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Celebrating Bill

Legendary test pilot William “Bill” Dana honored by friends and family at event

By Jay Levine
X-Press editor

Internationally recognized former NASA Armstrong test pilot Bill Dana expressed through actions, not words, that he was among the best of the best at what he did. He was honest, humble, had great integrity and was the ultimate professional.

Those were a few thoughts speakers mentioned at a celebration of Dana's life at NASA Armstrong July 17. Dana died May 6. He was 83.

Best known for his exploits in the X-15 rocket plane and a series of lifting body aircraft, he also was a legendary prankster with a sense of humor that made him a favorite at the center. In a 2008 survey developed for employees to recognize some of the driving forces of the center, Dana received more mentions than anyone else.

Center Director David McBride recalled his first experience with Dana, as the test pilot exited an F-104 aircraft: “His smile would light up any day.”

Ken Szalai, a former center director, relayed a M2-F3 post flight meeting. It was the first flight of the



Center Director David McBride, left, presents an American flag flown during NASA research flights to Bill Dana's widow, Judi, center and the Dana's three daughters and son. From left are McBride, Sidney Sparks, Leslie Dana-Kirby, Matt Dana and Jan Sieving.

Astrobotic landing system tested

By Leslie Williams

Armstrong Public Affairs

Astrobotic Technology's newly developed autonomous landing system was put to the test recently when it controlled Masten Space Systems' XA-0.1B Xombie suborbital technology demonstration rocket during a NASA-sponsored launch and landing at the Mojave Air and Space Port in Mojave, California.

In a June 20 test, funded by the Flight Opportunities Program of NASA's Space Technology Mission Directorate, the vertical-takeoff, vertical-landing Xombie ascended to about 853 feet (260 meters) in 25 seconds. During the boost phase, the Astrobotic Autolanding System (AAS) was activated and it navigated the vehicle to a precise landing location, avoiding sand bags that



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NASA/Ken Ulbrich

Masten's rocket-powered Xombie technology demonstration vehicle rockets skyward during a flight test of Astrobotic Technology's autonomous landing system.

had been placed as mock hazards. If the AAS had chosen a landing point other than one of the two open pads, Masten software would have overridden the prototype system to land the vehicle safely.

The test objectives included accurately tracking Xombie's location, detecting hazards larger than 10 inches (25 centimeters) and finding an acceptable landing location. The AAS uses cameras and an inertial measurement unit for navigation, because the Global Positioning System used on Earth would not be available for a landing on another planet or the moon.

"Conceptually, this is like the Apollo missions where the astronauts navigated to a safe landing

Xombie, page 6

G-III structural evaluations complete

By Peter W. Merlin

NASA Armstrong Public Affairs

NASA Armstrong Flight Loads Laboratory technicians recently completed structural evaluations on a modified Gulfstream G-III aircraft that will serve as a test bed for the Adaptive Compliant Trailing Edge (ACTE) project.

The loads tests assisted engineers in predicting the levels of structural stress the airplane will likely experience during ACTE research flights. And for the first time, some unusual hardware aided the process: the aircraft was supported by three large inflatable airbags during the tests.

ACTE project researchers have replaced the airplane's conventional aluminum flaps with advanced, shape-changing assemblies that form continuous conformal surfaces with no visible gaps. Evaluation of the revolutionary new flap system is a joint effort between NASA and the U.S. Air Force Research Laboratory. The advanced flexible trailing-edge wing flaps have the potential



ED14-0095-128

NASA/Ken Ulbrich

NASA's G-III flying test bed aircraft rests on three pneumatic lifting devices or "airbags" in preparation for loads testing in NASA Armstrong's Flight Loads Lab.

to improve aircraft aerodynamic and fuel-use efficiency and reduce airport-area noise generated during takeoff and landing.

FlexSys Inc. of Ann Arbor, Michigan, developed the

new experimental flaps for installation on Armstrong's G-III Aerodynamics Research Test Bed aircraft. Flight testing is expected to begin later this summer.

Before flying the airplane in the

ACTE configuration, technicians had to conduct specialized ground tests that involved applying known stresses, or loads, via hydraulic jacks

ACTE, page 5

Gregory joins Armstrong

Jack I. Gregory Jr. is NASA Armstrong's new director for Mission Support. He is responsible for oversight of the center's administrative support departments to ensure efficient and effective support of Armstrong's mission of advancing science and technology through flight. Gregory assumed his present position in June.



