



The Dryden XPRESS

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ACCESS studies contrails

By James Banke

NASA Headquarters Public Affairs

NASA researchers have begun a series of flights using the agency's DC-8 flying laboratory to study the effects of alternate biofuel on engine performance, emissions and aircraft-generated contrails at altitude.

The Alternative Fuel Effects on Contrails and Cruise Emissions, or ACCESS, research involves flying the DC-8 as high as 40,000 feet while an instrumented NASA HU-25 Falcon aircraft trails behind at distances ranging from 300 feet to more than 10 miles.

"We believe this study will improve understanding of contrail formation and quantify potential benefits of renewable alternate fuels in terms of aviation's impact on the environment," said Ruben Del

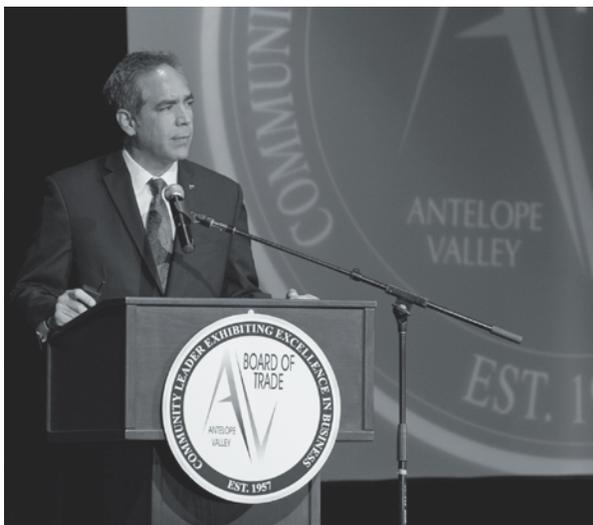


NASA/Eddie Winstead

Instruments on a HU-25 measured the chemical contents of the exhaust contrails from the NASA DC-8 using standard fuel and biofuel. This image of the DC-8 also was captured from the HU-25.

ACCESS, page 8

*Dryden
Director
David
McBride
explained
the center's
economic
impact on the
community
and how area
businesses and
contractors
have
contributed to
Dryden.*



ED13-0051-15

NASA/Tom Tschida

Dryden success fueled by AV businesses, contractors

By Jay Levine

X-Press editor

Dryden had a successful year in 2012 and businesses and contractors in the Antelope Valley had a role in that success.

Dryden Director David McBride delivered that message during his presentation at the Antelope Valley Board of Trade Business Outlook Conference Feb. 22 at the Antelope Valley Fairgrounds in Lancaster. The conference featured local, state and federal representatives giving updates on the economic trends and forecasts on the communities that make up the Antelope Valley and issues that can impact the area.

McBride showed a brief video highlighting Dryden projects, programs

Conference, page 6

By Jay Levine

X-Press editor

Dryden is at the forefront of developing aerospace technology and it is now recognized as a model for insuring that none of that technology fails from the use of counterfeit parts.

Steven Foster, who is Dryden's lead specialist for procurement quality assurance, spearheaded the development of a procurement process that greatly reduces the possibility of getting and using counterfeit parts.

"We might sometimes add a few steps in a process, but we sleep better at night knowing that we have done everything we can to mitigate that risk," Foster said. "Some people take the road of least resistance. We don't."

Counterfeit part makers are becoming more sophisticated and attuned to the market, making it a bigger and bigger problem for industry and government, Foster said. Suppliers selling counterfeit parts across the nation increased 63 percent from 2002 to 2011, adding 9,539 new high-risk vendors in 2011 alone.

It is estimated that about 2 percent of all parts purchased by the government are counterfeit – more than 500,000 parts a year. An example of the problem is \$2.7 million in damage to a U.S. Department of Defense missile system caused by the use of counterfeit parts.

"In a recent webcast to 30 countries, we explained how Dryden reduced the risk of counterfeit parts with good processes in place to do a thorough vetting of companies in size from a mom-and-pop store to a multi-million dollar corporation. We use that data to make informed decisions about if we want to use a supplier or not," Foster said.

A electronic risk assessment questionnaire was developed at Dryden to determine a company's records on where parts came from, controls on how the parts are acquired and tested prior to the parts arriving here. A point system from zero to 100 was developed to determine risk. The higher the score

Fake parts

Dryden program recognized as one of best in the nation



ED13-0011-3

NASA/Jim Ross

Scott Erickson prepares a material analyzer to determine the quality of metal sheets that were delivered to Dryden.



