



Glenn Teams on Tools for Improving Flight Safety

Did you know there are approximately 1,500 active volcanoes around the globe? Over the past 15 years, more than 80 incidents of aircraft encounters with volcanic ash have disrupted air traffic worldwide.

A major aircraft subsystem affected by volcanic ash is the engine. Because of this, there is strong interest among military and civil aviation authorities to understand the degradation caused to aircraft engine components when volcanic ash is ingested.

Continued on page 2



Volcanic ash is sprayed into a F-117 engine of a C-17 aircraft.

Photo courtesy of NASA AFRC

2015 CFC Underway!



GRC-2015-C-6034

Photo by Chris Lynch

Sera Nelson from W.A.G.S. 4 Kids was one of several Combined Federal Campaign (CFC)-sponsored charities showcased during the CFC Agency Fair. See page 3 for upcoming events.

Researchers Aid Firefighter Safety

Over the next 3 years, Glenn smart-sensors technology experts will be collaborating on a project to design and test sensors aimed at protecting firefighters from respiratory damage and illnesses. Their goal is to develop sensors that will alert structural and wildland firefighters to hazardous particulates or toxins in the air during both firefighting and cleanup phases.

The Department of Homeland Security and Federal Emergency Management Agency have awarded a group of researchers from Glenn, Case Western Reserve University (CWRU) and Makel Engineering, Chico, California, a \$1.5 million Assistance to Firefighters/Fire Prevention and Safety Grant to develop a prototype. The project involves Glenn researchers and collaborators who have received several R&D 100 Awards and NASA recognition for development directly related to sensor technologies.

Dr. Paul Greenberg, an expert in advanced particulate sensors for spacecraft early warning fire detection, and Dr. Gary Hunter, an expert in chemical sensors, lead Glenn's participation.

"Paul and I have worked for a significant period of time in developing the core technologies that can enable this type of system," Hunter said.

Team leader Dr. Fumiaki Takahashi, CWRU, previously worked with Greenberg and was a co-investigator on several Glenn-developed International Space Station (ISS) experiments. He seeks to expand on NASA's compact particulate and gas sensors, to include alerts for toxic gases such as formaldehyde and acrolein. These gases cause eye, nose, throat and lung irritation, and potentially cause cancer with long-term exposure. They are found in building materials, fungicides and

Continued on page 2

In This Issue

Director's Safety Corner 2
Students Build Test Bed 2

Moving Out NASA Technology 3
CFC Events on Horizon 3

2015 Softball Champs 6
Cyber Security Awareness 7



Let's Commit to Our Egress and House Cleaning Initiative

An important take-away message from our recent Safety and Health Awareness Day is that safety awareness and a commitment to following safety practices prevent mishaps. Toward that goal, our center kicks off the Egress and House-keeping Cleaning Initiative this month. Facilitated by the Safety and Health Awareness Committee, comprised of representatives from each directorate, along with a committed management team, this initiative will help us identify ways to eliminate excess clutter that can turn into potential hazards. I am asking the Glenn community for your time and attentiveness to help us achieve a safer and cleaner workplace—as we prepare for Glenn's 75th Anniversary celebration.

I strongly support the cleaning initiative. Please join me in this commitment to safety.

—Jim

Tools for Flight Safety

Continued from page 1

Glenn was one of four NASA centers, working with military and industry partners, to test and evaluate new engine health management (EHM) technologies under NASA's Vehicle Integrated Propulsion Research (VIPR) project. This includes the test and evaluation of new sensors and diagnostics to monitor engine health. The team recently completed the third and final phase of VIPR testing and evaluation.

"These sensors allow us to monitor performance, and operations in normal operations, but also during unexpected events such as ingesting volcanic ash plume, a bird strike, a component failure, or responding real-time to changing conditions," explained John Lekki, Glenn's

VIPR principal investigator. "The process also helps develop prognosis tools to predict how certain levels of debris will impact performance."