Jack Gregory

Mission Support Directorate departments include the offices of acquisition management, chief financial officer, facilities engineering and asset management, human resources management and development, education, strategic communications and protective services.

Prior to coming to NASA Armstrong, Gregory served as chief of staff of the Air Force Test Center,

previously the Air Force Flight Test Center, from October 2007 until June 2014, assisting the center's commander with directing the developmental flight test and base support activities at Edwards Air Force Base and other test locations around the nation.

Gregory served on active duty in the U.S. Air Force for almost 29 years from November 1978 through July 2007. His last active duty positions were two-year assignments as vice commander of the AFFTC from 2003 to 2005 and vice commander of the 11th Air Force at Elmendorf Air Force Base, Alaska, from 2005 to 2007.

His earlier assignments included flying duties throughout the U.S. and Europe as a pilot and instructor pilot in the F-4 and F-16, and staff assignments

working international affairs issues in Korea and at the Pentagon. He commanded at the squadron and group levels and was qualified as a joint specialty officer.

Gregory retired with the rank of colonel in the USAF. During this time, he logged more than 3,400 flight hours in the F-4 and F-16 and received numerous awards for meritorious service and outstanding achievement.

Gregory holds a bachelor's degree in biology from Berry College, Mt. Berry, Georgia. He earned a master's degree in public administration from the University of Oklahoma in 1994 and earned a second master's degree in strategic studies from the Air University at Maxwell Air Force Base in 2000. Gregory's military education includes attendance at the Air Command and Staff College, the Armed Forces Staff College and the Air War College.

News at NASA

Ellen Stofan tours NASA Armstrong

NASA's Chief Scientist Ellen Stofan visited NASA Armstrong July 23, touring various research projects and facilities and talking with center personnel to learn how the research conducted at the center benefits broader agency goals.

NASA Armstrong Center Director David McBride pointed out some key project activities and how the center is leading new discoveries in aeronautical sciences. Jacob Schaefer of the Controls and Dynamics Branch of the center's Engineering Directorate briefed her on the X-56 Multi-Utility Technology Testbed program.

During her tour of the center, Stofan learned about the capabilities of the autonomously operated Global Hawk aircraft and the upcoming deployment to NASA's Wallops Flight Facility in Virginia in support of the Hurricane and Severe Storm Sentinel mission. NASA Armstrong Global Hawk project manager Chris Naftel highlighted how the suite of scientific instruments aboard the aircraft can gather data that will enable scientists to better predict how hurricanes intensify, leading to better hurricane warning systems.

One of the highlights of her visit was the opportunity to spend some time with NASA interns and a group of middle-school girls who were at the center for a Tech Trek tour sponsored by the American Association of University Women.

Tour, page 6

FSC is certified platinum

By Jay Levine
X-Press Editor

NASA Armstrong Flight Research Center's new Facilities Support Center has been certified platinum, the Leadership in Energy and Environmental Design's highest standard for long-term sustainability.

LEED certification, which is determined by the U.S. Green Building Council, recognizes the best strategies for energy reduction and conservation. The certification marks Armstrong's first platinum-rated building. NASA policy requires all new buildings to be certified to the LEED silver level or higher.

"The CITC (Consolidated Information Technology Center) was our first LEED certified building, which achieved a silver



ED14-0017-14

NASA/Tom Tschida

The 38,000-square-foot structure has been certified that it met the Leadership in Energy and Environmental Design new construction platinum standard for environment and energy efficiency.

Platinum, page 5

Celebration... from page 1

aircraft after the M2-F2 pilot Bruce Peterson was seriously injured and the aircraft was damaged and rebuilt with a third vertical tail and other improvements to become the M2-F3.

“Dana was the only one that was not concerned and it was a flawless flight,” Szalai said. “Everyone in the room stood and applauded.”

Dana recalled years later that it was the first and only time that he had received a standing ovation and that he didn’t understand it. He said he was not surprised by the flight because he knew from his work that he was flying a safe aircraft.

Many speakers touched on Dana’s mantra to “Always take the job seriously, but never take yourself seriously.”

