



ASTROGRAM

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NASA, Microsoft launch collaboration with immersive photography

NASA and Microsoft Corporation of Redmond, Wash., have released an interactive, 3-D photographic collection of the space shuttle Endeavour preparing for its upcoming mission to the International Space Station. Endeavour launched from NASA Kennedy Space Center in Florida on Aug. 8.

For the first time, people around the world can view hundreds of high resolution photographs of Endeavour, Launch Pad 39A and the Vehicle Assembly Building at Kennedy in a unique 3-D viewer. NASA and Microsoft's Live Labs team developed the online experience using hundreds of photographs and a photo-imaging technology called Photosynth. Using a click-and-drag interface, viewers can zoom in to see intimate details of the shuttle booster rockets or zoom out for

a more global view of the launch facility. The software uses photographs from standard digital cameras to construct a 3-D view that can be navigated and explored online. The NASA images can be viewed at Microsoft's Live Labs at: <http://labs.live.com>

"This collaboration with Microsoft gives the public a new way to explore and participate in America's space program," said William Gerstenmaier, NASA's associate administrator for Space Operations, Washington. "We're also looking into using this new technology to support future missions."

"With Photosynth, we take pictures of an environment and knit them together into an experience that people can move through like a 3-D video game," said Microsoft Live Labs Architect Blaise Agueria y Arcas. "NASA

provided us with some outstanding images, and the result is an experience that will wow anyone wanting to get a closer look at NASA's missions."

The NASA collections were created in collaboration between Microsoft's Live Lab, Kennedy and NASA Ames.

"We see potential to use Photosynth for a variety of future mission activities, from inspecting the International Space Station and the Hubble Space Telescope to viewing landing sites on the moon and Mars," said Chris C. Kemp, director of Strategic Business Development at Ames.

Photosynth was created in collaboration between Microsoft and the University of Washington. The software combines hundreds or thousands of regular digital photos of a scene

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NASA develops wireless tile scanner for space shuttle inspection

A new space shuttle tile inspection method using NASA-built, wireless scanners is replacing manual inspection. The new process began with the shuttle mission STS-118.

Technicians used six new scanners to look for cracks and other imperfections in some of the 24,000 tiles that cover space shuttle Endeavour. The agency designed and built the new tools at NASA Ames. In the past, workers at Kennedy visually analyzed tiles and measured dings and cracks with small hand-held scales.

"The new method is much faster and more accurate because the depth and volume measurements of the flaws and their locations are wirelessly transmitted into a computer

database," said Joe Lavelle, a senior engineer and project manager at Ames.



NASA photo by Dominic Hart

This image, taken at NASA Ames where the scanner was developed, shows sample shuttle tiles being scanned to illustrate how technicians would use the new tool to evaluate tiles on the space shuttle orbiter.

"This tool allows the inspectors to determine with very high confidence whether a shuttle tile needs to be replaced or just repaired."

"When they made the measurements manually with the scales, they had to estimate the volume of flaws to a worst-case value because they could not precisely measure the volume with any accuracy," Lavelle explained. "With this scanner, they will actually save tiles and the time-consuming process of replacing them."

The thermal tiles on the space shuttle protect it from the extreme heat generated during re-entry into the

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Editor's Note:

Next month's September 2007 issue of the Astrogram will be the final paper copy of the newsletter. Beginning October 2007, the Astrogram will be accessible online only at: <http://www.nasa.gov/centers/ames/astrogram/2007/07astrograms.html>

NASA engineer works to develop new airplane to seek water on Mars

You might think it is impossible to fly an airplane over Mars, but it is

on the surface.” According to Lemke, if the airplane could land on the lip of

a crater or edge of a cliff, then the craft could use radar to look for signs of water below the ground’s surface.

Radar will go through very dry surface material with very little change, but a water layer would be a hundred times more reflective, Lemke observed.

Carbon dioxide would echo radar with yet a different reflectivity, he added.

“You should be able to tell the difference between water ice and liquid water, again by how reflective it is,” Lemke noted. The airplane would probably also have a camera, he said. Previous Mars airplane missions were judged to be extremely exciting scientifically, but very risky technically, so they were not selected, according to Lemke. Mars airplane missions are technically challenging because “the planetary exploration community has no experience with flying airplanes on other planets,” Lemke said.

“One of the main technical challenges was to build an airplane that could be folded to fit inside an entry capsule,” Lemke observed. “It’s a capsule - usually conical in shape. It’s got a heat shield on it. It enters the martian atmosphere from space and protects the payload inside,” he explained.

A second challenge is that the air-

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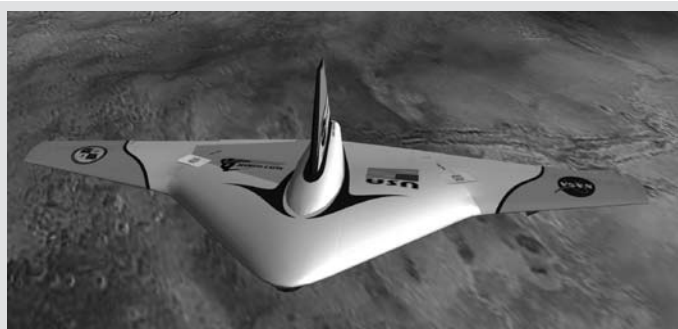


photo by Naval Research Laboratory

The MATADOR Mars airplane concept is seen here ‘flying’ over the Mars landscape. The plane could be designed to carry a variety of instruments, such as ground-penetrating radar to search for water near a gully on Mars.

possible. Actually, glider-like airplanes that, in theory, could ride the wispy air of the red planet have been on drawing boards for the last 30 years.

One of the latest proposals is to fly a rocket-powered Mars airplane and land on the edge of a cliff in search of water, a fluid that is essential to life, as we know it.

“For the last three years, I’ve been developing a Mars airplane concept that is specifically designed to accomplish a soft landing,” said Larry Lemke, a NASA Ames engineer who recently submitted his proposal to space agency officials. “You use small rocket motors to land like a Harrier vertical-takeoff-and-landing (VTOL) airplane lands. The idea would be to conduct a precision landing near Mars gullies to look for subsurface water,” he explained.

NASA Associate Administrator for Science Alan Stern issued a request for information for small landers that could be secondary payloads on future missions to Mars. The first opportunity for a secondary payload Mars mission might be in 2013 on the Mars Science Orbiter (MSO), according to Lemke.

Lemke’s plan calls for the airplane to have ground-penetrating radar to search for water near a gully on Mars after the plane lands. Scientists have found Mars gullies from about 330 feet (100 meters) to 660 feet (200 meters) down steep walls, according to Lemke.

“The gullies always appear on steep walls like a crater or a cliff, and the gullies all appear partway down a wall,” Lemke said. “The theory is there is an underground water layer, and every so often the water pops out

“You should be able to tell the dif-

Alan Stern shares science mission updates

In August, Alan Stern, Associate Administrator of the Science Mission Directorate (SMD), visited Ames to meet with and talk to the Ames scientists and employees. It was his first visit to the center since he was appointed AA. He was pleased to have the opportunity to answer questions and share his vision for SMD’s research and scientific exploration programs.

Stern began his presentation by citing four SMD core objectives: to get more science done within our budget; to ensure the success of NASA’s ‘Vision for Space Exploration;’ to promote U.S. leadership for all science disciplines; and to create a better workplace. He said that retiring the space shuttle in 2010 and developing new human spaceflight systems prevented the previously planned rate of growth for science.

Additional objectives included increasing the number of flights, expanding foreign collaboration and suborbital research, recreating a lunar science community and accelerating progress on the Earth Science Decadal Survey. Accomplishments cited were returning the Near Earth Object program to SMD, adding \$3M to NASA Astrobiology Institute’s budget, and funding four-



NASA photo by Eric James

Associate Administrator of the Science Mission Directorate (SMD) Alan Stern recently visited Ames to meet with the employees at the center to answer and discuss questions about SMD’s research and scientific exploration programs.

year grants. Audience questions ranged from concerns about the amount of paperwork required to do their jobs, to perpetually competing for funding for research grants and programs.

Stern previously served as executive director of the Space Science and Engineering Division at the Southwest Research Institute, Boulder, Colo.

