



# AeroSpace FRONTIERS

VOLUME 22 • ISSUE 3 • MARCH 2020

**State of  
NASA Events**  
Page 4

**Love Your  
Library**  
Page 5

**Unmanned Aircraft  
Communications**  
Page 6

**Chief Technologist  
Champions Innovation**  
Pages 2–3





DIRECTOR'S  
SAFETY CORNER

## Your Opinion Matters

Key to our success as a center is a strong safety culture that fosters an atmosphere of open communication, mutual trust, shared safety values and confidence to balance challenges and risks for mission success. It is important to continually assess our safety culture to know how we are doing and where we can improve. I encourage you to take a few minutes to participate in this year's safety culture survey, which is currently open through March 20. Check the Upcoming Events calendar on WING for a link to the Safety Culture Survey. Your feedback from last year's survey was highly valuable and used to establish our Safety Culture Action Plan.

Your opinion matters in assessing and strengthening our safety culture for mission success.

### *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 & External Relations 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: **S. Jenise Veris**, ATS

Design: **Rhys Sampson**, ATS

Managing Editor: **Kelly R. DiFrancesco**

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

NASA

# Chief Technologist Champions Innovation Ecosystem

On Jan. 22, NASA Chief Technologist Dr. Douglas Terrier conducted a town hall meeting with Glenn employees at Lewis Field. The visit included an innovation workshop in the MIC Auditorium. Terrier, accompanied by Ken Wright, Agency Innovation Lead, discussed preserving and expanding NASA's innovation leadership.

Center Director Dr. Marla Pérez-Davis introduced Terrier, who summarized his responsibilities and discussed components of the workshop. He is principal advisor to the Administrator on technology policy and investments for the portfolios across all four mission directorates. He advocates for technology strategic partnerships; oversees NASA's digital transformation; and champions grassroot efforts for NASA's Innovation Ecosystem.

Terrier and Wright have traveled across the agency with the goal of gathering input from center chief technologists, stakeholders and others. Their mission is to create a network (ecosystem) of actionable initiatives with potential for building a future state of successes based on NASA's current innovation.



GRC-2020-C-00529

*On the Cover: NASA Chief Technologist Dr. Douglas Terrier, right, and Ken Wright, NASA Innovation lead, at the Zero-Gravity Research Facility at Lewis Field. Discussions centered on planned modifications to the facility to enable rapid-turnaround testing of devices in lunar gravity. They visited several other Artemis-related testing facilities to build their awareness of Glenn capabilities.*



GRC-2020-C-00498

Photo by Marvin Smith

Left to right: Wright and Dr. Terrier discuss environmental testing of lunar excavation technology with aerospace engineer Erin Rezich in Vacuum Facility 13.

Terrier said there could not be a more important time to emphasize this effort because we have so many challenges in front of us.

“For the past 60 years, NASA leadership has been underpinned by the fact that we have innovation in our DNA,” he said. “That’s what has enabled us to be successful and will keep us successful with all the big deadlines, including Artemis and the huge science and aeronautics projects coming up in the next 5 years.”

Wright talked about the work done to establish NASA’s Innovation Framework and the Innovation Portal that incorporates local and regional resources to stimulate innovation to benefit the agency. The framework introduces technology challenges that inspire creative thinking; rewards failure as part of sharing lessons learned; opens barriers; and nurtures leadership, through co-competitions that expand innovation.

Pérez-Davis affirmed support for these efforts. “I look forward to capitalizing on the knowledge gained at the workshop—some of which I cited as pillars in my commitment to the center—and integrating them into the direction we will be taking the center.”

By S. Jenise Veris



GRC-2020-C-00455

Photo by Jef Janis

Left to right: Wright discusses workshop content with Glenn’s Deputy Chief Technologist Kurt Sacksteder and Office of Technology Incubation and Innovation Deputy Director Mary Lobo.

## Administrator Bridenstine Presents “State of NASA”

# Glenn Hosts Media Roundtable, Facebook Live

NASA Administrator Jim Bridenstine presented his annual “State of NASA” address on Feb. 10, broadcast live from Stennis Space Center. Bridenstine highlighted the agency’s progress over the past year and the work ahead on the Artemis program.

The address featured President Donald Trump’s Fiscal Year 2021 Budget request of 2.5 billion for NASA. The request fully funds the Space Launch System and Orion spacecraft.

