



# AeroSpace FRONTIERS

VOLUME 23 • ISSUE 7 • JULY 2021

## Continuing John Glenn's Legacy

Pages 2–3

## Administrator Presents State of NASA

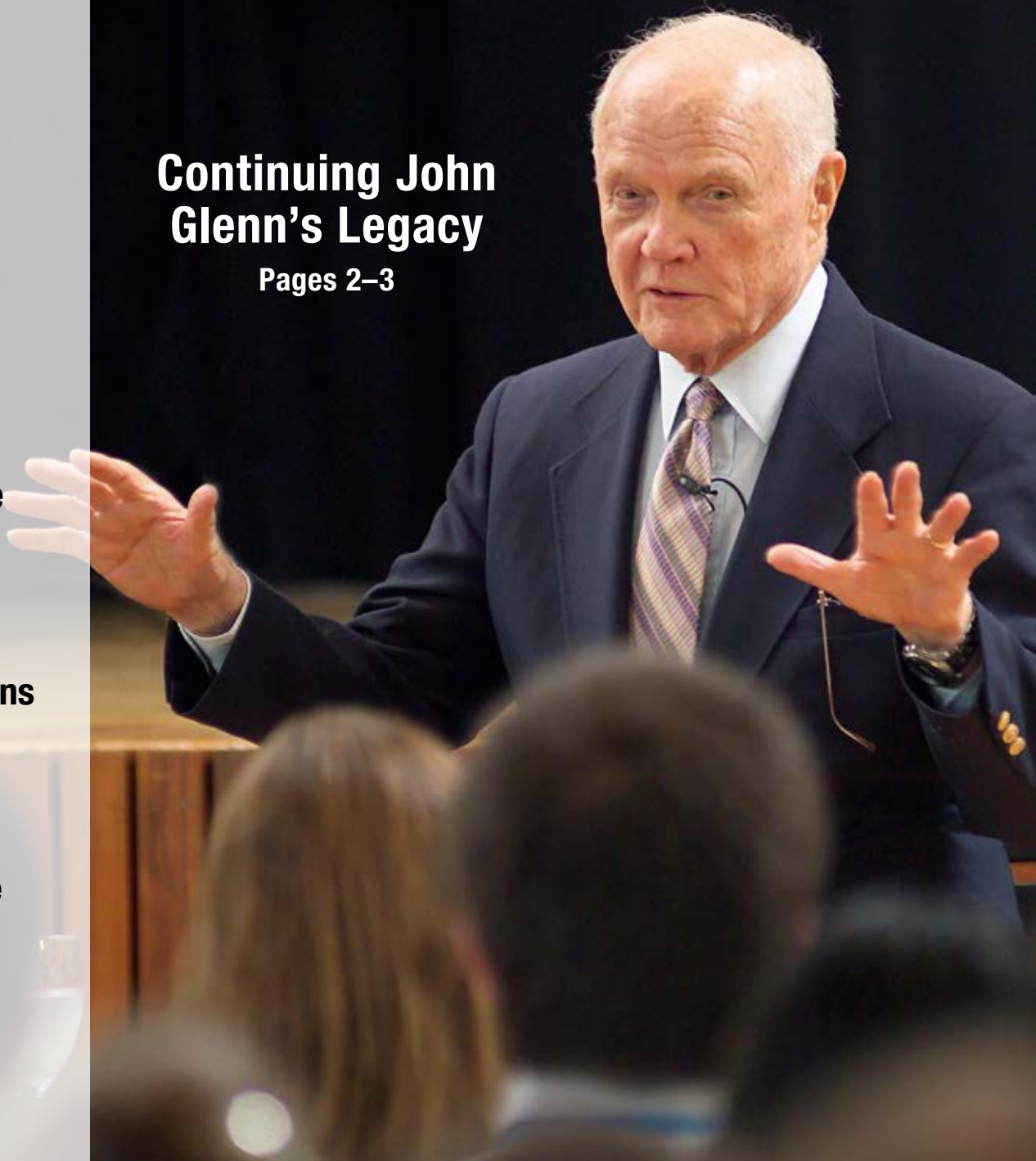
Page 4

## Probing Questions of Flight

Page 6

## Navigating the Pandemic

Page 7





## DIRECTOR'S SAFETY CORNER

### Safely Transitioning to Stage 2

Due to the improving local conditions and evolving federal guidance, I recently announced we will be transitioning to Stage 2 of the NASA Framework for Return to Onsite Work. I would like to reiterate, transitioning to Stage 2 will be a process that takes time. Throughout the transition process, we will continue to prioritize the health and safety of our workforce. The center is preparing for an increased number of employees onsite by enhancing safety measures, frequently cleaning, and providing timely updated guidance through regular communication. Please continue to consult Glenn's coronavirus website, the WING page, and regularly communicate with your supervisor for information about the measures put in place to ensure your safety at work. Remember, we are all in this together. The continued success of our center and agency relies on each of us taking personal responsibility to ensure a safe and healthy environment.

