National Aeronautics and Space Administration

NASA IT STRATEGIC PLAN
Fiscal Years (FY) 2022-2026

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Message from the CIO

NASA's Mission is to explore the unknown in air and space, innovate for the benefit of humanity, and inspire the world through discovery. To achieve this, our Agency's ambitious missions span research, engineering, exploration, and discovery on and around the Earth, our solar system, and beyond. NASA enables safe, efficient, flexible, and environmentally sustainable air transportation. The International Space Station has supported continuous human presence and research in space for over two decades. The James Webb Space Telescope is capturing and transmitting awe-inspiring insights into our universe and Artemis will propel humanity back to the Moon and beyond in a new era of human spaceflight. All of NASA's activities, including these flagship missions, depend on effective, resilient information technology (IT), data, and safeguards to be successful.

IT capabilities enable NASA's discoveries, allow the sharing of mission data, improve NASA workforce productivity, and increase mission quality, resilience, and cost-effectiveness. To drive these outcomes in support of our missions, NASA's IT Strategic Plan aligns the IT community's priorities around five goals. These goals focus on achieving consistent operational excellence, transforming NASA through information and technology, and ensuring proactive, resilient cybersecurity, all supported by great customer experiences and an exceptional team.
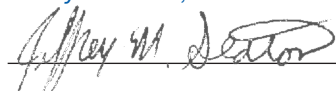
The recent restructuring of NASA's Office of the Chief Information Officer (OCIO) organization to an enterprise operating model for IT has already yielded significant benefits for the Agency on this strategic path. These include greater consistency in our services and delivery, a shift toward enterprise IT applications, contract consolidation, enterprise IT management capabilities, and operational efficiencies. We are in the early stages of maturing the enterprise model, and our efforts have set us up to continuously improve what we do and how we do it in support of NASA's missions.

We will continue to deliver effective services and value for our mission partners. NASA's technology-based collaboration capabilities are continually evolving to support the Agency's hybrid work environment. Our network and telecommunications teams enable critical mission activities within NASA and with our commercial partners. By harnessing digital advances like intelligent automation and artificial intelligence, we are transforming NASA's operations and will improve data accessibility for our stakeholders while continuing to implement a zero trust approach to combat ever-changing cyber threats.
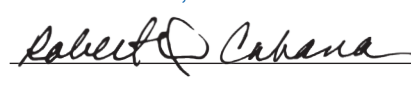
We leverage technology to support a holistic approach to diversity, equity, inclusion, and accessibility and will continue to enable an environment where all employees feel valued and share a sense of belonging. Everyone should be able to navigate, interact, and engage with content supported by, as opposed to limited by, technology. OCIO is proactively ensuring that IT purchases are compliant with Section 508 of the Rehabilitation Act prior to deployment and constantly updating legacy systems and technology that are not compliant. We are also continuously improving our technology and are redesigning the nasa.gov website, other websites, and applications to make all digital content accessible to everyone.

Building on this foundation, we are excited about the journey ahead of us to further enable and enhance NASA mission success through information and technology capabilities. This plan captures our vision and roadmap for supporting NASA and we are ready to make this vision our reality with our mission partners.

Jeffrey M. Seaton, NASA Chief Information Officer   *Robert D. Cabana, NASA Associate Administrator*

Purpose

As part of Section 3506(b)(2) of Title 44 of the United States Code and the Clinger-Cohen Act of 1996, OCIO is required to develop and maintain an information resources management strategic plan. NASA uses its IT Strategic Plan to outline our vision of the future for the strategic use of information and technology at the Agency. The plan provides a clear, unified, and long-term direction that guides the mission alignment, investments, and accountability of NASA's IT community to support achievement of NASA's Strategic Plan. The outcome of execution of this plan during FY 2022-2026 is to maximize the value of our IT contribution to NASA's missions, partners, and the public. NASA's diverse IT community will accomplish this outcome by sharing NASA's results and partnering on transformational capabilities while improving quality, productivity, mission safety, and cost-effectiveness across the Agency – all delivered with great customer experiences by a talented, engaged team of teams. These outcomes are described below and are referenced throughout this plan.

The strategic use of IT contributes to NASA's mission success in several ways

Shares NASA's data and results through open, appropriate access

Increases mission quality and effectiveness through data and technology

Accelerates mission results through increased productivity

Increases mission safety and resilience through adaptive cybersecurity

Increases mission cost-effectiveness by driving efficiency and reinvesting the difference

Enables discovery and understanding as a strategic partner on capabilities like data science

Enabled by a talented team delivering great customer experiences

Figure 1: Strategic Value of NASA's Data and Information Technology

NASA reviews progress toward its IT Strategic Plan periodically and publishes an updated plan as appropriate based on the Agency's needs. This plan identifies IT goals, objectives, and metrics that support achievement of the NASA Strategic Plan and implementation of relevant Federal laws and policies. These goals provide focus for a roadmap and investment priorities that guide the allocation of IT resources to help accomplish the Agency's Vision and Mission. The release of this NASA IT Strategic Plan addresses the main drivers for change listed below as well as numerous other drivers.

