



The Dryden X-**PRESS**

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IceBridge resumes

DC-8 flying laboratory continues Antarctic mission

By Sarah DeWitt/Kathryn Hansen
Goddard Space Flight Center

Scientists returned in late October to the Southern Hemisphere, where NASA's Operation IceBridge mission is set to begin a second year of airborne surveys over Antarctica. The mission monitors the region's changing sea ice, ice sheets and glaciers.

Researchers are flying from Punta Arenas, Chile, on NASA's DC-8, a 157-foot-long airborne laboratory equipped with a suite of seven environmental instruments. The focus is to re-survey areas undergoing rapid change and to embark on new lines of investigation. Based at the Dryden Aircraft Operations Facility in Palmdale, Calif., the DC-8 flying lab and its flight crew and scientists flew from Palmdale to Punta Arenas.

"We are excited to learn how the glaciers and sea ice have changed since last year's campaign," said Michael Studinger, IceBridge project scientist



ED10 0309-11

NASA Photo by Tony Landis

NASA's DC-8 flying laboratory takes off from its base at the Dryden Aircraft Operations Facility in Palmdale for the IceBridge Mission. The flights for the mission are based in Punta Arenas, Chile.

at Goddard Space Flight Center in Greenbelt, Md.

"We also are going to be mapping uncharted regions that will allow us to better assess

future behavior of the Antarctic ice sheets and sea ice."

IceBridge science flights will continue through mid-November. Flights depart Punta Arenas and

cross the Southern Ocean to reach destinations including West Antarctica, the Antarctic Peninsula and coastal areas. Each flight lasts about 11 hours.

Instruments for the 2010 Antarctic campaign are the same as those flown in 2009. A laser instrument maps and identifies surface changes. Radar instruments penetrate snow and ice to provide views of what lies beneath for use in developing a profile of the ice's characteristics and also of the shape of the bedrock supporting it. A gravity instrument measures the shape of seawater-filled cavities at the edge of some major fast-moving glaciers.

Using these tools, researchers are surveying targets of ongoing and potential rapid change, including the West Antarctic Ice Sheet, which is the area with the greatest potential

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Direction, goals focus of NASA retreat

By Jay Levine
X-Press Editor

At NASA's senior leadership retreat Oct. 13-14 at Langley Research Center in Hampton, Va., NASA leaders met to discuss the future, define goals and discuss the agency's mission statement and vision, Center

Director David McBride said at an Oct. 19 town hall meeting.

The president's plan for NASA, which is supported in the NASA Authorization Act of 2010, is for the agency to pioneer new frontiers of innovation and discovery. For NASA to do that,

the new plan invests more in NASA, extends the life of the International Space Station to 2020, adds another space shuttle flight and calls for launching a commercial space transportation industry, McBride explained.

In addition, the president's plan

calls for the development of path-breaking technologies, is designed to create thousands of new jobs and gives NASA a roadmap for the future course of human space exploration and development.

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Mullane talks teamwork

Former astronaut thanks employees for shuttle contributions

By Peter W. Merlin
Dryden History Office

Former astronaut Mike Mullane, a veteran of three shuttle missions, gave his “Countdown to Teamwork” presentation in the ISF auditorium Oct. 7 as part of Dryden’s Career Development Mentoring Program.

Mullane, selected as a mission specialist in 1978 in the first group of space shuttle astronauts, logged 356 hours in space aboard the orbiters Discovery (STS-41D) and Atlantis (STS-27 and 36) before retiring from NASA and the Air Force in 1990. He has been inducted into the International Space Hall of Fame and is the recipient of many awards, including the Air Force Distinguished Flying Cross, Legion of Merit and the NASA Space Flight Medal.

At the outset of his talk, Mullane expressed gratitude for Dryden’s contributions to the space shuttle program.

“Thanks for all that you’ve done to put America in space and to put me in space,” he told center employees.

