National Aeronautics and Space Administration

X-PRESS

ARMSTRONG FLIGHT RESEARCH CENTER

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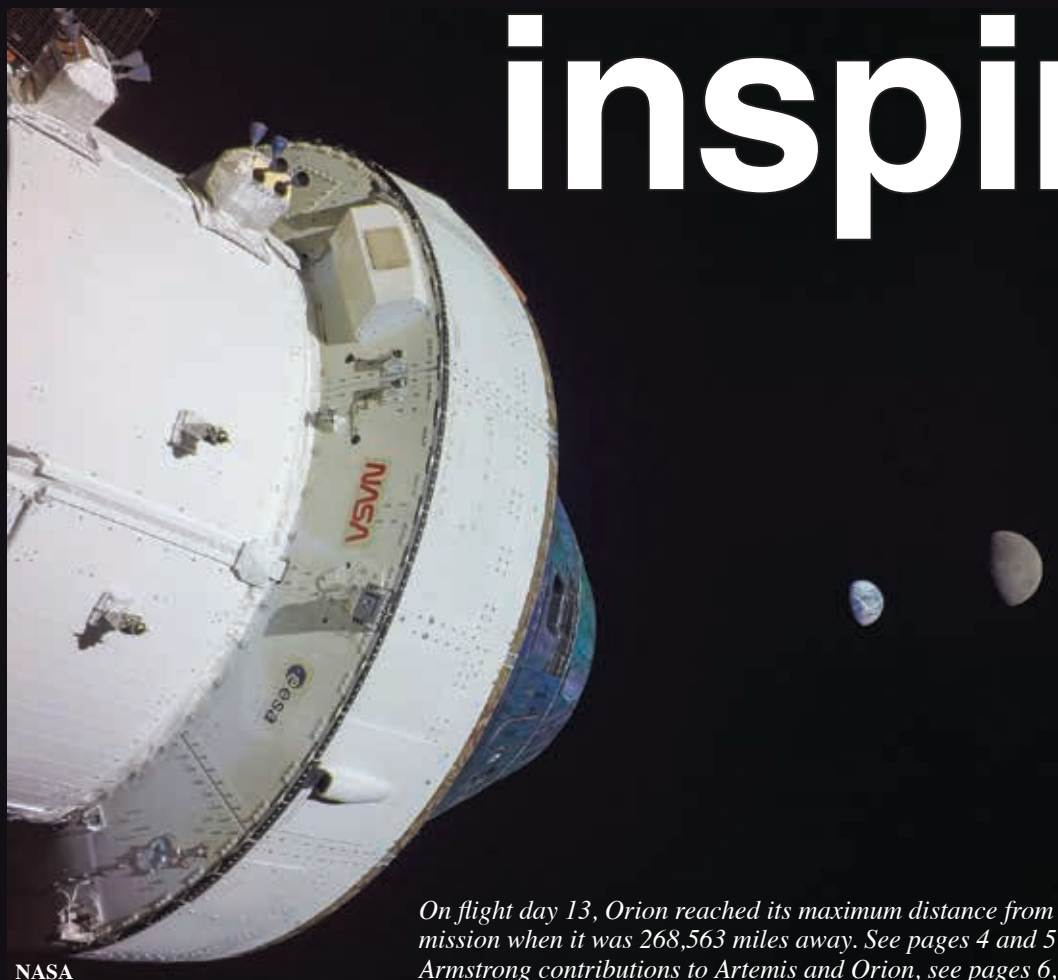
Artemis I inspires



NASA

On flight day 13, Orion reached its maximum distance from Earth during the Artemis I mission when it was 268,563 miles away. See pages 4 and 5. To learn more about NASA Armstrong contributions to Artemis and Orion, see pages 6, 7, and 10.

Just announced: Bradley Flick named center director

www.nasa.gov

X-59 engine installed

By Matt Kamlet
NASA Armstrong Public Affairs

NASA's quiet supersonic X-59 now has the engine that will power it in flight.

The installation of the F414-GE-100 engine took place at Lockheed Martin's Skunk Works facility in Palmdale in November, marking a major milestone as the X-59 approaches the completion of its assembly.

The 13-foot-long engine from General Electric Aviation packs 22,000 pounds of propulsion energy and will power the X-59 as it flies at speeds up to Mach 1.4 and altitudes around 55,000 feet.

"The engine installation is the culmination of years of design and planning by the NASA, Lockheed Martin, and General Electric Aviation teams," said Ray Castner, NASA's propulsion performance lead

Install, page 3

AFRC2022-0146-60 **NASA/Carla Thomas**

A GE Aviation F414-GE-100 engine is installed in NASA's quiet supersonic X-59 aircraft at Lockheed Martin's Skunk Works facility in Palmdale. The 13-foot-long engine packs 22,000 pounds of propulsion energy and will power the X-59 to speeds up to Mach 1.4. Installation of the engine marks a major milestone as the X-59 nears assembly completion, taxi tests, and first flight.