BY RUTH DASSO MARLAIRE

NASA engineer works to develop new airplane to seek water on Mars

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plane must unfold itself in mid air, according to Lemke. Once it unfolds, the airplane would fly to a gully using a computer pilot. A pilot on Earth could not remotely control the airplane, because even at the speed of light, radio signals can take longer to reach Earth than the entire flight.

According to Lemke, the airplane would have a mass of about 143 pounds (65 kilograms). The engines would be small rockets powered by hydrazine. In a hydrazine thruster, two chemicals, called bi-propellants, mix to cause a reaction and produce thrust.

"In this kind of a mission you just want to get down to the place and land," Lemke said. "The endurance may be no more than 15 minutes. You'll have to have autonomous software called seeing-recognition software. It means the computer in the airplane has to be able to take images of what it sees and compare that to a stored image of where it wants to be, and then figure out how to get to the desired spot. This is similar to how cruise missiles work," Lemke

explained.

Lemke said there are several advantages to using an airplane to conduct Martian science missions. "It can fly much closer to the surface than a satellite . . . a kilometer above the surface," he observed. Comparing an airplane to a balloon, he said, "An airplane can go where you command it to go. A balloon goes wherever the wind blows it."

Lemke said there are other potential missions for Mars airplanes. "An airplane mission could last anywhere from 15 minutes to probably five hours," he said. Longer missions might use propeller airplanes.

"The most efficient technique would be a propeller," Lemke explained. "The power would come from a storable liquid fuel or an electrical power source, a battery or fuel cells."

The goals of a Mars airplane mission have changed over the years, according to Lemke.

"In the beginning, high-resolution photos would be a main choice, but, today, we have a high-resolution Mars

orbiter satellite." He said today's Mars airplane missions would most likely study atmospheric science, such as wind speed, pressure, dust and minor constituents like methane.

Another objective of a Mars airplane mission might be to land a payload, Lemke added. "The idea would be to use it as a precision lander," he said.

"I think when humans arrive, there are two scenarios that make sense," Lemke predicted. "One is that you could use small robotic aircraft for scouting and for a short range communication relay. The second is for transporting people and small amounts of cargo for regional exploration," he continued.

Lemke developed his Mars airplane proposal for the NASA Science Mission Directorate's Mars Technology Program.

BY JOHN BLUCK

Shuttle tile scanner

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Earth's atmosphere. After each shuttle lands, technicians go through a very rigorous and lengthy process to assess the surface of the tiles for any damage.

Each scanner weighs approximately 2.9 pounds and is about the size and shape of a small teapot. Technicians place the machine on the tile's flaw to scan it. In about three seconds, the data are computerized and archived.

Engineers can scrutinize computerized 3-D pictures of the flaws. The images show the length, width and depth of the flaws on the surface of the tiles. Although engineers designed the instrument to scan space shuttle tiles, it also could scan reinforced carbon-carbon material used on the leading edges of the shuttle's wings.

Engineers developing a heat shield system for NASA's new spaceship Orion already are using a larger, desktop version of the scanner to study heat shield samples tested at Ames. NASA is building a second desktop scanner for use at NASA's Johnson Space Center in Houston. The unit should be completed in about two months.

For high-resolution images of the scanner, visit: http://www.nasa.gov/mission_pages/shuttle/news/wireless_scanner.html

BY JOHN BLUCK

NASA officials discuss progress of new spaceship development



NASA photo by Dominic Hart

NASA Ames hosted a news briefing on Aug. 1 to provide updates on NASA's Constellation Program, which is developing the Orion spacecraft and Ares rockets to support an American return to the moon by 2020. The Orion spacecraft will carry astronauts to the International Space Station by 2015, and support missions to the moon, Mars and beyond.

NASA Ames leads the Orion Thermal Protection System Advanced Development Project that is

producing a heat shield to protect Orion during its return from low-Earth orbit or the moon.

Participants included, above photo, left to right, Constellation Program Manager Jeff Hanley and Orion Project Manager Skip Hatfield, both of NASA Johnson Space Center, Houston; and James Reuther of Ames, leader of the Advanced Development Thermal Protection Systems (heat shield) Project for the Orion crew exploration vehicle.

NASA Web site shows possible Mars landing sites for 2009 mission

NASA's Marsweb Web site now includes high-resolution images of candidate 2009 landing sites for the Mars Science Laboratory (MSL) rover.

The rover, 1,875 pounds (850 kilograms), will assess whether Mars ever had an environment that could support microbial life. The Internet site, created to support the MSL landing site selection process, includes pictures taken from NASA's Mars Reconnaissance Orbiter satellite. It is located at http://marsweb.nas.nasa.gov/landingsites/msl/mro_images/.

"As with the Mars Exploration Rover (MER) sites selection effort, we are providing an interactive Web site containing images and other information for anyone interested in helping to choose the MSL landing site," said Virginia Gulick, a planetary geologist at NASA Ames.

"We want to make sure that we select a site where it is safe to land, scientifically interesting and also maximizes the unique capabilities of the instruments on the MSL rover,"

she added. The Web site will help the scientific community to provide its input about the potential landing sites

gate by clicking and dragging a cursor across the picture on the special Web pages.

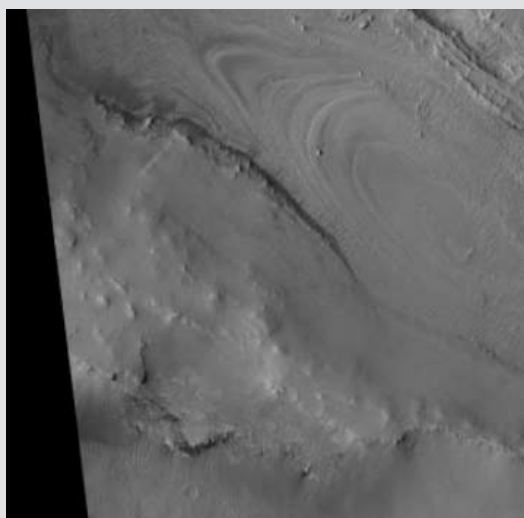
"With these Web resources, users can quickly and easily explore the enormous images in full-resolution over the Web," noted Glenn Deardorff, a computer scientist at NASA Ames, who created the Web pages.

The Mars Reconnaissance Orbiter satellite's High Resolution Imaging Science Experiment (HiRISE) is the source of 23 of the images on the pages. Another 14 images came from the satellite's context imager.

NASA's Science Mission Directorate funded development of the Marsweb MSL site selection Web pages. NASA's Jet Propulsion Laboratory, a division of the California Institute of Technology, Pasadena, manages the Mars Science Laboratory mission for the NASA Science Mission Directorate, Washington.

For more information about the mission, please visit: <http://mars.jpl.nasa.gov/msl/>

BY JOHN BLUCK



From the Marsweb site, photo taken by the Mars Reconnaissance Orbiter satellite of the proposed Mars Science Lab landing site in Meridiani Crater Lake.

on Mars, according to Gulick.

Large images of the 33 candidate Mars landing sites, converted to 'zoomable' images, that users can navi-

Public invited to help scientists study meteor shower

When Comet Kiess' dust trail briefly encounters Earth in the dark, early morning hours of Sept. 1, 2007, astronomers predict that an extremely rare Aurigid meteor shower will result. Meteor showers happen when comet dust streaks into Earth's atmosphere and vaporizes.

To help document the uncommon event, researchers hope the public will submit digital photos and camcorder movies of the shower's "shooting stars" to a team of scientists from NASA and other organizations.

The cause of the Aurigid meteor showers is very old. About 2,000 years ago, comet Kiess passed the sun and ejected a cloud of dust. The comet completed its first orbit of the sun in 1911 when Lick Observatory's Carl Kiess discovered the object. Its dust formed a continuous stream of particles that has been flowing just outside Earth's orbit ever since.

On Sept. 1, 2007, the Earth will travel through the stream of dust particles in the wake of the 1911 return of comet Kiess, according to astronomer Peter Jenniskens, an expert on me-

eteor showers, who works for the SETI Institute, Mountain View. "Metors will radiate from the constellation of Auriga, many as bright as the brighter stars in the sky," said Jenniskens, who also works at NASA Ames.