The author of “Riding Rockets: The Outrageous Tales of a Space Shuttle Astronaut” (Scribner, 2006) shared personal experiences that ranged from humorous anecdotes of toilet malfunctions to the inspirational story of how he made his youthful dreams of spaceflight come true. Describing the combination of fear and wonderment astronauts experience during a shuttle launch, Mullane said, “At the same time we’re terrified, we’re also boundlessly joyful.”

The main thrust of the presentation included an overview of the fundamentals of teamwork and some of the obstacles faced by organizations such as NASA. Mullane was candid in sharing his opinions about missteps that led to the losses of two space shuttle orbiters, Challenger in 1986 and Columbia in 2003.



ED10 0302-16

NASA Photo by Tony Landis

Former astronaut Mike Mullane speaks to Dryden employees about teamwork during an Oct. 7 presentation at the center.

He defined three fundamental elements of teamwork. First, he emphasized the need for every member of a team to take responsibility for his or her actions and be fully invested in team goals at all times.

“When you see a problem and don’t say anything, you cease to be a team member and become a passenger,” he said.

Second, he recommended that each team member exercise “courageous self-leadership.” He pointed out that team members should not hesitate to speak up simply because of lack of seniority, reluctance to confront others or fear of reprisal.

“A good leader empowers the

team members. Everybody counts.”

Finally, he warned against a tendency to normalize even the smallest deviance from prescribed procedures. He urged everyone to recognize that they are vulnerable to false feedback and the temptation to deviate from established standards. The strength of Mullane’s advice lay in his common-sense approach.

“Maintain situational awareness and think ahead. Plan the work and work the plan. Be extraordinarily vigilant when altering standards, because they were established for a reason.”

Mullane used the Challenger disaster as an example of normalization of deviance –

acceptance of events that are not supposed to happen – caused by false feedback. The spacecraft was lost 73 seconds after launch due to a catastrophic failure caused by a damaged rubber O-ring in a seal between segments of a reusable solid-fueled rocket booster. Schedule pressure that precipitated a launch under adverse temperature conditions was also considered a factor in the accident.

Mullane said that inspections of O-rings from the previous 24 shuttle flights revealed 14 instances of damage.

“If you deviate from standards and nothing bad happens,” he said, “the absence of bad consequences makes you think it is safe to deviate.”

Referencing the conditions that preceded the final flight of Challenger, he noted, “In a no-pressure situation [earlier in the program], O-ring damage was deemed intolerable but under intense schedule pressure it was expected.”

Rather than alerting officials to a serious problem, it lulled them into a false sense of security.

Emphasizing the importance of learning from past experience, Mullane suggested that organizations should archive and review case studies of near misses and disasters. He said that the loss of the orbiter Columbia resulted in part from a loss of corporate memory. Schedule pressure once again eclipsed safety concerns.

During the final launch of Columbia, foam debris from the external fuel tank struck the leading edge of the orbiter’s wing, causing damage that resulted in catastrophic failure during re-entry. Previous foam strikes over the preceding 22 years of shuttle operations had occasionally caused significant damage but had not been serious enough to result

See Mullane, page 7

NAC visits Dryden

The NASA Advisory Council, members of which advise NASA Administrator Charlie Bolden on agency programs and policy issues, held a two-day quarterly meeting in October at the AERO Institute in Palmdale. Hosted by Dryden, the sessions focused on reports from the chairman of the council's various committees and comments from NASA Deputy Administrator Lori Garver that the agency needs to shift public attention to the future of NASA's aerospace research and scientific exploration in the post-shuttle era.

"We have to be able to communicate better with the public about what they feel is of value that we do, and then, of course, communication is two-way, having them understand more what it is that are doing," Garver said. "The president's budget was all about leading human space flight into the future, having a more robust and strong program that can last for decades and centuries."



ED10 0298-10

NASA Photo by Tom Tschida

Bob Meyer, Stratospheric Observatory for Infrared Astronomy program manager, leads a tour of the SOFIA aircraft for the NASA Advisory Council and discusses the infrared telescope aboard the highly modified NASA 747SP, which is based at the Dryden Aircraft Operations Facility in Palmdale.

