

## **Glenn Helps Prepare Orion's First Flight Test for Launch!**

### NASA Manager Gives Accolades

The Orion Multi-Purpose Crew Vehicle (MPCV)—the next generation spacecraft—begins its journey in December with the Exploration Flight Test-1 (EFT-1). NASA's Orion Program Manager Mark Geyer visited Lewis Field, April 24, to talk about the spacecraft that will support human exploration beyond low Earth orbit.

"This year NASA will launch a spacecraft that will go farther than any has traveled since Apollo!" he said, during his Town Hall meeting.

The uncrewed test flight will take Orion to an altitude of about 3,600 miles above the Earth's surface. This is more than

Continued on page 2



## C-2014-2013

Photo by Bridget Caswell

Left to right: Geyer, Glenn Deputy Center Director Greg Robinson and Director of Space Flight Systems Bryan Smith sign the "I'm On Board!" banner to support EFT-1.



C-2014-2280

Photo by Bridget Caswell

# **Center Celebrates National Lab Day**

Kristin Ratino, Glenn Educational Programs Office, demonstrates how varying temperatures in a vacuum chamber change the size of objects during National Lab Day. Hundreds of area students came out to Lewis Field to learn more about math and science-related careers. Story on page 3.

## **Innovative Program Attracts Veterans**

On the heels of President Obama's challenge to increase the hiring of veterans to 100,000 by 2013, Glenn has spearheaded a new system to enhance training and developing veterans with disabilities to enter the Federal workforce. Under this new system, Glenn collaborates with the Veterans Administration to develop a qualified

Continued on page 5

## In This Issue

Store Your Boat and RV Onsite...2 Symphonies Pay Tribute ......4 Glenn Collaborates with ESA .....5 Volunteers Rock Robotics .......6 Strategizing Print Services .......8

# **Store Your Boat or RV Onsite**

The NASA Glenn Exchange is implementing a Boat and Recreational Vehicle (RV) Storage Program at Lewis Field and Plum Brook Station. The storage locations are being prepared and vehicle storage is anticipated to begin as early as July 2014.

Vehicles eligible for storage include motor homes, boats and trailers that must be in operating condition at all times. Owners must have proof of ownership, a current valid state registration and insurance for each vehicle the entire duration of storage. This service will be available to all Personal Identification Validation (PIV) badged civil servant and support service contractor employees located at Lewis Field and Plum Brook.

Boat/RV spaces will be available on a firstcome, first-serve basis. Employees must complete a Boat/RV Storage Contract (GRC 945 form) and submit it to the Exchange Business Manager Connie Carroll for approval.

Storage fees are \$300 for 6-month rental, per space, and \$600 for 12-month rental, per space. The rental fee(s) must be paid



at the time of application/contract. Payments can be made by cash, check or credit card. Call Connie Carroll, 216-433-5535, to reserve your space.

The storage lot may be accessed Monday through Sunday spring/summer—April through August from 8 a.m. to 8 p.m. fall/winter—September through March from 8 a.m. to 4 p.m.

Look for details on Today@Glenn.

# **Orion's First Flight Test**

#### Continued from page 1

15 times farther than the International Space Station orbital position. The Orion vehicle comprises five primary elements. They include the Launch Abort System, the Orion Crew Module, Service Module, the Spacecraft Adapter and the fairings and MPCV to the Stage Adaptor.

At the Town Hall meeting, Geyer talked about Orion's evolution and the critical skills Glenn team members bring to the program. NASA Glenn will provide support to the project including propulsion, manufacturing, vehicle integration and testing. Glenn is home to the European Service Module (ESA) Integration Office, which leads the integration effort between the ESA



C-2014-2024

Geyer generated excitement for the test flight during the Town Hall.

Photo by Bridget Caswell

and the rest of the MPCV. The center will conduct thermal and vacuum testing; electromagnetic interference and electromagnetic capability testing; and mechanical vibration modal and acoustic testing in the Space Power Facility at Plum Brook Station.

Geyer met with several civil servant and onsite support service contract teams dedicating their efforts to the program. He later joined Nicole Smith, Glenn project manager for the MPCV Crew and Service Module, in presenting individual and team commendations to employees.

