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F/A-18E: Center assists with complex loads tests

AFRC2021-0159-10 NASA/Josh Fisher

A top view shows the wing loading test configuration of an F/A-18E from the Naval Air Systems Command (NAVAIR) in Patuxent River, Maryland. The aircraft is in the NASA Armstrong Flight Loads Laboratory for one of the center's biggest loads calibration tests. The testing is needed before the aircraft can serve as a test vehicle for determining if it can safely manage maneuvers and proposed upgrades. See page 6.

Pat Stoliker retires

NASA Armstrong career spanned 30 years

By Jay Levine
X-Press editor

Patrick Stoliker, NASA Armstrong deputy director, retired Feb. 18. He had a 30-year career as an engineer and manager at the center.

Stoliker takes with him a career of great memories and partnerships.

One highlight was when he worked as a lead flight controls engineer on the X-31A Enhanced Fighter Maneuverability project, during close-in-combat evaluations of the quasi-tailless experimental aircraft.

"I liked hanging out with the X-31 crew," Stoliker recalled. "During the Paris Air Show deployment, I helped bring equipment to the airplane and I helped them set up. Mike Bondy was crew chief and he let me pull the remove before flight flags (called red tag items) on the hydrazine system and the landing gear. Later, he let me give the hand signals to marshal the airplane in for German pilot Quiran Kim."

However, there were challenges getting to the air show. The first X-31 aircraft was lost in an accident on Jan. 19, 1995. The investigation indicated the crash resulted from ice accumulation in the nose boom, which was not heated. That led to incorrect data reaching flight computers. The result was an uncontrollable aircraft. The incident is detailed in the "Breaking the Chain" book, followed by presentations to amplify the flight safety messages.

"In retrospect we had the data," Stoliker said. "We could have used it to prevent a crash and I have continued to carry the memory of that event."

A completely different challenge took him out of his comfort zone.

"With the Integrated Financial Management System, the agency was moving towards one system for all the centers, there was a challenge finding a replacement

Stoliker retires, page 12

AFRC2022-0018-22 NASA/Josh Fisher

Brad Flick, who is now NASA Armstrong deputy director, presents Pat Stoliker, then center deputy director, with a photo album and watch on behalf of the NASA Armstrong Exchange Council. In the background is Steve Jensen, NASA Armstrong Director of Engineering and master of ceremonies for the retirement event.

ED13-0155-13 NASA/Tom Tschida

Former NASA space shuttle astronaut Steve Lindsey, then director of flight operations for the Sierra Nevada Corporation, pointed out features of the firm's prototype Dream Chaser flight test vehicle to then NASA Administrator Charlie Bolden and Patrick Stoliker, NASA Armstrong deputy director. Behind them adjacent to the Dream Chaser is the original M2-F1 lifting body aircraft, which pioneered the wingless lifting body concept in the 1960s at the center.

AFRC2018-0288-21 NASA/Lauren Hughes

Pat and Pam Stoliker take a break from serving chili for a picture at the NASA Armstrong Halloween Chili Cookoff and Costume Contest.

Pilots stay sharp for flight

AFRC2022-0018-11 NASA/Josh Fisher

NASA photographer Josh Fisher captured this flight of NASA Armstrong flight crews including Nils Larson Glenn Graham in the F-15 (at left) and Shawn Kern and Jim Ross in the F/A-18. The flights were for pilot proficiency, a chance for flight crews to stay ready to fly research missions, or observe a flight from the air to provide another set of eyes.

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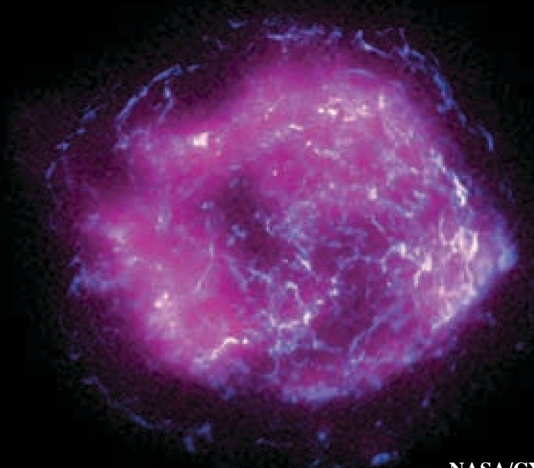
NASA's Imaging X-Ray Polarimetry Explorer, which launched Dec. 9, 2021, has sent back its first science image: Cassiopeia A – the remains of a star that exploded 11,000 light-years from Earth.