Internal Drivers

- *NASA's 2022 Strategic Plan* and stakeholder priorities and feedback. NASA's Strategic Plan aligns priorities and activities around four themes: Discover, Explore, Innovate, and Advance. IT is addressed in Strategic Objective 4.2, "Transform mission support capabilities for the next era of aerospace."

- OCIO's transformation to optimize services by shifting to an enterprise operating model for IT. This transformation will increase OCIO's customer focus, enable reliable service delivery, optimize resource use, and improve performance management to achieve desired results.

- NASA's specific strategies that contribute to the direction for NASA's IT Strategic Plan. These include digital transformation; the future of work; data management, such as Science Mission Directorate's (SMD's) Strategy for Data Management and Computing for Groundbreaking Science; mission support; and Diversity, Equity, Inclusion, and Accessibility (DEIA).

- Resource management and risk mitigation. The dynamic IT environment requires continuous attention to address obsolescence, resourcing, and cybersecurity risks.

External Drivers

- NASA's response to the COVID-19 pandemic, with employee safety as top priority through extensive use of mandatory telework and on-site mitigations, required a paradigm shift in how our workforce delivers missions. NASA will create a future that reinforces "People First, Mission Always," focusing on agility and providing employees the best work options and environment to achieve mission success.

- Technology advancements and new ways of doing business provide numerous opportunities. These opportunities include data and analytics, Agency agility, productivity, and cybersecurity through low-code/no-code enterprise application platforms and a strengthened, resilient posture through Zero Trust Architecture. Zero trust is a data-centric architecture that provides timely, appropriate data and resource accessibility.

- Following receipt of the Government Accountability Office (GAO) report GAO-18-337, OCIO incorporated some technical updates to its NASA IT Strategic Plan in September 2019. OCIO then began work on a more substantial update to plan, resulting in the development of the NASA IT Strategic Plan for FY 2022-2026.

- Federal laws and policies, including guidelines and criteria for implementation:

  - The Federal Information Security Modernization Act (FISMA) and mandates such as *Executive Order 14028 on Improving the Nation's Cybersecurity* and the *Office of Management and Budget (OMB) Memorandum M-22-09, "Moving the U.S. Government Toward Zero Trust Cybersecurity Principles* to protect critical systems and data from persistent and increasingly sophisticated malicious cyber campaigns.

  - The Federal Information Technology Acquisition Reform Act (FITARA) to improve agency management of IT and strengthen agencies' ability to deliver on missions and conduct business. Technology Business Management (TBM) supports this effort by enabling a consistent way to connect business value to technology investments.

  - The Modernizing Government Technology Act to improve Federal technology by providing financial resources and technical expertise to agencies to invest in modem technology that improves service delivery, secures sensitive systems and data, and saves taxpayer dollars.

  - The Federal Cloud Computing Strategy, *Cloud Smart*, is a long-term strategy to drive agency cloud adoption to achieve savings, security, and faster services.

  - The *Federal Data Strategy* is a 10-year vision to accelerate data use to deliver on missions, serve the public, and steward resources while protecting security, privacy, and confidentiality.

  - The 2022 President's Management Agenda focuses on advancing three priorities: strengthen the Federal workforce, deliver excellent, equitable customer experience, and manage the business of Government. To enable these priorities, agencies will work together to enhance and secure Government IT and data as vital support and catalysts for mission delivery.

Alignment With NASA's Strategic Plan

NASA inspires the world through exploration and discovery, leading scientific and technological advancements that benefit all humanity. The Agency embraces the challenge of furthering global scientific and technological achievement and expanding the realm of what is possible in aeronautics and space. The 2022 NASA Strategic Plan outlines the Agency's Vision for the future and the long-term direction for all of the Agency's activities. The strategic plan is the foundation on which NASA builds and measures success, based on four strategic goals that contribute to maintaining American leadership in space, aeronautics, climate research, and innovation while driving economic growth in the civil space sector. These goals, each supported by strategic objectives, are below.

- **Discover:** Expand human knowledge through new scientific discoveries

- **Explore:** Extend human presence to the Moon and onto Mars for sustainable long-term exploration and utilization

- **Innovate:** Catalyze economic growth and drive innovation to address national challenges

- **Advance:** Enhance capabilities and operations to catalyze current and future mission success

NASA's goals cover more than flagship missions and cutting-edge technology development. These goals reinforce NASA's commitment to working smarter in a digitally enabled hybrid environment, doing business more effectively and efficiently, and being transparent in its operations. The Agency's IT activities are managed within NASA Strategic Objective 4.2, "Transform mission support capabilities for the next era of aerospace." NASA's IT Strategic Plan provides cross-cutting support for achieving all four Agency goals.

