



The Dryden X-**PRESS**

Volume 53 Number 11 June 17, 2011

Open for business

SOFIA science missions are officially under way

By Jay Levine
X-Press Editor

A Stratospheric Observatory for Infrared Astronomy Science and Education Media Day held June 8 at the Dryden Aircraft Operations Facility featured 11 speakers detailing the SOFIA program, its science missions and educational-outreach activities.

The event was held to announce that the SOFIA is ready for business and initial science flights are complete. A new series of 23 flights is under way, including those on which educators selected for science missions have flown.

The SOFIA program is managed at Dryden, and Ames Research Center, Moffett Field, Calif., manages the program's science component. German partners developed the 100-inch infrared telescope that is housed behind a large door in the aft of the host NASA 747SP.

Because the atmosphere's water vapor obscures Earth-bound observations of the infrared spectrum, "The SOFIA makes observations that are not possible from the Earth," said Bob Meyer, SOFIA program manager. The flying observatory has the advantage of being able to be aloft about six hours at a time above the atmosphere while making scientific observations of the heavens.

Meyer said the observatory's



EC11-0173-086

NASA Photo by Tom Tschida



EC11-0173-071

NASA Photo by Tom Tschida

Above, media and special guests were permitted to go aboard the Stratospheric Observatory for Infrared Astronomy following an education and media day June 8.

At left, a member of the German media interviews Terry Herter, principal investigator with the Cornell University-built Faint Object Infrared Camera for the SOFIA Telescope, or FORCAST, instrument.

See Observatory, page 4

Crew module on its way

PA-1 set for display at the final space shuttle launch

By Jay Levine

X-Press Editor

The Pad Abort-1 crew module began its journey from Dryden June 14 to the Kennedy Space Center, Fla., for display at the July 8 scheduled launch of Atlantis, the final flight of the space shuttle program.

For weeks, Dryden employees have been handling checklist items such as lifting and installing the forward bay cover on the crew module and securing avionics pallets and crew module panels. Lifting and loading of the crew module onto the trailer to transport it across the country was completed earlier in the week.

For four years, Dryden's Orion crew module abort flight test team worked toward a successful research flight that went flawlessly at White Sands Missile Range in New Mexico on May 6, 2010. The crew module reached an altitude of one mile and attained speeds exceeding 500 mph.

The team faced challenges daily as members spent weeks and months away from their families during the 10 months leading up to the launch. "You will never take all of the risk out of spaceflight, but teams like ours try to greatly reduce it," said former Dryden Exploration Mission Director Brent Cobleigh.

The use of a system like the one demonstrated at White Sands can decrease the odds of losing a crew in the Orion spacecraft from 1 in 559 to one in 1,877 during the launch phase of the mission, Cobleigh said.

During a recent awards ceremony at Dryden to recognize the achievements of Dryden team members, NASA's former Orion project manager, Mark Geyer, said of the crew escape system's function during the test flight at White Sands, "If it [the White Sands launch] had



ED11 0174-68

NASA Photo by Carla Thomas

Crews prepared the PA-1 crew module for transport to Kennedy Space Center, Fla., where it will be displayed at the launch of the final space shuttle mission.



ED11 0174-168

NASA Photo by Carla Thomas

As a result of changes made at the main gates to Edwards Air Force Base, the route by which the PA-1 crew module traveled was across Rogers Dry Lake, through the shuttle viewing area and out Rocket Site Road. Once the caravan exited federal property, escort duties were handed off to the California Highway Patrol.

been a launch where the system was needed, we would have saved lives."

Dryden Center Director David McBride said regardless of the

direction of the agency's space program, the team's work on the launch abort system is "the shape of things to come" and the system

will have a valued role in the safety of future space travelers.

Johnson Space Center, Houston, was the lead partner in the multi-center effort that also included Kennedy Space Center, Langley Research Center, Hampton, Va., Marshall Space Flight Center, Huntsville, Ala., Glenn Research Center, Cleveland, and industry partner Lockheed Martin.

Cathy Bahm, Dryden abort flight test deputy project manager, said Dryden's work included aspects of testing, from test and validation efforts to integration work, including work with Lockheed Martin avionics. She also detailed development of a Mobile Operations Center from one housed in an empty trailer into the command center used at the White Sands launch.