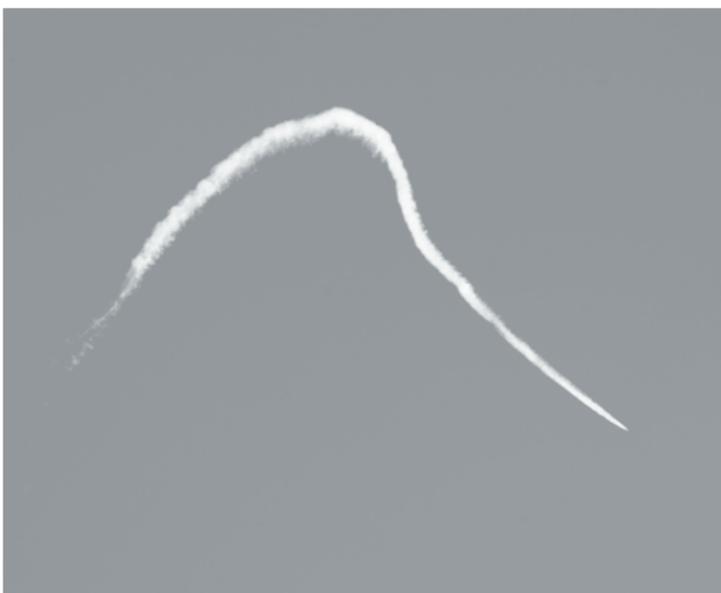
The day prior to the meeting, the research and development efforts council was briefed on the SOFIA under way during a tour of Dryden airborne observatory, the Global facilities in Palmdale and at Edwards Hawk science aircraft and other Air Force Base.

SonicBOBS continues

For several years, NASA has been researching means of reducing not only the strength of the shockwave produced when a high-performance aircraft exceeds the speed of sound, but also the perceived intensity of those shockwaves – or sonic booms – heard by people on the ground. Dryden's current Sonic Booms On Big Structures – or SonicBOBS – project is part of that effort.

Two NASA F/A-18 aircraft flew a series of targeted supersonic runs on Oct. 14 that resulted in multiple sonic booms of varying intensity being heard in the Edwards Air Force Base area. A second series of flights was flown Oct. 16.

The experiments are examining the structural response of large office buildings to low-amplitude



ED10 0316-56

NASA Photo by Tom Tschida

An F/A-18's contrail marks the aircraft's supersonic flight, which was monitored on the ground as part of ongoing SonicBOBS research.

See SonicBOBS, page 8

News at NASA

Proposals sought in hypersonics project

An amendment has been made to the NASA Aeronautics Research Mission Directorate announcement, "Research Opportunities in Aeronautics 2010," for solicitation of additional proposals. The announcement has been modified to include new topics in support of the agency's hypersonics project.

With the amendment, the hypersonics project of the Fundamental Aeronautics program calls for proposals about enabling technologies and development of a new pool of expertise in two primary areas: air-breathing access to space and entry, descent and landing of high-mass vehicles in planetary atmospheres.

Educational institutions, nonprofit organizations and private-industry entities engaged in foundational research are expected to be the announcement's primary award recipients.

Specific evaluation criteria, deadlines and points of contact are available in the announcement. This solicitation will entail a two-step proposal submission process. The due date for Step 1 submissions is Nov. 23.

For more information about this announcement and updates on additional research topics in other project areas, visit NASA's Research Opportunities website, <http://nspires.nasaprs.com>.

ER-2 checks out new instrument

A team of Jet Propulsion Laboratory researchers and their collaborators at the University of Arizona's College of Optical Sciences in Tucson are developing a new prototype science instrument for a next-generation space satellite mission that would survey the impacts of aerosols and clouds on global climate change.

The MSPI, or Multiangle SpectroPolarimetric Imager, is a multi-directional, multi-wavelength, high-accuracy polarization camera. It is a candidate instrument for NASA's Aerosol-Cloud-Ecosystem, or ACE, mission, the need for which was identified in results from the National Research Council's Earth Sciences Decadal Survey. The ACE mission objectives include characterizing the role of aerosols in climate change, especially their effect on precipitation and cloud formation.