According to Jenniskens, the shower will be visible by the naked eye from the western United States, especially in California, Hawaii, Alaska and other western states and Mexico and the western provinces of Canada. Prime viewing time will be on Saturday, Sept. 1, 2007, from 4:06 a.m. - 5:06 a.m. PDT, Jenniskens forecasts. Astronomers believe the whole event will last no longer than one-and-a-half hours and will not be seen again in our lifetimes.

Sunlight has pushed the comet's ejected particles into wider orbits around the sun in a thin stream just outside of Earth's orbit. "On occasion, the combined gravity of the solar system's planets moves this dust trail into Earth's path," Jenniskens, explained.

Jenniskens and fellow researchers Jérémie Vaubaillon of the California Institute of Technology, Pasadena,

Calif., and Esko Lyytinen of Finland, predicted the upcoming, rare Aurigid shower.

According to Jenniskens, as dust grains from comet Kiess collide with Earth's atmosphere during the Aurigids shower, they will begin to vaporize at about 80 miles altitude, and the bigger comet particles will penetrate as low as 50 miles.

Jenniskens is leading a team of scientists and astronomers to study the Aurigid meteor shower from two aircraft. The airplanes will take off late Friday night, Aug. 31, 2007, from Moffett Field at NASA Ames, and will carry researchers from NASA, the SETI Institute, Utah State University and other organizations to a location high above the Pacific Ocean to view the meteor shower early Saturday morning, Sept. 1.

The primary goal of the mission is to count the meteors over the large area visible from the airplanes and measure the exact duration and peak time of the shower. Scientists will observe how the meteors break up and examine their colors to learn about the

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NASA robots practice moon survey in the Arctic Circle

Two NASA Ames robots recently surveyed a rocky, isolated polar desert within a crater in the Arctic Circle. The study will help scientists learn how robots could evaluate potential outposts on the moon or Mars.

The robots, K10 Black and K10 Red, carried 3-D laser scanners and ground-penetrating radar. The team arrived at Haughton Crater at Devon Island, Canada, on July 12 and operated the machines until July 31. Scientists chose the polar region because of



NASA photo by Dominic Hart

On July 20, Ames hosted a live, two-way video conference with a panel of NASA researchers currently working in Haughton Crater, Devon Island, Canada. Employees had the opportunity to ask questions of Chris McKay, Space Science Division, NASA Ames, regarding the value of analog sites; Matt Deans, Intelligent Robotics Group, NASA Ames, regarding the Ames K10 robot site survey; and Pascal Lee of the SETI Institute regarding the 'stranded astronaut' EVA walk-back experiment.

the extreme environmental conditions, lack of infrastructure and resources, and geologic features. Also, Haughton Crater is geographically similar to Shackleton Crater at the South Pole of the moon. Both are impact craters that measure roughly 12.4 miles in diameter.

"We are learning about the awesome potential of human and robot teams," said Ames Center Director, S. Pete Worden. "Studying how humans and robots can maximize scientific returns in sites such as Devon Island will prepare us to walk on the moon

and Mars."

NASA is planning to send astronauts back to the moon by 2020. Prior to establishing a lunar outpost, the agency must conduct detailed surveys at a variety of locations to produce maps, look for minerals and water, and learn

other details. NASA plans to accomplish its surveys with an automated orbiting spacecraft, not a robotic lander, but the agency still has a keen interest in advancing the laser scanning technology.

Most of the lunar sites are on harsh terrain and in permanently shadowed areas. It is not unusual for site surveys to require thousands of measurements and hundreds of hours to complete. A robot can reduce mission cost and improve mission effectiveness by allowing ground control to conduct surveying tasks.

"A typical scenario involves multiple rovers autonomously surveying a region while humans supervise and assess data from a remote location," said Terry Fong, director of the Intelligent Robots Group at Ames.

The robots used different techniques from the goal-directed traverses and isolated sampling tasks that Mars scientific rovers have used to explore the red planet. K10 Black and K10 Red utilized a mix of information previously obtained by aerial and satellite imaging and data that the robot survey team gathered.

The 3-D laser scanner can map topographic features as far as 3,280 feet away. The ground-penetrating radar, which NASA Jet Propulsion Laboratory, Pasadena, Calif., developed, can map below ground as deep as 16.4 feet.



NASA photo

The Intelligent Robotics Group conducted a robotic field test in Haughton Crater on Devon Island, Canada. Two NASA Ames K10 rovers, 'Red' and 'Black,' performed systematic surveys of several simulated lunar outpost sites, including a roughly 700 m-by-700 m region called 'Drill Hill.' The K10 rovers were equipped with ground-penetrating radar to map underground layers and a 3-D scanning laser to map topography. During the three-week test, the two rovers drove more than 30 km and collected more than 25 GB of data. 'K10 Red' is seen here near the Haughton-Mars Project Base Camp.

The robots covered the area in lawnmower-like paths at human walking speeds to systematically map above and below ground, according to Fong.

The practice survey in Haughton Crater took place at an area called Drill Hill. The robots covered about 120 acres of terrain. Researchers commanded the robots remotely from the Haughton-Mars base camp more than two miles away from Drill Hill.

The robots navigated using the Global Positioning System, stereo cameras, laser scanners and sun trackers. Each of the four-wheel-drive machines weighs 165 pounds and can carry a payload up to 110 pounds.

A key objective of the Drill Hill survey was to test the instruments and software on the robots as well as the equipment and software that humans would use at lunar bases and ground control to supervise the robots. Engineers at NASA Johnson Space Center in Houston assessed advanced robot driving techniques using a multi-screen cockpit. NASA Ames tested software that makes high-resolution maps for interactive display in 3-D.

NASA's Exploration Technology Development Program sponsored the robotic site survey at Haughton Crater.

For more information, including an updated blog, visit: <http://haughton2007.arc.nasa.gov>

BY JOHN BLUCK

NASA Ames software monitors Space Station gyroscopes

NASA has added a new computer program to help monitor the four gyroscopes that keep the International Space Station properly oriented without the use of rocket fuel. During a spacewalk on Aug. 13, 2007, two astronauts from the space shuttle Endeavour removed and replaced a gyroscope that failed in late 2006.

Computer scientists at NASA Ames designed the new software for the space station. The Inductive Monitoring System was added to a group of existing tools to identify and track problems related to the gyroscopes.

"If the system does something unexpected, the software alerts ground controllers that something is different, an anomaly, and that allows them to analyze the situation and take preventive measures as necessary," said David Iverson, the computer scientist at Ames who spearheaded the five-year effort to develop the software.

During its development, researchers used the software to analyze several months of normal space station gyroscope data collected by the International Space Station Mission Control Center at NASA Johnson Space Center, Houston. In these tests, problems with the gyroscopes were noticed long before the previous system flagged glitches. NASA started using the soft-



David Iverson, above, is lead for the Ames-led development of computer software that monitors the condition of the gyroscopes that keep the International Space Station (ISS) properly oriented in space as the ISS orbits Earth. The gyroscopes are flywheels that control the station's attitude without the use of propellant fuel. NASA computer scientists designed the new software, the Inductive Monitoring System, to detect warning signs that precede a gyroscope's failure. According to NASA officials, engineers will add the new software tool to a group of existing tools to identify and track problems related to the gyroscopes in 2007. If the software detects warning signs, it will quickly warn the space station's mission control center.

ware earlier this year.

The software program also has been used in F-18 fighter planes and by the space shuttle's leading edge impact detection system, as well as for electric power plant and water quality

monitoring.

For more information about the International Space Station, visit: <http://www.nasa.gov/station>

BY JOHN BLUCK

'Rosy future' forecast for small spacecraft

Recently, a few weeks before space shuttle Endeavour's launch, an excited collection of visiting interns, resident researchers and space enthusiasts gathered in Ames' main auditorium to hear Pete Klupar's colloquium, 'Small Spacecraft, What's the Big Deal?'

Klupar was quick to answer the rhetorical question posed by the title of his talk, by stating that small spacecraft have a "rosy future" thrust behind NASA's exploration and science missions.