Figure 2: IT Alignment with the NASA Strategic Plan

NASA's Information Consumers

Per the National Aeronautics and Space Act of 1958, NASA is accountable to "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof." The Agency collaborates with and supports diverse internal and external information consumers and stakeholders with varying needs and uses for NASA's information. The public is the Agency's largest information consumer, sharing in our mission results and using our expanding open datasets, including data on *https://data.nasa.gov/*.

Major internal information consumers are listed below. NASA conducts its work in five mission directorates, together with the Mission Support Directorate and Administrator's staff offices. NASA Headquarters, nine field Centers, and a federally funded research and development center (FFRDC), the Jet Propulsion Laboratory (JPL), perform the work that supports these directorates and NASA's missions.

The Agency's diverse workforce of just under 18,000 civil servants is distributed among its Centers, facilities, and Headquarters, as shown in Figure 3. NASA works with many more U.S. contractors, academia, and international and commercial partners. NASA also coordinates with Federal Government entities that issue laws, policies, and standards that influence the direction and operations of NASA's information management.

Mission Directorates and Offices

- The Aeronautics Research Mission Directorate conducts research to advance the safety, capacity, and efficiency of the air transportation system, reduce emissions, and sustain U.S. technological leadership in the aviation industry.

- The Space Technology Mission Directorate invests in transformational technologies that help offset future mission risk, reduce cost, advance capabilities that enable NASA's missions, and support space industry growth and high-quality job creation.

- The SMD conducts scientific exploration enabled by observatories that view Earth from space, observe, and visit other bodies in the solar system, and gaze out into the galaxy and beyond.

- The Exploration Systems Development Mission Directorate defines and manages the systems development for programs critical to the Artemis lunar exploration initiatives and capabilities to support sustainable human deep space exploration.

- The Space Operations Mission Directorate focuses on launch and space operations, including launch services, space communications and navigation, the International Space Station, and eventually, sustaining operations on and around the Moon.

- The Mission Support Directorate enables the Agency's missions by managing institutional services, capabilities, and critical mission support resources.

- The Administrator's staff offices provide cross-cutting direction for safety and mission assurance, workforce and diversity, acquisition and use of IT, small business opportunities, as well as coordinating science, technology, engineering, and mathematics (STEM) engagement activities, international partnerships, and legislative affairs.
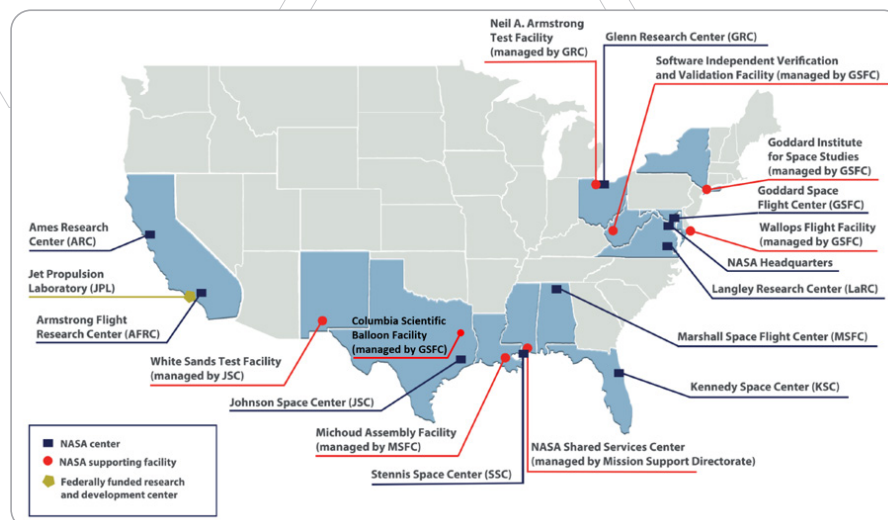