Matt Redifer, Dryden crew module integrated product team lead, said the team faced several challenges, including fixing broken equipment, altering structural loads on the vehicle as understanding of the flight environment improved, working around cultural differences among project partners and project flight reviews and processes.

Also included in the long list of tasks was design and installation of 683 sensors, which were divided into 403 sensors for the launch abort system and 280 for the crew module.

David McAllister, abort flight test operations lead, said the team's flexibility was a key reason that the launch was a success despite whatever adversity greeted team members at the beginning of each day.

Team members agreed that the great sacrifices leading to the flawless flight will lead to the crew module abort system's use on a future spacecraft. Use of the system, team members said, will mark another great day for NASA and the nation in the effort to protect the people

G-III helps assess levees

At the request of the U.S. Geological Survey and the U.S. Army Corps of Engineers, NASA conducted a radar-imaging mission June 7 with its Gulfstream III environmental research aircraft over areas of the lower Mississippi River that are nearing flood stage.

The modified G-III business jet, carrying a synthetic aperture radar developed by the Jet Propulsion Laboratory, Pasadena, Calif., departed its base at the Dryden Aircraft Operations Facility in Palmdale, Calif., and flew to New Orleans to acquire data over the Mississippi's levee system. A mid-day refueling stop was planned at Naval Air Station New Orleans.

The flights had been requested by Gerald Bawden of the U.S. Geological Survey as part of a multi-agency collaborative effort on levee stability and situational-awareness development for those agencies. These flights complement a multi-year Levee Assessment by Remote Sensing project led by Mississippi State University professor James Aanstoos and a similar levee stability project in California. The study is being undertaken to assess the condition of levees and to identify,



ED07 0042-04

NASA Photo by Lori Losey

The G-III environmental research aircraft flies a mission.

classify and prioritize potential problems, according to Aanstoos.

A prior mission by the G-III, made to obtain baseline data on the levees, was conducted in April, and the second mission was scheduled for late June. The mission in early June was added due to the imminent risk to levees posed by the current high river levels.

The G-III is equipped with a NASA-developed Precision Platform Autopilot that enables it to fly within 16 feet of a flight path flown on earlier missions while the

aircraft is flying above 40,000 feet altitude. That accuracy allows the L-band radar, mounted in a pod below the aircraft's fuselage, to accurately record any displacement of the terrain beneath that may have occurred since the previous imaging mission.

NASA's Airborne Science program, Earth Science Division in Washington, funds operation of the G-III research aircraft and its synthetic aperture radar as well as work involving other NASA environmental research aircraft.

Feds Feed Families begins

The Third Annual Feds Feed Families food drive is now under way. All federal agencies are working together this summer to pursue a nationwide goal of collecting at least two million pounds of non-perishable food for local food banks across the country.

Summer is an especially difficult time for food banks to maintain supplies sufficient to meet the demand. The summer campaign started May 26 and will run through Aug. 31.

NASA employees nationwide are working together to collect at least 110,000 pounds of food donations. All food collected will be donated to a center-designated

food bank or charity that serves area communities. Participation is voluntary, and no cash donations will be accepted.

During this year's drive, the agency is again encouraging friendly competition among its ten field centers to see which can top the rest in donations. The center that averages the most weight in donations per employee will be declared the winner. Since collection dates vary by center, be sure to look for announcements and advertisements about the program posted around your workplace.

Aaron Rumsey, aaron.w.rumsey@nasa.gov, is the Dryden center contact.

Questions regarding agency participation in Feds Feed Families may be directed to agency contacts Kevin Ortegel, kevin.j.ortegel@nasa.gov, and Cindy Steele, cindy.steele-1@nasa.gov. For general information about the program, visit <http://www.fedsfeedfamilies.gov>.

To keep track of the latest developments during the NASA food drive, please visit the "NASA Feeds Families" page on Facebook, and/or follow "NASAfooddrive" on Twitter. The Feds Feeds Families government-wide program can also be followed at "Feds Feed Families" on Facebook, and "fedfooddrive" on Twitter.

News at NASA

J-2X engine ready for test

NASA's new J-2X rocket engine, which could power the upper stage of the nation's future heavy-lift launch vehicle, is ready for the first round of testing. The fully assembled engine was installed June 11 in the A-2 Test Stand at Stennis Space Center in Mississippi.

