5000 BTU/hr., \$150/obo; **ENTERTAINMENT CTR**, oak, Danish modern, TV, VCR, knick-knack shelves w/glass drs., 5 lg. drawers., 2 match. pcs., 6'x36"x21" & 6'x30"x16", great cond., \$120/obo; **DINING RM CHAIRS**, 3 ea., black lacquer, \$ 10 ea. 626/355-2157, Steve.

**AIR CONDITIONERS**, win. mount, Panasonic CW-806TU, 7800 BTU '96, Consumer Reports' best brand, \$250, Signature 5825, 5000 BTU '94, \$150. 626/795-4975.

**BIKE**, boys, 20", 5 spd. Shimano shifter, offroad tires, exc. cond., \$49. 909/592-2279.

**BIKE**, road, Cannondale, 58cm alum. frame, Shimano equipped, SPD compatible pedals, exc. cond., \$500/obo. 349-1645, Janet or Charles.

**CAGE** for rabbit, lg., wire frame, mounts on wall or table top, gd. cond., \$10/obo. 909/981-7492, Jim or Darlene.

**COFFEE & END TABLE**, oak, 626/359-7666. **COPIER**, prof., 50 copies/min., sorter, document feeder, 1,000 sheet paper bin, 3 new cartridges, \$350. 626/969-4001.

**COINS**, '99-D Susan B Anthony dollars, \$2 ea. or tube of twenty coins, \$28, or '96 mint sets, \$12. 626/332-2682, Steve.

**COMPUTER**, Mac PowerBook G3, 3-yr. ext. warr., '99 Series, mod. MAC OS 9, 333MHz processor, 192Mb RAM, 14" screen, 56kpbs modem, Ultra SCSI, 100/10Mbps Ethernet, 2 USB ports, PCMCIA slot, line in audio, built-in mic., VST USB floppy drive, Norton AntiVirus 6.0 Utilities 5.0, MS Office 98, Virtual PC 3.0 (PC DOS), PC MacLAN for Win. 95/98. 626/798-3541.

**DINING TABLES**: 42"x72" elegant clear glass, 6 chairs, \$375; 42" round tinted glass, 4 chairs, \$200, or \$500 for both tables. 626/523-9229, Daryl.

**DRESS**, woman's, evening, stunning, black, 626/523-9229, Daryl.

spaghetti straps, make ABS, brand new, sz. 2-4, pd. #235, sell \$195. 241-8208 after 9 pm, Irene.

**FLYING SAUCER**, hand-built, 12 ft. dia., pvc & tarps, good child's playhouse, \$50/obo. 352-4885, Daniel.

**HAMMER DRILL**, B&D Prof. 1/2", set of masonry bits, green, series. 3000 BPM, reversible, variable spd., hammer on/off, gd. cond., \$45; **EXERCISE BIKE**, stationary, older style, speedometer & odometer, force adjustment, handlebar/seat adj., \$15; **GUITAR STAND** for acoustics, legs fold, gd. cond., \$10; **IRONING BOARD** metal, full sz., folds, pad & cover, gd. cond., \$10. 352-0075.

**MATTRESS SET**, twin, Ortho, 4 mos. old; bought new for \$140, sell \$70, firm. 626/798-8626.

**MISCELLANEOUS**: tools, gardening equip., refrigerator, furn., antique stoves, 7-pc. French antique bedrm. set, lots of odds-&ends, clothes, suitcase, antique mirror, ski clothes & equip. sz. 7, black leather suit, coat, skirt, jacket, shoes, toys, etc. 626/794-0455, Oli.

**MOVING SALE**: furniture, oak roll-top desk, walnut etagere, girl's French provincial bedrm. set (desk, dresser, chest-of-drawers, bed-side stand), solid-wood, cargo-type bunk bed, bkcse., chest-of-drawers, Wurlitzer ebony upright piano, lg. butcher-block oak kitch. island, ready to install, stove, 2 self-cleaning gas ovens, men's & women's bicycles, much more. 626/446-2091, eves/weekends.

**OPERA TICKETS**, Billy Budd, June 17 matinee, Dorothy Chandler Pavilion, Balcony B, 2 seats, \$29 ea. 952-8455.

**PALMORDER** 8, Sony 24X, color, digital, Steady Shot, 3 batt., \$299; Belkin 4 to 1 peripheral sharing device w/gold IEEE cable, \$45, orig \$99; **BATTERY**, long lasting metal hydride for Nokia 6000 series cell phone, \$15; **BATTERY**, new, for Sony Mavica, \$30, orig. \$65. 366-6134.

**PETAL CAR**, 1970s?, shaped like an Oscar Mayer weiner-mobile, gd. wkg. cond., real collectable, \$185. 248-5282.

**PLAYHOUSE**, outdoor, for toddlers, \$75. 626/355-9733, after 3 p.m.

**POOL**, Doughboy, 16' dia., great cond., ladder, pump, cover, acces., \$1,000/obo. 249-9534.

**RECLINER**, dark green, med. sz., w/tiny striping exc. cond., take apart for storage/moving, new cost appx. \$350, sell for \$100, can deliver if needed. 246-3331.

**REFRIGERATOR**, top freezer, Amana, 20 cu. ft., almond, exc. cond., \$200. 957-7905.

**SOFA**, 2 pc., has twin sleeper & recliner, beige w/multi-colors, exc. cond., \$600/obo. 626/334-1535 after 6 p.m.

**TABLE**, work, folding, wall-mount, hollow-door, 36"x80", hinged at 26"x54" in fold-up, now bolted to wood wall mount, exc. cond., \$15/obo. 909/593-4046, vivdavis@starquest.net.

**TOY CAR**, R.C. gas pwrr., Traxxas, Nitro Rustler, O'Donnell pipe, Dirthog tires, chrome rim, recoil starter, radio, Pro-15 race eng., ready to run, exc. cond., 6 mos. old, \$249. 909/592-2279.

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**WASHER/DRYER** combo, Kenmore heavy duty, perfect for small spaces, \$600. 626/289-7790, Nathan.

**BIKE**, boys, 20", 5 spd. Shimano shifter, offroad tires, exc. cond., \$49. 909/592-2279.

**BIKE**, road, Cannondale, 58cm alum. frame, Shimano equipped, SPD compatible pedals, exc. cond., \$500/obo. 349-1645, Janet or Charles.

**CAGE** for rabbit, lg., wire frame, mounts on wall or table top, gd. cond., \$10/obo. 909/981-7492, Jim or Darlene.

**COFFEE & END TABLE**, oak, 626/359-7666. **COPIER**, prof., 50 copies/min., sorter, document feeder, 1,000 sheet paper bin, 3 new cartridges, \$350. 626/969-4001.

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