

Lunar Prospector hits paydirt

Low-cost Ames mission finds evidence of water ice at Moon's poles

Take a small, inexpensive spacecraft, a science payload of instruments made from off-the-shelf hardware, and send the whole package to the solar system's most explored planetary body. Don't take along a camera or a computer, don't let the vehicle land, conduct esoteric remote-sensing research from 60 miles in space, and don't provide any visuals. Not exactly a recipe for success, you say? Particularly in a world grown accustomed to a daily dose of Mars science, planetary rovers, 360-degree panoramic views, and cute little rocks with names like Barnacle Bill and Scoobee Doo.

Well, go figure! For it is precisely from this improbable beginning that Lunar Prospector has emerged to become one of the most talked about NASA missions in recent decades. LP has so captured the attention of people from around the world that the project's website has recorded well over 50 million "hits" in just the past two months. On March 5 alone, the day of the press conference to announce Lunar Prospector's preliminary science findings, the website was visited by an estimated 10 million guests. And these figures do not include the 'mirror sites' on the East Coast.

What accounts for the incredible level of interest in the Lunar Prospector mission? Primarily, it is the public's fascination with the question regarding the presence or absence of water ice in the Moon's polar regions. So, on March 5, interest was running at a fever pitch as representatives of the electronic and print media gathered at Ames to hear the science team's pronouncement on the question on everybody's mind. And the verdict? The LP team did not disappoint, announcing that their analysis of neutron spectrometer data shows a high probability of water ice at both the north and south poles of the Moon. They also unveiled the first-ever operational gravity map of the entire lunar surface.

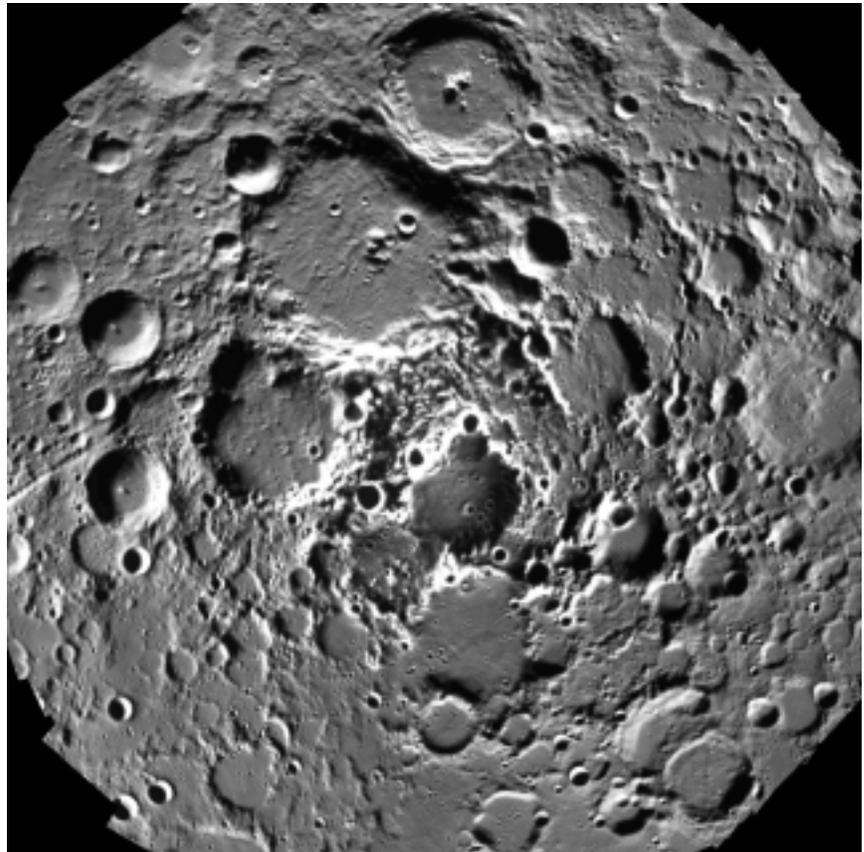
Just two months after the launch of Lunar Prospector, mission scientists expressed their belief that they have solid evidence of the existence of lunar polar ice. They also provided estimates of its volume, dispersion, mixing ratio and location. They acknowledged their continuing amazement at the incredible performance of the spacecraft and its science payload. "This spacecraft has performed beyond all reasonable expectations," said Ames' Scott Hubbard, the NASA Lunar Prospector mission manager. "The preliminary science findings are just the tip of the iceberg compared to the wealth of information forthcoming in the months and years ahead."

The presence of water ice at both

lunar poles is strongly indicated by graphs of data ratios from the spacecraft's neutron spectrometer that "reveal distinctive 3.4% and 2.2% dips in the relevant curves over the northern and southern polar regions, respectively" said principal investigator Alan Binder of the Lunar Research Institute, Gilroy. "This is precisely the kind of data 'signature' one would expect to find if water ice is present."

However, water ice on the Moon is not concentrated in polar ice sheets, according to LP scientists. "While evidence of water ice is quite strong, the water 'signal' itself is relatively weak," said William Feldman, co-investigator

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Satellite view of Moon's north pole

NASA calls for submissions for '98 Software of the Year Award

NASA has opened nominations for its' 1998 Software of the Year Award, which recognizes software developed and owned by NASA.

The award is sponsored by the Chief Information Officer, Lee Holcomb; the Chief Engineer, Daniel Mulville; and NASA's Inventions and Contributions Board (ICB). Last year, the competition resulted in nearly \$200,000 awarded. Information about the winner and the finalists from 1997 is available at the Web site: <http://www.hq.nasa.gov/office/codei/swy97win.html>

The award includes a trophy, a certificate signed by the Administrator, and a monetary award of up to \$100,000, and will be presented to author(s) of software that (1) NASA has an intellectual property interest in, (2) has been supported, adopted, sponsored or used by NASA, and (3) is significant to the NASA mission. Software programs must be commercial-grade (not alpha or beta phase) products.

Entries will be judged by the NASA Software Advisory Council. After its review, the Council submits its' selection(s) to the ICB. The ICB may recommend a monetary award of up to \$100,000 for the winner(s). The award will be presented by NASA officials later in the year on behalf of the NASA Administrator.

NASA Form 1329 (ICB Award Evaluation Questionnaire) must be completed for each entry. Copies of the software, sample applications and data, and descriptive documentation of the package should be included, in addition to evidence demonstrating the impact and degree of innovation and suitability of the entry.

Direct additional inquiries on award criteria and award submission forms to Betsy Robinson in the Commercial Technology Office, ext. 4-3360 or email to: brobinson@mail.arc.nasa.gov. Entries and supporting material must be submitted by Mon., Apr. 17, (no exceptions).

Huntress announces his departure from NASA

Dr. Wesley T. Huntress, Jr., NASA's Associate Administrator for Space Science, has announced his departure from the Agency in the near future.

