



# THE ARMSTRONG X-PRESS

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## Can you hear me now?

**Jay Levine**  
X-Press editor

“Say again” was a frequent phrase heard from people communicating to and from the T-34 aircraft at Armstrong, but a new system makes communication much clearer.

The Active Noise Reduction system with noise cancelling headphones is integrated into the pilot’s helmet and plugs directly into the aircraft, said Jack Trapp, associate director for Armstrong Flight Operations. In addition to the helmet headphones, a new panel was installed in the T-34 to accommodate the system allowing pilots to hear better and at lower volumes.

“There was a lot of background noise and it was hard to hear the tower, other pilots and mission managers,” Trapp said.



AFRC2018-0099-1

NASA/Ken Ulbrich

*T-34 lead pilot Scott Howe said a new Active Noise Reduction system with noise cancelling headphones is making it easier to hear.*

The tandem cockpit aircraft has a nose turboprop, making the cockpit the noisiest area. In addition to saving the pilots’ hearing from the background engine noise, the system will help with overall mission success because people can hear the radio and each other more clearly, Trapp said.

Scott Howe, T-34 lead pilot, said pilot reviews have been positive.

“They are very effective,” Howe said. “The ear seals keep the direct engine noise out and the noise cancelling portion reduces the low-end roar from the motor that is predominantly loud in the T-34. Without that noise we are able to hear the radio and each other much better.”

Before the noise cancelling

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## Bridenstine introduces himself

**By Jay Levine**  
X-Press editor

NASA’s 13th Administrator James “Jim” Bridenstine introduced himself to employees across the agency, discussed some key programs and answered questions at a town hall May 17.

“It’s a true honor to be here,” he said. “I have been overwhelmed by the kindness of all the people who I’ve met. I am convinced that this

is the greatest agency to work for, and I am absolutely convinced that every one of us in this room, and people who are watching on television, we all hit the jackpot when we got offered a job here. You’re the reason that the



James Bridenstine

agency is perceived in that way.”

He discussed a range of topics from the proposed moon mission, Earth and space science and the Low-Boom Flight Demonstrator, which is expected to come to Armstrong for flight testing.

President Donald Trump’s Space Policy Directive 1 calls for a sustainable return to the moon, Bridenstine said, and that will require commercial partners to fully

realize. It will take investment to tap ice from the moon and use the hydrogen and hydrogen components to make rocket fuel.

Other potential advantages of launching a spacecraft from the moon are that the moon has no atmosphere and its gravity is one-sixth that of Earth, he added. Many nations see the possibility of the

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# Air taxis may be coming

By Jim Banke

Aeronautics Research  
Mission Directorate

There was a time when people and goods were moved through the crowded city on the ground, restricted to the busy street surfaces by necessity and gravity.

Inspired visionaries considered new ways to get about town and dreamt of innovative flying machines that could safely transport passengers and ship cargo within the urban jungle by rising above the congestion below.

No, we're not talking about the Wright Brothers in 1903.

This is the new era in air transportation that NASA and a community of government, industry and academic partners are working together on, right now.

The goal, known as Urban Air Mobility (UAM), is a safe and efficient air transportation system where everything from small package delivery drones to passenger-carrying air taxis operate over populated areas, from small towns to the largest cities.

And it's no dream.

"The convergence of technologies, and new business models enabled by the digital revolution, is making it possible to explore this new way for people and cargo to move within our cities," said Jaiwon Shin, NASA's associate administrator for aeronautics research.

But there's still much research to be done, tests performed, demonstrations conducted, and operating rules and regulations to be written and adopted before you should expect same-day package delivery by air on the roof of your office building downtown.

## Leading the Way

To that end, NASA is committed to leading the UAM community to identify the key challenges still ahead, and is exploring the research, development and testing



NASA/Lillian Gipsons

*An artist's conception of an urban air mobility environment shows air vehicles with a variety of missions and with or without pilots are able to interact safely and efficiently.*

requirements needed to address those challenges.