Klupar, chief of the Small Spacecraft Office here at Ames, said the "resurrection and redemption" of small spacecraft is due to NASA's need for a sustainable, high perfor-

mance and affordable return to the moon, as well as other space missions. They are the craft of choice, due to the fact that small spacecraft can accomplish NASA missions at a lower cost and risk than their larger counterparts, by a window of nearly \$190 million a launch. The time and money saved could enable NASA to quickly conduct a greater number of missions.

Klupar defines small spacecraft by three criteria: weight, cost and the time they take to develop. This criteria revolutionizes the manner in which spacecraft are designed: the capability of the small spacecraft is applied to mission needs, as opposed to the expensive older manner of

determining mission requirements and then creating a craft to enable them. According to Klupar, small spacecraft remain resilient, preventing experiments from being held hostage if a launch is delayed, and do not restrict NASA to a queue of predetermined missions.

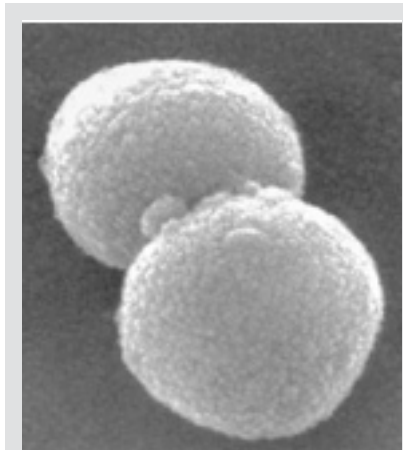
Klupar critiqued the continuing practice of pouring additional NASA resources into "fewer baskets" by focusing solely on large launches, because they would only "squeeze" the budgets for smaller endeavors. He enthusiastically supported commercial collaborations and "more exploration and more science for less dollars."

BY RACHEL PRUCEY

Astronauts conduct study of bacterial growth in space

When space shuttle Endeavour rocketed into space on Aug. 8, it took along a common microorganism normally found in the upper respiratory tract of approximately 40 percent of the healthy human population.

The experiment, Streptococcus pneumoniae Expression of Genes in Space (SPEGIS), part of the STS-118 space shuttle mission will investigate the effects of the space environment on



Scanning electron micrograph of *Streptococcus pneumoniae* (x14,520). Photo taken by Phillips, D.M., *New England Journal of Medicine*, 1993 Aug 12; 329(7):477

the common microorganism *Streptococcus pneumoniae* (*S. pneumoniae*). Scientists believe that sending this bacterium into space may lead to a better understanding of *S. pneumoniae*, an opportunistic human pathogen, which causes infections in individuals with reduced immune function. This bacterial pathogen is the most common cause of pneumonia, middle-ear infections and bacterial meningitis.

"The opportunity to investigate and understand the effects of spaceflight on the pathogenic potential of *S. pneumoniae* may further the design and development of new drugs that can be used for treatment of diseases on Earth," said Hami Teal, the experiment's project scientist and a researcher at NASA Ames.

Vials containing bacterial cultures were loaded aboard space shuttle Endeavour in SPEGIS canister assemblies developed by NASA. The hardware consists of three canisters, each containing three sealed polypropylene vials inserted into aluminum jackets to

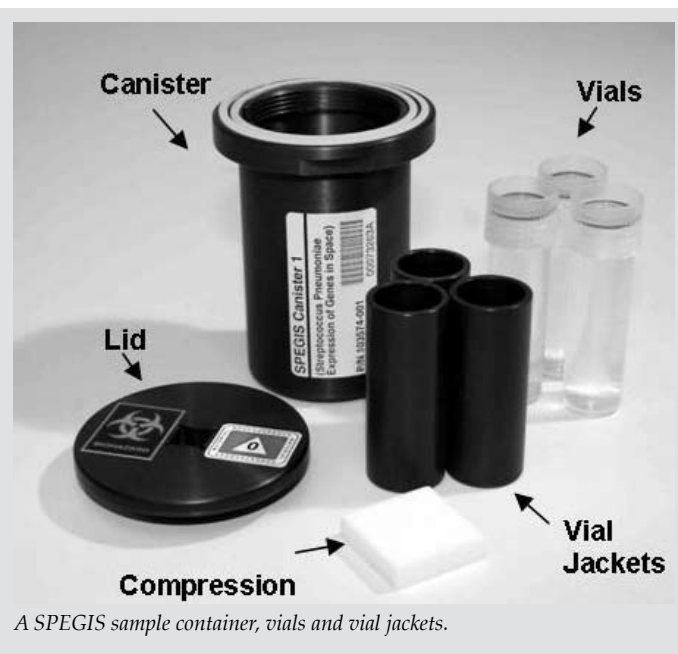
improve contact and enhance thermal transfer. The SPEGIS experiment only requires transfer of the canisters from refrigeration to incubation and then to a freezer to preserve the sample. The SPEGIS experiment will be returned to Earth for analysis by scientists. Since the SPEGIS canisters are triple-contained and never opened, the crew is never in direct contact with the bacterial cultures.

"We expect the SPEGIS experiment will provide important new information about how microbes adapt to microgravity and the spacecraft environment. These results will lead to a better understanding of these organisms on a molecular level and how their ability to interact with humans may be altered," said David W. Niesel, the project's principal inves-

tigator and professor at the University of Texas Medical Branch in Galveston, Texas.

For more information about the SPEGIS research project, visit: http://www.nasa.gov/mission_pages/station/science/experiments/SPEGIS.html

BY RUTH DASSO MARLAIRE



A SPEGIS sample container, vials and vial jackets.

Public, media views STS-118 launch



NASA photo by Jon Pierre Wiens

News media and the public were invited to attend a special pre-launch program in the Exploration Center at NASA Ames on the afternoon of Aug. 8. This event was an opportunity to observe the live, televised broadcast of the launch of STS-118 space shuttle Endeavour from NASA Kennedy Space Center, Fla., and attendees heard several speakers who discussed the upcoming mission. Guests listened to remarks from Ames' planetary scientist Chris McKay; researcher Cecilia Wigley, who discussed one of the experiments aboard STS-118; Laura Shawnee, of Ames' Education Division, discussed the Educator Astronaut Program; and astronaut Janice Voss, seen here, top left, in the above photo, speaking to the attendees of the pre-launch program, who has flown in space five times and provided pre-launch commentary.

Public to help scientists study meteor shower

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materials that formed the solar system.

Not only is the shower rarely seen, the Aurigid meteors also may be very unusual, Jenniskens noted. They are solid bits of the icy comet Kiess that returned from the Oort cloud of comets on the outskirts of the solar system.

"Billions of comets have spent 4.5 billion years in the Oort cloud, where cosmic rays baked their crust over the age of the solar system," Jenniskens said. "Some of the Aurigid meteors could be bits and pieces of this original crust of the comet. Comets that return more frequently to the sun have long lost this pristine crust," he observed.

Several tips follow for setting up a digital camera or camcorder to take images of meteors.

Meteors, or "shooting stars," look like streaks of light, or sparks flying from a distant campfire or fireworks. Observers can photograph meteor streaks by pointing digital cameras and camcorders towards the sky, but away from the moon.

The Aurigid meteors ("shooting stars") will look as if they are coming from the constellation Auriga (Latin for charioteer) in the northeastern sky. Perseid meteors will seem to originate from the constellation Perseus, just above Auriga. Astronomers named the showers for the constellation of stars from which the meteors appear to be derived.

Astronomers suggest that photographers go to safe locations that are far away from the haze of cities. According to astronomers, dust in the atmosphere in metropolitan areas will scatter moonlight and make the sky too bright to photograph or see the meteors well.

Jenniskens suggests that people who wish to contribute digital images to scientists should first use their cameras' "clock set" options to set them to the correct time, accurate to within one second. To find out the correct time, photographers can dial time-of-day services provided by telephone companies in their local areas. For example, in the San Francisco Bay Area, photographers can dial the letters on their telephones that spell "popcorn," (415) 767-2676.

Photographers should place their cameras on tripods and use a "night," "bulb" or similar camera setting, so

the volunteer observers can shoot meteor pictures with exposure times of 10 seconds, one after the other. Photographers should set the camera's light sensitivity to ISO 1600, according to Jenniskens.

"Choose a fairly small field of view that is no larger than the square of (the constellation) Pegasus," he said. "Take many successive 10-second-duration exposures," he added.