Huntress is responsible for NASA's programs in astrophysics, planetary exploration and space physics. "I have served in this position for more than five years now," Huntress said, "and it is simply time to move on."

"Wes Huntress has presided over a revitalization of NASA's Space Science enterprise," NASA Administrator Daniel S. Goldin said. "Five years ago, the Hubble Space Telescope had problems, spacecraft costs were growing out of control, and serious budgetary threats were clouding NASA's future in space science. But during his tenure, thanks in no small part to the magnificent team

he assembled at the field centers and NASA Headquarters, the Space Science enterprise has become one of NASA's crown jewels.

Huntress was named to head the Office of Space Science in March 1993. He began his career at NASA's Jet Propulsion Laboratory (JPL), Pasadena, Calif., as a National Research Council resident associate in the 1960s. He joined JPL permanently in 1969 as a research scientist specializing in ion chemistry and planetary atmospheres. Huntress and his research group gained international recognition for their pioneering studies of chemical evolution in interstellar clouds, comets and planetary atmospheres.

NASA will begin a search for Huntress' replacement immediately.

Shuttle veterans depart NASA

Astronauts Jerry M. Linenger, M.D., (Capt., USN), Blaine L. Hammond (Col., USAF) and M. Rhea Seddon, M.D., have retired from NASA to pursue private interests. Linenger, who lived aboard the Mir space station for 122 days from Jan. to May '97, has retired from NASA. He arrived at the Mir as a member of the STS-81 crew and returned with the STS-84 crew, logging 132 consecutive days in space during those combined missions. Selected as an astronaut in '92, his first space flight was on board Discovery for STS-64, an 11-day mission, in '94.

Hammond retired from NASA and the Air Force to join a private aerospace firm in California. He was selected as an astronaut in '84 and is a veteran of two Shuttle flights. He served as the pilot on STS-39, the first unclassified Department of Defense mission in '91, and again as pilot for STS-64, an 11-day mission in '94 to study the atmosphere and the Earth's environment.

Seddon, one of the first six women selected as astronauts in '78, retired to pursue a private career. She is a veteran of three space missions, accumulating 722 hours in space. She flew first on STS 51-D in Apr. '85 on a mission to deploy two commercial satellites. Seddon then flew on two life science research missions, Spacelab Life Sciences 1 and 2, in '91 and '93. From Sept. '96 through Nov. '97, she was detailed to Vanderbilt University Medical School in Nashville, TN, to assist in developing experiment protocols for the Neurolab mission set for an Apr. '98 launch.

"Jerry, Blaine and Rhea contributed greatly to the success of the missions they flew," said David C. Leestma, director of Flight Crew Operations. "We wish them the best of luck in their new ventures."

For information on Linenger, Hammond, Seddon or any NASA astronaut, see the NASA Internet biography homepage at URL: <http://www.jsc.nasa.gov/Bios/>

CFC drive surpasses local counties' goals

More than \$830,000 was collected by the '97 Federal Combined Federal Campaign (CFC) in Santa Clara and San Benito Counties, the best total in more than five years. Ames was the lead agency to chair the recently completed campaign, and people from Ames contributed almost \$211,000 of the total.

The goal established prior to the campaign was \$775,000, a slight increase over the previous year, according to two-county Campaign Chairman Dr. Ken Munechika of Code D. In addition to Ames, nearly a hundred federal entities in the area took part in the effort to raise money for worthy causes.

"I think the key campaign workers and extremely high Post Office contributions were crucial elements of our success," Munechika said. "Mike Dalton of the U.S. Postal Service sometimes worked around the clock, because postal employees work in post offices at all hours. Sylvia Longchamps of Code II went with him on one 24-hour stint, and she was exhausted by it." Longchamps served as the primary Loan Executive for the campaign.

"The large increase in donations over previous years in the two counties is very significant when you consider the reduced number of federal employees due to cutbacks in the military, at Ames and at other federal agencies," Munechika said. "Much of the credit is due to Sylvia Longchamps' involvement and hard work."

"Capt. Lorraine Flakes of Onizuka Air Force Station in Sunnyvale, was the vice Loan Executive and worked hard with Longchamps to help increase contributions," Munechika added.

Munechika and Vice CFC Chairman Col. James Dill of Onizuka had a friendly competition during the drive. They represented some of the larger federal organizations.

"Dill headed the Gold Team that consisted of the Postal Service, Onizuka, the Naval Air Reserve and the IRS. I had the Red Team that included the Veteran's Administration, Ames, the Navy Program Management Office and the Navy Patrol Wing Pacific," Munechika explained.

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NASA hosts student robotics competition in Hangar One

NASA Ames Research Center, Moffett Field, CA, hosted a student robotics competition featuring students from six San Francisco Bay Area high schools on Tues., Feb. 24.

Nearly 170 high school students competed against each other from 6 p.m. to 8:30 p.m. in historic Hangar One as part of the 7th Annual FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition. The contest will conclude with FIRST's National Robotics Competition Apr. 2 to 4 featuring some 200 student-built robots at Disney's Epcot Center in Orlando, FL.

NASA Ames sponsored the Bay Area students in order to stimulate their interest in the fields of engineering, science and technology. The six schools that participated in the contest were Aptos High School, Gunn High School, Los Altos High School, Monta Vista High

School, Palo Alto Senior High School and Woodside High School.

"NASA is proud to sponsor 170 students in this exciting and educational robotics competition," said Michael Goldman, Ames' project advisor for the six schools. "We hope these students who participated in this intense, hands-on robotics competition will eventually become NASA engineers."

In addition to Goldman, Daryl Rasmussen of Ames served as project lead. Other NASA contributors include team engineers Dan Christian and Robert Mah; Hank Schwoob from the Ames fabrication shop and Yvonne Clearwater and Cynthia Stagner from the Ames Technology and Communications Outreach Group. Further information about the competition is available at the FIRST website: <http://www.usfirst.org>

BY MICHAEL MEWHINNEY



Students from six Bay Area high schools participated in the Robotics competition.



photos by Rick Slagae

Briefs

Voyager 1 breaks distance record

The Voyager 1 spacecraft is set to break another record and become the explorer that has traveled farthest from home.

This past February, Voyager 1, launched more than two decades ago, cruised beyond the Pioneer 10 spacecraft, becoming the most distant human-created object in space, at 6.5 billion miles (10.4 billion kilometers) from Earth. The two are headed in almost opposite directions away from the Sun. Having completed their planetary explorations, Voyager 1 and its twin, Voyager 2, are studying the environment of space in the outer Solar System.

"The data coming back from Voyager now suggests that we may pass through the termination shock in the next three to five years," said Dr. Edward C. Stone, Voyager Project Scientist and Director of NASA's Jet Propulsion Laboratory (JPL) in Pasadena, CA. "If that's the case, then one would expect that within 10 years or so, we would actually be very close to penetrating the heliopause itself and entering into interstellar space for the first time," said Stone.

NASA SBIR Awards

NASA has selected 335 research proposals for negotiation of Phase I contract awards for NASA's Small Business Innovation Research (SBIR) Program.