AFRC2022-0154-64 **NASA/Jim Ross**

Last flight

By Elena Johnson
NASA Armstrong Public Affairs

The Stratospheric Observatory for Infrared Astronomy (SOFIA) flew from NASA Armstrong for the last time Dec. 13.

SOFIA flew over Palmdale and Edwards Air Force Base (it is above NASA Armstrong at left) as a salute to community support during the program. The aircraft continued to its final destination in Tucson, Arizona, where it will ultimately be on display at the Pima Air & Space Museum.

After 732 nights observing, the SOFIA program concluded on Sept. 29. SOFIA was a mission of discovery, revealing unseen – and sometimes unseeable – parts of our universe including water on the sunlit surface of the moon. The Boeing 747SP jetliner was modified to carry a 38,000-pound, 100-inch telescope.

Nelson names Flick Armstrong director

NASA Administrator Bill Nelson named Bradley Flick NASA Armstrong's center director on Dec.5.

"Brad is a compassionate leader with a long career in revolutionizing air transportation, developing sustainable aviation, and nurturing a diverse and inclusive workforce," Nelson said.

Nelson said Flick leads a center that continues to advance and secure America's leadership in aeronautics, develop aerospace technology that will revolutionize aviation, and contribute to the understanding and protection of Earth.

"As the agency's leader in high-risk flight research, Brad will lead his teams through the successful first flights of the agency's first all-electric experimental aircraft, and the quiet supersonic aircraft," Nelson added.

Flick served as acting center director since July 2022. Prior to that he was deputy center director overseeing management, strategy, and operations at Armstrong. Flick was the director for Research and Engineering at the center and was responsible for the technical and administrative management of the Research and

Bradley Flick

Engineering Directorate's engineering workforce.

"It's humbling to even be considered, much less selected to lead this very special place," Flick said. "We all ride on the shoulders of legendary flight researchers and the discoveries they made here over the last 75 years."

The center's missions will continue to change and evolve, but there are still exciting opportunities for discovery through flight and he said his goal is to make sure NASA Armstrong is a part of it.

"More important than the mission are the people – you all and those who'll come after us," he wrote in an email to center staff. "I want us to work together to have the kind of workplace we're all proud of."

Flick served as NASA Armstrong center chief engineer from October 2005 to September 2009. He began his career at the center in 1986 as a flight systems engineer on the F/A-18 High Alpha Research Vehicle (HARV) project.

In 1988, he transferred to the Operations Engineering Branch, where he continued work on the HARV project with a lead role in the development of several experimental systems, including the thrust vectoring control system, emergency electrical and hydraulic systems, the spin recovery parachute system, and an actuated nose strake system. He served as mission controller on approximately 100 HARV research flights.

Flick wrote a column for the February 2022 X-Press highlighting his experience during his early career at the center that provides additional insights.

Install ... from page 2

for the X-59. "I am both impressed with and proud of this combined team that's spent the past few months developing the key procedures, which allowed for a smooth installation."

The X-59 team will follow the aircraft's assembly with a series of ground tests and ultimately, first flight in 2023.

NASA's X-59 is the centerpiece of the agency's Quesst mission. The aircraft is designed to reduce the sound of sonic booms, which occur when an aircraft flies at supersonic speeds, to a quiet sonic "thump." This will be demonstrated when NASA flies the X-59 over communities around the U.S. starting in 2025, with the goal of providing the data necessary to open the future to commercial supersonic flight over land, greatly reducing flight times.

News at NASA

SWOT mission begins

A satellite built for NASA and the French space agency Centre National d'Études Spatiales to observe nearly all the water on our planet's surface lifted off on its way to low-Earth orbit on Dec. 16. The Surface Water and Ocean Topography (SWOT) spacecraft also has contributions from the Canadian Space Agency and the UK Space Agency.

The SWOT spacecraft launched atop a SpaceX rocket from Vandenberg Space Force Base in California with a prime mission of three years. The satellite will measure the height of water in freshwater bodies and the ocean on more than 90% of Earth's surface. This information will provide insights into how the ocean influences climate change; how a warming world affects lakes, rivers, and reservoirs; and how communities can better prepare for disasters, such as floods.

SWOT will undergo a series of checks and calibrations before it starts collecting science data in about six months.

"Warming seas, extreme weather, more severe wildfires – these are only some of the consequences humanity is facing due to climate change," said NASA Administrator Bill Nelson. "The climate crisis requires an all-hands-on-deck approach, and SWOT is the realization of a long-standing international partnership that will ultimately better equip communities so that they can face these challenges."

NASA

The optical navigation camera mounted on the Orion spacecraft captured this view of the Moon's surface. On flight day 20 of the Artemis I mission, the spacecraft made its second and final close approach to the Moon.

Mission complete

Artemis I succeeds, accomplishes new records

By Kathryn Hambleton
NASA Headquarters Public Affairs
Tiffany Fairley
NASA Kennedy Public Affairs
Leah Cheshier
NASA's Johnson Public Affairs

NASA's Orion spacecraft splashed down in the Pacific Ocean, west of Baja California, Dec. 11 after a record-breaking mission, traveling more than 1.4 million miles on a path around the Moon and returning safely to Earth, completing the Artemis I flight test.