*Maeda*

### AeroSpace Frontiers

is an official publication of Glenn Research Center, National Aeronautics and Space Administration. It is published the second Friday of each month by the Office of Communications in the interest of the Glenn workforce, retirees, government officials, business leaders, and the general public.

Submit short articles and calendar items to the editor at [doreen.b.zudell@nasa.gov](mailto:doreen.b.zudell@nasa.gov).

Editor: **Doreen B. Zudell**, ATS,  
216-433-5317

Assistant Editor: **Adam Schabel**, ATS,  
216-433-2888

Design: **Rhys Sampson**, ATS

Managing Editor: **Kelly R. DiFrancesco**

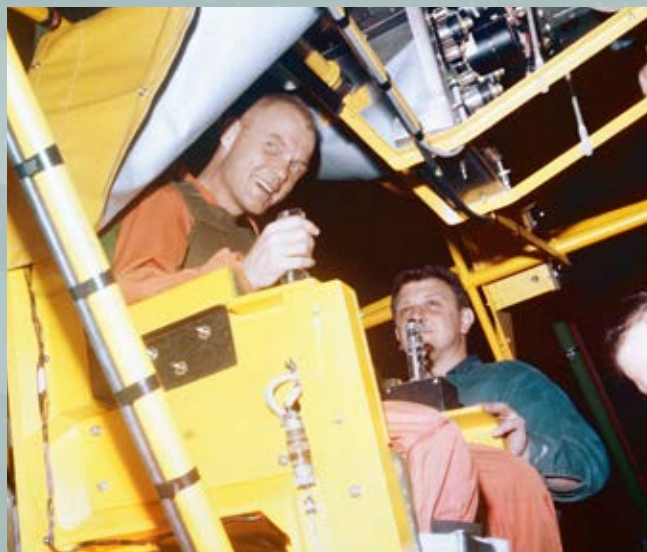
Circulation: **Angela Williams**, ATS,  
216-433-8921

# Expanding Horizons, Opening Frontiers Carrying On John Glenn's Legacy

One hundred years after his birth on July 18, 1921, John H. Glenn Jr. continues to inspire and motivate humankind. Glenn served the people of this nation well as a military combat and test pilot, astronaut, and U.S. senator from Ohio. This year, as we commemorate the 80th birthday of the Glenn Research Center, we reflect on this American hero and humble servant for whom our center is named.

During the center's official renaming celebration in May 1999, Glenn expressed his pride at being associated with the center, not only for its historic contributions but for its bright future. Indicating the words displayed on one of the parade floats—Expanding Horizons, Opening Frontiers—he noted, "That just about says it for the lab here."

That day, he challenged the men and women of NASA Glenn to continue working to make that mission a reality for our future explorers—in air and space.



GRC-1989-C-05310

Photo by NASA

*Glenn trains on the Multiple-Axis Space Test Inertia Facility (gimbal rig) during one of his earliest visits to the center in 1960. The gimbal rig simulated tumble recovery maneuvers that might be encountered in spaceflight.*

### On the Cover:

*John Glenn addresses summer interns and early career employees during a visit to Lewis Field in 2005.*



Photo by Marvin Smith  
GRC-2005-C-00979





GRC-1984-C-02636

Photo by Don Huebner

*Sen. Glenn (center) views an aircraft engine model, part of the Advanced Turboprop Program, during a tour at the center in 1984. Right: U.S. congressman Louis Stokes and Center Director Andrew Stofan look on.*

In a later interview, Glenn said that although the center's renaming was a great honor to him, the main benefit was the opportunity to highlight the important work the center was doing: "I was proud of the fact that we were calling attention to some of these advances in research and engineering that had come from the center and which make a big difference for our country."

Glenn's personal desire to explore propelled him to become the first American to orbit Earth on Feb. 20, 1962. In fact, one of his first trips to NASA Glenn (then NASA Lewis Research Center) was in preparation for that historic flight. In 1960, he trained on the center's Multiple-Axis Space Test Inertia Facility (gimbal rig).

In later years, Glenn would return to the center as a U.S. senator intent on staying abreast of the latest technology. "I visited the center many times to keep up with the scientific advances," he noted.

