National Aeronautics and Space Administration

AEROSPACE Frontiers

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NASA Innovations Make An Impact In the Marketplace

Aerogels Set For Manufacturing, Flywheel Technology Goes For A Spin

NASA Glenn's Technology Transfer Office (TTO) recently negotiated two patent pending, exclusive license agreements.

TTO officials negotiated with FLEXcon of Spencer, Massachusetts, an exclusive license to develop Glenn aerogel technology. The agreement allows FLEXcon and its affiliate, Blueshift International Materials Inc., to manufacture and market Glenn's patent pending polyimide aerogels for many aerospace applications. They include such products as insulation for cryotanks and spacesuits, as well as more down-to-Earth uses in construction, refrigeration and pipe insulation.

"We are delighted to secure this licensing agreement for Glenn's technology," said Center Director Jim Free. "We have hundreds of technologies available for licensing at Glenn, and it is extremely gratifying when the private sector adapts NASA innovations so they can make an impact in the marketplace. By licensing the polyimide aerogel technology to FLEXcon, Glenn gains a commercialization partner."

GRC-2011-3586 Photo by Marvin Smith

GRC-2011-3682 Photo by Michelle Murphy

Above: Award-winning aerogel technology; and right: The G2 flywheel, developed for space application, is the foundation for a new G6 technology.

Flywheels Go to Market

NASA Glenn has also signed an exclusive pre-patent license agreement with Power Tree Corp. of Miami, Florida to use and commercialize Glenn's patent-pending

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Center "Best In Class" For Inclusion

The Greater Cleveland Partnership Commission on Economic Inclusion has selected Glenn as the 2014 Best In Class winner in the category of supplier diversity, nonprofit/government organization. The Greater Cleveland Partnership presented the award to Center Director Jim Free at their annual meeting, June 17.

Commission on Economic Inclusion BEST IN CLASS 2014 Nonprofit/Government Supplier Diversity

The award is based on survey results from commission members who participated in the Commission for Economic Inclusion's 2014 Employers Survey on Diversity. The survey measures three critical aspects—CEO commitment, managers' accountability and business outcomes—of a successful diversity and inclusion strategy.

In This Issue

Caution: Orange Barrels Abound

Construction season is upon us—on our nation's roadways and on our Glenn campuses. It's an indication of the agency's commitment to improve our infrastructure and invest in a safe work environment. According to OSHA, construction is also one of the most hazardous industries in our nation. Incidents involving speeding, backing up and accidents, in general, increase during orange barrel season. Our best defense against these incidents is to observe the barricades and slow down while traveling through construction zones at the center. Cautious, courteous driving and walking are crucial to the safety of those who conduct the work and those who benefit from it.

Enjoy another active summer, be patient and safe traveling!

—Jim

Schubert Named SMA Deputy Director

Schubert

Kathleen Schubert has been selected as deputy director of the Safety and Mission Assurance (SMA) Directorate, effective May 20. She is a key member of the SMA Directorate that is responsible for establishing and assuring compliance with NASA's safety and mission assurance strategies, policies and standards.

Schubert previously served in major leadership roles at both NASA Glenn and NASA's Johnson Space Center for the management and development of the Orion Crew and Service Module. She led the development of the international implementing arrangement with the European Space Agency for the provision of the European Service Module. In addition, Schubert has served in multiple supervisory positions, most recently as the deputy chief for the Exploration Systems Project Office.

"Kathy brings a wealth of knowledge and experience in supervision and space flight development and management," said SMA Director Anita Liang. "She's built successful collaborations within complex and diverse technical teams across the project management, SMA and engineering communities at NASA, as well as with NASA's industrial and international partners."

Enjoy lively music, picnic fare and activities to celebrate NACA and NASA's 100 years of achievements.

2015 Center Picnic

Celebrating US:
Standing on the Shoulders of NACA

Wednesday, Aug. 5
11 a.m.–2 p.m.
Lewis Field Picnic Grounds
Rain Date: Thursday, Aug. 6
(same time and location)

Attention Employees: Watch *Today@Glenn* for registration details
POC: Betsy Lavelle, 216-433-3198

Attention Retirees: You are invited to this year's picnic, so spread the word; See enclosed flyer for registration details

Innovations to Marketplace

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G6 flywheel design. The agreement allows design, build and operation for a variety of power management applications in the electric power industry.