To further support the upcoming EFT-1, Glenn employees signed an "I'm On Board!" banner. The banner was available in the Administrative Building Auditorium during the Town Hall, and later in the Glenn Café. Several employees spread the word about the test flight by tweeting during the signings. The banner will be displayed at the test flight at NASA Kennedy Space Center.

Dr. Timothy Tyburski, chief of Glenn's Exploration Systems Project Office, managing Glenn's efforts in support of the Orion Program, said a lot of progress has been made on the Orion program. "The EFT-1 vehicle is being readied for launch at the Kennedy Space Center. It's not just on paper anymore," he said.

### Orion Program Commendation Awards

Individual Awards

Damon Delad, Umbilical Connector Issues

Kevin Konno, Fairing Separation Test Elliot Schmidt, Finite Element Mapping Analysis Course

Tom Vannuyen, Fairing Separation Test and Failure Review Board

#### Team Awards

MPCV Systems Requirements Document Development Team Kimberly Johnson and Joel Knapp

Orion Service Module Static Test Team Bob Allen, Louis Ghosn, Jenny Hayes Lizalyn McKnight, Nelson Morales, John Ramsey, Andrew Ring, Elliot Schmidt, John Thesken, Corey Varner and Nathan Wilmoth.

#### Cyroshroud Refurbishment Team

Mike Becks, Greg Blank, Brian Brandenburg, Robin Brown, Jerry Carek, Shawn Corwin, Dave Cotton, Chris Czernec, Kevin DeCosta, Tom Dixon, Rich Evans, Ralph Fekete, Chris Griffiths, Stan Grisnik, Bill Hagelberger, Mike Henry, Bob Kohler, Monica Hostler, Robert Hostler, Doug James, Joe Kerka, Andrea Lizzi, Larry Opper, Steve Pitts, Dave Pravlik, Todd Schroeder, Steve Sinclair, Nicole Smith, Henry Speier, Bob Trimble, John Ursem, Steve West, Kevin Winke and Tim Work.

## National Lab Day Attracts Students, Special Guests

More than 300 students from across Northeast Ohio experienced an upclose view of NASA Glenn's research and world-class facilities during National Lab Day, May 19. The event was part of a nationwide initiative to encourage hands-on learning in schools to improve science and math education.

Robert LaSalvia, acting branch chief, Glenn Educational Programs Office, kicked off the event by welcoming students to Lewis Field. Robyn Gordon, director of Center Operations, Glenn; Dr. Roosevelt Johnson, associate administrator for Education, NASA; and Dr. Deborah Delisle, assistant secretary for Office of Elementary and Secondary Education, U.S. Department of Education, provided additional remarks. They encouraged students to work hard in school, believe in their abilities, and not be afraid to dream. They also stressed to students that they are the generation to pioneer future innovation.

Astronaut Douglas Wheelock discussed his career and shared videos to support his experiences on the International Space Station. Wheelock told students that while growing up in Windsor, N.Y., he thought of himself as "an ordinary kid in an ordinary town." Then he began dreaming.

"We're all quite ordinary, but if you begin to dream and picture yourself doing it, you can achieve your goal," he said.

The event included a variety of demonstrations and fun activities to expose students to new career fields; and provide memorable hands-on experiences in science, technology, engineering and mathematics (STEM).

Additionally, a panel of distinguished educators conducted a STEM forum. They discussed STEM education policies and future direction with regional superintendents, university faculty, teachers and STEM content partners.

-By Doreen B. Zudell





Photo by M. Murphy





C-2014-2181

Photo by Michelle Murphy

Photo by Michelle Murphy



Pictured top to bottom: Astronaut Wheelock inspires students • Intern Austin Vorisek demonstrates wind tunnel technology • Students learn about tires for Mars • Dr. Dan Raible, far left, and Dr. Afroz Zaman, far right, brief Dr. Johnson and Dr. Delisle on laser communications technology • Panelists, left to right: Dr. Delisle; Dr. Johnson; Dr. Sajit Zachariah, Cleveland State University; and Aimee Kennedy, Battelle, discuss STEM education policies • Glenn volunteers on right, back to front: Zachary Williams, George Saad and Kristin Spear brief students on NASA technologies