His pioneering spirit and futuristic view would earn Glenn, at the age of 77, the distinction of being the oldest person to venture into space as he flew onboard the Space Shuttle *Discovery* in 1998. During that STS-95 mission, Glenn performed research to learn about the effects of microgravity on older humans.

In 2019, the American Astronautical Society, in association with NASA Glenn, held its inaugural John Glenn Memorial Symposium in Cleveland. The annual symposium continues to serve as a hub to showcase the latest information on advancements in aerospace and aeronautic technology—a fitting tribute to a man whose career reflects a lifelong commitment to the science of flight.

"This month we celebrate the 100th birthday of a true space pioneer and a devoted public servant, Sen. John Glenn," said Center Director Dr. Marla Pérez-Davis. "Though we lost the senator a few short years ago, we continue his legacy of exploration, inspiration, and discovery at the center bearing his name, and we strive to embody his legacy each day as we make lasting contributions to our nation."

By Doreen B. Zudell



GRC-1999-C-01153

Photo by Hugh Aylward

*Glenn and his wife Annie during the center renaming event in 1999.*



GRC-2019-C-05398

Photo by Rami Daud

*The first John Glenn Symposium held in Cleveland in 2019. Center Director Dr. Janet Kavandi (far right) participates in a panel discussion.*



# Newly Appointed NASA Administrator Presents State of NASA

On May 28, the Biden-Harris administration released the full budget proposal for fiscal year 2022, with a request for \$24.8 billion for NASA. This is an increase of more than 6% over what the agency received the previous year. It includes \$795.7 million in spending for NASA Glenn.

NASA Administrator Sen. Bill Nelson spoke to agency employees during his first State of NASA event from NASA Headquarters on June 2. He reflected on his long history with the agency and NASA's unique responsibility "to all come together as we push the frontier."

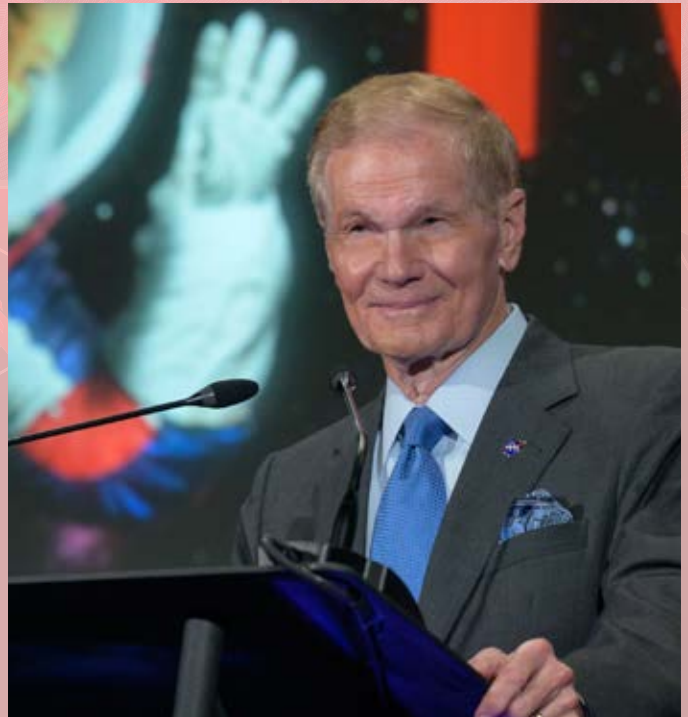
Nelson saluted the workforce and laid out plans for the future. He discussed the agency's plans for future Earth-focused missions to address climate change and a robotic and human return to the Moon through the Artemis program. He also announced two new planetary science missions to Venus—VERITAS and DAVINCI+.

"Thank you for all the amazing work you've done throughout the year," he said. "NASA is only as good as its people, and we're lucky to have the best of the best."

For more information on NASA's budget, visit <https://www.nasa.gov/news/budget/index.html>.

To view Sen. Nelson's full State of NASA address, visit <https://www.youtube.com/watch?v=nDem528iNF0>.

By Doreen B. Zudell



AS16-113-18339

Photo by Bill Ingalls

*Sen. Bill Nelson gives his first State of NASA address.*

## Budget Request Supports Glenn's Progress in Key Areas

The President's fiscal year 2022 proposed budget for NASA includes \$795.7 million in spending for Glenn. This would support continued progress in the following areas:

- Leading the development of the Power and Propulsion Element (PPE), the first element to be launched as part of Gateway, NASA's orbiting lunar outpost. The PPE will use solar electric propulsion to maneuver and provide power to Gateway.
- Demonstrating fission surface power, solar electric propulsion, and cryogenic fluid management technologies for future deep space exploration missions.
- Leading the formulation of the Communications Services Project, an effort to enable commercial communications providers for near-Earth NASA operations.
- Supporting NASA's strategic vision for aeronautics by leading the development of hybrid-electric propulsion systems, which will

reduce fuel consumption, noise, and emissions and enable the U.S. aviation industry to maintain global leadership.

