National Aeronautics and Space Administration

The Dryden X-PRESS

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Studying FaINT sound

By Gray Creech
Dryden Public Affairs

NASA's Supersonics Project embarked on its latest effort to soften sonic booms when a NASA F/A-18 aircraft took to the air for a project called Farfield Investigation of No Boom Threshold, or FaINT, in late October.

The latest in a continuing progression of NASA supersonics research projects aimed at reducing or mitigating the effect of sonic booms, FaINT is designed to enable engineers to better understand evanescent waves. Evanescent waves are an acoustic phenomenon that occurs at the very edges or just outside of the normal sonic boom envelope.

For an aircraft flying at a supersonic speed of about Mach 1.2 or less at an altitude above 35,000 feet, the shockwaves being produced typically do not reach the ground, so no sonic boom is heard. This is because shockwaves from an aircraft flying supersonically at higher altitudes are refracted, or bent upwards, as they enter warmer air closer to the ground, due to the fact that the speed of sound increases with air temperature.

ED12-0306-10 NASA/Jim Ross

Dryden's F/A-18B mission support aircraft No. 852 flies near the Tehachapi Mountains. The aircraft flew a series of low-supersonic, high-altitude flight profiles during the Farfield Investigation of No Boom Threshold, or FaINT, flight research project at Dryden.

But when sonic booms curve upward they create a series of sonic boom waves that are focused along a line. This line is called a caustic line. The side of the caustic line opposite of the sonic boom waves is called the "shadow side," where the evanescent waves are generated. This is the area that NASA researchers are studying during FaINT.

"It's exciting to help lead a new area in sonic boom flight research," said Larry Cliatt, principal investigator

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Work schedule will be put to a vote

By Jay Levine
X-Press Editor

Four years ago when Dryden management offered the option of the Maxi-Flex work schedule that allowed every other Friday to be a day off, a large majority of the center took the plunge.

Now, four years later, Dryden officials had a Town Hall Oct. 19 about converting the rest of Dryden's staff to the same schedule in January 2013 to improve workforce coordination and efficiency and save up to $300,000 a year in utility and operational costs. The savings will come from having the center "go dark" for three-day weekends, eliminating the need for heaters, chillers, lights and other infrastructure needs for those days.

The schedule is a compressed 9/80 work schedule and functions like this: workers have nine-hour days Monday through Thursday with Friday of one week being a day off and the second Friday an 8-hour day.

The math works out to 80 hours in a pay period. It was first proposed to the Dryden civil service workforce for a vote in summer 2008 to take the edge off of high fuel costs and followed Presidential direction for government agencies to reduce energy use.

At the Town Hall, Center Director David McBride, Dryden Deputy Director Patrick Stoliker and Associate Center Director Vince Chacon fielded questions and tallied some of the pros and cons of moving the whole center to the 9/80 compressed schedule.

Currently, under the Maxi-Flex schedule, each day of the week

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BWB marks 100th flight

New record reached for unmanned test aircraft

ED12-0331-10 NASA/Carla Thomas

The upgraded X-48C version of Boeing's Blended Wing Body subscale research aircraft banks over Rogers Dry Lake during a test flight Oct. 16. Combined with the earlier X-48B version, the X-48 technology demonstrator has now flown 100 test missions, more than any other single unmanned X-plane.

The Boeing X-48 Blended Wing Body subscale research aircraft made its 100th flight on Oct. 30 at Dryden.

The unmanned X-48C aircraft flew two separate 25-minute flights that day, which marked the seventh and eighth flights for the X-48C since it began flying under its latest configuration on Aug. 7. Between 2007 and 2010 the aircraft made 92 flights in the X-48B iteration.

"Once again, working closely with NASA, we have been pleased to pass another flight-test milestone in our work to explore and validate the aerodynamic characteristics and efficiencies of the Blended Wing Body concept," said Boeing X-48 project manager Mike Kisska of Boeing Research and Technology.

"We are thrilled by the continued success of our flight testing and the useful data that we have collected during the first eight X-48C flights," added Heather Maliska, Dryden's X-48C project manager.

