



# AeroSpace FRONTIERS

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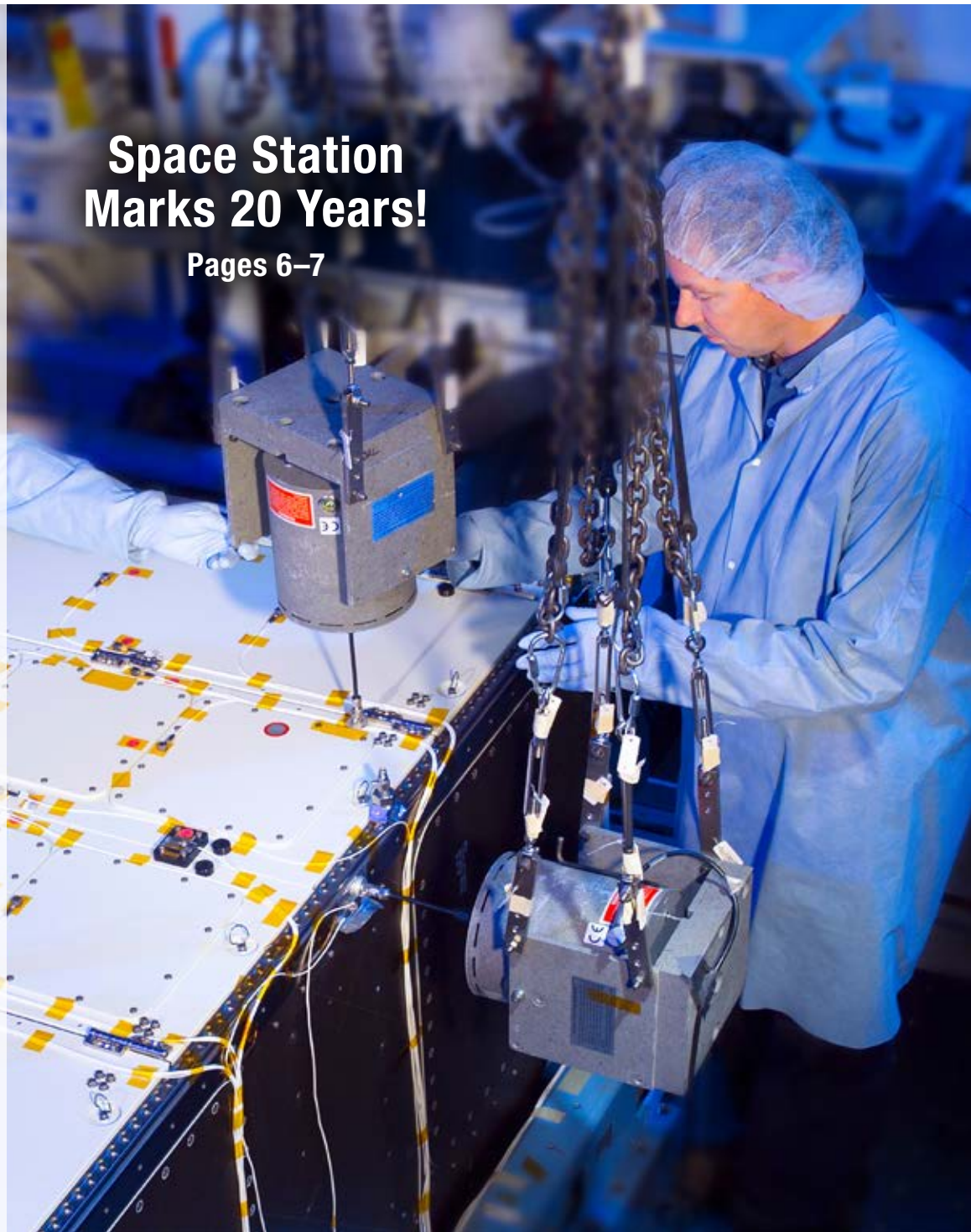
## Space Station Marks 20 Years!

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## Online Safety

Thank you for your participation at our recent Safety and Health Awareness Event and your continued diligence to physical safety and health amidst the pandemic. Working remotely also requires our attention to online safety and cybersecurity. This month, join me in observing Cybersecurity Month. I encourage you to engage in the various events planned. Check out [Today@Glenn](#) for ways you can participate.