- Inspiring the next generation of scientists, technologists, engineers, mathematicians, and explorers by supporting the agency's STEM engagement efforts.
- Driving economic growth through our Small Business Innovative Research and Technology Transfer programs.
- Sustaining our staffing and maintaining our world-class test facilities, including NASA's Neil A. Armstrong Test Facility, where we expose spacecraft to the extreme environments of space.

"NASA Glenn's workforce made amazing progress under the most difficult circumstances this year," said Center Director Dr. Marla Pérez-Davis. "We look forward to continuing to advance aviation, technology, and humanity's future in space during fiscal year 2022."

# Roaming! NASA's Space Communications Terminal

In the early days of cellphone use, each user was limited to their chosen provider's network and service capabilities. Restricting customers to service within one network led to high prices for out-of-network calls and limited value for customers. Cellphone providers long ago adopted roaming, allowing devices to jump from network to network without interrupting service and increasing competition across the industry and value to consumers.

Roaming is not available in space, so network access is an issue as satellites and spacecraft orbit the Earth. This will soon change as NASA develops a new Wideband Ka-band communications terminal, which is a transceiver that operates over government and commercial Ka-band spectrum allocations (17.7 to 31 GHz). This roaming function will give spacecraft the ability to seamlessly connect to various communications networks and allow for multi-access points of services, lower latency, and lower costs.

"This is a first for a Ka-band user terminal," said Nang Pham, Wideband project manager at Glenn. "The versatile capabilities demonstrated by the terminal bring us a step closer to space communications interoperability for future NASA near-Earth missions."

The new terminal will support NASA's plans to rely exclusively on commercial providers for near-Earth space communications and navigation operations by the mid-2030s. This further fosters an affordable and robust space commercialization path in the U.S.

For almost 40 years, NASA has relied on its Tracking and Data Relay Satellite (TDRS) system to provide near-constant communication links between the ground and satellites in low-Earth orbit. However, the infrastructure was not originally designed for interoperability between networks.

This new Wideband Ka terminal prototype will allow satellites to connect with multiple space relay networks, including TDRSs, enabling NASA's transition from government to commercial space communications services.

"This terminal will allow missions to reduce risk and costs by offering competitive choices for where they get their commercial satellite service," said Marie Piasecki, Wideband project principal investigator at Glenn. "A high Technology Readiness Level terminal capable of

operating on a wide assortment of networks truly takes advantage of commercial investments in space."

NASA recently concluded a month of trailblazing tests that successfully demonstrated communications over-the-air with the Wideband Ka terminal prototype for the very first time. A groundbreaking roaming experiment was the highlight of testing, where services switched in real time between NASA's TDRS system and Inmarsat's Global Xpress satellite.

This successful demonstration provides proof of initial roaming capabilities and confidence that commercial services can one day support future space users. The Wideband Ka terminal prototype is at a sufficiently high technology readiness level that the next technology transitional phase will be to demonstrate in a space environment.

The Wideband terminal prototype will now undergo additional ground testing and demonstrations with various commercial service providers. NASA's Space Communications and Navigation program is planning a flight demonstration, currently targeted for 2025, to evaluate in-orbit roaming capabilities across multiple government and commercial networks.

By Molly Kearns



GRC-2021-CN-00045

Photo by NASA

*The Wideband Ka Terminal Antenna assembled at Lewis Field conducts an over-the-air demonstration of roaming capabilities.*



# A Probing Question: How Do You Fly the X-59 Accurately?



GRC-2021-C-01294

Photos by Bridget Caswell

*Technician Cory LeHotan makes adjustments to the metal shaft that holds the X-59 Probe for testing.*

Mountains of data will be required if NASA's X-59 Quiet SuperSonic Technology (QueSST) airplane is going to help change the future of commercial supersonic flight over land, and a sophisticated suite of instruments is needed in the air and on the ground to collect it.

On the aircraft, these instruments are known as the air data system. A computer takes input from probes, sensors, and other devices and feeds that information—like altitude, airspeed, air pressure, and temperature—to the pilot and flight control computer to ensure safe and accurate flying.

In an effort to perfect the X-59's air data system, engineers from across the agency visited the 8- by 6-Foot Supersonic Wind Tunnel at NASA Glenn. There, they evaluated the air data probe, which is installed at the tip of the aircraft's nose and is used to measure key flight parameters, as well as the aircraft's attitude while flying.