Splashdown is the final milestone of the Artemis I mission that began with a successful liftoff of NASA's Space Launch System (SLS) rocket Nov. 16, from Launch Pad 39B at NASA's Kennedy Space Center in Florida. Over the course of 25.5 days, NASA tested Orion in the harsh environment of deep space before flying astronauts on Artemis II.

"The splashdown of the Orion spacecraft – which occurred 50 years to the day of the Apollo 17 Moon landing – is the crowning achievement of Artemis I. From the launch of the world's most powerful rocket to the exceptional journey around the Moon and back to Earth, this flight test is a major step forward in the Artemis Generation of lunar exploration," said NASA Administrator Bill Nelson. "It wouldn't be possible without the incredible NASA team. For years, thousands of individuals have poured themselves into this mission, which is inspiring the world to work together to reach untouched cosmic shores. Today is a huge win for NASA, the United States, our international partners, and all of humanity."

During the mission, Orion performed two lunar flybys, coming within 80 miles of the

lunar surface. At its farthest distance during the mission, Orion traveled nearly 270,000 miles from our home planet, more than 1,000 times farther than where the International Space Station orbits Earth, to intentionally stress systems before flying crew.

"With Orion safely returned to Earth we can begin to see our next mission on the horizon which will fly crew to the Moon for the first time as a part of the next era of exploration," said Jim Free, NASA associate administrator for the Exploration Systems Development Mission Directorate. "This begins our path to a regular cadence of missions and a sustained human presence at the Moon for scientific discovery and to prepare for human missions to Mars."

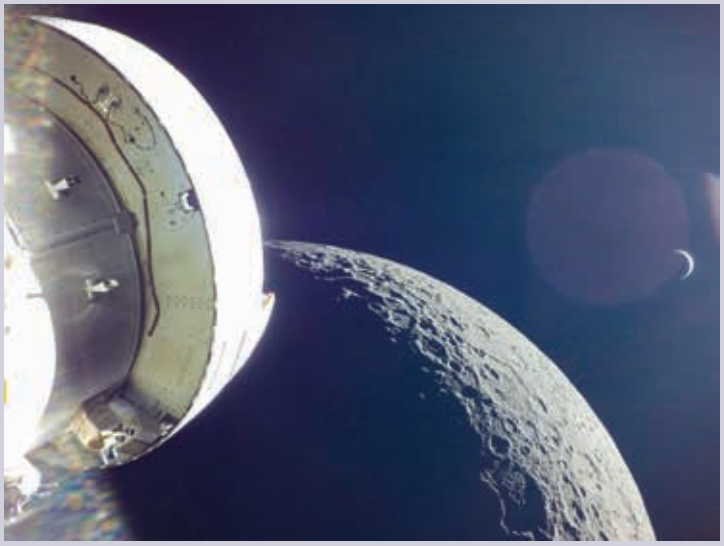
Prior to entering the Earth's atmosphere, the crew module separated from its service module, which is the propulsive powerhouse provided by ESA (European Space Agency). During re-entry, Orion endured temperatures about half as hot as the surface of the Sun at about 5,000 degrees Fahrenheit. Within about 20 minutes, Orion slowed from nearly 25,000 mph to about 20 mph for its parachute-assisted splashdown.

During the flight test, Orion stayed in space longer than any spacecraft designed for astronauts has done without docking to a space station. While in a distant lunar orbit, Orion surpassed the record for distance traveled by a spacecraft designed to carry humans, previously set during Apollo 13.

"Orion has returned from the Moon and is safely back on planet Earth," said Mike Sarafin, Artemis I mission manager. "With splashdown we have successfully operated Orion in the deep space environment, where it exceeded our expectations, and demonstrated that Orion can withstand the extreme conditions of returning through Earth's atmosphere from lunar velocities."

NASA/Brandon Hancock

NASA's Space Launch System rocket with the Orion spacecraft atop launches the agency's Artemis I flight test Nov. 16.



NASA

Orion captured the Earth rising behind the Moon.

NASA/Regan Geeseman

NASA's Orion spacecraft for the Artemis I mission was successfully recovered inside the well deck of the USS Portland on Dec. 11 off the coast of Baja California.

Recovery teams are now working to secure Orion for the journey home. NASA leads the interagency landing and recovery team on the USS Portland, which consists of personnel and assets from the U.S. Department of Defense, including Navy amphibious specialists, Space Force weather specialists, and Air Force specialists, as well as engineers and technicians from NASA Kennedy, the agency's Johnson Space Center in Houston, and Lockheed Martin Space Operations.

In the coming days, Orion will return to shore where technicians will offload the spacecraft and transfer it by truck back to Kennedy. Once at Kennedy, teams will open the hatch and unload several payloads, including Commander Moonikin Campos, the space biology experiments, Snoopy, and the official flight kit. Next, the capsule and its heat shield will undergo testing and analysis over the course of several months.