This summer, team members performed a series of ground tests ingesting volcanic ash into a Pratt & Whitney F-117 high-bypass military turbofan engine on a government C-17 aircraft. They used a range of sensors and Model-Based Gas Path Diagnostics to gather data and measure engine changes, which included a vibration sensor; a fiber optic temperature sensor; a thin film sensor and pressure sensor with accompanying electronics; a microwave sensor; and an emissions sensor. Once the testing data is analyzed, the results will be shared with other aeronautics researchers.

By S. Jenise Veris

Firefighter Safety

Continued from page 1

industrial disinfectants that are released during forest fires when lumber, tobacco, gasoline, methane or oil is burned.

Makel Engineering's researchers will integrate the toxic gas sensor with NASA's compact sensors in a small and light unit that can be hand-held

or worn outside protective gear. They will test the units in CWRU and NASA labs. The Cleveland Division of Fire, Tualatin Fire and Rescue in Greater Portland, Oregon, and the U.S. Forest Service will then test in the field.

The U.S. Department of Interior has been working on a cohesive strategy to

Students, Glenn Build Test bed

Students from the EHOVE (Erie Huron Ottawa Vocational Educational) Career Center in Milan, Ohio, with help from NASA Glenn engineers and technicians, have teamed up to build a mobile solar power plant. NASA plans to use this system as a test bed and a source of power for a variety of tests.

Mounted on a 16-foot trailer, the power plant can produce 3 kilowatts of power. Its solar panel arrays, when deployed, span 512 square feet and can be retracted for transport. It shares the same technology used in Glenn's 1-kilowatt system, originally designed for moon-based applications such as the NASA Desert RATS (Research and Technology Studies) project.

Continued on page 8



GRC-2015-C-1847

Photo by Marvin Smith

As part of the partnership, EHOVE students visited Lewis Field to learn more about welding from Glenn's Tom Dixon, right.

help firefighters safely and effectively extinguish wildfires across the country. The Fire Protection Research Foundation in Quincy, Massachusetts, will help to form a balanced and diverse technical panel to provide external evaluation and guidance on this project.

By S. Jenise Veris

NASA Glenn Technologies Moving Out Beyond NASA

NASA Glenn technologies are typically developed to solve a very specific problem—whether it's making something faster, lighter, smaller or more efficient. Whatever the motivation, it's crucial to remember that NASA's challenges aren't necessarily unique. Companies in the private sector have much to gain from faster, lighter, smaller and more efficient technologies as well.

Take aerogels, for instance. Their remarkable characteristics—low density, light-weight and unmatched insulating capability—provided NASA a means to achieve cryogenic insulation for space shuttle and space exploration mission applications. Now NASA Glenn's polyimide aerogels have been licensed to a U.S. company for commercialization, where they will be tested in the private sector for use in construction, refrigeration, pipe insulation and cold weather sports equipment.

Glenn's Technology Transfer Office (TTO) has a mandate to find new uses for NASA's innovative technologies. When Glenn technologies get into the hands of American businesses, it sparks job growth and results in new products and services that improve our lives.

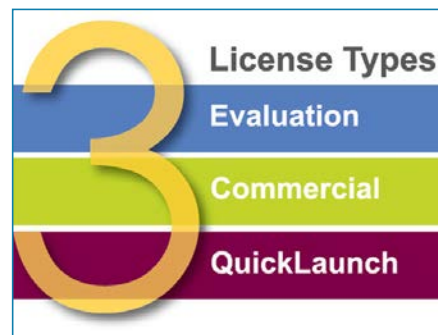
So how can you get involved in moving Glenn technologies outside of our gates? It all starts with filing a New Technology Report (NTR) on new innovations that you are developing. Once you submit an NTR, the TTO works with our patent attorney to seek patent protection for the inventions when appropriate. Glenn's TTO then evaluates the technology's commercialization potential and maps out industry segments that would stand

The TTO has three types of licenses that can be used to engage with our commercial partners.

Evaluation License: Enables companies to "test drive" the commercial viability of NASA technologies with minimal risk and up-front commitment; well suited for early technology readiness level technologies that need additional investment.

Commercial License: Allows companies to make and sell products based on NASA technologies; requires detailed commercialization plans and financial status documentation.