NASA/CXC/SAO/IXPE

News at NASA

NASA/Kim Shiflett

Teams retracted the first two of 20 platforms surrounding the Space Launch System rocket and Orion spacecraft that allow work on the integrated system.

Artemis prepares for a first roll out

The Artemis I Moon rocket is getting closer to rolling out of the Vehicle Assembly Building(VAB) at NASA's Kennedy Space Center in Florida for the first time.

The first two of 20 platforms surrounding the Space Launch System (SLS) and Orion spacecraft that allow work on the integrated system inside the building were retracted for roll out to Launch Complex 39B. Teams retracted the platforms, which move like hydraulic kitchen drawers,

Artemis I, page 12

Mentors guided my early career

What I learned influenced my approaches to work

Guest column

Brad Flick
NASA Armstrong
deputy center director

EC87-0149-012 NASA/Mike Smith

From left, Brad Flick, Dick Simon, and Jerry Henry analyze the aircraft data bus.

When Jay Levine asked me to write a guest column looking back at my time at Armstrong, my first reaction was, "Wait, that means I'm an old guy!" Then I thought, "Cool, that'll be fun!" I had no doubt that I'd focus on the first 10 years of my career. As much as I've enjoyed and grown in the time since, I'll always think of those early years as the best part of my career. It's when I learned how to be an engineer and when I really grew to appreciate this very special place. I'll talk about the work, but I'll also mention many of the people that influenced me. The history books talk about the projects, but it's really the people that make the center what it was, is, and will continue to be.

My first day at the then NASA Ames-Dryden Flight Research Facility was Sept. 15, 1986. A fellow Clarkson College of Technology alumni, Ed Hamlin, was the deputy branch chief of the recently created Flight Systems branch and he convinced his boss, Jim Phelps, to take a chance on a kid with a diploma, but no actual engineering experience. Most of the other new hires had been co-ops, but my school had no such program, so this was my first professional engineering job. I didn't expect it would last over 35 years.

I was assigned to the F-18 High Alpha Research Vehicle (HARV) project, under two mentors, Don Yount and Jerry Henry, who decided to assign me to work half time in the avionics shop for my first three months so I could learn the ropes. This turned out to be the best thing they could've done. I didn't know the first thing about how airplanes work, but I'm a quick study and had a knack for thinking at a systems level. Splitting my time between working with some very good engineers like Don, Jerry, Dick Simon, and Ron Young, and some very talented and experienced technicians like Al Greishaber, John (Beanie) Bruno, Tracy Ackeret and Gary Beard gave me the best possible education about not only the airplane, but also how the center worked.

The HARV team was in the middle of rebuilding the airplane after it had sat at the Naval Air Station in Patuxent River, Maryland, being cannibalized for a few years after its first life as the spin test bird in the pre-production developmental flight test program. NASA acquired the airplane to do high angle-of-attack research because it had been modified with a spin chute and emergency electrical and hydraulic systems. It was a low time airframe, but it was in rough shape. When I walked into the hangar on my first day, I saw about a dozen people crawling all over the airplane. The team was rebuilding just about everything except the structure.

The fuel system, environmental control system, electrical system, flight control system and avionics all needed to be rebuilt and upgraded to as close to the current fleet configuration as we could get it. Along with replacing the early flight test data system and replacing it with a NASA research flight instrumentation system. It was a busy time. I've always thought of airplanes as an integrated collection of subsystems, all required to work together. We were up to our elbows in every single subsystem, so it was a great opportunity to learn both the hardware and software functionality. Just like with cars, computers, or houses, the best way to learn how things work is to fix them. We had some help from McDonnell Douglas on-site representatives, but the team was largely all NASA. There was a lot of learning the hard way, because system documentation was a little hit or miss, but we had it all together and flew our first flight in April 1987.