C-2014-2219

Photo by Michelle Murphy



### **News and Events**

### Local Musical Tributes Showcase NASA

Two local orchestras paid tribute to NASA in April. On April 25, the Cleveland Pops Orchestra and NASA Glenn presented "To Reach the Unreachable Stars: A Tribute to NASA and the 25 NASA Astronauts from Ohio" at Severance Hall. Cleveland Pops performed music from various science fiction movies and other popular compositions accompanied by multimedia presentations of NASA footage created by Glenn's Imaging Technology



Center. Ohio astronauts Mike Foreman and Don Thomas (retired) joined Center Director Jim Free in providing remarks to offer insight into some of the imagery. NASA exhibits highlighted Glenn's groundbreaking work. Similarly, Canton Symphony Orchestra patrons enjoyed a live concert of Gustav Holst's "The Planets" in the Umstattd Performing Arts Hall, April 26. A video of NASA's latest planetary images, commissioned by the Houston Orchestra, accompanied the

Photo by Marvin Smith

performance. Pictured above, left: Carlos Gomez, Community and Media Relations Office, staffs Glenn's space exploration exhibit in Canton. Above, right: Thomas narrates "Voyage Into Space," originally composed for John Glenn by Peter Nero.



### Exploring Talents Through the Arts

Volunteers from Glenn's Disability Awareness Advisory Group and the Office of Diversity and Equal Opportunity helped make May 8 memorable for 900 individuals with disabilities attending the VSA Ohio/Cleveland Area Service Division festival. VSA Ohio is part of an international organization committed to changing perceptions and classroom practices for how all people can learn through, participate in and enjoy the arts. Students explored their talents at activity stations featuring various art media and performances in dance, drama and music illustrating "The Arts: Tell a Story" theme. The Cuyahoga Public Library partnered on one of four NASA stations to demonstrate 3-D printing, an innovative technology capable of reproducing products of all types and textures more affordably. Pictured: Glenn's Mark Smith applies NASA temporary tattoos.

Photo by Richard Woodward

#### Glenn Sparks Federal Reserve Bank's Innovation

NASA Glenn's Creativity and Innovation (C&I) team hosted 43 employees from the Federal Reserve Bank (FRB) of Cleveland's Statistics & Analysis and Credit Risk Management departments on April 24. The group came to tour and learn about a methodology the C&I team is promoting to improve innovation at Glenn. C&I team members guided FRB participants in an "ideation" session (pictured) to apply the methodology for generating ideas on ways the FRB can integrate creativity in their daily tasks. Their visit included a tour of the Simulated Lunar Operations (SLOPE) facility.



Photo by S. Jenise Veris



### NASA and Tower Share 70-Year Union

Len Tower recently celebrated a 70-year association with NASA that began in 1944 as a co-op student with the Aircraft Engine Research Laboratory. He retired in 1979 with 35 years of service. Now, as a Distinguished Research Associate, Tower contributes a few hours a week modifying computer codes he wrote to analyze heat pipe performance under space environments. The Thermal Energy Conversion Branch acknowledged Tower's contributions during a luncheon, March 28. Pictured: Tower with retired Branch Chief Richard Shaltens, left, and Lee Mason, branch chief, Thermal Energy Conversion Branch, right.

## **Glenn Collaborates With ESA on Communications Experiment**

NASA Glenn and the Politecnico di Milano (Polytechnic University of Milan, Italy) have initiated an experiment that could lead to the development of nextgeneration communications satellites.

On April 15, four members of the Glenn radio frequency (RF) wave propagation team traveled to Milan, Italy, to install a beacon receiver atop the university's Electrical Engineering Building. The beacon receiver is a critical piece of hardware for their joint propagation experiment, designed to receive a signal from a beacon aboard the European Space Agency (ESA) Alphasat spacecraft.

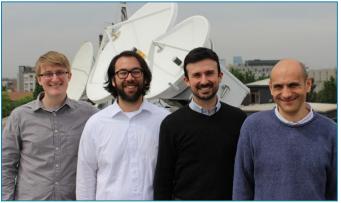
James Nessel, Advanced High Frequency Branch, led the team that designed, fabricated and tested the hardware in Glenn's RF Propagation Research Laboratory at Lewis Field. RF propagation research provides critical data on atmospheric effects-such as rain, clouds and snow-that aids in system planning for ground-to-space communications system design and performance.

