



The Dryden

X-**XPRESS**

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Dream Chaser near free flight

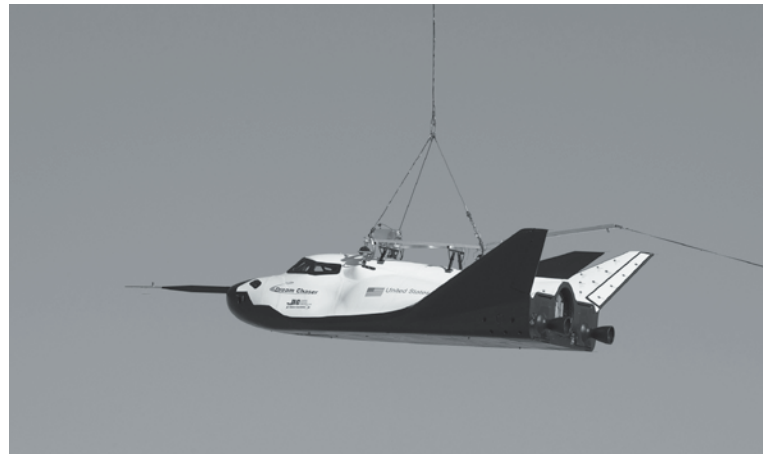
NASA partner Sierra Nevada Corporation, or SNC, of Louisville, Colo., successfully completed a captive-carry test of the Dream Chaser spacecraft Aug. 22, at Dryden.

During the two-hour test, an Erickson Air-Crane helicopter picked up a test version of the Dream Chaser flight vehicle and flew it over a dry lake bed at Edwards Air Force Base at a maximum altitude of approximately 12,400 feet. The spacecraft followed the projected path it will fly during future approach and landing tests at Dryden. Dream Chaser's flight computer, along with its guidance, navigation and control

systems were tested. The landing gear and nose skid also were deployed during flight.

"Today is the first time we have flown a fully functional Dream Chaser flight vehicle, and we are very pleased with the results," said Mark Sirangelo, corporate vice president and head of SNC's Space Systems. "Our team represents the very best in collaboration between industry and government. We have worked closely with NASA, Dryden and the Air Force to reach this important milestone in our

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ED13-0300-003

NASA/Kenneth E. Ulbrich

NASA partner Sierra Nevada Corporation of Louisville, Colo., performs a captive-carry test of the Dream Chaser spacecraft at Dryden.

MUTT has a good first flight

The X-56A Multi-Utility Technology Testbed takes off on its inaugural flight July 26 at Edwards Air Force Base, Calif. The unmanned aircraft is designed to study active aeroelastic control technologies such as active flutter suppression and gust load alleviation.



ED13-0253-031

NASA/Kenneth E. Ulbrich



Salute

Gordon Fullerton, a former NASA astronaut and Dryden research pilot, passed Aug. 21 at age 76. Coverage begins on page 4.

NASA honors Dryden employees

The NASA Honor Awards for Dryden employees was Aug. 6 and included 21 individual awards and one group award.

Outstanding Leadership Medal

Thomas P. Jones

For exceptional leadership of the NASA Dryden Flight Research Center Supersonics and High Speed project teams.



Exceptional Service Medal

Laura J. Fobel

For outstanding technical leadership and sustained performance through contributions to NASA's Mission in the areas of Information Technology and Systems Engineering.



Christopher D. Jennison

For exemplary service to the Airborne Science Program which has resulted in extraordinary scientific progress in NASA Earth Science.



Jerry C. McKee

For exceptional service over the past 29 years at DFRC where he contributed to mission success in the technical infrastructure and mission support areas.



ED13-0011-74-41

NASA/Tom Tschida

Kevin Rohrer, center, represents the Dryden Shuttle Delivery, Media, and Family Day Team he led. Gwen Holm, left, and David McBride, right, present the NASA Group Achievement Award to Rohrer.

Matthew E. Redifer

For sustained exceptional engineering and leadership contributions to aeronautics research, earth science, and space exploration.



John A. Saltzman

For sustained excellence in System Engineering that has contributed to the success of Center and Agency level projects and activities.



Steven L. Wildes

In appreciation for outstanding professional dedication and commitment to safety and sustained



performance over his NASA career of 30 years.

