National Aeronautics and Space Administration

AeroSpace FRONTIERS

VOLUME 24 • ISSUE 3 • MARCH 2022

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Safe Return: Stay Alert

Welcome back to all who have been away from the center!

In our HEROICS 7 Expected Behaviors, the "S" stands for Safety, in which we demonstrate a vigilant commitment to a safe work environment through good situational awareness and communication. To be situationally aware is to be alert. As we increase occupancy and return to more on-site work, we need to be alert at the work site. Practical tips include the following: take your time to assess the work site before starting activities; review current COVID–19 safety protocols; review the work environment for any hazards including slips, trips, and falls; and carefully consider how to safely restart idle equipment. Let's continue our vigilant commitment to a safe return at Glenn.

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.

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Dr. Pérez-Davis Featured at City Club Forum

Center Director Dr. Marla Pérez-Davis addressed The City Club of Cleveland on Jan. 28 to share how NASA Glenn continues to push the boundaries of innovation in space and aeronautics research. President and CEO of Great Lakes Science Center Dr. Kirsten Ellenbogen moderated the event, which touched on Glenn's technology, economic impact, partnerships, diversity, and STEM careers. Pérez-Davis addressed questions from audience members, including students who were eager to gain more insight into STEM careers. The Ohio Aerospace Institute sponsored the forum, which was part of the City Club's Local Heroes series. To view the forum, visit https://go.nasa.gov/3GxG0wQ.

GRC-2022-CN-00014 Photos courtesy of Michaelangelo's Photography

Dr. Ellenbogen, left, facilitates a lively discussion with Dr. Pérez-Davis during The City Club of Cleveland event.

GRC-2022-CN-00016

A diverse audience, including students and business professionals, listen to the event.

NASA Day of Remembrance

Observances Embrace Core Value of Safety

During NASA's Day of Remembrance on Jan. 27, the agency paused to acknowledge the legacies of those who gave their lives in pursuit of exploration and discovery, notably the fallen heroes of the Apollo 1, Challenger, and Columbia missions. This year also marks 55 years since the Apollo1 tragedy, which occurred on Jan. 27, 1967.

Virtual presentations hosted by Glenn and NASA Headquarters centered on the inherent risks of space flight and our responsibility in ensuring that we fully understand those risks before we take them.

During the NASA Glenn virtual program, Center Director Dr. Marla Pérez-Davis and NASA Associate Administrator for Space Operations Kathy Lueders reflected on the contributions made by our predecessors and discussed how their sacrifices influence our work today. Lueders stressed the value of working through the processes and how this is necessary to ensure that we are making the best decisions possible to keep our NASA family members safe. She emphasized the importance of acknowledging what we do not know and listening to input from various perspectives to become better informed risk takers.

Earlier in the day, NASA Administrator Bill Nelson led an observance at Arlington National Cemetery in Virginia. This included a traditional wreath-laying ceremony at the Tomb of the Unknown Soldier, followed by observances for the Apollo 1, Challenger, and Columbia crews.

Later that afternoon, Nelson joined NASA Deputy Administrator Pam Melroy, Associate Administrator Bob Cabana, and NASA Chief of Safety and Mission Assurance Russ DeLoach for the headquarters virtual program. Nelson moderated a discussion on the topic of safety and lessons learned from the agency's tragedies. Each panel member shared candid, personal experiences and lessons learned from these tragedies. Like Lueders, they stressed the value of diversity and inclusion in decision processes related to risk.

In conclusion, Nelson acknowledged the significance of those who gave their lives in pursuit of discovery by taking the next giant leap and meeting challenges head-on. "In doing so," he said, "we must never forget the lessons learned from each tragedy and embrace our core value of safety."

By Doreen B. Zudell

GRC-2022-CN-00007 Photo by Elizabeth Fraser

Nelson (back) and Melroy (front) participate in a wreath-laying ceremony at the Tomb of the Unknown Soldier at Arlington National Cemetery.

On the Cover:

Center Director Dr. Marla Pérez-Davis addressed The City Club of Cleveland on Jan. 28 to share how NASA Glenn continues to push the boundaries of innovation in space and aeronautics research.