Glenn will operate the experiment and collect data remotely from Glenn's RF **Propagation Research** Laboratory. The university will also receive the data and oversee the site and maintenance of the hardware throughout the 5-year duration of the experiment.

Nessel said the Milan installation is the fifth

Glenn-led propagation terminal site in the world. Other locations include Goldstone, Calif.; White Sands, N.M.; Dededo, Guam and Svalbard, Norway. Milan is the first NASA site, however, to monitor at higher Q band (40 GHz) frequencies. Existing terminals operate under Ka band (20 GHz) frequencies.

"The data we collect from this experiment could assist in developing



Left to right: Michael Zemba and James Nessel from Glenn with Lorenzo Luini and Carlo Riva from the Politecnico di Milano stand in front of the Glenn-developed beacon receivers.

the next generation tracking and data relay satellites," Nessel said.

-By Doreen B. Zudell

#### **Team Members**

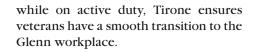
Jacquelynne Morse, Robert Manning, James Nessel (lead), Brian Vyhnalek and Michael Zemba, Advanced High Frequency Branch; Nicholas Varaljay, Space Power & Propulsion, Communication and Instrumentation Branch

## **Innovative Program Attracts Veterans, Disabled** -

Continued from page 1

pool of veterans with disabilities, while meeting Agency diversity goals in hiring and expanding employment opportunities for veterans.

Doris Tirone, Office of Human Capital Management (OHCM), is leading this effort. As a 22-year Navy career veteran and a former outplacement counselor



"We're working with the VA's Veteran Rehabilitation and Employment Program (VR&E) rehabilitation counselors and Glenn supervisors to target specific positions/careers that will help our

> veteran interns get the vital work experience they need. In turn, the center is temporarily able to fill skill gaps," Tirone explained.

Tirone said veterans, who have 20 percent or greater serviceconnected disability and have experienced obstacles to obtaining/ retaining employment, are eligible for the VR&E program. Veterans who complete the VR&E

training program are eligible for direct hire appointments in the federal government. VR&E is managed by the Veterans Administration, under the regulations of Title 38/Chapter 31.

In 2013, Glenn hired 15 veterans, the highest veteran rate in the agency (20 percent) and for disabled veterans (26.7 percent). The center is currently working with the VA to establish a network of VR&E counselors working with veterans interested in training opportunities with NASA.

"The NASA brand attracts many qualified interns and, to date, Glenn has been able to bring on six veterans through the VR&E program who don't count against our FTE," said "Lori Pietravoia, director of Glenn's Office of Human Capital Management. "The VA pays them a stipend and VR&E is fully funded, including any education and training costs. It's a win-win situation."

-By S. Jenise Veris



Pietravoia, left, and Tirone, right, with current Veteran interns representing all branches of the military. They are, left to right: Christopher J. Miller, Curtis Rimer, Joshua Jones, Daniel Saccomando and Kyle Lynch. Not pictured: Joshua Dumont.

## **Employees Named Outstanding FIRST Volunteers**

Volunteers are one of the most critical elements contributing to the success of Cleveland's own version of March Madness—the Buckeye Regional FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition (FRC). During this year's championship finale, March 22, three Glenn employees received an Outstanding Volunteer Award for longstanding contributions that significantly impact the quality of the competition.

"This year the Buckeye Regional welcomed 53 high school student teams for the competition.Without this dynamic duo, you wouldn't know the score!" saidAnn Heyward, Buckeye Regional Committee chair, of award winnersAdam and Chip Redding, serving in Glenn's Aviation Environments Test Engineering and Mechanical Design branches, respectively. The Redding brothers have been part of the Buckeye Regional family



Murray emcees at the FRC.

## Space Flight Awareness Awards

since it began in 2002, and the FIRST program since 1995. Together, they manage and operate the scoring and the field control systems. From pushing the button to begin autonomous play to posting final match points, they play a critical role in ensuring a smooth flow of match play and maintaining the pace of the event.

As master of ceremonies (aka, emcee), Matt Murray, WYLE/Imaging Technology Center, Logistics and Technical Information Division, kept the teams and audience pumped up throughout the ups and downs of competition. Murray was cited for his ability to entertain, inform and cheer all the teams throughout the game. He has been a true ambassador of FIRST, always smiling and encouraging contestants.