Timothy L. Williams

For sustained exceptional service as Aviation Safety Officer and Research Test Pilot.



Exceptional Public Service Medal

Michael Venti

For exceptional commitment, dedication and partnering efforts towards innovative approaches in establishing a new generation of propulsion research at NASA.



Exceptional Public Achievement Medal

Russell Billings

For outstanding innovation and leadership in Science, Technology, Engineering and Mathematics (STEM) Education Programs.



Exceptional Engineering Achievement Medal

Benjamin J. Pearson

For the groundbreaking development and programming of the Android-based Ground Collision Avoidance Application Software on the SUAV/GCAS project.



Russell W. James

For exceptional engineering achievement in designing and developing highly specialized mission support systems for NASA Dryden's Western Aeronautical Test Range (WATR).



Exceptional Achievement Medal

Dana D. Purifoy

For exemplary leadership skills to the Center and the Agency while leading the Subsonic Research Aircraft Testbed modification team.



FOSS makes R&D 100

By Sam Smith

Dryden Public Affairs and

Gray Creech

Dryden Public Affairs

Dryden's patented fiber optic sensor system, or FOSS, technology has been named the winner of an R&D 100 Award, which R&D Magazine touts as the "Oscars of Innovation."

The fiber optic sensors offer unparalleled options for high-resolution sensing in applications that require a unique combination of high-powered processing and lightweight, flexible and robust sensors. The technology had been flight-tested several years ago on Dryden's modified MQ-9 Predator B aircraft named "Ikhana" to measure the change in the aircraft's wing shape real time in flight. The effort represented one of the first comprehensive flight validations of fiber optic sensor technology.

"It's a prestigious award, and it took a team working diligently for years to get us to this point," said Allen Parker, a research engineer on the fiber optics project. "It's an honor and humbling to be among the companies and research groups receiving this award."

In application, a long, hair-thin fiber optic strand is attached to a structure, like the Ikhana's wings. Every quarter inch along the fiber, a sensor instantaneously feeds



ED13-0237-44

NASA/Tom Tschida

Dryden's fiber optic team, including, from left, optics engineer Hon "Patrick" Chan, structures engineer Lance Richards, electrical engineer Allen Parker and instrumentation specialist Anthony "Nino" Piazza won the R&D100 award for their work.

back the strain and shape of the structure to a computer. The result is a complete, as-it-happens look at every twist and turn of the structure from literally hundreds of sensors along a single strand of optical fiber attached to it.

"In addition to aerospace applications like some we've tested, the sensors can also be used to look at the stress of other structures, like bridges and dams, and possibilities extend to biomedical uses as well,"

said Dryden structures engineer Lance Richards, who co-authored the patent application with Dryden's William Ko. "The applications of this technology are mind-boggling," he added.

The 51st annual R&D Top 100 awards recognize the innovation as one of the top 100 revolutionary technologies of the year. Winning technologies also include an electron

Award, page 7

In the next X-Press

The Stratospheric Observatory for Infrared Astronomy team returned from its first deployment to the Southern Hemisphere in August. The next X-Press will include articles on the science of SOFIA, the aircraft and the key components of the New Zealand missions.



ED13-0220-246

NASA/Carla Thomas

News at NASA

Stofan is new chief scientist

Planetary geologist Ellen Stofan became NASA's chief scientist Aug. 25.

Stofan is NASA Administrator Charlie Bolden's principal advisor on the agency's science programs and science-related strategic planning and investments.

Prior to her appointment, Stofan was vice president of Proxemy Research in Laytonsville, Md., and honorary professor in the department of Earth sciences at University College London in England.

The appointment marks Stofan's return to NASA. From 1991 through 2000, she had a number of senior scientist positions at NASA's Jet Propulsion Laboratory in Pasadena, Calif., including chief scientist for NASA's New Millennium Program, deputy project scientist for the Magellan Mission to Venus, and experiment scientist for SIR-C, an instrument that provided radar images of Earth on two shuttle flights in 1994.

Stofan conducts research on the geology of Venus, Mars, Saturn's moon Titan, and Earth. Stofan is an associate member of the Cassini Mission to Saturn Radar Team and a co-investigator on the Mars Express Mission's MARSIS sounder. She also was principal investigator on the Titan Mare Explorer, a proposed mission to send a floating lander to a sea on Titan.