NASA's part in this process, Shin said, reminds him of the quote often attributed to President John F. Kennedy, who was fond of saying "A rising tide lifts all boats." NASA-developed technology and systems related to UAM will help lift a new aerial marketplace to success.

It's a role within aviation that NASA has successfully played throughout its history, beginning more than a century ago with its predecessor organization, the National Advisory Committee for Aeronautics.

The result is that, today, every U.S. airplane and air traffic control facility has on board, or relies in some way on, aeronautics technology that originated with

NASA.

The story is expected to be no different for UAM, which NASA began exploring as early as 2003 when a NASA researcher presented a conference paper entitled "Personal Air Vehicles: A Rural/Regional and Intra-Urban On-Demand Transportation System."

Building its expertise in this area, NASA continued to study the topic and in 2016 published a study about On-Demand Mobility, the results of which helped inspire and define a path for turning the UAM vision into reality.

"Now, our goals are to help develop and enable as much as possible what we like to think of as an entire ecosystem when it comes to Urban Air Mobility," said Davis Hackenberg, a NASA engineer who is helping to coordinate the

agency's UAM activities.

"We're looking at the best ways to do this and learning a lot as we go," he said.

NASA's aeronautical innovators at four of its research field centers in California, Ohio and Virginia are supporting UAM through a number of projects and have been working to identify the best ways NASA can help.

At the top of the list: safety.

NASA and its partners are working with the Federal Aviation Administration to come up with a way to safely manage all of these low-flying aircraft so they do not interfere with or burden the current air traffic control system that manages the national airspace.

In fact, NASA's Unmanned

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## Air taxi... from page 2

Aircraft Management Systems project, which has already conducted several successful demonstrations managing small drones in flight under various conditions, could be very helpful as a foundational tool for UAM researchers to take advantage of in developing their air traffic management system.

But safety is a key driver for more than just air traffic management.

NASA is looking to ensure the entire UAM system – and every iteration along the way – is operated with a high degree of safety, and that all air vehicles do not generate unacceptable levels of noise.

Another area where NASA's strengths already are assisting UAM air vehicle development is with its electric propulsion research.

Hybrid-electric or all-electric-powered vertical takeoff and landing air vehicles are likely to dominate UAM operations over cities thanks to their significantly reduced, or even zero emissions, as well as relatively quiet operation.

Earlier this month, NASA made available to the entire UAM community extensive technical data gathered from its still-ongoing X-57 Maxwell project, which is an all-electric propulsion experimental research airplane.

The shared data comes from more than 25 publicly available documents written by the X-57 team, who already are working with regulators on how best to approach certifying their new ideas for flight – all of which can be helpful to the UAM community.

### All Partners Welcome

“The key to success in making UAM a reality is the opportunity for NASA to work with a large, diverse set of partners,” Hackenberg said.

Building the UAM ecosystem requires expertise in many areas, including those where NASA traditionally has not had strong expertise. So, essentially, the more partners NASA has in this effort the merrier.



NUAIR Alliance / Eric Miller

*A pilot launches a drone on a planned maneuver during a demonstration coordinated by NASA's Unmanned Aircraft Systems Traffic Management project.*

“There are several areas that have not been ‘traditional NASA,’ but in order to understand the entire landscape and develop this entire UAM ecosystem, we need to consider everything and work with those who can help us,” Hackenberg said.

For example, part of the UAM model could include “vertiports” – dedicated platforms where an air vehicle can take off or land as close to its customer’s final destination as possible.

Such platforms would come with certain infrastructure requirements – power, secure access, cleared landscaping – that are likely to involve real estate developers, property managers, utility companies, and local government officials and civil engineers.

“These are entities and people that NASA in the past hasn’t really partnered with on projects of this scale,” Hackenberg said. “They will be able to help us with our challenges, while at the same time we can provide our expertise so they can better understand what the UAM community’s needs are.”

And while NASA intends to remain a leader in the areas where it can best help, Hackenberg said the agency is keenly aware of the importance of listening to the UAM community to be sure everyone is on the same page and moving in the same direction.

“Traveling by personal air vehicle will become commonplace in the future, and NASA wants to help the UAM community to make it happen,” he said.