ED13-0011-17-17

NASA/Tom Tschida

Preventing counterfeit parts from showing up in Dryden projects takes a team, which includes, left to right, Steven Wildes, Sherry Schmitz, Nadia Wright, Jaime Garcia and Steven Foster.

the more confident Dryden can be that it is safe to purchase from the company. A score of 52 is required in most cases to procure parts, Foster said.

"Traceability is a big part of aerospace. Where did this part originate? Some suppliers can only trace it back to a country. Of course we won't use it because we don't know exactly where it came from and the risk would be too great," Foster explained.

It's not always easy tracing where parts came from, even those that are common off-the-shelf items.

"Some vendors do not want to release information when we start digging. If they refuse to give it to us, we disqualify them," Foster said.

"There can be a situation where a high-risk company is the only one with the part we need. We still get it, but we increase inspections and testing of the part before it is put into an aircraft for flight," he added.

Dryden has found counterfeit parts, one that cost just a nickel.

"Low cost items can have a high cost on our operation," said Steven Wildes, branch chief of the Quality Assurance branch.

The parts were tie straps that were used mostly for bundling wires together so they did not interfere with other flight control components during a mission. The parts were procured from overseas.

"Dryden technicians would put the tie wraps on and the part would snap and break in half. We evaluated why the tie wraps would break and determined they were counterfeit," Wildes said.

Another example was when Dryden ordered O-rings for a jet engine component. What the center received was a video recorder belt that was labeled as an O-ring that was "very obviously a counterfeit part," he said.

Former Center Director Kevin Petersen was concerned about counterfeit parts in the mid 2000s and that's when Wildes was chosen to focus on the quality of parts. Wildes later hired Foster to focus on refining processes to filter out

Avila, Collie win SFA awards

Two Dryden employees have been honored by NASA's Space Flight Awareness program for their contributions to excellence in quality and safety in support of human spaceflight.

Dennis Avila, a program manager with Lockheed Martin under contract to Dryden and Michael A. Collie, a Dryden lead quality assurance specialist, were among civil service and contractor employees from throughout the agency who were honored during ceremonies Jan. 27 at the Stennis Space Center in Bay St. Louis, Miss. The awards were presented by NASA astronaut Shane Kimbrough and Greg Williams, NASA's deputy associate administrator for the Human Exploration and Operations Mission Directorate.

Avila, a 40-year veteran of the aerospace industry, was honored for his exemplary leadership and management of space shuttle landing and post-flight technical support and shuttle retirement and transition activities at Dryden. He was cited for his work in retaining a cadre of trained, certified and competent technicians who maintained space shuttle ground support, navigation



Dennis Avila

and visual landing equipment, as well as keeping them focused on being ready to support potential shuttle landing and post-flight activities during the winding down of the shuttle program in 2009-2011.

Collie was honored for providing exemplary quality assurance support to NASA's Human Space Flight Program during assignments with the Defense Contract Management Agency, NASA's Johnson and Kennedy space centers and Dryden from 1997 through the conclusion of the shuttle program. His work also included detail assignments at the Rockwell Space System (later the Boeing Company) facilities in Palmdale and Rocketdyne in Canoga Park. Collie's citation noted his "outstanding contributions to the space shuttle orbiter fleet, the X-38 crew return vehicle and the Orion abort flight test program are true examples of his commitment to quality in assuring safety of flight and mission success."

In recognition of their space flight program contributions, Avila and many of the other honorees toured Kennedy in Florida and



Michael A. Collie

participated in activities during the Jan. 30 launch of NASA's next-generation TDRS - K communications satellite, the latest spacecraft in the Tracking and Data Relay Satellite System. TDRS is a constellation of space-based communication satellites providing tracking, telemetry, command and high-bandwidth data return services.

NASA's Space Flight Awareness Program recognizes outstanding job performances and contributions by civil service and contractor employees throughout the year and focuses on excellence in quality and safety in support of human spaceflight. Recipients must have contributed beyond their normal work requirements toward achieving a particular human spaceflight program goal; contributed to a major cost savings; been instrumental in developing material that increases reliability, efficiency or performance; assisted in operational improvements; or been a key player in developing a beneficial process improvement.