Figure 3: NASA's Centers and Facilities

Strategic Management Model for NASA IT

The model in Figure 4 represents our approach to responsively plan, execute, and evaluate changes to NASA's IT environment needed to support achievement of NASA's Vision and Mission. This approach is evolving as NASA transitions to an enterprise operating model for IT, using industry best practices for recently established enterprise management capabilities. The model facilitates a repeatable approach based on continuous learning for near- and long-term planning by identifying needs, forecasting capability and technology changes, informing resource planning, and aligning project and service delivery to implement and sustain our IT services and capabilities. The role of this strategic plan is summarized below.
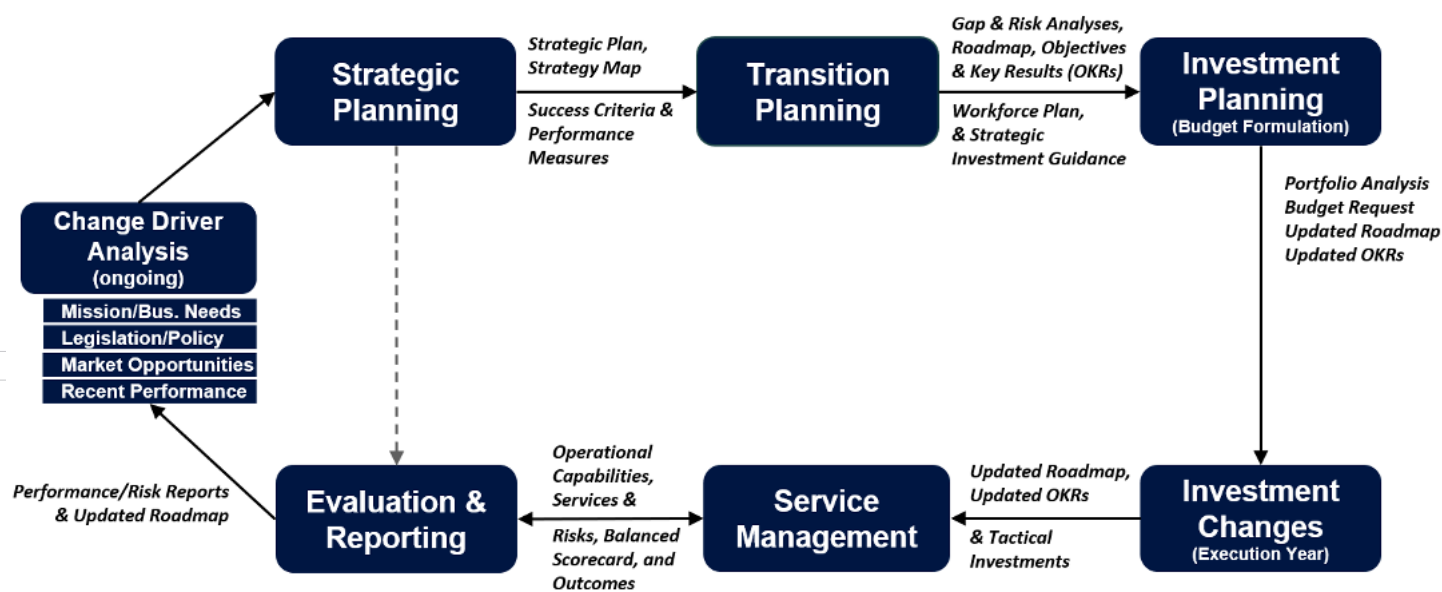

Figure 4: Strategic Management Model For NASA IT

Formulation of the NASA IT Strategic Plan is informed by scanning and analysis of drivers for change, including NASA's needs, recent performance, business and technology trends, and Federal laws and policies. We use strategy mapping during planning to communicate the cause-and-effect relationship between strategic objectives and show how value is created. The strategic plan is the product of diverse agencywide engagement that sets the vision, mission, outcomes, goals, objectives, and success criteria for NASA's IT community in alignment with Agency priorities. While the strategic plan spans five years, we adaptively plan and execute on an ongoing basis to take advantage of opportunities and adjust to needs and priorities. We perform recurring gap analyses between our current architecture and the future architecture identified in the strategic plan. These gap analyses and assessment of our threat environment inform development of our transition plan, or roadmap, which translates IT strategies into actionable plans and investments for the IT community to meet our customers' needs.

We establish Objectives and Key Results (OKRs), or actionable priorities, to measure progress toward achieving our strategic goals, and to inform annual investment planning, projects, and initiatives. By regularly evaluating near-term and long-term performance and risks using a balanced scorecard approach supported by OKRs, we determine if our service management actions and strategies are successful or need adjustment. Based on this performance feedback, we update NASA's IT Strategic Plan and roadmap as needed.

IT Vision, Mission, Values, and Principles

To ensure focus and alignment, the IT community shares NASA's Vision: **Exploring the secrets of the universe for the benefit of all.** We are in an era of more complex missions, rapidly evolving IT, and profoundly expanding data collection and processing. Achieving NASA's Vision depends on secure, effective digital processes, technology, and accessible data.

Our mission describes the IT community's role in bringing NASA's Vision to life: **Empower NASA's people and partners to achieve mission success through secure, evolving information technology and accessible data.** Our path to successfully enable achievement of NASA's Vision is guided by _NASA's core values_ and the decision-making principles described below.

Vision: Exploring the secrets of the universe for the benefit of all.

Mission: We empower NASA's people and partners to achieve mission success through secure, evolving information technology and accessible data.

Values: NASA's core values of Safety, Integrity, Inclusion, Teamwork, and Excellence mandate individual and organizational behavior across the Agency at all levels.

