National Aeronautics and Space Administration



AeroSpace FRONTIERS

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DIRECTOR'S SAFETY CORNER

Spring Forward With Safety in Mind

Because of the strong commitment from the Glenn workforce, the 2017 post-Safety Day walkthroughs were a tremendous success. We completed 100 percent of the walkthroughs before the end of the year, and achieved 98 percent of the cleanups by February 2018. It is a pleasure to walk around the center and see clean and organized workspaces, labs and facilities. As we look forward to spring, remember to continue to keep escape routes clear and minimize hazards!

Thank you for your continued commitment to a clean and safe work environment.

AeroSpace Frontiers

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

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

Assistant Editor: S. Jenise Veris, ATS

Design: Jami Drost, ATS

Managing Editor: Kelly R. DiFrancesco

Circulation: Angela Williams, ATS, 216–433–8921

NASA Testing Kilopower for Future Space Exploration

Center at Lew

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Left to right, Glenn's Jessie Walker, Marc Gibson, Tom Godfroy (NASA Marshall) and Jim Sanzi (behind Godfroy) take measurements to center the instrument core on the test stand during the dry run in the Glenn Hangar.



On the Cover: Tom Godfroy, left, and Marc Gibson ensure the test stand and prototype power system are ready to be shipped from Cleveland to Nevada

Left:

GRC-2017-C-06838 Photos by Rami Daud

When astronauts someday venture to the moon, Mars and other destinations, one of the first and most important resources they will need is power.

A reliable and efficient power system will be essential for day-to-day necessities, such as lighting, water and oxygen, and for mission objectives, like running experiments and producing fuel for the long journey home. That's why NASA is conducting experiments on Kilopower, a new power source that could provide safe, efficient and plentiful energy for future robotic and human space exploration missions.

This pioneering space fission power system could provide up to 10 kilowatts of electrical power—enough to run two average households—continuously for at least 10 years. Four Kilopower units would provide enough power to establish an outpost.

About the Experiment

The prototype power system was designed and developed by Glenn in collaboration with NASA's Marshall Space Flight Center in Huntsville, Alabama, and the Los Alamos National Laboratory. The reactor core was provided by the Y12 National Security Complex. Glenn shipped the prototype power system from Cleveland to the Nevada National Security Site (NNSS) in late September.

The team at the NNSS recently began tests on the reactor core. According to Glenn's Marc Gibson, Kilopower lead engineer, the experiments should conclude with a full-power test lasting approximately 28 hours in late March.

The Kilopower Advantage

Fission power can provide abundant energy anywhere we want humans or robots to go. On Mars, the sun's power varies widely throughout the seasons, and periodic dust storms can last for months. On the moon, the cold lunar night lingers for 14 days.

"We want a power source that can handle extreme environments," said Glenn's Lee Mason, NASA's principal technologist for power and energy storage. "Kilopower opens up the full surface of Mars, including the northern latitudes where water may reside. On the moon, Kilopower could be deployed to help search for resources in permanently shadowed craters."

In these challenging environments, power generation from sunlight is difficult and fuel supply is limited. Kilopower is lightweight, reliable and efficient, which makes it just right for the job.

By Jan Wittrv

For more information about the Kilopower project, visit https://www.nasa.gov/directorates/spacetech/kilopower.

NASA, Partners Discuss Kilopower

NASA and its partners hosted a news conference, Jan. 18, at the National Atomic Testing Museum in Las Vegas, to discuss a recent experiment involving a new power source: Kilopower. This source could provide the safe, efficient and plentiful energy needed for future robotic and human space exploration missions.

Representatives from NASA and the National Nuclear Security Administration's Los Alamos National Laboratory and Nevada National Security Site discussed the experiment and answered questions on Kilopower. The Kilopower project aims to demonstrate space fission power systems technology that has the potential to enable future crewed surface missions to the moon, Mars and beyond. Testing began in November 2017 and is expected to continue through March 2018.

Top Right:

Left to right, Glenn's Director of Space Flight Systems Bryan Smith; Associate Administrator of the Space Technology Mission Directorate (STMD) Stephen Jurczyk; Glenn's Kilopower Lead Engineer Marc Gibson; and STMD Chief of Staff Mike Green examine the prototype power system.