Vaughn honored for support

By Jay Levine
X-Press editor

Stephanie Vaughn, a Dryden safety specialist, was selected Jan. 25 as the 2013 Edwards Air Force Base Military Spouse of the Year. The Military Spouse of the Year award recognizes military spouses' important contributions and commitment to the military community.

"She has done everything and



Stephanie Vaughn

anything to ensure Airmen and military families feel like they are amongst friends and at home when they are stationed at Edwards," according to a nomination sent to Military Spouse Magazine. The magazine had an open nomination from November 2012 to January 2013 and a vote from the magazine's readership determined winners from across the nation.

Vaughn supports the military community by volunteering, organizing events, rounding up

resources, helping other spouses, cooking meals for military families and accompanying fellow spouses to squadron socials or meetings.

"I have to thank (my employer) Integrated Science Solutions Inc. very, very much for allowing me to take community service hours every year. It would have been very difficult to accomplish the things I have done for the Edwards community if I had been limited to volunteering after business hours," Vaughn said.

Award, page 5

News at NASA

Dragon arrives at ISS

The International Space Station received its second contracted cargo delivery March 3 when the SpaceX Dragon arrived with science cargo, hardware and supplies for the Expedition 34 crew.

Dragon is scheduled to spend more than three weeks attached to the station. During that time, the crew will unload around 1,200 pounds of science cargo, station hardware and crew supplies from the craft and reload it with more than 2,600 pounds of experiment samples and equipment for return to Earth.

Dragon is set to complete its mission on March 25 and make a parachute-assisted splashdown in the Pacific Ocean about 300 miles west of the coast of Baja California.

Dragon launched atop a Falcon 9 rocket March 1 from Cape Canaveral Air Force Station in Florida, beginning the second of 12 SpaceX flights contracted by NASA to resupply the station. This marks the third visit by a Dragon capsule to the orbiting laboratory, following a demonstration flight in May 2012 and its first commercial resupply mission in October 2012.

Dragon's rendezvous with the station was delayed a day in the wake of a temporary loss of three of four banks of thrusters after Dragon separated from the Falcon 9 rocket.

Jetsons saw this coming

By Jay Levine

X-Press editor

When George Jetson was ready to head off to the office he hopped into his bubble-shaped aerocar and zoomed off to work.

Traffic was manageable without cumbersome signals. In addition, he didn't have to worry about parking because his personal air vehicle conveniently converted into a briefcase.

While the realities of the concepts from the 1960s cartoon have not yet come to pass, two Dryden researchers are working on technology that could one day make such a vehicle possible. Fitting them in your suitcase is still a way off.

By using an off-the-shelf, quad-rotor, remotely piloted aircraft with its own piloting system, Matt Redifer and Loyd Hook can do the math to develop algorithms needed for future control systems. They envision these systems to safely and reliably operate a personal air vehicle and make many of those solutions part of the standard hardware for easier certification.

For example, programming the vehicle to avoid accidents with other air traffic is a must. The duo said they also believe such a vehicle would need to have a number of autonomously controlled piloting functions to win certification from the Federal Aviation Administration for this futuristic transportation.

The technology designed to enhance safety and reliability for an eventual personal air vehicle also has broad applications for manned and unmanned aircraft. For example, aircraft required to fly near dense urban or residential areas for work such as delivering packages, law enforcement, or disaster preparation or response could benefit as the FAA continues to look at solutions to best integrate manned and unmanned systems



ED13-0016-31

NASA/Tom Tschida

The quad rotor vehicle is flying to validate research on elements of a futuristic control system that has immediate applications for unmanned aircraft systems and potentially to a future personal air vehicle.



ED12-0387-17

NASA/Tom Tschida

Dryden cooperative education student Justin McCarthy, from left, and Dryden researchers Matt Redifer and Loyd Hook display the quad-rotor vehicle they are using for their research.

in the National Airspace System. In addition, some uses could be out of this world. A future Mars flying vehicle could use the systems technologies Redifer and Hook are

developing.

To begin their research, Redifer and Hook purchased the quad-rotor aircraft and augmented the autopilot system as part

of a Dryden Center Innovation Fund grant. Eventually the system for the quad-rotor aircraft could incorporate global positioning satellite information, map and typographical information. For now, three cameras provide location information to navigate the aircraft.