Dana was very serious and very thorough in his preparations and that was one of the reasons many people believed that he was so successful. His more than 40-year career started on Oct. 1, 1958, when the National Advisory Committee for Aeronautics became the National Aeronautics and Space Administration.

A prime example of Dana’s professionalism was his work on two remotely piloted Highly Maneuverable Aircraft Technology, or HiMAT, aircraft in the late 1970s.

“Bill was skeptical about unmanned aircraft,” Szalai said.

Despite Dana not being a fan of unmanned vehicles, his contemporaries said he worked hard on the challenging project. In fact, he commented that flying HiMAT “was every bit or more demanding physically and mentally than a ‘real’ aircraft.”

Former Center Director Kevin Petersen said Dana, “worked tirelessly to make projects successful.” Petersen also had a number of opportunities to work with Dana and said the test pilot showed, “passion and kindness.”

Ted Ayers, a former deputy center director and former neighbor to Dana in Tehachapi, said Dana had “class and style” and although he



ED14-0207-080

NASA/Ken Ulbrich

Above, former center test pilots Rogers Smith and Eddie Schneider, from left, portray Milt Thompson and Bill Dana during a skit at a celebration of Dana’s life. Below, Dana wears the legendary pink boots.



NASA

was a legendary pilot, he “did not brag about it.”

Dana’s success was also attributed to his devoted and dedicated family, many whom spoke at the memorial.

“He had a passion for flying and he loved working here at NASA,” Dana’s daughter Jan Sieving

said. “He loved people and he particularly loved you people.”

Matt Dana, Bill’s son, has flown F-16s for the U.S. Air Force for 25 years. He said his father never pushed him, only encouraged him. “My real influence was the people here and the environment, where you feel like you are part of

something bigger than yourself.”

Former center test pilots Eddie Schneider and Rogers Smith, known for their humorous skits and as well as for their work on cutting-edge aircraft, staged a salute to Dana and another legendary X-15 test pilot, the late Milt Thompson.

Schneider and Smith acted as if they were Dana and Thompson meeting in heaven. The skit touched on the more human aspects of the men.

One of the recounted stories was how Dana came to wear pink boots on the last test flight of the X-24B on Sept. 23, 1975. New flight suits were white, not the silver ones the pilots previously wore. Dana took exception to the white boots that accompanied the new suits. Dana insisted that no self-respecting test pilot would wear white boots and he would rather wear pink boots.

So on the day of his flight there were a pair of painted pink boots with daisy decals on them in his locker. He later did have a pair of black boots, but he wore the pink ones for the flight.

Sieving explained another aspect of that story involving Ralph Jackson, a former center public affairs chief, that suggests there was some payback involved in the prank. Ralph had three daughters and his wife was pregnant. Jackson was convinced it would be a boy. Dana threw a baby shower/poker game for Jackson.

“So naturally Dad and friends threw him a ‘Think Pink’ party. Somewhere in there they stole Ralph’s size 13 shoes, painted them pink and hung them above the table like baby booties,” she said.

While Dana enjoyed practical jokes, he was always serious about his work.

“Dana was the consummate professional and humble,” said Schneider, who was a master of ceremonies for the event. “It was a great ride and a pure joy to be on his wing.”

“We have lost a humble giant, but his legacy is forever,” Rogers added.

ACTE... from page 2

to the aircraft. Scientifically calibrated strain gages provided researchers with highly accurate measurements of the applied stresses, enabling them to predict the structural performance of the aircraft in flight. According to chief test engineer Larry Hudson, "Doing a test of this nature enables us to understand on the ground, by applying certain loads into the airplane, what loads will be experienced in flight under similar conditions."

Lifting the airplane off the floor with the three inflatable airbags, the first step in the testing process, helped isolate the airframe from any potential influence of the landing gear on strain-gage data. According to principal investigator Bill Lokos, this method has never been used before in the center's loads lab.

The airbags were positioned beneath the wings and aft fuselage to keep the main gear tires off the floor so that loading throughout the aircraft's center wing box structure remained constant. This was necessary, Lokos explained, because increased loading on the wings typically resulted in decreased loads on the gear, which affected the strain-gage measurements

and skewed the results of the preliminary equations.