Guiding Principles

NASA's Governance and Strategic Management Handbook relays overarching principles that govern NASA's activities. The IT principles below further articulate how our IT community will make decisions.

- We are a unified team and depend on each other. We collaborate, partner, and succeed together.

- We strive to meet customer requirements and exceed customer expectations.

- Ideas must turn into measurable customer value. Rapid delivery of effective, user-friendly capabilities is what matters.

- We value simplicity over complexity. Simple does not mean easy.

- Communications are clear and timely.

- Capabilities are secure from the start. Cybersecurity is part of everything we do.

- We work as hard to reduce inefficiency as we do to create and develop services.

Our IT Strategic Plan and Priorities

The remainder of this plan outlines the strategic direction, goals, and priorities that our IT community will pursue to help make NASA's vision of the future a reality. We formulated this plan with customers and stakeholders across the Agency. To provide focus, we identified five strategic goals for the next five years. After clarifying these goals, we engaged NASA's mission directorates and Centers through stakeholder reviews of the goals and objectives. After updating the plan based on stakeholder feedback, NASA's IT governing council reviewed and approved this plan.

The next section of the plan discusses each goal, strategic objective, and performance objective in detail. Our goals focus on delivering great customer experiences, achieving consistent operational excellence, transforming NASA through information and technology, and ensuring proactive, resilient cybersecurity, all delivered by an exceptional team. Since OCIO transitioned into an enterprise operating model for IT in 2022, some performance objectives in this plan are in the early stages of development. Performance objectives in development have performance indicators, while mature performance objectives have specific, time-based commitments via a target. As our enterprise operating model and mission engagement matures further, we will update the early-stage performance objectives to include target commitments that drive progress toward the desired Agency outcomes. Targets are to be achieved by the end of the fiscal year stated, with the understanding that changes to resources and technology may affect achievement of these targets.

2022 NASA IT Strategic Plan Summary

NASA's Mission Directorates
Aeronautics Research
Exploration Systems Development
Space Operations
Science
Space Technology
Mission Support
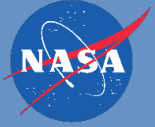
IT Vision — Exploring the secrets of the universe for the benefit of all.

IT Mission — We empower NASA's people and partners to achieve mission success through secure, evolving information technology and accessible data.

IT Values — • Safety • Integrity • Inclusion • Teamwork • Excellence •

Strategic Outcomes

- Increase quality & effectiveness **Q**
- Increase cost-effectiveness **C**
- Share results & data **R**
- Accelerate results **A**
- Innovate & enable discovery **D**
- Increase safety & resilience **S**

Goal 1: Satisfaction
Deliver Great Customer Experiences
Cross-cutting Support

Goal 2: Excellence
Achieve Consistent Operational Excellence
Q   C

Goal 3: Transformation
Transform NASA with Information & Technology
R   A   D

Goal 4: Cybersecurity
Ensure Proactive, Resilient Cybersecurity
S

Goal 5: People
Develop an Exceptional OCIO Team
Cross-cutting Support

Objectives (Goal 1)

1.1 Create and evolve a shared understanding of mission and business requirements.
- ❑ Service alignment survey (FY 2024)
- ❑ Requirements management system (FY 2024)
- ❑ % of IT investments contributing to customer needs
- ❑ % increased use of OCIO services

1.2 Improve satisfaction with OCIO's products and services.
- ❑ Customer perception reporting (FY 2023)
- ❑ Assess OCIO services alignment (FY 2024)
- ❑ Streamline IT onboarding (FY 2024)

1.3 Ensure OCIO's products and services are easily accessible and intuitive.
- ❑ Redesign NASA.gov (FY 2023)
- ❑ Right-size NASA's digital footprint
- ❑ New OCIO intranet (FY 2023); decrease legacy sites (FY 2024)
- ❑ % of Web content and IT projects complying with Section 508

Objectives (Goal 2)

2.1 Increase the effectiveness of IT planning, investment, and communications.
- ❑ 80% of investments meet expected benefits
- ❑ Increase % of IT spend to enhance & transform vs. operate
- ❑ % of investments that align to architecture

2.2 Excel at IT program and project management to deliver results.
- ❑ 90% of IT projects on schedule; 85% on budget
- ❑ 95% of OCIO org OKRs align to strategic objectives (FY 2026)
- ❑ 90% of materials enable informed board decision

2.3 Increase the reliability, effectiveness, and efficiency of NASA's IT operations.
- ❑ % requests delivered within service level
- ❑ % of OCIO trained in IT service management
- ❑ % transition to an enterprise IT service management process

Objectives (Goal 3)

3.1 Transform how NASA operates using digital capabilities.
- ❑ 60,000 cumulative hours saved by automation (FY 2025)
- ❑ # of decommissioned / modernized systems
- ❑ %/# of use-cases supported by enterprise platforms
- ❑ Phased zero trust architecture (FY 2026)
- ❑ Pipeline for process transformation
- ❑ Reduction of duplicate IT offerings

