

The Ames Astrogram

Communication for the Information Technology Age

July 2002

Disabled students 'wow' Ames' Center Director

A group of disabled students recently presented some space-related computer artwork they had created in a ceremony at Ames. When Center Director Dr. Henry McDonald received the art, he opened it up, and said, "Wow!" according to Tom Bakey,

they can be easily corrected or erased to begin again," according to the CADartists web page at: <http://www.cadartists.org>

During their Ames tour, the students visited Hangar 1. "In the cafeteria, they were presented with space ice cream," Bakey said.

"The thing that was nice about the tour was they kept it moving. They had fun looking at the planes, too."

The highlight of the tour, though, Bakey said, was the fire station. The students wore hats, given to them by firefighters. "The firemen lit two pots on the runways. They had the fire engines screaming down the runway to put out the fires," Bakey said.

CADartists includes a group of business people who volunteer time and materials to help disabled children and young adults. Last summer, the stu-

dents also visited the Microsoft campus in Mountain View, and they created artwork of the facilities on their computers. Microsoft



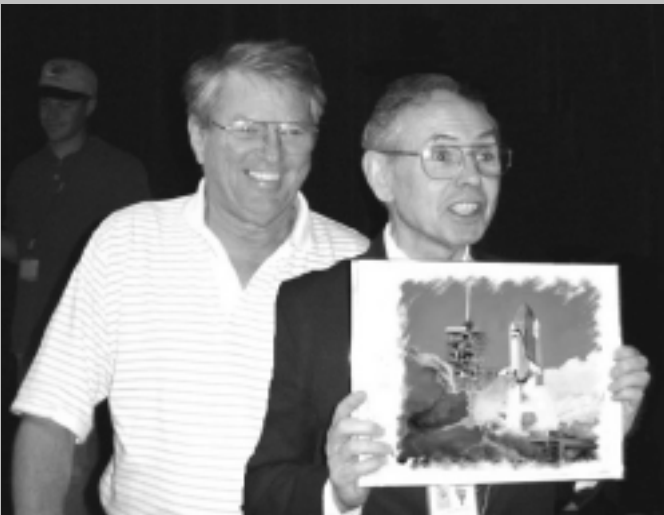
Chairman Bill Gates of Microsoft signed their artwork and thanked them.

Earlier, when former President Clinton and Vice President Gore visited Sunnyvale, the class created artwork based on photographs taken during the visit. Some of the artwork was put on display in the White House, and Vice President Gore called Bakey to congratulate him.

Students have fun creating art when they

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photo credit CADartists



'Space Shuttle' art, created by disabled students, is proudly displayed by Ames Center Director Dr. Henry McDonald. Tom Bakey, the group founder, is shown with McDonald at left.

a retired entrepreneur who works with the students. The two images show space shuttle and an astronaut doing a 'space walk.'

"Most people think they'll see stick figures, or something like that, before they actually see the art," said Bakey.

"The students' latest project was to do artwork about the space shuttle -- drawing the shuttle, an astronaut, and also what the astronaut might see from the flight deck," said Ames retiree Dick Kurkowski who arranged a tour of the center for the students, aged 10 to 25 years.

Kurkowski's neighbor, Bakey, started helping disabled persons learn art some 10 years ago. "I saw a whole bunch of disabled people one time, and I said, 'Why don't we teach them to draw using computers?'" His efforts eventually became CADartists, Inc., a non-profit organization based in San José, that helps disabled students of all ages use the power of computers to express themselves with art. He retired 15 years ago after he started a number of Silicon Valley companies.

The original artwork produced by the students is made solely with computers, a mouse and software. No paint brushes or paint are used, but still the resulting pictures look like traditional art.

"The special program eliminates the frustration many of these students would have in a traditional art class. If mistakes are made,

NASA chief of staff visits Ames



photo by Tom Trower

NASA chief of staff and White House liaison Courtney Stadd (right) is shown with Ames' Executive Assistant Jack Boyd during a visit to Ames Research Center on July 1.

Code I employees honored for 'technology infusion'

More than 100 employees were honored recently by the Information Science and Technology Directorate (Code I) for their outstanding work and for infusing technology into key NASA programs and projects.

During a recent 'all hands' and internal awards ceremony held before a capacity audience assembled in the main auditorium, Code I Director Dr. Steven Zornetzer delivered a 'state of the directorate' and highlighted numerous accomplishments of Code I during the past year.

Zornetzer lauded the Directorate's major advances in high-end computing and computing architectures, and the technology insertion into the Mars Exploration Rovers (MER) project for the Mars 2003 mission. He also praised the major cost and schedule savings to the International Space Station that resulted from the directorate's work with on-board communications and fault detection. He further cited Code I's significant impact on FAA air traffic control procedures and air line safety reporting effectiveness.

"The Information Sciences and Technology Directorate continues to distinguish itself within NASA as a major contributor to both new and innovative research in IT as well as to NASA missions and programs," Zornetzer said. "It is our goal to demonstrate unequivocally that NASA's return on investment for the research and technology development done in Code I is the highest in the agency."

Zornetzer opened the ceremony with the announcement of a new 'Technology Infusion' award. The new award is given in recognition of outstanding work that has resulted in the infusion of technology into one or more NASA programs, projects or flight missions. In order to be eligible for the award, Code I employees must have utilized their expertise and or technology to provide a solution to a problem, provide a new capability, substantially increase the efficiency of a process or activity, or otherwise provide significant value to a NASA program, project or other major activity.

Technology Infusion award recipients included: Nicola Muscettola, John Schreinder, Jay Trimble and Kanna Rajan of Code IC for the infusion of new technology into the Jet Propulsion Laboratory/Mars Exploration Rover (JPL/MER) program; Dr. Irving Statler of Code IH for the infusion of the Performance Data Analysis and Reporting System (PDARS) technologies into the Federal Aviation Administration (FAA) Air Traffic Management System; and Dr. Stuart Rogers of Code IN for the infusion of "OVERSET" technology (a technique for solving computa-

tional equations), into the design of Boeing's Sonic Cruiser.

Also honored during the ceremony were

tributions and leadership, and the many children and young adults who have been enriched by her numerous community out-

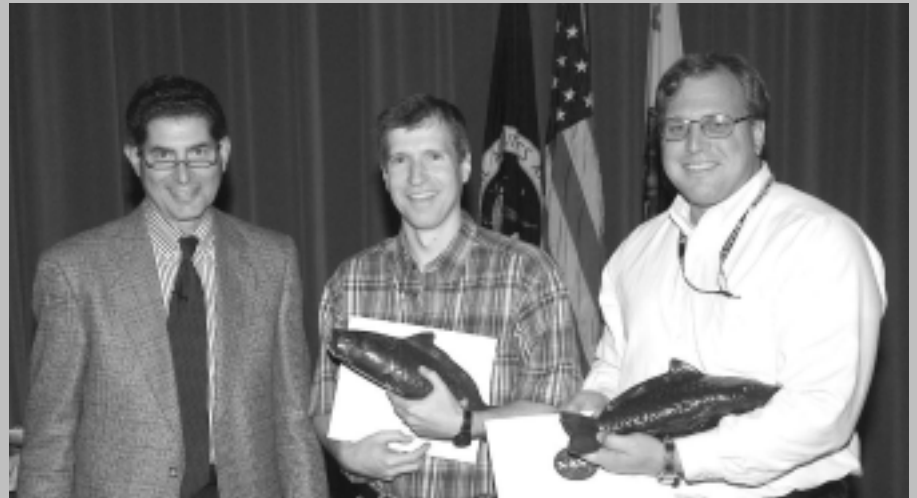


photo by Tom Trower

Steven Zornetzer, left, Director of Information Sciences and Technology at Ames, presents the first Technology Infusion awards to the Mars Exploration Rover (MER) team members, Jay Trimble (center), John Schreiner (right), Kanna Rajan and Nicola Muscettola (not pictured). The award was given in recognition of the team's outstanding work resulting in the infusion of new technology into the JPL/MER program.

recipients of the 2002 NASA Honor Awards. Although nominations are submitted by each field center, NASA Headquarters makes the final selection. The awards were presented during the annual honor awards ceremony on July 10.

Dr. Karen Gundy-Burlet of Code IC received the Exceptional Service Medal. The award was presented in recognition of her inspiration to NASA senior management, her managers and colleagues at Ames and the aerospace community for her technical con-

reach activities.

Kanna Rajan of Code IC was honored with the Public Service Medal, and the 1024 processor single system image Origin 3000 supercomputer project team of Code IN received a group achievement award.

Also recognized during the ceremony were recipients of the 2001 NASA Honor awards, the 2001 Ames Honor awards, Contractor excellence awards, and numerous other miscellaneous awards.

BY MIKE MEWHINNEY ▲

Disabled students 'wow' Ames center director

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meet once a week in a classroom at KLA-Tencor, Inc., San Jose, equipped with personal computers. The students select the width of their 'brush stroke' and if their artwork will look like an oil or watercolor painting. CADartists have earned many awards, and their artwork is on display in many public and commercial buildings, as well as in homes across the country.

"For their efforts, each week a student is selected to be 'Artist of the Week.' The student receives a special award, like a t-shirt, depicting the artwork. All students get their pictures framed," according to the CADartists web site.

BY JOHN BLUCK ▲

Astrogram deadlines

All Ames employees are invited to submit articles relating to Ames projects and activities for publication in the *Astrogram*. When submitting stories or ads for publication, submit your material, along with any questions, in MS word by e-mail to: astrogram@mail.arc.nasa.gov on or before the deadline.