The first phase of the project was to study and document the high angle-of-attack aerodynamics of the baseline F-18. To do so, we developed

Brad Flick, page 11

Fab shop on wheels

Shop can assist robotics teams, disaster relief

By Jay Levine
X-Press editor

NASA Armstrong is bringing a fabrication shop on wheels to national student robotics competitions beginning in March. It will give robotics teams the ability to quickly modify or fix their robots.

The mobile shop allows a technician to weld, machine, or perform sheet metal repairs to damaged robots and send it back to action. Equipment onboard includes a mill, lathe, drill press, metal saw, air compressor, generator, belt sander, arbor press, metal work tooling, and welding equipment.

"It is an awesome opportunity for the students," said Alan Crocker, NASA Armstrong Fabrication branch chief. "We hope in addition to fixing the robots that we will inspire the kids. Some of them might want to be technicians with the potential of building components that will go to outer space. They are so motivated, and that reinvigorates me."

How it works is students will file a work order detailing what part they need, or what needs to be fixed. Then NASA Armstrong staff will help replace and fix student robots.

The center received the mobile fabrication shop on Feb. 7, thanks to the Robotics Alliance Project based at NASA's Johnson Space Center in Houston. The robotics alliance is dedicated to increasing interest in science, technology, engineering, and mathematics (STEM) disciplines, and inspiring students in the United States

Shop on wheels, page 10

AFRC2022-0011-04 NASA/Lauren Hughes

Alan Crocker, Fabrication branch chief, shows the mobile shop that can fix robots for student teams and potentially with disaster relief.

AFRC2022-0011-08 NASA/Lauren Hughes

Jason Nelson is one of the Fabrication branch technicians that has volunteered to help staff the mobile shop. With the tools around him, Nelson can help student teams return broken robots to competition.

Volunteers are needed for robotics local event

Help inspire our next generation of engineers, technicians, and scientists by volunteering for the Aerospace Valley Regional For Inspiration and Recognition of Science and Technology robotics competition April 6-9 at Eastside High School in Lancaster.

No experience is necessary, all technical and non-technical backgrounds desired.

Robot inspectors, judges, and general logistics help is needed. Wednesday is a setup day, Thursday includes robot inspections, practice matches, and finishing the setup. Friday (an RDO) and Saturday are competition days, judging, regional awards, and tear down.

Friday and Saturday are the two big days we need logistics help. Read the COVID protocols at https://www.avregional.org/covid-protocols, talk to your supervisor if you would like to help out on Wednesday and/or Thursday, register online through www.avregional.org/volunteer. For more information, contact David Voracek on Teams.

Heavy lifting

NASA Armstrong Flight Loads Laboratory is assisting the Navy with complex loads calibration tests on an F/A-18E aircraft

AFRC2021-0159-02 NASA/Josh Fisher

Left wing load hardware is setup for testing an F/A-18E from the Naval Air Systems Command (NAVAIR) in Patuxent River, Maryland. The aircraft is in the NASA Armstrong Flight Loads Laboratory for the center's biggest load calibrations tests. This testing is needed before the aircraft can serve as a test vehicle for determining if it can safely manage maneuvers and proposed upgrades.

By Jay Levine
X-Press editor and
Elena Johnson
NASA Armstrong Public Affairs

The NASA Armstrong Flight Loads Laboratory is working on its most complex loads calibration tests on an F/A-18E Super Hornet.

The aircraft is from the Naval Air Systems Command (NAVAIR) in Patuxent River, Maryland. NAVAIR retired its previous loads test aircraft and NASA Armstrong staff are assisting to prepare the new aircraft for its role to help safely manage in flight maneuvers and determine how the F/A-18E fleet will perform if proposed upgrades are incorporated.

Larry Hudson, NASA Armstrong Flight Load Laboratory chief test engineer, explained a few elements of the work.

