IT Talk

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Our Future Workforce and Workplace

IT Talk

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Message from the NASA CIO

Technology today is driving trends in the world around us. Because of this, the workplace is in for tremendous changes over the next decade. We are already starting to see the rise of Augmented Reality and Artificial Intelligence. Many companies, not to mention Federal agencies, are now slowly incorporating these technologies into their business operations. In this issue, we will look at some predictions about how we will work in 2020 and the next decade.

We'll also learn more about the Jet Propulsion Laboratory's (JPL) Innovation Experience Center and Stennis Space Center's (SSC) new community workspace known as the HIVE, or Highly Innovative and Versatile Environment.

And finally, as we start off a new year, a giant thank-you to the Centers and the team within the Office of the Chief Information Officer for all their hard work and dedication last year. We are well on our way in delivering IT capabilities that meet NASA's diverse missions more effectively, efficiently, and securely.

As we start 2020, I offer up a few key goals I would like to see us accomplish:

1. Continue to look for ways to improve IT services and better safeguard NASA's data.
2. Make cybersecurity more effective and simpler.
3. Enhance and improve customer satisfaction.
4. Make it easier for NASA employees to collaborate both inside and outside of NASA.
5. Deliver cloud computing services that are easy and secure to use.

Happy New Year—let's make it another stellar year!

~Renee

Happy New Year from the NASA OCIO!

Office of the Chief Information Officer staff at the annual holiday party, December 17, 2019 at NASA Headquarters
Photo Credit: (NASA/Michael Porterfield)

JPL's Desktop Update Celebrates Ten Years

*By Whitney Haggins, IT Communication Strategist, and Emily Sylvester, Communications Specialist,
Jet Propulsion Laboratory, California Institute of Technology*

For the last decade, the Jet Propulsion Laboratory (JPL) IT communications team has hosted the Desktop Update for JPL's business and administrative staff. This bi-monthly meeting is an IT focus and information session that started in response to an urgent need to help communicate calendaring solutions during the Laboratory's transition in 2009 to the Outlook Unified Message System. Since addressing its primary purpose, the group has continued to find value in gathering together to learn about upcoming IT tools and services, and it marked its ten-year anniversary this fall.

The venue provides an opportunity for participants to become familiar with new IT products and services before lab-wide implementation. The meeting is advantageous to the OCIO and the Desktop Update community because developers can discuss new IT rollouts with a highly engaged group of users, who provide valuable feedback and ask pertinent questions, leading to a better overall final product. It also benefits the Desktop Update attendees because they have an opportunity to be active participants in improving the tools they use, while also giving them a preview of what changes in the Lab's computing environment will occur within the offices that they support. Many in the group have participated in pilots and user acceptance testing over the years, and they continue to be valuable partners in defining IT at JPL.

Ames in the News

ARC CIO Team members before Center Director Tu, Administrator Bridenstine, and Vice President Pence spoke at Ames Research Center [Photo by: Cara Dodge]

On the science side of NASA's lunar exploration program, Vice President Mike Pence recognized the Ames Research Center's contributions to understanding the Moon. Ames has led three of the last five NASA lunar science missions and is now working on instruments to study lunar geology, biology experiments, and technology demonstrations to fly with commercial services or future NASA robotic missions. Ames' newly announced VIPER mission, short for Volatiles Investigating Polar Exploration Rover, will bring together expertise across the Agency and industry for lunar science advances.

Administrator Jim Bridenstine, introduced by Ames Center Director Eugene Tu, also shared a few words with the workforce, making reference to NASA's recent celebration of the 50th anniversary of the Apollo 11 Moon landing.

To view the full Astrogram feature story, complete with photos, visit here: *https://www.nasa.gov/feature/ames/pence-calls-on-nasa-in-silicon-valley-to-write-the-next-chapter-for-america-in-space*

NASA Information Technology Strategic Plan —Goal #5: People

By Jonathan Walsh, IT Strategic Planner, and Meredith Isaacs, Communications Specialist, NASA Headquarters

NASA's Information Technology (IT) Strategic Plan for Fiscal Years 2018–2021 is an outcome-oriented plan based on conversations with diverse stakeholders in support of achieving NASA's missions. Progress toward the plan helps NASA improve Agency outcomes by driving discoveries as a strategic partner, accelerating results through productivity, sharing NASA's data and results, and increasing quality, resiliency, and cost-effectiveness.