Stofan has master and doctorate degrees in geological sciences from Brown University in Providence, R.I., and a bachelor's degree from the College of William and Mary in Williamsburg, Va.

We will miss you, Gordo

By Jay Levine

X-Press editor

Dryden employees, family and friends celebrated a life well lived Aug. 26 as they honored the late NASA astronaut and research pilot Gordon Fullerton – or to those who knew him, Gordo – at a celebration of Fullerton's life.

Family and friends described Fullerton as a humble family man, who was very kind, unflappable, smart and who had a great sense of humor. He died Aug. 21 at age 76. Fullerton had flown in 135 different aircraft and logged more than 16,000 flight hours. His resume also included two space shuttle missions, including one as a commander.

Dryden Center Director David McBride said Fullerton inspired people to pursue careers in science, technology, engineering and mathematics with his work on programs like Apollo, the space shuttle and accomplishments as an Air Force test pilot and a NASA Dryden research pilot.

"Those activities were accomplished by great engineering," McBride said. "They were accomplished by courageous and very skilled crews and Gordo was one of those who made it work. Gordo was one of those few who took the risk that inspired the next generation. Thank you, Gordo."

In addition, McBride read statements from NASA Administrator Charlie Bolden about Fullerton.

"Gordo was a mainstay of NASA for many years. His support of the Apollo program, the shuttle program and his accomplishments in breaking new ground in aeronautics will not be forgotten. He will be missed, but his legacy will continue to thrive. We will build on all that he gave



EC77-8142

NASA

Enterprise and the host NASA 747 Shuttle Carrier Aircraft crewmembers included, from left, Fitz Fulton, Gordon Fullerton, Vic Horton, Fred Haise, Vincent Alvarez and Tom McMurtry.

to NASA and our nation's space and aeronautics programs."

Jim Ross, Dryden photo chief, recalled flying with Fullerton.

"Every flight with Gordo was a once in a lifetime opportunity," he said. "I had 57 once-in-a-lifetime opportunities with him."

Ross recalled his first flight. He was in a G-suit and feeling like Tom Cruise in Top Gun.

"Gordo had this puzzled look on his face and then he said, 'We don't use a G-suit in the T-38.' I embarrassed myself. I had no idea how the whole thing worked," Ross explained.

He didn't fly with Fullerton until

later and the first flight was rough for the first-time flier.

"The first person in the locker room after my flight was Gordo. He was excited and asked how the flight went. I had my back toward him and he could tell when I turned around that it didn't go well. It took two months before I flew again. Consensus of all the pilots was you can't base your ability to fly from one flight. All of them encouraged me and I eventually flew with Gordo."

Because Ross and camera colleagues Carla Thomas and Lori Losey didn't have a broad base of experience with pilots and

airplanes, Fullerton worked to boost their knowledge. One flight made Ross anxious.

"I am having a heart attack, grab the stick and fly," Fullerton told Ross: "You fly with old pilots so this could really happen."

"It felt like I was the one having a heart attack," Ross recalled, "but I had a great time flying with Gordo."

Karl "Bo" Bobko, who served as an astronaut with Fullerton in the U.S. Air Force Manned Orbiting Laboratory program in 1966 and later became a space shuttle astronaut with NASA, shared recollections of Fullerton.

For example, Fullerton was



EC98-44749

NASA/Jim Ross

In 1998 Gordon Fullerton became one of just two American pilots to fly the Russian supersonic Tu-144 during a series of test flights at the Zhukovskiy Air Development Center outside of Moscow, Russia. He is seen above in the Tu-144 cockpit.

unflappable during jungle survival training.

In a potentially life-threatening position following a thunderstorm that made a river swell and a whirlpool form and threatened them, Fullerton looked at him and said, "I don't think this is survival training anymore."

The two men went deep into the river to escape the whirlpool and lived to tell the tale, Bobko said.

"Gordo would have told you that story, but he wouldn't tell you about his mission on Space Shuttle Challenger when it lost one engine on launch, but made it to orbit,"



NASA Photo

Above, Gordon Fullerton works during STS-3, the only shuttle mission to land at the White Sands Missile Range, N.M. Below, Fullerton receives the U.S. Department of Defense Distinguished Service Medal from then-President Ronald Reagan.