3.2 Enable insights from NASA's data & information.
- ❑ 100% orgs have data stewards (FY 2024)
- ❑ # data sets evaluated for quality
- ❑ # data sets added to Agency data platform

3.3 Enable flexible and equitable work options and environments to achieve mission success.
- ❑ # of conference rooms outfitted with hybrid conferencing capabilities
- ❑ % utilization of NASA's external collaboration capabilities

Objectives (Goal 4)

4.1 Simplify, strengthen, and scale NASA's cybersecurity.
- ❑ Migrate to enterprise portfolio (FY 2025)
- ❑ Independent security control assessments (FY 2026)
- ❑ 80% reduction in unapproved NASA user logins (FY 2026)

4.2 Reinforce operational resilience through strategic cybersecurity risk management.
- ❑ Enhanced endpoint detection/response (FY 2023)
- ❑ 80% multi-factor auth on mission systems (FY 2024)
- ❑ Centralized event logging (FY 2025)
- ❑ Policies block unauth apps; Secure Shell proxy (FY 2023)
- ❑ Integrate public Agency web app firewalls (FY 2024)
- ❑ Enterprise operational technology device management capability (FY 2025)

4.3 Integrate risk-based cybersecurity into mission development & operations.
- ❑ NASA cybersecurity score ≥94 (FY 2025)

Objectives (Goal 5)

5.1 Attract, hire, and retain a diverse, strategically-aligned OCIO team.
- ❑ % increase in positive responses to questions on Federal employee survey related to recruiting/hiring and role consistency
- ❑ Decrease time to hire

5.2 Enhance employee experience by ensuring team members feel included, engaged, and valued.
- ❑ % increase in positive responses to questions on Federal employee survey related to inclusion and the employee experience

5.3 Develop team members' talents and support career development to meet mission needs.
- ❑ % increase in positive responses to questions on Federal employee survey related to OCIO Career Paths and expanded development opportunities

Figure 5: 2022 NASA IT Strategic Plan Summary

Strategic Goals and Objectives

Strategic Goal 1:
Deliver Great Customer Experiences

OCIO's products and services exist to enable the work of NASA. We support the scientists, engineers, technologists, and mission support personnel who strive to accomplish NASA's Mission and contribute to maintaining American leadership in space, aeronautics, climate research, and innovation while driving economic growth in the civil space sector. Delivering great customer experiences is a foundational element of OCIO's service delivery strategy, driven fundamentally by the voice of the customer.

We will deliver great customer experiences by knowing our customers across the Agency – mission and mission support partners alike – and maintaining effective relationships. We will engage with customers to understand their requirements, priorities, and business goals and partner to use IT solutions that help customers achieve their business goals. We will advocate for their interests when we develop products, services, and processes and use their feedback to establish priorities and drive continuous improvement.

Strategic Objective 1.1: Create and evolve a shared understanding of mission and business requirements.

As NASA's IT services provider, OCIO partners with Agency stakeholders to provide value-added, mission-focused technology services. It is critical that these services reflect the mission and business needs of the Agency. OCIO will maintain this connection by engaging with customers across the Agency to understand, document, and advocate for their requirements in the development and operations of IT products, services, and systems. We will incorporate these customer requirements in the development of NASA's enterprise architecture and associated roadmaps.

We will *engage with customers in multiple ways* – through conversations at Centers between customers and relationship managers, with IT service lines and stakeholders, and through formal and informal channels such as focus groups, Teams channels, and customer forums.

OCIO's Customer Engagement Office will *provide a central point to collect and infuse the customer experience and requirements* into our service delivery and performance management. Relationship managers will work with Agency customers to understand and anticipate their mission and business needs and document and analyze their requirements. Relationship managers will engage with the customer, be it an individual, a business customer, or a mission, to understand their needs, guide them through options, and appropriately connect them to solutions. Those solutions could be readily available from our service catalog or solutions we develop to meet customer needs. Relationship managers also advocate for the mission by

articulating customer challenges and impacts of change, whether it be technical, policy, or process change.

We will use this relationship management team to *strengthen relationships with our customers* to better understand and advocate for their mission priorities and IT requirements.

Performance Objectives

1.1.1 Implement regular survey of customers on alignment of IT services with customer needs. (Target: Implemented in FY 2024)

1.1.2 Establish enterprise capability to document, track, verify, and validate stakeholder mission and technical requirements, monitor effective requirements fulfillment, and manage backlog at the portfolio, service element, and product levels. (Target: Implemented in FY 2024)

1.1.3 Increase IT investments contributing to customer requirements/needed capabilities. (Indicator: Percentage of investments contributing to customer requirements/capabilities)

1.1.4 Measure and increase utilization of OCIO services. (Indicator: Percentage of increased utilization)

Strategic Objective 1.2: Improve satisfaction with OCIO's products and services.