GRC-2022-CN-00003
Photo courtesy of Michaelangelo's Photography

Glenn Highlighted in Spinoff 2022

Glenn continues to conduct research and develop new technology for the benefit of all, as evidenced by its presence in NASA's Spinoff 2022, which was released in January. The publication tells the stories of companies, startups, and entrepreneurs who transform NASA innovations into cutting-edge products and services that boost the economy, protect the planet, and save lives.

Several Glenn technologies appear in the publication, including polyimide aerogel, a temperature-sensitive coating, and an additive manufacturing system producing composite parts that can withstand high temperatures. Here is more information about each one:

- **Polyimide aerogel** is a strong material that provides heat resistance and blocks ultraviolet light while allowing radio signals to pass through. The greatest benefit will be stronger, more reliable connections for mobile devices and longer-lasting batteries due to more efficient operation.
- **Temperature-sensitive coating** is painted onto surfaces and changes from a reddish-brown color at room temperature to black-gray at 1,100 degrees Fahrenheit. The coating can be used in the aerospace and automotive industries, and in industrial and residential ovens and furnaces, among other applications.
- **Additive manufacturing system** produces composite parts that can withstand high temperatures. This invention will enable aerospace companies to produce parts with complex geometry for engine components facing high temperatures. It also has other potential applications, including printing legacy parts for military aircraft and producing components for high-performance electric cars.

To view the NASA Spinoffs 2022 publication, visit https://spinoff.nasa.gov/Spinoff-2022-release.

By Adam Schabel

GRC-2022-CN-00010 Photos by NASA

The temperature-sensitive coating has applications in aerospace with high-speed aircraft flight testing, along with industrial and residential ovens and furnaces—among other applications.

Below: Dr. Kathy Chuang checks on research relating to the additive manufacturing system.

GRC-2022-CN-00011

NASA's Watts on the Moon Challenge Welcomes Teams

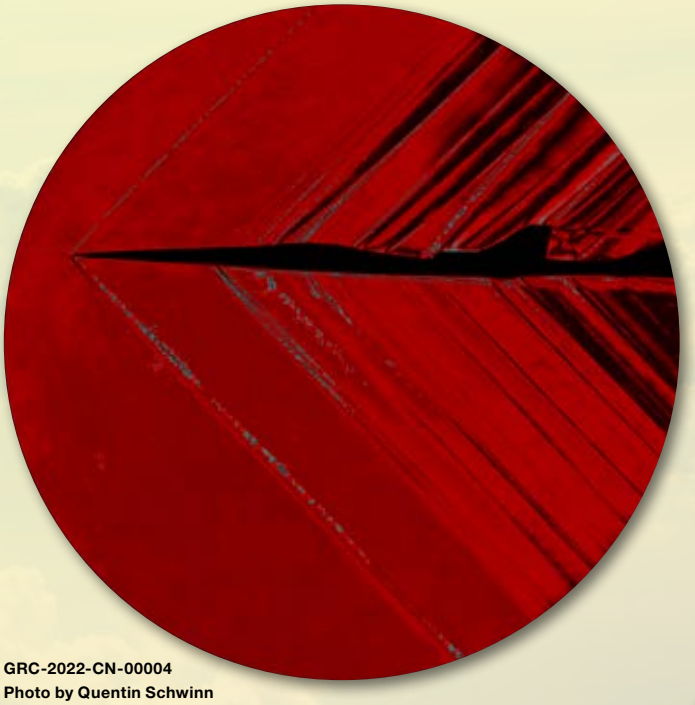
NASA's Artemis program plans to establish a sustainable human presence on the lunar surface and validate systems and operations to prepare for exploration of Mars and beyond. Glenn is helping lead a public prize competition to assist in meeting these needs.

NASA's Watts on the Moon Challenge is supported by the Space Technology Mission Directorate and offers up to $5 million in prizes to design, build, and demonstrate prototype systems to address technology gaps in lunar surface power transmission and energy storage.