"The number of load control channels used at one time is nearly 40% more than the next largest test ever performed in the lab," Hudson said. "Testing involves loading three areas of the aircraft: wings, vertical tails, and horizontal tails. We typically have done loads calibration tests on wings."

Testing on the horizontal tails wrapped up in October. The second phase began in December 2021 on the wings and is set to continue through March. A third phase is estimated to start in May to test the aircraft's two vertical tails.

Testing includes the operation of 84 hydraulic actuators during the performance of 87 load cases, said Kim Tucker, NASA Armstrong F/A-18E test project manager.

That includes the simultaneous operation of 56 actuators during the loading tests on the wings to determine the structure's response.

"For each test case, hydraulic actuators will push and/or pull on the aircraft surface to put it into tension or compression with a known amount of force," Tucker said. "Strain gages installed on the aircraft will measure the response."

The amount of load applied to the aircraft starts low and then increases with subsequent test cases.

"The load cases for this test were designed to reach a maximum of approximately 60% of the airframe allowable limit load," she explained. "There are 11 horizontal tail load cases, 62 wing load cases, and 14 vertical tail load cases resulting in a total of 87 test cases."

As each phase is completed, equations are formulated from the test results.

"Equations are used to evaluate real time loads during test flights and simulations," she explained. "Those real time loads consist of aerodynamic and inertia loads, or forces that the aircraft structure experiences during flight."

The laboratory is not unfamiliar with load calibration programs and brings that experience to this work. For example, there was an important lesson learned from the F/A-18 Active Aeroelastic Wing Loads Calibration Test in 2001 that involved reduction in the test load limit.

"The biggest lesson learned was the fact that you do not have to load test an aircraft wing beyond 60% of the design limit load to obtain accurate loads equations," Hudson explained. "Being able to test to a lower load limit reduces the risk of damaging the aircraft during testing."

One of the biggest challenges early on for this project was bonding the 180 load pads to the wings and vertical tails. It provided an opportunity for NASA Armstrong staff to innovate, as they frequently do during a project.

"We had to develop a well

Loads lab, page 9

AFRC2021-0024-67 **NASA/Ken Ulbrich**

The load pad bonding process for the vertical tails was a preliminary step in the process to test the F/A-18E.

AFRC2021-0060-14 **NASA/Lauren Hughes**

Walter Hargis, left, and Chris Mount apply tank sealant on the aircraft surface of a F/A-18E.

AFRC2021-0060-39 **NASA/Lauren Hughes**

From left, Wally Hargis, Ray Sadler, Chris Mount, and Ronnie Haraguchi place a load pad on the aircraft surface of a F/A-18E.

AFRC2021-0060-42 NASA/Lauren Hughes

From left, Ronnie Haraguchi, Chris Mount, and Ray Sadler vacuum bag load pads on the aircraft surface of a F/A-18E.

AFRC2021-0078-03 NASA/Lauren Hughes

An F/A-18E from the Naval Air Systems Command in Patuxent River, Maryland, is moved to the NASA Armstrong Flight Loads Laboratory.

AFRC2021-0107-05 NASA/Lauren Hughes

From left, Dominic Barela and Lucas Oramas review a drawing for installing the wing load test fixturing on a F/A-18E.

AFRC2021-0124-54 NASA/Josh Fisher

The F/A-18E actuator is positioned for pinning to the horizontal tail load test fixture.

AFRC2021-0124-69 NASA/Josh Fisher

Larry Hudson does an inspection after the F/A-18E actuator was pinned to the horizontal tail load test fixture.

AFRC2021-0132-15 NASA/Josh Fisher

The horizontal tail is under test load on the F/A-18E.

Loads lab... from page 8

thought out vacuum bonding process for both horizontal and vertical surfaces, which required doing it right the first time," he added.

NAVAIR's F/A-18E arrived at NASA Armstrong in October 2020. The aircraft was configured for test by removing parts not needed for the calibration and installing test-specific hardware where necessary, Tucker said.

Aircraft wing and tail pad bonding surfaces were prepared by removing the radar absorbent material and paint coatings and applying a fresh layer of primer to promote load-pad adhesion.

