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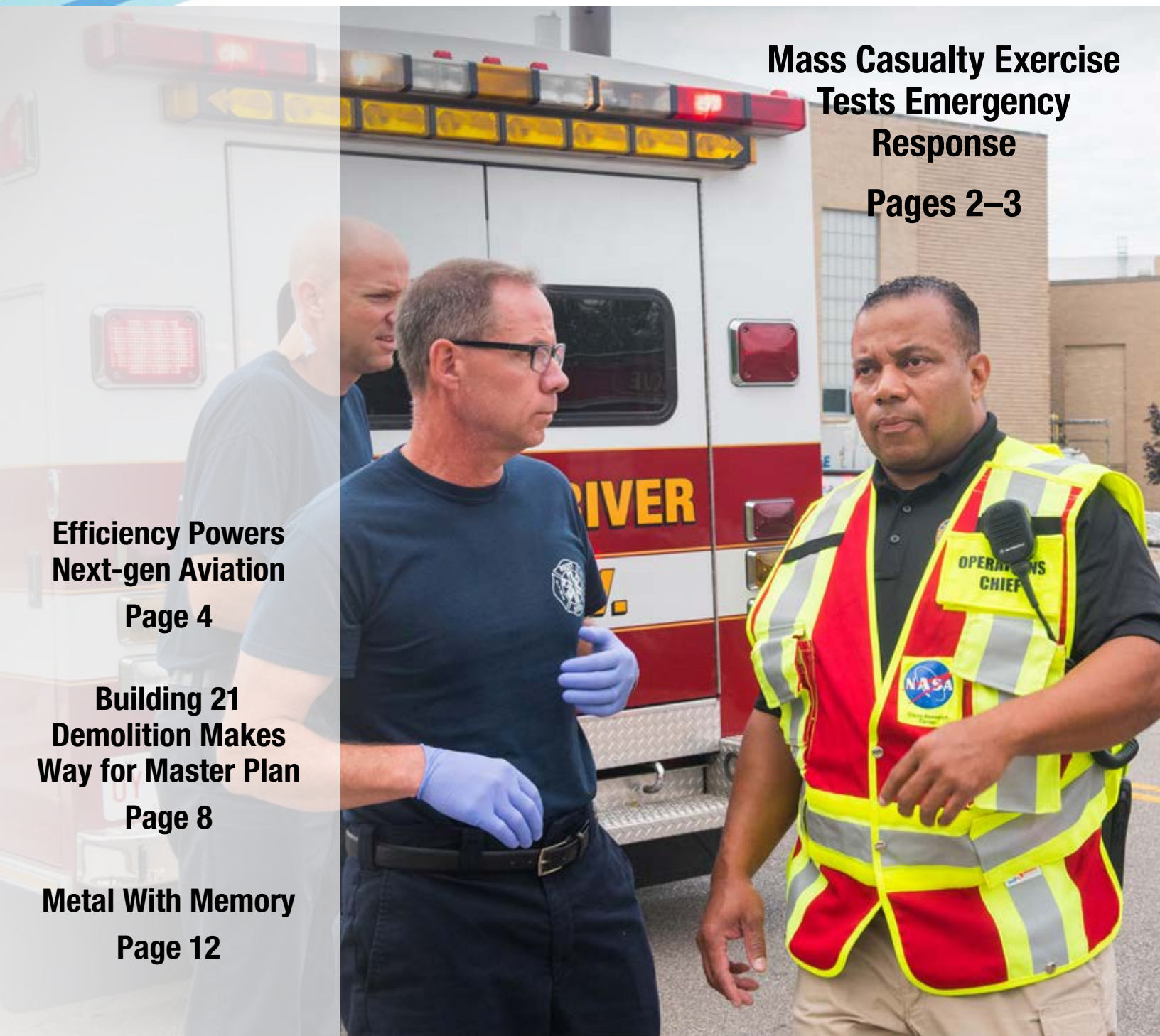

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Holiday Safety Awareness

As our thoughts turn to the holidays and festivities with family and friends, safety should be a priority. Accidents increase as demands on our time and energy increase.

As we prepare those delicious meals, keep food safety at the forefront; one in six Americans suffer a food-borne illness each year.

Slow down—next to drunk driving, speeding is the leading cause of driving-related injuries and deaths. We put safety first at our center; doing so outside of work will ensure that we and our loved ones remain safe throughout the holidays.