Artemis I was the first integrated test of NASA's deep space exploration systems - the Orion spacecraft, SLS rocket, and the supporting ground systems - and was supported by thousands of people around the world, from contractors who built the spacecraft and rocket, and the ground infrastructure needed to launch them, to international and university partners, to small businesses supplying subsystems and components.

Through Artemis missions, NASA will land the first woman and the first person of color on the surface of the Moon, paving the way for a long-term lunar presence and serving as a steppingstone for astronauts on the way to Mars.

Learn more about Artemis I:

https://www.nasa.gov/artemis-1

ED08-0096-08 NASA/Tom Tschida

AFRC2021-0039-16 NASA/Carla Thomas

***Above**, when the Artemis I mission launched Nov. 16, the RangeHawk based at NASA Armstrong was in the skies over the Pacific Ocean. RangeHawk, which uses Global Hawks outfitted with telemetry equipment, received data as NASA's Space Launch System rocket and Orion flew over the Western Hemisphere.*

***At left**, Mark Geyer, NASA's Orion manager, came to NASA Armstrong in April 2008 to see the Pad Abort-1 test article. Dave McAllister, at right, shows Geyer the Orion capsule mockup. Pad Abort-1 was tested at the White Sands Missile Range in New Mexico.*

Members of the NASA Armstrong Ascent Abort-2 management and engineering team contributed to the AA-2 launch at Cape Canaveral in Florida July 2, 2019. From left are Gary Martin, Rose Blomquist, Ernest Nwajagu, Lucas Moxey, Leo Gross, Jeff Sutherland, Chuck Rogers, Joe Hernandez, David Dowdell, Jeri Myers, and Dan Nolan. Team members show how the separation ring, crew module, and launch abort system fit together.

AFRC2019-0170-1 NASA/Lauren Hughes

ED09-0221-234 NASA/Tony Landis

***Above**, it takes a lot of people to make big projects work. This image captures most of the center's team members that worked on the Pad Abort-I Orion launch abort system development test before the Orion test module was transported to White Sands Missile Range in New Mexico. **Below**, the Orion Heat Shield Spectrometer package will be installed on the Orion spacecraft. A fiber optic cable will connect the package to the Orion's heat shield for the Artemis II mission, the first scheduled crewed mission.*

With the assist

NASA Armstrong has contributed to Artemis, Orion

By Jay Levine
X-Press editor

For more than a decade, NASA Armstrong has supported development and testing efforts for the Orion spacecraft and other key elements of NASA's Artemis missions.

NASA launched Artemis I, an uncrewed flight test of the Space Launch System rocket and the Orion, Nov.16 and it returned Dec. 11. It is the first of increasingly complex missions to provide a foundation for human exploration to deep space and beyond.

The following list and links detail some of NASA Armstrong's contributions.

• Center staff were in the control rooms when the Orion spacecraft launch abort system was demonstrated on July 2, 2019. They supported the Artemis Ascent Abort-2 (AA-2) safety test, which