People are NASA's greatest asset on its journey to manage IT as a strategic resource to securely unleash the power of data. We are caring for our people and preparing them to successfully support NASA's vision and missions.

The Office of the Chief Human Capital Officer (OCHCO) is partnering with us on our journey, including the transition of the Agency's IT resources to an enterprise operating model in alignment with the Mission Support Future Architecture Program (MAP).

To ensure employees understand their roles and value, we will clarify lines of authority and accountability for IT between the Agency and NASA's Centers and articulate the link between our IT community's efforts and achievement of NASA's missions. The Agency will leverage talent wherever it may be. Employees will strengthen their competencies to keep pace with NASA's changing needs, supported by career paths, training, and succession plans. Finally, the Agency will encourage good stewardship, embrace a culture of decision-making—fortified by diversity and inclusion—and empower our employees to take calculated risks to foster innovation and mission success.

NASA's IT Strategic Plan is reviewed annually and updated as necessary to reflect NASA's overall strategic direction and presidential administration priorities.

For more information, visit *www.nasa.gov/ocio/itsp* or email *agency-itsp@mail.nasa.gov*.

IT Portfolio Community Face-to-Face, October 23, 2019 at NASA Headquarters
Photo Credit: (NASA/Michael Porterfield)

Our Future Workforce And Workplace

By Tom Soderstrom, IT Chief Technology and Innovation Officer, Jet Propulsion Laboratory, California Institute of Technology

It's hard to forecast what the U.S. economy will look like in 10 years, much less what the workday or workplace will resemble. However, the challenges we face today are likely to get even more difficult. Here are a few:

- **Competing effectively** in the marketplace

- **Innovating and infusing** new capabilities quickly and inexpensively

- **Recruiting** new stars, **retaining** our skilled people, and **retraining** our existing workforce

- **Responding** rapidly to changes, aka "Innovating Faster"

One thing we do know: As younger generations enter the workforce, they bring new habits, technologies, conventions, and expectations that will transform business and Government. Enterprises who embrace these transformations will benefit more quickly.

Let's examine this transformation through a tried and proven lens: people, processes, and technologies.

1. **Hire and Retain Motivated People**

Newer team members want to work in a highly collaborative start-up environment using the latest technologies in the cloud. They also want to use—and contribute to—Open Source and to be part of something much bigger than themselves. While we continue hiring experienced team members and contractors, by bringing in interns focused on the emerging technologies into an open "start-up" environment and later employing the best ones, we gain proven performers who fit into our culture and at a lower overall cost. Next year, they select interns, and the process repeats.

Over time, we build a workforce that is passionate about our mission and accustomed to innovation and collaboration, one that employs emerging technologies and fits in our culture. Their work tools are simply a smartphone, a laptop, and a cloud account.

How can we create a workplace that encourages innovation? To test this, we created an innovation lab and start-up environment at Jet Propulsion Laboratory (JPL). First, we looked for space that no one else wanted, and then we gutted it.
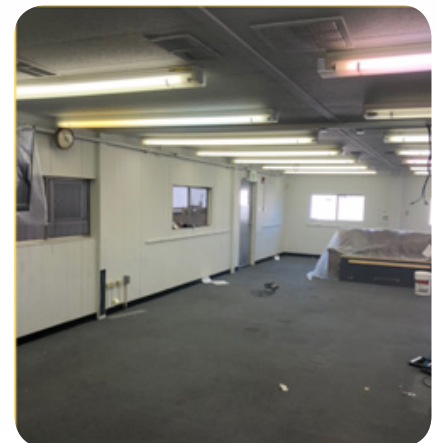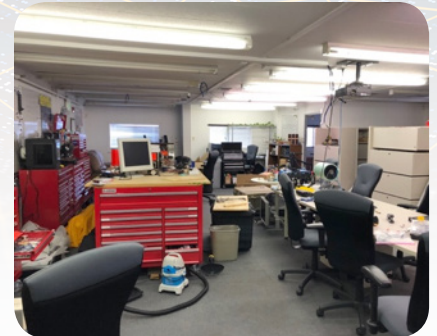
We then let the inhabitants design and help outfit the area. Partnering with our Facilities department has enabled the successful deployment of several experiments across JPL. Because the inhabitants received hands-on experience, they can fix things that break. They are then also able to advise and implement their innovations to other locations.