Beginning in mid-June, the engine will undergo a series of 10 test firings that will last several months.

The test stand, which supported the space shuttle main engine project, has been modified to accommodate the J-2X engine's different shape. In addition to structural, electrical and plumbing modifications, a new engine start system was installed and control systems were upgraded on the stand. Liquid oxygen and liquid hydrogen transfer lines, which dated to the 1960s, were replaced.

Fueled by liquid oxygen and liquid hydrogen, the J-2X engine will generate 294,000 pounds of thrust in its primary operating mode to propel a spacecraft into low-Earth orbit. The J-2X can start and restart in space to support a variety of mission requirements.

The A-2 test stand originally was used to test Saturn V rocket stages for NASA's Apollo program. In the mid-1970s, the stand was modified from Apollo program parameters to allow testing of space shuttle main engines.

Pratt & Whitney Rocketdyne of Canoga Park, Calif., designed and built the J-2X for NASA.

To learn more about the engine visit http://www.nasa.gov/mission_pages/j2x/.

Observatory ... from page 1

modifications are about complete, most subsystems are ready and, essentially, "The SOFIA is open for business and can begin unlocking the secrets of the universe for generations to come."

Alois Himmes is SOFIA program manager for NASA's German partner, the German Aerospace Center, or DLR.

Himmes explained that the Germans are responsible for 20 percent of SOFIA operations, including providing astronomers as well as mechanics and engineers to service the German-built telescope, the world's largest airborne infrared telescope built to date.

"We make a seamless team," Himmes said of the joint NASA/German operation.

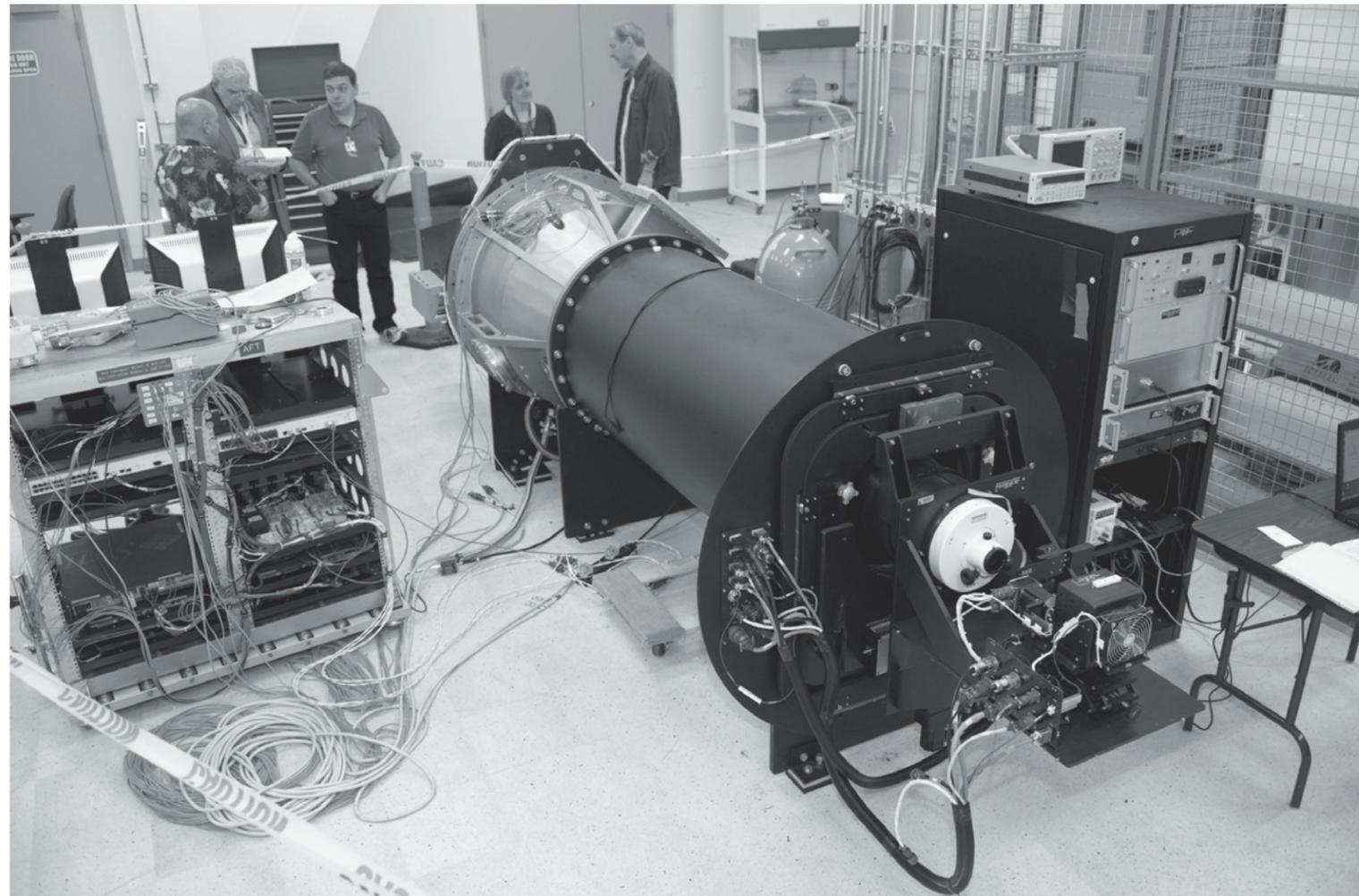
Dryden Center Director David McBride congratulated the SOFIA team on its achievements, noting that the road to developing the flying observatory has been hard and long. Preparing it for its missions entailed "the most complex [aircraft] integration – as complex as any of our X-planes."