Practicing online safety and cybersecurity vigilance helps ensure 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 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).

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# Inside NASA's Pandemic Response Campaigns

In mid-March, much of the country shut down in response to the rapidly spreading novel coronavirus (COVID-19). NASA centers found ways to refocus their skills and technologies to address the pandemic. As rates of infection and hospitalization again tick upward in many states, several of the solutions NASA field centers developed in the spring now teeter on the verge of widespread application.

When a team of engineers at NASA's Jet Propulsion Laboratory in southern California learned doctors nearby needed ventilators, they got to work right away. They set out to design an inexpensive version that would not use any of the same parts as traditional ventilators, to avoid competing for supplies.

At NASA's Johnson Space Center in Houston, the Technology Transfer Office combed through more than 2,000 technologies and software programs looking for anything that might be useful in confronting the health crisis. The center submitted 34 open-source technologies to the United Nations. The center is also helping a handful of groups update and manufacture a simple, human-powered ventilator originally designed for the space program.

Meanwhile, NASA's Armstrong Flight Research Center in Edwards, California, joined a local public-private task force with a hospital and college, a neighboring city, and two spaceflight companies. They ended up patenting an improvement to an oxygen helmet for COVID-19 patients.

When NASA Glenn heard that a familiar company was working to update a device for sterilizing medical equipment and spaces, the center jumped in to help.

In all these cases, NASA and its partners found that with a little guidance, aerospace engineers also make pretty good medical engineers. To learn about these projects, visit <https://go.nasa.gov/32ziTQv>.

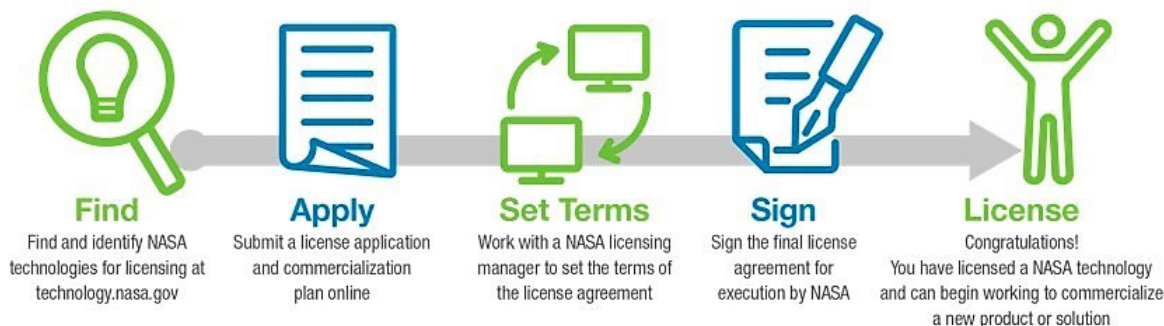


GRC-2020-C-02365

Photo by Gordon Berger

*Glenn's Claire Fortenberry, standing, and Rosa Padilla track data on the laptops during testing on the AMBUstat system. The lights are out because videotaping the disinfectant spray plume and the resolution is much better in a dark environment (the spray is backlit).*

## How to License NASA Technology



## Glenn Breaks Record for Technology Transfer Licenses!

NASA Glenn achieved a record-breaking number of licenses signed in a fiscal year. The Technology Transfer Office (TTO) signed 27 licenses during fiscal year 2020—beating the record of 23 set in 2016!

Licenses reside under five categories. Of the five licenses, four different types were signed this year: Research License (13), Government Use License (6), Data Usage Agreement (3), and Commercial Exclusive License (5).

“2020 turned out to be a pretty exciting year in terms of licensing GRC’s technologies,” said Amy Hiltabidel, licensing manager, TTO. “Folks are finding our technology in a number of ways—agency website and marketing efforts, our inventors’ contacts, and directly contacting the staff at the TTO. What this means is GRC’s technologies are very relevant and highly sought for industrial applications. Our goal for 2021 is maintaining and expanding these important relationships.”

There were five licenses signed for Glenn’s Small Solar Electric Propulsion (SSEP) technologies. This is the most innovative license that Glenn offers because it includes design drawings, patents, test data, and more, unlike a traditional license. This license is designed to assist U.S. companies in becoming major competitors in solar electric propulsion.