An airborne prototype version of the instrument, the AirMSPI, was checked out recently on one of NASA's high-altitude ER-2 Earth Resources aircraft during a two-hour flight piloted by Dryden research pilot Tom Ryan from the Dryden Aircraft Operations Facility in Palmdale, Calif. According to JPL MSPI principal investigator David J. Diner, the Oct. 7 maiden checkout flight of the AirMSPI instrument was very successful. A follow-up checkout flight is will be made soon.

The MSPI is a follow-on instrument to the JPL-developed Multi-angle Imaging SpectroRadiometer, or MISR, that is aboard NASA's Terra satellite. An airborne version of that instrument, AirMISR, was previously flown on NASA's ER-2s during missions from Dryden. Some components of AirMISR have been incorporated into the new AirMSPI instrument.

"AirMISR had four spectral bands; AirMSPI has eight and three of them are polarimetric," Diner explained. "This additional



ED08 0053-07

NASA Photo by Carla Thomas



Photo courtesy JPL

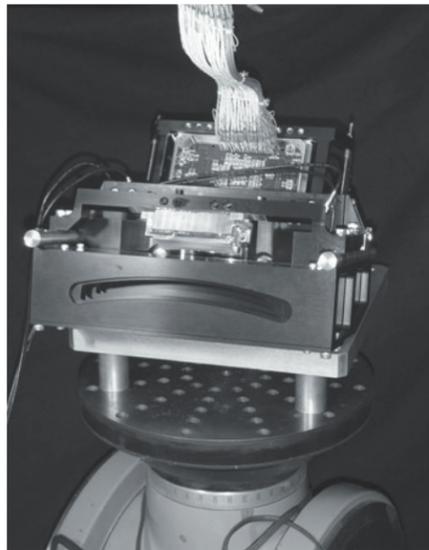


Photo courtesy JPL

Top, the ER-2 flies a mission. At left, the black circular area shows where the sensor is located on the underside of the ER-2. Above, JPL's Multiangle SpectroPolarimetric Imager is pictured. The instrument is a multi-directional, multi-wavelength, high-accuracy polarization camera.



ED10 0211-01

NASA Photo by Jim Ross

The Stratospheric Observatory for Infrared Astronomy team continues to work toward full checkout of the aircraft in preparation for science missions.

Work continuing with SOFIA

Testing of the entire integrated observatory system and individual subsystems on NASA's Stratospheric Observatory for Infrared Astronomy 747SP was conducted in October during a series of nighttime, ground-based observations. The Faint Object Infrared Camera for the SOFIA telescope, or FORCAST, instrument was mounted on the telescope for the tests.

Later this fall, the SOFIA 747SP will take to the night sky for several flights to check out the entire observatory system. This will be followed by a series of initial science flights.

The FORCAST instrument, developed by a team of scientists working under the direction of principal investigator Terry Herter of Cornell University, will remain on the SOFIA's German-built telescope during the first flights when the flying observatory begins its study of the universe.

Earlier this summer, the SOFIA completed envelope expansion flight tests. The aircraft was flown at varying altitudes, air speeds, telescope cavity-door positions and telescope angles to verify modifications made to the aircraft to allow it to operate with a telescope installed in the rear fuselage.

During 12 flights, engineers measured structural loads to ensure that the new bulkhead and cavity door system has acceptable design margins and to confirm that the open cavity door does not create excessive acoustic vibrations on the telescope or aircraft. In-flight maneuvers and landings verified that the aircraft's flying qualities do not change when the telescope cavity door is open during flight.



ED10 0308-60

NASA Photo by Tony Landis

The FORCAST (an infrared camera) built for the SOFIA airborne observatory is mounted on the German-built infrared telescope that is at the heart of the NASA 747SP aircraft.