Deadline:	Publication:
July 31	Aug. 2002
Aug. 28	Sept. 2002
Sept. 25	Oct. 2002
Oct. 30	Nov. 2002

Ames sets continuous improvement goals for 2002

NASA Ames received OSHA's Voluntary Protection Program (VPP) Star award in a ceremony held in May. As part of the continuing effort to make safety a core value, the center's eight directorates teamed together to create 12 goals for continuous improvement for 2002. The 2002 goals can be found on the VPP web site at <http://vpp.arc.nasa.gov/> and include:

1. Employee recognition and participation. This includes developing, documenting, implementing and reporting on ways to measure and improve the effectiveness of the following employee participation programs: Ames safety accountability program/employee participation in monthly inspections; safety suggestion program, and Ames safety committees and task forces.

2. Health and safety program self-assessments. Develop and implement a center-wide self-assessment program to measure the effectiveness and determine the status of the center's safety and health programs, to include a survey of each directorate once per year; inspect directorate facilities; review directorate implementation of the safety programs; and survey one third of directorate employees using the PEP survey.

3. Ames Safety Accountability Program (ASAP) metrics. This entails monitoring ASAP metrics and participation across all four metrics: supervisor inspections, employee training, hazard correction, and supervisor training.

4. Annual Performance Evaluation Profile (PEP) Survey. Implement the PEP survey for 33 percent of the center each year and assist each directorate in reviewing and addressing survey questions whose score is below the PEP low score threshold.

5. Contractor safety. Develop and implement effective methods to improve contract safety by recognizing contractors who demonstrate exemplary safety and health program performance. Develop corrective action plans for contractors whose injury rates are above the industry average.

6. Machine shop safety. Ensure that all operational machine tools on the center are adequately safeguarded.

7. Chemical management systems. Improve the systems for the acquisition, use, control, storage and management of chemicals at Ames.

8. Ergonomics. Improve employee awareness of methods they can use to recognize and prevent ergonomic injuries. A subgoal is that 95 percent of all civil service staff be trained in basic recognition and prevention of work related ergonomic injuries within three years. Make ergonomic training available to contractor employees and encourage them to participate.

9. X-files/construction of facilities (C of F). Ensure that 100 percent of the X files are budgeted and scheduled for resolution and that there are effective means for employees to become informed of hazard abatement priorities and status.

10. Safety office customer service. Improve safety division effectiveness and en-

hance customer support relationships between the safety division and line organizations.

11. Injury and illness recordkeeping and reporting. Implement the new OSHA 300 log reporting system as specified by OSHA

regulations and NASA policy.

12. Coordination with OSHA. Ensure that the annual report to OSHA is submitted as required to maintain Ames VPP Star certification.

BY SHELLEEN LOMAS ▲

Ames' volunteers bring 'discovery' to Collins elementary school

With light and amazement in their eyes, sixth-grade students watched the 'magic' of moving robots and the international space station as Terry Grant and Glen Sasaki, two Ames scientists, unveiled the reality of the unseen.

It was 'discovery day' at Collins elementary school in Cupertino, and several Ames scientists, engineers and public affairs officers went to talk and inspire the students about science, engineering and technology. Such outreach is important to people at Ames, including one of the hosts of the

the 'C' computer language to do such things as moving forward and turning. They also displayed a more complex robot, which has sensors to determine obstacles. The students tested the robot's sensors by putting their hands in front of it, and the robot always sensed the obstacle and moved away.

Dino, an Ames public affairs officer, told students that "NASA needs smart people like you to give robots directions, because without people, robots are nothing." Grant, Dino and Davis also talked about the significance of robots for the exploration of space and planetary bodies such as the moon and Mars.

To encourage the kids even more, Grant showed a movie about students' involvement in robotics through Botball competitions, where children from elementary school to high school construct and program robots to knock balls off a platform. The first robots to do so bring victory to their 'parent' team. There was a lot of excitement and interest among the students in Botball.

The students also had an opportunity to pretend to be robots themselves and set the real robots in motion. Robots moved around the table so vividly as though they, too,

wanted to inspire the students to get involved in robotics and compute, design and operate them.

The other presenter, Sasaki, who is a mechanical engineer in the mechanical systems and materials engineering branch, spoke to students about the various challenges and wonders of living in space. He talked about why people go into space, how people go there, and what has already been done by NASA. He told them about the importance of the exploration of space to see what is out there, setting high goals, and tackling the hardest problems. He showed several slides about the International Space Station and said that "These are just like Lego parts put

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photo by Jonas Dino

Terry Grant shows students how to program and operate robots during his presentation at Collins elementary school.

event, Jerry Wang of the engineering evaluation laboratory, who was critical to the success of the event. Wang invited and coordinated several volunteers at the event, including those from Ames. Among the speakers from Ames were Grant, Sasaki, Luke Sing, Dr. Paul Davis, Dr. Tom Roellig, David Leskovsky, Jonas Dino and Braxton Davis.

Terry Grant, a computer scientist in the computational sciences division, and his student, Braxton Davis, work on robotics and computer programming. "You can construct these robots and even more sophisticated ones yourselves," Grant said as the students watched a small robot move across a table and then turn. Grant and Davis told the students how they program their robots in

Teachers' creativity soars at NASA science workshop

During a recent 10-day workshop jam-packed with activities, 25 teachers heard some two dozen Ames presentations and

During the two weeks, the teachers learned about cutting-edge NASA projects, visited NASA facilities, attended seminars by NASA researchers, engineers and technicians, and studied topics ranging from aeronautics to interplanetary exploration.

"I plan to use these resources to give my students an appreciation and awareness of science and math applications in aeronautics and space careers," said Steven Brennecke, a high school science and mathematics teacher at Big Bend High School in Terlingua, Texas.

After an initial

laboratory, the 20-G Centrifuge, the Moffett flight control tower, the Educator Resource Center, the FutureFlight Central air tower/airport simulator and other facilities.

Components of the workshop were devoted to professional collaboration, in which teachers shared ideas and strategies for translating their experiences into valuable classroom activities and materials.

"The teachers are busy from morning until night," said Clausen. The teachers stayed at a fraternity house at Stanford University in Stanford. "They even have activities at night."

Some subjects covered included human physiological changes in zero G, bed rest studies, hydroponics/regenerative life support, considerations for long-term space flight, the electromagnetic spectrum, the Galileo mission to Jupiter, exploration of Mars, mission mathematics, PASCAL: a Mars climate network mission, NASA flight testing, astrobiology, biological and physical research and the search for Earth-like planets.

The teachers also made field trips to the Monterey Bay Aquarium, and the Exploritorium in San Francisco.

The Ames program included educators from Arizona, California, Colorado, Kansas, Hawaii, Missouri, Montana, Oklahoma, Oregon, Pennsylvania, Texas, Utah, Washington and Wyoming.

BY JOHN BLUCK ▲



photo by Tom Trower

Teachers participating in the recent NASA education workshop (NEW) at Ames pose outside the Visitor Center.

made field trips to the University of California, Berkeley, the Lick Observatory at Mt. Hamilton and many points in between. The teachers from 14 states attended the workshop at Ames from June 23 through July 6.

This year, nearly 250 educators participated in similar workshops at ten NASA centers across the nation. The National Science Teachers' Association partnered with NASA in this teacher workshop program.

"The NASA Education Workshop (NEW) is the best-kept secret in education," said JoAnn Arthur, a mathematics teacher at Richey High School in Richey, Mont. "All teachers should fight for an opportunity to attend." Arthur successfully competed with hundreds of other educators for one of 25 spots in the workshop at Ames.

"NASA is about inspiring the next generation of explorers," said Donald James, chief of the NASA Ames Education Branch. "These educators are our partners on the front lines."

"I have seen various technologies not available in Montana. I hope to be able to bring back content to be implemented in my classroom and awareness of what scientists do at NASA," said Frank Hallett, a physics and chemistry teacher at Fergus High School in Lewistown, Mont. "The giant wind tunnels used for the development of aviation advancement were most impressive."

"I also was impressed with NASA's commitment and dedication to education," he added. "They are making a tremendous effort to help teachers understand the technology of the future. I want to gain knowledge and information not available in textbooks."

"The NASA education workshop program is a unique combination of scientific and technological information and hands-on experience," said Ames educational specialist Tom Clausen, workshop organizer.

windshield tour of Ames, teachers saw the 9 by 7 foot test section of the Unitary Plan wind tunnels, the Ames Aerospace Encounter (an educational facility for students), the arc-jet

Tower simulator provides new view for safer space shuttle landings

A state-of-the-art simulator at Ames is helping design a new control tower that will make space shuttle landings safer and more efficient.

In a series of simulations at NASA Ames' FutureFlight Central, engineers from NASA's Kennedy Space Center (KSC) are modeling a world-class control tower for the space shuttle landing facility. Ground-breaking for the new tower is slated for mid-Fall 2002 with work to be finished in 2003.

"The purpose of this simulation was to evaluate several interior tower cab configurations as well as optimizing tower height before beginning expensive construction," said Ken Christensen, FutureFlight Central project manager.

During the simulation, KSC engineers evaluated several prospective control tower heights and orientations under varying visibility and weather conditions. The new tower design will allow greater visibility and safety during space shuttle landings and shuttle training aircraft (STA) flight operations.