Photo courtesy of Marie Fullerton

Bobko said. "If he was here, I'd wish him 17,000 mph (the speed required to achieve orbit). Now that he's on the other side, I wish him Godspeed."

Larry Schilling, former Dryden associate center director for operations, offered another view of Fullerton, who after retirement was

active with family and friends until a stroke a few years into retirement challenged him. The challenges were great, but so too was Fullerton's spirit. He didn't feel sorry for himself and worked hard to regain his body and mind. His sense of

See Gordo, page 6

Gordo... from page 5

humor returned and he enjoyed his grandchildren and frequent visits from friends.

Unfortunately, that progress slowed and his condition worsened. But still, Fullerton maintained his sense of humor calling the Schillings “the Pesos” when he began to study Spanish.

“That shows real depth of character after the stroke to fight to recover. He loved his family and they loved him,” Schilling said

Many will remember Fullerton as a hero, a family man and a great pilot. Aviation Week writer Guy Norris explained that Fullerton also was down to Earth.

“He was a nice guy who always had time for a chat with me at Society of Experimental Test Pilot meetings. He was the first astronaut I ever talked to who could truly describe the awesome experience of space flight in an accessible way,” he said.

Former Center Director Ken Szalai said Fullerton was “one of the best of the best.” As such, he instantly gave credibility to projects he supported. One example Szalai cited was the Convair 990 work at Dryden that dealt with excessive brake and tire wear on the shuttles that resulted in changes that benefited the program.

Other examples including the Propulsion Controlled Aircraft that looked at using only propulsion to compensate for damaged aerodynamic controls on an aircraft and supersonic transport work that involved working with the Russians, becoming one of just two Americans to ever fly the Russian supersonic Tu-144.

“He was kind, humble and smart. He was top tier at everything he did. You don’t replace a Gordon Fullerton,” he said.

Fullerton’s son Andy and daughter Molly Mansubi attended the event.

Molly said the best advice Dad gave her about careers was, “Love what you do and never work a day in your life,” she recalled.



EC04-0324-127

NASA/Tony Landis



ED13-0300-003

NASA/Jim Ross

Above, Gordon Fullerton is pictured in the SR-71 cockpit. *At left*, Fullerton, right, stands with some of his fellow X-43 team members. From left are Brian Minnick of Orbital Sciences, Brad Neal, Frank Batteas and Fullerton.



EC04-0233-08

NASA/Tom Tschida

Above, Fullerton signs a bobblehead of himself for a young fan at an Aerospace Appreciation Night. *At right*, Marie and Gordon Fullerton attend the unveiling of a painting featuring Gordo that commemorated his induction into the Aerospace Walk of Honor in Lancaster.



EC03-0195-23

NASA/Tom Tschida

Fullerton widow Marie Fullerton, spoke best of the man who was her greatest love and best friend as she was his through 45 years of marriage.

She recalled the day they met at a party. She was a nurse and he was a test pilot who drove a Porsche, which she said she didn’t know what that was then. “You must be Gordy,” she said. “Gordon is the name,” he replied. They dated every day after that first meeting and later married in Ohio.

“He loved his 17 years at Johnson Space Center and he loved and respected all of you here. When

he came home and something on the plane didn’t work, he knew it would be OK and safe to fly (when he returned to the cockpit). He had only kind things to say about Dryden and the environment here. You were his other family,” she said.

Gordon Fullerton also was a believer in education, Marie Fullerton added.

“He loved to talk about space and flying. He never turned down an opportunity to talk to children unless he really couldn’t make it,” she said.

She also expressed gratitude.

The event fittingly ended with a flyby and “missing man” pull-up of an F-15 aircraft.

If you heard a sonic boom on Aug. 21 and didn’t see a plane, that was him. Runway 22 in heaven was preparing for his arrival – once he finished some supersonic barrel rolls, of course.