SBIR goals are to stimulate technological innovation, increase the use of small business (including women-owned and disadvantaged firms) in meeting federal research and development needs, and increase private sector commercialization of results of federally funded research.

The NASA SBIR Program Management Office is located at the Goddard Space Flight Center, Greenbelt, MD, with executive oversight provided by NASA's Office of Aeronautics, NASA Headquarters, Washington, DC. Individual SBIR projects are managed by the NASA field centers and the Jet Propulsion Laboratory.

Aeronautics Award

Gulfstream Aerospace Corporation (GAC) and the Gulfstream V (GV) Industry Team have earned the prestigious National Aeronautics Association's Collier Trophy, which recognizes the top aeronautical achievement in the United States for '97.

Gulfstream and the GV Industry Team were recognized specifically for successful application of advanced design and efficient manufacturing techniques, together with innovative international business partnerships, to place in customer service the Gulfstream V — the world's first ultra long-range business jet.

SDB forum scheduled

On Wed., March 11, Ames will sponsor a Small Disadvantaged Business (SDB) Forum in the Moffett Training and Conference Center, from 8:30 a.m. to 12:00 noon. This is the seventeenth in a series to be held at the various NASA research centers.

The purpose of the forum is to allow highly qualified high-tech small, disadvantaged business (SDBs) and minority educational institutions to present their capabilities and address questions from a technically-oriented audience. For the first time, Ames will have two minority educational institutions give presentations, one of which is a Historically Black College and University (HBCU). The following minority institutions and SDBs will participate in our forum: (1) City University of New York, City College, New York, N.Y., whose expertise includes multi-media information distribution and high speed communications; (2) Prairie View A & M University, Prairie, TX, whose programs give a special emphasis to computational fluid dynamics and aeronautical research; (3) Sierra Lobo, Strongsville, OH, whose capabilities include aerospace engineering and research testing; (4) Diversitech, Inc., Cincinnati, OH, a firm with aerospace test & evaluation, information systems and design engineering capabilities; and (5) SETS, McLean, VA, a company specializing in advance information technology. Dr. Robert L. Norwood, Director, Commercial Programs Division, Headquarters Code RW, will attend as the representative of the Associate Administrator, Office of Aeronautics. William Berry, Deputy Center Director, is also scheduled to participate. Everyone is welcome and encouraged to attend. If you need additional information, please contact Tom Kolis at ext. 4-4690.

Reminder — scholarships available

Application forms are now available for NASA College Scholarships. Forms can be obtained from Janine Ciffone, ext. 4-4948, M/S: 19-12 or email: jciffone@mail.arc.nasa.gov

New R&D code formed

A new organizational structure has been developed to provide centralized engineering and manufacturing services in support of the Center's missions and to improve the operation and maintenance of the National Full-Scale Aerodynamics Complex, the Unitary Plan Wind Tunnels, the 12-Foot Pressure Wind Tunnel, and related supporting facilities.

The proposed structure establishes a new directorate for research and development support functions and is designed to consolidate technical services and wind tunnel operations at Ames. The new Directorate will be called Research and Development Support Directorate (Code F).

The reorganization has been submitted for approval to Headquarters, which has indicated support for the proposed changes, but the Agency's reorganization procedures require a formal review process, which is expected to be completed in the next 30 to 60 days. Although the organization cannot be officially established until such approval is obtained, effective immediately the new Directorate will begin to function operationally.

During this interim phase, Nancy Bingham will serve as the Acting Director of Research and Development Services. Cliff Imprescia will serve as Deputy Director for Technical Services, and George Kidwell will act in the capacity of Deputy Director for Operations. During Mr. Kidwell's detail, Thomas Edwards will act in the capacity of the Deputy Director, Aeronautics Directorate.

Mobile Lab visit

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across the country in a flight simulator.

Burnett Academy is a San Jose Unified School District middle school Aviation/Aerospace Technology magnet. The magnet program integrates science, math and computer concepts to prepare students for further studies in aerospace engineering and technologies. To schedule a visit, contact Burnett Academy Principal Barbara Lateer at (408) 535-6267.

The MAEL is managed by NASA's Lewis Research Center, Cleveland, Ohio, and is currently on a nation-wide tour of schools.

BY MICHAEL MEWHINNEY



Space Act Awards

Six Ames project teams recognized at Space Act awards ceremony

The Deputy Center Director, William E. Berry, recognized the following six Ames project teams for recent Space Act Awards totalling over \$14,000. The team members attended an awards ceremony hosted by the Commercial Technology Office on Mon., Feb. 23, in the Moffett Training and Conference Center. Each of the contributors was honored with a certificate and monetary award from NASA's Inventions and Contributions Board.

Panel Method Ames Research Center (PMARC)

PMARC is an aerodynamic prediction method based on low-order panel methods. The major contribution is providing an accurate analysis tool to U.S. companies and universities which would otherwise not be able to afford it.

Awardees: Dale Ashby, ARC; Michael Dudley, ARC; Joe Katz, San Diego State Univ; Steve Iguchi, San Diego State Univ.

Mars Virtual Exploration

This contribution is an interactive computer-based software learning product on CD-ROM. It delivers the equivalent of 40 hours of classroom learning on exploring the planet Mars, targeted at fourth through sixth grade students.

Awardees: Rodrigo de Toledo, Sterling; Geoffrey Bruce, Sterling; Kathleen Burton, Quantum; Laura Shawnee, ARC; Michael Marlaire, ARC; John Connell, Sterling; Brenda Collins, Quantum.

Thermal Protection Systems Expert and Material Properties Database (TPSX)

A database of advanced thermal protection system (TPS) material properties was compiled into a Microsoft Windows-based application. The database includes physical, thermal and mechanical data as well as photographs and drawings of some materials.

Awardees: Thomas H. Squire, ELORET; Frank S. Milos, ELORET; George C. Hartlieb, ARC; Daniel Rasky, ARC; Mark Gilbert, San Jose State University; Marilyn Murakami, ARC.



photo by Sue Bowling

Award winners from the Publishing on the Web group socialize after award ceremony. From left to right: Christian Jacobsen of Javasoft, Paul Salm of Barnes Construction, Sonia Kao of Sterling Software and Wanda Luke also of Sterling.

New Millennium Program (NMP) Electronic Collaboration and Document Sharing System

This is an Internet-based suite of software tools that facilitates collaboration, communication and data sharing among members of widely-distributed teams working towards a common objective. This system is believed to be the largest collaboration tool ever developed and used by NASA.

Awardees: Paul Lucas, Caelum; Martha Del Alto, Caelum; Michael Compton, Caelum; Bob Kanefsky, Caelum; Vinod Baya, Caelum; Helen Stewart, Caelum.

Portable Batch Systems (PBS)

PBS is a client/server package to permit batch (and scheduled interactive) processing under Unix. PBS pioneered the separate scheduler approach to batch system.

