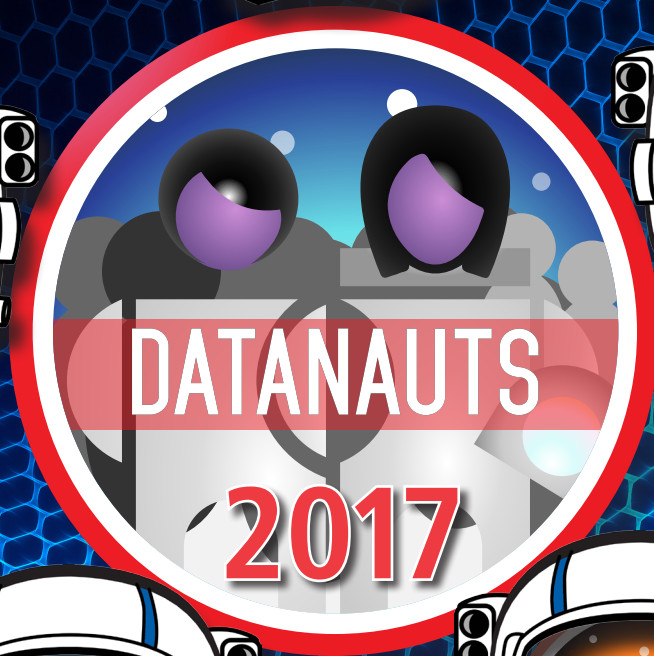


IT Talk

April - June 2017

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Message from the NASA CIO

I'm always proud to boast about the terrific work being done at the Centers. In this issue, we'll explore how the NASA Datanaut program is providing another year of data science discovery. Datanauts is a year-round opportunity to learn and practice data science skills. Datanauts are engaging with our open data to create innovative new thinking, processes, and products.

Also one year ago, we reached a successful milestone by implementing the Information Technology Business Services Assessment plan. The IT BSA is changing the way we do business and helping us to uncover savings, assist collaboration, and minimize redundancies.

We took a hard look at how we manage IT and outlined a series of steps the Agency needs to take to optimize and protect our IT assets. The BSA is ensuring that IT is seen as a strategic Agency resource, establishing clear direction for the NASA CIO to approve the Agency's IT spending plan for oversight of non-highly specialized AND highly specialized IT investments. Our job is to deliver IT as a strategic partner to enable the mission safely and securely. We'll take a look at where we are today and where we still need to go tomorrow.

And finally, technology trends continue to affect the way we do work. Employees can be more productive and more satisfied, and we can accomplish NASA's mission more quickly, more securely, and at lower cost. We'll show you something new on the horizon that may impact the next generation of explorers.

I hope you enjoy this issue.

~Renee



NASA Women in Tech *By Eldora Valentine, OCIO Communications Officer, Headquarters*

A special congratulations goes to NASA Chief Information Officer Renee Wynn and Acting Deputy Associate Chief Information Officer for Technology and Innovation Beth Beck, who made *FedScoop's* top women in technology list for 2017. You can read more at <https://www.fedscoop.com/fedscoops-top-women-in-tech-2017-renee-wynn/> and <https://www.fedscoop.com/fedscoops-top-women-in-tech-2017-beth-beck/>.

Additionally, NASA Chief Information Security Officer Jeanette Hanna Ruiz has been named one of the top women in cybersecurity by *CyberScoop*. For more information, visit <https://www.cyberscoop.com/top-women-in-cybersecurity-jeanette-hanna-ruiz/>.



Renee Wynn, CIO



Beth Beck, Acting DACIO for T&I



Jeanette Hanna Ruiz, CISO

NASA's Deaf and Hard of Hearing Community Utilizes IT Solutions to Enhance Collaboration

By Vince Whitfield, Communications Specialist, Langley Research Center

Deaf and Hard of Hearing (D/HH) employees across the Agency are discovering new ways to leverage collaboration services provided by the Agency's Office of the Chief Information Officer (OCIO). William F. Wood is a LabVIEW developer/architect and an engineer for various hardware prototype systems at NASA Langley Research Center. He is part of an initiative to enhance communication options for D/HH employees at NASA by utilizing the Agency's Desktop Mobile Video Teleconferencing System (ViTS).