According to Jenniskens, volunteers should not move their cameras once they are set to take images, so that the frequency rate of the meteors can be measured. After the shower, each volunteer should record his/her observing location on a map, look at each of their images and make a list with the time each meteor picture was taken, Jenniskens said.

"Do not alter the digital images because scientists will use photo-editing programs to analyze the different colors in the images to learn about the meteors' compositions," Jenniskens advised.

According to Jenniskens, people interested in videotaping the meteors also should first set their camcorder clocks to the correct time. "Set the

camera so that the time is recorded on the video picture (date not needed)," Jenniskens said.

"Mount the camcorder on a tripod, and then point to a region in the sky with many bright stars. Zoom in enough to see those bright stars in the video. Continue videotaping for the duration of the shower. Do not move the camera during the shower. Later, watch the video to find the meteors and provide a list of times and record your location on a map," he noted.

Those people who would like to contribute their images and other observations to researchers should send them by e-mail to pjenniskens@seti.org. The public may also upload their images and data to the Aurigid Meteor Shower Web site at: <http://aurigid.seti.org>

According to Jenniskens, other organizations interested in obtaining meteor images and observations from volunteers include the American Meteor Society and the International Meteor Organization.

To view images from past meteor observation campaigns, visit: <http://leonid.arc.nasa.gov>

BY JOHN BLUCK

Titan seen as similar to Earth

In Dr. Chris McKay's talk on Titan, Saturn's largest moon studied by the joint NASA/ESA/ASI Cassini-Huygens spacecraft, he demonstrates how Titan is like Earth in many ways. McKay calls it "our real twin," save for the fact that it averages -180 degrees Celsius. Like Earth, its atmosphere is dominated by nitrogen with a pressure close to sea level, it experiences a greenhouse effect, and it experiences "wet ages," where methane plays the role of water to shape the surface and atmosphere, just as Earth's hydrological cycle. It has characteristic fluvial features, such as deep channels and shorelines, but no large bodies of liquid on its surface.

He contributes the absence of liquid methane to radiative time scales. While Earth's atmosphere loses all radiative energy in 100 days, Titan's takes 100 years. This is because Titan's atmosphere is so massive and thick (10 times the column mass of Earth's), that it experiences no day and night chang-



Chris McKay during his recent talk at Ames about Titan.

es in temperature; only "summer" and "winter." This may explain why Titan's temperature has not changed in the last 13 years, as well as the dynamic cloud activity and small lakes residing in the polar regions.

The probe confirmed a number of "knowns," yet unanswered mysteries remain: what is the origin and source of re-supply of methane on Titan, a gas which is destroyed over time by the Sun? Why is the surface of Titan wet? Are what appear to be rocks really water? Is there any organic material or life?

BY RACHEL PRUCEY

In Memory of . . .

Victor Stevens, an original NACA engineer, dies

Victor I. "Vic" Stevens, one of the group of original NACA engineers at Ames, passed away on June 26, 2007, in Medford, Ore.

Stevens joined Ames in 1941 fresh from the University of Washington. He had worked in the wind tunnel there, and so quickly made his mark in the Ames 7-foot-by-10-foot wind tunnels. Stevens was part of the research group led by Harry Goett, who used a model of the Navy PV-1 patrol aircraft to first demonstrate how handling quality predictions could be made with powered wind tunnel models.

When the Ames 40-foot-by-80-foot wind tunnel opened in 1944, Stevens moved there as an assistant branch chief. He led the group that quickly demonstrated the value of the full-scale tunnel by solving the compound aerodynamic problems of the Ryan XFR-1 Fireball, the first U.S. Navy airplane with jet propulsion. Those years were so busy at Ames that when he retired in 1972, Stevens still carried forward unused annual leave from World War II.

Stevens also contributed to Ames' work in making the swept wing useful in the design of high-speed subsonic and supersonic aircraft. He worked with R.T. Jones on some important tests of swept wings in the 6-foot-by-6-foot wind tunnel. He shared a double desk with Bill Harper and worked closely with Roy Jackson and other aeronautical engineering legends.

Stevens was better known, though, for his career in engineering management. Harvey Allen, chief of the Ames High Speed Research Division, had conceived of and designed the first supersonic, free-flight tunnel. When it opened at Ames in 1949, he asked Stevens to lead the section that operated it. Allen, renowned as an inspirational engineering leader, appreciated strong management but had no interest in doing it himself. So he asked Stevens to serve as his assistant chief in the High Speed Research Division, one of the most creative and productive aeronautical engineering teams ever assembled. When the 3.5 foot hypersonic wind tunnel opened in 1959, Stevens became assistant chief of the newly formed Ames Thermo- and Gas-Dynamics Division. He served there throughout the 1960s as



Victor I. "Vic" Stevens

it expanded its work into new areas of hypersonic and space research, such as re-entry vehicle research and lifting-body design.

As assistant division chief, Stevens' blackboard always had some new curve drawn by someone in his division who had stopped by to explain the technical details of his project. In the NACA spirit, he was a stickler about precise and clear writing, and closely edited the technical papers of those who worked for him. He was known as a superb mentor. When Jack Boyd had an opportunity to take a Sloan Fellowship, Stevens also took on Boyd's duties as technical assistant to the director, so that Boyd could attend Stanford.

Stevens enjoyed lecturing at universities throughout the Northwest

to recruit bright students to come to Ames. Stevens recruited Scott Crossfield from college to be an engineering test pilot for the NACA, and Crossfield later became the first person to fly Mach 2. Among those he enticed to Ames were Leroy Presley, Pat Peterson, Victor Peterson, Allan Faye, Rodney Wingrove, Glen Stinnett and Dale Compton.

When NASA launched its space shuttle program in 1970, Ames Center Director Hans Mark asked Stevens to lead an office to coordinate all Ames' support of the shuttle program. Stevens was highly regarded throughout NASA, and enjoyed a reputation for being thorough and conscientious. Stevens' efforts were instrumental in making Ames' technology useful to senior shuttle program managers at NASA Headquarters, as well as Marshall and Johnson space centers.

Stevens retired in 1972, saying he hoped to open management opportunities for younger engineers. His hobbies included photography, camping and woodworking. He met his wife Katherine "Kay" Stevens as students at the University of Washington; she preceded him in death. He is survived by his son, Victor "Torrie" C. Stevens, who worked at Ames on the QSRA as a flight test engineer. He is also survived by his daughter, Ann Eggertsen who worked for the State Department as an architect and is now working on her PhD in psychology from the University of Texas in Dallas.

BY VIC PETERSON AND TORRIE STEVENS

Ames holds annual Summer Science Day



NASA photo by Dominic Hart

The combined 4th Annual Foothill-DeAnza Internship Program 'Student Achievement Celebration' and the 11th Annual Ames Summer Science day was held on Aug. 16. This year, there was one large poster presentation for both programs, which provided an opportunity for people at Ames and across the local community to meet in a casual setting where they could view and discuss posters describing 2007 summer projects conducted by students and faculty fellows. Posters were presented in a variety of diverse fields including life sciences, nanotechnology, Earth/space/astrobiological sciences, aeronautics and information technology.

ACC hosts 4th annual Partners in Excellence Reception

The Ames Contractor Council (ACC) hosted the 4th annual Partners in Excellence Reception in early August in the Exploration Center. Representatives from 10 codes and 28 contract companies attended the event. This annual event is a unique opportunity for Ames center management and contractor company representatives to gather in an informal setting to mix and mingle. Gatherings such as this reception foster better working relationships that help both the government and its contractor community achieve success in pursuit of NASA's objectives.

ACC President Chris Johnson welcomed everyone and presented highlights of ACC activities this year. He then introduced Ames Center Director S. Pete Worden, who informed everyone that Ames' future is quite bright. He mentioned many of the projects that are moving forward, including the Vertical Motion Simulator, Future Flight Central, Constellation, the Arc Jet facilities for CEV technology, small spacecraft and upcoming partnerships

security, safety and new business.