Gabriel Benavides, Electric Propulsion Systems Branch, leads the effort in transferring SSEP technologies. Companies are licensing this technology to use in propulsion systems for satellites, including helping underserved communities access wireless internet.

Three technologies were licensed for the first time. Soft magnetic materials (LEW–19859–1) was invented by members of the Materials and Structures Division, Alex Leary, Randy Bowman, Ronald Noebe, Vladimir Keylin, and Grant Feichter. Soft magnetic materials can be easily magnetized and de-magnetized. These materials are ideally suited for power electronics where space and weight are a premium.

### Licensing Opportunities

- **Government Use License:**
  - o Leverage NASA technologies for government-funded projects.
- **Commercial License:**
  - o Secure rights to make and sell products based on NASA technologies.
- **Data Usage Agreement:**
  - o Used when the intellectual property is not patented, it allows for NASA to share data or other info that is not available in the public domain.
- **Startup NASA License:**
  - o License patented technologies with favorable terms for startups.
- **Research License:**
  - o “Test drive” the commercial viability of NASA technologies with minimal risk.

Multi-Parameter Aerosol Scattering Sensor (LEW–18634–1) was invented by Engine Combustion Branch members Paul Greenberg and David Fischer. It is an aerosol-detection system that characterizes atmospheric particles, enabling real-time environmental monitoring often critical for public safety. The multi-parameter aerosol scattering sensor was originally developed to demonstrate a highly accurate, low-false-alarm, early fire detection system in space.

Temperature and Pressure Sensors (LEW–18614–1) was invented by Jeffrey Eldridge, Optics and Photonics Branch. These are noncontact, ultra-bright luminescence-based surface temperature mapping and sensing systems capable of operating in environments with extremely high thermal radiation.

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>.

# *Games, Entertainment, and More*

## Glenn Hosts First Virtual Center Picnic

For years, Glenn’s annual summer picnic has encouraged employees to take a much-deserved break and spend time together in an informal setting. But how do you gather when the majority of the workforce is teleworking?

On Aug. 18, center leadership and a very creative and determined team of employees from across the center, blazed the trail for the first Virtual Center Picnic. The event included virtual welcome presentations by Center Director Dr. Marla Pérez-Davis and senior managers, online games and activities, and a magician. Prior to the event, employees submitted photos for favorite quarantine and virtual vehicle show contests.

“The picnic is one of the ways our leadership thanks employees and interns for their commitment to the center and the NASA



GRC-2020-C-02127

Photo by Dennis Brown

*Center Director Dr. Pérez-Davis welcomes employees and kicks off the virtual event.*

mission,” said Betsy Lavelle, picnic lead, Logistics and Technical Information Division. “They thought it would be nice to continue celebrating our employees in a new way.”

According to Lavelle, the 40-member committee met for weeks to brainstorm ideas for activities that would work in a virtual environment. “I was amazed and excited at the enthusiasm and creativity of the team members while expressing their commitment to doing what was necessary to provide a fun and inviting event,” she said.

Special thanks to the Office of Chief Information Officer for enabling it all to happen!

By Doreen B. Zudell



GRC-2020-C-02131

Photo by Dennis Brown

*Ambassador and emcee Gretchen Morales-Valle, right, introduces Center Operations Directorate managers, Robyn Gordon, top, and Seth Harbaugh (Senior Leadership Champion for the picnic).*



GRC-2020-CN-00062

Photo by Michael Cuy

*Vehicle Show People’s Choice: Michael Cuy’s homebuilt in 1998 Pietenpol Air Camper.*



GRC-2020-C-02135

Photo by Dennis Brown

*Plum Brook Station Director Dave Stringer joins senior managers in creative greetings.*

## Online Activities

### ***Favorite Quarantine Photo***

Candice McDonald

### ***Vehicle Show***

People's Choice: Michael Cuy  
Antique Class: Michael Howard  
Muscle Car: Pat Spanos  
Sports Car: Allen Turner  
Truck/SUV: Frank Bremenour  
Boat: Sarah Phillips  
Motorcycle: Jeremiah O'Callahan