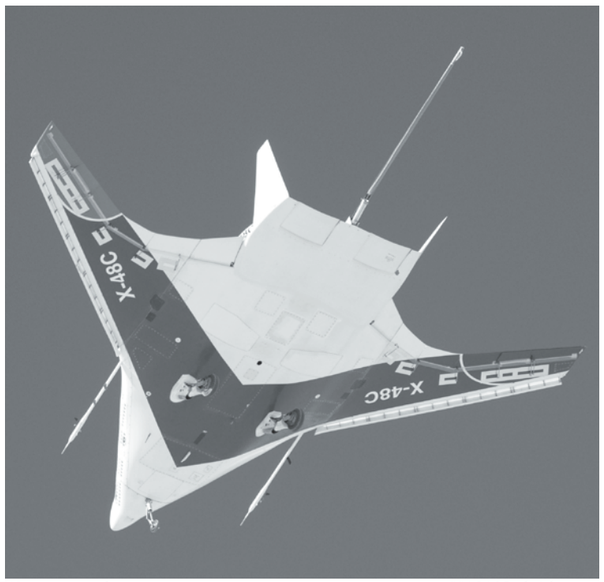
Kisska noted that X-48's 100 test flights more than doubles the record of 40 flights performed by a single unmanned X-plane. The previous record holder was an X-45A Joint Unmanned Combat Aircraft technology demonstrator, also developed by Boeing.

The X-48 is a scale model of a heavy-lift, subsonic aircraft that forgoes the conventional tube-and-wing airplane design in favor of a modified delta design that effectively blends the vehicle's wing and body into a smoothly contoured configuration. Boeing and NASA believe the blended or hybrid wing body concept offers the long-term potential of significantly greater fuel efficiency and reduced noise.

Boeing's blended wing body program manager Bob Liebeck said earlier flight tests of the X-48B proved that a blended wing body aircraft could be controlled as effectively as a conventional tube-and-wing aircraft during takeoffs and landings and other low-speed segments of the flight regime. With the X-48C, the team has been evaluating the impact of noise-shielding concepts on low-speed flight characteristics.

The X-48C, which was modified from the previous X-48B version, is configured with two small 89-pound-thrust turbojet engines instead of the three 50-pound-thrust engines on the B-model. The wingtip winglets on the X-48B have been relocated inboard next to the engines on the C-model, effectively turning them into twin tails, and the aft deck was extended about two feet at the rear.

The Boeing-NASA team expects to fly the X-48C about 20 more times before the program concludes.



ED12-0331-06 NASA/Carla Thomas

Boeing's X-48C Blended Wing Body research aircraft is silhouetted against the morning sky during its fifth test flight on Oct. 16. It has flown eight times since Aug. 7.

ED12-0332-02 NASA/Jim Ross

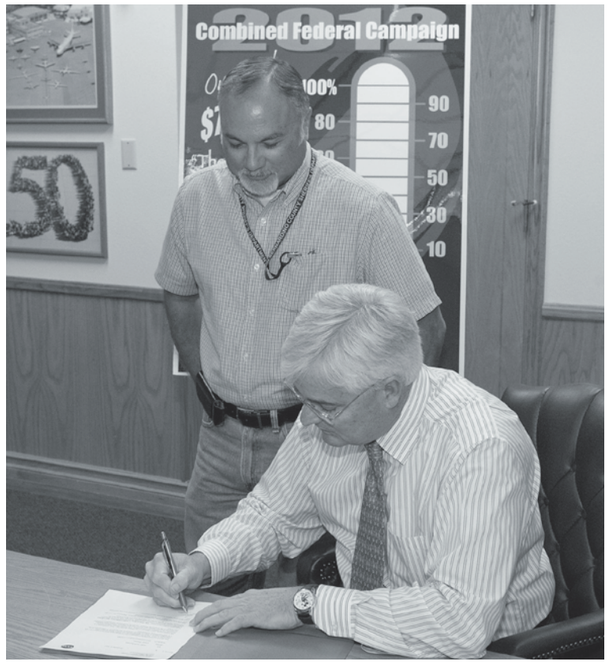
Global Hawk returns home

NASA Global Hawk No. 872 approaches the runway at Edwards Air Force Base, as the aircraft returns from a study of hurricane formation in the Atlantic Ocean off the coast of Africa. The Global Hawk was deployed for a month to NASA's Wallops Flight Facility in Wallops Island, Va., for the Hurricane and Severe Storm Sentinel, or HS3, mission.