Awardees: David Tweten, ARC; Albaeus Bayucan, MRJ; Robert L. Henderson, MRJ; Thomas M. Proett, MRJ

Publishing on the Web

"Publishing on the Web," does an outstanding job of providing an entertaining, interactive, participate,

non-linear learning experience superior to any book classroom lecture or conventional computer-based course. It delivers the equivalent of a one-day seminar on the fundamentals of HTML.

Awardees: Kimberly Copeland, Sterling; Fay Pattee, Sterling; Wanda Luke, Sterling; Paul Salm, Barnes; John Connell, Sterling; Robert Carlson, ARC; Sonia Kao, Sterling; Christian Jacobsen, Javasoft; Joe Jordan, Sterling; David Hooper.

This award established under the authority of the Space Act of 1958, allows the NASA Administrator to grant monetary awards up to \$100,000 for technical contributions which are determined to have significant value in the conduct of aeronautical and space activities.

Commercial Technology Office (CTO) Chief Dr. Bruce Webbon encourages you to report your new technology developments to your CTO commercialization manager. By doing so, you can participate in the process of technology evaluation for patentability, *NASA Tech Briefs* publication and eligibility for monetary awards. For more information, contact the CTO office at ext. 4-1754.

Lunar Prospector

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and spectrometer specialist at the Los Alamos National Laboratory, New Mexico. "Our data are consistent with the presence of water ice in very low concentrations across a significant number of craters." Using models based on other Lunar Prospector data, Binder and Feldman predict that water ice is confined to the polar regions and exists at only a 0.3 to 1% mixing ratio in combination with the Moon's rocky soil or regolith.

How much water ice do Lunar Prospector scientists believe they have detected? Assuming a water ice depth of one-half meter—the depth to which the LP neutron spectrometer instrument can penetrate, Binder and Feldman estimate that their data are consistent with the 'equivalent' of 10,000 to 50,000 square kilometers of water ice-bearing deposits spread out across the northern pole, and an additional 5,000 to 20,000 square kilometers dispersed throughout the southern polar region. This translates to an overall range of 10-300 million metric tons of lunar water ice, they estimate, depending upon the model used. What is more, the LP team reported, twice as much of the water ice mixture was detected at the Moon's north pole as at the south, contrary to popular expectation.

The University of California at San Diego's Jim Arnold previously estimated the upper limit of water ice that could conceivably be present on the Moon as a result of meteoritic and cometary impacts and other processes at 10 billion to 100 billion metric tons. Further, he claims, the amount of lunar regolith subject to 'gardening' by impacts in the past 2 billion years extends to a depth of about two meters. On that basis, the LP estimate of water ice (which is based on a measured depth of one-half meter) would have to be increased by a factor of up to 4—possibly, raising it to the 40 million to 1.2 billion metric ton range. In actual fact, Binder and Feldman caution that, due to the inadequacy of existing lunar models, their own estimates "could be off by an order of magnitude (a factor of ten) in either direction."

These findings raise two interesting questions: "How do Lunar Prospector and Clementine estimates compare?" and "Is the amount of water ice detected by Lunar Prospector of economic

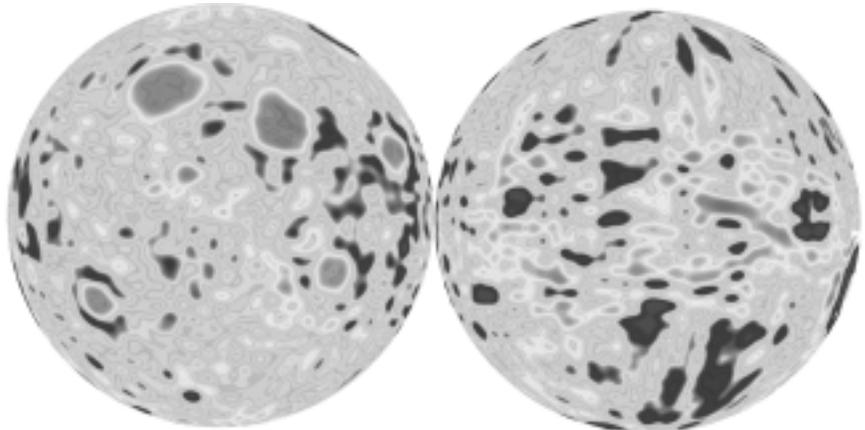
significance?"

It is not possible to compare the Lunar Prospector and Clementine science missions directly because the two used different data sensors, with varying data footprints (or cell size), and dissimilar analysis techniques. Clementine scientists found virtually all of their evidence for the existence of lunar water ice in the permanently shadowed regions of the southern lunar pole. They claimed that "a conservative analysis suggests an upper limit of 15,500 square kilometers of south pole terrain is likely to be in permanent darkness." From this and other data, estimates in the science community of the volume of water attributable to Clementine range from 100 million to 1 billion metric tons.

There are various ways to look at the economic potential of the detected lunar water ice. One way is to estimate the cost of transporting that same

drinking, food preparation, bathing, and washing. At that rate, 30 million metric tons of water (7.2 billion gallons) could support a community of 1,000 two-person households for well over a century on the lunar surface. Alternatively, astronauts on orbit in the shuttle are known to consume between 10.8 and 29 kilograms (approx. 20 to 60 pounds) of water per day. Using the upper consumption estimate and a 30 million metric ton LP water ice estimate, there is enough water ice at the moon's poles to support a lunar base camp of 1,000 astronauts for more than 2,500 years.

Of course, the actual or 'real' economic benefit of the estimated LP volume of lunar polar ice is dependent upon its accessibility, area of dispersion, mixing ratio, location, the end use to which it is put, the cost of getting it to the Moon by alternative means, and a



Near and far side gravity maps of the moon developed from Lunar Prospector telemetry data.

volume of water ice from Earth to the Moon. Currently, it costs about \$10,000 to put 1 pound of material into orbit. NASA predicts that, in the coming years, advances in information technologies and other areas will reduce that figure by a factor of 10 to only \$1,000 per pound. Using a very modest estimate (from within the LP projected range) of 30 million metric tons, the cost to transport that water volume to the Moon would be \$60 trillion. Similarly, since it would cost over \$2 million to carry a metric ton of water to the lunar surface, the lunar water ice deposits have economic value to the extent that they can be 'mined' for less.

From another perspective, a typical person is estimated to consume 100 gallons of water per day for

host of other factors.

Before the Lunar Prospector mission, historical tracking data from a variety of Lunar Orbiter and Apollo missions provided evidence that the lunar gravity field is not uniform. Mass concentrations (or mascons) caused by lava (mare) which filled huge craters are known to be the cause of the anomalies. However, precise maps of lunar mascons covering the Moon's equatorial nearside region were the only ones available.