Glenn researchers developed the next-generation flywheel system for power storage that operates without bearings and with increased performance and reliability for both space- and Earth-based applications.

As an energy solutions provider, Power Tree will deploy the NASA flywheel technology for a variety of grid and industrial applications. These include demand-side management functions as well as voltage and frequency regulations, which are particularly vital for grid stability as more renewable energy sources come online.

Glenn's Technology Transfer Office's primary mission is to make NASA technologies available to the public for commercial applications.

"NASA Glenn has been advancing flywheel technologies for more than 20 years," said Kim Dalgleish-Miller, chief of Glenn's Technology Transfer Office. "With Power Tree taking this concept to market, the entire nation benefits, as NASA technology adds value to the power generation sector and ultimately helps to reduce our carbon footprint."

For information on Glenn's G6 flywheel design, visit http://go.nasa.gov/1DHcmyl.

For more information about the polyimide aerogels technology developed at Glenn, visit: https://technology.grc.nasa.gov/featured-tech/aerogels.shtm.

More information about Glenn licensing opportunities is available at https://technology.grc.nasa.gov/.

NASA 1915-2015

A century of aerospace achievement

What was it like to work here when NASA was NACA? Over the coming months, we will share a few memories of NACA employees still working at the center. Our fourth profile is Erwin Zaretsky, who works as a Distinguished Research Associate in the Rotating and Drive Systems Branch, Materials and Structures Division.

Erv Zaretsky

Q. How did you begin your career at NACA?
A. I was "strongly encouraged" to attend a NACA interview arranged by my heat transfer professor, despite my plans to enter the Air Force and flight school to become a pilot. The recruiters persuaded me to work at NACA for the 6 weeks prior to reporting to active duty. They had suggested I go to flight school, then return to become one of NACA's test pilots. Instead, I got immersed in lubrication/bearings research and the rest is history.

Q. What do you remember most about the workforce culture of the early years?
A. What really amazed me was the esprit de corps that the staff had for the agency and camaraderie among their coworkers. Lights stayed on after 5 p.m., and people came in on weekends.

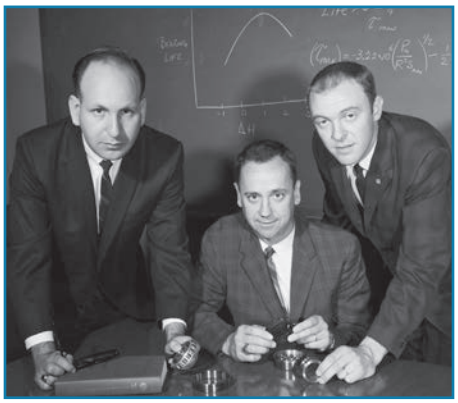
Zaretsky

Q. As NASA has evolved through the years, what has stayed the same?
A. The caliber and capability of the staff has remained very high. However, I believe they are less empowered to peruse pioneering research commensurate to NACA/NASA goals and missions due to monetary and organizational constraints.

Q. Who stands out among those you have mentored over your career?
A. The late Richard Parker, Stuart Loewenthal and Dr. John Coy, stand out from my early career. More recently, I would say Dr. Bruce Steinetz, who specialized in traction drives and seals, and Dr. David Lewicki, whose expertise is research in gearbox life and reliability impacting maintenance and durability of turboprop aircraft and helicopters. Also, recent retiree Fred Oswald, who led our work related to the Space Shuttle Return to Flight after the Columbia accident.

Q. What do you feel is the most important contribution you have made to NASA's mission?
A. I have always worked collaboratively with individual researchers both within and outside the agency or as a member of a research team. From inception to retirement of the Space Shuttle Program, I provided technical analysis and solutions. I worked with Fred Dolan of NASA's Marshall Space Flight Center on a turbopump bearing problem on the 1986 Space Shuttle Challenger disaster. Later, I was a member of the NASA Engineering & Safety Center/Glenn/Marshall team assembled after the Space Shuttle Columbia loss in 2003. We identified a potential wear and lubrication problem internal to shuttle actuators that could impact the reliability and safety of the remaining shuttle fleet.