My best for an enjoyable and festive season!

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Submit short articles and calendar items to the editor at doreen.b.zudell@nasa.gov.

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GRC-2017-C-07519
Photo by Marvin Smith

University Hospital's MedEvac receiving critically injured patient for transport.

Mass Casualty Exercise Tests Emergency Response Plan

NASA Glenn's Office of Protective Services, Emergency Response Team members and several local fire and rescue departments participated in a mass casualty exercise at Lewis Field, Sept. 20.

On the Cover:
Captain Ernest Witcher, right, GSVC/Glenn Office of Protective Services, gives Rocky River Fire Department personnel, Frank Schaefer, back, and Bill Stuchal, a situational report when they arrive on the simulated accident scene.

GRC-2017-C-07440
Photo by Bridget Caswell

GRC-2017-C-07482
Photo by Bridget Caswell

Emergency responders establish a treatment area to care for victims until they are able to be transported to the hospital.

GRC-2017-C-07328

Photo by Marvin Smith

Emergency Operations Center activated to support response activities.

The "Under Pressure 2017" exercise was conducted to test the effectiveness of the center's emergency response plans. It centered on a boiler explosion in building 12, involving a number of injuries to people in and around the building. Victims played by Traumatic Players of Cleveland were triaged nearby and transported for treatment to the Fitness Center, which served as a simulated hospital. University Hospital's MedEvac helicopter, which landed near the Shipping and Receiving Facility, was called in to transport one victim with severe injuries.

"This exercise involved many moving parts coming together, especially with teams from Southwest General Health Center and Brook Park Fire Department," said Glenn's Emergency Management Specialist Brian Laney. "Additionally, support from Glenn's senior management was crucial to our ability to conduct the event."

Laney said the exercise is part of the center's 5-year Master Training Exercise Plan, which involves a variety of emergency preparedness activities such as fire drills and tabletop exercises. The day after the exercise, the Glenn Emergency Management Response team conducted a tabletop exercise to evaluate and determine a plan to notify others who would have been affected by the mishap, such as customers and building employees.

In the coming weeks, the team will further evaluate and document positive and negative outcomes from the exercise in order to fine-tune emergency plans.

By Doreen B. Zudell

GRC-2017-C-07359
Photo by Bridget Caswell

Protective Services' security officer/emergency medical responder triages patient.

Composite photo of next-gen aircraft.
GRC-2017-CN-00062 **Photo by NASA**

Efficiency Powers Advancement: Next-gen Aviation

While the aircraft industry continues to adopt innovative technologies, which are making current aircraft more energy efficient, there is new interest in exploring alternative propulsion systems and energy sources. This presents an opportunity to develop concepts that will dramatically reduce fuel usage, while opening up potential new markets and business opportunities for American companies and carriers.

"I feel we are at a tipping point in commercial aviation," said Jim Heidmann, manager of NASA's Advanced Air Transport Technology Project. "We are exploring and developing game-changing technologies and concepts for aircraft and propulsion systems that can dramatically improve efficiency, reduce environmental impact and accelerate the introduction of new aircraft."

One of the most pivotal areas of commercial aviation's renaissance centers around highly integrated propulsion systems. A team of engineers at Glenn is conducting cutting-edge research into high-pressure-ratio compact gas turbine engines, low-emission combustors, electric-enhanced propulsion and boundary-layer ingesting engines.

Initial ground tests of a subscale STARC–ABL concept will take place at NASA's Electric Aircraft Testbed at Plum Brook Station.
GRC-2015-C-07774 **Photo by Marvin Smith**

Some of these key propulsion system advances converge in an aircraft concept study called STARC–ABL (single-aisle turbo-electric aircraft with an aft boundary-layer propulsor).

The STARC–ABL concept, developed by Jim Felder, Propulsion Systems Analysis Branch, and others across the agency, is under consideration as one of NASA's future X-planes. It looks similar to the proven tube-and-wing aircraft you see every day, but unlike those aircraft, a significant amount of electrical power, approximately 3 megawatts, is used for turboelectric propulsion.

While preparing for initial ground tests of a subscale STARC–ABL concept at NASA's Electric Aircraft Testbed (NEAT) at Plum Brook Station, the team recently awarded 12-month contracts to Boeing, teamed with Georgia Tech, and LibertyWorks with ESAero, to further investigate the challenges surrounding the hybridization of commercial aircraft.