Lunar Prospector has dramatically improved this situation, according to co-investigator Alex Konopliv of the Jet Propulsion Laboratory, Pasadena. He analyzed LP telemetry data to produce a map of both the near and far side of the moon. He identified two new mascons

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Aeronautics over the Internet

How do you teach aeronautics using fish fins, wind mills, bouncing balls, a person's hands, and javelins? Cislunar Aerospace, Inc.'s *K-8 Aeronautics Internet Textbook* (K8AIT) makes learning basic scientific principles fascinating and fun by using familiar aerodynamic shapes to help students recognize common principles of flight. K8AIT is an electronic multimedia, interactive textbook that is delivered over the Internet via the World Wide Web (<http://wings.ucdavis.edu>).

"Aeronautics isn't just aircraft, it's fluid flow," said Dr. Jani Marcari Pallis, Principal Investigator and Chief Executive Officer of Cislunar Aerospace, Inc. (CAI). "We emphasize conceptual learning to help students see the same aerodynamic shapes across things.

Students learn to recognize the principles of aircraft flight in nature, machines and sports."

Sports? Yes, sports have air foils—a person's hands, bicycle man/machine relationships, and balls and javelins. One of the newest features on CAI's Web site is "Tennis—Aerodynamics in Sports Technology" which helps students understand aerodynamics, physics and mathematics. It focuses on the aerodynamics of a tennis ball as it is hit, flies, spins, and bounces. Videoconferences and chat sessions over the Internet will allow students and teachers to participate in the project and learn how scientific principles apply to all areas of life.

The K8AIT was a cooperative agreement sponsored by the NASA Learning Technologies Project (LTP) whose charter is to combine NASA's inspiring mission, unique facilities, and specialized workforce with the best emerging technologies to promote excellence in America's educational system. The K8AIT project has been so successful that the University of Califor-

nia at Davis has agreed to continue hosting the project's server after the project has been completed.

"There are many reasons why it has been difficult to get aeronautics into the classroom," said Pallis. "The material is esoteric, it's not part of state framework, it's not an easy subject, and there is no comprehensive textbook on aeronautics. The cooperative agreement made it possible for us to provide computers and Internet access for schools that might not be able to afford this technology." Pallis has a degree in aeronautical engineering and is well qualified to develop the K8AIT curricula.

Cislunar has several pilot sites

including the Children's Hospital in Oakland, a campsite school for children of migrant farm workers in Davis, California, a 100-year-old school for the deaf in the Bronx, and

a public library. "Sign language is a challenge," said Pallis. "Our Web site has a 3-D model signer that moves its hands. We have different sign language characters; two male, two female, an Asian, and an African American. Technology is also a big challenge—in the Bronx, one school didn't even have electricity in some classrooms. They had to do the wiring."

Classrooms implement the textbook lessons in different ways. "Some have the monitor in front of the class and use a wireless keyboard and mouse, while others use a projector system with the computer located in the library," said Pallis. In Oregon teachers have to go out and visit the hearing-impaired children." Since many high schools have cut public libraries, CAI plans to develop curriculum to teach students how to do research. "The exceptional quality of this project, is that it cultivates these young minds in ways never possible before. This pool of talent might fuel unimagined possibilities for the aeronautics industry as these students enter

college." Commented Mark Leon, Learning Technologies Project Manager.

K8AIT includes English and Spanish written text in four reading levels, still pictures and short video clips. There is a *Self-Paced Internet Training Class*, and *The Scientists and Engineers Guide to Working with Students*, which prepares NASA experts to talk to the students and understand their manual dexterity. The *Student Activity Workbooks* provide interactive problems on the Internet to reinforce aeronautics concepts presented and contain self checks and activities that teachers can print out for homework.

In conjunction with NASA Stennis, CAI also plans to explore with students the uses of satellite imagery in aeronautics. The Clark satellite is expected to launch in early '98, and data will be available for the pilot schools in the fall. Children will be able to see satellite images from their own area and compare them to other areas, and they will be taught how to interpret satellite images and their uses in agriculture, fire fighting and aviation.

The next step for CAI is to showcase NASA people, projects and facilities in the *Careers* and *Future of Aeronautics* chapters of the textbook. LTP will assist CAI in providing live Internet videoconferences for Spanish-speaking students featuring NASA ARC scientists and engineers. As Internet video technology advances, CAI plans to provide similar conferences for deaf students in sign language. For further information contact: Mark León, email: mleon@mail.arc.nasa.gov, or Jani Macari Pallis, Ph.D., Cislunar Aerospace, Inc. email: deke@cislunar.com

BY PAT KASPER



Learning about aeronautics via the Internet at Oakland's Children's Hospital photo by Cesar Acosta

Engineer Week talks..



Linda Rogers gives her presentation at Whisman School during Engineer's Week photo by Tom Trower

Ames Research Center Logo Contest

Sponsored by the NASA Ames Exchange Council

Develop a design you feel represents Ames Research Center

1st Prize - \$1000.

Finalists will receive T-shirts with their designs on them.

Entries must be in color on 8" X 11" white paper. All entries are due to Mail Stop 19-22 by March 20th. All entries become the property of the Ames Exchange. Contest is open to all Ames civil servant and contract employees except Exchange Council members

Finalists will be chosen by the Exchange judges. The final choices will be posted in the Ames Cafe so that all Center employees can vote for the first prize winner.

The Exchange Gift Shop will have patches, t-shirts and caps made with the winning design.

POC: Janine Ciffone, Ames Exchange, ext. 4-4948

Astronomers needed

Be a visiting astronomer in Bay Area schools and community centers in 1998-99. The Astronomical Society of the Pacific is seeking amateur and professional astronomers and advanced astronomy students to participate in Project ASTRO, an innovative program that matches amateur and professional astronomers with 4th-9th grade teachers in Bay Area schools and community centers.

Project ASTRO helps astronomers form an ongoing partnership with a teacher. Astronomers with an interest in education and some experience working with children or teens or presenting astronomy to the public are encouraged to apply. Astronomers attend a summer training workshop with their partner teacher, receive a wide variety of activities and resource materials, work together to plan school year activities and programs and commit to make at least four daytime visits during the school year.

During the school year visiting astronomers (depending on their interests) can help to lead hands-on activities, serve as a resource for teachers, organize evening observing sessions, create a school astronomy club, present auditorium programs, arrange field trips or assist with science fair projects. The project's emphasis is on a hands-on, inquiry-based approach that research has shown is most effective in helping students learn the process of science.

The 1998-99 training workshop is scheduled for Fri., Aug. 14 through Sat., Aug. 15, at the San Mateo County Office of Education, Redwood City. Participating astronomers are required to attend all or most of the workshop. Visits will begin in fall of this year.

The first application deadline (for preferred placement) is April 11, although applications will be accepted after this date. To request an application call (415) 337-1100, ext. 101 or e-mail astro@aspsky.org. For more information contact Nicole Taddune, Bay Area Coordinator, at the Astronomical Society of the Pacific, (415) 337-1100, ext. 101 or visit their web site at www.aspsky.org. Project ASTRO is funded by the National Science Foundation.