Right:

Center Director Dr. Janet Kavandi delivers opening remarks during a Kilopower press conference hosted by NASA and the Department of Energy at the National Atomic Testing Museum, Jan. 18.







NASA Spinoff 2018 Is Out!

Learn how NASA technologies are contributing to your quality of life—from lifesaving technology, to better running shoes, and everything in between.

Read online or download the latest edition of NASA Spinoff at https://spinoff.nasa.gov/Spinoff2018/index.html.

All Hands Covered Topics From Space Corridor to Workforce Transformation

During her All Hands Meeting, Jan. 23, Center Director Dr. Janet Kavandi updated the workforce on a number of timely topics.

She discussed Gateway, a concept for a crew-tended lunar orbital platform led by NASA and our international partners. She said Glenn secured an important role to provide the first element of Gateway—a Power and Propulsion Element (PPE)—which will supply solar electric propulsion and communication to the new platform. The PPE is expected to be launched into cislunar orbit in the early 2020s.

Kavandi also announced that Glenn has identified a route to move large hardware between Mansfield Regional Airport and Plum Brook Station. She said that power and communication lines along the 41-mile route will be either raised or buried to accommodate the transport of large diameter test articles. The Orion Exploration Mission 1 (EM–1) vehicle, which includes the integrated crew and service modules, requires the route for testing at the Space Environmental Complex. Once finished, the "Space Corridor" will bring additional testing opportunities to Plum Brook Station.

In the area of Early Career Workforce Transformation, Kavandi reported that Glenn is progressing well in its efforts to secure a workforce that can meet the future mission needs of the agency. She said with attrition and new hires, the average age of center employees is starting to come down. "When we give ourselves [Glenn] a goal, we go after it," she said. "These efforts will ensure a sustaining group of people for years to come."

Deputy Center Director Dr. Marla Pérez-Davis gave an overview on the Mission Support Future Architecture Program (MAP). She explained the differences between MAP and the Business Services Assessment (BSA). She described how MAP will implement a phased plan to transform all mission support functional areas from their current state to an enterprise architecture.

The Office of Chief Financial Officer, Office of Human Capital Management and Office of Legislative and Intergovernmental Affairs are the first phase of projects under MAP. Additional functional areas will fall within subsequent phases with the goal of having all MAP projects reach implementation by fiscal year 2023. For more information on MAP, visit https://inside.nasa.gov/msd/map.



Center Director Dr. Kavandi talks about Glenn's strides in Early Career Workforce Transformation during her All Hands.

Chief Information Officer Sean Gallagher gave an update on cybersecurity. He said unauthorized access and malicious code were the top cybersecurity issues in 2017, and the agency is taking countermeasures to secure NASA data. Gallagher shared several examples of countermeasures, including revamping training so it is more user friendly and increasing federal and agency coordination.

"You can help," Gallagher said. "Know your information...involve cyber risk management early in a project...stay vigilant...separate personal and work accounts...support system owners." Gallagher's full presentation is available on the Director's Corner page on WING, under Presentations.

Office of Human Capital Management Chief Lori Pietravoia then provided a brief overview of Glenn's current Voluntary Separation Incentive (buyout) and Early Out Authority Implementation Plan. Employees who meet the criteria and are accepted will need to separate from the agency by April 3.

Employees had the opportunity to ask questions after the presentations. The briefing concluded with a video highlighting 2017 center activities, and Kavandi thanked employees for their many contributions throughout the year.



GRC-2018-C-00456

Guests of the NASA Social view Lightfoot's State of NASA presentation.

Photo by Rami Daud

State of NASA Event Gives 'In-Person' Experience

NASA Glenn opened its doors to members of the media and social media, Feb. 12, for a "State of NASA" event featuring a behind-the-scenes look at the center's work. The event coincided with President Trump's fiscal year (FY) 2019 budget proposal delivery to Congress.

Glenn's Digital Communications Team, Office of Communications and External Relations, welcomed a group of 21 social media influencers to Lewis Field for a NASA Social. Following a welcome from Digital Communications Lead Nikki Welch, Center Deputy Director Dr. Marla Pérez-Davis presented a video highlighting Glenn's work and gave a center overview.