"To conduct a true assessment, it is important to be able to closely replicate the workplace--here lies the strength of this simulator," said Dr. Dawn Elliott, KSC principal investigator.

FutureFlight Central displayed very realistic, detailed and high-resolution day and night scenes, including the KSC skyline, run-

way and topography, thus providing a great resource for the simulation of the new tower. The simulation also evaluated the interior of the tower using human factors principles to determine the most efficient layout. FutureFlight Central, the world's premier air traffic control tower simulator for airport operations and planning, includes a 360-degree high-fidelity visual simulation configurable to any airport in the world.

"FutureFlight Central has a unique NASA capability. It will optimize the working environment for our people and offer future safety training opportunities. Spaceport planners, using this tool, can evaluate future technology impacts, requirements and options well before decision time. We are fortunate to have this facility available to us as we start our new tower," said Ed Taff, NASA shuttle launch facility operations manager.

The shuttle landing facility, first opened for flights in 1976, was specifically designed for landing NASA's space shuttle orbiters. Its paved runway is 15,000 feet long by 300 feet wide, exceeding the length of the longest paved runways in the United States.

More information about FutureFlight Central can be found at: <http://ffc.arc.nasa.gov/> More information about the Kennedy's Shuttle Landing Facility can be found at: <http://www-pao.ksc.nasa.gov/kscpao/nasafact/landingfac.htm>

Ames' science teams win Space Act awards

The Space Act award program, which is coordinated through the Ames Commercial Technology Office (Code DK), is designed to provide official recognition of, and grant equitable monetary awards for, those inventions and scientific and technical contributions that have helped to achieve NASA's aeronautical, commercialization and space goals. It is also intended to stimulate and encourage the creation and reporting of similar contributions in the future. To accomplish these objectives, the Inventions and Contributions Board funded by NASA Headquarters is authorized to recommend the granting of monetary awards.

NASA Ames has two teams that have recently received such Space Act Award recognition. Over \$20,000 was awarded to the teams.

The first space act award was for the 'Comprehensive Toolset for Model-Based Health Monitoring and Diagnostics,' which is a software toolset for designing and developing diagnostic applications such as those required in integrated vehicle health management systems. Three software tools that support systems engineering, systems design and testability, automated diagnostics and troubleshooting, and system autonomy have been developed during a seven-year collaboration between researchers at NASA Ames and Qualtech Systems, Inc. The tools are: 1) TEAMSTM 5.0, the testability engineering and maintenance system, a tool used in static design/analysis phases of complex systems; 2) TEAMS-RTTM, a real-time diagnostic engine that provides diagnostic functionality for integrated vehicle health systems on-board a flight vehicle or embedded into a run-time architecture; and 3) RDSTM, the remote diagnosis server, an application that can support multiple simultaneous diagnostic sessions from a variety of remote systems. Programs that will benefit from this technology include commercial and military aviation, advanced transportation systems, the shuttle, the international space station, robotic and autonomous explorers.

Those honored with this award included: Rick Alena, Jim Cockrell, Bill Hindson, Ann Patterson-Hine, Dwight Sanderfer and Julie Schonfeld, all of Ames.

Kevin Cavanaugh, Somnath Deb, Charles Domagala, Sudipto Ghoshal, Venkata Malepati, Venkatesulu Malepati, Krishna Pattipati, and Roshan Shrestha of Qualtech were also recognized.

The second space act award was for the 'Method and System for an Automated Tool for En Route Traffic Controllers.' Direct-To is based on the trajectory analysis methodology and software resident in the Center/TRACON Automation System (CTAS). In today's air traffic control system, aircraft fly on fixed airways and air traffic controllers maintain aircraft separation by visual monitoring of radar position, heading and altitude information. The fixed airway structure and the lack of automation for radar controllers results in inefficient routings and air traffic control operations. The Direct-To tool

continuously and automatically analyzes all aircraft routings to identify those aircraft that can save time by flying direct to a downstream fix on their route of flight. Direct-To displays route advisories, critical aircraft separation information and other information that helps controllers determine when direct routes are possible given current traffic conditions allowing controllers to quickly assess route and altitude options without being distracted from their primary responsibility for safe aircraft separation.

Diagnostic software being developed to keep launch vehicles healthy

As launch vehicles become increasingly complex, ensuring crew safety and mission success becomes more difficult, but integrated vehicle health management tools may provide some solutions.

Identifying minor system errors before they become critical is one key to developing safer, more reliable and less expensive space vehicles. As part of NASA's Space Launch Initiative (SLI), Honeywell and NASA Ames recently conducted a milestone demonstration that showed separate technologies could be integrated into one cohesive package to handle realistic problem scenarios that might be encountered in space.

"The Space Launch Initiative develops critical technologies, but it also demonstrates the value of those technologies in a relevant environment. Early demonstrations such as this are part of making sure we are on the right track," said William Kahle, IVHM project manager at NASA Ames.

To ensure realism, engineers selected key component technologies and developed realistic scenarios that would yield relevant and significant results for second-generation reusable launch vehicles (RLVs). For the demonstration, engineers looked at many types of failures, including key subsystem and cross-subsystem 'sympathetic' failures. 'Sympathetic' failures occur when problems in one system affect the performance in another system. In one scenario, IVHM systems were able to determine that an indicated pressure-system failure in a propulsion subsystem actually was caused by a failure in a power system control module.

"This is a realistic scenario that occurs often in complex systems such as RLVs," said Dr. Ann Patterson-Hine of Ames. "It demonstrates the need for a vehicle-wide health management system."

In order to handle these types of failures and to build system flexibility, the engineers used a variety of techniques. "We recognized early on that the health management requirements of RLVs demand a range of diagnostic approaches from model-based to expert system technologies," said Ronald Quinn, principal investigator for Honeywell.

NASA Ames leads the IVHM effort for SLI, and has also developed other diagnostic and simulation tools. Livingstone, a model-based reasoner, was selected to emulate the propulsion health management system. TEAMS

Those honored with this award included: Danny Chiu, Heinz Erzberger, David McNally, and Philippe Stassart of Ames.

To obtain more information about the Space Act Award program, visit: <http://icb.nasa.gov> or contact the Ames Space Act Award Liaison officer Betsy Robinson (Code DK) at: brobinson@mail.arc.nasa.gov. All Space Act awards are coordinated through the Ames Commercial Technology Office.

BY BETSY ROBINSON ▲

(Testability Engineering and Maintenance System), a product of Ames' Small Business Innovative Research program, provided model-based reasoning for the power system and provided vehicle-level diagnoses. Spacecraft control language was used to develop expert systems and the architectural infrastructure that integrated these technologies. These tools cover a wide range of capabilities necessary to satisfy the health management needs for RLVs.

The Space Launch Initiative is NASA's technology research and development program aimed at dramatically increasing safety and reliability and reducing the cost of a second-generation reusable launch vehicle. All NASA field centers and the Air Force Research Laboratory are actively participating in the Space Launch Initiative and are vital to its success.

Information about Integrated Vehicle Health Management and NASA's Space Launch Initiative can be found on the Internet at: <http://www.slinews.com> and <http://www.spacetransportation.com>. Information about Honeywell can be found on the Internet at: <http://www.honeywell.com>.

BY JONAS DINO ▲

Ames' Sid Sun honored by AIAA

The American Institute of Aeronautics and Astronautics (AIAA), San Francisco section, recently presented an award to Sid Sun, assistant chief of Ames' Life Sciences Division (Code SL), in recognition of his work in leading the Galileo memorial scholarship program from 1998 to 2000. The scholarship was set up by the AIAA and NASA Ames to honor the people who died on the Galileo I aircraft that crashed in 1973. Each year, the scholarship is awarded to a handful of high school seniors in the San Francisco Bay Area who will major in math, science or engineering in college.

NASA, Carnegie Mellon to open summer robotics camp

Thirty Bay Area high school students entering their senior year this fall are taking part in a new robotics summer course. The unique program is being offered by Carnegie Mellon University at its west coast campus, in collaboration with NASA Ames and the National Hispanic University, San José.

Students in the 'Robotic Autonomy' program will build, program and operate their personal vision-based, mobile robots as they learn about the electronics, mechanics and computer science of robotic systems. The college-level class will culminate with an autonomous robot contest in August. Then, graduates of the program will take their robots home for more experimentation. The robots are worth more than \$1,000 each.

"We are delighted to host the Robotic Autonomy program with Carnegie Mellon University, a renowned leader in computing and robotic technologies," said NASA Ames Director Dr. Henry McDonald. "This is an excellent opportunity to provide world-class instruction in robotics to these students, while furthering NASA Administrator Sean O'Keefe's goal of inspiring our youth. I am particularly gratified that more than half of this first class is comprised of minority students sponsored by the National Hispanic University."

The seven-week robotic autonomy course is being held from July 1 to Aug. 16 in Bldg. 17 at the NASA Research Park. The class is taught by Illah Nourbakhsh, assistant professor of robotics at Carnegie Mellon's Robotics Institute in Pittsburgh. Nourbakhsh is co-founder of the institute's 'Toy Robots' initiative and does research in electric wheelchair sensing devices, robot learning, theoretical robot architecture, believable robot personality, visual navigation and robot locomotion.

"Our students will be building sophisticated, vision-based mobile robots during the first two weeks of the course, and programming them to solve increasingly challenging problems throughout the summer," Nourbakhsh said. "Because these robots have vision capability, they will be able to move quickly, both indoors and out, even over and around obstacles."