## AFCS contract awarded

NASA selected Integration Innovation Inc. (i3) in Alabama to provide aircraft flight crew support (AFCS) operations for Armstrong.

The AFCS operations contract award is a hybrid, firm-fixed price contract, with time, materials and other direct costs as indefinite delivery/indefinite quantity. The contract includes a one-month phase-in starting June 1, and a five-year base performance period starting July 1 and running through June 30, 2023. The potential value of the contract is \$45 million.

Integration Innovation, Inc. will provide flight crew operations support services to Armstrong including other NASA centers on an as-needed basis. This support includes aircrew and all aircraft and flight-line operations.

# News at NASA

## Jurczyk new AA

Steve Jurczyk has been named NASA's associate administrator, the agency's highest-ranking civil servant position. Jurczyk has been serving in the position in an acting capacity since March 10.

Prior to the appointment, Jurczyk had been associate administrator of the Space Technology Mission Directorate since June 2015. In this position, he formulated and executed the agency's space technology programs, focusing on developing and demonstrating transformative technologies for human and robotic exploration of the solar system in partnership with industry and academia.

He previously was director at NASA's Langley Research Center. Named to that position in May 2014, he headed NASA's first field center, which played a critical role in NASA's aeronautics research, exploration and science missions. Jurczyk served as Langley's deputy center director from August 2006 until his appointment as director.

Jurczyk began his NASA career in 1988 at Langley. From 2002 to 2004 Jurczyk was director of engineering, and from 2004 to 2006 he was director of research and technology at Langley.

He has been honored with two NASA Outstanding Leadership Medals, the Presidential Rank Award for Meritorious Executive in 2006 and the Presidential Rank Award for Distinguished Executive in 2016 – the highest honors attainable for federal government leadership.

# Bowers inspires students

By Jay Levine

X-Press editor

Al Bowers, NASA Armstrong's chief scientist, loves to hear about the successes of people he has mentored.

For decades he has been a strong supporter of education and seeding young minds. He often volunteers his time giving presentations to students of all ages, or mentoring a new group of students who could be the next great innovators.

It was Bowers' work that was recognized April 28. The International Leadership, Entrepreneurial Development, Arts and Design Thinking K-12 organization (iLEAD) honored him with the Vision in Education Award at their annual benefit event. The honor became even more special with recognition presented by the California Legislature and the U.S. Congress.

"The iLEAD award is expressly designed to honor those rare individuals who by visionary hard work and fearless leadership have forever positively impacted individuals in education," said Kathleen Fredette, director of Science, Technology, Engineering and Mathematics initiatives for iLEAD. "Al brought Prandtl to my class prior to me joining the iLEAD team, and he has been one of my biggest cheerleaders, welcoming me into the aero community without reserve."

In addition to speaking to iLEAD students and assisting Fredette with integrating more complex concepts into an aeronautics and soaring project, she said he also is supportive of her personal goals.

"He's been especially supportive of my (sailplane) piloting journey and listened when I hit walls, encouraged me when I felt like it was too much and also didn't accept excuses," she recalled.

An example of why Bowers received the award is evident in the experiences of a current



AFRC2017-0212-19

NASA/Lauren Hughes

*Al Bowers, center, and a group of student interns hook up a bungee cord for a flight of the Prandtl-D 3C subscale glider aircraft.*



Submitted Photo

*Al Bowers mentors students and speaks to groups frequently. He recently was recognized for his work. From left are Rick Cook, representing California State Sen. Scott Wilk; Amber Raskin, co-founder and co-CEO of iLEAD Schools; Kathleen Fredette, iLEAD director of Science, Technology, Engineering and Mathematics initiatives; Bowers; U.S. Rep. Steve Knight, Lily Knight; and Dawn Evenson, co-founder and co-CEO of iLEAD Schools.*

Pathways student he has mentored. University of California Berkeley student Loren Newton's technical paper detailed work he did as Bowers' intern. Newton processed flight data from the Prandtl aircraft into a quantitative model of the aircraft wing's unique flight dynamics. The paper based on that

data was judged as the best student technical paper in its category at a recent American Institute of Aeronautics and Astronautics event.