The ACC also has active committees that benefit the Ames community. Through our successful fundraising

expectations for technical, schedule and cost performance. The council strives to improve the productivity and enhance the quality of contractors'



NASA photos by Dominic Hart

ACC President Chris Johnson (MEI Technologies), left, and Ames Center Director S. Pete Worden, right, at the 4th annual Partners in Excellence Reception held in August at Ames. This event is an opportunity for Ames center management and contractor company representatives to meet informally.

activities, such as the golf tournament and historic calendar sales, we are able to contribute to education outreach and other worthy endeavors.

To learn more about the ACC and how it actively supports the Ames community, visit its Web site at: www.amescontractorcouncil.org

If you are eligible for membership in the ACC, you are also eligible to be included in the online list of companies under "About" on the Web site. This list links directly to each

services and products for the overall success of Ames Research Center.

The ACC focuses on maintaining open lines of communication between Ames center management and contractor site managers and representatives. Interested in developing contractor hidden potential, the ACC conducts several annual and special events to raise awareness of this organization's value to the Ames community. Proceeds from those events support the Ames Community.

BY DOREEN COHEN

NASA, Microsoft collaboration

continued from front page

to present a detailed 3-D model of a subject, giving viewers the sensation of smoothly gliding around the scene from every angle. A collection can be constructed using photos from a single source or multiple sources. The NASA Photosynth collection also includes the return of the space shuttle Atlantis to the Kennedy Shuttle Landing Facility from Edwards Air Force Base, Calif., in July.

Microsoft Live Labs is an applied research organization focused on the incubation of innovative, Internet technologies to improve and accelerate the next evolution of Microsoft's Internet products and services.

BY JONAS DINO



Ames Contractor Council officers for 2007, left to right, Chris Johnson, MEI Technologies (president); Nicki Rayl, EASI (secretary); Kathleen Starmer, SAIC (vice president); and Herb Finger, Unisys (treasurer).

with other centers such as JPL. Deputy Center Director Chris Christensen and Associate Center Director Steve Zornetzer also attended.

Any company with an active contract at Ames is invited to send its representative to the monthly ACC meetings, which are held the first Wednesday of the month, 11 a.m. to 12 noon, in Building 200 in the Jack Boyd Committee Room. The deputy center director, or his representative, is always first on the agenda with an update about center and agency activities. This update is followed with presentations by various guest speakers, including topics such as HSPD-12,

company's Web site, where company information and job opportunities may be found, <http://amescontractorcouncil.org/contract-frame.html>

The Ames Contractor Council (ACC) is a non-profit (501)(c)(4) organization whose membership consists of representatives from the contractor companies performing work at NASA Ames. The ACC strives to apply its collective pool of management talent to benefit the Ames community.

The ACC's mission is to assist NASA Ames in providing world-class quality products and services to its customers that consistently meet or exceed all customer specifications and

Code QE earns clean-up certifications on four sites

Every time a hazardous waste site is cleaned up - that's good news. In the past year or so, Ames' Environmental Services Division, Code QE, has completed and closed four Areas of Investigation (AOI) with the most recent closure certified on Aug. 2 by the California Department of Toxic Substances Control (DTSC). The four closed AOIs encompass:

- Buildings N-225/N-225B electrical substations soils contamination (closed 7/5/07).
- Building N-267 area soils contamination (closed 6/30/06).
- Buildings N-221C/N-227 electrical substations soils contamination (closed 2/8/06).
- Underground Storage Tanks at seven sites (closed 8/02/07).

In addition to the four AOI projects certified as closed by the California agency, one additional area encompassing the N-221 wind tunnel complex (AOI 4), remains under DTSC oversight. The other 11 AOIs are managed under the Environmental Protection Agency Region IX.

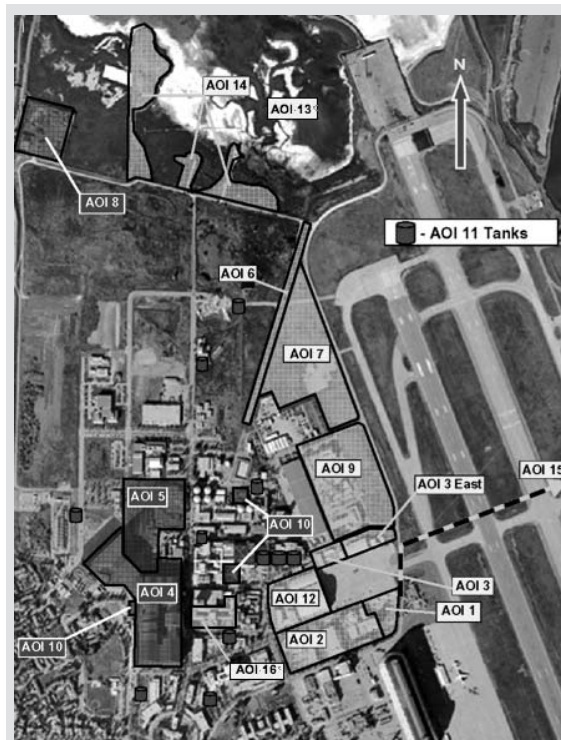
Clean up of hazardous sites is a long and arduous process requiring deep knowledge of contaminants and meticulous attention to complex and

stringent compliance, materials handling and disposal requirements. This work often includes investigative sleuthing into the past to uncover historical practices impacting the use of the land use.

Voluntary cleanup agreements governing the five AOI sites were negotiated with the DTSC in 1996 to help guide the Ames' investigative process. Now that these sites have been officially closed by the DTSC, NASA Ames can return these areas to unencumbered use and eliminate future expenditures for environmental actions, ultimately decreasing NASA's environmental liability, while increasing site sustainability and support of agency missions.

Congratulations to Code QE team manager Don Chuck and the support services contractor, ISSi team members Joe Lukas, Casey Fitzgerald and Brian Reddig.

BY APRIL NEILSON



This map shows the sites, AOI 5, 8, 10 and 11, which represent four clean up areas receiving certification for closure by the California Department of Toxic Substances Control.

The NASA Ames Water Quality Report is now available for review at: <http://q.arc.nasa.gov/qe/compl/dwater/AmesWaterQualityReportall.pdf>

Non-technical public lecture on asteroids to be held soon

On Wednesday, Oct. 3, 2007, at 7 p.m., astronomer David Morrison of Ames will give a non-technical, illustrated talk entitled 'Taking a Hit: Asteroid Impacts and Evolution,' as part of the Silicon Valley Astronomy Lectures.

Place: The Smithwick Theater at Foothill College
El Monte Road and Freeway 280,
Los Altos Hills

Cost: Free and open to the public
Parking is \$2

Call the series hot-line at (650) 949-7888 for more information and driving directions. No background in science will be required for this talk.

Asteroids have hit the Earth many times in the past, and they will continue to hit in the future, whether we are prepared or not. Collisions with our planet over 4.5 billion years have profoundly influenced the evolution of

life. In fact, were it not for the impact of a 15-km wide asteroid 65 million years ago, it is likely humanity would not be here.

Impacts are important for our future as well as our past. In the last two decades, we have learned not only how to evaluate the impact hazard but also (in principle) how to defend ourselves. The astronomers operating the Spaceguard Survey of Near Earth Asteroids have already reduced the risk of fatality from unknown asteroids by at least 75 percent. Unlike other natural hazards, we now have the capability of removing most of the impact risk within the next generation. However, the government still does not have a plan of action for when an asteroid is discovered heading our way or when an impact happens without any warning.

Morrison is one of the world's experts on the study of asteroid impacts. He is the senior scientist at the NASA Astrobiology Institute, where he participates in a variety of

research programs in the study of the living universe. Morrison is the author of more than 155 technical papers and has published a dozen books, including several widely used college textbooks in astronomy. He is the recipient of numerous awards for his scientific and his educational work, including the Sagan Medal of the American Astronomical Society for public communication.

Morrison was a founder of the multi-disciplinary field of astrobiology. Asteroid 2410 Morrison is named in his honor, but he assures us that it is not one of those that might hit the Earth.

The lecture is co-sponsored by NASA Ames, the Foothill College Astronomy Program, the SETI Institute and the Astronomical Society of the Pacific.

Past Silicon Valley Astronomy Lectures are now available in MP3 format at: <http://www.astrosociety.org/education/podcast/index.html>.