"At the end of the program, each student will take his or her robot home to keep. The robots will provide them with an unprecedented opportunity to continue to learn about and experiment with robotics," he added. Nourbakhsh noted that every student graduating from the robotic autonomy course will receive 12 units of Carnegie Mellon college credit, transferable to any university of their choosing after they complete their high school studies.

Nineteen of the robotics camp's class of 30 students are Latino high school juniors and seniors from the San José area, including the new Latino College Preparatory Academy located on the National Hispanic Uni-

versity campus. Since May, the students have prepared for the camp by attending classes in mathematics for robotics, C++ and JAVA at NHU from professors William Cruz, Hugo Comparan and Rodolfo Scarpati. This provides them with the necessary educational skills to build the robots.

"The goal is to encourage Latino students to pursue careers in science and engineering," said Vice Provost for Academic Affairs Dr. Josephine Hawkins. "According to the National Science Board, the future of the nation depends on a strong, competitive science and engineering workforce."

The Robotic Autonomy course represents Carnegie Mellon's first outreach program on its west coast campus at the NASA Research Park. Courses leading to master's degrees in software engineering and e-business will begin in the fall.

"We are excited to begin this joint venture with NASA for community outreach in the Silicon Valley," said Raj Reddy, Carnegie Mellon's Simon university professor of computer science and robotics and director of the west coast campus. "This program exemplifies our commitment to an active, stimulating and challenging educational process."

The west coast campus is a branch of Carnegie Mellon University, which is located

in Pittsburgh, and known as one of the world's premier institutions for information technology research and education. It also is known for its strengths in engineering, fine arts, business, public policy and computer science. Carnegie Mellon has been working to develop a presence in Silicon Valley since 1999 and it has been collaborating with Ames officials as they develop the NASA Research Park at Moffett Field.

In other work with NASA Ames, Carnegie Mellon researchers have developed high-profile robots such as Dante, which explored the interior of a volcano, and Nomad, which discovered meteorites in Antarctica. In addition, Carnegie Mellon researchers also have worked with Ames researchers on projects such as formal methods for verifying digital circuitry, vision and navigation, machine learning and data mining.

For more information about robotic autonomy, check the web site at: www.cs.cmu.edu/~rasc For more information about Carnegie Mellon West, see: <http://west.cs.cmu.edu> In addition, for more information about the National Hispanic University, visit: www.nhu.edu. For information about NASA Research Park, check: <http://researchpark.arc.nasa.gov>

BY MICHAEL MEWHINNEY 

Added leadership roles in IFMP

In a continuing effort to ensure the successful implementation of the Integrated Financial Management Program (IFMP), Administer O'Keefe has created two new roles in the IFM Program. With the addition of these new roles, the IFM Program gains two highly experienced leaders who will be responsible for key aspects of the IFM Program throughout the Agency. They are Patrick Ciganer and Paul Strassmann.

Ciganer has been appointed IFM Program Executive Officer (PEO) with responsibility for "everything IFM", including center implementation and IT infrastructure. In the May issue of the IFMP Informer newsletter, Ciganer said, "One of my main responsibilities is to remove IFMP roadblocks." He is also committed to identifying any possible obstacles at each center and working on solutions to problems that may arise during the course of IFM implementation agency wide. Ciganer has traveled to each of the centers and has held meetings with management to discuss issues, concerns, and to work out solutions to potential problems before they arise. By holding meetings with each of the center's leadership, Ciganer has created strong relationships with management that will facilitate the communication process between the IFM Program Office and the centers.

Strassmann comes to NASA as the new

Special Assistant for Information Technology. Although he has two objectives to work on immediately, his primary focus is to "eliminate the IT infrastructure risks for the IFM Program." As IFM continues to move forward with the scheduled project module implementation, the need to assess, review, analyze, and respond to the significant infrastructure issues that surface has become more crucial. In the June issue of the Informer, Strassmann states that, "my number one objective is to set up a network control center at MSFC that will make it possible for the systems managers to monitor Core Financial operation all the way down to the individual desktop keyboards--something they cannot do at this point." He defines his second objective as ensuring that NASA's WANs and LANs function reliably.

Both Ciganer and Strassmann bring significant professional experience and expertise with them as they join the Agency's leadership team headed by Mike Mann to place an additional emphasis on the progress of IFMP.

For more information and updates on IFMP you can go to the agency's web site: <http://www.ifmp.nasa.gov>. The IFMP Informer newsletter is a link on the site's home page.

BY PAM MCGEE 

Ames' researchers recognized by AIAA

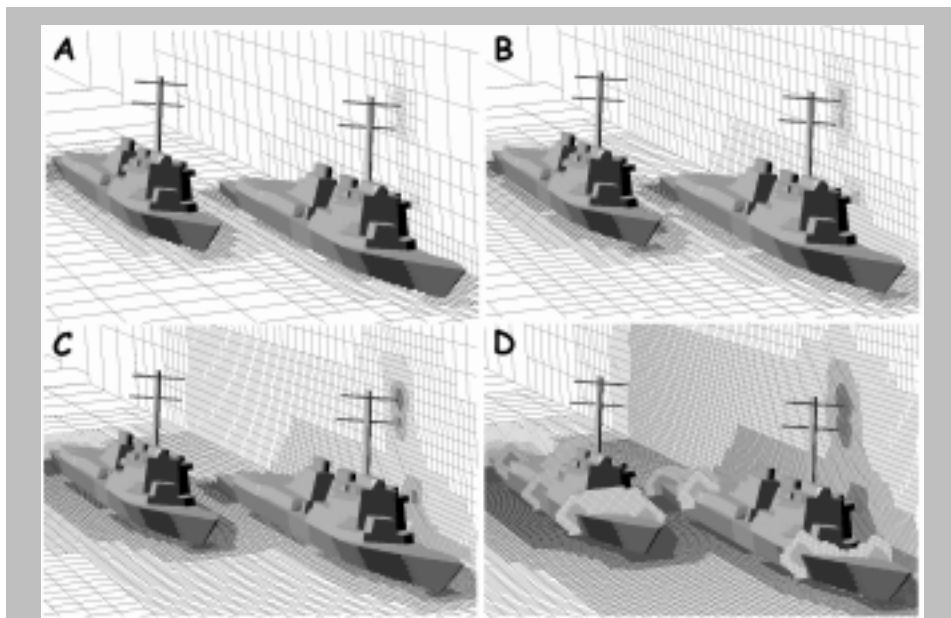
On June 25, the American Institute of Aeronautics and Astronautics (AIAA) recognized the work of NASA Advanced Supercomputing (NAS) division researcher Michael Aftosmis, and Marsha Berger, professor and deputy director of Courant Institute at New York University, in the area of error estimation and adaptive meshing. The team's paper, 'Multilevel Error Estimation and Adaptive h-Refinement for Cartesian Meshes with Embedded Boundaries' has been named best paper by the AIAA Fluid Dynamics Technical Committee for 2002. The award was presented at a special luncheon held in conjunction with the 32nd AIAA Fluid Dynamics Conference in St. Louis, Missouri.

The winning technical paper describes Aftosmis and Berger's development of new techniques for error estimation and adaptive refinement for computational fluid dynamics (CFD) solutions. The new adaptive mesh refinement, or h-refinement technique, provides an optimal mesh refinement strategy for flow field adaptive CFD solutions. Meshes, or grids are used to calculate flow fields surrounding vehicles, such as the space shuttle. "The novelty in our work is that it removes the ambiguity of mesh generation, and identifies the single best solution," says Aftosmis.

Several features put this new h-refinement strategy a cut above previous adaptive meshing techniques. "It is general enough that it can be applied to any type of unstructured or hierarchical mesh, and, since it is parameter free, it can be fully automated," explained Aftosmis. The new meshing strategy was also designated to remove the de-

pendence on user skill, making it very quick and easy to generate meshes. CFD groups at

ment criteria. Aftosmis and Berger plan to integrate these error estimation and refine-



The sequence of grids (A through D, above) surrounds two advanced destroyer-type surface ships. These simulations were generated using Cart3D's flow solver module, which employs a multigrid technique to improve the efficiency of the simulation.

the Department of Energy laboratories, Michigan State University, and Massachusetts Institute of Technology have been experimenting with the new error estimator and refine-

ment techniques into their grid generation and solution software package, Cart3D this fall.

BY HOLLY A. AMUNDSON ▲

Astrobiology academy begins intense summer program

Thirteen top science students from the United States and Canada recently began a 10-week course of intensive research projects at Ames.

Each student is working with a principal investigator to accomplish their individual research goals in astrobiology--which is the study of the origin, evolution, distribution and future of life in the universe.

The program, now in its sixth year, is designed to let students see astrobiology's 'big picture', said academy Director Dr. Doug O'Handley. "Through hands-on experiences, students see that space research is bigger than just NASA Ames," he said. "What differentiates our astrobiology program is its broadness--what is the space program and who is involved?" he noted. "The focus is learning by doing rather than by rote memorization or lengthy lecturing," O'Handley stressed.

According to O'Handley, training the next generation of astrobiologists is important because astrobiology is a young, emerging field. "It will depend upon the young scientists now to carry astrobiology forward and eventually confirm life, maybe even

intelligent life, in the universe," O'Handley said.