Space technology used to detect and treat heart disease

Astronauts who spend extended periods in space often experience weakening of their hearts and blood vessels. As doctors and researchers work to understand why this happens, many of their findings can be applied to heart disease. NASA's research and technology has led to breakthroughs in the understanding, diagnosis and treatment of heart disease -- the number one killer of American men and women.

"I am proud that NASA research is helping doctors treat heart disease," said NASA Administrator Daniel S. Goldin. "This is a fascinating time for medical science, when the developments of our

aeronautics and space programs can be applied to a disease that affects so many here on Earth," he said.

"Who would have dreamed that lasers used to measure Earth's ozone layer could be used to unclog arteries," Goldin continued. "If the past is our guide, our future in space will continue to advance medical science." NASA is working with the National Institutes of Health, the U.S. Department of Health and Human Services, dozens of hospitals, researchers and private companies. These collaborations have resulted in successful new programs to diagnose and treat heart disease.

CFC surpasses goals

continued from page 3

The Red Team won the competition which was measured by the largest increase in percentage of participation. "Dill would have won, though, if we had been measuring in money collected," Munechika said. "He had the Postal Service."

Sheila Johnson of Code DX served as the 1997 Ames Chair, and Bob Lopez of Code II served as Deputy Chair. The 1998 CFC chairman for the two-counties will be Col. Dill, and the primary Loan Executive will be Capt. Flakes.

BY JOHN BLUCK 

Mobile lab visits San Jose

NASA's Mobile Aeronautics Educational Laboratory (MAEL) opened its doors to the news media Feb. 25 to 26 to observe local students prepare data for a cross-country flight, using the data during a simulated flight. Housed in a 53-foot trailer, the MAEL provides a state-of-the-art classroom where students can explore real-world challenges in aviation at 10 unique

"hands-on/minds-on" workstations.

Designed to generate excitement in science and math, the workstations enable students to design an aircraft, test it in a wind tunnel, operate a Global Positioning System to learn about aviation and geography, use the Internet to search for essential information needed for the flight, chart a flight path and finally use the data to fly

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Women who changed America

Catherine Beecher (1800-1878), was a popular writer who argued that women should be trained as teachers. She was pivotal in founding several women's colleges and lived to see teaching become an acceptable profession for women.

Frances Perkins (1880-1965) was the first woman appointed to the Cabinet of a U.S. President. As Secretary of Labor, she was instrumental in shaping legislation to create unemployment insurance, Social Security and minimum wage.

Rosa Parks (b. 1913) is known as the "Mother of the Civil Rights Movement." In 1955, she was arrested for refusing to give up her seat to a white man on a segregated bus in Montgomery, Alabama. The resulting bus boycott led to the desegregation of all public schools in America.

Test your women's history IQ

1. 26 million women won the right to vote through an amendment to the U.S. Constitution. Which amendment, in what year?
2. Can you name the scientist/author whose book launched the environmental movement?
3. Whose daring refusal to move to the back of a segregated bus sparked the Civil Rights Movement of the 1950s and '60s?
4. Which Latina has repeatedly been the leading money winner in the Ladies Professional Golf Association?
5. Before 1917, it was illegal for doctors even to tell women about contraceptives. Which activist was responsible for reversing this restriction?
6. Which woman spoke out for Native Americans' rights nationwide and before Congressional committees in the 1880s?
7. Which creative businesswoman became America's first black woman millionaire?
8. Who was the first Asian-American woman elected to Congress?

Answers:

(1) The 19th Amendment in 1920; (2) Rachel Carson, *Silent Spring*; (3) Rosa Parks in 1955; (4) Nancy Lopez; (5) Margaret Sanger; (6) Sarah Winnemucca, a Paiute; (7) Madam C.J. Walker; (8) Patsy Mink of Hawaii

Celebrate women's history

Learning the true stories of women's history has a positive effect on just about everyone. For girls and women, these empowering stories from America's shared past generate feelings of personal strength and new possibilities. Correspondingly, boys and men gain increased respect for women by knowing more about their individual accomplishments and about the female experience across time. Celebrating women's lives — filled with courage, caring and contributions — is valuable for us all.

Women's history is filled with women whose lives and work have transformed American communities and the ideas of their day. Women's history is also about countless women who have lived out their lives quietly at the center of their families. Together, these women represent many and varied cultures, faiths, aspirations and beliefs. And, they have all contributed significantly to building our society and culture.

History looks different when the contributions of women are included as routinely as those of men. When we see history in this new way, it is as if we are looking through a wide-angle lens. More of the picture comes into view. By adjusting our focus, details that were missing become clear. An expanded view of history lets us see ourselves and our connection to the past differently. When we see history in a new way, we can see new possibilities for the future as well.

The path of the women's rights movement

1848 - Astronomer Maria Mitchell becomes the first woman elected to the American Academy of Arts and Sciences; almost a century passes before a second woman is added.

1850 - Quaker physicians establish the Female (later Woman's) Medical College of Pennsylvania in Philadelphia to give women a chance to learn medicine. Due to threats against them, the first women graduated under police guard.

1851 - Sojourner Truth gives her spontaneous "Ain't I a Woman?" speech at the woman's rights convention in Akron, Ohio.

1855 - Lucy Stone becomes first woman on record to keep her ownname after marriage, setting a trend among women who are consequently known as "Luch Stoners."

1855 - The University of Iowa becomes the first state school to admit women. In 1858, the board of managers tries, but fails, to exclude women.

1869 - The American Woman Suffrage Association is formed to secure the vote through each state constitution.

1967 - Executive Order 11375 expands Executive Order 11246's non-discrimination measure to include women. Enforcement is not won until 1973, however.

continued on next page

Volunteers wanted for new research study

Researchers in the Musculoskeletal Biomechanics Laboratory (N-239 Rm. 178) here at Ames (<http://george.arc.nasa.gov/~rwhalen>) are currently recruiting volunteers for a new study entitled "Age-Related Differences in Physical Activity Level and Bone Density in Women." If you are a female 25 to 35 years old, or 60 and older and you do not participate in high impact types of exercise such as running, volleyball, or basketball on a regular basis (walking, biking, swimming, and other low impact exercises are acceptable), we would like you to volunteer.

The laboratory has developed a device to monitor activity during your normal day which we have previously tested here at Ames during the past one to two years. The main focus of the research is to determine how musculoskeletal loading, caused by normal activity (walking, stair climbing, etc.) is affecting bone density. Particular to this study is how aging and physical activity relate to bone density.

Initially, a questionnaire to determine your musculoskeletal history will assess whether or not you may be included in this study. After you are screened in this manner, you will be

given an activity questionnaire to determine your previous yearly activity pattern. The first phase of testing will require you to visit N-239 to determine your gait patterns for walking and running over a force plate mounted in a sidewalk. This may take up to one hour of your time and will be scheduled over a weekend, or other convenient time. The second part of testing involves wearing several devices that will monitor your activity during your day, including the experimental device. For this phase of testing, you will need to visit the laboratory three times.