Adam and Chip Redding, left and center, tally scoring.

NASA Glenn is the largest sponsor of the Buckeye Regional FRC, one of FIRST Foundation's innovative programs offering students the excitement of sport combined with real-world engineering.

"Glenn provides professional volunteers who mentor students in designing and building robots and assist with event coordination. We also grant Buckeye Regional scholarships to participating schools," said Stephanie Brown-Houston, FIRST project manager at Glenn.

-By S. Jenise Veris



C-2014-2298

Photos by Bridget Caswell

Glenn conducted a ceremony in May to recognize several employees with a prestigious Space Flight Awareness (SFA) Program Award (sfa.nasa. gov/). Joel Kearns, deputy director of Glenn's Space Flight Systems Directorate, and nominating managers presented the awards. The Multipurpose Crew Vehicle (MPCV) Crew Module Pallet Vibration Test Team was recognized for outstanding technical expertise and professionalism in setting up complex instrumentation systems and sensors for a vast data collection effort, despite added scope and several setbacks. Continued on page 7



C-2014-2314

Above: The Crew Module Pallet Team and presenters, include pictured, left to right: Joel Kearns, retiree Paul Steve, James Szelagowski, Kevin Blake, Trevor Jones, Scott Cutlip, Dr. James Akers, Vicente Suarez, Lucas Staab, Joseph Ursic and Dr. Dexter Johnson. Not pictured: Tom Goodnight.

Left: The COMPASS team and presenters pictured, left to right, top row: Maria Babula, Jonathan Drexler, Mike Martini, Rob Falck, Mike Bur and Tom Packard. Second row: Joel Kearns, Tim Verbey, Jeff Woytach, Jim Fittje, John Gyekenyesi and Gary Kelm. Bottom row: Steve Oleson, Sally Gulan, Melissa McGuire, Jennifer Jordan and retiree Glen Williams. Not pictured: Leslie Balkanyi, Laura Burke, Kristen Bury, Antbony Colozza, Homer Fincannon, David Grantier, Dr. Geoffrey Landis, Lorie Passe, Carlos Rodriguez, Carl Sandifer, Paul Schmitz, David A.Smith, Dr. Anita Tenteris-Noebe, Jesse Terry, Gregory Walker and Joseph Warner.

### **Space Flight Awareness Awards**

Continued from page 6

The multidisciplinary Collaborative Modeling for Parametric Assessment of Space Systems (COMPASS) engineering team was recognized for exemplary service to NASA by answering critical questions and providing detailed spacecraft mission concepts for both human exploration and space science missions.

Kevin R. Carmichael received the SFA Management Award for his approach to creating, generating and finishing the first-ever Web-based handbook for NASA software development. Carmichael successfully led a small focused team, across four different states, to develop the handbook, which can be tailored for use by disparate teams and individual software developers.

### More Than a Memory

Walter A. Bishop, 80, a 1996 retiree with 33 years of NASA service, died March 20. Bishop spent most of his tenure leading testing of jet engine components in the Propulsion Systems Laboratory to further NASA's engine research technologies. He retired as deputy chief of the Aerodynamics Icing and Flight Branch in the Aeropropulsion Facilities and Experiments Division. He was an active member of the NASA Ski Club.

**Russell M.** "Slim" DeLombard, 91, a 1984 retiree with 23 years of NASA service, died March 21. DeLombard was a pilot and U.S. Army veteran of World War II. He joined the Plum Brook Station staff as an electrical engineer in the Electrical Equipment and Controls Section, and retired from the Engineering Division at Lewis Field. He taught many colleagues how to fly and served on the Lewis Safety Committee. *A memorial service will be held on June 20 at 7 p.m. at the Foster Funeral Home & Crematory*, *410 Main St., Huron, Obio.* 

Lee M. Woods, 76, a 1991 NASA retiree with 37 years of federal service, died March 18. Lee began his 27-year NASA career following 10 years in the U.S. Navy. He was an aerospace services operator in the Facilities Operations Division, who primarily supported the center's wind tunnel operations. As a member of the Supersonic Tunnels Operations Section, Woods aided major research efforts such as the turboprop Quiet Clean Short-Haul Experimental Engine, Space Shuttle and Zero G programs.