Student projects this summer will include modeling neural networks, studying the delivery mechanisms of organic matter in meteors, planning the search for liquid water on Mars and studying the cellular effects of hypergravity on bone.

Principal investigators working closely with the students include Drs. David DesMarais, Chris McKay, Natahlie Cabrol, Peter Jenniskens and others from Ames' Codes S, I and A.

Besides pursuing individual research, the students will also attend lectures, travel to other NASA centers and take leadership training courses. There are several new items on the plate for this year's class. For the first time, the students will travel to NASA Headquarters to meet with NASA Administrator Sean O'Keefe. They also will attend an astrobiology symposium on Catalina Island.

Past year's academy students have shown that studying at the academy has been a rich experience. Academy alums Andy Hock and David Fike, for example,

will accompany Cabrol of the SETI Institute to Chile for a Mars simulation experiment this year. And another group of recent graduates played important roles in last year's Leonid meteor observing mission in November.

Academy graduates Emily Schaller '01 and Avi Mandell '02 flew aboard the Leonid Multi-Instrument Aircraft Campaign, operating equipment aboard a military aircraft at 40,000 ft. The goal of this astrobiology mission was to search for organics that survived the entry through the Earth's atmosphere.

The student's summer research results will be presented at a mid-term review on July 16. Final presentations will be delivered at an open-to-the-public event on August 29 and 30.

The class of 2002 is sponsored by the NASA Astrobiology Institute, the NASA Ames Space Directorate, and the Director's Discretionary Fund.

For more information, visit: <http://www.academy.arc.nasa.gov/>

BY CARLY SCHNEIDER ▲

Ames' Boyd is keynote speaker at Raytheon event

Raytheon held its annual business meeting in May to honor its high performing individuals and teams on the federal information processing services and information technology services contracts at Ames. Almost 200 people attended the awards luncheon at the Santa Clara Marriott Hotel,



Ames' Executive Assistant Jack Boyd speaks at the Raytheon annual business meeting in Santa Clara recently.

including a number of NASA and Raytheon dignitaries. Providing the keynote speech was Ames' Executive Assistant, Jack Boyd. Previous keynote speakers have included astronaut Tammy Jernigan, former Deputy Center Director Bill Berry and Raytheon President Bill Swanson.

Boyd spoke eloquently and from personal experience on 'Six Decades of Significant Contributions to the NACA/NASA Mission, 1940 - 2002.' In his presentation, Boyd provided brief, but colorful, highlights of the history of Ames, in a decade-by-decade for-

mat. This included the construction of the 40-by-80-foot wind tunnel and flight research leading to the swept-bodywing aircraft design and the first faster-than-sound flight by an airplane, the XS-1 in the 1940s. This was followed by development of the blunt body concept for Earth re-entry vehicles by H. Julian Allen, the second Director at Ames, in the 1950s. Work in the 1960s led to the Apollo guidance system, the beginning of life sciences research, and the first aircraft to be controlled by a digital 'fly-by-wire' system in the U.S. In the 1970s, NASA Ames contributed to the Pioneer and Viking missions, resulting in the first close-up pictures of Jupiter, while also producing the first oblique wing aircraft, developing the science of computational fluid dynamics, and demonstrating the feasibility of the tilt-rotor concept with the XV-15.

The 1980s saw an extensive collection of data on space by the infrared telescope aboard the Kuiper C-141 Airborne Observatory. That decade also witnessed the construction of the National Full Scale Aerodynamic Complex with the 80-by-120 foot wind tunnel, exploration with the ER-2 high altitude aircraft, and launching of the NASA Ames-designed Galileo probe for a planned descent into Jupiter's atmosphere. In the final decade of the century, the range of NASA Ames research efforts expanded even further to include contributions to Mars Surveyor, Lunar Prospector, space launch vehicles, Next Generation Internet, nanotechnology, astrobiology and human-centered computing.

In addition to this panoramic view of Ames history, Boyd included references to his own personal experiences with illustrious visitors and scientists. The audience was enthralled with his descriptions of meetings with Chuck Yeager and with a father and his young son, the latter to later become the

famous singer John Denver.

Following this keynote address, Raytheon presented awards to its employees, based upon nominations by their peers. One group of awards was for team achievement. In this category were: the computing, networking and information systems (CNIS) support team of Tom Cochrane, Pat Elson, Sarah Garner, John Hardman, Krista Michaelsen, JoAnn Nelson and Larry Pierce; the flight control software design team of Kenny Cheung, Sharon Cioffi, Weiliang Dai, Dexter Hermstad, Hossein Mansur and Larry Pierce; the Code JT service pool management team of Sandra Glass, Carla Kearin, Edmund Mateo, Veneranda Jubilo, Olivia Ocegueda, Adele Prusa, Rosemary Sellen and Yaima Warf; the ARCLAN upgrade team of Greg Miller, Rich Bock, Mary Hunt, Sonja Koyama, Alan Maxwell, Ray Uribes, Dennis Ferguson, Jack Starnes, Sal Alvarez and Brandon Martinez; and the test subject office of Wendy Krikorian and Mary K. Tracy.

Individual awards were given in several categories. The peer awards went to George Lawton, Tom Cochrane, Weiliang Dai, Evelyn Decker, Jinn-Hwei Cheng, Greg Miller, Hoa Luong and Carla Kearin. The quality improvement award went to John Hardman. Marcy Chaussee won the community good citizen award. The outstanding support services award went to Cam Flocranger. Finally, the exceptional manager award was given to Marlene Hernan.

The Raytheon business luncheon concluded with award recipients assembling for 'remembrance' pictures with Jack Boyd and Raytheon's FIPs program manager and information technology and scientific services general manager Paul Thompson.

By JOY COLUCCI ▲

Ames' volunteers bring 'discovery' to local school

continued from page 3

together one by one." He spoke about the greatness and massiveness of the project and how much effort it took to put the international space station into space. "The primary message I weave into all my presentations is simple: select and accomplish high goals using ingenuity and creativity. I have found that this message can be tailored to children of all ages," he said.

At the end of his presentation, Sasaki put an astronaut suit on one of the students while others role-played being NASA engineers to design and improve the space suit. For the moment, as they discussed the subject and gave their suggestions, they were real scientists and engineers.

Sasaki has worked on a variety of projects at Ames, including wind tunnels, the VMS flight simulator and robotics. He currently supports the SOFIA flying observatory project in the 747 aircraft modification design area.

He has been giving school presentations for over 10 years, starting with his daughter's first-grade class.

"Over the years, I have discovered that just about any area of NASA's core missions generate interest and excitement in the children," Sasaki said. "I really enjoy presenting to children because it also awakens the inner child in me. I usually find that I am energized by the interest and enthusiasm that the children have, and bring that enthusiasm back with me to my work," he added.

Discovery Day at Collins elementary school was very successful thanks to the people at Ames who shared their time and enthusiasm. Kids liked the presentations, asked questions, were very interested in science, engineering and technology, and learned a lot of new things.

"It all starts with a dream ..." read one of the slides presented by Sasaki. The first stone

toward exploration and research has been put in place by the dedicated Ames volunteers, who inspired many kids at Collins elementary school to start dreaming.

By VERONIKA SOUKHOVITSKAYA ▲

Moffett golf set

Come have fun playing tournament golf with your team on Aug. 8. Tournament format is a team scramble 9 holes. The start time is 1 p.m. and check in is at 12:30 p.m. The fee is \$15.00 per player. Call Shannon Kahahane at the pro shop for any questions at (650) 603-8026.

Free golf lessons are available at the golf course. Classes begin at 5 p.m. The next class is July 18 on the short game (putting, chipping). Golf clubs are provided. Come out and use your facility--it's free. Call Bob Bihl at the pro shop for more information.

Length of Service 2002 awards ceremony held at Ames

The Length of Service 2002 awards ceremony was held in July. Employees with 25 years or more of federal service for the period July 1, 2001 to June 30, 2002 were honored. Special recognition was paid to 12 Ames employees who have reached their 40, 45, 55 and 60 years of Federal service milestone. Award winners are listed below.

40 Years

James O. Arnold
William J. Borucki
James P. Connolly
Heinz Erzberger
Daniel N. Petroff
Charles M. Winget
Dale J. Worth

45 Years

Patric L. Lewis
Robert E. Slye
Velvin R. Watson

55 Years

Murray Tobak

60 Years

Harold B. Herstedt

A complete list of honorees is as follows:

Code A - Office of the Director of Aerospace

25 Years of Service

Thomas S. Alderete
Edwin W. Aiken
Alan L. Dunn
Richard L. Jaffe
Ronald C. Winterlin

30 Years of Service

Jeffrey V. Bowles
Frances R. Jonasson
Jerri A. Jones
Michael R. Landis

35 Years of Service

William B. Cleveland
John D. Foster
Lyndell S. King
Paul T. Soderman
Leonard Tobias
Linda M. Vollenweider

40 Years of Service

James O. Arnold
Heinz Erzberger
Dale J. Worth

55 Years of Service

Murray Tobak

Code C - Office of the Chief Financial Officer

25 Years of Service

Antonio A. Arroyo

Code J - Office of the Director of Center Operations

25 Years of Service

Roger W. Ashbaugh
Randal L. Hobbs
Susan I. Pescador
Nellie M. Powell
John R. Ray

30 Years of Service

David H. Brown
Richard W. Carr
Bohdan K. Cmaylo
Teresa M. Del Vecchio
Vivienne D. Gallo
William H. Kettler Jr.
Sue Y. King
Mary E. Perez
Helmuth Pescador
Gerald P. Walatka

35 Years of Service

George M. Alger
Catherine Garcia
Gerald P. Oconnell
Rick J. Serrano
Barbara J. Young

45 Years of Service

Patric L. Lewis

60 Years of Service

Harold B. Herstedt

Code Q - Office of the Director of Safety, Environmental and Mission Assurance

25 Years of Service

Monty R. Bailey

30 Years of Service

Patricia E. Beck

Code I - Office of the Director of Information Sciences and Technology

25 Years of Service

Patricia S. Cowings
Maylene E. Duenas
Peter M. Goorjian
Gerhard E. Hahne
Marianne Mosher

35 Years of Service

Charles W. De Roshia
Edward M. Huff

45 Years of Service

Velvin R. Watson

Code D - Office of the Director

25 Years of Service

David A. Fencil
Linda L. Franklin
Sally O. Mauldin
Alan N. Wong

30 Years of Service

William D. Gambrel Jr.
G. Warren Hall
Cathy A. Pochel
Kenneth G. Stevens Jr.