Campaign underway for CFC

The 2012 Combined Federal Campaign began Nov. 5 and is scheduled to continue through Dec. 15. Ed Swan, left, is the CFC chair and watches as Dryden Deputy Director Patrick Stoliker signs a memo to kick off the campaign. The fundraising goal for 2012 is $75,000. Civil Service employees can contact their key workers for more information. Key workers are CFC organizers selected for each Dryden organization. The theme for this year is, "The time is now to make a difference that will last a lifetime."

ED12 0293-04
NASA/Tom Tschida



Hispanic heritage

Dryden Director David McBride, second from left, recently spoke at the Hispanic Heritage Month lunch as the keynote speaker. Dryden and the Air Force Test Center partnered to arrange for the event at Club Muroc. The heritage month began Sept. 15 and concluded Oct. 15.

ED12 0293-04
NASA/Tom Tschida

News at NASA

Dragon delivers

The SpaceX Dragon cargo craft splashed down in the Pacific Ocean Oct. 28 a few hundred miles off the coast of Baja California.

It marked a successful conclusion to the first contracted resupply mission to the International Space Station.

The Dragon capsule was taken by boat to a port near Los Angeles, where it was prepared for a return journey to SpaceX's test facility in McGregor, Texas, for processing.

While most of the cargo was returned to Texas, some research samples collected in the orbiting lab's microgravity were removed in California and prepared for immediate transport to NASA.

Dragon delivered 882 pounds of supplies to the orbiting laboratory, including 260 pounds of crew supplies, 390 pounds of scientific research, 225 pounds of hardware and several pounds of other supplies. Dragon returned a total of 1,673 pounds, including 163 pounds of crew supplies, 866 pounds of scientific research, and 518 pounds of vehicle hardware and other hardware.

Dragon launched atop a Falcon 9 rocket Oct. 7 from Cape Canaveral Air Force Station in Florida, beginning NASA's first contracted cargo delivery flight, designated SpaceX CRS-1, to the station.

The mission was the first of at least 12 cargo resupply missions to the space station planned by SpaceX through 2016 under NASA's Commercial Resupply Services contract.

California Science Center welcomes Endeavour

By Jay Levine
X-Press editor

Thousands of people anxiously waited Oct. 30 at the California Science Center in Los Angeles to catch the first glimpses of the Space Shuttle Endeavour in its new home.

The exhibit debuted following a ceremony attended by local, state and federal officials and dignitaries. Attendees also gained insight into Endeavour and NASA's future space missions, as Dryden Center Director David McBride spoke about the orbiter and NASA's future.

"Endeavour was part of the Space Shuttle Program's remarkable 30-year history. It flew 25 missions, helped us build the International Space Station and laid the foundation for an even more exciting future for NASA and America's space program," McBride said.

The new era of space exploration is underway, he added. SpaceX of Hawthorne, Calif., resupplied the ISS in October, the first American Company to succeed at that task, he said.

"By relying on American ingenuity, American companies, and American workers to take over routine transportation to the space station and other low-Earth orbit destinations, NASA can focus on developing the new Space Launch System and Orion multi-purpose vehicle that will take our astronauts further into space than we have ever gone before – to an asteroid and eventually to Mars," he said.

McBride spoke directly to the young people in the audience and said to be a part of the future of American spaceflight, help the country retain its technological edge and prepare for the jobs of tomorrow, "It all begins with the study of science, technology, engineering, math and the arts. Study hard and always do your best."