"Saying Al 'helped' me would be an understatement, he's a main reason why I ended up at Armstrong," Newton said. "Almost

four years ago, my high school science fair project ended up in his hands; almost solely on this basis he took a chance on me and offered me an internship position while I was an inexperienced college freshman. At Armstrong he related stories to encourage us to dream big and inspire us to make a difference. It is no coincidence that interns look up to Al so much. He combines a rare blend of brilliance, passion, character and humility."

Bowers is seen as a great mentor and also as an inspiration for the presentations he gives students at all levels of education and the knowledge he imparts. It's the way he allows students to use their critical thinking skills to solve challenges and to discover for themselves the answers to their questions that makes Bowers special.

In one presentation, he explained that the Cassini Spacecraft revealed that Saturn's moon Titan has rainfall cycles like Earth and has the only known lakes and seas in the solar system other than those on Earth. Scientists around the world are trying to figure out how to get a boat on the river Thames on Titan. He asked the students, "What do you want to do with your life? Don't you want to be one of the students working on this right now? It's to motivate them to open their minds to alternate realities that they could create."

Project-based learning has students encounter problems and find answers, he said. It's a philosophy that Bowers supports in his mentoring and a way he tries to encourage and inspire people in his presentations.

"The answer might be far beyond students' ability to solve the problem," he said. "That's OK, a number of them figured out the problem. You can find lots of people who get you the right answer to a problem. But the hard thing is to

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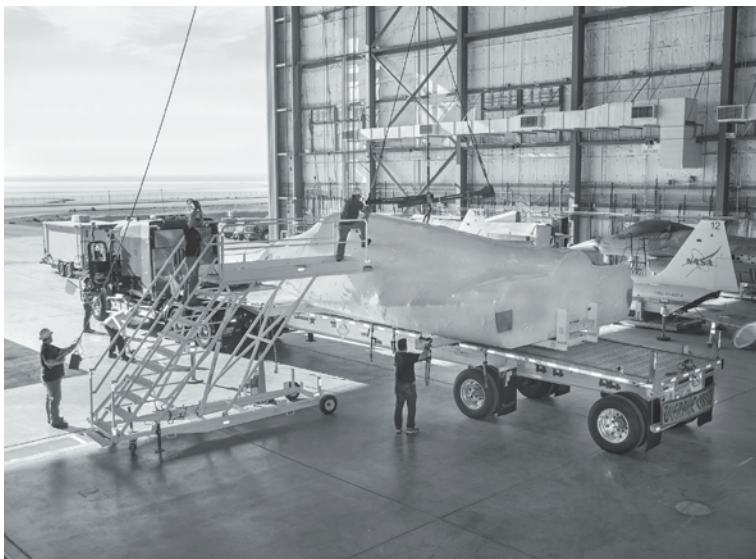




AFRC2018-0067-18

NASA/Ken Ulbrich

*Dream Chaser is lifted onto a truck in Armstrong's historic space shuttle hangar, where the spacecraft stayed as it was being prepared for testing and flights.*



AFRC2018-0067-24

NASA/Ken Ulbrich

*Dream Chaser is loaded onto a truck for its journey to Colorado.*



AFRC2018-0067-44

NASA/Ken Ulbrich

*Dream Chaser passes the HL-10 at Armstrong before departing for Colorado. The vehicle underwent testing and preparation for the successful approach and landing flight at Armstrong.*

# Dream Chaser departs

**By Leslie Williams**

Armstrong News Chief

After nearly 16 months at Armstrong, Sierra Nevada Corporation's Dream Chaser spacecraft departed April 5. The flight test vehicle headed to Colorado to be on display in one of the company facilities and may be used to support future manufacturing and ground testing operations.

Based on the HL-10 lifting body aircraft design, the spaceplane was at Armstrong undergoing ground and flight testing to validate critical avionics and air data systems and verify aerodynamic characteristics. The testing culminated in a successful runway landing Nov. 11, 2017.