Harold Herstedt, Ames recipient of the 60-year Length of Service award.

photo by Tom Trower

Code F - Office of the Director of Research and Development Services

25 Years of Service

George H. Kidwell Jr.
John H. Reed

30 Years of Service

Gary L. Hallock
Leonard C. Hee
Eduardo A. Pasilliao

35 Years of Service

James W. Govorko
Robert W. King

40 Years of Service

Daniel N. Petroff

Code S - Office of the Director of Astrobiology and Space Research

25 Years of Service

Barbara J. Navarro

30 Years of Service

Duane A. Allen
Katherine C. Sablan

35 Years of Service

Jerome G. Borucki
Nancy G. Daunton
Max Loewenstein

40 Years of Service

William J. Borucki
James P. Connolly
Charles M. Winget

45 Years of Service

Robert E. Slye

VAMS holds technical interchange meeting

The Virtual Airspace Modeling and Simulation (VAMS) project is a new, multi-year research and development effort that is led by Ames and is focused upon developing advanced concepts and design tools for the national airspace system. This recently funded project was officially rolled out at a technical interchange meeting (TIM) held at Ames from May 21 to 23. The TIM was attended by 120 research scientists, engineers and FAA representatives. It was one of the first steps in a multi-stage process to explore new concepts and design tools to expand the capacity of the airspace system in the next 20 years.

"During the next 20 years, it is projected that the number of passengers in our air traffic system will nearly triple, based on the need for sustained economic growth," said Harry Swenson, VAMS project manager. Swenson went on to say, "NASA is working with the FAA to develop and explore revolutionary changes in airspace operations to meet the public demands for increasing capacity while alleviating flight delays."

To meet this capacity challenge, the VAMS project is supporting development of advanced concepts from industry and NASA. The industry concept developers selected for this effort include: Raytheon, Boeing, Metron Aviation, Seagull Technology, Northrop Grumman and Optimal Synthesis. Also contributing to this endeavor to explore the effects of revolutionary changes to airspace operations are teams from Ames' aviation systems and human factors research and technology divisions and Langley Research Center. The task of developing a research agenda has been assigned to a University team, including Embry-Riddle University,

George Mason University, Massachusetts Institute of Technology, and San José State University.

During the three-day conference, participants had an opportunity to view presentations by the VAMS concept developers and by researchers from existing NASA projects aimed at making improvements to the current air traffic system. In addition, VAMS researchers obtained feedback on the viability of their concepts. VAMS sub-element manager Robert Fong noted, "The TIM provided a forum for concept developers to present their proposals and to discuss them with other concept teams and their NASA sponsor. For many, it was the first time their ideas had been presented."

There were a variety of approaches presented for resolving future capacity issues. Some proposals called for the redesign of portions of the system, such as the management of aircraft on the surface or in terminal or enroute airspace. Many concepts proposed various levels of optimization and automation in the different airspace domains. There were also proposals suggesting a redesign of the entire system. Fong noted, "The challenge to these researchers is to notice developing trends and project them 20 years into the future. A case in point is the rise in corporate and factional ownership of jet aircraft in the private sector. Some of the concepts address this trend by including massive point-to-point travel using regional airports as a means of decreasing traffic at major airports." To determine the feasibility of each concept, the VAMS project will develop modeling capabilities to simulate and assess the concepts.

VAMS is divided into three areas or sub-

elements: system level integrated concept (SLIC); virtual airspace simulation technologies (VAST); and systems evaluation and assessment (SEA). Each sub-element deals with a specific segment of the overall design process.

This TIM focused on the SLIC sub-element effort, which brings together and reviews the concepts that need to be assessed to develop a unified capacity-increasing concept. This VAST sub-element is developing a modeling and simulation capability for assessing these concepts using scenarios and evaluation metrics defined by the SEA sub-element. The SEA sub-element will be responsible for evaluating the concepts.

The project is funded through 2007. This and future TIMs are an integral part of the VAMS project plan. The next meeting will take place in August.

Sadoff passes on

Melvin Sadoff, a former aeronautical engineer at NASA Ames, died of congestive heart failure on April 14, 2002.

Sadoff joined the scientific staff of NACA in 1943 for a distinguished career at Ames aeronautical laboratory for over 40 years. He retired in 1981. Throughout his career, he specialized in research on aircraft load, stability and control, handling qualities and human-pilot response. The results of his work appeared in over 30 technical publications.

From 1944 to 1946, he was on active duty in the U.S. Navy as a member of a special detachment assigned to Ames.



Melvin Sadoff

Among his positions were chief of the Human-Machine Integration branch; assistant chief of the Biotechnology division and assistant chief of the Biomedical Research division. In 1966, he received the NASA Sustained Superior Performance Award, and in 1974 he was awarded the NASA Exceptional Service Medal. This award was given "in recognition of his contributions to the new technology which integrates aircraft and spacecraft equipment design with the specific mental and physical capabilities of human beings."

Sadoff is survived by his wife, Judith, of Palo Alto, his daughters, Michal and Shoshana, his son, David, and five grandchildren.

Dear Friends and Colleagues at Ames:

Please let me thank all of you who participated in my retirement reception, worked on the gifts given, sent me good wishes for the future and anyone I missed saying goodbye to. I will always have great memories of my last few weeks at Ames as a NASA employee. Ames is a unique and special place where good and bright people spend their careers seeking knowledge, insight, understanding and ways they can contribute to the welfare and future of humankind. I can think of no finer place to have spent most of my career.

Thank you for everything we have shared, all you have contributed, the support you have given me and such a fine sendoff into the future. I wish all of you the very best and you can be sure that, wherever I spend the remainder of my life, Ames and its people will be in my thoughts.

Sincerely,

Bill Berry
Ames' Deputy Director (Retired)

Settlement design contest award winners tour Ames

More than 35 students, teachers and parents spent June 17 touring Ames. The students were award winners in the ninth annual Space Settlement design contest. This year's

provided support in making this an exciting and unique educational experience for all the tourists. Special thanks to Al Globus, Chris Gong, Larry Kellogg and Chris Roden

Students design their space settlements and related materials and then submit their entries to Ames for judging. Teachers use the contest as an instructional thematic in their science curriculum. The contest promotes team building, space physics and project-web based learning in addition to addressing national science standards.

Space colonies are seen as permanent communities in orbit, as opposed to living on the moon or other planets. The work of Princeton physicist O'Neill and others has shown that such colonies are technically feasible, although expensive. Settlers of the high frontier are expected to live inside large air-tight rotating structures holding hundreds, thousands or even millions of people along with animals, plants and single-celled organisms vital to comfort and survival. There are many advantages to living in orbit; namely, zero-g recreation, environmental independence, plentiful solar energy and terrific views, to name a few.

There is plenty of room for everyone who wants to go. The materials from a single asteroid can build space colonies with living space equal to about 500 times the surface of the Earth. Entries for next year's contest will be due on March 31, 2003. Encourage your children and teachers to participate. Materials that support space settlement activities may be found on the web at: <http://lifesci3.arc.nasa.gov/SpaceSettlement/teacher/>. The contest and related web page are funded and operated by Ames' Code S.

BY BRYAN YAGER ▲



photograph by Bryan Yager

Space settlement contest design award winners on the recent tour of Ames.

contest included entries from over 568 students with 20 teachers assisting. Submissions came from Canada, Japan and 14 U.S. states. The grand prize winners were Hickman High School students from Columbia, MO. For contest results and details see: <http://lifesci3.arc.nasa.gov/SpaceSettlement/Contest/Results/2002>.

The students participated in learning activities at the Ames Aerospace Encounter in the morning. Victoria Callor, Jeff Smith and Chris Maese next escorted the visitors through Bio Vis demonstrations and the high bay in building 240. The students were then escorted through the 9 foot x 7 foot wind tunnel by Herb Finger and Dan Bufton, and concluded their tour of Ames in building 258. Gina Morello-Ficcadenti and Marcia Redmond presented a dynamic view of the visualization and computer labs, which inspired many questions from the students.

The students were treated to lunch at the Ames Megabytes Café, where they were presented with award packets which included follow-up materials and activities supporting their visit.

Credit goes to all Ames volunteers who

for their support in making this an unforgettable experience for the students.

The contest is divided into two separate categories, 6th through 9th and 10th through 12th grade divisions.