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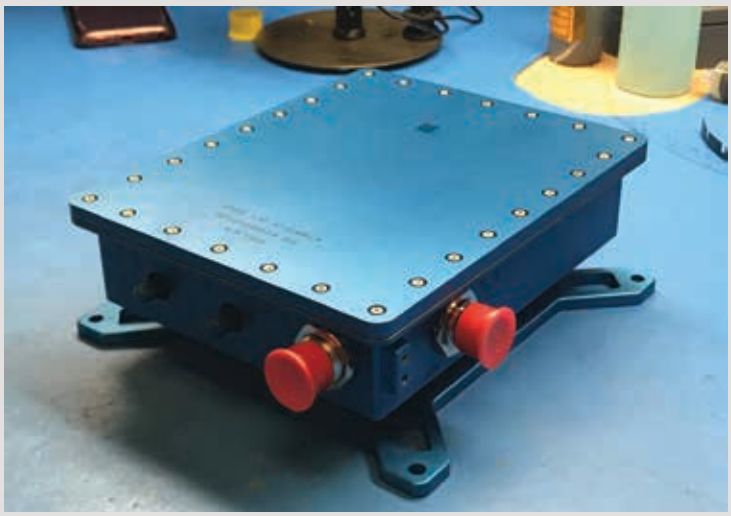
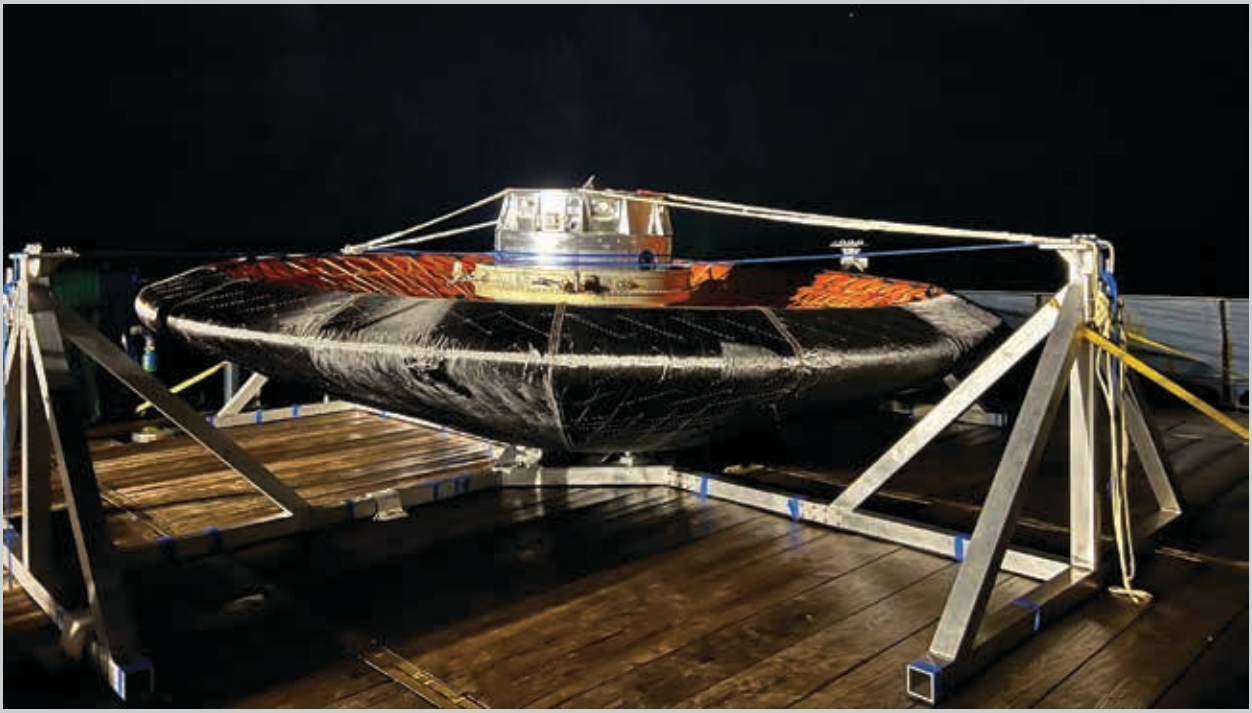


NASA



The Low-Earth Orbit Flight Test of an Inflatable Decelerator, or LOFTID, heat shield was recovered from the Pacific Ocean on Nov. 10, shortly after it completed its demonstration and splashed down.

United Launch Alliance

LOFTID succeeds

Heat shield deployed, Armstrong tech worked

By Jay Levine
X-Press editor

Technology developed at NASA Armstrong flew on the Low-Earth Orbit Flight Test of an Inflatable Decelerator, or LOFTID, mission. It provided temperature data on how the inside of the inflatable structure heated that will help improve designs for future missions.

The LOFTID demonstration – a partnership between NASA and United Launch Alliance (ULA) – tested the Hypersonic Inflatable Aerodynamic Decelerator, or HIAD, technology, which uses an inflatable structure to slow down and protect payloads entering an atmosphere. Inflatable heat shields could enable heavy payloads to re-enter Earth's atmosphere and could also land heavy payloads on Mars – like those required for crewed missions – meeting the landing challenges of thin atmosphere and low gravity.

The configuration of the HIAD used in LOFTID consisted of a stack of the inflatable concentric rings that were strapped together to form a strong blunt cone-shaped structure that acted like a giant brake. The LOFTID mission also used a suite of sensors to collect data on its flight performance.

NASA Armstrong's innovation, a space-rated Fiber Optic Sensing System, or FOSS, flew on the LOFTID demonstration. While researchers knew at the flight's conclusion that they had collected data throughout the flight, analysis is ongoing and will be the focus of a future feature.

FOSS was originally

AFRC2020-0053-3 NASA/Ken Ulbrich

Frank Pena and Jonathan Lopez work on securing a Fiber Optic Sensing System unit developed at NASA Armstrong. The unit is one of five developed to test a new variant of the technology researchers have developed to withstand the harsh environments of a rocket launch and space travel.

developed to monitor stress on test aircraft. The technology was transferred for public benefit and some uses could include monitoring structural integrity of bridges, in the automotive industry for frame analysis for improved safety and handling, and in rockets for monitoring temperature and liquid levels in cryogenic tanks.

For LOFTID, FOSS monitored temperatures on the back side of the inflatable decelerator, giving engineers a thermal map of how the decelerator heated. When that map is complete, it will help engineers improve future HIAD designs. The LOFTID mission represents the first use of FOSS technology in space.

In addition to FOSS, another NASA Armstrong innovation aided in the development of the inflatable heat shield technology. Before NASA Armstrong began working on HIAD, center researchers worked on flexible strain gauges developed from elastic material tubes, used frequently in the medical field. Those strain gauges stretched across the inflatable heat shield elements, and in combination with FOSS, provided data conventional strain gauges could not during a series of tests in 2013 in the NASA Armstrong Flight Loads Laboratory.