The idea for the project came from a conversation that Hook had with Mark Skoog. Skoog, the NASA project manager for several automatic ground collision avoidance system, or GCAS, projects, thought that the system developed on an F-16 and flown on the Dryden Remotely Operated Integrated Drone, or DROID, could be modified to work with a personal air vehicle. The concept was to make it possible to fly the vehicle in an autonomous mode, like an aircraft, but make it as easy to drive as a car, Hook explained.

FAA certification requirements for analytical systems that learn and predict situations would be complicated. For that reason Hook and Redifer chose a multi-layered system approach, Hook said. A standard flight control system is the first layer with safety critical systems constituting a middle layer that also has a GCAS with the authority to tell the higher level, or "thinking" systems that it can't perform certain maneuvers. For example, "the GCAS would tell the computer it can't fly into the ground," Hook said.

Redifer is interested in the control challenges of the system. The quad-rotor vehicle can validate and verify that the new subsystems work and lay the foundation for the higher level analytical "thinking" for the system.

"Moving the GCAS algorithms to hardware will increase the reliability that will be essential for a future personal air vehicle," Redifer added.

Project goals include demonstration of the multi-level

Quad rotor, page 8

Tech payload flies on balloon

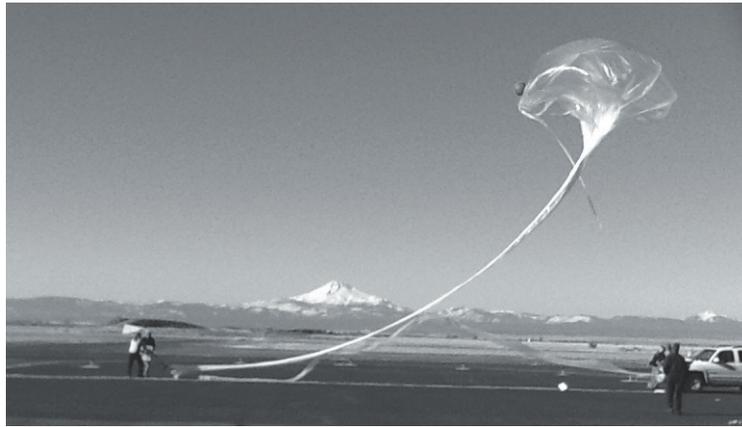
By Leslie Williams

Dryden Public Affairs

NASA's Flight Opportunities Program marked its first high-altitude balloon payload flight recently when one of the program's flight providers, Near Space Corporation of Tillamook, Ore., launched a developmental technology payload on a high-altitude balloon.

With Mount Jefferson in Oregon's Cascade Range as a backdrop, NSC personnel sent the balloon aloft to an altitude of about 102,000 feet – just over 20 miles – after launch from the airport at Madras, Ore., Jan. 20. Suspended underneath the balloon was a data acquisition system payload developed by the New Mexico Institute of Mining and Technology that would monitor the reliability of a commercial space vehicle's structure.

"The NSC high-altitude balloons provide a cost-effective platform to enable technology development payloads to be tested in a realistic, space-like operational environment," said Bruce Webbon of NASA's Ames Research Center, campaign manager for the launch. "Conducting such tests is fundamental to achieving the Flight



NASA/Bruce Webbon

The NSC balloon carrying the NMT prototype data acquisition payload begins its ascent from the Madras, Ore., airport.

Opportunities Program's goals of advancing technology maturation."

NMT professor Andrei Zagrai said a team of NMT engineering students designed and built the monitoring system to determine structural integrity for space vehicles, which is especially important for reusable craft re-entering the atmosphere. He said the technical university is focused not only on educating a new generation of engineers, but also on providing practical experience to their students.

The flight experiment

successfully delivered data that validated both sensors and wireless communication electronics that can be detected through metallic spacecraft materials over considerable distances that had to be proven in a realistic space environment.

Near-space balloon platforms provide a capability for the NASA program by flying above 99.9 percent of the atmosphere for long durations of hours or days, compared to only a few minutes with suborbital vehicles.

"We are pleased with the

immediate success we have been able to bring to NASA's Flight Opportunities Program with our relatively mature low-cost platform," said NSC President Tim Lachenmeier. "The program provides a unique win-win-win situation for NASA, technology developers and NSC."