“The budget proposed represents a 12% increase and makes this one of the strongest budgets in NASA history,” Bridenstine said. “The reinforced support from the President comes at a critical time as we lay the foundations for landing the first woman and the next man on the south pole of the moon by 2024. This budget keeps us firmly on that path.”

Glenn hosted a media roundtable to discuss the state of NASA and the center’s role in developing the next generation of aircraft and sending the first woman and next man to the moon by 2024. Media attending the event viewed Bridenstine’s address via NASA Television.

After the address, Center Director Dr. Marla Pérez-Davis hosted a media roundtable with Associate Administrator of NASA’s Space Technology Mission Directorate James Reuter and Glenn Chief Financial Officer Vicki Hagerman.

Reuter updated media on the development of transformative space technologies, such as solar electric propulsion and fission surface power. Pérez-Davis and Hagerman discussed the state of Glenn and its proposed fiscal year 2021 budget of \$802.4 million.

“We are in a very good position to support the national mission and the local economy,” Pérez-Davis said.

Meanwhile, social media followers visited Glenn’s Facebook page for a Facebook Live event that aired from the Space Environments Complex at Plum Brook Station. Robin Pertz, Library, History and Records supervisor, led a discussion with Nicole Smith, project manager for testing. Smith answered questions from Glenn’s followers about testing the Orion spacecraft at Plum Brook, and the agency’s preparations for the Artemis I mission.

For details on NASA’s budget, strategic plans and performance reports, visit [www.nasa.gov/budget](http://www.nasa.gov/budget).



*Dr. Pérez-Davis, left, and Reuter answer questions from media.*



*Hagerman, left, talks one-on-one with Taylor Haggerty of WCPN’s ideastream.*



*Smith, left, and Pertz following the Facebook Live event that highlighted Orion spacecraft testing at Plum Brook Station.*

# Love Your Library

## Open House Showcases Resources

Lewis Field celebrated National Library Lovers' Month on Feb. 12 with an open house at Glenn's Science and Engineering Library. The event highlighted an array of library services and introduced a new, more comprehensive online research tool.

Science Librarian Jillien Zudell demonstrated how to use the new electronic-based resource tool located on the Library website. This user-friendly tool enables users to pull from every electronic journal and database accessible to the Library.

The event also showcased the Learning Center's growing collection of materials available in a variety of formats that can be borrowed to view in the office, home or the comfortable library setting. Resource Coordinator Dawn Sedor explained how the self-study training area offers a collection of topics such as safety, NASA history and organizational and professional development. Additional materials in the areas of languages and health and wellness have been added to help employees develop skills in areas of importance and interest.

Records Manager Anne Mills shared information about records identification and retention. She answered questions and offered assistance regarding electronic storage. A federal mandate requires that all NASA records must be electronically stored by 2023.

Library, History and Records Supervisor Robin Pertz encourages employees to stop by the Library on the first floor of building 142 for help with your next research and project pursuits. "The comfortable, informal setting is ideal for time away from the office as well as for collaborative meetings."

Librarians are also available to attend meetings to explain and demonstrate Library services or meet with teams to discuss information needs. Do not forget the Mobile Librarians who set up their outreach work stations in or near your office building throughout the year.



Photos by Doreen B. Zudell  
GRC-2020-CN-00006

*Zudell, center, demonstrates the new online research tool to Jim Robinson (left), and Sedor.*



GRC-2020-CN-00008

*Pertz, center, standing, talks with patrons Dawn Parker, left, and Ken O'Connor, about library services.*



GRC-2020-CN-00007

*Sedor, standing, assists patron Laura Kudma in the Learning Center.*

### At Your Service

Library, History and Records Supervisor, Robin Pertz, 3-5576  
 Science Librarian, Jillien Zudell, 3-8058  
 Internal Library Loan, Marcia Stegenga, 3-8305  
 Documents and Standards, Janis Dick, 3-5781  
 Learning Center, Kathy Hamilton, 3-2998  
 Resource Coordinator, Dawn Sedor, 3-2495

By Doreen B. Zudell

# Quantum Technologies Change the Face of Unmanned Aircraft Communications



GRC-2019-C-09878

*NASA Twin Otter research aircraft with QKD device attached to its underbelly.*

Photos by Jef Janis

On the underbelly of a Twin Otter research aircraft, a laser communication device stares out into the open skies over Cleveland. It is not a camera taking images, but rather has eyes only for particular optical communication frequencies forming the foundation to a quantum key distribution (QKD) system being tested at NASA Glenn for use on unmanned aircraft (UA).