QuickLaunch License: Streamlined path for organizations to obtain commercial licenses on select NASA technologies; minimal turnaround time because fees and standard license terms are published, not negotiated.



to benefit most. It's okay if your technology is in the early development stage. Any improvement—no matter how big or small—should be reported as an NTR.

"In FY2015 alone, Glenn's TTO has secured 8 licenses and we plan to build on that momentum in FY2016, making even broader impacts with NASA Glenn's outstanding technologies," said TTO Chief Kim Dalgleish-Miller. "To learn more, check out our new website, <http://technology.grc.nasa.gov>, follow us on Twitter, @NASAGlennBiz, and stop by and see us on the first floor of Building 77. We'd love to help your technology move out beyond NASA."



GRC-2015-C-5773

Photo by Marvin Smith

NASA Glenn celebrated the signing of an exclusive license agreement with FLEXcon, Inc. of Spencer, Massachusetts, Sept. 3. FLEXcon will manufacture and market Glenn's patent pending polyimide aerogels using a process that will enable this technology to reach a mass audience. Pictured: Center Director Jim Free, left, and President and CEO of FLEXcon Neil McDonough shake hands after signing.

Combined Federal Campaign Upcoming Events

Mark Your Calendar for These Fun Activities!

Tailgate & Chili Cook-Off

Friday, Oct. 9, 11 a.m.–1 p.m.
Cafe Dining Room

Basket Raffle

Friday, Oct. 23, 8 a.m.–1 p.m.
Cafe Dining Room

Plum Brook CFC Festival

Friday, Nov. 6, 11 a.m.–1 p.m.
Engineering Bldg.

Pacesetter
Campaign
Ends Oct. 9!



Exercise Focuses on Continuity of Operations



GRC-2015-C-4247

Photo by Marvin Smith

Glenn's Emergency Management Office (EMO) staff, in conjunction with the Safety and Health Division, conducted a Closed Point of Dispensing exercise in the MIC Auditorium, July 21. The exercise allowed Glenn's EMO staff to review the center's response during a pandemic situation, as well as identify any areas in need of improvement. More than 200 employees participated in the exercise, which was evaluated by the Center for Disease Control, U.S. Health and Human Services and NASA Headquarters Emergency Management. Pictured: Occupational Health Branch Chief Luz Jeziorowski, in green vest, aides a participant through the process during the exercise.

PBS Employees Enjoy Appreciation Lunch



Photo by Larry Oppen

Glenn's Plum Brook Station staff took a well-deserved break to attend an Employee Appreciation gathering, Sept. 2. The event included a cookout with all the fix'ins, games and socializing with coworkers. Senior managers, including Center Director Jim Free and Plum Brook Station Director David Stringer, mingled with staff.

Center Golf Outing Scores Fun



GRC-2015-C-4647



GRC-2015-C-4730

Photos by Chris Lynch

Glenn employees and guests participated in the 6th Annual Glenn Golf Outing at Mallard Creek Club in Columbia Station, July 31. A total of 240 golfers participated in the four-person scramble. Nice day. Nice scores. This year's winners at 14 under par (68) on the Blue 18 were Doug Bride, Greg Murray, Chich Ruggeri and John Zima. Taking the title for the Red 18 at 8 under par (56) were Jonathan Burris, Pasquale Daltorio, Kevin Meredith and Brian McConnell. After the scramble, participants gathered for a meal and conversation with fellow golfers. Check the *Today@Glenn* archives for the scores. Pictured, top, left to right: Eric Mindek, Bob Azzardi, Dennis Brown and Kim Glatzer team for high fun and low scores. Pictured, bottom: Glenn's Ed Becks, far right, gives a thumbs up as he enjoys the buffet after a great day on the course.

Legislators and Staff Visit During Recess



Photo by Andy Swaim

Center Director Jim Free hosted 8 visits by members of Ohio's U.S. Congressional Delegation, Ohio (State) General Assembly, and/or their legislative staff during the month of August. During the visits, coordinated by Dr. Kim Veris, Glenn's legislative affairs officer, the guests toured Lewis Field and Plum Brook Station facilities to learn about current and planned research and technology development, which support NASA missions.