During tow and taxi tests, a pickup truck pulled the Dream Chaser test vehicle on California's Edwards Air Force Base's two concrete runways to validate the performance of the spacecraft's nose skid, brakes, tires and guidance, navigation, and control systems. The company performed the tow tests with releases at speeds up to 60 mph. Taxi tow tests are standard for winged vehicles to prove the overall spacecraft handling post-landing.

Once ground structural testing and tow tests were complete, Dream Chaser performed a two-flight captive-carry phase during which a Columbia Chinook helicopter picked it up and flew it over the proposed path for the future approach and landing free flight test.

The vehicle's flight computer, guidance, navigation and control system, and state-of-the-art flush air data system were tested, as well as the landing gear and nose skid. Following the captive carry phase, the Dream Chaser performed a free flight test on Nov. 11, being released by the Chinook from approximately 10,000 feet above ground level and autonomously flown to Edwards AFB Runway 22L, successfully landing and rolling out to a full stop. The runway is also known for the first space shuttle landing on a concrete runway.

Armstrong provided hangar space, engineering support and access to the restricted airspace at Edwards Air Force Base. Additionally, the project relied on the base's support from the Air Force Test Center's 412th Test Wing (TW) and Arnold Air Engineering and Development Center Hypersonics Combined Test Force (HCTF) for range safety analysis and flight test support. AFRC, the 412th TW, and HCTF support enabled Sierra Nevada to successfully test their Dream Chaser vehicle in the approach and landing phase.

# Match making mission succeeded

By Leslie Williams

Armstrong News Chief

World View's Stratollite high-altitude balloon lifted off from the company's launch facility in Tucson, Arizona, reaching a float altitude of 115,000 feet March 29. The balloon was aloft for approximately five hours before landing near the border of New Mexico and Texas.

The balloon flight itself was nothing new for NASA's Flight Opportunities program flight provider World View Enterprises. The company has been flying scientific payloads on its high-altitude balloons since 2015. This flight, however, was a matchmaking mission of sorts. Onboard: the Low-Cost, Lightweight, Reusable Radiation Nose payload from NASA's Ames Research Center in Silicon Valley and the Automated Radiation Measurements for Aerospace Safety-High Altitude (ARMAS-Hi) payload from Space Environment Technologies and the University of Southern California both in Los Angeles. Both payloads aim to detect or monitor radiation on space-based missions – similar capabilities identified by Flight Opportunities Campaign Manager Paul De León as being a likely match for a fruitful collaboration.

"I knew that the Ames principal investigator wanted to fly along



Submitted Photo

*World View's Stratollite high-altitude balloon is prepared for liftoff from the company's Tucson, Arizona, facility.*

another radiation sensor in order to validate his data," explained De León. "It made a lot of sense – the more data they can obtain, the more confidence the researchers can have in the sensor's accuracy. But the other sensors the investigator inquired about were either unavailable or were simply too bulky to be installed on the flight."

Enter ARMAS-Hi – a commercial off-the-shelf sensor experiment featuring a very small footprint, low weight and low power consumption.

The ARMAS-Hi payload was selected by Flight Opportunities to receive a SpaceTech-REDDI grant, enabling their respective principal investigators (PIs) to choose an appropriate commercial flight provider for demonstration. While Flight Opportunities cannot direct flight providers to manifest specific technologies together, De León had a hunch the principal investigators would want to work together.

"When I saw both technologies I said hey, this would be a great match – if they can collaborate,

then they can use each other's payloads to validate the results of their flight experiments," said De León. He went with his instinct and connected the Ames principal investigator (PI) Meyya Meyyappan, and the ARMAS-Hi PI, Kent Tobiska. The researchers discussed the possibilities for leveraging data from a shared flight, leading to the joint manifest.

"It turned out to be a win-win situation for everyone," said De León.

With the World View flight successfully completed, the two organizations now begin the process of analyzing data in preparation for further research.

The Flight Opportunities program selects promising technologies from industry, academia and government for testing on commercial launch vehicles. The program is funded by the Space Technology Mission Directorate and managed at Armstrong. Ames manages the solicitation and selection of technologies to be tested and demonstrated on commercial flight vehicles.