"During the 12-month cycle, we'll work with the teams to take a deep dive into their hybrid and turboelectric aircraft concepts," said Subproject Manager, Amy Jankovsky, Aeronautics Mission Office. "These concepts will provide in-depth, detailed analyses of the propulsion and electrical systems, and we will recommend technology development paths for their concepts."

Ultimately, NASA hopes to contribute to a next-generation aircraft that will substantially reduce fuel burn, noise and emissions. Many researchers feel we are only a few steps away from a major aviation revolution, and that a commercial aircraft using NASA-developed, hybrid-electric or turboelectric propulsion technology could be flying to an airport near you by 2035.

By Jimi Russell

Glenn Employees Earn Women of Color Awards

Glenn Personnel Supported Conference

Three NASA Glenn employees were among those honored during the annual Women of Color STEM Conference held in Detroit, October 5 to 7. The event recognizes women of color achievements in science, technology, engineering and math and provides onsite educational and networking opportunities for those interested in pursuing STEM careers.

Diana Centeno-Gomez, Aeronautics and Ground-Based Systems Branch deputy chief, received a Technology All Star award reserved for women in the mid-level to advanced stages of their careers who have demonstrated excellence in the workplace and in their communities.

Two members of Glenn's Safety and Mission Assurance Directorate (SMAD) were honored. **Danielle Griffin**, Management Integration Office, received the Professional Achievement in Government award as a mid-career professional, who has demonstrated significant impact as a leader and role model. **Abigail Rodriguez**, Program and Project Assurance Division, received the Technology Rising Star award for early careerists who are helping to shape technology for the future.

Glenn led the agency in support of the conference activities including the NASA professional seminar, a career fair, a precollege event, educational workshops and hands-on activities. Deputy Center Director Dr. Marla Pérez-Davis and several members of Glenn's leadership—Aretha Carr, Office of Equal Opportunity Programs director; Robyn Gordon, Center Operations director; and Konstantinos "Gus" Martzaklis, SMAD deputy director—and center staff contributed to the success of this event.

By S. Jenise Veris

GRC-2017-C-08076 Photo by Rami Daud

Honorees, left to right, Centeno-Gomez, Griffin and Rodriguez

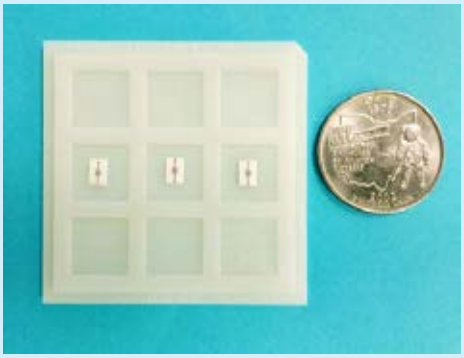
Uniting Against Hunger

NASA Glenn joined federal agencies across the nation in the fight against hunger by participating in the annual Feds Feed Families food drive, July 31 to Aug. 31. Lewis Field and Plum Brook Station employees donated a total of 3,356 pounds of nonperishable food. Donations were made to the SCAN Hunger Center Pantry in Berea and the Crossroads Homeless Shelter in Sandusky. Thanks to everyone who donated!

Trending With Tech Transfer

Carbon Dioxide Gas Sensor and Method of Manufacturing

Alabama-based Morningbird Media Corporation has signed an evaluation license for Glenn's carbon dioxide (CO_2) gas sensor and method of manufacturing. This license will help them develop a method for their Electronic Alchemy 3D printing system to create a new class of printable sensors to complement their suite of printable functional electronics. Glenn's Gary Hunter and Jennifer Xu developed the sensor to detect CO_2 concentrations from .5 to 4 percent over a broad temperature range. As shown in the photo below, its small, low-power, easy-to-use and fabricate design makes it ideal for a multitude of applications.



GRC-2017-CN-00060 Photo by Jennifer Xu

Remembering POW and MIAs: Remaining Vigilant

The Veterans Awareness Committee (VAC) held its annual Prisoner of War/Missing in Action Observance, Sept. 14. During the event, Tom Hartline, Facilities, Test and Manufacturing director and VAC member, shared a poignant story about locating his great-uncle who was missing in action since World War II. Guest speaker Sam Felton Jr., current commander of the Disabled American Veterans, Chapter 20 in Lorain, reflected on serving in Vietnam. Lorain High School's Army Junior ROTC presented the Missing Man Table ceremony to remind us to never forget the sacrifices of our men and women in the armed forces.