### ***Test Your Knowledge***

John Brodt  
Dan Brown  
Paula Umlauf

### ***Star Trek Trivia Group***

Research and Engineering Directorate

### ***Star Wars Trivia Group***

Office of Technology Incubation and Innovation

### ***Pop Culture Trivia Group***

NASA Safety Center

### ***NASA Trivia Group***

Safety and Mission Assurance

### ***Scavenger Hunt #1***

Erin Wood

### ***Scavenger Hunt #2***

Aaron Anderson

### ***Who's Who?***

Maria Babula  
David Friedlander  
Jeannette Owens  
Sarah Phillips  
Joe Saus  
Megan Sorrelle  
Sharon Wallhead  
Cherie Westbrooks  
Cathy Wilson



GRC-2020-C-02308

Photo by Yvette Graham

*Favorite Quarantine Photo: Dr. Candice McDonald, right, and friend/neighbor Heidi Vance slimed in a homemade double-dare-style showdown!*



GRC-2020-C-02413

Photo by Imaging Technology Center

*The 2020 Glenn Virtual Center Picnic Planning Team.*

*First Crew Arrived Nov. 2, 2000*

# International Space Station Celebrates 20th Anniversary

## Center Archivist Robert Arrighi looks back at Glenn's impact on the orbiting laboratory.

On Dec. 3 and 4, 2000, the crew of Space Transportation System (STS-97) unfurled the first permanent solar arrays on the International Space Station. The football-field-sized collection of 32,800 reflective solar cells instantly made it one of the brightest objects in the night sky and the largest electrical power system (EPS) ever in space. The vision and engineering excellence of the Lewis Research Center (now Glenn) has played a significant role in space station from inception until today, most notably the development of the EPS.

President Reagan formally initiated the Space Station Freedom (SSF) program in January 1984. Soon after, 24 Lewis engineers relocated to Houston to participate in a year-long agency effort to define the space station's requirements. NASA divided the SSF project into four work packages and assigned the critical electric power package to Lewis.

The EPS is essential for maintaining the station position, operating electronics, and conducting experiments. Lewis created the SSF Directorate to devise a startup system for the space station and develop the permanent solar array or a solar mirror and integrate it into various designs. For the next few years, Lewis strove to develop a system to meet the space station's ever-changing power requirements and configurations. This included design, construction, and testing of the power generation, storage, and distribution systems.

NASA Lewis developed cathodes for the plasma contactor that prevented electrical charge buildups and nickel-hydrogen batteries that stored electrical energy for use during the eclipse period of orbit. Engineers verified the operation and deployment of space station's radiator panels and electronics at Plum Brook's Space Power Facility.

Lewis led the agency's cooperative efforts with the Russians for several years. Their launch vehicles experts

made several trips to Moscow in 1992 to evaluate pairing the Russian Soyuz spacecraft with U.S. launch vehicles to serve as a rescue vehicle for SSF. They also determined that the space station's orbital inclination had to be altered to accommodate Russian launch vehicles. President Clinton ordered an overhaul of the design in early 1993. Lewis personnel served on the team that reconfigured the design, and by December 1993, Russia became a full partner.

Construction of the space station began in 1999. On Nov. 2, 2000, NASA's William Shepherd and cosmonauts Sergei Krikalev and Yuri Gidzenko initiated a 20-year period of uninterrupted human presence on the orbiting laboratory.

The Fluids and Combustion Facility (FCF), consisting of two modular, reconfigurable racks, was permanently installed on space station, between 2008 and 2009, to conduct research remotely on physical and biological experiments. The Combustion Integration Rack (CIR) continues to be critical in research on fire safety and methods for suppressing fires in space. The Fluids Integration Rack (FIR) enables investigators from multiple disciplines to integrate or configure components of their experiment(s) similar to those in ground laboratories. Glenn also introduced a new treadmill harness design for crewmembers' enhanced comfort and loading during treadmill exercise in space.

In 2010, the Space Communications and Navigation testbed was launched and installed aboard space station to serve as an on-orbit, software-defined radio (SDR) communication system. It assessed risks and transmitted signals to work around unexpected hardware or system failures. The technology has evolved into a successful commercial product line for global aircraft tracking on the Iridium satellite network.