Ames Ongoing Monthly Events Calendar

Ames Amateur Radio Club, third Thursday of each month, 12 noon, N-T28 (across from N-255). POC: Michael Wright, KG6BFK, at ext. 4-6262.

Ames Ballroom Dance Club, Classes on Tuesdays. Beginning classes meet at 5:15 p.m. Higher-level class meets at 5:50 p.m. Held in Bldg. 944, the Rec. Center. POC: Helen Hwang at helen.hwang@nasa.gov, ext. 4-1368.

Ames Bicycling Club, Every 3rd Wednesday of the month. The meeting location is Building N-245 Auditorium, 12 noon - 1 p.m. Contact Julie Nottage at jnottage@mail.arc.nasa.gov, ext. 4-3711. By-laws of Ames Bicycling Club can be found at <http://zen.arc.nasa.gov>; the link is right under the picture.

Ames Bowling League, Homestead Lanes on Thursday nights at 6:20 p.m. Seeking substitute bowlers. Questions to sign up: Mike Liu at ext. 4-1132.

Ames Child Care Center Board of Directors Mtg, every other Monday in N-262/Rm 180 from 1-2:30 p.m. POC: Sally Miller, ext. 4-5411.

Ames Contractor Council Mtg, first Wednesday each month, 11 a.m., N-200, Committee Room. POC: Chris Johnson, ext. (650) 938-8017.

Ames Federal Employees Union (AFEU) Mtg, third Wednesday of ea. month, 12 p.m. to 1 p.m., Bldg. 221, Rm 104. Guests welcome. Info at: <http://www.afeu.org>. POC: Marianne Mosher, ext. 4-4055.

Ames Mac Support Group Mtg, third Tuesday of ea. month, 11:30 a.m. to 1 p.m., Bldg. N262, Rm 180. POC: Tony ext. 4-0340.

Ames Model Aircraft Club, flying radio-controlled aircraft at the north end of Parsons Ave. on weekend mornings. POC: Mark Sumich, ext. 4-6193.

Ames Sailing Club Mtg, second Thursday of ea. month (March through Nov), from 12 p.m. - 1 p.m. in Bldg. N-262, Rm 100. URL: <http://sail.arc.nasa.gov/>. POC: Becky Hooley, ext. 4-2399.

Environmental Forum, first Thursday every other month, 9 a.m. to 10 a.m., Bldg. 218/2nd floor training room. URL: <http://q/qe/events/EHSseries/> POC: Stacy St. Louis at ext. 4-6810.

The Hispanic Advisory Committee for Excellence (HACE) Mtg, first Thurs of month in N255 room 101C from 11:45 a.m. to 12:45 p.m. POC: Eric Kristich at ext. 4-5137 and Mark Leon at ext. 4-6498.

Jetstream Toastmasters, Mondays, 12 p.m. to 1 p.m., N-269/Rm.179. POC: Miwa Hayashi at ext. 4-1397, mhayashi@mail.arc.nasa.gov, Web: <http://jetstream.freetoasthost.com>

Native American Advisory Committee Mtg, fourth Tues each month, 12 noon to 1 p.m., Bldg. 19, Rm 1096. POC: Mike Liu at ext. 4-1132.

Ames emergency announcements

To hear the centerwide status recording, call (650) 604-9999 for information announcements and emergency instructions for Ames employees. You can also listen to 1700 KHz AM radio for the same information.

Safety Data

NASA-Ames Occupational Illness-Injury Data for Calendar Year-to-Date 2007 Jan. 1, 2007 – July 31, 2007

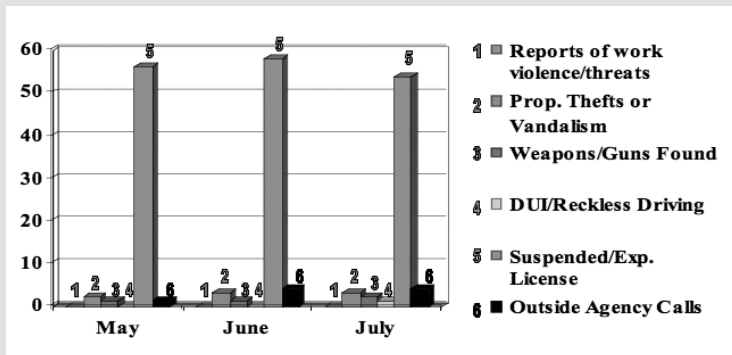
	Civil Servants	Contractors
First aid cases	6	11
Lost Workday cases	0	1
Recordable cases	0	2
Restricted duty days	0	0

Above data are as of July 31, 2007. May be subject to slight adjustment in the event of a new case or new information regarding an existing case.

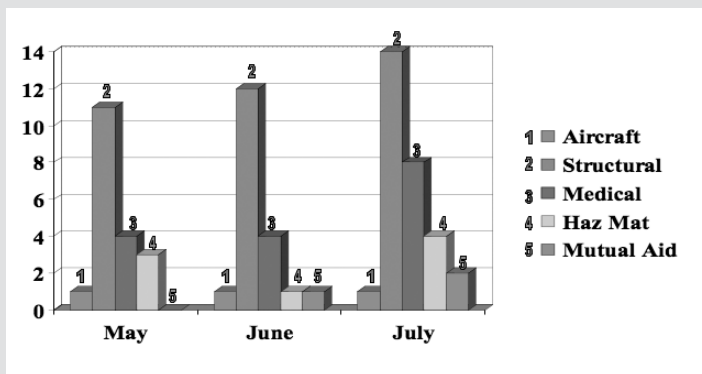
Protective Services monthly activity

A statistical summary of activities of the Protective Services Division's Security/Law Enforcement and Fire Protection Services units for the month of July 2007 is shown below.

Security/Law Enforcement Activity



Fire Protection Activity



Ames Classifieds

Ads for the next issue should be sent to astrogram@mail.arc.nasa.gov and must be resubmitted for each issue. Ads must involve personal needs or items; (no commercial/third-party ads) and will run on a space-available basis only. First-time ads are given priority. Ads must include home phone numbers; Ames extensions and email addresses will be accepted for carpool and lost and found ads only. Due to the volume of material received, we are unable to verify the accuracy of the statements made in the ads. Caveat emptor!

Miscellaneous

The Ames Cat Network needs help finding homes for cats trapped at Moffett. They range from feral to abandoned/lost pets. Tested, altered and inoculated. Call Iris at ext. 4-5824 if you or someone you know are interested in fostering or adopting a cat.

Kitchen table for sale, it comes with matching chairs. Pam (650) 344-0725.

1933 Philco console radio, model 18L. Good condition. \$400 or B/O. E-mail acsullivan@comcast.net

Twin day bed with trundle. White enamel frame with delicate flowers, 2 mattresses. 2 years old. Paid \$1,000, Asking \$500 or B/O. E-mail acsullivan@comcast.net

Craftsman lawn mower, 6.5hp, 21" push mower, looks and runs great, like new, \$75. Bill (408) 252-0386.

PM Challenge 2008 set!

The NASA PM Challenge 2008 will be held Feb. 26 - 27, 2008 in Daytona Beach, Fla. Visit the Web at <http://pmchallenge.gsfc.nasa.gov/index.htm> for details. Call for speakers: Download the Speaker Requirements Document at: <http://pmchallenge.gsfc.nasa.gov/Speaker2008.htm>. Speaker abstracts and biographies are due Sept. 14, 2007. PM Challenge is sponsored by the NASA Office of the Chief Engineer, the NASA Academy of Program/Project and Engineering Leadership (APPEL) and the NASA Office of Safety and Mission Assurance.

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<http://nacenter.arc.nasa.gov/lodging.html>

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Exchange Information

Information about products, services and opportunities provided to the employee and contractor community by the Ames Exchange Council. Visit the web site at: <http://exchange.arc.nasa.gov>

Beyond Galileo Gift Shop N-235 in the cafeteria, 8 a.m. to 2 p.m., ext. 4-6873

Don't forget to purchase your baby shower, birthday, holiday gifts at Ames' two gift shops!

Visitor Center Gift Shop N-943 M-F, 10 a.m. to 4 p.m., ext. 4-5412

NASA logo merchandise, souvenirs, toys, gifts and educational items.