Hartline recalls the story of locating the remains of his great-uncle (background photo) from World War II.

GRC-2017-C-07774 Photo by Marvin Smith

NEWS AND EVENTS

Healthy Steps Earn Golden Shoe Awards

As part of 2017 Safety and Health Awareness Day, employees participated in the Center Health Walk and competed for the coveted Golden Shoe Award. At Lewis Field, Glenn's Safety and Mission Assurance (SMA) Directorate team placed first with 34 percent participation. They were followed by the Plum Brook Station team, 29 percent participation; Aeronautics Directorate and Office of Technology Incubation and Innovation team, 26 percent participation; and Office of Chief Information Officer team, 24 percent participation. Additionally, Plum Brook Station held an onsite health walk competition among buildings. The Propulsion Test Complex (PTC) placed first with 81 percent participation; Engineering Building, 20 percent participation; and Space Environments Complex, 14 percent participation.

PTC Facility Manager Jerry Hill displays the Plum Brook Station Golden Shoe Award.

GRC-2017-CN-00057
Photo by Geneva Biglin

Center Director Janet Kavandi presents the 2017 Golden Shoe Award to Deputy Director of SMAD Gus Martzaklis.

GRC-2017-C-03932 Photo by Marvin Smith

GRC-2017-C-05430 Photos by Marvin Smith

Golfers head out to the tee box.

GRC-2017-C-05491

Left to right: Pasquale Daltorio, Kevin Meredith, Jonathan Burris and Brian McConnell

GRC-2017-C-05480

Left to right: Brad Weisenberger, Wes Sallee and Nick Connelly

GRC Golf Outing— Wet Start but Strong Finish

Two hundred thirty-three golfers endured a little rain, rumbles and sunshine at the 8th Annual Glenn Research Center Golf Outing at Mallard Creek Golf Course, Aug. 4. Four-person scramble participants ended the day with steak or barbeque and talk about their great shots and near misses. The top two teams are pictured, right.

Students Encouraged To Come Fly With NASA

Glenn's Office of Education, with the support of staff across the center, hosted Aviation Day at Lewis Field, Aug. 18, to engage middle and high school students in activities related to aeronautics careers. Activities included a career panel discussion, a design competition, research demonstrations and tours. Pictured is the chief of Glenn's Aircraft Operations Office and pilot Jim Demers (far left) conducting a Flight Research Facility tour with students from Menlo Park Academy. Approximately 100 students, accompanied by parents and teachers from five area schools, participated.

GRC-2017-C-06703 Photo by Quentin Schwinn

GRC-2017-C-07293 Photo by Marvin Smith

Dr. Del Rosario moderates a discussion with guest speaker Moreno.

Distinguished Hispanics Help Shape the Future of America

Aeronautics Director Dr. Rubén Del Rosario moderated a discussion with Bernie Moreno, president of Bernie Moreno Companies and chairman of Cleveland State University's Board of Trustees, at this year's Hispanic Heritage Month Observance, Sept. 28. The discussion centered on the theme "Shaping the Bright Future of America." Moreno immigrated from Bogota, Columbia, as a child and became a U.S. citizen at 18. He shared the philosophies he lives by that have led to his success and leadership to others. The event also included a performance from Julia de Burgos Cultural Arts Center and Hispanic food for purchase.

Building 21 Demolition Makes Way for Master Plan

The Engineering and Supply Building (21) demolition project, which began in September, is targeted for completion in November. This project is an essential step in the sequence of demolition and replacement projects required to implement the approved Glenn Master Plan.

The demolition makes way for the future construction of the Research Support Building (RSB), which is scheduled to break ground in the summer of 2018. The RSB, along with the existing Mission Integration Center building, allows for the creation of a new central campus—a place that reflects the historic character of the campus and enables the Glenn staff to come together as a community.

Starting on the north side at the loading dock, the building took just 2 weeks to level.

GRC-2017-CN-00061 Photo by Janet Lane

Employees Recognized for Contributions to Space Flight Mission Success

Several members from Glenn's Space Flight Systems workforce recently received Space Flight Awareness (SFA) Awards. The SFA Awards program is a NASA-managed motivational and recognition program for NASA employees and contractors who have major responsibilities for human space flight mission success.