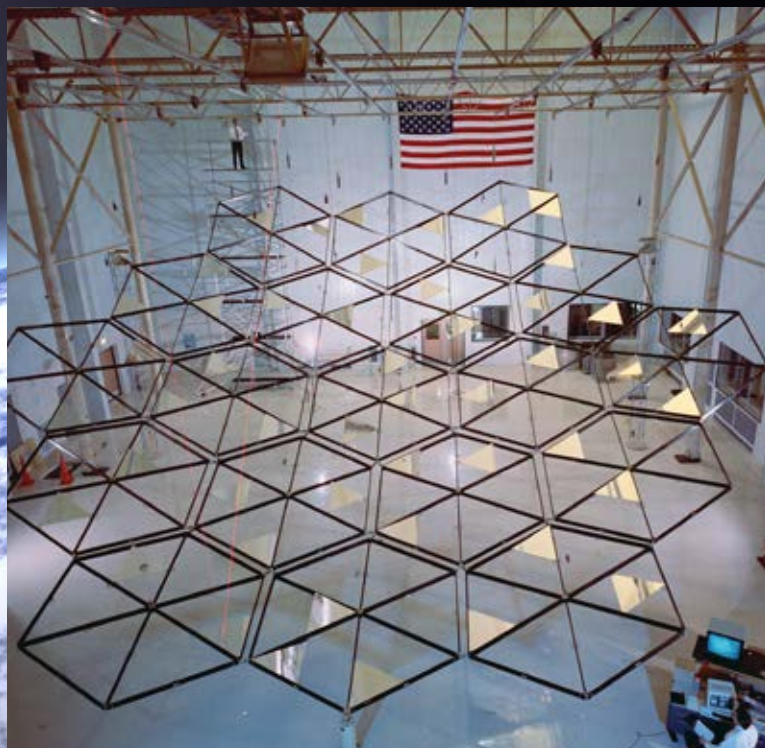
Glenn remains active in space station operations by continually monitoring the power system, utilizing the SPACE computer code to predict the power level for

each orbit and configuration, and maintaining the overall health of the astronauts. The center leads the agency in developing electric propulsion technologies—solar and nuclear—to help government and commercial customers extend space station’s life and enhance opportunities for exploration in low-Earth orbit and beyond.

By Robert Arrighi



20 Years on the International Space Station



GRC-2005-C-08656

Photo by Quentin Schwinn

*This 1989 photo shows testing at Plum Brook Station of the football-field-sized Solar Dynamic Collector for Space Station Freedom.*



GRC-1984-C-02957

Photo by John Marton

*Ronald Thomas, future head of the Space Station Freedom Directorate, shortly before the center was assigned responsibility for designing the space station’s power system in June 1984.*



GRC-2000-C-00279

Photo by Christopher Lynch

*Space Station radiator panels deployed in Plum Brook’s Space Power Facility in 2000. Pictured, left to right: Christopher Rauch, Larry Johnson, and Thomas Jares.*

GRC-2005-C-00892

Photo by Marvin Smith



**On the Cover:**

*Pictured are Kim Otten, left, and Mark McNelis, testing the Fluids and Combustion Integration Rack in the Structural Dynamics Laboratory for the International Space Station in 2005.*

# Glenn Technology Chosen for FedTech Startup Studio



*People's Choice Pitch Night trophy.*

The Smart Tire Company was the People's Choice award winner among eight business plans showcased at the FedTech Startup Studio Pitch Night, Sept. 2. The presentations detailed plans to launch a new product or process applying cutting-edge NASA technologies. The winning team chose the Superelastic Tire, one of six Glenn breakthrough technologies brainstormed for applications during the 8-week accelerated studio startup program. Their plan is to create a Shape Memory Alloy Radial Technology (SMART) Superelastic, revolutionary nonpneumatic (airless) tire that is lighter, stronger, and longer lasting to support renewable/terrestrial development. Harvey Schabes, Glenn's Tech Transfer Office chief, said the center is following up with the entrepreneurs to explore partnerships and commercial opportunities.

## NEWS AND EVENTS

*100th Anniversary of Women's Right To Vote*

### NASA Personalizes Women's Equality Day

Glenn hosted screenings of the movie "Hidden Figures" for employees across the agency as part of several NASA activities celebrating Women's Equality Day, Aug. 26, and the 100th anniversary of women's constitutional right to vote. The movie showcased the outstanding contributions of a group of African-American women, led by Katherine Johnson and Mary Jackson, who were recently honored in the renaming of two NASA facilities. NASA also provided a YouTube.com video "The Past, Present, and Future of Women in Space." It featured a panel of NASA women in STEM careers, who shared their stories and emphasized the value women add to the agency's missions.