By S. Jenise Veris



GRC-1966-C-02713 Photo by Martin Brown

Zaretsky, above, left, with colleagues William Anderson and Richard Parker and their award-winning ball bearing research in 1966.

New Lighting Offers Safety, Energy Efficiency

How do you correct a dimly lit area outside, when no outlets are available? You get creative! Read on to learn how Glenn's Facilities Division has provided an economic and energy-efficient solution to exterior lighting challenges.

Parking Lots

Inadequate lighting in several parking lots posed safety issues at Lewis Field and Plum Brook Station. With no available external power to connect the new lights, installing or "trenching" new power would be a costly endeavor.

"After a lighting analysis, we determined that solar light poles could be installed in parking lots of buildings where there is no available power," said Robert Puzak, chief, Systems Management Branch. "These poles provide the needed light and avoids the cost of trenching."

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GRC-2015-C-3468 Photo by Michelle Murphy

Solar lighting, pictured right, in Lewis Field and Plum Brook parking lots provide needed light while saving utility and maintenance costs.

Employees Acknowledge Ultimate Sacrifice

GRC-2015-C-2996 Photo by Bridget Caswell

Glenn's Veterans Awareness Committee (VAC) hosted a Memorial Day Observance, May 21, to remember U.S. Armed Forces men and women who have given their lives serving our country. Employees gathered at the Lewis Field Flag Pole as VAC Advisor Tom Hartline reflected on the fallen heroes. Emma Hicks, 11-year-old daughter of U.S. Army veteran and employee Lisa Hicks, sang the National Anthem. VAC members presented the colors and an honorary wreath.

Visiting Panel Focuses on Safety Performance

GRC-2015-C-3227 Photo by Marvin Smith

The Aerospace Safety Advisory Panel (ASAP), which provides independent assessments of NASA's safety performance and advises the agency on processes for improvement, visited Glenn, June 2 and 3. Panel members, Maj. Gen. (Ret.) Claude M. Bolton Jr. and Dr. Patricia Sanders, toured Lewis Field and Plum Brook Station and received briefings on the broad range of the center's research and projects. Harmony Myers, NASA Headquarters ASAP executive director, and Paula Frankel, ASAP technical writer, accompanied them. Pictured: Dr. David Manzella, front left, highlights the Electric Propulsion Laboratory for, left to right, Dave Irimies, Kurt Hack, Bolton, Sanders, Frankel and Myers.

Local Mini Maker Faire Focused on Innovations

Photo by Carlos Gomez

A team from NASA Glenn supported the 3rd annual Cleveland Mini Maker Faire, held at the Cleveland Public Library's Main Branch, June 6. They engaged hundreds of local "do-it-yourself" enthusiasts eager to learn about NASA's cutting-edge, maker-style technology such as additive manufacturing. Pictured: Robert Carter, High Temperature and Smart Alloys Branch, displayed prototype NASA hardware made by additive manufacturing (3-D printing) using advanced materials such as Glenn-developed chopped carbon fiber polymers.

Basic Conflict Management Training

Conflict is a product that appears when emotions become heightened in any situation. However, there are proven ways that can mitigate and eliminate the negative feelings that arise from conflict.

Katey Forskett of Curtis Lewis & Associates will provide onsite Basic Conflict Management Training:
Managers and supervisors: July 29
Employees: July 30

See *Today@Glenn* to register by July 22.

It's Here...WING 2.0!

The center's new internal website, Web IntraNet @ Glenn (WING), was released on July 1. WING is now supported by the WordPress Content Management System, and provides several overall site enhancements that enable employees to:

- View WING content on ACES-managed smartphones and tablets
- Search information across all WING and *Today@Glenn* content
- Find Glenn event information on the WING homepage

Employees will also notice improvements to the center's daily news bulletin, *Today@Glenn*. New features such as a date selector and a "My Submissions" link make it easier to navigate the news bulletin and see messages submitted for posting. Employees are encouraged to report bugs and provide feedback via the "Bug Report," and the "Questions" and "Survey" links at the bottom of the page.