Steve Zornetzer, Ames associate director, recognized the challenges of preparing the aircraft and integrating the 17-ton telescope. "Dryden has risen to the engineering challenges," he said.

Early science flights with the SOFIA included a mission flown the night before the event and, "These early science flights show exciting data were gained," he said.

Zornetzer mentioned Ames' legacy with flying telescopes, which paved the way for the SOFIA. A modified C-141 with a 36-inch reflective telescope called the Kuiper Airborne Observatory flew for 20 years and was retired in the mid-1990s to free up funds for the SOFIA effort. Also, a Learjet in the late 1960s flew with a 12-inch reflective telescope.

An airborne observatory has the advantage of being able to be dispatched anywhere in the world to optimize scientific opportunities.



EC11-0173-094

Visitors learn about the operation of the SOFIA telescope with the High-Speed Imaging Photometer for Occultations, or HIPO, instrument attached. A chance to see the HIPO instrument was one of many opportunities available to guests at the SOFIA science and education media day on June 8 at the Dryden Aircraft Operations Facility in Palmdale, Calif.

Also, instruments on board can be modified and changed out continually, enabling missions and training for personnel to evolve and helping inspire students to pursue careers in science, technology, engineering and mathematics, or STEM, fields.

Michael Bicy, director of science at Ames, said the SOFIA is a unique facility. "You will see an airplane with a hole in it," he said. "I see something different. I see an observatory."

Bicy then noted some of the SOFIA's most valuable attributes, including the ability to add new instruments throughout its lifetime,

development of data processing and analysis capabilities, careful planning of astronomical observations and – by including teachers on science missions – inspiring young people in science-related careers.

"We are looking forward to scientific discoveries that will be SOFIA's legacy," he added.

Recalling the legacy of airborne telescopes, Bicy acknowledged the recent passing of Frank Low, who observed with a 12-inch telescope on a NASA Learjet, and of Jim Elliot, who identified the rings around Uranus while on board the Kuiper.

The SOFIA reached key milestones in the past year that included the first light through the telescope, in May 2010, and the first science flight, on Nov. 30, said Pamela Marcum, SOFIA project scientist.

"The first phase [of science missions] is complete. Now, basic science has begun with the 23 flights that started last month. We fly high above the water vapor and come home after every mission, where we can service and upgrade instruments," Marcum said.

So far, expectations have been exceeded, said Terry Herter, principal investigator with the Cornell University-built Faint Object Infrared

Camera for the SOFIA Telescope, or FORCAST, instrument.

"At every stage, things have worked better than expected," he said. "It has been fun, and challenging enough to be interesting."