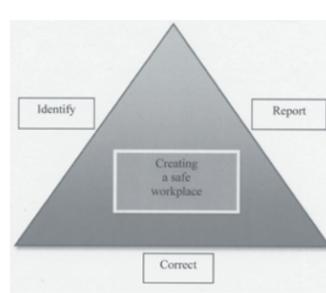
Spooktacular



Dryden's 14th annual chili cook-off and costume contest didn't disappoint, as Code M, at left, won for the group talent category with its "Dryden Family Feud." Code X's unsynchronized swimming, bottom right, also elicited chuckles. Doug Garvin channeled his inner hillbilly, bottom left, and was the individual costume winner. In the chili category, Code CR's White Lightning was the People's Choice, with Judge's Choice going to Jerry McKee's Original Afterburner Chili. Second place Judge's Choice was awarded to EMCOR/Geraldyn Drake's ROC ME Chili and honorable mention went to Mary Wilson's MMX Chili. The event raised \$1,712 for the Dryden Exchange Council.



NASA Photos by Tom Tschida



Employees support safety

Dryden's Safety office highlights three ways employees can make Dryden a safer place to work: identify potential problems, report incidents and correct unsafe conditions or potential hazards.

When employees identify a potential problem/hazard or report an incident, safety personnel are provided an opportunity to make an assessment and abate the potential hazard, preventing an employee from being injured.

Safety personnel note that several employees have already begun identifying potential problems. For the center to be successful in becoming safer, Dryden employees are needed to be the center's eyes and ears.

The Safety office identified Dryden employees diligence as key to ensuring workplace safety, and hopes the effort is being carried over to increased attention to safety at home.

Base pastor offers support to Dryden

Edwards Air Force Base Chaplain Lt. Col. Timothy T. Ullmann met with the Dryden Executive Leadership team Oct. 25. New outreach activity is expanding at Dryden to "offer front-line help to resolve an issue before it escalates," he said.

The services will augment what Dryden offers and is available to government and contract staff.

Chaplain Maj. Brian Clouse will offer to help people at the center and can be reached at Chapel Two at 661-277-2110.

"We see everyone as a part of Team Edwards," Ullmann said.



ED10 0331-03

NASA Photo by Tony Landis

Lt. Col. Timothy T. Ullmann addresses the Executive Leadership Team.

-Passings-

Kay and Associates AGE equipment mechanic **Timothy A. LaBarbara** died Oct. 15. A former member of the U.S. Marine Corps, he was buried in Riverside National Cemetery.

Former secretary to then Center Director Ken Szalai **Dora Borjon** passed away suddenly during an October trip to Sonora, Mexico. Plans for a memorial service are pending. She also served as director of human resources at the center.

Retreat... from page 1

The NASA Authorization Act of 2010 spells out what Congress and the president want the agency to do. Still to come is the appropriations legislation that is expected to equal about \$19 billion for NASA.

In fact, just prior to the congressional recess, the Senate unanimously approved the NASA Authorization Act of 2010 and the House voted 304-118 in favor of the legislation.

“In an era where we’re seeing political disagreement across the country, NASA still has huge bipartisan support. Congress sees NASA and technology as a driver of the economy,” McBride said.

During the retreat, McBride said NASA’s new vision was unveiled: NASA leads scientific and technological advances in aeronautics and space for a nation on the frontier of discovery. The mission calls for NASA to drive advances in science, technology and exploration to enhance knowledge,



David McBride

education, innovation, economic vitality and stewardship of the Earth.

Along those lines, NASA’s draft 2010 Strategic Plan goals also were listed:

- **Goal 1:** Extend and sustain human activities across the solar system. Dryden’s work with Johnson Space Center, Houston, and White Sands Missile Range, N.M., with the Pad Abort-1 test to validate an escape system for a future space vehicle is one example of how Dryden can assist with that goal, McBride said.