Supporting the G-III with standard aircraft jacks was not an option, he noted, because the effects were even more pronounced than those produced by the gear alone. Alternatively, using a cradle system would have been costly and time consuming. Airbags of the type used to lift aircraft in the field following gear-up landings were already available as proven, off-the-shelf hardware.

Once the G-III was properly positioned, lab technicians applied loads via hydraulic jacks positioned underneath the wings. Structures lead Eric Miller explained that combining known loads values with strain-gage responses in the lab helps researchers develop a database for validating or correcting existing load equations.

"We'll be able to correlate these data so that we can drive our own load equations and be able to monitor flight loads in real time during ACTE flight tests," he said.

"This test will either validate those equations," Lokos added, "or help fix them if we find that they're off."

Successful ground testing is



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NASA/Ken Ulbrich

Principal investigator Bill Lokos, left, and test conductor Larry Hudson review the test checklist prior to initiating the airbag lift of the G-III aircraft.

key to successful flight-testing. A comprehensive set of data and loads equations will result in more precise flight-test data and enhance safety of flight because researchers will be able to expand the flight-test envelope without exceeding the aircraft's structural limits.

"It's important that we have a small error band and that we know what it is, so we won't cause harm to the airplane while testing the

new flap," Lokos added.

The ACTE effort is part of NASA's Environmentally Responsible Aviation (ERA) project under the Integrated Systems Research Program of NASA's Aeronautics Research Mission Directorate. The ERA project explores and documents the feasibility, benefits and technical risk of vehicle concepts and enabling technologies to reduce aviation's impact on the environment.

Platinum... from page 3

rating in October 2013," said David McBride, center director. "The FSC achieved platinum. This is another step in NASA's goal to establish more sustainable infrastructure. This facility also raises the bar for our future construction projects and is a part of the center's master plan."

The \$12.7 million, 38,000-square-foot FSC building incorporates energy and water conservation, solar energy and recycled materials. The \$8.8 million, 22,000-square-foot CITC also was NASA's first LEED certified data center. The architectural firm Development One, which is based in Santa Ana, California, designed both structures.

"Energy conservation is the most outstanding feature of the new Facilities Support Center,"

said Dan Mullen, Armstrong energy conservation manager. "We estimate that we will see a 46 percent reduction in energy consumption versus a standard building of this type."

The new building is a result of the center's organizations pulling together, said Gemma Flores, Armstrong's FSC project manager.

"The success of the Facilities Support Center project, from the planning, design, construction, activation, and finally achieving LEED Platinum certification, is due to the dedicated collaboration of a number of Armstrong organizations," Flores said. "Their diligence led to project success and has given the center efficiencies that benefit the center's mission through innovation, implementing

cutting-edge elements and making environmentally conscious decisions."

The FSC uses the sun to offset overall energy costs by more than 17 percent, Flores said.

Water usage was another key component in the FSC's design, where elements combine to use about 40 percent less than standard construction, Flores added.

Even during the construction phase of the building, conservation was a focus. About 95 percent of the construction waste was recycled and more than 20 percent of its construction materials were made from recycled products, Mullen explained.

Aeronautical elements and surrounding historical buildings and hangars inspire the overall

design of the facility. The curved shape of the roofline was designed to resemble the curves of aircraft wings and the front facade reflects the look of Hangar 4802. The curved surfaces offer advantages in reflecting natural light to illuminate major work areas, Flores explained. The FSC design also incorporated the use of translucent wall panels and low-energy transfer windows that allow light to pass through while blocking heat and cold.

The FSC includes collaborative office space, conference rooms, restrooms, shower/changing facilities, fabrication workshops, development and training laboratories and a storage mezzanine.

Comfort and Hays Electric Inc. of Long Beach, California, and its subcontractors built the facility.

Xombie, ... from page 2

by looking out the window of the lunar landing module,” explained Kevin Peterson, Astrobotic’s chief technology officer. “In this case, we have an onboard computer instead of an astronaut, and the cameras, inertial measurement unit and software are so precise that they can track the craft’s location to within a few meters.”

In February, Mojave-based Masten and Astrobotic, headquartered in Pittsburgh, had flown the Xombie in an open-loop test in which the AAS payload was running and collecting data. The open-loop flights followed a pre-set trajectory, but the vehicle did not accept any data or commands from the autonomous landing system.