Herter, who had just hours before the event completed a SOFIA mission, said the one-of-a-kind flying observatory collected images on the very first science flight more than a year ago, when there was no guarantee that would be possible, and the observatory has continued to impress ever since.

Herter also said he was lucky to be able to be among the first to use the observatory, and that



EC11-0173-0555

NASA Photo by Tom Tschida

Thomas Keilig, telescope assembly manager for the German SOFIA Institute, points out features of the SOFIA's 100-inch primary mirror to Airborne Astronomy Ambassador Kathy Fredette of Desert Willow Intermediate School in Palmdale, Calif.

size does matter in the case of the SOFIA telescope because more detail can be captured with it; this level of detail sheds light on key astronomical areas of interest such as star formation – the telescope "peers" through dirt and dust into the center of the Milky Way galaxy, looking at phenomena such as black holes, newly born and dying stars and details at the galactic center, which is 30 times farther away from Earth than is Earth's nearest star.

In the future, the SOFIA will be used for a wide range of programs encompassing planetary science, star formation, stellar evolution, the interstellar medium and others, he said.

Rolf Güsten of the Max Planck Institute for Radio Astronomy in Bonn, Germany, and principal investigator for the German Receiver for Astronomy at Terahertz Frequencies spectrometer, or GREAT, talked about some of the science that his instrument is expected to achieve.

The GREAT works in a manner similar to that of a radio receiver, with which a person can tune in to hear the station they choose. With his spectrometer, Güsten said, he is "tuning in the building

blocks of the universe" with a radio 100,000 times more sensitive than one tuning into a listener's musical choice on Earth.

"All molecules have characteristic frequency footprints," he explained. The spectrometer focuses on finding those footprints with far-infrared spectroscopy, examining an under-used part of the electromagnetic spectrum that offers astronomers the greatest promise but for which technology to study it is only now becoming available to scientists.

An April 1 science mission with the GREAT instrument captured photons of a star-forming cloud in M-17 SW. Güsten said he and members of the astronomical community are awaiting the GREAT instrument's use in seeking deuterium, an element considered a chemical clock of the evolution of the universe that dates back to the big-bang event.

As scientists on board the SOFIA redefine what people know about the universe, teachers will be watching from seats adjacent to the researchers to see how the science is conducted. Educators will take what they learn back to their classrooms for use in inspiring the next generation of scientists.

Six teachers already have flown science missions as part of the 2011 U.S. Airborne Astronomy Ambassadors program – flights SOFIA officials initially did not believe would start until late in 2012. Two of the teachers, Marita Beard of Branham High School, San Jose, Calif., and Kathleen Fredette of Desert Willow Intermediate School in Palmdale, Calif., talked to media representatives about their experiences and what they hope to bring back to their classroom.

Teachers chosen for the program submitted proposals detailing how their participation would improve learning opportunities for their students. Once selected, there also were training requirements as well as a requirement for maintaining a continuing commitment to the SOFIA program.

Dana Backman, SOFIA education and outreach manager, and Dörte Mehler, education outreach manager for the German SOFIA Institute, or DSI, explained that the SOFIA is the first airborne observatory designed to accommodate visitors. An area inside the aircraft is set aside to allow people to witness the way the scientific process really works and the blood, sweat and tears – and sleepless nights – researchers endure to bring knowledge to the world.

Eventually, guests of the program also will include university academics at work on compelling research, additional educators, journalists, museum docents and leaders of amateur astronomy organizations.

Erick Young, SOFIA Science mission operations director for the Universities Space Research Association, explained that his organization coordinates the educational opportunities, public outreach and mission planning.

"The world we live in is molded by science and technology, and NASA has the ability to inspire young people in these areas," he said.

Dryden's first Maker Camp event took place May 19-20 in the ISF auditorium. More than 40 employees, from students to senior managers, took the opportunity to escape their everyday routine and work on fun and innovative engineering projects.

Maker Camps are being held at most NASA centers during spring and summer. Each center chooses challenging and locally relevant projects that encourage creativity. Dryden selected three main projects: How do you experiment with an aircraft that weighs less than a slice of bread? How many different ways could you fly on Mars? Where can we work in a fun, collaborative and cubicle-free environment?