Some examples include:

- sit/stand desks;

- an open environment with unassigned workspaces but many large displays;

- a "phone booth" (without a phone, but for privacy);

- blinds that follow the Sun for energy efficiency and comfort;

- walls that switch between transparent and opaque glass for privacy by the click of a button or a spoken word (done by simply applying an add-on film at a fraction of the cost of specialized glass);

- telepresence robots that allow remote team members to participate in conversations;

- large touchscreens for better collaboration inside and outside our enterprise;

- and even a machine learning "watcher" for when the coffee runs out.
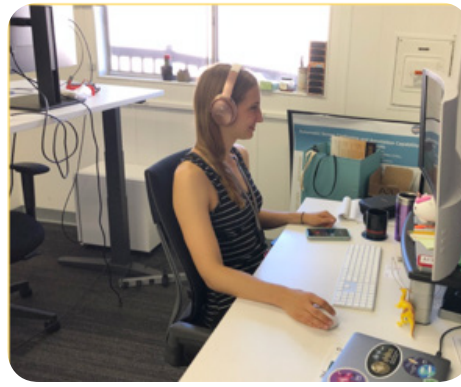
What happens when you combine an objective of global significance (the exploration of Earth and space) with a powerful mantra ("The stars are calling and we must go"), add in a high-energy, collaborative environment that promotes continuous learning and enables working remotely? You create an energized workforce that experiences faster innovation while retaining star performers far longer than average.
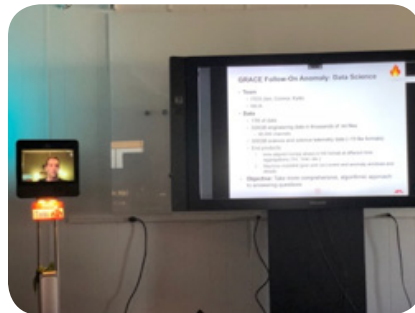
2. **Ensure Effective Processes**

To maintain focus on what matters, we must consistently communicate the goals of NASA and JPL (such as searching for life in space and protecting Mother Earth). We need to continuously measure and reduce "wait states," enabling appropriate access to information without lengthy wait times that impede an individual's progress. We will also automate and measure everything–automatically, relentlessly, and continuously.

Having a set of small but essential projects ready to prototype will help us try out new technologies at a rapid pace and at low risk. Rapid prototyping by small (2-5 person) cross functional teams of end-users and developers has proven highly effective in understanding a project's potential gain and the user experience. Using Agile methodologies to iterate from Minimum Viable Products to rapid releases accelerates the time to market: automated deployments, tests, and a symbiotic integration with cybersecurity help to ensure lasting successes.

But how can we infuse new methods and technologies into the legacy environment? By pairing new team members with experienced domain experts, we infuse new technologies and specialized skills to solve significant domain problems. We also gain cross-mentoring and team-building benefits. By ensuring that internal open source code is made available to other developers, we have already seen a 50 percent increase

in code reuse while reducing the risk of losing code should a critical programmer leave.

We need to make it easy to "do the right thing" to allow faster adoption of new processes in the enterprise. The emergence of cloud-based tools will help us deal with the massive amounts of data. However, if a service is not secure, it'll put the organization at risk and won't be deployed. Therefore, we need to focus on (1) creating crowd-sourced data available for reuse, and (2) building cybersecurity and compliance into the tools and services themselves. We should also automatically and proactively measure and alert if something falls "out of compliance."

3. **Infuse Future Technologies**
By identifying the emerging technology waves that will matter to us, we can attempt to solve today's problems with tomorrow's technologies. If the solution doesn't generate exceptional results, we drop it. However, if the results of the prototypes are positive, we double down on those technologies. To do so involves partnering with other users at NASA and JPL and other business partners. By being early to gain actual results from new technologies, we can influence the industry innovators to create their emerging services so that we (and thereby the Federal Government) can use them.