The STMD is responsible for developing the crosscutting, pioneering, new technologies and capabilities needed by the agency to achieve its current and future missions.



NASA/Alexander Golz

## The SOFIA returns

*NASA's Stratospheric Observatory for Infrared Astronomy, SOFIA, took off for the return trip from an extended maintenance period and resumed science flights May 22. The May 22 mission was a 10-hour, overnight flight on which the SOFIA observed a number of celestial objects including an area of dense gas in the constellation Sagittarius. Researchers also studied the material remaining after a supernova explosion to better understand how these cataclysmic events impact the surrounding area and if these interactions form cosmic rays. Following the May 22 and May 23 science missions, The SOFIA's next deployment is scheduled to be to Christchurch, New Zealand, June 1, to investigate science targets best observed from the southern hemisphere.*



## Bowers... from page 4

find the right problem. I want these kids to know, they have asked the right question and they are on the right track. The critical thinking skills that they need right now are the same that will always be needed.”

The challenging tasks on the Prandtl-D aircraft are an example of how Bowers chooses to mentor. The students’ work has been a key part of the project that has shown that future aircraft can become significantly more efficient by using a wing design that includes a real and metaphorical twist on conventional wings.

“Here’s an idea that is so radical and so different and Armstrong Director David McBride and Center Chief Technologist David Voracek took a risk funding the idea,” he said. “There was a real opportunity where we could use interns as the workforce. In many ways the Prandtl is a microcosm of the bigger projects we have here. We go through design reviews, documents and answer questions like how we make these things fit together?”

The greatest challenge with a student workforce is schedules are very real and the work has to be in a condensed timetable that coincides with the 10 weeks or so before the internships end, Bowers said. To meet some of those challenges, Bowers and center staff work to prepare for when the students arrive so students can get right to work.

There are real-world implications of Bowers’ interns work.

“I try to turn these endeavors into teaching moments so that they understand this is a real problem, which happens on our big projects that things don’t work out the first



NASA/Mary Ann Harness

*Al Bowers talks to an elementary school class in New Mexico as part of NASA’s outreach to students.*

time, every time,” he said. “Many times students get a piece of data from the airplane that no one in the history of the universe has seen. It is their job to explain what they found.”

To see students and former interns succeed is his biggest success as a mentor.

Jennifer Cole, who is Armstrong’s Aeronautics Research Mission Directorate chief engineer and Advanced Air Transportation Technology senior adviser for flight, was mentored by Bowers in 1998 and 1999 as a summer student and again when she began full time at the center in 2000.

Bowers’ insight and guidance have been valuable during her career when she is looking for a perspective that’s grounded not only

in facts, but also the context of why, she said. For example, Bowers was chief engineer of a subscale research project called the Blended Wing Body when it was discussed as a possibility for a human-piloted experimental vehicle.

Cole was interested in disagreements between industry and government. Bowers explained the project’s history and how the goals and interests of government and industry drove the perspective on requirements. Part of that discussion was how government seeks data sets, tool validation and dissemination of the research to a broader audience, where industry is focused on confirming new configurations are solid and could lead to commercial product success.

“Al has this way of giving

objective information required to understand both sides of the coin,” she said. “He is very approachable and a fantastic storyteller and can present a story in context of the political environment or constraints to help shed light on why choices were made. At the end of the story, I gained perspective and had some of my assumptions challenged.”

“I never hesitated to ask him a question because I knew he would not judge me,” she added. “I always appreciated that he does not tell you the answer. He will pull you in a few directions by telling you of an experience, insight, or knowledge that resonates and helps you decide on a course of action.”

Bowers hears from prior interns often. One just messaged him that he graduated and is working for a GPS company. Three interns went to work on Cassini and four more are working on the Space-X Falcon heavy rocket.

Bowers has been recognized for his mentoring as a three-time winner of the NASA Armstrong Henry Arnaiz mentoring award. Armstrong peers also awarded Bowers the Pride in NASA Award and a project engineer award. NASA recognized his work with Exceptional Service Medals for the X-29, F/A-18 HARV and the X-48. NASA also recognized him with its Exceptional Achievement Engineering Medal in 2016 for his work on the Prandtl aircraft.