Several experiments were conducted using micro remote-controlled aircraft. Some of the first experiments focused on flow visualization, with tufts of string or magnetic cassette tape attached to the small aircraft's wings. There were experiments with center of gravity that resulted in achieving a variety of stable flying conditions. There was flying in tandem, formation flying and flights made with maximum cargo weight as well as with a second wing.

The most complex experiment was one involving a photogrammetry experiment in which five different cameras recorded an airplane as

Maker Camp

Projects foster creativity and resolve challenges

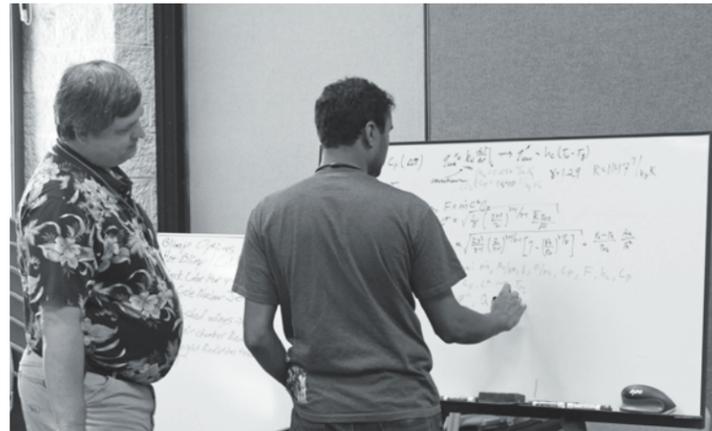


Photo courtesy Ryan Stillwater

Bob Clarke, left, and Nalin Ratnayake share ideas on a nuclear propulsion system for a Mars airplane.

it flew in front of a time-coded screen. The project's immediate goal was determining how useful research data could be obtained in difficult environments; it was designed to inspire participants to find creative and innovative ways to do experiments and research in their regular jobs.

A Mars flier could not be built and sent to Mars for test flights in

just two days. Instead, participants used their imagination to determine what a Mars aircraft might look like and identify technologies that would help to make it a reality. Possibilities ranged from blimps painted black, to take advantage of solar heating, to airplanes that shed their wings after landing to become a rover. Ideas for enabling technology ranged from vertical-

takeoff-and-landing capabilities to nuclear-powered propulsion systems. Ideas generated during the Maker Camp will be used in a Research Opportunities in Space and Earth Sciences 2011 Mars Fundamental Research proposal request.

The future home of an "Innovation Space" to be established at Dryden has been identified as the Lakebed Conference Room – at least half of it, anyway. Maker Camp participants shared visions of what is needed for outfitting an Innovation Space; whiteboards, Wi-Fi, comfortable chairs and coffee were among suggestions.

Other ideas ranged from a CNC machine to beanbag chairs. During the second day of the Maker Camp, the project migrated to the Lakebed Conference Room to begin detailed planning of how the room will look. Soon, Dryden should have a place designed to encourage collaboration in a free-flowing environment.

At the event, demonstrations supplemented the main project work. Michael Buttigieg gave a demonstration of the 3-D laser scanning tool currently being used at Dryden. The scanner was used to create detailed 3-D models of glider and remotely controlled aircraft. Participants were also

See Camp, page 8

Summer of Innovation returns to Dryden

Dryden's 2011 Summer of Innovation program is in full swing in the Antelope Valley! NASA's agency-wide Summer of Innovation initiative is an exciting science, technology, engineering and mathematics-based program designed to inspire students – as only NASA can – to choose careers in STEM fields. Targeted at the middle school level (grades 4-9 for the 2011-12 school year), Summer of Innovation activities provide engaging, project/engineering-based academics during summer months that continue throughout the following school year. The program

encompasses learning activities for students and professional development opportunities for teachers. Palmdale's AERO Institute is leading implementation of the program.

The agency is supporting the national commitment to STEM education improvement and inclusion of all populations in these disciplines, as demonstrated through several new federally supported initiatives. Administrator Charles F. Bolden, with the expressed support of President Barack Obama, announced the NASA Summer of Innovation program in

January 2010. Science, technology, engineering and mathematics achievement and accessibility have remained a cornerstone issue for the White House Council on Women and Girls.