Video highlights of Fullerton’s career is located at:

<http://youtu.be/Hpvml6wXFE4>

A full biography of Fullerton is available online at:

<http://www.nasa.gov/centers/dryden/news/Biographies/Pilots/bd-dfrc-p004.html>

Rutan recalls record flight

By Sam Smith

Dryden Public Affairs

Nearly 26 years ago a nine-day, three-minute and 44-second around-the-world flight of the Voyager aircraft – without stopping or refueling – landed at Edwards Air Force Base. The flight of the one-of-a-kind aircraft set a world record that remains unchallenged.

Dick Rutan, the pilot of this historic flight, recounted the Voyager's almost 25,000-mile

circumnavigation of the globe from Dec. 14 to Dec. 23, 1986, to Dryden employees at a recent event.

"I got to really hate this airplane. I felt not only was it not going to work, but I would probably die in it," Rutan said of the Voyager, the aircraft Dick's brother Burt Rutan designed. "Yes, it had terrible flying qualities, but it had to make it around the world. Burt knew that it must have major compromises to make it around the world."

Also, the flight arguably deserved an award for being the worst date in history. Rutan shared the bathtub-sized cockpit for a week and a half with his then-girlfriend Jeana Yeager. She was not related to Brig. Gen. Charles E. "Chuck" Yeager, who was the first to pierce the sound barrier in the experimental, rocket-powered X-1 on Oct. 14, 1947.

Rutan even brought a small plastic bag with an adhesive, circular

opening to answer the question he said he is often asked first – how did you go to the bathroom?

Despite the challenges and dangers of flying the Voyager, Rutan said the flight "was arguably aviation's last milestone."

During his presentation, Rutan also showed a video of the Voyager's take off for the historic flight. The approximately two-minute video

Rutan, page 8

NASA Awards... from page 2

Michael C. Nesel

For the successful transition to the Consolidated Information Technology Center, ensuring uninterrupted service to the Center, its employees, and its customers.



Early Career Achievement Medal

Jonathan (Brett) Swanson

For unusual and significant legal contributions in support of NASA's programs and activities.



of over 100 facility repairs, modifications, and upgrades.

Exceptional Bravery Medal

For exceptional bravery in recovering an ER-2 after an oxygen system malfunction.



Laurie A. Grindle

For exemplary leadership skills to the Center and the Agency while leading the G-III DRE Lessons Learned Team.



David B. Spivey

For outstanding innovative contributions to NASA Dryden Simulation capability resulting in significant cost savings and substantial improvements of key simulation equipment.



Silver Achievement Medal

Lisa Jackson

For outstanding achievement in excellence and teamwork in support of NASA's Unmanned Aircraft Systems Integration in the National Airspace Systems Project.



Equal Employment Opportunity Medal

Kurt G. Sanner

For outstanding achievement in Equal Employment Opportunity efforts by creating and promoting an environment that is accessible and welcoming to employees with disabilities.



Andrew L. Boykin

For unusual and significant performance during the first 2 years of his NASA career by managing several electrical infrastructure improvements, and helping his peers with the electrical scope



Group Achievement Award

Dryden Shuttle Delivery, Media, and Family Day Team

Team Leader – Kevin Rohrer

For exceptional team performance supporting the Endeavour Media and Family Day viewing of the orbiter and the successful delivery of Endeavour to the California Science Center.

Employees collect food for charity

Dryden employees came through big during the annual Feds Feed Families Food Drive.

Employees donated 1,187 pounds of food during the 2013 campaign.

The donated food will be distributed by the Grace Resource Center in Lancaster to help families throughout the community.

Award... from page 3

microscope capable of recording movies, a device that harnesses power from viruses, a robotic glove and an underwater vehicle that can operate both with and without a human crew. Past winners include the fax machine, halogen lamps and high-definition television.

The company 4DSP, an abbreviation for "For Digital Signal Processing," has a licensing agreement with Dryden to commercialize the fiber optic sensors for industries as diverse as automotive, aerospace, oil and gas, medical devices and wind energy.

R&D Magazine will present its Top 100 awards to the Dryden FOSS team at ceremonies in Orlando, Fla., on Nov. 1, 2013.

Dream Chaser... from page 1

flight test program. We look forward to seeing Dream Chaser land on the same runway as the space shuttle orbiters once did as we move forward in the development of the next-generation crew transportation vehicle.”