An initial checkout on the system is performed in the lab and will take about 30 minutes. All device operations will then be explained and given to you for wearing in the fanny pack provided, or on your waist during your day (i.e. from when you get dressed in the morning until you retire in the evening.) You will be asked to wear all devices for five continuous days starting on a Wednesday morning and continuing to the following Sunday evening. At the end of the five days you will need to return to the lab for a final checkout.

The final part of testing involves a

low dosage x-ray of your heel bone using a commercial bone densitometry machine (that is currently awaiting Human Research Board approval for this phase of testing), which will take about ten minutes. This will be done during one of your three visits to the laboratory.

Consent is required for all study participants, and you may withdraw from the study at any time for any reason, although we hope you continue with all phases of testing.

Retired Ames' employees and/or spouses (civil servant and contractors welcome) as well as current employees are encouraged to volunteer for this study. Volunteers are not limited to on-site personnel, so please encourage your friends and/or spouses who live within a short driving distance from Ames to participate. Please call Susan M. Bowley (sbowley@mail.arc.nasa.gov) at ext. 4-3440 to volunteer for this study or for further information.

Women's movement

continued from previous page

1971 - For the first time in it's 130 yrs, attorney Ruth Bader Ginsburg successfully uses the Fourteenth Amendment to overturn a sex-biased law in the Supreme Court case *Reed v. Reed*.

1974 - Hundreds of colleges are offering women's studies courses; there are over 80 full programs in place. Additionally, 230 women's centers on college campuses provide support services for women students.

1974 - The number of women in public office begins to rise. Women now hold 8% of state legislative seats and 16 seats in Congress. By 1986, 14.8% of legislative seats, and 24 seats in Congress. In 1997, 21% of legislative seats, 62 seats in Congress.

1976 - Title IX goes into effect, opening the way for women's increased participation in athletics programs and professional schools, enrollments leap in both categories. Title IX withstands repeated court challenges over time.

1981 - Sandra Day O'Conner is the first woman ever appointed to the U.S. Supreme Court. In 1993, she is joined by Ruth Bader Ginsberg.

1987 - Responding to the National Women's History Project, the U.S. Congress declares March to be National Women's History Month.

1993 - Take Our Daughters to Work Day debuts, designed to build girl's self-esteem and open their eyes to a variety of career possibilities for women.

Women's history month schedule of events

Women's History Month Display
March 2 to 31, N-241.

Tax and Financial Strategies Seminar
March 11, N-241, Rm. B1, 11:30 a.m. to 1:00 p.m.

Books & Article Forum
March 18, N-241, Rm. 237, 11:30 a.m. to 1:00 p.m. Refreshments to be served. RSVP NLT 3/12 to Christine Monroe at ext. 4-4695, or Angela Brumfield at ext. 4-5778.

Events & Classifieds

Calendar

Jetstream Toastmasters, Mondays, 12 noon to 1 p.m., N-269/Rm. 179. Guests welcome. POC: Jenny Kahn at ext. 4-6987 or Pam Walatka at ext. 4-4461.

Ames Child Care Center Board of Directors Meeting, Tuesdays, 12 noon to 1 p.m., N-213/Rm. 220. POC: Lisa Reid, ext. 4-2260.

Blood Drive, Mar. 12 from 7:30 a.m. to 3:30 p.m. in Bldg. 3, the Moffett Training and Conference Center. Sign up via Internet: <http://dq.arc.nasa.gov>

Ames Sailing Club Meeting, Mar. 12, 11:30 a.m. to 1 p.m., N-262/Rm. 100. POC: Greg Sherwood at ext. 4-0429.

Ames Multicultural Leadership Council Meeting, Mar. 18, 11:30 a.m. to 1 p.m., Galileo Rm./Ames Café. POC: David Morse at ext. 4-4724 or Sheila Johnson at ext. 4-5054.

NFFE local 997 Union General Meeting, Mar. 18, 11:30 a.m. to 12:30 p.m., Bldg. 19/Rm. 1040. POC: Marianne Mosher at ext. 4-4055.

Ames Amateur Radio Club, Mar. 19, 12 noon, N-260/conf. rm. POC: Walt Miller, AJ6T at ext. 4-4558.

Ames Asian American Pacific Islander Advisory Group Meeting, Mar. 19, 11:30 a.m. to 1 p.m., N-213/Rm. 261. POC: Daryl Wong at 4-6889 or Brett Vu at ext. 4-0911.

Native American Advisory Committee Meetin, Mar. 24, 12 noon to 1 p.m., Ames Café. POC: Mike Liu at ext. 4-1132.

Ames African American Advisory Group Meeting, Apr. 2, 11:30 a.m. to 12:30 p.m., N-241/Rm., 237. POC: Antoinette Price, ext. 4-4270 & Mary Buford Howard, ext. 4-5095.

Environmental, Health & Safety Monthly Information Forum, Apr. 2, 8:30 a.m. to 9:30 a.m., Bldg. 19/Rm. 1078. POC: Linda Urabel at ext. 4-0924.

Hispanic Advisory Committee for Employees, Apr. 2, 11:45 a.m. to 12:30 p.m., N-239/Rm. 177. POC: Carlos Torre, ext. 4-5797.

Ames Contractor Council Meeting Apr. 8, 11 a.m., N-200/Comm. Rm. POC: Greg Marshall at ext. 4-4673.

Ames Classifieds

Ads for the next issue should be sent to astrogram@mail.arc.nasa.gov by the Monday following publication of the present issue.

Ads must involve personal needs or items; no commercial/third-party ads. Ads will run on space-available basis only. First-time ads are given priority. Ads must include home phone numbers. Ames extensions will be accepted for carpool and lost and found ads only.

Housing

Unit For rent: Sunnyvale (Homestead/Hollenbeck) 1 bdrm unit in a 4-plex, carport, deck, new carpet, new paint, \$895/mo., avail. 4/1. Call Larry (408) 738-1447.

Two rooms for rent, culdesac home w/ priv. rms + bath. Campbell school district, lg. backyard, new carpet/paint, WD, garage. NS, M or F, no drugs, clean, prof., \$774/ mo. +deposit + half utils. Call Tom, (408) 369-9718, eves.

Prof., clean, NS female w/cat seeks same to share Mtn. View twtnhs, 1.5 m fm. main gate, mstr. bdrm. & bath, WD, space for furn., storage, avail 2/23, \$625 + utils. (650) 969-7009.

Transportation

'80 Suzuki GS850G motorcycle. Call Barry, (510) 793-4457.

'82 Yamaha XZ Vision 550cc, 12K miles, looks, starts, & runs like new. All fluids changed, new brakes (F & R), tires (F & R), & battery, \$900 or B/O. Call Steve (408) 737-9499.

'87 Chev Corvette. Immaculate, mint condition. 27K miles, loaded with options, Z51 suspension, AT, PS, PB, gold/buckskin-black int. \$13,000. (408) 241-6936.