Two presidential initiatives, "Educate to Innovate" and "Investing in Innovation," were announced in the fall of 2009, calling upon industry, academia, nonprofit organizations and other stakeholders in education to collaborate in addressing what subject experts and congressional committees have identified as a national crisis in STEM education.

One of the agency's overarching goals is inspiring students, through interaction with NASA employees, missions, research and facilities, to be the nation's future scientists, engineers, explorers and educators. NASA is tapping its unique resources to improve the retention of students in STEM disciplines, providing opportunities and activities along the entire length of the education pipeline.

Summer of Innovation objectives will be accomplished through strengthening the capacity of partner

See Innovation, page 8

Where is he now?

Former scholarship winner excels

By Tess Hoffman

Special to the X-Press

When Erich Schneider was awarded the 1987 Exchange Council scholarship he was only 15 years old and already a graduate of Covington Latin School in Kentucky. His father, Ed, a Dryden research test pilot since 1983, was also an alumnus of the private Catholic school, known for its strong science program and training in the classics.

Beginning in the third grade, Schneider had shown a strong interest in computers. The Exchange Council's Thomas Finch Memorial Scholarship helped him meet his tuition needs as an undergraduate at the California Institute of Technology, and gave him an additional connection to the Dryden family.

Schneider graduated from Cal Tech in 1991 with a Bachelor of Science degree in engineering and applied science with a computer science focus. He attended Texas A&M University for graduate studies in computer science, and was involved in the university's bioinformatics working group. He returned to Cal Tech in 1999, taking a position in IT Services as a system administrator.

Eventually, Schneider moved on to become a senior software developer at Yahoo. He currently works as



NASA Photo

Erich Schneider, second from left, and his parents, Ginger and Ed Schneider, were on hand in 1987 when Erich received the Exchange Scholarship from then Dryden site director Martin A. Knutson, right. Below is a current photo of Erich Schneider.

a programmer for Pasadena investment company First Quadrant.

Schneider is the sole member of his family still living in California. Both parents retired in the early 2000s and returned to their childhood home

in northern Kentucky. Schneider's brother also moved to Kentucky,



Erich Schneider

and lives there with his family.

During his early days with First Quadrant, Schneider discovered that one of his co-workers is former Dryden employee Lisa Jacobs, who was a computer system administrator at the center's Data Acquisition

Facility in the early 2000s.

It's a small world after all.

SAFE sets June event

The newly named Safety Action Forum for Employees – SAFE – will meet June 29 from 6 to 8 a.m. On the Dryden campus, the group will meet in the lobby of building 4800. At the Dryden Aircraft Operations Facility in Palmdale, the meeting will be held in the building 703 breezeway, next to the tool crib.

Be prepared for disaster

NASA is the lone federal agency responsible for its people's safety and well-being in space as well as here on Earth.

Over the past year, Administrator Charlie Bolden has emphasized the importance of family/personal preparedness for the entire NASA family. Preparedness is key to protecting families and communities during potential emergencies including fires, floods, earthquakes, hurricanes, tornadoes, terrorist attacks and other catastrophes.

The most important assets in the successful completion of NASA's mission are its people and their loved ones. The agency has developed a set of informational guides designed to help people prepare themselves, their families and pets for emergencies. These guides provide step-by-step instructions on how to develop a family preparedness plan.

All employees are encouraged to download these guides, prepare plans and review them with their families. The agency has taken necessary steps to prepare our NASA family; now, it is up to employees to prepare for an emergency.

Administrator Bolden's video on family preparedness and the Family Preparedness guides are at: <http://www.nasa.gov/centers/hq/emergency/personalPreparedness/index.html>.

June 29, 1959 – The X-15-3 (56-6672) arrived at the North American Aviation test facility at Edwards.

June 8, 1960 – The X-15-3 (56-6672) exploded during a static engine run. Pilot Scott Crossfield escaped unharmed.

June 1, 1994 – Two Lockheed GTD-21B drones (serial nos. 525 and 529) were delivered to the Dryden Flight Research Facility from Davis-Monthan Air Force Base, Ariz.

June 2, 1994 – Two more GTD-21B drones (serial nos. 513 and 537) were delivered to NASA DFRF inside C-17A (89-1189). Total cost of the delivery service for all four drones was \$1.