- **Goal 2:** Expand scientific understanding of the Earth and the universe in which we live. The Stratospheric Observatory for Infrared Astronomy, a NASA 747SP carrying the world’s largest airborne infrared telescope, is set to begin science missions later this year and be a part of that goal. Also, the recent hurricane studies with the Global Hawk and DC-8 and the DC-8’s work on the IceBridge mission are

examples of how Dryden is assisting with that goal.

- **Goal 3:** Create the innovative new space technologies for our exploration, science and economic future. Dryden has a big role and California and west coast-based companies have presented a number of technology development proposals, McBride said.

- **Goal 4:** Advance aeronautics research for societal benefit. Demonstrating technology will be part of Dryden’s task as flight research projects and programs are developed, he added.

- **Goal 5:** Enable program and institutional capabilities to execute NASA’s aeronautics and space activities. Dryden is operated efficiently and the institution and facilities are about the right size and the employees have the right core skills, McBride said.

- **Goal 6:** Share NASA with the public, educators and students to highlight opportunities for participating in our mission, foster innovation and contribute to a strong national economy. Outreach has traditionally been strong at Dryden and information and photos and videos of aircraft are frequently requested on the Web, he said.

NASA Administrator Charlie Bolden released his goals, all of which McBride said contain elements that Dryden supports:

Concerning safely flying the remaining shuttle missions, McBride said Dryden will be ready to assist with shuttle support and landings if required for the final orbiter missions.

A second point is to assure that a cohesive senior leadership team is in place to implement the priorities for the agency, while ensuring that the workforce stays engaged and motivated about their work achieving NASA’s mission, and making NASA the number one place to work in government. Dryden will mirror that with its leadership team and workforce, McBride said.

Ensuring an energized, innovative program of technology development and scientific and aeronautics research to support exploration beyond low-Earth orbit and make life better here on Earth are goals Dryden will work to achieve through flight research.

Another goal is to facilitate the success of a viable commercial space industry to provide assured U.S. access to low-Earth orbit for cargo and crew and acquire, mature and infuse commercial capabilities across all NASA activities. Dryden’s airworthiness and flight safety review is considered a solid approach for commercial space activities, McBride said.

A continuing goal is to promote enhanced cooperation with international, industry, other U.S. government agency and academic partners in the pursuit of our missions. Dryden has a number of agreements in place, including those with industry partner Northrop Grumman on Global Hawk; Lockheed Martin on Automatic Collision Avoidance Technology; international partner DLR with the SOFIA; and The Boeing Company and Cranfield Aerospace on the X-48B and C.

One new direction has peaked McBride’s optimism. A new focus on flight research will require Dryden to return to activity that constitutes one of its main contributions to NASA aeronautics. Flight research is expected to validate emerging technologies and raise their readiness level for use by the private sector through commercialization, McBride said.

“You never know how something is going to work, or if it will work, until you take it to flight. Ultimately, you have to take it to flight to get the technology to the level of confidence high enough for our customers to take that technology forward,” McBride said.

Regardless of the complexion of NASA and how the goals are carried out, one thing seems certain – the outlook for NASA appears solid.

Mullane ... from page 2

in a catastrophe. As a result, such incidents were considered simply a normal maintenance issue rather than a safety-of-flight issue.

Mullane suggested that effective teamwork and leadership are key to avoiding future mishaps. Concluding with a return to his philosophy of self-leadership, Mullane used his own life story as an example.

Noting that he had not seemed destined for great success, he said he had not been a child prodigy.

He wasn’t a sports star, he said, wasn’t popular, and didn’t date the homecoming queen. Yet he realized his lifetime dream of becoming an astronaut because of leaders (parents, teachers, etc.) who saw his potential and fostered his inner motivational drive. He emphasized that self-leaders set lofty goals, stay focused on what’s important, and constantly strive to do their best.

“Success isn’t a destination. It’s a continuous life journey of working toward successively higher goals.”

Nov. 14, 1958 – Following modification as a mothership for the X-15, NB-52A (52-0003) was delivered to Edwards Air Force Base from North American Aviation’s Palmdale facility.