This was the second captive-carry test of the Dream Chaser flight vehicle and its first captive-carry at Dryden. Data obtained from the test will provide SNC valuable information about the Dream Chaser hardware and ground operations. The test paves the way for upcoming free-flight tests at Dryden this fall as part of the company’s agreements

with NASA.

SNC is working with NASA to develop Dream Chaser, planned to launch atop a United Launch Alliance Atlas V rocket, through the agency’s Commercial Crew Development Round 2, or CCDev2, and Commercial Crew Integrated Capability, or CCIcap, initiatives. New commercial spaceflight capabilities being developed by NASA partners through these initiatives eventually could provide launch services to transport NASA astronauts to the International Space Station from U.S. soil.

“It’s great to see real American-made hardware taking flight right here in the U.S.,” said Ed Mango, NASA’s Commercial Crew Program manager. “This is just the start of an exciting flight test campaign for SNC’s Dream Chaser at Dryden.”

Work leading up to the captive-carry test included an evaluation of the performance of Dream Chaser’s braking and landing systems, during ground tow tests, at increasing speeds. SNC engineers also verified the spacecraft’s computer and software systems, instrumentation and

steering performance. The company held a thorough flight test readiness review with engineers, technical experts and representatives from NASA and the U.S. Air Force.

SNC’s CCDev2 Space Act Agreement with NASA is set to culminate with an upcoming approach-and-landing free-flight test at Dryden. SNC also is on track to complete all 12 of its CCIcap milestones by the summer of 2014. All of NASA’s industry partners, including SNC, continue to meet their established milestones in developing commercial crew transportation capabilities.

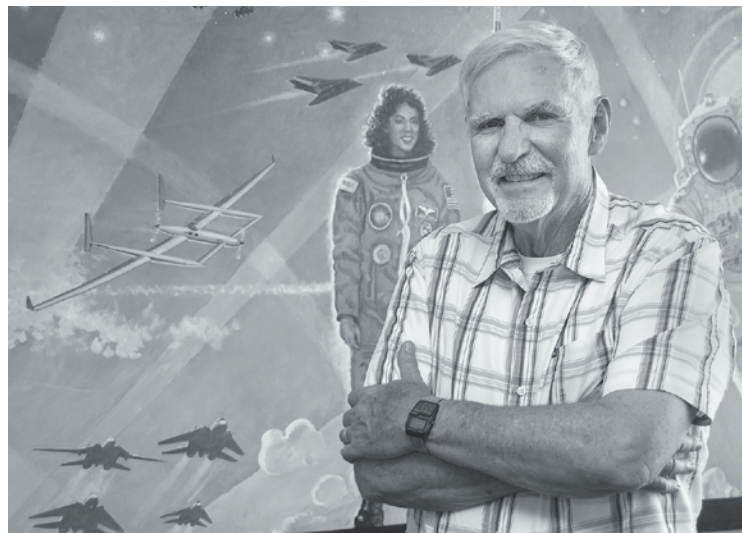
Rutan... from page 7

starts with the lightweight aircraft taking almost the entire length of one of the world’s longest runways to take to the skies. The video ends with the chase plane flown by Burt Rutan following the Voyager for the first leg of the flight before Burt turned back.

“They got 100 knots,” Rutan said quoting Burt. “I did not think they’d make it.”

When the Voyager returned to Edwards Air Force Base, Rutan said he expected to land and park in a remote corner of the flight line. He was surprised to find tens of thousands waiting for his return.

“That dry lake bed is sacred ground,” Rutan said of Rogers Dry Lakebed. “Maybe when I die they can spread my ashes out there.”



ED13-00294-28

NASA/Ken Ulbrich

Dick Rutan, the pilot of the Voyager flight, recounted the almost 25,000-mile circumnavigation to employees at Dryden. The Voyager is seen flying at left, center, in this painting by the late aerospace artist Robert McCall.

Aircraft have right of way

Aircraft have movement right of way over vehicles or foot traffic. All drivers that encounter an aircraft taxiing or being towed are required to stop and allow the aircraft passage, said Dryden flightline and safety officials.

Officials also ask employees that they need to be alert in several areas. For example, vehicle access to the road south of Hangar 4802 between the EMCOR/Kay and Associates entrance and the flight line entrance North of Hangar 4802, officials said. Those areas can present safety challenges, as they are congested and there can be a lot of activity.

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

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