"As the aircraft flies, it is critical that we have the most accurate flight data available for safety and the supersonic research mission," said Jeff Flamm, the X-59 lead aerodynamics engineer at NASA Langley. "Wind tunnels give us a controlled environment to precisely calibrate the aircraft's probes and sensors, and the data we collect at Glenn will inform the decisions we make to set us up for success during our initial flights."

While in the tunnel, the probe was subjected to various flight conditions, including runs at takeoff, transonic, and supersonic speeds, to fine tune and verify successful hardware and software operation. The wind tunnel data will be used during initial flight testing, while the team uses the real flight data from the early flights to further calibrate the air data system to adjust for any conditions not presented during testing.

"We are able to simulate specific flight conditions and speeds in our wind tunnel, which has made it a destination for the X-59 team," said David Friedlander, research engineer at NASA Glenn. "An aircraft like the X-59 will cover a multitude of flight scenarios and

different ambient environments, so the tunnel data we produce is critical to its success."

The air data probe is now on its way to Lockheed Martin Skunk Works to be installed on the X-59. NASA is planning to start its test flight series in 2022.

The X-59 team will return to the tunnel at NASA Glenn later this year to complete a sonic boom test. Using a small model—measuring about a foot and a half in length—this test will produce pressure, or "shock wave," data to compare with computer modeling and better predict actual sonic booms and sonic thumps during flights. After leaving Glenn, the team will travel to Japan for additional testing with Japan Aerospace Exploration Agency (JAXA). The outcome of both tests will validate the unique airframe design technologies NASA believes will allow future supersonic planes to fly quietly.

Once the X-59's airworthiness has been proven in wind tunnel and flight testing, NASA will begin community overflights in 2024 to gauge the public's perception of the sonic thump. Data from these flights will be presented to regulators in the U.S. and abroad with the potential to lift the ban on commercial supersonic flight over land.

By Jimi Russell



GRC-2021-C-01219

*The X-59 QueSST's air data probe is mounted inside the 8- by- 6-Foot Supersonic Wind Tunnel.*



# Event Provides Tips To Thrive During Difficult Times

The pandemic brought with it high levels of stress and anxiety for people across the country. With U.S. infection rates in decline, new challenges are emerging as we cautiously begin to transition back to pre-pandemic life.

NASA's Glenn, Langley, and the Space Technology Mission Directorate teamed up to provide a resource for charting your course through pandemic life. The "Navigating the Pandemic: From Surviving to Thriving" two-part virtual event on May 26 offered tips on how to set aside fear and frustration, while also helping to reduce anxiety.

Mike Verano, a licensed therapist and board-certified telemental health professional, kicked off the event with a discussion centering on social connection. He emphasized that a lack of social connection can be detrimental to an individual's health.

According to Verano, connecting with others can increase happiness, lower levels of anxiety and depression, and increase self-esteem. While Verano encouraged social connection, he stressed the importance of the relationships we create.

"When it comes to connections, it's not about how many we have—it's the depth of them," said Verano.

Patrick Runnels, M.D., MBA, chief medical officer, Population Health and Behavioral Health at University Hospitals, explained how during the pandemic, people's routines atrophied. He added that as the country begins to get back to a somewhat normal routine, this can cause anxiety levels to rise.

"You're not alone," said Runnels. "Even the most well put-together person is dealing with their own challenges, too."

To combat an increase of anxiety, Runnels encouraged people to brighten their outlook, which can benefit physical health and emotional wellness. He touched on ways to reduce stress by getting enough sleep, exercising regularly, setting priorities, thinking positively, relaxing, and being deliberate about social media use.

Runnels also emphasized the importance of strengthening social connections and being mindful. Mindfulness is being aware of all that's going on inside of you and all that is happening around you in a nonjudgmental way.

The first portion of the program concluded with a brief workout session led by Emily Harrison, fitness director at Langley Research Center.

Sarah Wilcox, a business consultant, author, and executive coach, led off the afternoon portion of the event. She offered what she called tips on how to "regain sanity" with the use of stability, organization, reflection, gratitude, and laughter, among others.

"It's time to lift our heads up and lighten the load now that we have the opportunity to do that," said Wilcox.

Employee Assistance Program counselors Susan Wilcox (Glenn) and Dr. Sophia Sills-Tailor (Langley) closed out the event by answering participants' questions.

By Adam Schabel



# Glenn Debuts Next-Generation Broadcast System

The way we view television on-site at Glenn is now a lot clearer due to UNITE TV, a new high-definition Internet Protocol Television (IPTV) hybrid broadcast system.