*Preparing For After a Disaster*

# Virtual Security Day Focuses on Personal Emergency Preparedness



How do you protect yourself and your loved ones when faced with a major emergency? During NASA Glenn’s Virtual Security Day, Aug. 25, the message was clear: It all starts with a plan.

Center Director Dr. Marla Pérez-Davis and Protective Services Office Chief Christi Tomaro stressed the importance of personal emergency preparedness in their opening comments. Tomaro then introduced the keynote speaker Jacob Margolis, science reporter and host of the podcast “The Big One: Your Survival Guide.”

Margolis shared first-hand knowledge of what it was like for his family and him to live through two major earthquakes that rocked southern California in the summer of 2019. He explained why, depending on the severity of a disaster, local communities and federal agencies may not be able to immediately provide assistance.

“You can advocate for better preparedness in your community, but it’s up to you to prepare for the safety of you and your family,” he said. “Have a conversation with your family about the items you will need to stay comfortable after a disaster.”

Along with water, food, medicine, and allowing for pets’ needs, Margolis recommends documents that prove home ownership and insurance. He also advises having a contingency plan with family, friends, and neighbors in case you lose contact with one another.

Margolis, along with Glenn’s Emergency Management Specialist Allen Turner, answered employees’ questions relating to emergency preparedness.

Margolis recommended listening to his free podcast: “The Big One: Your Survival Guide,” which takes you through real scenarios of what can happen during a disaster and what you can do to survive. He said the Department of Homeland Security’s “Make a Plan” website at <https://www.ready.gov/plan>, will guide you and your family through an emergency preparedness plan.

By Doreen B. Zudell



*Keynote speaker Margolis*



*Oberhaus*

**Oberhaus Recognized**

During Glenn’s Virtual Security Day, the Protective Services Office recognized Phillip Oberhaus (GSVC) for his dedication and support to the office.

## PROMOTIONS



Lane

**Janet Lane** has been selected chief of the Facility Program Management Branch in the Management Integration Division, Facilities, Test and Manufacturing Directorate. Lane has extensive experience leading efforts to assist Glenn in sustaining infrastructure capabilities and operations supporting the center's Master Plan.

**Jennifer Thomas** has been selected chief of the Environmental Management Office in the Facilities, Test and Manufacturing Directorate. More recently, under Leidos, Thomas served as Environmental Program manager for the Construction, Maintenance, Environmental, and Testing Services contract, leading efforts to ensure Glenn environmental compliance.



Thomas

## RETIREMENTS



Dr. Hurwitz

**Dr. Frances I. Hurwitz**, Materials Chemistry and Physics Branch, retired Sept. 2, 2020, with 40 years of NASA experience.

**William Schoren**, Reliability and Safety Engineering Branch, retired Sept. 30, 2020, with 35 years of federal service, including 32 with NASA.

## Children's Artwork Wanted for Calendar Contest

The Commercial Crew Program is holding an artwork contest now through Oct. 28 for children ages 4 to 12. The winning artwork will be used to create a 2021 calendar, which has a different space-related theme each month. For more information about the competition's themes, rules, deadlines, and entry form, visit <https://contest.sciartexchange.org/NASA-crew-calendar-2021/>.



## MORE THAN A MEMORY



Stankiewicz

**Norbert Stankiewicz**, 86, a 1994 retiree with 33 years of NASA service, died Sept. 5. He served as physicist/mathematician supporting the plasma power generation section of the Electromagnetic Propulsion Division early in his NASA career before switching to projects in the Spacecraft Communications Division. Stankiewicz supported development of the high-efficiency Traveling Wave Tube for satellite communications and other communications technologies in the Microwave Amplifier Branch and Electron Beam Technology Branch. His daughter, Michelle Wimmer (BQMI), works in the NASA Safety Center and grandson, Andrew Wimmer (ZINT), works in Glenn's ISS & Human Health Branch.

# Upcoming Center Events

## National Cybersecurity Awareness Month Event



**Date: Tuesday, Oct. 20**

**Webinar: The Wild West: Hacking Today and Protecting Yourself**

See Today@Glenn for link.