GRC-2017-C-08035 Photos by Bridget Caswell

Dr. Rickey Shyne, Research and Engineering director (left), congratulates SFA Trailblazer Schmidt.

Elliot A. Schmidt, Structural Mechanics Branch, received the SFA Trailblazer Award for contributions to the commissioning of the Mechanical Vibration Facility and the European Service Module Test Campaign. Schmidt delivered tools that previously did not exist to ensure reliable and accurate data capture, analysis and validation, increasing efficiency during a very demanding test campaign.

Bartlomiej F. Zalewski, a ZIN Technologies, Inc. (ZINT) employee supporting NASA Glenn, received the SFA Trailblazer Award for his innovative work in developing a simulation tool to explore nonlinear affects during launch vehicle separation for the Space Launch System. Prior to Zalewski's program development efforts, researchers would spend months developing simulation models and analysis.

The Functional Fault Model (FFM) Tools Development Team representing several NASA centers with their industry partners, was awarded the SFA Team Award. The award recognizes the development and demonstration of a new software tool to advance functional fault modeling simulations, analysis and verification for the safety of human exploration. Glenn team members, who work in the Communications and Intelligent Systems Division, include **Christopher Fulton** (ZINT), **Kevin Melcher** and **William Maul** of Vantage Partners LLC (VPL).

By Jimi Russell

GRC-2017-C-08033

Zalewski (center) is congratulated by Joel Kearns, deputy director of Glenn's Space Flight Systems Directorate and Dr. Marla Pérez-Davis, deputy center director.

GRC-2017-C-08036

Dr. Rickey Shyne, Research and Engineering director (second, left) congratulates, left to right: Maul, Melcher and Fulton, SFA Team Award winners.

AWARDS

Pineda Selected HENAAC Honoree

Dr. Pineda

Dr. Evan Pineda was recognized as a "Most Promising Engineer—Advanced Degree—Ph.D." at the 29th Annual Hispanic Engineer National Achievement Award Conference (HENAAC), held Oct. 18 to 22 in Pasadena.

Pineda, who is an aerospace research engineer in Glenn's Multiscale and Multiphysics Modeling (LMS) Branch, contributes to the Space Launch System, Advanced Composites Project, and Transformational Tools and Technologies Programs.

RETIREMENTS

Mainger

Steven W. Mainger, Avionics Branch, Power Division, retired Sept. 30, 2017, with 34 years of federal service, including 28 ½ with NASA.

Attention Retirees!

To electronically subscribe to *AeroSpace Frontiers*, email **grc-aerospacefrontiers-subscribe@lists.nasa.gov**.

MORE THAN A MEMORY

Eisenberg

Sheldon

Joseph D. Eisenberg, 88, a 2000 retiree with 40 years of government service, died Aug. 13. Eisenberg was a U.S. Air Force Korean War veteran who served on the NASA Lewis team for Advanced Subsonic Technology. They performed mission and cycle analyses to develop high-payoff propulsion and power technologies for subsonic aircraft for the nation's global air transport system. Later in his career, he focused on rotorcraft-propulsion-related projects, including the "Osprey" helicopter, a crossover rotorcraft for a helicopter and a plane.

Robert "Bob" Sheldon, 87, a 1982 retiree with 32 years of NACA/NASA service, died Oct. 3. Sheldon was an U.S. Air Force Korean War veteran who began his NASA career after graduating the NACA Apprentice Program as a journeyman Flight Propulsion Qualified Mechanic in 1959. Over the years, Sheldon held many supervisory positions within the Test Installations Division. He also served the center as a CPR instructor.

NASA Heat Transfer Pioneers Pass

GRC-2015-C-06129 Photo by Bridget Caswell

Drs. Siegel, left, and Ostrach at the Hall of Fame induction ceremony.

Dr. Simon Ostrach and **Dr. Robert Siegel**, two of three world-renown researchers recognized as NASA "Giants of Heat Transfer," recently died. They were inducted into the first class of Glenn's Hall of Fame in 2015 with Dr. Robert Deissler, posthumously.