NASA Armstrong completed set up of all the load pads and bonding and assembled test structures called whiffle trees needed to distribute prescribed hydraulic actuator loads. Before the F/A-18E was brought into the laboratory and attached to the floor tracks with restraining hardware, center staff also worked on load pad bonding onto the aircraft.

In addition, work was completed on the design, analysis, and fabrication of many hardware pieces for the test setup. The hardware pieces included fixtures for the wing test, horizontal spindle test, and vertical tail test, as well as aircraft restraining hardware, and hundreds of components for the load trains, or the columns of hardware through which load travels, and whiffle trees.

The overall effort is expected to be completed by summer 2022, when test-specific hardware will be removed, and the aircraft will be configured for flight and returned to NAVAIR. When it returns, the work NASA Armstrong staff assisted with will enhance safety for the F/A-18E fleet by understanding the implications of proposed upgrades and in flight maneuvers.

AFRC2021-0132-17 NASA/Josh Fisher

Larry Hudson and Tony Chen inspect test data during horizontal tail testing on an F/A-18E.

AFRC2021-0145-39 NASA/Josh Fisher

The NASA Armstrong Flight Loads Laboratory is working on one of its biggest load calibrations tests on an F/A-18E. This image shows a front view of the aircraft.

AFRC2021-0145-42 NASA/Josh Fisher

The F/A-18E testing is needed before the aircraft can serve as a test vehicle for determining if it can safely manage maneuvers and proposed upgrades. This is a rear view of the test setup for the wing loads testing.

Medical transport – fast

By Teresa Whiting
NASA Armstrong Public Affairs

NASA

Several projects supporting NASA's Advanced Air Mobility or AAM mission are working on different elements to help make AAM a reality. AAM could be used in healthcare operations in the form of air taxi ambulances or medical supply delivery in the future. This concept graphic shows how a future AAM vehicle could aid in healthcare by carrying passengers to a hospital.

During the global pandemic people have realized remote healthcare, delivery, and easy access to services are paramount. NASA's Advanced Air Mobility or AAM mission paves the way toward enabling significant air mobility needs such as better access to healthcare services.

AAM has the potential to provide medical transport for people and supplies around the world. This could be a highly automated air ambulance flying above traffic to get to the hospital in a more sustainable and lower cost manner than we have today with helicopters. This could look like a smaller drone carrying blood or organs between hospitals and donation centers. This could even look like faster transport of medical supplies, vaccines, or medicine.

Think about if you live in a remote area with little access to quality healthcare, but a city a few hours away has top-notch doctors. The doctors could access an air taxi and fly to you to perform care in your remote area. Same goes for if you had a medical emergency, you could hop on an air ambulance and travel to a city hospital.

Several projects under the mission are working on different elements to help make AAM a reality in medical operations. This includes work on automation, noise, vertiport and vehicle design, and airspace design to keep everyone safe while flying in the skies together. It is going to take an effort between government agencies, industry, and the public to build new highways in the sky.

NASA's vision is to map out a safe, accessible, and affordable new air transportation system alongside industry partners and the Federal Aviation Administration. Once developed, passengers and cargo will travel on-demand in innovative, automated aircraft across town, between neighboring cities, or to other locations typically accessed today by car.

Shop on wheels... from page 5

to pursue professions in those fields to create an inspired, experienced, and technical workforce for the aerospace community.

A key element of that goal is to support high school robotics teams at national robotics competitions with engineering and technical professionals from government, industry, and universities to gain hands-on experience and mentoring.

"The interactions with NASA engineering technicians at these events are an excellent opportunity for students to gain insights into career paths for NASA that are vital to our success," said David Voracek, NASA Armstrong chief technologist and NASA Armstrong project manager for the Robotics Alliance Project.

The NASA Armstrong mobile fabrication shop is set to roll in March and April to Monterey, Fresno, and Lancaster to support For Inspiration and Recognition of Science and Technology robotics competitions. NASA Armstrong's Fabrication branch will provide two technicians (three during training) to staff the portable shop during the national events including Jason Nelson, Alex Zamora, German Escobar, and Jose Vasquez.