NASA/Bill Ingalls

Space Shuttle Endeavour, mounted atop its strongback transporter frame on seismic isolator pedestals, is shown in the Samuel Oschin Pavilion at the California Science Center in Los Angeles during the exhibit's grand opening ceremonies.

ED12-0349-29 NASA/Tom Tschida

Melvin D. Leland, NASA associate administrator for education, talks directly to Mark Mardrosians of Dixie Canyon Community Charter School in Sherman Oaks, Calif.

He continued, "It is my hope that Endeavour's presence here will inspire you and more of your friends and peers to pursue studies and careers in STEM disciplines. America needs you. NASA needs you. Set your sights on the stars and never, never, never give up!"

NASA astronaut R. Shane Kimbrough attended, as did former astronauts, Leland D. Melvin, Barbara R. Morgan, John (Danny) Olivas and Garrett E. Reisman.

Melvin, who currently is NASA's associate administrator for education, also made inspirational presentations to two groups of 700 students and one group of 800 teachers during special events at the California Science Center. The grand opening of the Endeavour

See Endeavour, page 7

ED12-0349-155 NASA/Tom Tschida

NASA had more than three-dozen displays and exhibits including this Human Exploration and Operations Directorate exhibit.

NASA/Jay Levine

Dryden Director David McBride visits with members of the robotics team from Beckman High School of Irvine, Calif.

ED12-0349-76 NASA/Tom Tschida

Dryden's Tom Horn talks to a family about the robotics program, which includes a Lego League for younger students.

A frightful good time for all

Dryden's main campus at Edwards and the Dryden Aircraft Operations Facility in Palmdale had spooktacular contests that included a chili cook-off, pumpkin decorating, costumes and skits. The dual events raised a combined $1,832 for the Dryden Exchange to fund center employee activities.

Caldrons of chili were brewing thanks to 26 participants. The People's Choice at Dryden went to Code C, Momma Mia Chili, while the People's Choice at the DAOF went to Code CR Blast-Off Chili. The Judge's Choice at Dryden went to the Code A Acquisition Style Chili and at the DAOF was awarded to Alan Crocker's Creamy White Chili.

Costume contest winners included Richard Wong and his children in the mini-me category, Doug Garvin for the funniest

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ED12-348-80 NASA/Tom Tschida

ED12-348-22 NASA/Tom Tschida

ED12-348-89 NASA/Tom Tschida

Above, Jeff Nelms and Monica Hoffman are the Code M Lampshades. Top right are Gemma Flores and Gwen Holm, who introduced skits and announced contest winners. Bottom right, Michele Hurd, John Trigg and Desiree Sylvia stand by the Code F Pumpkin Support Center.

Schedule... from page 1

represents a day off for someone on center, which makes some work challenging since many competencies of the center are one deep, McBride added.

"There are days we can not fly because we can't get everyone together," McBride said.

The idea to better balance work and family lives has been successful, according to work force surveys since the change. In addition, McBride said two fewer days per month to drive out to the center conserves fuel. Unfortunately, an unintended consequence was some inefficiency this proposed synchronization of work schedules seeks to close.

A number of people do not currently work the 9/80 Maxi-Flex, McBride said. Some of those workers have children that attend school on base, or have other schedule challenges that make working the 9/80 difficult. Employees can coordinate their work hours with their supervisors, as long as those hours include the core Dryden hours of 8 a.m. to 3:30 p.m.

For those people not currently on the 9/80 schedule – if the vote of Dryden civil servants goes in favor of the 9/80 schedule later this year – alternatives are under consideration for how to meet everyone's needs and still retain the proposed savings.

Some of those suggestions included telecommuting for those who can work from home, or an alternate worksite, either at a single facility at Dryden or the center's Palmdale locations at the AERO Institute, or the Dryden Aircraft Operations Facility. Those details will not be worked out until after the proposed vote.

Also, some projects will still have telecons they might have to attend with customers on the off days. Air Force and commercial customers not on the schedule also will need to be notified early in the project planning as to the schedules. If customers need to run a flight on the off-day schedule, the cost of energy and overtime will have to be figured into the cost," McBride added.