'88 Cadillac El Dorado, Gold series, too much new to list, 120,000 miles, asking \$5800 or B/O. Call Bob (408) 736-4039.

'88 Plymouth Voyager SE, excellent cond., well maintained, 98K miles, V6, PS, PB, AC, Rf rack & other opts. \$5,600. (408) 448-6118.

'89 Mazda 323, 2dr, Good gas mileage, Good shape, 115k miles. \$2400. Good first time car for teenagers. Call Chris (408) 778-0909

'93 Toyota Camery LE, automatic, 4 cylinder, 60k mi., AC, AM/FM/cass.,alarm, new tires, excellent cond., \$11,500. Call Ed or Gloria (408) 241-6753 or (408) 241-5849.

Astrogram deadlines

All Ames employees are invited to submit articles relating to Ames projects and activities for publication in the *Astrogram*. When you submit stories or ads for publication, make sure to check the publication deadline and submit your material by e-mail to astrogram@mail.arc.nasa.gov on or before the deadline. Stories should be sent as enclosures in MS Word.

If you have questions about items for publication, contact the editor at the above email address.

DEADLINE	PUBLICATION
MON., MAR. 9	FRI., MAR. 20
MON., MAR. 23	FRI., APR. 3
MON., APR. 6	FRI., APR. 17
MON., APR. 20	FRI., MAY 1
MON., MAY 4	FRI., MAY 15
MON., MAY 18	FRI., MAY 29
MON., JUN 1	FRI., JUN 12
MON., JUN 15	FRI., JUN 26

Miscellaneous

Player piano, Antique, w/rolls, \$800. (650) 941-2784.

GE dish washer, black, 6 mo. old w/manual and warranty, \$150. (650) 856-9122.

Late model GE built-in electric double oven, self cleaning, LED controls, clock & timer, \$175 or B/O. (408) 448-6118.

Lazy-boy sectional couch w/incliners, woven fabric, cream w/pastel colors, \$400 or B/O. (510) 829-5145 eves.

486-66Mhz VLB motherboard & CPU, 256K cache w/ "green" BIOS & manual, \$75. (408) 295-2160.

16bit PC stereo sound card w/ CD ROM interface + multimedia software & manuals, \$35. (408) 295-2160.

PC/Apple compatible joystick w/trim pots, \$5. IDE/floppy controller card w/cables, \$10. Serial(2)/parallel ports card, \$5. (408) 295-2160.

5K Fun Run/Walk

The Fitness Center will sponsor it's monthly 5K run and 2 mile run/walk on Tues., Mar. 17. Meet outside the Fitness Center before the 12 noon start. No Cost. Bring a friend, enjoy the beautiful outdoors and goodies at the finish line. This will be the second race of the 5K/Fun Run Series. POC: Nancy Dunagan, ext. 4-5804

Ames retirements

Name	Date	Code
Wanda Riney	12/31/97	J
Robert D. Showman	1/2/98	AF
Ralph H. Robinson	1/2/98	C
John T. Howe	1/2/98	DH
Jerry M. Deerwester	1/2/98	O
James L. Martin	1/2/98	O
Earl V. Petersen	1/2/98	OP
Gary L. Thornton	1/11/98	O
Carlton Gillespie, Jr.	1/31/98	OPM
John D. Wilson	1/31/98	JFF
Nancy Y. Lowe	2/14/98	AD
Yvonne S. Russell	2/27/98	II
Floyd W. Moffitt	2/28/98	AOS
Bob Carlson	2/28/98	II
Larry B. Hofman	2/28/98	D
Henry G. Montoya	3/3/98	JMD
Lado Muhlstein, Jr.	3/3/98	AO
Dennis Riddle	3/13/98	AAL
C. Thomas Snyder	3/28/98	N
Richard Greif	4/3/98	AFA

Wanted: Used remote control airplane w/ controller. Call Josh (408) 962-0963.

5 Squaw Valley lift tickets good any day during the '98 ski season for \$39 ea. This is a \$9 savings! (650) 593-6282.

Lunar Prospector

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on the Moon's nearside that will be used to enhance geophysical modeling of the lunar interior. This work has produced the first-ever complete engineering gravity map of the Moon—a key to the operational safety and cost efficiency of future lunar missions.

Lunar Prospector is scheduled to continue its present primary data gathering mission at an altitude of 100 kilometers (62.5 miles) for a period of ten more months. At that time, the spacecraft will be put into an orbit as low as 10 kilometers (6.25 miles) so that its suite of science instruments can collect data at finer resolution in support of more detailed scientific analyses. In addition, composition and surface structure information developed from data returned by the spacecraft's gamma ray spectrometer instrument will be a crucial aspect of additional analysis over the coming months. It will permit scientists to further refine their lunar models, and should allow them to make more precise estimates of the amounts of water ice-bearing deposits they believe to be present at the Moon's poles.

Lunar Prospector is a joint mission of NASA Ames Research Center, Lockheed Martin and the Lunar Research Institute. Important science instruments and contributions were provided by a host of universities, private companies and individuals from the greater science community.

BY DAVID MORSE 

NASA 7 aircraft operations

The NASA 7 Aircraft (air taxi service between Dryden and Ames) now picks up and drops off passengers at Base Operations, N-158 (Tower Bldg). The telephone number will remain the same, ext. 4-6309. The fax number has been changed to ext. 4-1750 and the mail stop is: 158-1. Passengers will be able to park their cars at N-158.

Arrival and Departure times have not changed:

Arrive Ames:	7:30 a.m.
Depart Ames:	8:00 a.m.
Arrive Dryden:	9:15 p.m.
Depart Dryden:	2:15 p.m.
Arrive Ames:	3:30 p.m.
Depart Ames:	3:45 p.m.
Arrive Dryden:	5:00 p.m.

POC: for Air Taxi at Ames: Trudy Schlaich, ext. 4-6309
POC: for Air Taxi at Dryden: Nancy Morgan, 805/258-4281

Unknown

I look in the distance.
A bright blue and green ball is there.
It is small.
I can cover it with my finger.
It looks so alone.
Alone in the vast black empty
nothingness.
I want to return.

It takes me days to reach it.
As I look down, I see a light gray
dirt.
Lifeless and dull, boring and still.
I wonder if there ever was life on it.
Maybe.
Lots of craters in the surface. Big
and small.
It is cold here and I feel light on my
feet.
I must return

As I get closer, the big blue and
green ball becomes larger and
larger.
Days pass, seems like months.

I am very close.
It's getting hot and bumpy. This
lasts for a minute.
Then I fall.
Hit the water.
I am home, safe from the unknown.

-- Poem submitted by local 14-year-old, Coe Macartney. It was selected as Editor's Choice by the National Library of Poetry. It is about returning to Earth from a mission roaming the solar system.

THE AMES Astrogram

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Managing Editor.....David Morse
Editor.....Astrid Terlep

THE AMES Astrogram



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