While the primary focus of the trailer is to assist students, Voracek added, "the fabrication shop is also available for NASA Armstrong projects and could be used to assist with emergency response efforts."

For example, NASA Goddard used a similar trailer in Florida during hurricanes for sharpening tools used to clear debris and to form fire breaks, Crocker said.

Regardless of its use for students, center projects or to assist with an emergency response, the mobile fabrication shop provides an agile capability.

Brad Flick... from page 4

a system to eject dye onto the aircraft forebody for on-surface flow visualization, a smoke generator system to eject smoke out of the aircraft forebody, a translating pressure rake to measure the leading-edge vortex and an in-house developed high-resolution video system to document what was going on. Dave Richwine and Dick Klein led the mechanical design work, working with all the artisans in the machine, sheet metal, and what was the rocket shop/hydraulic shop. I picked up a lot of the electrical and instrumentation work with Jerry Henry and exceptionally creative technicians like Merle Economu, Wes Hughes, Howard Trent, and others. Looking back on it, I now appreciate that we were inventing very innovative measurement techniques, doing the risk analysis, and well, just figuring it out on our own. That's the Dryden I remember and the Armstrong I want to foster.

Following an inadvertent canopy jettison with Bill Dana flying the airplane on flight 101 (it's a story, ask me sometime), we ended Phase 1 and moved on to Phase 2, where we expanded the airplane envelope to extreme angles-of-attack. We contracted with McDonnell Douglas to develop a multi-axis Thrust Vectoring Control System and Research Flight Control System to allow controlled flight over 55 degrees angle of attack (AoA). I had a few very cool jobs for Phase 2. Still working with Jerry Henry and the electric shop, we rebuilt and integrated the emergency backup electric and hydraulic systems to supply backup power in the event of a dual engine flameout at high AoA.

EC89-0096-239 NASA

NASA Armstrong (then Dryden) researchers used smoke generators and yarn tufts for flow visualization studies on an F/A-18 as part of the High Alpha Research Vehicle (HARV) project.

We also rebuilt and tested the spin recovery parachute. Luckily, we never needed to use any of those systems in anger in the nearly 300 subsequent flights. But it was a great opportunity for this young engineer to learn at a systems level.

Concurrently, we also built up and integrated the F-18 Iron Bird and flight controls hardware bench so we could perform full verification and validation of the modified control system. That was another huge effort where I worked with folks like Bill Frederickson and Linda Kelly on the bench, Mark Collard on the Iron Bird aircraft, Martha Evans, Jeff Ray, Dick Simon and others on the simulation, Vicki Regenie, Mike Earls, Joe Pahle, Joe Wilson, Keith Wichman and many others on the flight control system software and its verification and validation.

Phase 2 of HARV will always be my career highlight. We flew nearly 200 research flights, mostly outside the published F-18 flight envelope, requiring teamwork across every single discipline, all intended to bring Bill Dana, Ed Schneider, Jim Smolka, Mark Stucky, and a slew of guest pilots home safely. At any given time, we were a flight controls project, a structures project, a propulsion project, or an aero project. We all relied on and learned from each other to get the job done.

In Phase 3, we partnered with our friends at NASA Langley to design, integrate, and flight test a system of actuated control surfaces (strakes) on the radome to control the aircraft by manipulating the vortices shed by the nose at high AoA. The Langley team was led by principal investigator Dan Murri and mechanical designer Mark Lord, while Joe Pahle led our control law development with Mike Thomson leading the software team. I designed the actuator control system hardware to connect the hardware to the software. We flew about another 100 research flights, which ended the HARV program. The airplane currently sits in the Virginia Air and Space Museum in Hampton, Virginia.

I probably didn't appreciate this at the time, but I now look at my 10 years on the HARV program as a blessing. I got to learn about aircraft, engineering, interdisciplinary flight research and NASA overall from some of the best in the business at a time when we had a lot of freedom to innovate, both in product and process. I had the privilege to work with and learn from talented project managers like Don Gatlin, Jenny Baer-Reidhart, and Dennis Bessette, chief engineers like Bob Meyer, Vicki Regenie, and Al Bowers; fellow operations engineers Art Tanaka and Dick Klein; and some of the best researchers, engineers, technicians, and mechanics in the business. I can't name them all, but the teamwork and collaboration established my mental model for a successful project team.