Wood has worked at NASA Langley Research Center (LaRC) for 25 years. He was born Deaf and utilizes interpreter Christina York to communicate with his team members and peers. Last year, he began collaborating with fellow D/HH NASA employee Jessica Conner, who works at NASA Kennedy Space Center (KSC) and is the founder of the Agency-wide D/HH Interest Group (DHHIG). "This is an opportunity for us to get to know each other, develop networking, share information and successful stories, discuss signs for NASA terminology, provide feedback about assistive technology, and more," Conner said. In April, 2016, the first NASA DHHIG ViTS

session took place, with 19 participants connecting from conference rooms across multiple Centers. The DHHIG determined that since ViTS is not tailored to each participant's individual needs, and scheduling sessions often requires participants to reserve the ViTS room months in advance, there might be better options.

What the DHHIG needed was an application that would work from within their own workstations and could accommodate a wider range of meeting schedules. Joan Roberts, who works in the Office of the Chief Financial Officer (OCFO) at NASA LaRC and whose parents are both deaf, connected Wood with Ed McLarney, the Center's Chief Technology Officer for Information Technology. McLarney introduced the DHHIG to Desktop Mobile ViTS as an alternative to the conference room-based ViTS.

Wood, who is the technical point of contact for the DHHIG, found that Desktop Mobile ViTS is much better suited to the specific communication needs of D/HH users. He recently began meeting with trainers and developers from the Communications Service Office at NASA Mar-

shall Space Flight Center (MSFC), the facility that provides Desktop Mobile ViTS, to test various configurations of the service. The goal of this testing and development is to identify the best mobile video communication system. "I am very excited about our team effort to be able to improve the video communication technology directly with their developers, who are very eager to have our feedback," Wood said.

In addition to utilizing videoconferencing to communicate with his fellow employees, Wood is also working to help NASA's D/HH community agree on common sign language for technical terms used within NASA where none already exist. "Because there is no formally centralized Agency-wide program for D/HH employees to be able to collaborate with each other, we have developed our own sign language for many, if not most, of the technical words we use daily," Wood explains. He also sees the technology's potential to inform students about careers at NASA, plan events such as Deaf Awareness Week, and expand discussions about D/HH accessibility issues to all Centers.

Efforts such as those undertaken by Wood and the DHHIG are outstanding examples of the powerful nature of using collaborative technology in innovative ways to meet the needs of diverse NASA populations. To find out more about the Agency's collaboration services, visit the NASA Communications Service Office page at <https://cso.nasa.gov/>. ♦



NASA DHHIG Members William Wood, Joan Roberts, and Christina York use American Sign Language (ASL) to discuss communication systems.

A Robotic Ambassador

By Tomas Soderstrom, Chief Technology and Innovation Officer, and Michael "Mik" Cox, IT Data Scientist, Jet Propulsion Laboratory, California Institute of Technology

How can we reach and impact the next generation of explorers? How can we make them care about science, engineering, and technology? How can we prepare them to work for NASA?

What if we built a cute, smart rover with which they can talk? If we built it, would they engage?

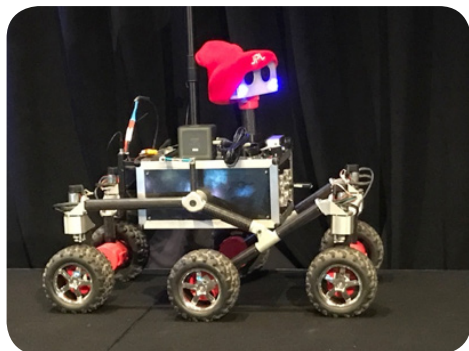
As it turns out, Jet Propulsion Laboratory (JPL) actually did build one...and ROV-E is her name-o.



The Remotely Operated Vehicle for Education (ROV-E) was built over the course of about a year by six early-career hires at JPL as a way to learn the end-to-end process for building a spacecraft. They designed and built ROV-E to go to schools and museums and drive over people as they lay on the floor. The rover has expandable USB ports to allow future engineers and dreamers to give her new features.

This year, we used these USB ports to give ROV-E a voice through Amazon's Alexa, powered by Amazon Lex.

We demonstrated ROV-E's new features at Amazon's re:Invent conference in December 2016. ROV-E, looking a bit like the Curiosity rover, strutted her stuff in front of several thousand people, and they marveled at her prowess and agility.



She drove and answered questions about Mars (yes, by speaking). She is built from mostly open source software and hardware components and 3D printed parts. She can take driving commands both from voice commands and from an optional remote control. She can automatically follow you around using a camera and a 3D depth sensor. She can avoid obstacles and even has a blinker to tell us where she's going. She can do this through a constant connection to the Internet.