The Watts on the Moon Challenge awarded a total of $500,000 to seven Phase 1 winning teams in May 2021. The Challenge announced a Phase 2 competition on Feb. 23. In Phase 2, participants are required to build prototype hardware for competitive testing in a NASA lunar environmental simulation facility. NASA welcomes domestic teams to compete for up to $4.5 million in Phase 2 prizes whether or not they entered Phase 1.

Phase 2 will last approximately 30 months and will take place in three levels of competition. In each level, documents or hardware submitted by eligible teams will be evaluated by a panel of judges. Seven winners from level one will advance to level two and four winners from level two will advance to the competitive environmental testing at level three. Two teams will be recognized as final winners after competition level three. NASA Glenn is partnering with the Ohio Aerospace Institute, which will encourage Ohio industry and universities to participate in this challenge.

For more information on the challenge, visit https://nasa.gov/wattson.



GRC-2022-CN-00004
Photo by Quentin Schwinn

BOOM... Thump

NASA engineers are hoping to lift the ban on commercial supersonic flight over land by replacing the piercing sonic boom with a quieter sonic "thump."

This colorized schlieren image is of a small-scale model of NASA's X–59 Quiet SuperSonic Technology (QueSST) airplane taken inside Glenn's 8- by 6-Foot Supersonic Wind Tunnel during a recent boom test. The multiple-week campaign produced datasets and shockwave visuals that engineers from the agency's Commercial Supersonic Technology project will use to validate boom-reducing technologies and sonic-boom-predicting capabilities. For more information on the testing, visit https://go.nasa.gov/3fV3pgT.

Schlieren photography is a visual process used for photographing the flow of fluids of varying density.

Using the Moon to Address Earth's Digital Inequality

Most Americans take access to reliable, fast wireless internet (Wi-Fi) for granted. Yet, in underserved communities, reliable internet access can be as elusive as it is on the Moon. NASA is working to solve both challenges.

Digital inequality or inadequate internet access is a socioeconomic concern across the United States, and the pandemic has worsened the divide. In Cleveland, a study by the National Digital Inclusion Alliance found that about 31% of the city's households have no broadband access.

Following the study, the Greater Cleveland Partnership (GCP), an economic development organization, reached out to NASA Glenn for assistance in examining the technical barriers of digital inequality—the way only a space agency can—by using the Moon to solve an earthly problem.

"This presented a great opportunity to develop solutions to the challenges we face sending astronauts to the Moon under Artemis while also addressing a growing societal issue in our hometown," said Mary Lobo, director of Technology Incubation and Innovation at Glenn. "We were pleased to establish a mutually beneficial study partnership with the GCP."

NASA's Compass Lab at Glenn, which specializes in abstract spacecraft and mission design, applied lunar network approaches to address technical challenges to Wi-Fi connectivity in the local community. Comparing a lunar surface area to an area around Cleveland produced interesting results.

The study found that attaching Wi-Fi routers to approximately 20,000 lampposts or other utility poles would help solve Cleveland's connectivity issues. By spacing routers no more than 100 yards apart, this approach would provide around 7.5 megabits per second (Mbps) download speed in a four-person home.

"That connectivity is good enough to complete schoolwork, participate in virtual calls, and other internet-based activities, but it isn't high enough to allow for 4K streaming," said Steve Oleson, Compass team lead at NASA Glenn. "If we move the routers a little closer, 50 to 75 yards apart, that greatly improves bandwidth."

Each router would provide connections to outdoor and indoor users within a 50-yard radius from its host pole. Though, Wi-Fi repeaters would most likely be required to help older, low-performing devices connect indoors.

"This technological examination will help inform key aspects of the collaborative strategy to solve the digital divide in Greater Cleveland," said Marty McGann, GCP executive vice president of advocacy and strategy. "Addressing this will have lasting impacts on the growth of our economy for years to come and is a major step to creating a much more equitable, inclusive economy."

Building on the effort, Cuyahoga County, where Cleveland is located, released a request

for proposals (RFP), asking companies for affordable internet access solutions throughout the county.

"NASA's work helps set the stage for evaluation of the RFP responses to determine the most effective plan for connecting our neighborhoods," said Catherine Tkachyk, Cuyahoga County's chief innovation and performance officer.