OCIO's products and services exist to enable the NASA workforce to achieve the Agency's mission of discovery, exploration, innovation, and advancement. Improving customer satisfaction with these products and services are fundamental priorities for OCIO, because these services are so critical to the efficiency and effectiveness of our customers. We will engage with our customers to *understand customer experience challenges and identify opportunities* for improvement. We will continually assess performance and satisfaction with our services through user feedback, metrics, operational and administrative data analysis, surveys, human-centered design methodologies such as journey mapping, and other methods. We will provide consistent measurement methodologies for customer experience and satisfaction across all OCIO services and sub-organizations. We will drive consistent continual improvement practices and follow-through across processes and services.

In addition to assessing customer experience across our services, we will *focus on key experiences of particular importance* to our customers. We will assess the performance of these designated services through meaningful measures from the perspective of the customer and turn those assessments into plans to improve customer experience. We will continuously engage with our customers to identify priorities for service performance, updating designated services based on continual feedback.

An area of particular importance to our customers is onboarding. We will continue to partner with the Office of STEM Engagement, the Office of the Chief Human Capital Officer, the Office of Physical Security, and the Office of Procurement to *streamline the onboarding experience for all new hires joining NASA.* We will reduce the time it takes for new hires to be operational with the IT equipment and access they need to be successful in their work. We will also work to reduce the time it takes to fulfill customer orders for new IT equipment such as laptops and cell phones.

Performance Objectives

1.2.1 Implement regular executive reporting of customer perception across IT products and services, including both quantitative and qualitative data, based on tickets and incorporating narrative feedback from customers. (Target: Implemented in FY 2023)

1.2.2 Annually assess the alignment and performance of OCIO products and services to ensure they are meeting customer needs. Use the results to drive improvements in OCIO products and services. (Target: Implemented in FY 2024)

1.2.3 Streamline the IT onboarding experience for new hires to be operational with their IT equipment, measured by reduced time and increased process efficiency. (Target: Streamlined in FY 2024)

The Artemis I launch team at consoles inside Firing Room 1 of the Rocco A. Petrone Launch Control Center at Kennedy Space Center

Strategic Objective 1.3: Ensure OCIO's products and services are easily accessible and intuitive.

OCIO will make it simpler for customers to work with us and get the IT they need when they need it. A key focus is improving the digital customer experience for NASA's internal customers and the public by modernizing Agency websites using human-centered design methodologies.

NASA's sprawling online footprint of more than 2,800 external websites presents an opportunity to dramatically *improve the user experience for our employees, partners, and the public we serve.* From scientists to school children, our online visitors are forced to navigate multiple NASA websites with different designs and competing content to find the information they seek. OCIO will work with the Office of Communications and the SMD to redesign the Agency's main websites (www. nasa.gov and science. nasa.gov) into one cutting-edge web experience able to host NASA's wealth of existing content, built atop a new platform that empowers internal content creators to tell their stories. NASA's Web Modernization Team has worked since 2019 to meet and exceed the requirements of the 21st Century Integrated Digital Experience Act. The team's priorities include assessing and consolidating the Agency's web presence, redesigning the main Agency website, and building a new Agency wide content management system following industry best practices for usability, accessibility, security, and search engine optimization. Right-sizing NASA's digital footprint will improve user experience by making information more discoverable, strengthen digital security, reduce website redundancy, and maximize the effectiveness of online communication. To prevent further sprawl, OCIO will establish Agencywide web governance, maintain an annual inventory of NASA's public websites, and create and enforce a comprehensive NASA web policy.

OCIO will *make it easier for NASA employees to find the enterprise IT services and support they need* by modernizing its internal website. Currently, employees must navigate multiple websites across NASA's legacy federated IT environment that contain inconsistent, and sometimes outdated, information and processes. The website will consolidate current, relevant content across IT service lines and Centers into a central location with a single "front door" that includes a service catalog with an authoritative list of all active services, products, and points of contact across OCIO. We will focus on key user journeys and incorporate customer priorities as identified through metrics, customer feedback, and collaboration with OCIO business and customer relationship managers and other Agency stakeholders. The "front door" will continuously improve as new priorities and needs emerge through these feedback channels. Consolidating websites into a single intuitive front door will improve usability, reduce duplication of effort, and improve the findability of OCIO content. OCIO will

develop governance to establish a robust content management process for internal content creators and ensure content is relevant, up-to-date, accessible, findable, and uses plain language to meet customers' needs and improve employee experience.

We strive to implement IT products and services that can be used by all employees. OCIO is committed to *ensuring the accessibility of our IT products and services.* All technology, whether developed in-house or externally, is expected to be compliant with Section 508 of the Rehabilitation Act before deployment. Our approach will be informed by our community of customers with disabilities. Our intent is to provide a voice to this employee community, a clearinghouse for accessible technology services to improve their customer experience, and accountability for the compliance of NASA's IT services.