Now available at NASA's Lewis Field and Neil A. Armstrong Test Facility, UNITE TV is a next-generation broadcasting service that replaces the previous broadcasting system known as Lewis Information Network, or LINK. The new system is a collaboration of the Enterprise Video Content Delivery Network and Glenn's existing cable network.

Three years ago, Glenn's Office of the Chief Information Officer (OCIO) began developing a new broadcasting system to replace the outdated LINK system.

"This system allows us at Glenn to bring our technology up to date," said Shanton Bland, Mission Support Office, and project manager for UNITE TV. "Glenn is coming up to speed with the use of this type of next-generation technology."



GRC-2021-CN-00038

Graphic by Bryan Boyd

UNITE TV boasts several features that were absent from LINK. The video quality is drastically improved over what was previously offered. Additionally, the new broadcasting system displays content from other NASA centers as well as local television channels such as ABC, NBC, CBS, and FOX. UNITE TV also allows for advertisements, digital signage, and emergency broadcast bulletins to be shown on the system.

"We can now broadcast center events, inclement weather updates, and anything that needs to be communicated," said Dominic Giordano, (SAIC) NASA Integrated Communications Services program manager, OCIO Mission Support Office. "When you're more informed as an organization, you're going to perform at a higher level."

When more individuals return to on-site work, Bland is looking forward to using the new service to fine-tune communication throughout the center, and across the agency.

"UNITE TV is at the ground level and will improve exponentially as the workforce becomes more aware of its capabilities," said Bland. "This will develop into a common technology used throughout the center."

UNITE TV can be accessed on-site by visiting [video.nasa.gov](https://video.nasa.gov) on a computer, or on a monitor that is set up to broadcast the network. Please visit Today@Glenn or contact Bland at [shanton.v.bland@nasa.gov](mailto:shanton.v.bland@nasa.gov) for more information about UNITE TV.

By Adam Schabel

## Technology Transfer License Highlight: Government Use License

Glenn's Technology Transfer Office (TTO) offers four different ways to license a NASA technology: Commercial, Research, Government Use, and the Startup NASA License. After TTO and the company have mutually agreed on the appropriate technology, the ideal license type is pursued.

The Government Use license is a nonexclusive, no-cost license with a term limited to the contract period of performance. The license is available to those under active contracts with the U.S. government. Businesses are able to use NASA technologies that could help them to meet their contractual requirements. This opportunity leverages taxpayer-funded innovation to have a greater impact for the government, while at the same time supporting the business with new NASA-developed technologies.

Glenn signed a Government Use license with Goodman Technologies

in 2020, which has six Small Business Innovation Research licenses, for the silicon carbide (SiC) fiber-reinforced SiC ceramic matrix composites (SiC/SiC CMCs). Goodman Technologies plans to use the Glenn technology in additive manufacturing, rapid prototyping, thermal protection systems, and ballistic impact systems. The SiC/SiC CMCs will be used with agencies like NASA, the Air Force, and the Department of Defense.

The Government Use license is just one way that TTO can help to further the relationship between industry and NASA technologies, promoting collaboration and future innovation.

TTO will be sharing more information about the different types of licenses in future issues of AeroSpace Frontiers. For more information on NASA Glenn's technologies available for licensing, visit <https://technology.grc.nasa.gov>.

By Lauren Simmers



# Saffire IV Team Earns SFA Award



NASA recognized Glenn's Saffire-IV team with a prestigious Space Flight Awareness (SFA) Flight Safety Award during a virtual ceremony on June 7.

The team concluded the fourth Saffire experiment, conducted on the Cygnus NG-13 resupply mission, under extremely challenging circumstances during the COVID-19 pandemic. This work resulted in more than twice the data collection expected and set a new record for data collection for a Saffire experiment. The experiment demonstrated that turning off the airflow is not sufficient to ensure that a low-gravity flame is extinguished. Its data will be used in future spacecraft designs to enhance fire safety, including improved methods for fire protection, detection, and suppression.

Dr. Alotta Taylor, SFA program manager in the Human Exploration and Operations Mission Directorate, moderated the event. Special guest speakers included Kathy Lueders, Human Exploration and Operations Mission Directorate manager and Russ DeLoach, NASA Safety and Mission Assurance chief. During a video message, astronaut Chris Cassidy thanked the team and affirmed that the efforts of the Saffire IV team directly impacted the astronauts' safety and success.