The grand finale of ROV-E's demos happened when we turned off the Internet on stage—and ROV-E kept going. This feat constituted the worldwide launch of a new technology called Green-grass that Amazon and JPL had worked on and that Amazon launched at the re:Invent conference. It allows Lambda and IoT (Internet of Things) functions to work without Internet and to reconnect and continue to stream data and update themselves once Internet is available again. This type of technology could be really important to NASA in offline situations such as sending rovers under vast sheets of ice or automatically guiding rovers to help find and rescue stranded miners.

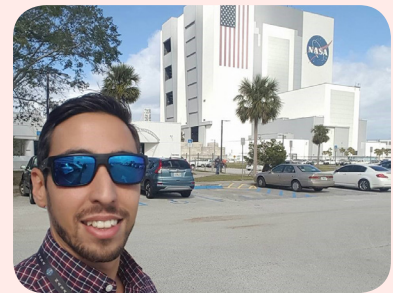
So, did people engage? Yes, they did. ROV-E was the star of the show, with people even asking to take selfies with her. She has appeared at the NASA booth at the Consumer Electronics Show and has gone to numerous outreach events. We have since released the logic for ROV-E's voice to the public through a custom Alexa skill called "NASA Mars," where anyone can get answers to thousands of questions about Mars as well as the latest updates on what the real Curiosity rover is up to on Mars.

We decided to take the next step and make ROV-E available to the world through inexpensive open source components and a simple instruction manual so that anyone can build one at home or at school. We want to make it cheaper and easier than it currently is to build. We also want to make it into a science platform, where citizen scientists of all ages will be able to add their own hardware and program their own experiments.

By the end of this summer, ROV-E will come to explorers and tinkerers of all ages and to a school or museum near you. We hope that ROV-E will be a robotic ambassador that will make NASA proud and inspire everyone to participate in NASA's mission. ♦

Federal 100 Winners Announced

Congratulations to 2017 Federal 100 winners Luis Barés, Enterprise Collaboration Services Lead, KSC; Tomas J. Soderstrom, Chief Technology and Innovation Officer JPL; and Kevin Murphy Program Executive for Earth Science Data Systems. The Federal 100 Awards recognize Government and industry leaders who have played pivotal roles in the Federal Government IT community. This year's winners were honored at the March 30 Federal 100 Awards gala in Washington, DC. The full list of winners is available at <https://fcw.com/articles/2017/03/30/2017-fed-100-main-page.aspx>.



Luis Barés



Tom Soderstrom



Kevin Murphy



Datanauts—Growing Data Scientists One Day at a Time

By Beth Beck, PhD, Acting Deputy Associate CIO for Technology and Innovation, Headquarters

The NASA Datanaut initiative is an innovative, agile design practice that offers a social dev-ops (software development–IT operations) environment for participants to beta-test coding, leadership, and project management skills using NASA data and tools, while providing NASA with unique insights into the data communities they represent. Each new class of volunteers allows NASA to evolve processes to take advantage of lessons learned from the serendipity of skills, personalities, interests, and engagement of the participants.

Datanauts represent varied backgrounds, experiences, and technical expertise with one common thread: Each is eager to learn and enhance coding skills; experiment with NASA's data, tools, and techniques; and engage with subject matter experts. Selection for the program is a subjective process intended to create a collaborative cohort to enable experimentation with concepts and processes. The end goal is to help NASA define and develop opportunities to increase the ratio of women and girls in the data science and data analytics fields.

We started the process 3 years ago, when our Office of the Chief Information

Officer (OCIO) Open Innovation team noticed the imbalance of men to women—80:20 ratio—among volunteer participants who engage with NASA's open data initiatives. The team embarked on a quest to better understand how to attract more women and girls to data by conducting a two-part study consisting of a literature review, followed by dozens of interviews with leaders in the data, maker, and startup communities. The findings from the study included the following: Women are looking for signs that they will be welcome at an event, they want a collaborative environment to explore new skills and topics, and they look for opportunities to team and partner in the exploration process.

To address these insights, we created several new efforts, including the NASA Datanaut initiative, to serve as an experiment in targeted data engagement, using agile development practices to test out new concepts; keep, expand, and enhance what works; and fix or discard what does not. We designed NASA Datanauts to encourage women and newcomers to explore NASA data and tools in a collaborative environment with other data explorers who come from varied backgrounds and coding skill levels.