While we all had our organizational-based responsibilities, there was very little territorialism. If someone needed help in another area and we could pitch in, we just did it. There were seemingly endless opportunities to learn and grow, and I took advantage of those opportunities. In those first 10 years, I grew from a young, fresh out of school kid to a journey level engineer who had designed and flown safety critical hardware, had been entrusted with overseeing a one-of-a-kind research aircraft, had controlled over 100 high-risk flights and most importantly to me, had gained the trust of the world's best flight research organization to do all that.

Stoliker retires... from page 2

program manager," he recalled. "I stepped up, even though I had taken just a single accounting class for engineers in college. It touched more than just accounting, as it crossed over into finance, acquisition, human resources, and budget."

He had to take a different approach to the financial environment than he did as an engineer. He talked to individuals and learned a lot about the center's mission support teams. One of the highlights for Stoliker was taking his new team to fly in the simulators on a team building trip to understand the impact of its work on the center's mission.

A hallmark of Stoliker's career is his communication skills, which he credits from his mentors in his early career in the aerospace industry where open communication was stressed. As deputy director, he established an informal way for employees to bring up questions called Popcorn with Pat. He also communicates weekly the latest news and recognizes exceptional center staff in his Status by Stoliker emails.

"The more you establish relationships, the easier it is to accomplish the mission," he said. "Even when situations are tense."

He considers his work on flight safety to be among his most important contributions.

"Flight safety and preparation was always important to X-31 flights, and I was a part of the flight readiness reviews on the X-38," he said. "I also was the chairman on the flight readiness reviews for the hypersonic X-43A. Chairing reviews for two X-planes was super cool."

He also noted the work to take the NASA 747 Stratospheric Observatory for Infrared Astronomy to flight and the science data teams have achieved. That, and the science airplanes the center operates to fly unique missions around the world, are possible because of the center's safety culture.

Stoliker received the NASA Exceptional Service Medal in 1999 for his contributions to flight control system development.

"Getting recognized by my peers was very satisfying," he recalled. "I received that award when I was chief of the Controls and Dynamics branch. We were doing groundbreaking work and transitioning it to flight."

He also earned the NASA Outstanding Leadership Medal in 2009 for exemplary leadership and personal involvement in directly influencing the sustainment of NASA's flight research capabilities and competencies.

He received a second NASA Exceptional Service Medal in 2016 acknowledging his leadership and contributions to the safe and effective management of the center.

As he prepares for his retirement, he knows the center has a bright future.

"We have built a dedicated and diverse leadership team," he said. "It makes leaving easy knowing that I am leaving the center in very, very, capable hands."

In deciding to retire, one element was hard, Stoliker said.

"I told someone after a 45-year career including co-op and industry, the decision to move on was easy," he said. "The decision to leave the people, that was hard."

Artemis I... from page 3

near the launch abort system on the Orion spacecraft in anticipation of the roll.

Teams are continuing to install instrumentation on the SLS's twin solid rocket boosters inside the VAB. Thousands of sensors and special instruments will monitor the rocket and spacecraft as they roll out for the first time on March 17 and make the four-mile journey to Launch Complex 39B, arriving on March 18. Engineers will capture as much data as possible on the performance of all the systems that are part of the rocket, spacecraft, ground systems used for rollout, and on the pad for propellant loading and other activities. Once all the rocket and spacecraft systems are inspected, the 322-foot-tall rocket will roll to the launch pad for the wet dress rehearsal test, which is scheduled to occur approximately two weeks after it arrives at 39B.

The last steps remaining before rollout include inspecting each piece of the rocket and spacecraft, including physically entering different components of SLS and, step-by-step, making sure SLS and Orion are ready for the trip to the launch pad. As inspections continue, the NASA Kennedy ground systems team is working to remove equipment and scaffolding away from the rocket and will continue retracting the platforms until the entire rocket is revealed.

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