The lunar portion of the study assumed a basecamp at Malapert Massif, a large impact crater near the Moon's South Pole. This area meets NASA's requirements for sun exposure and line-of-sight communications with the Deep Space Network, and it is a prime spot for in situ resource utilization.

Surface exploration will require high-rate communications between astronauts and various elements like Gateway, landers, habitats, rovers, and more. However, there are many unknowns when it comes to Wi-Fi connectivity on the Moon.

"While the Moon doesn't have the level of interference found in a neighborhood full of houses and trees, it also does not have the advantage of an existing infrastructure of power, back feeds, and even a lunar internet, all of which need to be supplied," said Oleson.

Using the same pole-based approach, the team recommends mounting routers on multiple 24-foot poles attached to habitats, landers, or other large hardware. In contrast to a single, large tower, this approach would provide astronauts in habitats network stability while mobile explorers could roam between routers.

This lunar Wi-Fi framework is still very conceptual, but the team hopes the Wi-Fi study will help inform future Artemis plans. In the meantime, the analysis will help American cities bring underserved communities vital internet access and the many benefits of the digital age.

By Jimi Russell

A view of the Moon from Earth.

iss059e027725
Photos by NASA/JSC

A crew member aboard the International Space Station captured this night view of Cleveland from an altitude of approximately 240 miles.

iss034e044575

MLK Observance

Bridging Cleveland's Digital Divide

NASA Glenn and the Cleveland Foundation participated in Great Lakes Science Center's (GLSC) Martin Luther King Jr. celebration day on Jan. 17. Glenn's Mary Lobo, director of Technology Incubation and Innovation; and Cleveland Foundation's Leon Wilson, chief of Digital Innovation and chief information officer, served as panelists for a virtual presentation. They discussed efforts to bridge the digital divide in Cleveland, and how the knowledge gained from this endeavor may someday bring Wi-Fi to the Moon.

GRC-2022-CN-00006 Photo by Chris Hartenstine

Lobo, left, and Wilson, below right, answer questions from moderator JonDarr Bradshaw, STEM Learning Coordinator with GLSC.

NEWS AND EVENTS

Observance Series Takes A Holistic Approach

This year's National Black History Month theme recognized not only the history, culture, and contributions of Black Americans, but also the importance of issues relating to health and wellness.

NASA's African American employee resource groups, including Glenn's African Heritage Advisory Group, (AHAG), coordinated four agencywide events in support of this year's Black History Month theme "Black Health and Wellness." During the month of February, weekly virtual sessions centered on different health and wellness topics. This included a kickoff followed by sessions on mental health/suicide awareness, nutritional health, and physical health. A variety of NASA and outside speakers spoke during live events open to all civil servants, support service contractors, students, and interns. All sessions provided time for questions between speakers and attendees.

Glenn's Eunice Adams-Sipp, AHAG chair, and one of the members of the Mental Health and Suicide Awareness team that organized the Feb. 9 program, introduced speaker Lisa McCraney. Author and leading expert in the mental health field, McCraney discussed the value of reaching out to friends and loved ones about suicide, the importance of self-care, and resources for a full and productive life.

In case you missed any of these presentations, they will be sent via an agency email with links to the events in March.

New Building Offers Collaborative Workspace

As NASA's missions evolve and the boundaries of exploration expand, the agency's infrastructure and workforce must adapt with them.