"Once we establish the schedule, it will be easy to predict the sequence of flights," McBride said.

That's not to say there won't be exceptions. For example, McBride said the Stratospheric Observatory for Infrared Astronomy, or SOFIA, will continue its 14-day cycle in the short-term, but that ultimately, that program also will work into a schedule that will include three days off in a row.

When aircraft are flying missions, such as the Global Hawk hurricane study, the same will be true. However, those are temporary changes to the schedule that do not require the center to be fully staffed for the operations. Services from other areas will need to be accounted for prior to a flight day on one of the off periods.

Not every flight needs attorneys, human resources, procurement and other support services that will not be available on those days the center is closed, McBride explained. He added that about 96 percent of civil servants already work a 9/80 schedule.

The Maxi-Flex schedule is not the first of its kind in the federal government, as NASA's Jet Propulsion Laboratory in Pasadena also has a similar schedule. In fact, McBride hypothesized that all of NASA might one day end up with a similar work schedule and then Dryden would sync with NASA Headquarters' schedule.

Regardless of the vote later this year there will be a change – either to the full 9/80 compressed schedule, or back to the traditional 10/80 schedule.

Dreams of Endeavour

By Jay Levine
X-Press editor

When crowds lined up to see Endeavour at the California Science Center Oct. 30, Jeffrey N. Rudolph smiled.

Rudolph, the president and CEO of the California Science Center in Los Angeles, saw the fulfillment of a long-time dream to bring one of the nation's space shuttles to Los Angeles. Along the way he had some opportunities, including attending Endeavour's landing at Dryden Sept. 20.

"The landing at Edwards was very emotional, seeing Endeavour actually arriving in California. It really brought home that a 20-year dream was truly coming to fruition. I have spent quite a bit of time with Endeavour at KSC during the last 15 months, but seeing it gracefully landing on the SCA (the NASA 747 Shuttle Carrier Aircraft) was a truly memorable moment," Rudolph said.

He compared that experience with seeing Endeavour arrive at Los Angeles International Airport the following day after the orbiter and its host NASA 747 flew over a large portion of California on the orbiter's last flight.

"What amazed me in L.A. was seeing the incredible excitement, joy and inspiration that the final flyover provided throughout the State of California. It was a magical moment," he said.

The California Science Center displays the orbiter in a horizontal position at the Samuel Oschin Pavilion and more than 2 million people are expected to see Endeavour during its first year at CSC. The orbiter will ultimately be housed in a new addition intended to be built to the east of the California Science Center's Annenberg Building that is anticipated to open in 2017.

"Guests have a chance to see the Endeavour right away and learn about the science, engineering and significance of this national treasure. When the Samuel Oschin Air and Space Center is completed, we will move the Endeavour and display it upright with a full stack including the SRB's (solid rocket boosters and a replica ET (external tank)," Rudolph said.

There's more: "Guests should be able to walk up a ramp to get a great view into the payload bay. We are still working on the engineering, but are hoping that we can place Spacehab in the payload bay," he said.

Rudolph said he was "thrilled" to be the sole West Coast permanent home for one of the shuttles.

"California played a crucial role in development, construction, maintenance and support of the shuttles and has long been a center of innovation and development of our air and space technology. Because of this, many people all over California feel a deep sense of pride and connection to the shuttle program. For the thousands of scientists and staff who worked on the shuttle program and who continue to work in the space industry, for their families and the local communities who support them, receiving the Endeavour is like a wonderful homecoming," he said.

Endeavour's new mission will be to inspire the next generation of scientists, engineers and explorers to support the United States in maintaining a crucial role in air and space.

ED12-0349-76 **NASA/Tom Tschida**

Brandon Cruz, left, and Joseph Alvarez of Downtown Value School in Los Angeles look at a Space Shuttle Endeavour display.

Endeavour... from page 5

exhibit was part of a six-day event, called SpaceFest.

"This is the launch of a new mission for Endeavour to inspire the next generation of explorers. The students, parents, teachers, and attendees celebrated this addition to this community and to California's focus on science, technology, engineering and mathematics education," Melvin said.