Team members include:

NASA: Gary Ruff (team lead), Thomas Acquaviva, Martin Bradish, David Carek, Kyle Gee, Kelly Hall, Lisa Lambert, Mark Lefebvre, Jose Lombay-Gonzalez, Brian Loucks, Sandra Olson, Joseph Ponyik, George Santosuosso, William Schoren, David Urban, Lisa VanderAar.

HSX LLC: Yishi An, John Snead, David Stainbrook, Joseph Staudt.

Case Western Reserve: John Easton.

Universities Space Research Association: Paul Ferkul, Jay Owens.

Northrup Grumman: Danelle Fogle.

ZIN Technologies: David Anderson, Eric Anderson, Christopher Bodzoney, Joey Bostick, Charles Bunnel, William Dial, Kevin Driscoll, Gregory Funk, Nathan Funk, Pete Galant, Raymond Margie, Mark Morris, Ruth Morris, Annie Poulouse, Rowan Rodgers, Kenneth Smith, Dave VanZant.

KBRWyle Technology Solutions: Michael Carozzoni.

Analytical Mechanics Associates, Inc.: Richard Verbus.

Peerless Technologies Corp.: Kathleen Kelly.

By Doreen B. Zudell

## NEWS AND EVENTS

### Followers Learn How Glenn Supports the Agency

On June 2, NASA Administrator Sen. Bill Nelson presented the State of NASA and shared updates about the agency's work to improve life on Earth and explore our solar system. The following day, Glenn's Digital Communications team invited the public to learn more about how our center in Cleveland, Ohio, supports NASA's progress on electric aircraft, and exploring the Moon, Mars, and beyond. They released a new "Year of Innovation" video and followed it up with an online question-and-answer opportunity on our digital platforms. Social media users submitted questions to us, and our technical experts answered them online.

View the video at <https://go.nasa.gov/3iHFCnf>.



GRC-2021-CN-00042

Photo by Nikki Welch

# Lifting Safely Doesn't Have To Be Extreme

There is no NASA award for the strongest man or woman. There is no prize for lifting something alone instead of using a buddy lift or lifting aid. Lifting doesn't have to be extreme, and more importantly, it should not be. Even light loads can lead to injury when not lifted correctly. Potential injuries can be avoided with the use of proper lifting techniques, buddy lifts, and lifting aids.

The NASA Safety Center recently added new products to the Lifting Safety page. These helpful resources, along with many more, provide tips to prevent lifting injuries both at work and at home.

Visit <https://go.nasa.gov/3dTopmV> for more information.



## PROMOTION



*Freeh*

**Joshua E. Freeh** has been selected chief, Human Exploration and Space Operations Project Office for the Space Flight Systems Directorate. He most recently served as deputy manager for the European Service Module Integration Office for the Orion Multi-Purpose Crew Vehicle.

## RETIREMENTS



*Dr. Choi*

**Dr. Benjamin B. Choi**, Rotating and Drive System Branch, Materials and Structures Division, Research and Engineering Directorate, retired on May 31, 2021, with 31 years of NASA service.

**Dennis L. Huff**, Acoustics Branch, Propulsion Division, Research and Engineering Directorate, retired June 18, 2021, with 36 years of NASA service.

**Dave Huntsman**, Office of Technology Incubation and Innovation, retired June 3, 2021, with 46 years of NASA service.



*Huff*

## MORE THAN A MEMORY



*Alexovich*

**Robert E. Alexovich**, 92, a 1985 retiree with 33 years of service, died March 30. His early work focused on instrument research and development. When NACA became NASA, Alexovich was assigned to space-related research. Those activities included design and development of automatic control systems for rocket test operations, space flight experiment data systems, and launch vehicle electrical systems management. Alexovich worked on the Advanced Communications Technology Satellite system and received an Exceptional Scientific Achievement Medal (1976). He retired as deputy chief of Technology in the Space Communications Division.