"This event is an opportunity for you, our social media fans and friends, to get an exclusive look at the center," Welch said. "It serves as an opportunity for us to highlight the work we do, and specifically the work that is enabled by the FY 2019 budget proposal."

Concurrently, Glenn News Chief Jan Wittry and her Media Relations Team, welcomed members of the local media to gain details on the budget request for the agency and for Glenn.

Media representatives settled in the Administration Building and social media guests gathered at the Mission Integration Center to watch NASA Acting Administrator Robert Lightfoot deliver the State of NASA address via NASA Television.

In his address, Lightfoot presented President Trump's FY 2019 budget request of \$19.9 billion for NASA. He addressed the progress made and the exciting work ahead on the agency's exploration initiative that secures America's leadership in space.

"It [budget] reflects the Administration's confidence that through NASA leadership, America will lead the way back to the moon and take the next giant leap from where we made that first small step nearly 50 years ago," Lightfoot said. For details about the FY 2019 budget, visit http://www.nasa.gov/budget.

Immediately following Lightfoot's presentation, Center Director Dr. Janet Kavandi and Chief Financial Officer Larry Sivic met with the media. They discussed Glenn's role in the nation's aeronautics and space exploration program as well as the center's portion of the proposed budget. WKYC Channel 3, Fox 8 News, the Columbus Dispatch, Cleveland Plain Dealer, WKSU 89.7 FM and WCPN 90.3 FM covered the event.

The FY 2019 budget proposes \$712 million in spending at Glenn, which is \$57 million more than in FY 2017. (Our FY 2018 Omnibus allocations are awaiting approval.) If approved, Sivic said this would be Glenn's largest budget in 7 years.

The budget proposal provides funds to begin building the in-space infrastructure for long-term exploration and development of our nearest neighbor, the moon. The agency will build an "outpost" near the moon, called the Lunar Orbital Platform-Gateway, which will be assembled in lunar orbit. It will be used as a staging point for missions to, near and beyond the moon.

"NASA Glenn, with our extensive in-space propulsion experience, is leading development of the Gateway's Power and Propulsion Element, or PPE," Kavandi said. PPE will provide transportation and controls for lunar orbital operations and power to future lunar orbiting elements and communications.

After the briefing, media were invited to tour the Electric Propulsion Laboratory and 8- by 6-Foot Supersonic Wind Tunnel. Social media guests also toured those locations, as well as the Graphics & Visualization (GVIS) Lab. Glenn subject matter experts provided facility highlights.

By Doreen B. Zudell

through NASA leadership, America



GRC-2018-C-00481 Photo by Rami Daud A NASA Social guest enjoys virtual reality in the GVIS Lab.



GRC-2018-C-00435

Photo by Marvin Smith

WKSU's Jeff St. Clair asks Dr. Kavandi follow-up questions after the news conference. Pictured, left to right, Kavandi, Sivic, St. Clair, The Plain Dealer's Grant Segall and Columbus Dispatch's Marion Renault.



GRC-2018-C-00416

Members of the media and senior leaders watch Lightfoot's address from the Building 3 Auditorium.

Photo by Marvin Smith

Social media followers on tour in the 8- by 6-Foot Supersonic Wind Tunnel.

> GRC-2018-C-00489 Photo by Rami Daud

will lead the way back to the moon

Center Remembers Fallen Heroes With Musical Tribute



Glenn's Day of Remembrance observance, Jan. 25, acknowledged the passion and commitment of the Apollo 1, Challenger and Columbia crews, other NASA family members and cosmonauts who have lost their lives furthering the cause of exploration and discovery. The program included personal remarks by Center Director Dr. Janet Kavandi and a presentation by Jeff Woytach, Science and Space Technology Systems Branch. Musical selections by the Glenn Band—with vocals by Ann Heyward and Laura King-Steen—honored the fallen heroes.

NEWS AND EVENTS



Dr. Kavandi speaks on the Evolution of Spaceflight.

Kavandi Presents at Museum's Explorer Series

Center Director Dr. Janet Kavandi gave a lecture on the Evolution of Spaceflight to a capacity crowd attending the Cleveland Museum of Natural History's Explorer Series, Jan. 26.