The Federal Aviation Administration's Office of Commercial Space Transportation, the Air Force Research Laboratory's Space Vehicles Directorate and NMT funded the students' research and testing of the health monitoring system. The Los Alamos National Laboratory, Metis Design and LORD Microstrain provided the hardware components.

An FAA spokesman noted that NASA was very cooperative and responsive in planning and executing this flight.

NASA's Space Technology Program is innovating, developing, testing and flying hardware for use in NASA's future space missions. Dryden manages the Flight Opportunities Program for NASA's Space Technology Program. NASA's Ames Research Center at Moffett Field, Calif., manages the payload activities for the program.

Award... from page 3

An example of Vaughn seeing a need and filling it is when she started the Airman Leadership School, or ALS, pre-graduation spouse socials. Her husband, Master Sgt. Danny "Myles" Vaughn II, was selected in 2012 as the Airman Leadership School Commandant at Edwards. Stephanie started hosting the ALS spouse socials as a way to get involved in the new squadron and offer support to the spouses of young airmen who were completing ALS.

"The positive feed back I have received from the ALS spouses in addition to the unwavering support from Mrs. Debbie Brewer, Mrs. Kelly Randolph, and Mrs. Nancy

McCollar has been overwhelming. I love to think that this event might be around for all of the future generations of Edwards ALS spouses," Vaughn said.

When the first social was successful, the Edwards Air Force Base Enlisted Spouses Club volunteered to take on the cost to make the spouse social a regular part of ALS graduations, which occur about seven times a year.

Vaughn also helped save Branch Memorial Park and Pond in 2008 by rallying public concern during the environmental impact planning process. Due to the response she received, Edwards' commanders opted to keep Branch open. When

Branch Park and Pond were being considered for closure again in 2012, she set out to organize a base wide fishing derby to demonstrate how important this asset is to base families.

Vaughn found local organizations to donate thousands in prizes and food and convinced the California Department of Fish and Game to supply the fish for a fishing derby. The event was free for everyone with base access, including military members, military dependents, civilians, contractors and retirees. More than 200 people attended, including base leadership, and the park and pond were saved. Stephanie

has accepted the task of planning another derby this year.

"It's a great honor to be a military spouse and even greater honor to be able to make a difference for the other spouses and families that are around me," Vaughn said. "The gratitude expressed from my fellow Edwards families is all I need to validate why I do the things I do."

Danny Vaughn, in his nomination letter, said his wife does so much for the Edwards community: "She leads mass collections and delivery of cookies for the dorm dweller's cookie drives each year and warm clothing and blanket drives for the Airman's Attic. She volunteers her time and money whenever she is able."

Conference... from page 1

and research in 2012, among them the space shuttle Endeavour delivery to the California Science Center in Los Angeles, sonic boom research and Earth and space science research missions.

In addition, other projects included the automatic ground collision avoidance system development, the X-48C flight testing, the Flight Opportunities Program, Boeing's Phantom Eye and Sierra Nevada Corporation's Dream Chaser space-access vehicle, an engineering mockup of which is scheduled to soon arrive at Dryden to begin approach-and-landing tests.

Many in the audience were audibly wowed as the aircraft flashed across the screen to a driving beat that accompanied the video.

McBride highlighted a number of projects, such as the Stratospheric Observatory for Infrared Astronomy, or SOFIA. Images from the observatory's 100-inch telescope are showing astronomical discoveries "astrophysicists did not expect," he said.

Dryden work on quieting sonic booms will lead the way to eventually allow supersonic travel over land, automatic ground collision avoidance systems will lead to future aircraft that cannot crash and the X-48C represents the new shape of future aircraft that will be 20 to 40 percent more efficient than today's tube-and-wing designs, he explained.

McBride noted that the Global Hawk is opening up civil opportunities for unmanned aircraft systems with its use for hurricane research, missions flown on Dryden's DC-8 flying laboratory are leading to new discoveries in climate research and the Flight Opportunities Program is encouraging commercial access to space. He said Sierra Nevada's Dream Chaser could lead to a winged manned spacecraft to orbit and Boeing's Phantom Eye testing at Dryden could eventually lead to a hydrogen-powered unoccupied surveillance aircraft that could remain aloft for up to four days.