Glenn Heightens Interest in Science

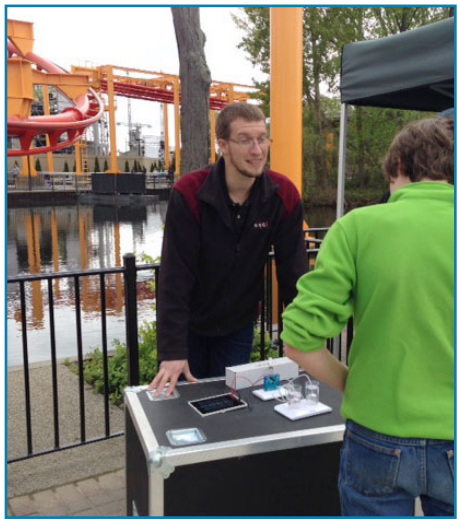

Photo by Nancy Hall

Glenn scientists and engineers, aided by NASA displays and exhibits, created a science laboratory at Cedar Point Amusement Park during "Physics, Science and Math Week," May 11–15. They talked with participating students and the general public about Glenn's contributions to International Space Station research, Orion/Space Launch System/Commercial Crew and NASA's aeronautics and science missions. They also conducted demonstrations related to rocket propulsion, alternative energy and microgravity science. Left: Nick Schifer, Thermal Energy Conversion Branch left, explains his demonstration.

Event Promotes Employee Outreach Staffing

Photo by S. Jenise Veris

A significant part of the NASA presence in the community is employees staffing exhibits and conducting demonstrations during public events. In preparation for the 2015 outreach schedule, the Office of Communications and External Relations conducted a staffing fair, May 28. The event provided potential staffers opportunities for training on demonstration carts, the photo booth, the inflatable astronaut costume and other exhibits/models used to create a NASA presence at outreach events. Pictured: Kristin Spear, Radioisotope Power Systems Program, (left) conducts training on the Alternative Energy demo cart. For a list of outreach staffing opportunities, visit http://outreach.grc.nasa.gov/.

Observances Accentuate Strengths in Differences

Photo by Wayne Wong

Glenn employees participated in Asian American and Pacific Islander Heritage Month festivities throughout the month of May. They also staffed NASA exhibits at the 6th Annual Cleveland Asian Festival, May 16–17. Glenn's Asian/Pacific Islanders Advisory Group sponsored its annual Asian Heritage Month Observance, May 27. Ben Ebihara, a NASA retiree now with Vantage Partners, pictured, gave a poignant account of how his family overcame hatred and racism as Japanese Americans living in internment camps during World War II. Instrumental performances by Rosa Lee and Janice Liu and Sufi dancing by Denys Morgan enhanced the event.

NASA Recognizes Glenn Technology Among Inventions

The team comprising Senior Technologist Dr. James DiCarlo, Materials and Structures Division, and Dr. HeeMann Yun, GE Aviation, received runner up for NASA's Government Invention of the Year (IOY).

Their invention, "Methods for Producing High-Performance Silicon Carbide (SiC) Fibers, Architectural Preforms and High-Temperature Composite Structures," significantly improves the properties of commercial high-performance SiC fibers that use boron or boron-containing compounds in their production (U.S. Patents 7,687,016 and 8,894,918). Fibers produced using this new process display higher strength retention, reduced fiber creep, and increased resistance to rupturing, even after exposure to high temperatures, mechanical stresses and severe environmental conditions. This advancement helps pave the way for the use of lightweight ceramic matrix composites reinforced by these SiC fibers in gas turbine hot-section components, where heat tolerance and durability for higher than metallic alloys are needed.

NASA's IOY program annually recognizes government and commercial inventions that have significantly contributed to NASA programs, or that exemplify NASA's mission to transfer cutting-edge technology to the U.S. industry.

Image credit: NASA

Dr. Yun and Dr. DiCarlo analyze a ceramic composite tube fabricated with the invented SiC fibers.

Promotions and Awards

Mark Kowaleski has been named chief of the Safety and Health Division (SHeD) of the Safety and Mission Assurance Directorate, effective May 31. Kowaleski previously served as the System Safety Discipline lead at the NASA Safety Center. He brings extensive safety experience as Headquarters' Safety and Mission Assurance manager for the Space Shuttle Program; executive director of the Aerospace Safety Advisory Panel; and systems engineer for the Earth Observing System at NASA Goddard.

Kowaleski

Walker

Darlene Walker has been named deputy chief of the Office of Education (OE) in the Center Operations Directorate, effective May 17. Walker previously served as the agency's Science, Engineering, Mathematics, and Aerospace Academy (SEMAA) project manager as well as the OE K–12 Education Team lead. She was responsible for the integration of a variety of local and national Science, Technology, Engineering and Mathematics (STEM) programs.