Kavandi recounted the intense training and preparation as an astronaut of three space shuttle missions, how spaceflight has evolved from Sputnik through shuttle highlighting Glenn contributions, and the possibilities of future space exploration.

Photo by Lori Manthey GRC-2017-CN-00096

Two Employees Step Up to NASA@work Challenges



GRC-2017-C-08104 Photo by Marvin Smith Center Director Dr. Janet Kavandi presents Ford his certificate and pin at a DSM meeting in October.



Banks

John Ford and Bruce Banks received awards for their solution/feedback to NASA@work challenges, an agencywide platform designed to increase innovation and access to ideas and knowledge from within the NASA community. Participants engage in interactive discussions on solutions to a challenger's topic or situation, with an opportunity to win an award.

Ford, V2Tech/OCIO Mission Support Office, was rewarded for his solution "Incorporate Active Tintable Electronic Coatings in Next Generation Space Suit Visor." Ford gave the challenger information on electrochromatic technology that could quickly and seamlessly change the tinting of an astronaut's helmet to protect their eyes and a contact to test the product.

Banks, SAIC/Environmental Effects and Coatings Branch, submitted a narrative about alternative corrections made in developing Hydroforming Ion Optics for Ion Thrusters for the challenge "Failure on the Path to Progress." Bank's lessons learned have now been successfully applied to 21 spacecraft.

For more information on NASA@work challenges, visit https://nasa.innocentive.com.

By S. Jenise Veris

Johnson and Litt Honored as AIAA Associate Fellows





AIAA President James Maser joined Regions/Sections Activities Division Chief Laura Richard in presentations to Dr. Johnson, left center, and Litt, right center, at the Associate Fellows induction ceremony.

The American Institute of Aeronautics and Astronautics (AIAA) inducted **Dr. Dexter Johnson** and **Jonathan Litt** into the Class of 2018 Associate Fellows during its Recognition Ceremony, Jan. 8. Johnson is chief of the Structural Dynamics Branch and Litt is a member of the Intelligent Control and Autonomy Branch.

AIAA describes Associate Fellows as people "who have accomplished or been in charge of important engineering or scientific work, who have done original work of outstanding merit, or otherwise made outstanding contributions to the arts, sciences, or technology of aeronautics or astronautics."

MORE THAN A MEMORY



Kaufman

Dr. Harold R. Kaufman, 91, a 1974 retiree with 23 years of NASA service, died Jan. 4. Kaufman was a physicist and NASA Glenn Hall of Fame inductee who invented the electron bombardment ion thruster. This experimental spaceflight hardware system, first flown in 1964, is the basis for new generations of thrusters powering spacecraft today. The "Kaufman ion source" is a variant of the duoplasmatron for the purpose of spacecraft propulsion systems, a center core technology. Kaufman continued advancing ion technology, in retirement, as a full-scale manufacturer of commercial ion sources at Kaufman & Robinson (KRI®).



Pollack

Frank G. Pollack, 92, a 1988 retiree with 26 years of NASA service, died Feb. 15. Pollack was a U.S. Army veteran of World War II. He retired from the Instrumentation and Control Technology Office, where he was recognized for superior work developing turbine blade temperature measurement techniques. He employed radiation pyrometry principles and imaging methods like photography and photoelectric scanning to make accurate measurements for the life prediction of turbine airfoils, crucial to managing and sustaining aircraft jet engines.

SATERN Upgrade Coming— What You Need to Know!



NASA's new and improved Learning Management System, SATERN, will go live on March 15. The agency is giving SATERN a face-lift that includes a more modern interface and several enhanced features, such as a new way to browse the course catalog.

In preparation for the 1-week migration downtime necessary to upgrade the new SATERN system, employees were directed to complete all SF–182 requests and training, with deadlines prior to March 30, by the end of February. Training requests not completed with this accelerated deadline, did not migrate to the new system and will have to be reentered. In addition, there will be no Individual Development Plan (IDP) functionality in the new SATERN. However, a new agencywide IDP template is available on the Human Resources Portal.