McBride stated that nearly three dozen local businesses or contractors contributed to Dryden's success in 2012. In return, the center created jobs in the community valued at \$75.5 million and generated an overall economic impact of \$328.4 million.

In addition, scientists and visitors to Dryden's main campus and the



ED13-0051-05

NASA/Tom Tschida

Brig. Gen. Michael Brewer, commander of the 412th Test Wing at Edwards Air Force Base, and David McBride, Dryden director, review notes prior to their presentations at the conference.

Dryden Aircraft Operations Facility in Palmdale, "eat in your restaurants and shop in your stores," he told conference attendees.

McBride noted many of the businesses and contractors that Dryden has employed, but he specifically thanked ASB Avionics of Mojave for that company's work in upgrading the flight deck avionics of the SOFIA aircraft, Adaptive Aerospace Corporation of Tehachapi for its installation of a SATCOM antenna on Dryden's B200 Super King Air and Nibbelink Masonry Construction of Lancaster for its work on the new Dryden Facilities Support Center.

Parts... from page 2

counterfeit parts. Finding parts for some of the center's aging aircraft can open the door for counterfeit part suppliers without a good system to detect them.

The dedication to keeping fake parts and subpar materials out of Dryden shops and aircraft continues with Center Director David McBride. McBride approved a state-of-the-art material analyzer that recently was delivered to Dryden to assist in determining the quality of delivered parts and materials.

Quality assurance representative Scott Erickson explained the analyzer could determine in a minute or less the chemical make up of materials. In addition, it is so sensitive that it can also be used to investigate even light

elements, solder and welds. Previous equipment could only analyze general metals, but this instrument is capable of looking at complex chemical elements used in the development of electronics. It is used to sample deliveries from established vendors and mills and more extensive investigations on materials from new vendors or from foreign mills.

Using the device, "We can trust what we are getting," Erickson said.

The next step is looking for ways to better share what the center has learned.

"We are also working with NASA Headquarters to develop a single list of cleared suppliers for use by all NASA centers. That information could also be shared with different



This material analyzer is one of the most recent tools used to uncover substandard materials and counterfeit parts.

ED13-0011-10
NASA/
Tom Tschida

agencies and companies," Foster said.

The goal of these efforts is the same – protect people from injuries

and eliminate unknowns about parts and materials from the risks that must be taken for a successful flight test program.

Safety Day set for March 13

By Jay Levine
X-Press editor

Dryden employees will have an opportunity March 13 to fill up on safety information during Safety Day and then fill up on food at the Employee Appreciation Lunch.

The mandatory day of activities for all Dryden employees is set for Hangar 4802. Bart Henwood, Aviation Safety branch chief, will make opening remarks at 8 a.m. followed by comments from Dryden Director David McBride.

The theme "I never thought it would happen to me!" provides insight into a number of topics on the agenda.

Angela Hefter and Stephanie Gutierrez of the Jacob Hefter Foundation are scheduled to speak about texting and driving. They will recall how a Metrolink engineer failed to see a red light signal because he was busy texting, which ultimately resulted in Jacob Hefter's death and that of 25 others and injuries to another 135 people.

Following them is Al Lederman, the chief motorcycle safety officer

at Edwards Air Force Base, who will talk about motorcycle safety. Next up is John Zellmer, Dryden chief of Protective Services, who will explain what the first 72 hours after a major emergency are like.

Senior Airman Cole Cargill is scheduled to talk about resiliency – maintaining well-being and responding to challenges. His presentation includes recognizing the signs and symptoms of depression and ways to defuse some of those feelings. Also on the schedule is Dryden historian Peter Merlin, who will present "Lessons from the Past," a discussion about lessons learned from case studies of organizational factors in three aviation mishaps.

The morning session is scheduled to conclude with guest speaker Gary Norland, who was a union maintenance electrician for a pulp and paper mill when he was investigating why a 200-amp, 12,500-volt power line was shorting out and shutting down a section of the pulp and paper mill. According to information from his website, he loved his work and had a can-do

attitude, so he pressed on with the job a few hours before the end of the day.