The key technologies we will all use: Internet of Things (IoT) to sense, ingest, and interact with the data; cloud computing to store and process the data; visualization and analytics to gain a deep insight into the data; and all subsets of AI to make the system smarter. These are also the components that will help build Intelligent Data Analytics (IDAs).

So, what will tomorrow's workplace and workforce look like?
We believe the above approach will work for any organization and scale, and will continue to evolve.

Our results so far (measured against the NASA and JPL goals) are positive, and the future is even more promising.

Here are but a few examples where we are doubling down:

• **Today's IDAs are maturing by allowing humans to find information through a natural dialogue,** such as locating conference rooms, information about thousands of contracts, automatically pulling together reports through dialogue, and proactively providing just-in-time information customized for each person. Tomorrow's IDAs will be much more powerful and will prove a crucial enhancer of productivity and job satisfaction.

• **Cloud computing is the enabler of all experimentation.** With JPL's "Send Your Name to Mars" project, we already experienced a tenfold increase in performance at one-tenth the cost, and at one-hundredth the risk through the use of a combination of serverless computing and reinforcement learning. Eleven million people sent their names to be inscribed on a chip on the Mars 2020 rover as it drives across the Martian surface.

• **Machine learning is already enhancing our daily work** in predicting spacecraft anomalies, prioritizing, and visualizing them for the human operators. It's also showing precisely where on Martian rocks to drill. Automation and machine learning have enabled autonomous measurement, visualization, and communication of natural disasters within minutes of their occurrence.

• **Visualization and analytics are used on all tasks** and have shown us where work moves quickly or slowly through our systems, which has helped us eliminate wait-states in several areas.

• **Augmented reality is helping us design spacecraft faster** and also assists scientists across the world meeting on the surface of Mars to discuss promising rocks or sites.

• **Internet of Things has helped us interact with conference room equipment and build sensors** to improve our clean rooms and improve safety in our labs, as well as improve parking for employees.

• **Tomorrow's workforce will be recruited and retained** by us focusing on the fantastic goals of our organization, facilitating the use of and contributions to open source, allowing remote-work polices, and encouraging rapid experimentation and learning of emerging technologies.

• **Tomorrow's workplace will be reconfigurable, fit-for-purpose spaces** with open, collaborative environments but will provide for private/meeting space when needed. Wireless displays and Bluetooth 5 / WiFi 6 / 5G will ensure that no wires will be needed in meeting rooms or for most of the campus as wireless presence will be fast and ubiquitous. Telepresence robots will help remote participants feel connected to teammates and be productive.

Smart Cities and Smart Campus initiatives will tie the workforce and workplace together by continuously helping reduce energy costs and increase workforce productivity and satisfaction through a mixture of automation, advanced technologies, and gamification.

To enable this future, we need to evolve the way we work, step by step and quickly. Sometimes, we'll need to step out of line and try something daring. Luckily, our mission and human DNA are already programmed to dare mighty things.

Robotic Process Automation Enterprise Services Coming Soon

By Douglas LeMere, Communication Specialist, NASA Shared Services Center

Robotics Process Automation (RPA) tools can help businesses improve the efficiency of processes and the effectiveness of services. Key benefits of RPA include automation of highly manual, high-volume, and routine business processes, enabling the workforce to reallocate time to more strategic and innovative tasks requiring deeper analysis. RPA reduces processing time while improving accuracy and consistency of results. It also provides the ability to achieve rapidly scalable efficiencies and improvements across the enterprise without requiring fundamental changes to processes.

What processes/departments are best suited for automation?
Any process where people are performing high-volume, highly transactional, rule-based functions. This allows employees to focus on more complex, higher value tasks and analysis. Process automation results in expedited back-office tasks in finance, procurement, supply chain management, accounting, customer service, and human resources, including data entry, purchase-order issuing, creation of online access credentials, or business processes that require access to multiple existing systems.

The Agency Applications Program Board recently approved the approach to providing this service across the Agency. The Agency Applications Office (AAO) will provide the infrastructure in a cloud environment and will work with the NASA Shared Services Center (NSSC) to establish governance for the program. The NSSC and the AAO are qualified to provide services across the Agency.