"Keep in mind, the current continuing resolution (CR) only funds the federal government through March 23, 2018. Therefore, our office cannot process any requests beyond the start date of March 23, unless a CR is passed," said Marlena Hudson, Sr. Organization and Development Consultant in Glenn's Office of Human Capital Management.

For those who may have missed the centerwide briefing on the SATERN upgrade, hosted by the Human Capital Development Division on Feb. 15, you can direct your training questions related to IDPs to Robert Reid at 3–2121. For all other training questions, contact the Training Coordination Office at 3–2310.



RETIREMENTS

Paul Bartolotta, Inlets and Nozzles Branch, Propulsion Division, retired Jan. 31, 2018, with 33 years of service.

Marsha Menci Nall, ISS Research and Human Health Office, Space Operations Project Office, retired Feb. 3, 2018, with 35 years of service.

Upcoming Center Events

BPW Golden Jubilee

In conjunction with the Ohio Aerospace Institute, the NASA Glenn Chapter of Business and Professional Women's Club (BPW) invites you to a Golden Jubilee event.



Wednesday, March 28

8:30 a.m. to 1 p.m. Ohio Aerospace Institute Sunroom

Keynote Speaker Center Director Dr. Janet Kavandi

Mary Roberts, OAI (registration) 440–962–3025 • maryroberts@oai.org

Nan vonDeak, Glenn (general) 216–433–2999 • amanda.l.vondeak@nasa.gov

To register, visit https://go.nasa.gov/2sw0sMb.



Yuri's Night: Space Party

Hosted by the Great Lakes Science Center

Saturday, May 19 7:30 to 10:30 p.m.

Come dressed to impress in your best outer space/science fiction-themed costume and compete for prizes in the costume contest. Experience the museum after dark—including the NASA Glenn Visitor Center! Adults 21 and over.

Buy your tickets early and save! See website for details. http://greatscience.com/explore/events-programs/yuris-night-2018



GSEL MOBILE LIBRARIAN

The Glenn Science and Engineering Library (GSEL) Mobile Librarian will be visiting Building 54 through March 15. 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

FIRST ROBOTICS BUCKEYE REGIONAL COMPETITION

Volunteers are still needed in various positions for the FIRST Robotics Buckeye Regional Competition, March 29–31, Cleveland State University's Wolstein Center. Come join the crew for this fun event! For more information and to register, visit http://www.oai.org/ firstbuckeye/volunteers.html.

POC: Stephanie Brown-Houston, 3-8006

APRIL OUTDOOR SIREN TESTING

The Emergency Management Office staff will conduct an outdoor "voice" test at Building 39, Lewis Field on Wednesday, April 4. An audible mass notification test on the "emergency condition" tone will be conducted on Saturday, April 7.

POC: Allen Turner, 3-6826

IFPTE LOCAL 28, LESA MEETING

LESA will hold its next membership meeting, Wednesday, April 11, noon, in the Glenn Employee Center's Small Dining Room.

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



National Aeronautics and Space Administration

John H. Glenn Research Center

Lewis Field 21000 Brookpark Road Cleveland, Ohio 44135

Plum Brook Station 3597 E. Scheid Road Sandusky, Ohio 44870

www.nasa.gov

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

NASA Tests New Alloy to Fold Wings in Flight

NASA has successfully applied a new materials technology developed at Glenn that would allow pilots to fold aircraft wings to different angles for aerodynamic benefit. The wings were folded during a recent test flight series at NASA's Armstrong Flight Research Center in California, as part of the Spanwise Adaptive Wing project, or SAW.

SAW aims to validate use of an innovative actuation system that uses a lightweight material called shape memory alloy to fold the outer portions of aircraft wings and their control surfaces for optimal in-flight benefits, both subsonic and supersonic.

The project is a joint effort between NASA's Armstrong, Glenn and Langley field centers, and Boeing Research & Technology in St. Louis and Seattle, and Area-I Inc. in Kennesaw, Georgia.

More details on the recent flight tests and the potential benefits of folded wings is available at https://www.nasa.gov/centers/armstrong/feature/nasa-tests-new-alloy-to-fold-wings-in-flight.html.



Emergency and Inclement Weather Lines

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