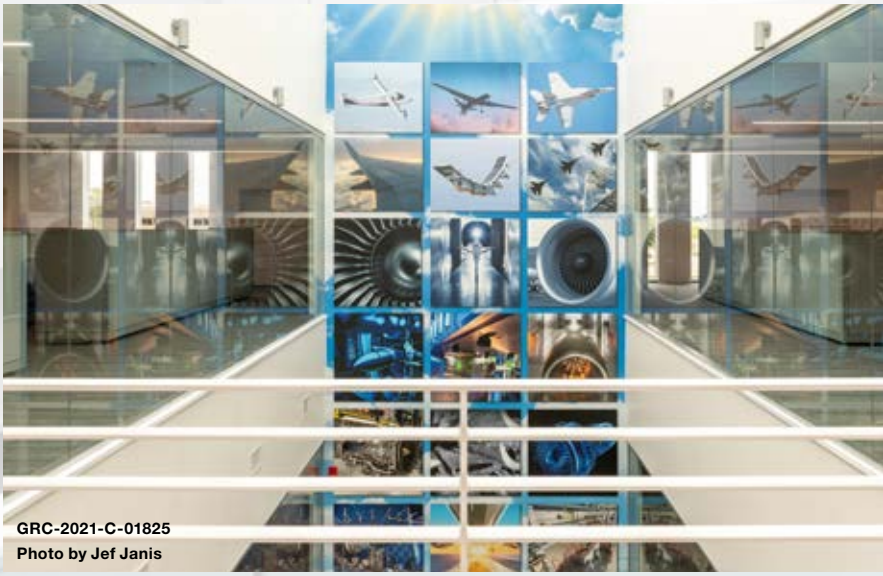
NASA Glenn recently completed construction on the Research Support Building (RSB) located at Lewis Field. This innovative building was designed to provide a flexible, inclusive, and collaborative workplace to meet future mission needs.

The RSB contains office space for approximately 164 Glenn civil servants and support service contractors who will gradually move in over the next few months. It also will serve as a campus center with a cafeteria, "hoteling spaces" for part-time teleworkers, exchange store, credit union, ATM, 16 conference rooms, training rooms, and multiple gathering spaces.

Concurrent engineering rooms allow multiple teams to work simultaneously on different phases of a technology or project. Several collaborative spaces throughout the building offer alternate work environments with a variety of seating types to facilitate collaboration..

For more information and to view additional photographs, visit https://go.nasa.gov/3ldl2Ua.

GRC-2021-C-01765
Photo by Marvin Smith



GRC-2021-C-01825
Photo by Jef Janis

GRC-2021-C-01857
Photo by Jef Janis

GRC-2021-C-01802
Photo by Jef Janis

VIPER Prototype Traverses Through the Sand

The test version of NASA's Volatiles Investigating Polar Exploration Rover (VIPER) kicks up high sinkage sand-like material while transiting Glenn's Simulated Lunar Operations Laboratory (SLOPE) bed.

In November 2021, the latest test rover visited SLOPE to complete the next iteration of mobility testing, a critical step toward ensuring the rover is ready for its 2023 mission to the Moon's South Pole to get a close-up view of the location and concentration of ice and other resources.

The latest prototype of the rover, known as Moon Gravitation Representative Unit 3 (MGRU3) has the same wheel design and base size as the rover that will go to the Moon. It also has the flight design motors, gearboxes and joints, as well as the newest version of the flight software.

For more information on this testing, visit https://go.nasa.gov/3rVgoES.

GRC-2021-C-04813 Photo by Jef Janis

Retirements

Leon R. Dozier Sr., Reliability and System Safety Engineering Branch, Program and Project Assurance Division, Safety and Mission Assurance Directorate, retired Feb. 26, 2022, with 38 ½ years of NASA service.

Laurie H. Levinson, Multiscale and Multiphysics Modeling Branch, Materials and Structures Division, Research and Engineering Directorate, retired Feb. 26, 2022, with 38 years of NASA service.

Mary Jo W. Shalkhauser, Avionics Systems, Power Division, Research and Engineering Directorate, retired Feb. 28, 2022, with 24 ½ years of NASA service

Dozier Sr.

Levinson

Promotions

Susan Jansen has been selected chief, Thermal Systems and Transport Processes Branch, Propulsion Division for the Research and Engineering Directorate. She has served as acting chief of the branch since October 2021. Prior to her detail, Jansen served as the deputy Thermal Control System manager for the Power and Propulsion Element spacecraft.

James A. Mullins has been selected chief, Operational Safety Branch for the Safety and Health Division. He previously served as the facility manager in the Test Facility Management Branch of the Management Integration Division. Prior to that position, Mullins worked as a test engineer.