Currently, anyone at the NSSC can submit ideas for automation using the Innovation and Continuous Improvement Program (ICIP) process via the NSSC workflow management tool—ServiceNow. Soon, anyone within the Agency will be able to submit a request for automation within ServiceNow through the new enterprise service implementation. The Enterprise Service Provider plans to monitor automation performance through a dashboard capability.

The NSSC began developing BOT automations in March 2018. Since that time, the NSSC has completed 36 BOT automations across all functional lines of business.

Stennis Space Center Office of the Chief Information Officer Announces Grand Opening of The HIVE for All Employees

Christopher Carmichael, Deputy Chief Information Officer, Stennis Space Center

Excitement explodes with the grand opening of a first-of-its-kind collaboration space at Stennis Space Center (SSC)! The HIVE (Highly Innovative and Versatile Environment) is the culmination of efforts by the SSC Office of the Chief Information Officer's (OCIO) Innovation and Efficiencies Program (IEP). IEP's mission is to promote increased creativity and problem solving through the integration of innovation and to initiate positive culture change for the SSC community. The HIVE ushers SSC into the future by providing a unique multipurpose area that consists of a strong mix of technology with smart markers, a 3-D printer, and a Microsoft Surface Hub. SSC users can expect more innovative technologies to come.

The new collaboration space allows employees to work creatively by broadening their work environment, utilizing the technology to encourage efficiency, clear roadblocks, or seamlessly work with others. The HIVE, located in the Roy S. Estess building, is open Monday through Friday (8:00 a.m.–4:00 p.m.) to the entire SSC community. This new versatile space can be reserved by submitting a request to the SSC-TheHIVE email box. The SSC OCIO is thrilled to provide this new forward-thinking workspace as one of their many exciting customer-focused services.

Stennis users explore the new facets of The HIVE during the grand opening

Communications Program Enables Real-Time Collaboration Rooms and Video Capabilities

By Sylvester Placid, Communications Program Communications Strategist, Marshall Space Flight Center

Collaboration Rooms

CP manages the custom multimedia collaboration room at Kennedy Space Center.

The Communications Program (CP) operates more than 1,300 huddle rooms, conference facilities, and video "walls" at locations across all NASA Centers. Collaboration solutions include video conferencing, ClickShare wireless presentation sharing, and voice conference hardware. Easy video conferencing and content sharing enables greater teamwork for personnel located across Centers. As NASA's geographically dispersed teams grow, CP will be ready to provide the collaboration services they need to accomplish their missions.

IPTV
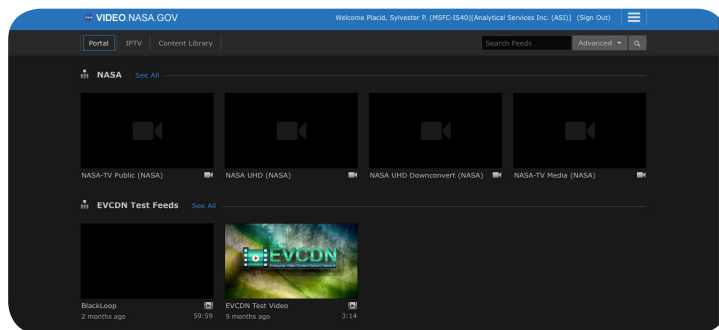
video.nasa.gov

CP is implementing Internet Protocol Television (IPTV) to provide live and on-demand video content over the internal NASA network to audiences across the Agency efficiently, securely, and at a significant cost advantage. IPTV enables customized television and video services for individual users and Center audiences. Live streaming, live recording, and video-hosting capabilities, including interactions with recorded presentations for mark up and replay, are available. Centers can use IPTV for digital signage and delivery of messages to public areas. Once available at your Center, you can visit *https://video.nasa.gov* (internal to NASA) to begin using video for collaboration like never before.