NASA had more than three dozen exhibits, displays, and educational demonstrations honoring aeronautics and space exploration past, present, and future.

Safety Day is set for Jan. 9

A Dryden Safety Day is set for Jan. 9, 2013.

The theme for this event is, "I never thought it would happen to me!"

The mandatory day of activities is scheduled for Hangar 4802. It starts at 8 a.m. and concludes at 3:30 p.m.

The day will consist of speakers, training, interactive displays and booths. Watch for more information in the X-Press and on the Xnet.

NSSC News is available

The NASA Shared Services Center quarterly publication, the NSSC News, is designed to provide updates on NSSC activities and contains information that NASA employees need to know.

It is available at www.nssc.nasa.gov/customerservice. Click on the newsletter icon for the latest issue.

Hear from the space station

NASA's Spot the Station service sends an e-mail or text message a few hours before the space station passes over your house.

The space station looks like a fast-moving plane in the sky, though one with people living and working aboard it more than 200 miles above the ground.

It is best viewed on clear nights. For more information on the International Space Station and its mission, visit the space station mission pages. To sign up for the e-mail go to: http://spotthestation.nasa.gov/

FaINT... from page 1

for the FaINT flight project at Dryden. "We are investigating supersonic technology and research that is relatively raw in the modern sense. When overland supersonic commercial travel is commonplace, it will be efforts like this that helped get us there."

The evanescent wave flights were over Edwards. Recording them on the ground were special microphone arrays placed on the southern portion of Rogers Dry Lake that are Dryden researchers' sensors of choice.

For the FaINT flight project, capturing the fleeting sounds of evanescent waves coming off sonic boom shockwaves was a challenge. Similar to the shadow the sun creates behind a building, if some light were to still leak around the edges it would not get completely dark, but it would get darker the further you move away from the edge. Certain conditions and refractions create a similar "shadow side" of a sonic boom where evanescent waves are generated, sounding similar to distant thunder. These waves quickly fade and disappear, as supersonic shockwaves act similar to boat wakes on water, decreasing with distance.

NASA/Tom Tschida

Cessna researchers prepare to launch a blimp that carries several microphones used to record sonic booms for the FaINT project.

"The FaINT team has been working hard on the development and design of the FaINT project for the last six months," said Brett Pauer, FaINT deputy project manager at Dryden. "NASA and its seven industry and university partners are ready to collect data and expand our collective knowledge of sonic boom propagation effects near the shadow side of them."

Characterizing the effects of both normal and loud sonic booms in order to provide the data necessary for engineers to design future low-boom supersonic aircraft has required an amazing amount of work and tenacity by NASA engineers from the agency's Dryden and Langley research centers and industry partners.

Recent and related sonic boom research preceding FaINT included the Superboom Caustic Analysis and Measurement Program, which produced and measured amped-up, super-loud sonic booms, and the Waveforms and Sonic boom Perception and Response project, which gathered data from a select group of volunteer Edwards Air Force Base residents on their individual perceptions of sonic booms produced by aircraft in supersonic flight over Edwards.

The overarching goal of NASA's sonic boom reduction research is to shrink the sonic boom "footprint" in order to make commercial supersonic flight over land practical.

NASA's Aeronautics Research Mission Directorate at NASA Headquarters in Washington, D.C., funded the research.

Halloween
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costume, Jason Gonella for the scariest costume and Code M for its skit performance.

Great Pumpkin contest winners included the Pumpkin Support Center by Code F on the main campus and three winners at the DAOF: UAS Surveillance for the Great Pumpkin in the best technical category, John Payne for best original pumpkin and Melissa Lopez for the best dressed pumpkin.

ED12-348-24 NASA/Tom Tschida

Lydia Dorfman, center, serves up some award winning Code C Momma Mia Chili. From left to right are Priscilla Wright, Dorfman and Sierra Cogan.

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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

Managing Editor: Steve Lighthill, NASA

Chief, Strategic Communications:
Kevin Rohrer

National Aeronautics and
Space Administration

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

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