The number of UA in the national airspace is growing and their ability to communicate with ground operators and each other is critical to a safe environment. But the increase in traffic is leading to an increase in communications disruptions because too many vehicles are trying to use the same limited number of frequencies.

QKD uses specialized laser and photon detector technology to enable UA to exchange encryption keys to communicate on extremely secure radio-frequency channels. In addition, an optical channel provides a high-data-rate communication link for high-bandwidth applications.

The QTech (Quantum Technologies) project, a partnership of Glenn and NASA's Ames, along with New

York's Air Force Research Laboratory and IJK Controls LLC, is attempting to harness the power of quantum technologies to ensure communication availability and address potential cybersecurity challenges.

The laser communication hardware attached to the aircraft has performed successfully in aircraft flight tests, and researchers hope to continue advancing state-of-the-art QKD technology focusing on simulated UA flight applications in a variety of environments.

By Nancy Smith Kilkenny



GRC-2019-C-09848

*Close-up of the QKD device*



## Coming Soon: New Agency STI System

Glenn will start using the new agency solution, Scientific, Technical and Research Information discoVEry System (STRIVES), for all scientific and technical information (STI) reviews/approvals on March 16. STRIVES will replace the current Electronic Document Availability Authorization (EDAA) system.

### IMPORTANT DATES:

- March 16—All NF1676 forms are required to be submitted in STRIVES.
- April 1—Approvers last day to approve forms in the EDAA/NF1676 system.
- April 1—All corrected final documents must be received by the Glenn STI Office for final processing.

### ACTIONS:

- **Submitters**—Ensure all STI submitted via the EDAA system is completed by April 1. STI submissions that have not received final review and final processing by the Glenn STI Office by April 1 will need to be re-created and re-submitted in STRIVES for full review.
- **Approvers**—Monitor your EDAA queue to complete appropriate reviews and final actions.
- **Submitters and Approvers**—Access EDAA at <https://stidaa.nasa.gov> for remaining forms in your queue that need attention to move the form(s) to the next stage in the approval routing.
- **Submitters and Approvers**—Access STRIVES to submit STI beginning March 16. Check the Glenn STI website for STRIVES link.

Updates will be posted on the Glenn STI Program website: <https://ltidportal.grc.nasa.gov/STINews.aspx>. If you have additional questions, please contact Kim Schuetz, Glenn DAA Representative, at 3-5803.

## State Officials, Industry Advocates Visit



Photo by Jef Janis  
GRC-2020-C-00187

Mike Barrett, left, highlights Glenn's solar electric propulsion technology during a tour for members of the Ohio Aerospace and Aviation Technology Committee, Northeast Ohio legislators and industry on Jan. 16. They met with center management for a general discussion of challenges and opportunities and toured several facilities. Lt. Gov. Jon Husted provided remarks emphasizing the state's strong support for the aerospace industry and applauded the research and testing conducted at Glenn. In the afternoon, guests attended a public meeting at the Ohio Aerospace Institute.

# Ensure Your Wireless Connectivity

The agency rolled out two new networks across all NASA centers to improve the consistent experience, enhance capabilities and better manage the devices accessing NASA's environment.

- The network “nasa-connect” replaces “nasaguest” as the single wireless option for guests, partners, employees and contractors with personal devices to connect. Personal devices can be connected by visiting [id.nasa.gov](https://id.nasa.gov) and selecting “Register My Non-NASA Device” under the “Popular Actions” menu. Sponsors can help their guests and visitors connect to the network by visiting [idmax.nasa.gov](https://idmax.nasa.gov) and submitting a NAMS request for a Guest User Account under the “Identities” tab. The legacy “nasaguest” network will be decommissioned in April.
- Authorized NASA-provided equipment with NASA certificates or mobile device management (MDM) software installed will be transitioned from nasa to nasa-device. Enterprise-managed Windows devices should already have transitioned to the new network; Mac and Linux users will be emailed specific instructions later this year.

If you have any questions or concerns, contact the Enterprise Service Desk at 877-677-2123 (Option 2).