Tickets, etc... N-943 outside the main gate, 10 a.m. to 3:30 p.m., ext. 4-5412 and Beyond Galileo, 8 a.m. to 1:30 p.m. ext. 4-6873

Mega Bites Cafeteria N-235, 6 a.m. to 2 p.m., ext. 4-5969/Catering ext. 4-2161

See daily menu at: <http://exchange.arc.nasa.gov>

Moffett Field Golf Club with 'Tee minus 1' Grill and Sports Bar. Call (650) 603-8026.

RV Lots Available Call to reserve a space at (650) 603-7100/01.

Civilian/Contractors, \$50/mo; military \$25/mo

NASA Lodge (N-19) 603-7100

Where to stay when you're too tired to drive home? What about the lodge?! Two types of rooms: Bldg. 19 (43 rooms), rate: \$55/night (\$5 ea ad'l adult); Bldg. 583 (150 rooms), rate: \$45/night (\$5 ea. ad'l adult)

Ames Swim Center (N-109) 603-8025

The pool is heated year round! The pool is currently available for lap swim, pool parties and special events. POC -Chana Langley, Pool Manager (650) 603-8025. Memberships: single memberships: \$40/yr. Family memberships: \$60/yr. After purchasing a membership, there is an entrance fee: daily entrance fee - \$3/day or lap pass fee - \$40 for 20 uses. Platinum membership - \$360/yr. (no daily fee). Special events: include military training, swim team events, kayak role practice, etc. The cost for special events is \$50/hr.

Vacation Opportunities

Lake Tahoe-Squaw Valley Townhse, 3bd/2ba-equipped, Balcony view, hiking, biking, golf, river rafting, tennis, ice skating, and more. Summer rates. Call (650) 968-4155, DBMcKellar@aol.com

Bass Lake vacation rental, 4 mls south of Yosemite. 3bd/1.5 ba, TV, VCR, MW, frplc, BBQ, priv. boat dock. Sleeps 8. \$1,050/wk. Call (559) 642-3600 or (650) 390-9668.

Big Sur vacation rental, secluded 4bd/2ba house in canyon setting. Fully eqpd kitchen. Access to priv. beach. Tub in patio gdn. Halfway between Carmel and Big Sur. \$175/night for 2; \$225 for 4 and \$250 for more, plus \$150 cleaning dep. Call (650) 328-4427.

Pine Mountain Lake vacation home. Access to golf, tennis, lake, swimming, horseback riding, walk to beach. Three bedrooms/sleeps 10. \$100/night. Call (408) 799-4052 or (831) 623-4054.

Incline Village, Forest Pines, Lake Tahoe condo, 3 bdrms/2 ba, sleeps 8, fireplace, TVs/VCR/DVD, stereo w/CD player, microwv, W/D, jacuzzi, sauna, outdoor pool. Walk to lake. Close to ski areas. Visit web site for pictures: <http://www.ACruiseStore.com> \$135/night spring and fall, \$173/night summer and winter (holidays higher) plus \$125 cleaning fee and 12 percent Nevada room tax. Charlie (650) 743-8990.

New York, 5th Ave. One fully furnished bedroom in 24 hour security bldg. overlooking Washington Square Park, \$2,000/wk or \$3,000/mo. negotiable. Call (650) 349-0238.

Paris/France: Fully furnished studio, 5th Arr, Latin Quarter, Notre Dame and Lie-St. Louis., \$1,400/wk. negotiable. Call (650) 349-0238.

Santa Cruz townhouse, 2 bedrooms plus study, 2 baths, decks, totally furnished, 3 blocks from beach, available July, August, September; \$1,600 per month. Call (831) 423-5777 (H) or (831) 277-8476 (C).

Lake Tahoe cabin rental in Agate Bay, North Shore. 4bd/3ba tri-level, AEK, cable TVs, fireplace, BBQ, deck, sleeps 10. Closest skiing is Northstar, Alpine and Squaw. Rates are \$375 a weekend, \$1,000 a week. Call (408) 867-4656.

Florida west coast vacation in St. Petersburg, beautiful 2bd/2ba condo, fully equipped kitchen and furnished, sunset views, 1/4 mile from St. Pete Beach, monthly or 2 week minimum rentals only. Call (703) 299-8889 or e-mail: jdgoehler@aol.com

Monterey Bay vacation rental at Pajaro Dunes, 20 miles south of Santa Cruz, 3bd/2ba beach house with distinctive architecture. Beautiful ocean and valley views, only 150 ft from the beach, first-class tennis courts. \$700/wkend, \$2,100/wk including cleaning by the maid service when you depart. Call (408) 252-7260.

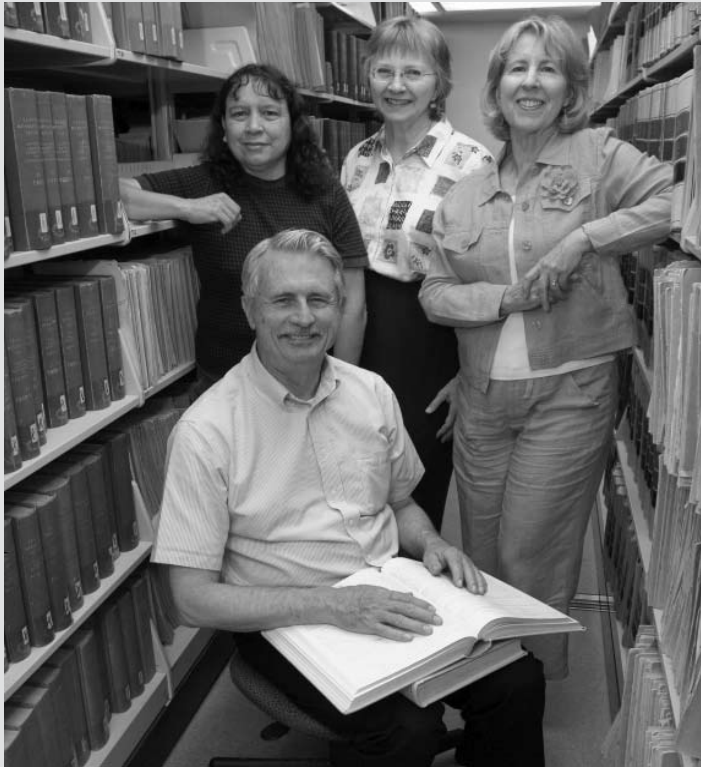
South Lake Tahoe large cabin surrounded by protected forest, 8 miles from Stateline Sleeps 12 comfortably, 4 bd/3ba. Hot tub/pool table/65" TV Matt (408) 482-5286

South Lake Tahoe cozy home backs up to large open meadow, 1 mile from Heavenly Valley. Sleeps 11, 3 bd/2.5 ba. Large deck with hot tub. Matt (408) 482-5286.

Astrogram deadlines

Please submit articles, calendar and classified advertisements to astrogram@mail.arc.nasa.gov no later than the 10th of each month. If this falls on a weekend or holiday, then the following business day becomes the deadline. For Astrogram questions, contact Astrid Olson at the aforementioned e-mail address or ext. 4-3347.

The NASA Ames Library provides variety of services



NASA photo by Dominic Hart

Standing, left to right: Ames librarians Kathy Ponce, Marie Schneider and Beverly McLeod. Seated is Dan Pappas.

Do you need help using one of the NASA Ames Library's resources or getting an answer to a question? Do you need an article or book not found in the library's collection? Do you need assistance in finding an old or obscure report? The Ames librarians can help you.

During recent funding realities, the goal has been to make as many of the library's journals available electronically as possible. Publisher price increases plus inflation have made this task a challenging one. However, the library is able to obtain most articles or documents needed by researchers through interlibrary loan at no additional cost.

For more information, come visit the Ames Technical Library, in Building N-202 in the basement and the Life Sciences Library in Building N-239 in Room 53.

Take a look at all the library has to offer. On the Web at <http://ameslib.arc.nasa.gov>, or call ext. 4-6325 or e-mail: library@mail.arc.nasa.gov

BY DAN PAPPAS



National Aeronautics and Space Administration

Ames Research Center
Moffett Field, CA 94035-1000



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Astrogram Web site: <http://www.nasa.gov/centers/ames/astrogram/2007/07astrograms.html>



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