Ostrach, 93, who left in 1960 after 15 years of NASA service, died Oct. 2. He returned as director of NASA's National Center for Space Exploration Research (1997–2002), before retiring to serve as professor emeritus of Engineering at Case Western Reserve University. One of NASA's "12 superstars of modern aeronautics," he researched warplanes and turbojet/turboprop engines and contributed to the development of an early supersonic wind tunnel. He also researched heat transfer and fluids in low gravity, developing important techniques for nuclear propulsion, space flight, microelectromechanical devices and crystals in semiconductors.

Siegel, 90, a 1999 NASA retiree with 44 years of government service, died Sept. 19. He was a U.S. Army World War II veteran who began his NASA career in 1955 after working in cooling nuclear reactors at General Electric. He investigated heat transfer for conditions in space, which led him to design the world's first drop tower in 1957. An expert on heat transfer, particularly in radiation and boiling heat transfer, he co-authored the book, "Thermal Radiation Heat Transfer," in 1972, still widely used as a graduate-level textbook.

Upcoming Center Events

FEHB Open Season

Federal Employee Health Benefits (FEHB) Open Season runs through Dec. 11, 2017.

Glenn's Open Season Fair

Tuesday, Nov. 14
10 a.m. to 2 p.m.

Upper Level of the Main Cafeteria, Building 15

POC: Rhonda Billick, 3–6286

Join your co-workers at the

2017 Center Holiday Gathering

Thursday, Dec. 7
1 to 3 p.m.

MIC Auditorium

NASA RETIRED WOMEN'S LUNCHEON

The next luncheon is Thursday, Nov. 16, at 1 p.m. at Corso's Italian Restaurant, 29691 Lorain Rd., North Olmsted. Please reserve your place with Gerry Ziemba at gto64gerry@yahoo.com or 330–273–4850.

GSEL MOBILE LIBRARIAN

The Glenn Science and Engineering Library (GSEL) Mobile Librarian will be visiting Building 5 from Nov. 28 through Dec. 7; 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

DECEMBER OUTDOOR SIREN TESTING

The Emergency Management Office staff will conduct an audible siren test focusing on the "emergency condition" tone on Saturday, Dec. 2, at Lewis Field. An outdoor "voice" test will be conducted in buildings 100 and 302 on Wednesday, Dec. 6.

POC: Allen Turner, 3–6826

IFPTE LOCAL 28, LESA MEETING

LESA will hold its next membership meeting, Wednesday, Dec. 13, noon, in the Glenn Employee Center's Small Dining Room.

Deadline for next calendar section is **Nov. 17, noon**. News and feature stories require additional time.

NASA Glenn Employees: For more calendar information, visit **https://wing.grc.nasa.gov/event-calendar/**.

National Aeronautics and Space Administration

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

Metal With Memory: Shaping the Future of Aviation

GRC-2017-C-05860 **Photo by Marvin Smith**

Dr. Benafan inspects a model of the shape memory alloy actuator and the outer wing section from an F/A-18 research plane.

Through NASA's Convergent Aeronautics Solutions Project, a team of engineers believe folding wings in-flight using advanced materials and technologies is a potential game changer for future aircraft that could improve aircraft performance and efficiency.

This innovative actuation system uses a revolutionary material that will accomplish this goal by using less complex, lighter and more compact hardware than conventional systems.

The revolutionary material is shape memory alloy (SMA), an engineered nickel-titanium alloy that can be trained to return to a desired shape after deformation. "By applying a temperature stimuli, you can trigger a physical change in the metal," said Dr. Othmane Benafan, materials research engineer. "It undergoes a reversible phase transformation much like ice melting and refreezing. The difference is it transitions from one solid state to another."

The material NASA is developing is similar to commercially available alloys, but with increased capabilities, making it well suited for aeronautics applications. It is also unique in regards to memory or "training," because the rare microstructural features produce a better material.

While engineers prepare to integrate SMA into a subscale flight test later this year at NASA's Armstrong Flight Research Center, the team at Glenn wants to get a head start on ground testing SMA actuators on a large-scale wing. To do this, NASA Armstrong removed a wing section from one of its F/A-18 scientific research aircraft for testing at Glenn. The wing will be used to demonstrate the actuation concept at a much larger scale compared to what we have now.

Through the full-scale ground tests and the upcoming subscale flight test, the project team is working to transform aircraft design through SMA-enhanced wing shaping.

For an extended version of this story, visit NASA Glenn's website at **https://go.nasa.gov/2xdkQAy**.

By Jimi Russell

Emergency and Inclement Weather Lines

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

Connect With Glenn