Elected officials visiting the center included: Congressmen David Joyce and Michael Turner; State Representatives Rick Perales, Marlene Anielski, Andrew Brenner, Stephen Hambley; and Emilia Strong Sykes. Also welcomed were legislative staff representing U.S. Senator Sherrod Brown, Congressional Reps. John Boehner; Marcy Kaptur, Jim Jordan, Bob Gibbs, and Bob Latta; and staff from the Ohio General Assembly.



GRC-2015-C-5230

Photo by Marvin Smith

Left: Glenn pilot Kurt Blankenship gives State Rep. Perales, center, and staff a tour of the hangar and highlights of Glenn's algal bloom efforts. Above: Congressman Joyce, far right, and OSU shadowing student Erik Smith, receive an overview from Dr. Gary Ruff, left, and his Saffire team.

Among the facilities toured were Lewis Field's Aircraft Operations Facility (hangar), Propulsion Systems Laboratory, Electric Propulsion Laboratory (EPL), and the Spacecraft Fire Experiment (Saffire) assembly area. At the EPL, guests received an overview of solar electric propulsion (SEP) work and its importance to the agency's Asteroid Redirect Mission and future deep space missions.

"The Martian" Fiction and NASA Facts

"The Martian" movie merges science fiction and factual narratives about Mars, building upon the work NASA and others have done exploring Mars and moving it forward into the 2030s. The script centers on an astronaut stranded on the planet, and includes nine real NASA technologies, including Glenn's contributions, that were part of his experience. To learn more about those technologies, visit <http://www.nasa.gov/feature/nine-real-nasa-technologies-in-the-martian>.



Latin Culture Promoted Through Media Outlets

Myra Rosario, president of Latino Cleveland Media Group, and Executive Producer/Host of "Yo Soy (I am) Latino Cleveland," shared her passion to bring positive change to Northeast Ohio's Latin communities during Glenn's National Hispanic Heritage Month Observance, Sept. 16. Rosario shared how she uses her marketing tools to highlight Latin culture and businesses that can help energize our nation's diversity. Her weekly variety show, which airs on WKYC Channel 3, is attracting more than 89,000 viewers in its first year of production. The Office of Diversity and Equal Opportunity and Glenn's Hispanic Advisory Group (HAG) sponsored the event. Pictured, right, Rosario fields questions following her presentation, while moderator Dr. Diana Santiago-DeJesus, HAG chair, observes.



GRC-2015-C-5977

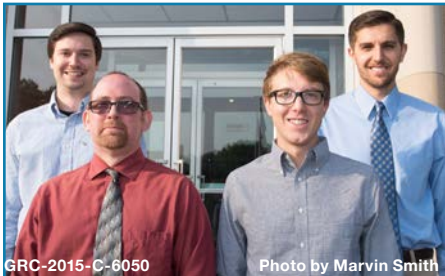
Photo by Rami Daud

Welcome to the NASA Family

Glenn welcomed four new employees and trainees to the workforce in July: They include: Eric Combs, Office of Protective Services; Charles Harris, Accounting & Financial Analysis Division; Noble Jones, Fluid Physics and Transport Processes Branch; and David Reagan, Manufacturing Engineering & Process Branch. We welcomed six more in August: Mark Archual, Data Systems Branch; Laura Farrell, Aero, Education & Reimbursables Support Branch; Harmony Myers (not pictured), Technical Excellence Office; Mason Rawson, Photovoltaic and Electrochemical Systems Branch; Urszula Szenfeld, Human Capital Consultant Division; and Yolanda White, Human Capital Consultant Division. In September, Glenn welcomed aboard three more: Sean Beckman, Quality Engineering and Assurance Branch; Andrew Chrysler, Advanced High Frequency Branch; and Douglas Cooper, Data Systems Branch. Brandon Cook is a new trainee for NASA Ames.