NASA is currently hosting the third class of Datanauts, selected in January 2017. The Datanaut experience encourages individual and group discovery through data challenges, virtual data chats with NASA and external experts, and community events hosted by class members. Individuals step into leadership roles to champion collaborative project design and development among their peers, as well as community events within their influence networks. Datanauts from previous classes serve as volunteer mentors and subject matter experts for incoming classes, modeling collaborative learning. The first three classes are part of a growing ecosystem of data problem-solvers.

Our founding class of 20 female leaders in the data and tech fields served as informal design thinkers to help us understand their communities and develop tools and activities to bridge the gap. We intended the all-female founding class to serve as a signal for future classes that women are always welcome, while we opened future class participation to both men and women.

The founding class of Datanauts worked with the OCIO Open Innovation team to co-create the design elements for the fu-

ture classes. Our team listened to their ideas, fleshed them out, and built products and experiences for future classes. Our team created an interactive user dashboard for virtual data engagements to learn and practice coding and data science as a cohort. We gave Datanauts the opportunity to collaborate on monthly challenges and individually focused code skill tracks for beginners and advanced coders, including a track to create an open-source code library for orbital dynamics enthusiasts. We worked with internal and external experts to design data engagement toolkits for class members to host community events, including a build-a-circuit kit, a stary night journal with a circuit board and corresponding app to mash up interactive space sounds, and a data visualization tutorial leveraging data.nasa.gov tools.

The second class of 45 women and 5 men served as beta-testers for the concepts designed and developed with the founding class. We intentionally selected participants—artists, storytellers, software developers, and hardware designers—with a blend of experiences, skill levels, and coding proficiency that ranged from beginner to expert. We created a collaborative environment for class members to learn from one another.

By the second class, our NASA team recognized a need for more facilitated conversations for idea sharing. We created the virtual data water cooler concept to bring in NASA experts to share mission content, interesting technologies, or new project ideas. We scheduled 30-minute chats twice a week with beginning to advanced content. For example, OCIO's Dr. Brian Thomas, Jason Duley, Faith Chandler, and Dr. Andrew Adrian shared topics that ranged from machine learning and natural language processing to code sharing and cybersecurity. Dan O'Neil, Marshall Space Flight Center (MSFC), was a frequent host discussing orbital dynamics, ontologies, and

visualizations. Dr. Shobhana Gupta, Science Mission Directorate (SMD), shared the intersection of health and Earth science data. In addition to these and other NASA experts, we have featured outside experts, as well as Datanauts themselves.

The current class, made up of 78 percent women, reflects the ratio of female applicants, which is a measure of success in itself. Women are indeed drawn to the program, as we had hoped in the original design. The NASA team, using our agile approach, made significant changes in the experience design this third round. We reworked the selection criteria and sought out applicants with project management and team-building skills to help fellow class members self-organize around concepts or ideas. In

addition, we eliminated monthly challenges, focusing instead on collaborative projects; added capabilities for Datanauts to self-generate group projects on our internal open.nasa.gov Web site; and enabled the co-creation of new community toolkits. We are impressed by what they have created so far, including a book on text mining leveraging NASA datasets, a Python Web-scraping tool, a data-enriched Mars landscape interactive game, a deep-learning tutorial using NASA data, and more. We expect to see more projects generated by the Datanaut ecosystem as class members step into leadership roles with their peers.

To learn more about Datanauts, visit: <https://open.nasa.gov/explore/datanauts/>.



2017 Datanaut Class Kickoff Meeting, February 23 2017 – NASA Headquarters

NASA's High-Tech Paint Helps Build Tougher Rockets

NASA's Ames Research Center (ARC) has a myriad of high-tech missions and research projects that run around the clock. From creating ever-smaller cube satellites (CubeSats), to running ever-improving rovers over landscapes similar to Mars', to nanobots and everything in between, ARC supports some amazing programs benefiting all walks of life. Several breakthroughs in high-tech paint have been made recently, including accomplishments in the area of testing rockets before they undergo the rigors of outer space.

A high-tech paint made a state-of-the-art aerodynamics test possible at ARC in California's Silicon Valley. Called Un-

steady PSP (for "pressure-sensitive paint"), it reacts with oxygen to produce light in response to buffeting against the rocket structure. Pink in color, the paint is applied to a small-scale model rocket that is then tested in a wind tunnel, with high-speed cameras recording images under ultraviolet light. The pressure data are visualized as colors (red: higher than average pressure; blue: lower than average pressure) and represent the moments before the rocket reaches supersonic speeds.