During that testing, straps attached to the top and bottom of the inflatable heat shield elements had mechanical actuators apply loads, which pulled or twisted inward to simulate strain the heat shield may experience during re-entry. That differed from the space-rated FOSS system on LOFTID that measured how the structure heats.

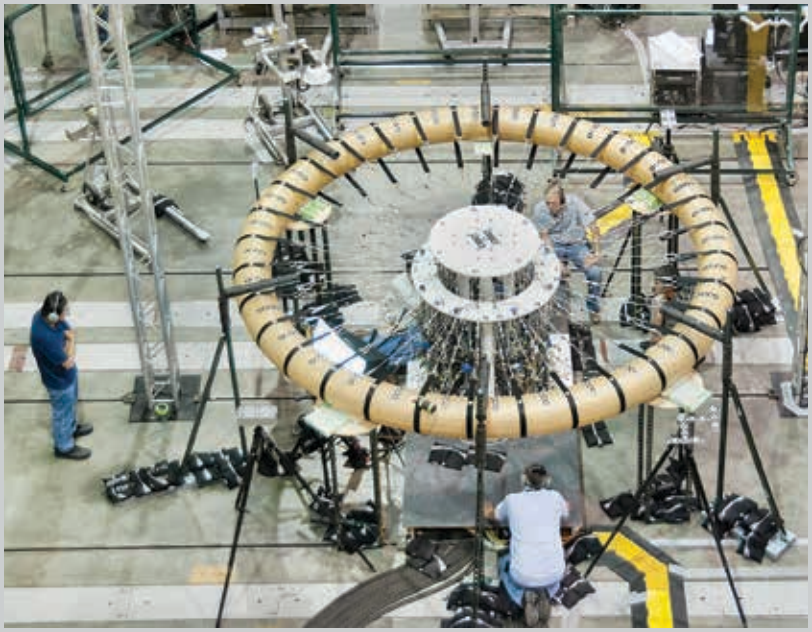
Anthony Calomino, who currently leads NASA's space nuclear technology portfolio, worked closely with NASA Armstrong during the 2013-2014 tests when he was the HIAD ground technology development technical lead at NASA's Langley Research Center in Hampton, Virginia.

"The testing at NASA Armstrong helped validate structural models for future decelerator configurations and validate instrumentation approaches that could be used in flight," Calomino said.

LOFTID launched with the National Oceanic and Atmospheric Administration's Joint Polar Satellite System-2, or JPSS-2, mission from Vandenberg Space Force Base in California on Nov. 10. Shortly after launch, LOFTID deployed from its host ULA Atlas V rocket and completed its demonstration through the extreme temperatures of atmospheric re-entry.

The LOFTID project is managed and funded through NASA's Technology Demonstration Missions program, part of the agency's Space Technology Mission Directorate. The project is led by NASA Langley, in partnership with ULA and with contributions from NASA's Ames Research Center in California's Silicon Valley, NASA's Marshall Space Flight Center in Huntsville, Alabama, and NASA Armstrong. NASA's Launch Services Program, based at the agency's Kennedy Space Center in Florida, is responsible for managing the launch services.

NASA and ULA dedicated the technology demonstration to the late Bernard Kutter. As ULA's manager for advanced programs, Kutter was instrumental in developing the plan to test the system on an Atlas V rocket.



ED13-0233-147 **NASA/Ken Ulbrich**

Center researchers test a component of the Hypersonic Inflatable Aerodynamic Decelerator, or HIAD, in 2013 in the NASA Armstrong Flight Loads Laboratory.

ED14-0015-048 **NASA/Ken Ulbrich**

The NASA Armstrong Flight Loads Laboratory team that worked on HIAD test articles included, bottom row, from left, Tony Chen, David Neufeld, Matthew Moholt, Wally Hargis, and Anthony Piazza. Second row, from left, are Ted Powers, Jeffery Howell, Ray Sadler, Ronnie Haraguchi and Gary Williams. Third row, from left, are Darren Mills, Jacob Roepel, and Aaron Rumsey.

Harold Robertson

Lori Losey and Jim Ross, from left, gather imagery on the Orion parachute tests as the system is prepared for a drop test from a C-17.

AFRC2018-0128-09 NASA/Lauren Hughes

April Torres and Angelo De La Rosa remove wire harnesses for signal input for the Orion AA-2 vehicle from electrostatic discharge protective covers. The AA-2 test article flew July 2, 2019.

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evaluated the Orion launch abort system's ability to carry the capsule away from a failing rocket if necessary. Here is an example of some of how the center supported this effort.

• Before the AA-2 tests could advance, NASA Armstrong assisted with component testing and integration work.

• NASA Armstrong assists with the Orion heat shield spectrometer system for the Artemis II mission, which will be the first with astronauts. The system is designed to collect shock layer radiation data from the heat shield during atmospheric entry that will be used to enhance astronaut safety. Plans are advancing to build additional spectrometer systems for future Artemis missions.