Dr. Paula Dempsey, Rotating and Drive Systems Branch, received the Best Paper Award for the 69th Meeting of the Society of Machinery Failure Prevention Technology (MFPT), held in Huntsville, Ala., in May. This award is presented to the conference paper with the highest level of excellence in technical content, clarity, originality and technical value. The paper, "Detection of Spiral Bevel Gear Damage Modes Using Oil Debris Particle Distributions," presented results of damage progression tests performed in Glenn's Spiral Bevel Gear Fatigue Test Rig.

Dr. Dempsey, center, with MFPT Executive Director Chris Pomfret, left, and Chairman, MFPT Board of Directors John Lucero.

Retirements

Luann Keys, Facilities Division, retired June 3, 2015, with 33 years of service.

Keys

Bruce A. Wright, Aviation Environments Technical Branch, retired June 30, 2014, with 35 years of service.

In Appreciation

Thank you to my friends and colleagues who signed my retirement book, card and poster or attended my retirement party. The gifts are all greatly appreciated as are your well-wishes as Vickie and I start our next adventure.

—Neil T. Van Dresar

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

Connect with Glenn

More Than a Memory

Lancashire

Smith

Richard D. Heath, 83, a 1988 retiree with 26 years of NASA service, died June 10. Heath was a Navy veteran of the Korean War with a long and distinguished career in various engineering and leadership roles at NASA, the National Oceanic and Atmospheric Administration and industry. Heath worked primarily at Plum Brook Station supporting the Rocket Systems Area and Space Power Facility Division. He served on the center's Incentive Awards Committee and was a recipient for his "Use of High-Pressure Gas Storage Cylinders" suggestion.

Richard B. Lancashire, 78, a 1995 retiree with 37 years of service, died Aug. 9, 2014. Lancashire was a mechanical engineer who developed technical and managerial expertise in diverse areas such as ramjet combustion, high-powered lasers and advanced ceramic materials for heat engines. He earned NASA's Exceptional Service Medal (1990) for contributions that helped the center gain leading roles in programs such as the Space Station Freedom and the Human Exploration Initiative. He was deputy chief, Office of Advanced Space Analysis, when he retired.

Floyd Z. Smith, 92, a 1989 retiree with 31 years of federal service, died June 12. Smith was an Army veteran of World War II, who joined the NASA workforce as a licensed mechanical engineer in 1961. He served as branch manager of the Atlas/Centaur Structural Systems Branch for more than 50 NASA launches, including Surveyor, Intelsat, Mars Observer, GOES, Solar and Heliospheric Observatory (SOHO), Cassini, Viking, High Energy Astrophysical Observatories (HEAO), Voyager, Pioneer-Venus, Mariner and Helios. His son, Brian Smith/VPL, supports Glenn's Management Support and Integration Office.

Calendar

CENTER GOLF OUTING: Glenn will hold the 6th Annual GRC Open Golf Outing, Friday, July 31, at Mallard Creek Golf Course. The four-person scramble is open to NASA employees, contractors, retirees, friends and family members. Shotgun start at 9 a.m. Cost is $65 per person and includes golf, prizes, cart, donuts, beverages and dinner. See *Today@Glenn* for details. POC: Jeff Swan, 216-433-5434.

SATURDAY TOURS AT LEWIS FIELD: Glenn offers free tours of its world-class facilities at Lewis Field one Saturday a month through October. Tour buses depart from the Main Gate every hour starting at 10 a.m. One-hour tours begin with a multimedia presentation in the Briefing Center Auditorium. The Aug. 1 tour will showcase the Graphics and Visualization and the Reconfigurable User-interface with Virtual Reality Exploration laboratories. For more information and a complete schedule, visit http://www.nasa.gov/centers/glenn/events/tours.html.

IFPTE LOCAL 28, LESA MEETING: LESA will hold its next membership meeting, Wednesday, Aug. 12, noon, in the Glenn Employee Center's Small Dining Room.

2015 HONOR AWARDS CEREMONY: Celebrate with Agency Honor Award and other Agency-Level Award recipients Friday, Aug. 14, 9:00 a.m. to 12:30 p.m. in the MIC Auditorium (bldg. 162). POC: Jasmine Coad 3-8631.