-Passings-

John W. Edwards, 71, an aeronautical engineer whose research helped NASA astronauts return to space following the 2003 Columbia disaster, died June 3. Edwards began work at NASA in 1965 at Dryden and transferred to Langley Research Center in Virginia in 1980. He was an authority in multiple fields, including flight control systems and design and aeroelastic analysis and testing.

Aug. 13 JetHawks game will honor Apollo 13's Haise

The 2011 Aerospace Appreciation Night at JetHawks Stadium in Lancaster is set for Aug. 13. The JetHawks will take on the San Jose Giants. This year's bobble-head giveaway features Fred Haise, member of the Apollo 13 mission. A barbecue will be held at 5:15 p.m. prior to the 7 p.m. game. All-you-can-eat hamburgers and hot dogs will be available. Tickets are \$6 for the game only, \$7 for the barbecue only and \$13 for both. Tickets are now on sale in the Dryden Gift Shop.

Innovation... from page 6

organizations that have demonstrated success in reaching students in grades 4-9 who are traditionally underserved in STEM disciplines (i.e., females, minorities and low-income students). Through summer and other extracurricular opportunities, intensive learning experiences will be offered that infuse NASA content and resources (e.g., educational materials, experts, facilities) into successful learning programs.

Dryden will partner with many Antelope Valley school districts during the 2011 Summer of Innovation program, including Palmdale Eastside and Westside, Lancaster, Tehachapi and the Antelope Valley Gateway Academy. More than 500 middle school students will participate this summer in rocketry, aeronautics and robotics activities offered by these partners. In addition, Dryden will reach over a thousand additional students with its support of Summer of Innovation programs in the Bakersfield, Downey, Imperial Valley and Phoenix service areas.

Dryden's SOI partner organizations will also provide professional development offerings for teachers that will extend into the school year. These are designed to support educators' long-term growth – including bolstering confidence in the teaching of STEM subjects and access to NASA content – and sustained engagement with students in their classrooms. Educators will participate in weeklong (minimum 20-hour) science camps with middle school students.

Support for our nation's students is an exciting challenge at the forefront of efforts to help give every American child the chance to be the next engineer, innovator, teacher, astronaut or astronomer, and look forward to this year's Summer of Innovation work with our partner students, parents and schools.

This piece was written by the Dryden offices of education and public affairs..



Photo courtesy Ryan Stillwater

Michael Buttigieg, left, demonstrates the use of a 3-D scanner in creating a glider model as Al Bowers observes.

Camp... from page 6

chance to pilot remotely controlled helicopters and airplanes. The Maker Camp event lasted just two days, but participants hope the creativity and enthusiasm it engendered will continue. Project ideas and volunteers are currently

being sought as plans get under way for the next Maker Camp at Dryden.

This article was provided to the X-Press by Dynamics and Controls branch engineer Ryan Stillwater, one of the Maker Camp event planners.

Ombuds services expanded

The Dryden Ombudsman program has been expanded in order to provide services at the AERO Institute and Dryden Aircraft Operations Facility, both in Palmdale, Calif., as well as at the main campus.

On the main Dryden campus, Keith Williams (phone 661-810-6871) and George Grimshaw (661-510-7810) are primary contacts, and Louise Boyd (661-810-8417) and Al Bowers (661-209-0304) are alternates. Their office is located in

room 1021, building 4800, and the office phone is ext. 2355.

At the off-site office, located in room N211 of DAOF building 703, Williams and Grimshaw are primary contacts and Kevin Reilly (661-510-4148) is alternate.

The Ombudsman program offers these confidential, informal, neutral and independent representatives to all center employees for discussion of issues involving organizational performance, mission success and safety.

The X-Press is published the first and third Fridays of each month for civil servants, contractors and retirees of the Dryden Flight Research Center.

Address: P.O. Box 273, Building 4839
Edwards, CA 93523-0273
Phone: 661-276-3449
FAX: 661-276-3566

Editor: Jay Levine, Tybrin, ext. 3459

Asst. Editor: Sarah Merlin, Tybrin, ext. 2128

Managing Editor: Steve Lighthill, NASA

Chief, Strategic Communications:
John O'Shea

National Aeronautics and
Space Administration

Dryden Flight Research Center
P.O. Box 273
Edwards, CA 93523-0273

Official Business
Penalty for Private Use, \$300