• An advanced and more durable version of the Fiber Optic Sensing System developed to collect strain and other measurements on aircraft saw its first use in space on the Low-Earth Orbit Flight Test of an Inflatable Decelerator, or LOFTID, mission. It provided temperature data on how the inside of the inflatable structure heats that will help improve designs for future missions.

• NASA Armstrong photographers and videographers documented the Orion parachute tests in Yuma, Arizona.

• The center's Ikhana aircraft chronicled the Orion spacecraft launch and splashdown on Dec. 5, 2014.

• NASA Armstrong staff used an F/A-18 aircraft to evaluate an autonomous flight control system for the Space Launch System rocket in November 2013.

• The center was key in the 2010 Pad Abort-1 Orion launch abort system developmental test.

Through Artemis missions, NASA will land the first woman and the first person of color on the Moon. That mission will lay a foundation for a long-term lunar presence and serve as a steppingstone to send astronauts to Mars.

AFRC2018-0128-03 NASA/Lauren Hughes

R.J. Smith mills a plate for the backup data acquisition system for the Orion Ascent Abort 2 crew module.

AFRC2018-0128-19 NASA/Lauren Hughes

Randy Wagner prepares elements of the Orion Ascent Abort 2 crew module backup data acquisition system for thermal testing.

NASA MIRO:

30 years of providing research opportunities

By Jim Skeen
NASA Armstrong Public Affairs

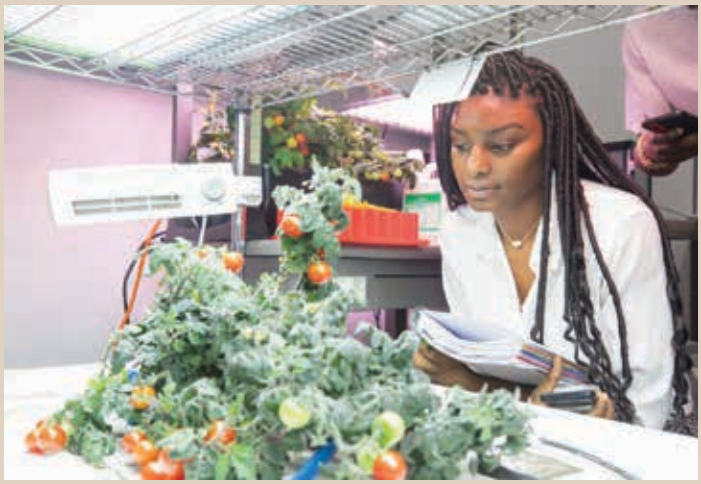
Thirty years ago, NASA launched the MUREP (Minority University Research and Education Project) Institutional Research Opportunity, or MIRO. The activity is designed to enrich STEM Research at Minority Serving Institutions (MSIs) in areas of strategic importance to NASA and to inspire the next generation of scientists and engineers.

MIRO strengthens NASA's research base, assists MSIs in expanding their capabilities, and provides experience for students in STEM fields, said Torry A. Johnson, MUREP Manager, NASA Headquarters.

"MIRO has fundamentally changed the way MSIs are viewed with respect to developing NASA-focused research," Johnson said. "Other funding opportunities have spawn from the work created by MIRO. This has led to greater discussion about how research plays an integral part in student engagement. Research experiences for undergraduates, in addition to existing Internship and fellowship opportunities, ready students for more mature research, preparing them to fill STEM jobs in the future."

MIRO, originally known as the University Research Centers, began in 1992 funding centers at seven Historically Black Colleges and Universities. Currently administered by the NASA Armstrong, MIRO has since funded centers at 38 MSIs in 16 states, the District of Columbia, and the U.S. territories of Puerto Rico and the U.S. Virgin Islands.

The research centers explore a wide array of topics vital to NASA missions, including autonomous aircraft technology, energy technologies under extreme conditions, climate observations, advanced manufacturing of lunar regolith drilling tools, air revitalization, climate observations, water reclamation and purification, resource recovery, in-situ propellant production, and lunar CubeSat technologies.



NASA/Cory Huston

Courtney Miller, a student at Langston University in Oklahoma, participates in a hands-on experience inside a Space Station Processing Facility lab at Kennedy Space Center on Sept. 18, 2019.

MIRO Office

Loleth Robinson, a City College of New York chemical engineering doctoral student, performs solid-state NMR measurements on NASA JPL battery materials for the future Europa Lander.

MIRO-funded centers are also part of Artemis, NASA's mission to return to the Moon and lay the groundwork for human exploration of Mars. The Navajo Technical University (NTU) in New Mexico, for example, is working with NASA's Marshall Space Flight Center in Alabama develop advanced parts for the Space Launch System, the powerful rocket that will sends astronauts to the Moon.

The research centers also emphasize student and faculty professional development, collaboration with NASA subject matter experts, partnerships with other institutions and industry, curriculum development, and STEM education outreach.