Randi Levin Appointed Jet Propulsion Laboratory's New Chief Information Officer

By Whitney Haggins, IT Communication Strategist, Jet Propulsion Laboratory, California Institute of Technology

On October 4, Jet Propulsion Laboratory (JPL) Deputy Director Larry James announced Randi Levin's appointment as JPL's new Chief Information Officer (CIO) and Director for Information Technology. She officially joined the Office of the Chief Information Officer (OCIO) in January 2019. Levin came to JPL with a résumé that reflects her role as an innovative and transformational business and technology executive with proven experience in entertainment, Government, and domestic and international operations, along with consulting and other industries.

Levin recently served as the CIO and Vice President (VP) of Technology Services at Forest Lawn Memorial-Parks and Mortuaries, one of the United States' largest privately owned, centrally operated cemeteries in the greater Southern California area. Her prior roles include the CIO and VP at Cast & Crew Entertainment Services and General Manager and Chief Technology Officer (CTO) for the City of Los Angeles.

She succeeds Jim Rinaldi, who had served as CIO since 2005. Rinaldi has accepted a new role as Chief of Information Technology and Data Advisor, reporting to the JPL Director's Office.

NASA Opens First End User Services SpaceBar at Marshall

By Taylor Goodwin, ASRC Federal/Analytical Services, Office of Strategic Analysis and Communications, Marshall Space Flight Center

NASA's End User Services Program Office (EUSO) opened the Agency's first walk-up "SpaceBar" technical support center at Marshall Space Flight Center (MSFC) with a ribbon-cutting ceremony on October 23.

Operated by EUSO, SpaceBar is part of an effort to provide an advanced IT customer service experience to all NASA end users. With just a trip to the EUSO SpaceBar, both Marshall civil servants and contractors will receive face-to-face technical support from skilled service technicians.

The SpaceBar is focused on getting easier, every-day problems fixed on-the-spot and ensuring the appropriate support for more complex problems.

Available services at the SpaceBar include computer and mobile walk-up support; software assistance, including login or reinstallation of BitLocker, AnyConnect or PIV, FileVault, and mobile device management; computer or mobile device loans; virtual private network assistance, including reinstallation or network resynchronization; business productivity support of applications, such as Microsoft Office 365 and Skype; system setting and configuration support; and password lockout and reset support. The space is also equipped with self-help kiosks that link to the Enterprise Service Desk (ESD)—enabling users to find links to reset passwords, search more than 1,900 knowledge articles to help resolve issues, create and check status of tickets and requests, approve requests, take surveys after tickets and requests close, view assets assigned to the user, and leave feedback.

One of the SpaceBar's most popular features is the showcase of available computers, mobile phones, and other technology. When team members are obtaining their initial machines or fulfilling a refresh, they can explore their options and interact with the technology before choosing a product.

"We're looking forward to having the SpaceBar available throughout NASA to have these services available just a short walk away," EUSO program executive Roscoe Sheehy said. "The EUSO SpaceBar provides a unique opportunity for our customers to examine the products and services we offer in a comfortable setting with access to knowledgeable technology professionals. As the host center for EUSO, Marshall Space Flight Center is a significant strategic partner and exemplifies continued support for our mission by allocating access to a perfect location for the EUSO SpaceBar."

The next SpaceBar location will open at NASA Headquarters in early 2020. Custom-built versions of the SpaceBar will phase into all other NASA field centers.

SpaceBar is a part of EUSO's commitment to provide seamless support in conjunction with NASA's overall mission objectives. As the Agency continues to work toward landing the first woman and the next man on the Moon by 2024, the EUSO team aims to do their part by offering an enhanced technical experience for all involved.
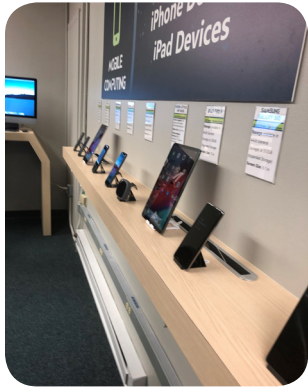
Agency Honor Awards

Lara Petze accepts the Agency Honor Group Achievement Award on behalf of the OCIO Diversity and Inclusion Team for their work in expanding opportunities for collaboration and teamwork.

Dan Pierson represents the NASA Personal Identity Verification (PIV) Team of 156 members while accepting the Agency Honor Group Achievement Award for achieving 89% PIV smartcard enforcement. The ceremony was held on November 5, 2019 at NASA Headquarters.

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