### Calendar

**SPACE SATURDAY:** The June 21 event for Space Saturday at the Great Lakes Science Center will be focused on "Space in 3D." It will feature presentations in 3D by Glenn's GVIS Lab. NASA exhibits and STEM activities are planned to enhance the event. For more information, contact David DeFelice, 216–433–6186.

IFPTE LOCAL 28, LESA MEETING: LESA will hold its next membership meeting Wednesday, July 9, noon, Employee Center's Small Dining Room.

JULY PUBLIC TOUR: The next Saturday tour, July 12, will highlight the Icing Research Tunnel. Tours are open to U.S. citizens and lawful permanent residents. Space is limited and reservations are required for admission. To register, call 216–433–9653 or send an email to sean.r.delaney-gesing@nasa.gov. For more information and a complete schedule of Glenn's tours, visit http://www.nasa.gov/centers/glenn/events/tours.html.

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



**CORRECTION**: Julie Kleinhenz, who coordinated NASA's role for the "Girls Take Flight" event featured in the May issue, page 4, was accidently omitted from the list of volunteers.



Carmichael, center, receives the SFA Managers Award from Joel Kearns and Maria Babula.



Bishop







Woods

Mark your calendar! Mission Integration Center, building 162, ribbon cutting ceremony and open house

Wednesday, July 30 beginning at 10 a.m. Speakers, selfguided tours, refreshments and more! See *Today@Glenn* for more details.

### Retirements



Bruce Bream, Program and Project Assurance Division, Safety and Mission Assurance Directorate, retired April 30, 2014, with 24 years of NASA service.

Bream

#### National Aeronautics and Space Administration

John H. Glenn Research Center at Lewis Field 21000 Brookpark Road Cleveland, Ohio 44135

www.nasa.gov

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 Community and Media Relations Office 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.

#### July 2014 issue copy deadline: June 20, noon

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





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

## New Printer Services Strategy Creates Efficiencies

In support of the President's Executive Order 13589, "Promoting Efficient Spending," the center is implementing a printer services strategy to increase efficiencies within the information technology environment. The new strategy focuses on reducing the printer-to-employee ratio through a redistribution and relocation of network printers and multifunctional devices (MFD).

Earlier this year, staff from Glenn's Office of the Chief Information Officer (OCIO) created a Printer Optimization Project Team comprising representatives from across the center. Team members from Lewis Field and Plum Brook Station reviewed building layouts, number of employees per floor and current location of ACES-supported printers. They then made suggestions to help determine printer-to-employee ratios. The process also includes a waiver option to address special circumstances.

"Currently, the center spends close to \$1M yearly on printers and toner, from both CM&O [Center Management and Operations] and Project funds. Our goal is to reduce the ACES print fleet by 50 percent, and eliminate the purchase of non-ACES toner and printers, which translates to a savings of around \$400,000 a year," said Print Optimization Project Manager Quiana Reese, Integration Office.

If you have questions about the printer services strategy, please contact the ACES Help Desk or visit https://ocio.grc.nasa.gov/print-optimization/.

-By Doreen B. Zudell

## Smartcard Login: Don't Forget!

#### Forget Your PIN?

Visit the Office of Protective Services Security/Badging window at the Lewis Field Main Gate on Tuesdays and Thursdays from 7 a.m. to 2 p.m.; OR

Make an appointment with Badge Support: 3-2206 or 3-9727 (Lewis Field) or 4-3226 (Plum Brook)

#### Forget Your Badge?

Request a temporary badge at the Main Gate at Lewis Field or Plum Brook; THEN

Call the ESD, 1-877-677-2123, or 3-4848, to have your computer temporarily reset to accept your Agency User ID and Password

The implementation strategy, now underway, includes the following objectives:

- Achieve a printer-to-employee ratio of approximately 1:20
- Reduce current MFD placement to one per floor
- Access to one color printer per floor (for most buildings)
- Gradually reduce personal printers and associated toner through attrition
- Reconfigure current printer settings to default to double-sided print, black and white copies, and enable Personal Identification Verification (PIV) for secure printing