Safety data for May - June 2002

	Civil Servants	Contractors
Not recordable first aid cases	3	7
Recordable no lost time cases	2	2
Restricted workday cases	0	0
Lost workday cases	0	2

Data above are as of 6/25/02. May be subject to slight adjustment due to late reporting or new information or reclassification.

Ames' Kwak and Kiris receive 'invention of year' award

NASA Administrator Sean O'Keefe recently honored the 11-person team that includes two Ames research scientists who



Dochan Kwak (above) receiving the 2001 Commercial Invention of the Year award from NASA Administrator Sean O'Keefe.

were significant contributors to the NASA/DeBakey miniature heart assist pump, an updated version of which was named winner of NASA's 2001 Commercial Invention of the Year Award.

Ames honorees Dochan Kwak and Cetin Kiris of the NASA Advanced Supercomputing (NAS) Division along with others including Dr. Michael DeBakey, the man known as the father of modern cardiovascular surgery, received the award during a ceremony on June 25 at NASA Headquarters, Washington, D.C. DeBakey, is Chancellor Emeritus at Baylor College of Medicine in Houston. O'Keefe presented individual certificates to team members.

"This is an excellent example of how NASA aerospace technology can be used to improve life," said Kwak, speaking about working on the heart pump project. "At the same time, the experience gained is spinning back, helping us to develop components of future rocket engines."

"We are extremely proud of our collaboration and have high hopes this work will save many lives," added Kiris.

The small ventricular-assist device, known as the DeBakey VAD, is similar to fuel pumps used in space shuttle main engines and is designed to be a bridge for heart patients who often are forced to wait months, if not years, for a donor organ. The VAD may also be used as a permanent way to help strengthen the beat of a weakened heart. Physicians are now subjecting the VAD to human trials.

However, during initial development of the one-inch by three-inch implantable axial rotary heart pump, engineers noticed two major problems. Friction led to damaged blood cells because the device created high shear flows through pump parts. Further, there were stagnant regions in the pump that caused blood clotting, a major problem with ventricular assist devices.

Ames researchers suggested improvements after simulating blood flow through

the pump using NASA computers and computational technologies that normally model the flow through liquid rocket engine turbo pumps.

"Johnson Space Center and the DeBakey Heart Center of Baylor College of Medicine asked us to help them because of our experience with simulating fluid flow through rocket engines," said Kwak, chief of the NAS Applications Branch (Code INA). Kiris and Kwak analyzed blood flow through the battery-powered heart pump, whose blade normally spins as fast as 10,000 rpm. "The speed of fluid flow through a rocket engine is faster than blood flow, but very similar in many ways," Kiris noted.

Following supercomputer simulations, NASA scientists were able to reduce red blood cell damage to an amount comfortably below acceptable limits. The improved blood flow pattern also reduced the tendency for blood clots to form.

"We worked with the team to make the blood flow more smoothly through the pump; that also removed the stagnant regions," Kiris said. NASA Ames scientists first

began assisting the NASA/Baylor team in 1993, and continue to collaborate with them.

After an intense competition in 1996, NASA granted exclusive development rights to MicroMed Technology Inc., Houston. In European trials, the MicroMed/DeBakey VAD was implanted in 115 patients with no incidence of device failure. In the United States, more than 20 patients have successfully received the device. Trials here will involve nearly 180 implants.

"Without the support of the NASA supercomputer design experts, the pump would not function as efficiently as it has," said Dallas Anderson, president and CEO of MicroMed.

"There are three groups who made this effort successful," Kwak said. "The medical team led by Dr. Michael DeBakey and Dr. George Noon, the systems engineers at Johnson Space Center, and the Ames computational team that used NASA supercomputer know-how to help develop the VAD." The team shared \$76,400 in awards for their work.

BY JOHN BLUCK ▲

Innovative science education is provided at Ames' Child Care Center

The NASA Ames Child Care Center (ACCC) provides high-quality child care and preschool education for children of members of the Ames community. Accreditation by the National Association for the Education of Young Children (www.naeyc.org) is evidence of the exceptional nature of the ACCC's

large numbers of students beyond the ACCC. Together, they created a new twist on an old idea--a scale model solar system specifically designed to be used with very young children.

Mary Urquhart is a National Research Council postdoctoral associate in the Center



photo by Camilla O'Reilly

Dr. Mary Urquhart asks ACCC preschoolers what they know about the planets. It turns out that they know quite a lot!

early childhood program. In addition to traditional age-appropriate activities, all of the children at the ACCC have the opportunity to participate in art and sensory experiences, and babies as young as nine months of age participate in the formal music program. A science program for the preschool classes encourages parent involvement.

Recently, the ACCC and an Ames postdoctoral researcher collaborated on a science project for the preschoolers that has the potential to have a positive impact on

seemed natural to Urquhart. "Last year I had done a preschool lesson on the colors of Earth and Mars. When Camala O'Reilly, the ACCC director, asked me to do a science project with the preschool again this year, I was thrilled" said Urquhart. "I asked if I could try something new with the children, and Camala was very supportive of the idea."

The project Urquhart had in mind was a scale-model solar system for very young children. "Scale models of the solar system are

continued on next page

Innovative science education at Ames' Child Care Center

continued from previous page

commonly used with students from upper elementary school through college, but those activities haven't been designed with very young children in mind. Space science activities of any type are almost non-existent for children younger than 3rd grade." For the children at the ACCC, however, doing a space-related project made sense to Urquhart. "Many of these children have parents who work on space exploration, and it is natural to assume that they would have an interest in learning more about space themselves. The ACCC's commitment to education was an important component of the project. I'm not a preschool educator, and in order to design the lesson plan I needed to have a partner who understands the children's abilities and age-appropriate learning goals."

With O'Reilly as her educator-partner, Urquhart modified a version of the classic scale-model solar system activity that she had written for upper elementary students for use with the oldest preschool class at the ACCC. Although the relative sizes and distances of the sun and planets remain important aspects of the activity, this new version has very different learning goals from similar activities for older students. For preschoolers, the activity is designed to teach age-appropriate concepts and skills such as size comparisons (bigger/smaller), sequential ordering, counting, measurement, and color matching while serving as an introduction to the planets. "Using the same scale for size and distance helps ensure no misconceptions are accidentally introduced" said Urquhart. "The intent is that the mental picture the students develop as a result of the activity will be consistent with scientifically accurate models."

The initial activity went very well. O'Reilly observed the lesson and was happy to see that the children were both engaged and seemed to be learning. Many of the children talked about the planets for hours after the activity, and one child insisted that his parents hang his planet cards by the dinner table so that they could talk about the planets during their meal. A revised version of the lesson plan is now publicly available on Urquhart's frequently accessed education web site at: <http://lyra.colorado.edu/sbo/mary/> under the topic of scale in the solar system. Urquhart hopes that the success of the scale-model solar system activity with ACCC students will encourage other schools to try age-appropriate space science lessons with young children.

The partnership between the ACCC and Urquhart has continued to bring new science experiences to ACCC children, although not all of them have been related to space. In April, the toddlers and preschoolers made 'bug houses' for their very own live ladybugs so that they could observe the small creatures up close. The preschoolers also learned about the life cycle of ladybugs, what the bugs eat and why they are helpful to gardeners. "The hardest part about that activity," laughed O'Reilly, "was convincing some of the older children to let their ladybugs go!"

The ACCC recognizes the importance of

exposure to science in early childhood, as does the American Association for the Advancement of Science (AAAS) in its 1999 document *Dialogue on Early Childhood Science, Mathematics, and Technology Education*. Science education at the ACCC goes well beyond the activities of growing plants and learning food groups common at many preschools. ACCC preschoolers participate in a regular science program called Young Explorers, a Bay area science program for young children coordinated by former ACCC parent Katy Korsmeyer. Parent Kelly Decker is the coordinator for the ACCC. Each month parent volunteers teach one of 18 lessons with the help of ACCC staff members. Lessons in the Young Explorers program cover topics such as volcanoes, magnetism, bugs, eyes and the properties of a gooey substance called gak. In addition, individual class-

rooms have monthly themes that include studying plants, animals, and other components of the natural world. Non-parent volunteers from Ames who are interested in sharing science with children are welcome to participate in the Young Explorers program, or to do creative lessons with the students.

The high-quality early childhood education provided to children by the Ames community at the ACCC is now more accessible than ever before. As part of its recent move to a new location, the ACCC has expanded its capacity and currently has openings for new preschool and infant/toddler children. If you are interested in enrolling your child, or volunteering at the ACCC, contact the author at (650) 564-9285. The ACCC web site, currently only accessible internally, is: <http://acc.arc.nasa.gov>.

BY CAMILA O'REILLY ▲

SHARP students selected for Ames' 2002 apprenticeship program

A total of 30 talented high school students have been selected to participate in this year's intensive science and engineering apprenticeship program, SHARP, for a minimum of eight weeks at NASA Ames. Deputy

Students who are permanent residents (in accordance with the state residency requirements) and live within a 50-mile radius of a participating NASA field installation, or are U.S. citizens, and will be 16 years old by the

time of the program begins in June are eligible to apply. The students selected are assigned to a mentor, many of whom are NASA scientists and engineers.

As apprentices, students learn and earn. They participate in an orientation process that provides them with an overview of the NASA field installation's mission and the activities necessary to accomplish the field installation's goals and objectives.

During the apprenticeship, the students complete designated assignments,

prepare written reports, make oral presentations, and participate in a variety of enrichment activities under the careful supervision of the SHARP program staff and mentors.