The June 20 flight test was a closed-loop flight where the Astrobotic landing technology sent both data and commands to Xombie, influencing its flight path to avoid hazards and land safely.

“I am very excited by the preliminary results of this test,” said Chris Baker, Flight Opportunities Program campaign manager. “Terrain relative navigation and autonomous hazard avoidance are

on the technology road maps for missions to Mars, Europa and elsewhere in the solar system. Two small companies working together have successfully demonstrated technologies that will not only assist them in their future endeavors, but have also been identified as enabling future NASA missions.”

Through NASA’s Flight Opportunities Program, officials have been working with commercial companies, universities and government organizations to coordinate testing of innovative space technologies on research flights through the use of commercial suborbital flight platforms.

The Flight Opportunities Program is managed at NASA’s Armstrong Flight Research Center at Edwards, California. NASA’s Ames Research Center at Moffett Field, California, manages the solicitation and selection of technologies to be tested and demonstrated on commercial flight vehicles.

NASA’s Space Technology Mission Directorate is innovating, developing, testing, and flying hardware for use in NASA’s future missions.



ED14-0078-17

NASA/Ken Ulbrich

Jerry Budd explains elements of the towed glider concept to Ellen Stofan.

Tour ... from page 3

“The young people represent the future of the agency and the nation as a whole from a scientific discovery perspective,” Stofan noted afterward. “It is critical that we prepare them for challenging careers as they will be the ones taking the next giant leap and helping us land humans on Mars and unraveling the origins of the universe.”

Stofan wrapped up her visit by highlighting some of the broader

questions NASA research is trying to answer about space and the universe. Stofan also emphasized the important role the center plays in helping to facilitate scientific studies to explain how climate change is impacting Earth. In closing, she stressed the importance of communicating to the public the results of NASA scientific investigations and the many great discoveries the agency makes.

Baron, former project manager, dies at 74

Former NASA Dryden (now NASA Armstrong) project manager Robert “Bob” Baron died June 6. He was 74.

Baron’s career at NASA spanned 40 years and included a number of historic flight projects such as the X-15 rocket plane, the Lunar Landing Research Vehicle and flight research that had major implications for the Space Shuttle Program.

Baron worked on the X-15’s two liquid hydrogen peroxide auxiliary power units that provided much of the research vehicle’s electrical power. This experience with hydrogen peroxide led to his work on the Lunar Landing Research Vehicle. He was the lead operations engineer and South Base manager for the LLRV, which was a key step in validating the lunar lander that astronaut Neil A. Armstrong manually piloted to the surface of the moon.

Baron was project manager for the CV-990 Landing Systems Research aircraft that set the standards for shuttle braking and landing conditions. He was project manager for nine years on the JetStar that performed tests of the space shuttle’s microwave landing system and laminar, or “smooth” air research. He also led efforts on the Eclipse project, where a F-106 was towed behind a C-141 aircraft to validate a concept for a first stage of a two-stage-concept to propel a vehicle to low-Earth orbit.

He was an advocate and center project manager for the X-38, a series

of increasingly complex research vehicle prototypes for a then-envisioned crew return vehicle to bring astronauts home from the International Space Station.

Baron was honored for his contributions as part of project teams including three times for his JetStar work and once each for the CV-990, the LLRV, the B-57 parachute tests and the Shuttle Landing Facility Runway Resurfacing Team.

In addition, he was recognized for his dedication to a number of projects including the NASA Exceptional Leadership Award in 1977, the NASA Exceptional Service Medal in 1986 and the Pride in NASA Award in 1989. He also received the Silver Snoopy Award in 1994, the Dryden Director’s Award in 1994, the Manned Flight Awareness Honoree Award in 1995 and the NASA Outstanding Leadership Award in 1996.

Stratman, former Dryden personnel director, dies

Richard “Dick” Stratman died June 15. He was 84.

He worked at NASA Dryden (now NASA Armstrong) for 20 years, retiring as the chief of the center’s Personnel Office in 1986.

Small business awards earned

NASA Armstrong individuals and teams were recognized during a ceremony at the center May 13 for earning NASA Small Business Advocates Awards, or NASA Small Business Industry Awards.