Combs



GRC-2015-C-6050

Photo by Marvin Smith

Left to right, front: Beckman and Chrysler; back: Cook and Cooper



GRC-2015-C-4883

Left to right: Rawson and Archual



GRC-2015-C-4383

Left to right: Farrell, Szenfeld and White



GRC-2015-C-3451

Left to right: Reagan, Harris and Jones

Awards and Honors

Robert Reid, Human Capital Development Division, earned second place honors in both the Table Topics and Humorous Speech categories during the Aerospace Toastmasters Club (ATC) annual competition, July 30. Glenn's ATC is affiliated with Toastmasters International, an educational nonprofit organization that focuses on developing good communicators. Members learn to improve their communication skills by participating in weekly club meetings and completing workbooks on communication and leadership. Contact Dale Force, 3-3520, for more information. Pictured: Reid, center, with Judith Majher, left, who earned first place in the Humorous Speech category and Miguelina Muniz, right, who earned first place in the Table Topics category.



Photo by Doreen Zudell

2015 NASA Softball League Tournament Champions



The 2015 NASA Softball League season ended with the undefeated Hit Squad earning the title of tournament champions. The final score was Hit Squad 22 and Dark Side 7. This was the second year in a row the Hit Squad earned this title. Pictured, front row, left to right: Anthony Wilford, Anthony Manco, Nick DiEgidio and Austin Manco. Back row, left to right: Bill Cherry Sr., Billy Cherry Jr., Antonio Davis, Larry Davidson, Scott Manco, Cory Tuley, Darrell Williams, Joe Sorok, Sal Olsen and John Mangdan.

More Than a Memory

Dr. David J. Brinker, 63, a 2013 retiree with 32 years of NASA service, died Aug. 23. Early in his career, he performed solar cell measurements and calibration and conducted research that led to establishing the Organo Metallic Chemical Vapor Deposition Laboratory. These efforts provided a foundation for the Photovoltaic and Power Technologies Branch and the development of spaceflight experiments, including the Advanced Photovoltaic Experiment (APEX). He also contributed to remote sensing for aircraft icing that enabled progress toward aircraft safety.



Dr. Brinker

Elmer Broz, 86, a 1987 retiree with 33 years of NASA service, died June 8. Broz was an U.S. Army veteran of the Korean Conflict. He was a member of the center's Research Instrumentation Team that provided instrumentation hardware fabrication, installation, checkout, calibration and maintenance, which contributed significantly to the objectives and success of NASA Lewis programs. He also supported the 1970 launch of the SERT II, (Space Electric Rocket Test) demonstrating the first orbital test of electron-bombardment of ion engines.

Dr. Robert G. Deissler, 94, a 1994 retiree with 46 years of NASA service, died Aug. 16. Deissler was a Navy veteran of World War II, who joined the NACA/NASA workforce in 1948. He was world renown for his contributions to the theory of statistical turbulence and an analytical model of turbulent heat transfer in tubes and channels. Deissler was recently inducted posthumously into the GRC Hall of Fame as one of the most influential heat transfer researchers in the center's history.



Dr. Deissler

Thomas F. Lakatos, 74, a 1994 retiree with 27 years of NASA service, died August 14. Lakatos was a U.S. Army veteran. He graduated from the NASA Apprentice Program as a research laboratory mechanic in 1971. Lakatos was a member of the hangar crew that modified the F-106. He later served on the Turbine Engine Hot Section Technology (HOST) Team that helped improve analytical and experimental tools for jet engine design and hardware of the 1990s.

Calendar

IFPTE LOCAL 28, LESA MEETING: LESA will hold its next membership meeting, Wednesday, Oct. 14, noon, in the Glenn Employee Center's Small Dining Room.

DISABILITY AWARENESS MONTH: The Disability Awareness Advisory Group will hold its annual observance, Wednesday, Oct. 28, from 2 to 3:30 p.m., Ad. Bldg. Aud. Dr. Maricela Lizcano, Materials Chemistry and Physics Branch, is the speaker. This year's theme is "My Disability is One Part of Who I Am." POC: Kathy Clark, 3-8354.