SHARP is a feeder program that is being used to build a resource pool of potential applicants for future NASA employment in the field of science and engineering. SHARP is specifically designed to attract and serve individuals who are underrepresented in the NASA scientific and engineering workforce. The program provides students with first-hand experience and information that will help them to make decisions about a career in mathematics, science and engineering.

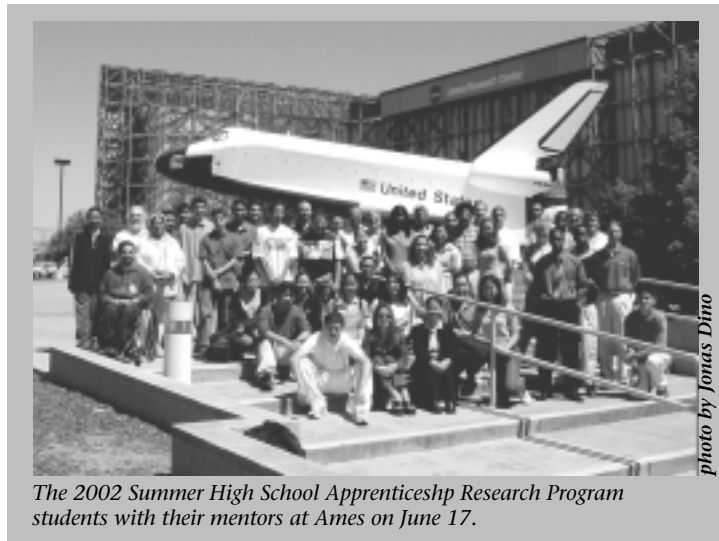


Photo by Jonas Dino

The 2002 Summer High School Apprenticeship Research Program students with their mentors at Ames on June 17.

Director Nancy Bingham and University Affairs Specialist Brenda Collins formally welcomed the students to the center at the opening ceremony on June 17.

The SHARP program, now in its twenty-second year, started in 1980 and is sponsored by NASA's Education Division and participating NASA field Installations. Interest in the program remains high, and continues to grow, according to Dr. Ray Hill, SHARP coordinator. There were over one hundred applications for 25 slots. The overwhelming application response prompted additional funding for five additional apprentice slots. SHARP is designed for high school students who have demonstrated an aptitude or interest in science and engineering careers.

Students show results of NASA research collaboration

For the past year, minority students and faculty at three universities have been collaborating with Ames researchers in various technical areas. On June 6, the group shared the results of that collaboration with the Information Sciences and Technology Directorate.

During the presentation, faculty and students from Jackson State University, Morehouse School of Medicine and Tennessee State University showcased projects in telemedicine, computer networking and mobile robots. Sponsored by the Historically Black Colleges and Universities (HBCU) program, the presentation was part of Ames' Minority Universities Involvement Program.

"Instead of just giving grants to university students to work on their projects, we create a true research collaboration, where we emphasize expertise and networking with benefits on both sides," said Maylene Duenas, associate director for strategic development for Code I, and host of the event.

The goal of the HBCU outreach program is to encourage minority students to pursue careers in science, engineering and technol-

ogy. Participants in the program are funded by NASA and collaborate on a research project for at least a year before presenting their findings.

Among the speakers were Elizabeth Ofili, M.D., from Morehouse School of Medicine; Shaofeng Yang, a graduate student, and professor Qutaibah Malluhi from Jackson State University; and Oluwole Taiwo, a graduate student and professor Saleh Zein-Sabatto from Tennessee State University.

Ofili discussed her ongoing research project involving telemedicine applications as a potential treatment for high blood pressure. Ofili is studying how telemedicine can provide countermeasures to reduce motion sickness in space and on the ground. She expects to complete her project in two years.

The second speaker, Yang, presented his research on computer networking, including a new network storage system. The new low-cost, high performance storage system can be used with video and multimedia files, software applications and data for weather, climate and ocean.

The third speaker, Taiwo, discussed how

mobile robots can be designed to follow a certain direction. The objective of this research is to develop software to plan and simulate the movement of multiple robots to multiple targets using genetic algorithms. Taiwo defined 'genetic algorithm' as "an artificial intelligence procedure, which is based on the theory of natural selection and evolution." This project can be applied in military, space and different industries.

Numerous Ames researchers, scientists and engineers attended the event. At the end of their presentations, each of the speakers thanked the Ames researchers for their support of the program. Both the university faculty and students, as well as Ames researchers, agreed this program was valuable, with the students gaining substantial research experience, while Ames helped develop new leaders in science, engineering and technology. "Our goal is to expand the Minority Universities Involvement Program and reach out to more minority students," Duenas concluded.

BY VERONIKA SOUKHOVITSKAYA

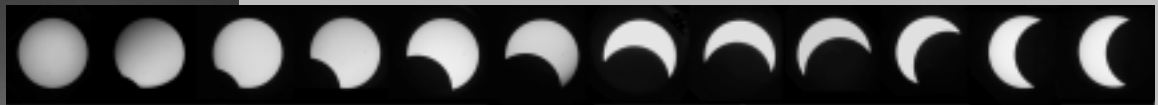
June solar eclipse as viewed from Ames and Baja

On June 10, Californians shared beautiful views of an annular eclipse of the sun, which maxed to 63 percent at 6:20 p.m. PDT in the San Francisco Bay area. Astronomers from Ames' Space Science Division, who know about safe solar viewing, witnessed this event with the aid of

an 8-inch reflecting telescope with special sun filter and separate special sun-viewing glasses.

Solar eclipses occur when the moon crosses in front of the sun, and happen fairly frequently, about once or twice a year. However, witnessing a total solar or annular eclipse

takes planning to be in the right place at the right time. And since the moon's shadow sweeps across the Earth at speeds at least 1000 mph, these events last only a few hours.



Above: Time elapse compilation of the June 10 partial solar eclipse taken by astronomers from the Ames Space Science Division. Photos by Kim Ennico and Tim Castellano.

Above: The June 10 solar eclipse as shot by Brian Day of Code DXE from Punta San Cristobal in Baja, using an Olympus OM1 camera, a Tamron 28mm-200mm lens, and a Thousand Oaks Type-2 solar filter. The solar filter was used on the first six exposures, but removed on the final exposure at sunset, allowing the beach, sea and clouds to be recorded at that time.



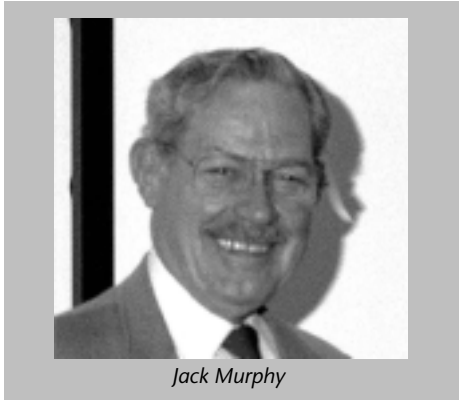
Left: NASA scientist Laura Iraci views the solar eclipse. During an eclipse part of the sun remains visible, so it is hazardous to look at the eclipse without protection. Here an 8-inch diameter telescope is fitted with a special solar filter. In the background, others are viewing the sun with a pinhole projection. It is advisable to never look at the sun directly.

photo by Kim Ennico

Former Ames public affairs director passes away

Jack Murphy, former public affairs director at NASA Ames Research Center, died on June 21 after a lengthy battle with pulmonary disease. He was 76.

Murphy came to Ames in 1987, leaving Washington, D.C. to become the Center's then Chief of External Affairs. Prior to coming



Jack Murphy

to Ames, Murphy had held the position of Assistant Administrator for Legislative Affairs at NASA Headquarters since 1981. In that capacity, he was the primary link between NASA officials and the Congress, working to maintain legislative and public support for the nation's space program. Murphy retired from NASA and Ames in 1991, returning to his beloved Arizona.

Murphy was a true pioneer in the field of Arizona broadcasting, presenting the first television newscast in that state on Dec. 4, 1949 on Arizona's first television station. He was Arizona's first news anchor, news direc-

tor and executive producer. He created the state's foundation for television news coverage. In 1969, Murphy developed a television network in South Vietnam for the United States Information Agency, leaving upon his departure a five-station national system operated entirely by the Vietnamese.

Murphy won numerous awards for excellence in television and, in 1993, was inducted into the Arizona broadcasters Hall of Fame. Throughout his career, he held leadership roles in a wide variety of professional, civic and community organizations. He is perhaps best known for his ties to Senator and former Presidential candidate Barry

Goldwater (R-AZ), working with him as a special assistant on behalf of the citizens of that state and the nation, and representing the senator in a variety of official capacities.

John F. (Jack) Murphy, Jr., was born on March 1, 1926, in Orlando, Florida. He is survived by his wife of 32 years, Mary Elizabeth Murphy; two daughters, Kathy Murphy Harber of Atlanta, Georgia, and Pat Murphy Alderman of Gilroy, Calif.; and two grandchildren, Patrick Beckhelm of San Jose and Kelly Alderman of Gilroy.

A memorial service for Murphy was held recently in Scottsdale.

Code A celebrates with Lebacqz



photo by Jonas Dino

The Aeronautics directorate gave Vic Lebacqz a rousing 'sendoff' as he assumed his new position as Associate Director for Aerospace Programs, replacing the departing Bob Rosen.



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