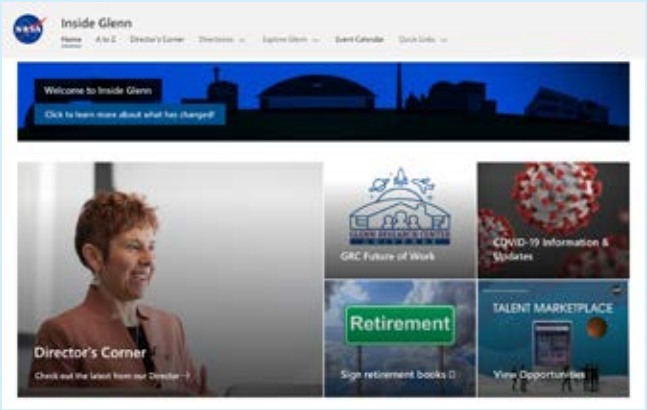
Jansen

Mullins

Inside Glenn Tips

How can I find links for SATERN and ESD?

Agencywide website links–including SATERN and ESD–are located under the Employee Tools pull down bar at the top of the Inside Glenn page.



Attention Employees and Retirees!

Do You Know This Person?

Glenn's Logistics and Technical Information Division needs your help identifying people, places, and research from archived images. If you recognize a photo placed here, email GRC-ITC@mail.nasa.gov.

To ensure your email reaches the right individuals, please enter "DYKTP" into the subject line. Although we cannot respond to individual emails, please know your participation is appreciated!

INFORMATION CAFÉ

Each month the Glenn Library hosts Information Café, a forum to highlight a library or information resource. Join them on the third Wednesday of each month from 11–11:45 a.m. The March 16 discussion will focus on the process to obtain copyright and reuse permissions for authors. Check Inside Glenn for the link.

POC: robin.n.pertz@nasa.gov

OUTDOOR SIREN TESTING

Emergency Management Office staff will conduct an audible siren test on the "emergency condition" tone on Saturday, April 2, at Lewis Field. A mass notification voice test will be conducted at building 39 on Wednesday, April 6.

POC: allen.r.turner@nasa.gov

Deadline for the next calendar section is **Wednesday, March 16, noon**. News and feature stories require additional time.

For more information on upcoming events, visit **https://nasa.sharepoint.com/sites/grc/SitePages/calendar.aspx**

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

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

Keeping the Center Moving *Forward*

While many employees transitioned to telework due to the pandemic, others remained on-site to ensure a safe and secure environment at the center. This column will highlight these services.

From the onset of the pandemic, NASA Glenn's janitorial staff at Lewis Field (Creative Management Technology, Inc. or CMTI) has been on-site, keeping the center clean and sanitized.

When COVID–19 first began spreading in the United States, it was unclear how significantly the virus would spread through contaminated surface contact. This meant that the cleaning staff would need to go above and beyond the requirements of day-to-day cleaning.

To determine the best approach for keeping the center sanitized, CMTI joined forces with the Logistics and Technical Information Division and the Safety and Health Division. The team methodically researched, tested, and utilized electrostatic sprayers to mitigate the risk of exposure through surface contact. They devised a process for regular sanitization of occupied areas that met the recommendations of the Centers for Disease Control and the Environmental Protection Agency.

As a result of this collaborative effort, Glenn led the way for the agency in the development of an operating procedure used by all NASA centers in incidences of COVID–19 exposure. This includes Neil A. Armstrong Test Facility.

Now that the center is slowly transitioning into larger employee occupancy, the janitorial staff has, again, adapted to updated cleaning guidance and increased work demands. This is in addition to addressing annual cleaning requirements such as window washing, floor stripping and waxing, and carpet cleaning.

If you happen to be at Lewis Field and see a CMTI professional in a blue polo shirt, take a moment to thank them for their efforts in keeping Glenn safe and clean.

GRC-2022-C-00105
Photo by Bridget Caswell

Maggie Lester, CMTI, cleans and sanitizes tables in the Research Support Building lobby.

Emergency and Inclement Weather Lines

Lewis Field: 216–433–9328 (WEAT)
Neil A. Armstrong Test Facility: 419–621–3333

Connect With Glenn