FEDERAL EMPLOYEE HEALTH FAIR: The National Active and Retired Federal Employees (NARFE), Chapter 470, in collaboration with other NARFE Chapters across Northeast Ohio, will present an

Open Season Health Fair. FEHB health, dental and vision plans representatives will be present. Representatives from the Ohio Senior Health Insurance Information Program, Pro Seniors and the Cuyahoga County Veterans Service Commission will attend. The fair will be held Friday, Nov. 6, from 1 to 3 p.m. at the North Olmsted Community Cabin, 28114 Lorain Road, North Olmsted. All current and retired federal employees are invited to attend.

NASA RETIRED WOMEN'S LUNCHEON: The next luncheon will be held Thursday, Nov. 19, 1 p.m. at Don's Lighthouse, 8905 Lake Avenue, Cleveland. Please contact Gerry Ziemba, 330-273-4850 or email gto64gerry@yahoo.com to reserve your space.

Cyber Security Awareness Month

**Travel Personal/Work:
Is Information Secure?**
Wed., Oct. 14, 12-1 p.m.
Ad. Bldg. Auditorium

**Is Your Use of IT Putting
NASA at Risk?**
Mon., Oct. 19, 12-1 p.m.
Ad. Bldg. Auditorium

Cyber Security Awareness Day
Wed., Oct. 21,
8:30 a.m.-12:45 p.m.
MIC Auditorium

Vendor Day: Latest IT Security
Thurs., Oct. 22, 10 a.m.-1 p.m.
Glenn Cafeteria

**Cyber Defense Supply
Chain Assurance**
Wed., Oct. 28, 12-1 p.m.
MIC, Room 130

Want more information?
Go to Glenn's Office of Chief
Information Officer website:
ocio.grc.nasa.gov

STOP. THINK. CONNECT

In Appreciation

Thank you to everyone at NASA who offered their prayers, condolences, cards, emails and other expressions of kindness on the recent passing of my mother, Margaret Handschuh. It has been a real blessing to be surrounded by such wonderful, caring people during this difficult time.

—Bob Handschuh

Emergency and Inclement Weather Lines
Lewis Field: 216-433-9328 (WEAT)
Plum Brook Station: 419-621-3333

Connect with Glenn



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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 via e-mail to the editor: doreen.b.zudell@nasa.gov or 216-433-5317.

November 2015 Calendar section deadline: Oct. 23, noon
News and feature stories require additional time

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

Glenn, EHOVE Build Mobile Power Plant

Continued from page 1

The EHOVE project was made possible through a NASA Space Act Agreement and funding from the Technology Transfer Office (TTO). Carol Tolbert, a NASA project manager, undertook this joint community outreach opportunity to collaborate with the students from Ohio's Erie County.

Working closely with Glenn's Senior Research Engineer Tony Colozza, Tolbert initiated discussions with the EHOVE administration to move ahead with building the solar power plant.

"We saw that it would be a good fit if we could produce the design, supply the hardware and have EHOVE put it together and get it working," Colozza said. "This partnership would help us complete the test bed and give the students a chance to work on technology with real-life applications."

Students in EHOVE's electrical technology, industrial technology, and collision and refinishing classes, trained by Glenn technicians, worked on the project at both the career center and at Lewis Field. These students installed wiring and electrical boxes, welded sections of the solar frame and painted the trailer. Additionally, three students worked with Glenn's Manufacturing Division to earn welding certification using NASA specifications.



Above: The mobile solar power plant mounted on a trailer. When solar array panels are deployed, they span 512 feet.

Last month, the mobile solar plant proved its worth when it was used with the Glenn-developed Scarab Rover demonstration. The mobile test bed will soon travel to the NASA Johnson Space Flight Center where it will be used as a power source for a spacecraft power system controls test bed.

Tolbert commented, "The Glenn staff was eager to share their time and talents with the students as this is a great example of our ability to advance a highly skilled, competent and diverse workforce."

By Doreen B. Zudell



GRC-2015-C-5798

Photo by Rami Daud

The mobile solar plant, pictured in background, was used with the successful Glenn-developed Scarab Rover demonstration at Lewis Field in September.