## NEWS AND EVENTS



### Free Code Depository

Glenn's Office of the Chief Information Officer is offering programmers a no-cost web-based DevOps life cycle tool called GitLab. This single-complete application helps teams accelerate software delivery from weeks to minutes, reduces development costs and decreases the risk of application vulnerabilities while increasing developer productivity. For more information, visit <https://www.grc.nasa.gov/ocio/services/applications/infrastructure/code/gitlab/>.

## Employees Named AIAA 2020 Fellows

The American Institute of Aeronautics and Astronautics (AIAA) has selected **Dr. Dhanireddy R. Reddy** and **Christopher J. Pestak** into its Class of 2020 AIAA Fellows and Honorary Fellows. AIAA confers the distinction of “Fellow” to recognize individuals for notable and valuable contributions to the arts, sciences or technology of aeronautics and astronautics.

Reddy is deputy chief of NASA Glenn’s Propulsion Division, Research and Engineering Directorate. Pestak is director of the onsite Universities Space Research Association (USRA), supporting Glenn’s Research and Engineering and Space Flight Systems Directorates.



Dr. Reddy



Pestak

## Remembering the Heroes of Space Exploration



Michael Ciannilli, pictured, NASA’s manager of the Apollo, Challenger, Columbia Lessons Learned Program, served as guest speaker for Glenn’s Day of Remembrance observance, held Jan. 30 in the Briefing Center. Ciannilli talked about the importance of gathering, preserving and loaning artifacts of these tragedies for lessons learned research and academic purposes. He stressed that the goals of the program are to remember the men and women who have paid the ultimate sacrifice and to minimize chances of tragedy ever happening again.



GRC-2020-C-00588

Photo by Jef Janis

On Jan. 28, astronaut Douglas Wheelock, Safety and Mission Assurance lead at Plum Brook Station, visited Akron’s Judith Resnik Elementary School. That day marked the 34th anniversary of the death of the school’s namesake, astronaut Judy Resnik, who died in the Space Shuttle Challenger accident. Wheelock recognized Resnik’s contributions and shared some of his own experiences in space. He encouraged students to value their teachers and work with them to achieve great things.



CN-2020-C-00009 Photo by Mike Cardew, Akron Beacon Journal

*Wheelock used a basketball and a tennis ball to illustrate how classroom cooperation aids teachers in helping students to achieve greater heights.*

## PROMOTIONS



*McVetta*

**Michael McVetta** has been selected Space Simulation Facility manager in the Management Integration Division, Facilities, Test and Manufacturing Directorate. McVetta most recently worked in the Test Facility Management Branch as a facility management engineer in the space simulation area.

**Deborah L. Waters** has been selected chief of the Test Facility Management Branch in the Management Integration Division, Facilities Test and Manufacturing Directorate. Waters has served in an acting capacity for this position over the past 7 months.



*Waters*

## RETIREMENTS

**Roland C. Gregg**, Space Environments Test Branch, Testing Division, retired Feb. 29, 2020, with 31 years of service.

### Retiring soon?

Share your retirement in AeroSpace Frontiers.  
Fill out the GRC431 form and send it to  
[Doreen.B.Zudell@nasa.gov](mailto:Doreen.B.Zudell@nasa.gov).

## IN APPRECIATION

Shouting out to all who shared their goodbyes before I retired!

I was blown away by the number of people who sent emails, stopped by to reminisce and called giving thanks for my years of service. Words cannot express the gratitude I felt for all the attention, time, gifts and the work my manager and co-workers contributed to make me feel appreciated and loved.

I sincerely thank you all.

—Cynthia Phillips

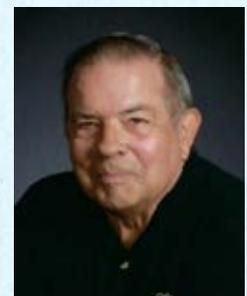
## MORE THAN A MEMORY



*Arcuri*

**Karen L. Arcuri**, a 2002 retiree with 40 years of federal service, died Jan. 18. Arcuri worked at the U.S. Department of Veteran Affairs in Michigan before she transferred to the NASA workforce in 1990. During her tenure at Glenn, Arcuri earned several performance and service awards as a supervisory human resources specialist in the Human Resources Division.

**John E. Eckert**, 80, a 1999 retiree with 38 years of NASA service, died Jan. 13. Eckert was a veteran of the U.S. Marine Corps. He served at NASA Lewis (Glenn) as a research laboratory mechanic leader in the Aero Space Flight Area, Test Installations Division. His son, John F. is an electronic lead technician supporting the Wind Tunnel Test Branch.