**Time: 10 to 11 a.m.**

**Speaker: David Kennedy, Founder of TrustedSec**

Sponsored by Glenn's Office of Chief Information Officer

**POC: Carol Brown, 216-433-2730**

Please note that no registration is required to attend, since credit will not be given for attendance as has happened in the past. Instead, all employees will need to complete the mandatory Cybersecurity & Sensitive Unclassified Information Awareness course in SATERN.

For more information, visit

<https://www.grc.nasa.gov/ocio/services/it-security/protect/awareness-and-training/it-security-training/cyber-security-awareness-month/>



### HISPANIC AWARENESS

Hispanic Awareness Month is Sept. 15 through Oct. 15. Glenn's Hispanic Advisory Group has created an inspirational cookbook that features recipes, background about the recipes, and highlights of Hispanic/Latino individuals who contributed to public service. This book will be available for all employees. Check Today@Glenn for details. POC: Ashley Cantor, 216-433-5159

### VIRTUAL COFFEE AND CONVERSATION

The Glenn Science and Engineering Library will host a virtual Coffee and Conversation with NASA'S Mishap Investigation Program Executive Ken O'Connor. Join them in Microsoft Teams on Wednesday, Oct. 21, from 11 a.m. to 12 p.m., to hear about O'Connor's career. See Today@Glenn under Upcoming Events for the link. POC: Robin Pertz, 216-433-5776

### DISABILITY EMPLOYMENT AWARENESS

Glenn's 2020 National Disability Employment Awareness Month will feature 508 Coordinator Jill Noble on Oct. 27, from 10 to 11 a.m., via Microsoft Teams. Noble will demonstrate various assistive technology and devices for individuals with disabilities. This event is sponsored by the Disability Awareness Advisory Group and the Office of Diversity and Equal Opportunity. Check Today@Glenn for details. POC: Angela Pierce, 216-433-2813

### OUTDOOR SIREN TESTING

The Emergency Management Office staff will conduct a mass notification voice test at bldg. 87 on Wednesday, Nov. 4, at Lewis Field. They will conduct an audible siren test on the "all clear" tone on Saturday, Nov. 7. POC: Allen Turner, 3-6826

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



## Expedition Astronaut Dr. Drew Morgan Talks With Glenn

During a virtual visit with Glenn employees on Sept. 16, Col. Andrew “Drew” Morgan, M.D., discussed his experiences living and working aboard the International Space Station. He served as flight engineer for Expeditions 60, 61, and 62.

“Today is a special opportunity to learn how the work we do here at NASA Glenn continues to impact human spaceflight and to learn the benefits space exploration brings back to Earth,” said Dr. Marla Pérez-Davis in her welcoming remarks.

Morgan was selected as a NASA astronaut in June 2013. He launched from the Baikonur Cosmodrome aboard the spacecraft on July 20, 2019—the 50th Anniversary of the Apollo 11 Moon landing. After safely arriving at the International Space Station, he settled in for a 9-month stay.

“I wish more than anything I could be there with you in person,” Morgan said in his opening remarks. “I like to think of NASA Glenn as my home center,” he added, reflecting on a number of his connections to the center. He mentioned some of those connections noting, “As a result of that, NASA Glenn is my home center,” he said.

Morgan and his fellow crewmembers contributed to hundreds of experiments in biology, Earth science, human research, physical sciences, and technology development.

“We are grateful to Drew for his operations support of our Fluids and Combustion Facility,” said Dr. Pérez-Davis. Prior to this briefing, he met with some of our microgravity science teams to discuss the results of their work. Morgan also benefited from the comfort of the “Glenn Harness,” while exercising on the space station’s treadmill.

Morgan talked about his rigorous astronaut training, and the camaraderie among his 2013 astronaut class. “I was fortunate to fly together on ISS with four members of my class,” he said.

He then narrated a video highlighting his journey including an inside look at living and working aboard the space station and breathtaking views of Earth. His personal comments shared the depth and range of emotions he experienced.

After the presentation, Glenn NextGen Ambassador Stephanie Booth, Secure Networks, System Integration and Test Branch, led a question-and-answer session with employees.



*Booth, left, leads the question-and-answer session with Dr. Morgan, right.*

“Today is a special opportunity to learn how the work we do here at NASA Glenn continues to impact human spaceflight and to learn the benefits space exploration brings back to Earth,” said Dr. Marla Pérez-Davis in her welcoming remarks.

By Doreen B. Zudell

### Emergency and Inclement Weather Lines

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

### Connect With Glenn