Both aircraft and spacecraft must be designed to withstand these dynamic forces, called buffeting, or risk being shaken to pieces. Unsteady PSP

had already been used in small research tunnels for several years, but a test conducted by the Air Force convinced the NASA Ames team, led by Jim Ross and Jayanta Panda, that they could adapt the methods for use in their bigger, busier wind tunnel environment. Gathered data provide researchers with vital information that should ultimately lead to improvements in the aerodynamic design and capabilities of space rockets.

More details about Ames Research Center and their missions and projects, along with videos of PSP being tested, are available at <https://www.nasa.gov/centers/ames/home/index.html>. ♦



NASA's Amber Favaregh prepares a model rocket for testing with pressure-sensitive paint.



Security Tips – Mobile Devices

By Meredith Isaacs, OCIO Communications Specialist, NASA Headquarters

More and more, NASA's work is conducted on devices beyond our workstations. As the number of mobile devices in circulation has increased, so have the opportunities and means for cyber attackers. Unfortunately, many commercial hacking apps and devices are available at low costs, and instructions are easily accessible online. How many of us know how to protect the Agency's data on our mobile devices?

Gaining Access

Many times, attackers gain access to mobile devices through honest mistakes made by owners, but no matter how well-intentioned one may be, missteps can compromise NASA's information and systems. The following are some ways hackers gain entry to your device:

- employee opens unknown links and e-mail attachments;
- employee connects to unsecure public Wi-Fi accounts (e.g., Starbucks, hotels, etc.);
- employee's device is hacked via Bluetooth;
- employee accepts counterfeit updates; or
- employee loses, and later recovers, the device.

Once an attacker has access to your mobile device, you may notice some disturbances while other intrusions go undetected. Some may see their device turn off and on independently, new apps appear and run, battery drain, and either an increase in dropped calls or unexpectedly good service. Without indication, attackers may skirt password protection, impersonate voice services (like Siri), and activate the microphone or camera.

Protect Yourself and NASA

The threat is out there. What can you do?

- If possible, do not use public Wi-Fi; rely on your mobile network.
- If necessary, only connect to the public Wi-Fi name provided by the business.
- Use VPN.
- Back up data regularly to defend against ransomware.
- Use encryption.
- Disable unknown, third-party applications.
- Maintain daily security practices: Set strong passwords and be vigilant with links/ attachments; do not share your passwords with others.
- Keep operating systems, applications, and browsers up to date; apply patches.
- Secure Wi-Fi in your home when teleworking: Use WPA2 security, update default settings, and restrict public access.

If you suspect that your NASA mobile device has been compromised, shut it off and report it to the NASA Security Operations Center (SOC) immediately at soc@nasa.gov or 877-627-2732. In addition to recommending preventative measures, NASA also employs Mobile Device Management (MDM) security precautions to protect your Agency devices and data.

If your personal device is compromised, shut it off and return it to the store; they will reload the operating system. If your personal device contained NASA data, report it to the SOC immediately.

For more information on mobile device security, please visit <https://inside.nasa.gov/itsd/mobile-security>.

2017 NASA IT Strategic Plan

In collaboration with NASA's Mission Directorates, Centers, and institutional offices, the OCIO is formulating the 2017 NASA IT Strategic Plan. The IT Strategic Plan sets the direction and priorities for the IT community to help accomplish NASA's Strategic Plan.

The strategic use of IT contributes to NASA's missions in several ways:

- shares NASA's data and results,
- increases quality and effectiveness,
- accelerates results,
- increases safety and integrity,
- increases cost-effectiveness, and
- drives new discoveries.

To accomplish these mission-oriented strategic outcomes, NASA identified five strategic goals for IT that will change the way we do business. These goals focus on delivering excellence, capitalizing on data and innovation, safeguarding NASA's data and IT assets, maximizing business value, and caring for our people and preparing them for tomorrow.

Strategy publication and outreach are planned for Spring 2017.

This March, the Information Technology (IT) Business Services Assessment (BSA) Implementation Plan reached its one-year anniversary. Over the past 12 months, IT personnel from across the Agency have met targets, from great to small, all to change the way IT at NASA works. While there is more work left to do, this new direction is more efficient, more secure, and more collaborative; additionally, it will yield savings to reinvest into enterprise IT services and the missions.