Nov. 4, 1973 – Don Mallick delivered a Bell 47G helicopter (N822NA) to the Flight Research Center from Houston. The four-day, 1,500-mile journey took 25.5 flight hours and required nine refueling stops. Average ground speed was 52 mph.

IceBridge... from page 1

for triggering a rapid increase in sea level. Another concern stems from the fact that the ice sheet is below sea level, which adds to its instability.

Revisiting previously flown areas, scientists can begin to quantify the magnitude of changes to land ice. Pine Island Glacier, the largest ice stream in West Antarctica and one with significant potential for contributing to sea level rise, has long been a primary target for sustained observation.

Satellite data, most recently from NASA's Ice, Cloud and land Elevation Satellite, or ICESat, have shown dramatic thinning there of up to 10 meters per year in places. Previous IceBridge flights

mapped the surface of the glacier and unusual features beneath it, providing clues to the glacier's rapid retreat and ice loss.

In addition to flying previous routes over the glacier, the IceBridge team plans to fly a new horseshoe pattern to sample tributaries feeding into Pine Island Glacier's main trunk. Other new flight lines will further explore the Antarctic Peninsula for purposes of mapping new targets, including the George VI Ice Shelf, above and below the ice.

Three high-priority flights are aimed at measuring sea ice. One goal involves mapping and measuring sea ice across the

Weddell Sea. Scientists want to know why sea ice in Antarctica is growing in extent, unlike sea ice in the Arctic, which is declining in extent. Current theories range from ozone depletion to changing ocean dynamics.

Other flights are planned in coordination with existing space and ground-based missions, such as one involving the European Space Agency's ice-observing Cryosat-2 satellite and another in connection with European ship-based research. Overlapping measurements help researchers calibrate instruments and boost confidence in resulting observations.

"A concerted effort like this will

allow us to produce long time series of data spanning from past satellite missions to current and future missions," Studinger said. "This is only possible through international collaboration.

"We are excited to have so many opportunities to work with our international partners during the upcoming campaign."

More information about Operation IceBridge is available at <http://www.nasa.gov/icebridge>.

The Operation IceBridge blog is at <http://blogs.nasa.gov/cm/newui/blog/viewpostlist.jsp?blogname=icebridge>.

Follow IceBridge on Twitter at <http://twitter.com/IceBridge>.

Instrument... from page 4

capability will provide greater sensitivity to aerosol optical and microphysical properties.

"The addition of more spectral bands and polarimetry helps pin down the particle properties better," he said. "Intensity and polarization imagery from the checkout flight look very good, so all indications are that the camera is working very well.

"The camera is mounted in a rotating drum, which orients it at a pre-programmed set of pointing angles using a motor, and the multi-angular views also help in studying aerosols," Diner said, noting that the AirMSPI can also be used to study clouds and Earth's surface.

The novel polarimetric imaging program, and the instrument technique used by the AirMSPI was built under NASA's Airborne Instrument Technology Transition program.

SonicBOBS ... from page 3

sonic booms. NASA engineers installed sensitive instrumentation in the Edwards Consolidated Support Facility office building to record the structural response of the recently constructed building to momentary overpressure of the sonic shockwaves.

A group of visitors to the center also experienced these quieter sonic booms and recorded their impressions of each boom on a

questionnaire prepared by project engineers. Arrangements had been previously made for the group, members of which are influential in the development of planned supersonic cruise vehicles, to be present for the flight tests so as to experience sonic booms first-hand; the Edwards supersonic corridor affords a number of opportunities to do so that are rarely available elsewhere.

Leland is new education chief

Administrator Charles Bolden announced Oct. 12 the selection of Leland D. Melvin as NASA's new associate administrator for education.

Melvin will be responsible for development of the agency's education programs. He succeeds James L. Stofan, who had served in an acting capacity since last spring. Since April 2010, Melvin has been assigned to the Headquarters Office of Education, where he led the education design team.

Melvin joined the agency in 1989 as an aerospace engineer. He joined the astronaut corps in 1998 and has served twice as shuttle mission specialist.

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