*Eckert*

# NASA GLENN RESEARCH CENTER

# 2020

## Speaker Series

# NASA IN YOUR LIFE



Learn more about NASA's new missions and how the agency is making life better on Earth through science, technology, engineering and mathematics (STEM)!

### Scheduled Events:

March 14, 11:45 a.m. to 12:45 p.m.

Leah Nakley, Erin Rezich and Dr. Tiffany Williams  
Women in Science Day Career Conversations  
Cleveland Museum of Natural History

March 25, 8 a.m. to Noon

Robyn Gordon  
Women in Leadership Symposium  
National Diversity Counsel  
Case Western Reserve University

April 21, 6 to 7:30 p.m.

Dr. Joel Kearns  
Learn From Leaders Series  
Lakeland Community College

### Coming Soon:

May 14

Global Aerospace Summit  
Ohio Aerospace Institute

June

International Space Station  
20 Years of Living in Space  
Cuyahoga County Public Library

Visit [NASA.gov/GlennSpeakerSeries](https://www.nasa.gov/GlennSpeakerSeries) for more details.  
Additional events will be added throughout the year.



### GSEL MOBILE LIBRARIAN

The Glenn Science and Engineering Library (GSEL) Mobile Librarian will be visiting bldg. 86 on March 17 and 19; bldg. 110 on March 24, 26, 31 and April 2; and bldg. 162 on April 7 and 9. The hours are from 1 to 3 p.m. A Glenn reference librarian will be ready to assist employees with subject searches, finding specific books and articles and other information needs on the spot.

POC: Robin Pertz, 3-5776

### ASTRONAUT RECRUITMENT

NASA is accepting applications through March 31 for a new class of Artemis Generation astronauts! For educational and professional requirements, apply to #BeAnAstronaut at [www.usajobs.gov](http://www.usajobs.gov).

### OUTDOOR SIREN TESTING

The Emergency Management Office staff will conduct a mass notification "voice" test at bldg. 39 on Wednesday, April 1 at Lewis Field. An audible siren test will be conducted on the "emergency condition" tone on Saturday, April 4.

POC: Allen Turner, 3-6826

### IFPTE LOCAL 28, LESA MEETING

LESA will hold its next membership meeting, Wednesday, April 8, noon, in the Glenn Employee Center's Small Dining Room.

Deadline for next calendar section is **March 18, 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

Plum Brook Station

3597 E. Scheid Road  
Sandusky, Ohio 44870

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

Read AeroSpace Frontiers online at <http://www.nasa.gov/centers/glenn/news/AF/index.html>.



# SHIIVER: Changing the Way NASA Keeps It Cool



Photo by Bridget Caswell  
GRC-2019-C-08026

*SHIIVER, a 13-foot in diameter test tank, sits inside the In-Space Propulsion Facility's vacuum chamber at Plum Brook Station.*

When deep space exploration missions launch, like NASA's future Artemis missions to the moon, they carry liquids with them for fuel and life support systems. These liquids are stored at cryogenic temperatures, ranging from  $-243$  to  $-423$  degrees Fahrenheit. They need to remain cold and in a liquid state to be usable. But as the extreme environment of space warms a spacecraft, the fuels begin to evaporate or "boiloff."

To combat boiloff, an eCryo project team at Glenn is evaluating a series of technologies aimed at reducing the boiloff losses for human exploration missions. To test some of these new technologies at a relevant scale, the team built a 13-foot-in-diameter cryogenic propellant tank called SHIIVER, or Structural Heat Intercept, Insulation, and Vibration Evaluation Rig.

"SHIIVER is the largest research tank NASA has ever built to test cryogenic technologies, and demonstrating the scalability is a critical aspect of infusion to in-space cryogenic propellant applications," said Hans Hansen, eCryo project manager at Glenn.

Glenn engineers just completed a series of thermal vacuum tests on SHIIVER inside the In-Space Propulsion Facility at Plum Brook Station. The tests assessed some interesting benefits of vapor-cooling and multilayer insulation performance for in-space conditions.

To learn more about the promising results from SHIIVER, link to the full story by Jimi Russell on Glenn's website at <https://go.nasa.gov/31sgAOE>.

## Emergency and Inclement Weather Lines

Lewis Field: 216-433-9328 (WEAT)  
Plum Brook Station: 419-621-3333

## Connect With Glenn