RETIRED NASA WOMEN'S LUNCHEON: The next luncheon will be Thursday, August 20, at 1 p.m. at Thyme2 Restaurant, 113 W. Smith Rd., Medina. Please make your reservation with Gerry Ziemba at 330-273-4850 or gto64gerry@yahoo.com.

Glenn Recognized for Communications Efforts

Two professional organizations recognized employees in Glenn's Office of Communications and External Relations for their work in the areas of social media and print communications.

Glenn's Web Portal Team of Nancy Smith Kilkenny (SGT), Kelly Heidman (Peerless) and Kathy Zona won an APEX Award of Excellence for their work in establishing and creating content for NASA Glenn's Instagram Social Media Account. APEX awards are based on excellence in graphic design, editorial content and the ability to achieve overall communications excellence in electronic media and print.

The Academy of Interactive & Visual Arts awarded the *AeroSpace Frontiers* newsletter and staff, Kelly DiFrancesco, Doreen Zudell (SGT) and S. Jenise Veris (SGT), with a 2015 Communicator Award. The Communicator Award is the leading international awards program recognizing big ideas in marketing and communications.

In receiving the awards, the newsletter and social media teams acknowledge the efforts of Glenn's Imaging Technology Center and Publishing Services staff. Their photography services and graphic design are crucial to producing quality communications products.

New Leadership Focus Speaker Series

Further develop your leadership potential through these 2-hour interactive workshops!

"Emotionally Intelligent Leader: Applying the Concepts"
Dr. Scott Allen, John Carroll University

First session: Wednesday, July 15
10 a.m. to noon • Briefing Center
Register on SATERN-GR-8G1514

See *Today@Glenn* for details.

National Aeronautics and Space Administration

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August 2015 Calendar section deadline: July 24, noon
News and feature stories require additional time

Editor: **Doreen B. Zudell**, SGT, Inc.
Assistant Editor: **S. Jenise Veris**, SGT, Inc.
Managing Editor: **Kelly R. DiFrancesco**

New Lighting Offers Savings, Energy Efficiency

Continued from page 3

Additionally, the solar light saves maintenance and avoids utility costs. The lighting poles use 36-W light-emitting diode (LED) lamps, which consume about 1/3 less energy and last 4 times longer than standard high-intensity discharge (HID) lamps. Motion sensors and 15-percent dimming features also enhance savings.

While solar lighting is not practical in heavily shaded or in readily powered available locations, to date, 8 solar poles have been installed at building 60 since 2012. Additionally, 24 of the newer poles have been installed at Lewis Field and 8 are scheduled to be installed at Plum Brook Station. A lighting analysis and design for solar poles in the Space Power Facility parking lot is underway.

Exterior, High and Low Bay Areas

To address federal mandates aimed at increasing energy efficiency, LED lighting is now a requirement in new exterior design and in interior high and low bay areas. The Facilities Division is replacing HID bulbs with LED lighting in these areas. This helps reduce energy and also reduce maintenance costs.

Puzak reports that LED lighting has been installed in the high bay of three Lewis Field buildings (50, 64, and 301). Plans call for installing LED lighting at Plum Brook Station's Spacecraft Propulsion Facility (B–2).

GRC-2015-C-3471 Photo by Michelle Murphy

The Lewis Field hangar now sports 23, 80-W LED light fixtures—4 additional to light up the words "Lewis Field." The total wattage decreased to 1,840, with a rated lamp life of 100,000 hours.

One of the most notably visible energy savings projects is the external lighting on the NASA sign at the Lewis Field Hangar. Previously, this sign had nineteen 400-W HID light fixtures for a total of 7,600 W and a rated lamp life of 15,000 hours. By replacing those light fixtures with 23, 80-W LED light fixtures—four additional to light up the words "Lewis Field"—the total wattage decreased to 1,840 with a rated lamp life of 100,000 hours.

"These replacement bulbs offer a significant savings," Puzak said. "The LED bulbs use ¼ the energy of the previous bulbs and offer a lamp life 6 times longer than the HID."

Editor's note: The lighting projects are funded through Headquarters under the NASA Energy Fund.

By Doreen B. Zudell