He ran a test on the power line and as he leaned over the bucket rail to stretch his back, he felt a sharp pain and a buzzing sound in his right ear. He had leaned back and touched what should have been a de-energized power line with his right earlobe. Every muscle and organ in his body convulsed and contracted and his heart stopped. He collapsed, fell back into the power line and hit it a second time with the back of his head. Fire and electricity shot through him and exited from 15 places resulting in electrical burns to more than 37 percent of his body.

Norland suffered permanent brain and spinal cord damage from the high voltage electrical trauma and was told he would never walk again. He has had more than 50 surgeries following the accident and has regained 40 percent use of his legs. He will talk about the harrowing injuries he endured and the ripple effect this injury has had

on him, his family, coworkers and the community.

The Employee Appreciation Lunch is combined with Safety Day and is scheduled from noon to 1:30 p.m., also in Hangar 4802.

After lunch, employees are encouraged to visit the ISF, which will host a number of booths with a safety theme including the NASA Safety Reporting System, the Employee Assistance Program, heat illness and prevention, ergonomics, hearing conservation, fatigue risk management, ground safety, Community Emergency Response Team, motorcycle safety, the dangers of texting while driving and emergency preparedness.

In addition, classes and training include the G650 Crash Investigation at the base auditorium, lockout/tagout training in the small mezzanine that requires prior registration in SATERN and a fire extinguisher demonstration outside hangar 4802.

For employees with additional questions, contact Denise Cope at ext. 2837.



Boeing/Bob Ferguson

Phantom Eye records its second flight at Dryden

Two weeks after completing taxi tests, Boeing's Phantom Eye, the liquid-hydrogen powered unmanned airborne system, took to the skies Feb. 25 for its second flight at Dryden. The flight lasted 66 minutes, reaching an altitude of more than 8,000 feet and a speed of 62 knots. Phantom Eye is designed to stay airborne for up to four days at 65,000 feet, providing intelligence, surveillance and reconnaissance capabilities to support a variety of missions.

ACCESS... from page 1

Rosario, manager of NASA's Fixed Wing Project.

ACCESS flight operations are being staged from the Dryden Aircraft Operations Facility in Palmdale and are taking place mostly within restricted airspace over Edwards Air Force Base.

During the flights, conventional JP-8 jet fuel, or a 50-50 blend of JP-8 and an alternative fuel of hydroprocessed esters and fatty acids that comes from camelina plants, power the DC-8's four CFM56 engines.

More than a dozen instruments mounted on the Falcon jet characterize the soot and gases streaming from the DC-8, monitor the way exhaust plumes change in composition as they mix with air, and investigate the role emissions play in contrail formation.

Also, if weather conditions permit, the Falcon jet will trail commercial

aircraft flying in the Southern California region, in coordination with air traffic controllers, to survey the exhaust emissions from a safe distance of 10 miles.

The flight campaign began Feb. 28 and is expected to take as long as three weeks to complete.

ACCESS follows a pair of Alternative Aviation Fuel Experiment studies conducted in 2009 and 2011 in which ground-based instruments measured the DC-8's exhaust emissions as the aircraft burned alternative fuels while parked on the ramp at the Palmdale facility.

A second phase of ACCESS flights is planned for 2014. It will capitalize on lessons learned from the 2013 flights and include a more extensive set of measurements.

The ACCESS study is a joint project involving researchers at Dryden, NASA's Glenn Research



ED13-0058-01

NASA/Lori Losey

NASA Langley's heavily instrumented HU-25 Falcon measures chemical components of the exhaust streaming from the DC-8's engines.

Center in Cleveland and NASA's Langley Research Center in Hampton, Va.

The Fixed Wing Project within

the Fundamental Aeronautics Program of NASA's Aeronautics Research Mission Directorate manages ACCESS.

Quad rotor... from page 4

autonomous piloting system.

"We want to have all the systems you would need," Hook said, "and demonstrate the multi-layer approach that will apply to unmanned aerial systems in the short term and one day a personal air vehicle. Such a future vehicle also will have health monitoring systems to indicate if there are troubles prior to takeoff, its destination and where it will land if an emergency develops."

A personal air vehicle is still a futuristic concept. However, the technology to make way for that possibility while making current aircraft systems safer and more reliable is underway today.



Dryden researcher Loyd Hook flies the quad rotor research vehicle to validate research on elements of a futuristic control system that has immediate applications for unmanned aircraft systems and potentially to a future personal air vehicle.

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