NASA Administrator Charles Bolden and Glenn Delgado, NASA Associate Administrator for the Office of Small Business Programs, presented the awards.

Bolden and Delgado also recognized NASA Armstrong for achieving all of its small business goals in fiscal year 2013. NASA Armstrong has met its small business goals for eight of the past nine fiscal years, said Robert Medina, Armstrong's small business specialist.

Medina, who has been a small business specialist for two decades and worked at NASA Armstrong for 37 years overall, was recognized as the Small Business Specialist of the Year. Medina has earned the award one other time in 2008.

Simply put, the nomination said Medina's "knowledge of the small



Robert Medina



ED14-0141-10

NASA/Ken Ulbrich

NASA Administrator Charlie Bolden, right and Glenn Delgado, NASA associate administrator for the Office of Small Business programs, left, present Center Director David McBride with an award for the center meeting its small business goals.

Small business awards, page 8



ED14-0141-21

NASA/Ken Ulbrich

Bolden and Delgado present Ron Young, Christopher Baker and Joe Lazano of the Flight Opportunities Office with an award for small business support.



ED14-0141-13

NASA/Ken Ulbrich

Bolden and Delgado present Lori Wilkens and Ray Wilkens of Inqu with an award for their performance as a small business.



ED14-0141-11

NASA/Ken Ulbrich

Bolden and Delgado present Anthony Ng, Leigh Ann Szymczak and Tim Wong of Arcata Associates with a small business award.



ED14-0141-12

NASA/Ken Ulbrich

Bolden and Delgado present Mike Marston, Matilde Guilloty, Brian Esslinger, Sherry Schmitz and Ernie Valdez of Jacobs Technology with an award for small business support.

Team enters summer games



Photo courtesy of Jason Nelson

The NASA Armstrong team placed sixth of out 15 teams at the Aerospace Summer Games, June 19. The Aerospace Summer Games is a friendly competition among aerospace companies that takes place annually at Dockweiler Beach in Southern California. This year was the 12th annual competition and the first year that NASA Armstrong participated.

Learning about robotics



ED14-0193-038

NASA/Ken Ulbrich

Some of the children of NASA Armstrong employees who attended the center's Take Your Children to Work Day tested their skills at the NASA Armstrong education department's robotics demonstration.

Small business awards... from page 7

business program, contracts, and the center's mission resulted in small businesses continuing to be integral team members in Dryden's core mission in fiscal year 2013."

The Flight Opportunities Program team, which included program manager Ron Young, Christopher E. Baker and Joel B. Lozano, was honored with the NASA Small Business Advocate Award for fostering opportunities for small businesses.

The nomination for the NASA-wide award stated: "The program is to be commended for their efforts in incorporating and supporting small businesses in funding this new commercial launch industry and seeking and awarding contracts to

small businesses to participate in this new developing industry."

NASA Armstrong Small Business Industry Awards were presented to Arcata Associates, Inqu, and Jacobs Technology.

For 11 years, Arcata has received outstanding ratings and was recognized as the Small Business Contractor of the Year for fiscal year 2013 at the center.

An example of the customer service that is part of their top ranking and an example noted in the nomination is, "Arcata was named one of the Help Desk Institute Customer Satisfaction Elite 50, a ranking that recognizes the technical services and top support centers from among 800

centers across the country."

Small Business Subcontractor of the Year was awarded to Inqu. Inqu began NASA Armstrong work in November of 2011.

One of the sections of the nomination states, "Inqu performed an independent assessment to determine Armstrong's ability to support project execution times with resources and assets identified for the Unmanned Aircraft Systems Integration in the National Airspace System program – a five-year project that will demonstrate solutions in specific technology areas and will address operational or safety issues related to UAS access to the NAS."

Jacobs Technology was recognized as NASA Armstrong's Large Business Contractor of the Year for fiscal year 2013. In addition to high contract ratings on a slate of projects, Jacobs was recognized for outstanding outreach activities.

The nomination includes many examples of Jacob's work, here is one example related to small business efforts: "In fiscal year 2013, 100 percent of (Jacobs') subcontracting was awarded to small businesses and the overall small business participation rate was three times that of their planned goals, representing 11 percent of total contract dollars. Their small business partners provide superior services."

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