Engineering is his passion and so are the opportunities of sharing that with the next generations.

“I love talking to kids,” he said. “Their enthusiasm is contagious. They ask questions I never imagined and they have incredibly curious minds.”

# Armstrong researchers publish results

Armstrong research led to three technical publications in March.

Francisco Pena, Benjamin L. Martins and W. Lance Richards collaborated on “Active In-flight Load Redistribution Utilizing Fiber-

Optic Shape Sensing and Multiple Control Surfaces,” NASA/TM-2018-219741.

Aamod Samuel, Joel Lozano, Olivia Carte and Troy Robillos published, “Creating Innovative

Frameworks to Spur Cultural Change at the NASA Armstrong Flight Research Center,” prepared for presentation at the 2018 IEEE Aerospace Conference, Big Sky, Montana, March 3-10, 2018.

Steffi B. Valkov, Daniel Sternberg and Michael Marston collaborated on “Operational Overview for UAS Integration in the NAS Project Flight Test Series 3,” NASA/TM-2018-219540.

## Administrator... from page 1

moon as a fueling depot and he wants to see the U.S. do it first – with commercial partners.

“Imagine if you had a fuel depot in orbit around the moon,” Bridenstine said. “Getting back and forth to that fuel depot, even to geostationary orbit, means that we’re going to be able to drive down the cost. That could mean the next time a satellite runs out of station-keeping fuel, instead of launching another \$500 million satellite on another rocket that costs \$100 million to launch, maybe we’re able to fuel that satellite, or give it some kind of station-keeping capability from lunar orbit.”

The strategic concept requires robust commercial capability to go back and forth to the moon and

going back and forth from lunar orbit to low-Earth orbit, he added.

Before joining NASA as Administrator, he began his federal service in 2012 as congressman of Oklahoma’s 1st District. He worked his way onto the Science Committee and the Subcommittee on Space, which oversees NASA. He also was chairman of the Subcommittee on the Environment, which oversees the National Oceanic and Atmospheric Administration, or NOAA. It was there that he learned that NOAA is heavily involved in space-related activities and works with NASA.

“As the congressman from Oklahoma, who has constituents who die in tornadoes every year, I got very involved in NOAA’s

capability to predict weather, especially as it relates to tornadoes,” he said.

In particular, he learned that the agencies work together on items like the Joint Polar Satellite System, or JPSS. In addition, he had oversight of several of the Geostationary Operational Satellites such as the GOES-R and GOES-S, which are now in orbit.

Concerning aeronautics, he touted the Low-Boom Flight Demonstrator.

“We’ve been plowing through the atmosphere at 0.6 Mach for 60 years now and this (experimental aircraft) is going to give us an opportunity to break that mold and fly across the continental United States, not just across the

oceans, at much faster speeds. Of course, everybody understands that time is critical to everybody in today’s busy world, and this could enable some commercial partners to ultimately achieve an objective of getting us across the country faster.”

Before he was a congressman, Bridenstine began his federal service in the military as a pilot, where he flew various aircraft, including F-18s, conducted more than 300 carrier landings and flew more than 1,900 hours.

He graduated with honors from Rice University with a triple major in economics, business and psychology.

Bridenstine also is the former executive director of the Tulsa Air and Space Museum and Planetarium.

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headphones, Howe said pilots were forced to make trade-offs in order to complete the mission, such as wearing modified half earplugs inside the helmet and turning the intercom system volume all the way up.

“It was a challenge to hear pilots and the radio during some of the noisiest situations and you almost wanted to pull back on the throttle to hear,” he said.

The new system allows the pilots to discard the ear plugs and turn the volume down on the intercom system, he added.



AFRC2018-0099-4

NASA/Ken Ulbrich



AFRC2018-0099-2 NASA/Ken Ulbrich

*At left, Active Noise Reduction system helmet is plugged into a panel on the aircraft. Above, the noise cancelling headphones are concealed in the black headphones cavity in the helmet.*

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