Efficiency

Through strategic sourcing, data center consolidation and cloud adoption, the zero-based review (ZBR) of IT Security spending, governance board adjustments, and creation of the Core Suite of Collaboration Tools, among others, the IT BSA targets duplication and inefficiency. Further, the shift of some IT services to enterprise management will increase Agency standardization.

Security

Ongoing IT Security efforts to protect NASA's data include the December 2016 deployment of the Continuous Diagnostics and Mitigation (CDM) tools for increased NASA network protection. Also forthcoming are the Risk Information Security Compliance System (RISCS) tools, both part of an IT Security architecture.

Collaboration

Inclusive governance boards, with representation from Office of the Chief Information Officer (OCIO) leadership and key stakeholders such as Mission Directorates, institutional offices, and Centers, increase IT portfolio oversight. On the horizon are the Core Suite tools, with Agency-wide availability. Also in progress are projects to upgrade Agency firewalls, increasing security and making collaboration between Centers easier.

Savings

The IT BSA calls for savings to be reinvested in enterprise services and missions. Contract management and communications services have produced savings, with another \$13.35 million



IT BSA Ask-Me-Anything with the CIO, February 22 2017. l-r Renee Wynn, Leah Hollander, Jonathan Aquino, Jonathan Reaves, Meredith Isaacs

saved through data center consolidation. With continued efforts in these areas, and others like streamlining collaboration tools, more opportunities to save and reinvest will arise.

IT at NASA is evolving. There is greater sharing, oversight, and accountability, as well as insight into the entire IT portfolio. IT Services are uncovering savings and new efficiencies and are also under increased security. These projects and results influence other IT priorities like Federal Information Technology Acquisition Reform Act (FITARA) and Federal Information Security Management Act (FISMA) scores and the IT Strategic Plan. Thank you for supporting these efforts.

We want to hear from you! Send your questions, thoughts, and suggestions to HQ-ASK-BSA-IT@mail.nasa.gov.

Want to know more? Visit <https://inside.nasa.gov/ociolbsa>.

Thank you to everyone who participated in February's "IT BSA Ask-Me-Anything with CIO Renee Wynn." We fielded questions from across all Centers, and about 300 tuned in live—we loved hearing from you! If you missed the conversation, visit our Web site above for the full replay.





Astronaut Al Drew Talks Space with the OCIO

By Eldora Valentine, OCIO Communications Officer, Headquarters

Recently, astronaut and Air Force Colonel Al Drew held a brown-bag lunch session with the Office of the Chief Information Officer. Drew discussed his STS-133 mission, which took place in 2011. STS-133 was one of the last three missions in the history of the Space Shuttle Program.

Drew has over 3,500 hours of flying experience and has piloted 30 different types of aircraft. He was selected for the astronaut corps in 2000. His missions included STS-118 (2007), the 119th Space Shuttle flight and the 20th flight for En-

deavor; and STS-133 (2011), the 133rd Shuttle mission and the 39th (and final) mission of Space Shuttle Discovery.

Drew grew up in the Washington, DC, area and graduated from Gonzaga High School in the district. He holds a B.S. in astronautical engineering and a B.S. in physics from the U.S. Air Force Academy, a master of aerospace science from Embry Riddle University, and a master of strategic studies in political science from the U.S. Air Force Air University.

Drew is currently working at NASA Headquarters in the Office of International and Interagency Relations.



Glenn IT Expo

By Kristin Ratino, Communications Specialist, Glenn Research Center

NASA Glenn held a Tech Expo on March 2, which drew over 150 attendees. Center personnel engaged with field experts to learn about the latest trends and emerging technologies in data storage management, cybersecurity, content management solutions, engineering simulation software, and more. Connecting with peers and industry partners in this informal environment enabled staff to share knowledge

about their missions and discover innovative solutions to their current challenges. Product experts in the fields of cloud storage and automated testing participated in technology information-sharing sessions, delving further into details about cloud storage solutions in a Government environment and electromagnetic compatibility (EMC) testing software solutions that automate testing and report generation.





Marshall's Modern Figures

A CELEBRATION

of Women Making a Difference Today



IT Talk

Congratulations to Sittra Battle, Assistant Program Manager for End User Services. She was selected as a Marshall Space Flight Center Modern Figure for her contributions to OCIO. She's third from the left on the top row.



Women of NASA Lego figures featuring: Margaret Hamilton, Katherine Johnson, Sally Ride, Nancy Grace Roman, and Mae Jemison

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