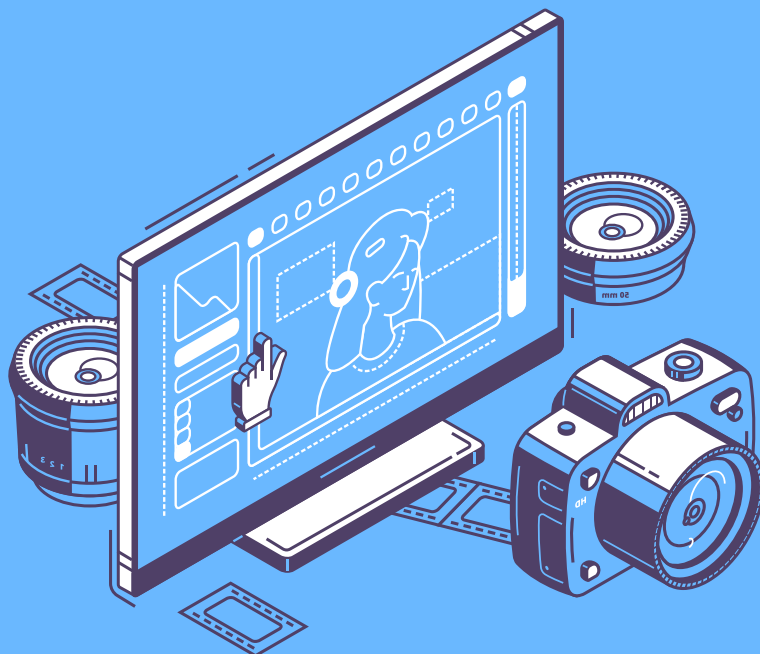
## Employees Get Creative in Historic Photo Re-Creation Contest

Employees showed off their creative side during the Glenn Research Center Historic Photo Re-Creation Contest. The contest, presented by Glenn's 80th Anniversary planning team, encouraged employees to enter an artistic re-creation of selected photos from NASA's image gallery. More than 200 employees viewed and voted to select the winners.

Congratulations to the 80th Anniversary Photo Re-Creation Contest winners:

- Digitally Re-Created Image: Graceful Discoveries by Carlos Gomez
- Physically Re-Created Image: Henry the Great Pyrenees by Jenny Boone.

Gomez and Boone each won a \$25 gift code to use at the online Exchange Store.



### INFORMATION CAFÉ

On Wednesday, July 21, from 11-11:45 a.m., the Library will host a mini lesson about "Successful Searching Tips" using Boolean search techniques that can be used across most library databases (and even Google) to optimize and refine the search process. Check Today@Glenn for the link.

POC: Robin Pertz, 3-5776

### LSS VIRTUAL TRAINING

Agencywide Lean Six Sigma (LSS) Virtual Green Belt Training will take place from Aug. 2 through 5, from 9 a.m. to 5 p.m. With this training comes the expectation to achieve Green Belt certification by passing the Green Belt exam and completing one LSS event or project. Register through SATERN at <https://satern.nasa.gov>.

POC: Peggy Raines, 3-2337

### OUTDOOR SIREN TESTING

Emergency Management Office staff will conduct a mass notification voice test at Building 6 on Wednesday, Aug. 4, at Lewis Field. An audible siren test will be conducted on the "lock-down" tone on Saturday, Aug. 7.

POC: Allen Turner, 3-6826

### VIRTUAL FACILITY TOURS

Glenn is hosting a virtual public tour season, featuring seven world-class facilities, through October. To learn more about the featured facilities, visit <https://www.nasa.gov/nasaglenntours>. The next tour is Aug. 19, Flight Research Building. Registration opens 1 month before the tour date and space is limited. Tell your friends and family!

POC: Debbie Lockhart, 3-8655

Deadline for the next calendar section is **Wednesday, July 21, noon**. News and feature stories require additional time.

National Aeronautics and  
Space Administration

John H. Glenn Research Center

Lewis Field

21000 Brookpark Road  
Cleveland, Ohio 44135

Neil A. Armstrong Test Facility

3597 E. Scheid Road  
Sandusky, Ohio 44870

[www.nasa.gov](http://www.nasa.gov)

Read AeroSpace Frontiers online at <https://www.nasa.gov/glenn/aerospacefrontiers>.



## Celebrating 80 Years Looking Back Through the Decades

NASA Glenn was originally established in 1941 as the Aircraft Engine Research Laboratory (AERL), part of the National Advisory Committee for Aeronautics (NACA). The laboratory became a national resource for innovations in aircraft engine technology that transformed commercial and military propulsion systems.

Over the decades, NASA's Cleveland-based scientists and engineers advanced technology in both aviation and space exploration, propelling the U.S. into a leading role in the aerospace industry.

### The Shuttle Era Begins: 1980s

NASA Lewis goes for major roles in mainstream programs. New programs include the space station power system, the Shuttle/Centaur upper-stage vehicle, and the Advanced Communications Technology Satellite (ACTS).



S81-30463

Photo by NASA

*A new era in spaceflight began with the April 12, 1981, liftoff of the space shuttle Columbia. Astronauts John Young and Robert Crippen opened a highway to space traveled by space shuttle crews for more than 30 years.*

### Emergency and Inclement Weather Lines

Lewis Field: 216-433-9328 (WEAT)

Neil A. Armstrong Test Facility: 419-621-3333

### Connect With Glenn