"The university receives the prestige and branding of being a NASA research center, a sign of the institution's commitment and competence in a particular field of research," said Katrina Emery, who managed the University Research Centers program from 2007-2012. "The prestige is also valuable from a student recruitment perspective. Pulling in more students from underrepresented populations is a major goal of the program."

In 2008, at Prairie View A&M in Prairie View, Texas, NASA helped create the Center for Radiation Engineering and Science for Space Exploration(CRESSE). The center looks for new ways to keep future astronauts and their flight instruments safe from the harmful radiation of deep space while on journeys to the Moon and beyond. NASA funding helped the university create postgraduate degrees in electrical engineering, said Richard Wilkins, a physicist

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MIRO ... from page 11

and director of CRESSE.

In 2019, Prairie View received another MIRO award to create the Center for High-Pressure Combustion in Microgravity. The center's research has the potential to lead to advanced rocket engine designs with increased efficiency and reduced carbon emissions.

"Those university research centers from MIRO acted as a model for future research centers that are now in place at Prairie View and are now flourishing," Wilkins said. "The original NASA funding was very impactful to the university."

A portion of the MIRO funding is earmarked for student support, with about 400 students a year receiving such support as scholarships, fellowships, and internships.

For students, MIRO can be life altering.

Dionne Hernandez-Lugo found her path to a NASA career while conducting research at the MIRO-funded Center for Advanced Nanoscale Materials at the University of Puerto Rico-Rio Piedras.

"I've been always interested in working for NASA. It was a dream that I had growing up, but I didn't really know how to get to NASA," said Hernandez-Lugo, who was born and raised in Puerto Rico. "I'm the only science major in my family, so I didn't really have a lot of information."

Hernandez-Lugo now serves as the Deputy Flight Systems Manager for the power and propulsion element for Gateway, a multi-purpose outpost that will orbit the Moon and support human missions on the lunar surface. Gateway is a key component of the Artemis program.

"Working on technology that is going to take us back to the Moon is a dream," Hernandez-Lugo said.

MIRO will continue to advance research in aeronautics and space. It will also continue to advance the careers of the next generation of scientists and engineers.

"We are extremely proud of the past 30 years and, with great anticipation, we look forward to continued growth and development of MIRO," said Torry A. Johnson, MUREP Manager "We look forward to continuing to work with our Mission Directorate colleagues to increase research capacities at MSIs and to create research opportunities that ultimately drives student success."

MIRO is managed through the NASA Armstrong Office of STEM Engagement. All MIRO awards are provided to minority-serving institutions to promote research capacity, expand aerospace research, increase workforce diversity, and strengthen STEM skills. MIRO research directly supports NASA's mission directorates: Aeronautics Research, Exploration Systems Development, Science, Space Operations, Space Technology.

Shuttle site manager dies

George Grimshaw, a former center space shuttle landing and recovery operations site manager, died Nov. 15. He was 64.

He came to NASA in 1984 as an avionics technician working on multiple experimental and research aircraft projects throughout his career. He was promoted and served as the center's Avionics Branch chief from 1999-2007.

Grimshaw was selected in 2007 as the site manager for the center's space shuttle landing and recovery operations. He held this position until the end of the Space Shuttle Program and his retirement in 2013.

He received the NASA Exceptional Service Medal in 2013, a Space Flight Awareness Award (STS-120) in 2007, and the Astronauts Personal Achievement "Silver Snoopy" Award in 1994, along with numerous other group and team awards. He also was selected to the American Space Museum's U.S. Space Worker Hall of Honor in Titusville, Florida.

Peake, flight surgeon, dies

Dr. Dwight Peake, NASA Armstrong flight surgeon, died in November.

He came to NASA Armstrong in 2017 and had previously worked at NASA's Johnson Space Center in Houston.

Peake is best known at the center for his guidance and recommendations during the pandemic. He also was key to streamlining use of the center's gym for employees. For his contributions, then NASA Armstrong Center Director David McBride presented him with the Director's Award at a peer awards ceremony.

People who knew him said he loved his job at the center, had a great sense of humor, and was full of compassion and care for his fellow NASA Armstrong co-workers.

Goodwin, engineer, dies

Kevin Goodwin, a flight systems engineer who worked at NASA Armstrong for decades, died Oct. 14. He was 61.

Goodwin worked on such projects at the Stratospheric Observatory for Infrared Astronomy, and the X-57 all-electric aircraft.

People who knew him said he loved being a part of the NASA family and was passionate about his work and the team he worked with. He loved challenges and was determined to deliver safe and technically sound engineering solutions. He challenged the norms for the betterment of the team. He also had a good sense of humor.

Williams, technician, dies

Gary Williams, who retired from NASA Armstrong in 2016, died in October.

Williams was a long-time employee who began in the center's environmental laboratory and then became a fiber optics technician in the flight loads laboratory.

People who knew Williams said he was a good guy, and he was kind to everyone he met.

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

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