Performance Objectives

1.3.1 Improve visitor satisfaction and search engine rankings for www.nasa.gov by launching a redesigned website. (Target: Launched in FY 2023)

1.3.2 Right-size NASA's digital footprint by decommissioning inactive websites and migrating active websites to the www.nasa.gov hub. (Indicator: Number of decommissioned and migrated websites)

1.3.3 Launch redesigned OCIO intranet presence to provide a single point from which customers may navigate to all IT products and services, programs, and features, streamlined content, processes, and technologies using human-centered design. (Target: Launched in FY 2023)

1.3.4 Decrease OCIO intranet sprawl by decommissioning inactive sites and migrating active sites into OCIO's intranet presence on One-NASA, resulting in a more navigable, better managed environment. (Target: Implemented in FY 2024)

1.3.5 Improve compliance of Web content with Section 508. (Indicator: Percentage of Web content in compliance)

1.3.6 Improve Section 508 compliance of OCIO-led purchases and acquisitions prior to production use. (Indicator: Percentage of purchases and acquisitions assessed for compliance)

Strategic Goal 2:
Achieve Consistent Operational Excellence

NASA depends on consistent operational excellence to achieve the Agency's missions. The pace of aerospace and industry innovation is increasing, and we must plan and deliver the support capabilities needed to advance NASA into the Artemis era and beyond. Our path toward operational excellence requires continuous improvement, building on the Agency's transition to an enterprise operating model for IT from a long-standing decentralized approach. Inconsistent planning, execution, and service delivery processes and tools contributed to duplicate and obsolete technologies and processes over many years. The deficiencies of legacy infrastructure have made it difficult to address increasing mission complexity, Agency and Federal requirements, and industry technology opportunities.

Convergence into a customer-oriented enterprise approach for planning, executing, and delivering IT will provide a scaled platform to improve customer experience, increase affordability and transparency, and pursue targeted innovation to directly enable NASA's missions. Adoption of industry best practices will streamline and continuously improve our processes to better support NASA's missions with increased productivity, agility, and service quality. Connecting data across these enterprise processes and underlying platforms will improve analysis and decision making at all levels. These practices will also increase cost-effectiveness by facilitating elimination of duplication and waste, improving affordability. Finally, our employee experience will improve through the use of common processes, roles, and tools.

We will enhance foundational capabilities for IT planning and investment, program and project execution, and service delivery. These capabilities span the IT life cycle, significantly impacting NASA's ability to perform its missions. We will increase the effectiveness of IT planning, investment, and communications through the use of business capability modeling, dynamic roadmaps, and enterprise-level strategy management processes. Exceling at IT program and project management will require transition to an enterprise IT program and project management capability, strengthened performance and risk management, and responsive, flexible IT governance. Finally, NASA will require consistent service delivery, disciplined service integration, and an enterprise IT service management platform to increase the reliability, effectiveness, and efficiency of NASA's IT operations.

Strategic Objective 2.1: Increase the effectiveness of IT planning, investment, and communications.

As NASA's missions evolve and increasingly integrate with industry, hybrid workforces and workplaces become the norm, and new technologies arise, NASA's IT-related requirements will change. A top priority for NASA's IT community is ensuring mission success, equitably and securely, while adapting to change and communicating effectively with our customers along the journey. This priority is challenged by the increasing complexity of NASA's missions and the continuously evolving IT landscape. We support and secure tens of thousands of devices, thousands of applications, critical networks and assets, and petabytes of data to enable NASA's missions and operations. Resource challenges hamper IT modernization and increase obsolescence due to the expense of maintaining legacy IT in an ever-changing environment. We must use a scalable mission-driven, technology-enabled planning and investment approach to ensure critical capabilities and assets are mission-ready, reliable, and affordable. Our aim is to maximize the mission benefit of investment in IT by optimizing resource use at the enterprise level while reducing

mission risk by eliminating duplication and obsolescence in IT services and contracts.

Our recent transition to an enterprise IT operating model will be a springboard for evolution, using industry best practices and newly established operating capabilities. Building upon realigned IT budget and resource authority and emerging enterprise customer relationship and service management capabilities, we will plan with our mission and mission support partners using common business processes with an enterprise view. We will *establish and use a business capability model* that provides a holistic view of NASA's mission, business, and external requirements to facilitate planning, prioritization decisions, and communications across the Agency. This business capability model will enable us to develop architectures that identify gaps, duplication, unintended redundancy, and opportunities for strategic investments that enable NASA's future.

This enterprise architecture will enable NASA to *develop and communicate dynamic roadmaps* that drive the continuous strategic alignment and contribution of our IT investments and inform opportunities for potential divestments or decommissioning of obsolete services.
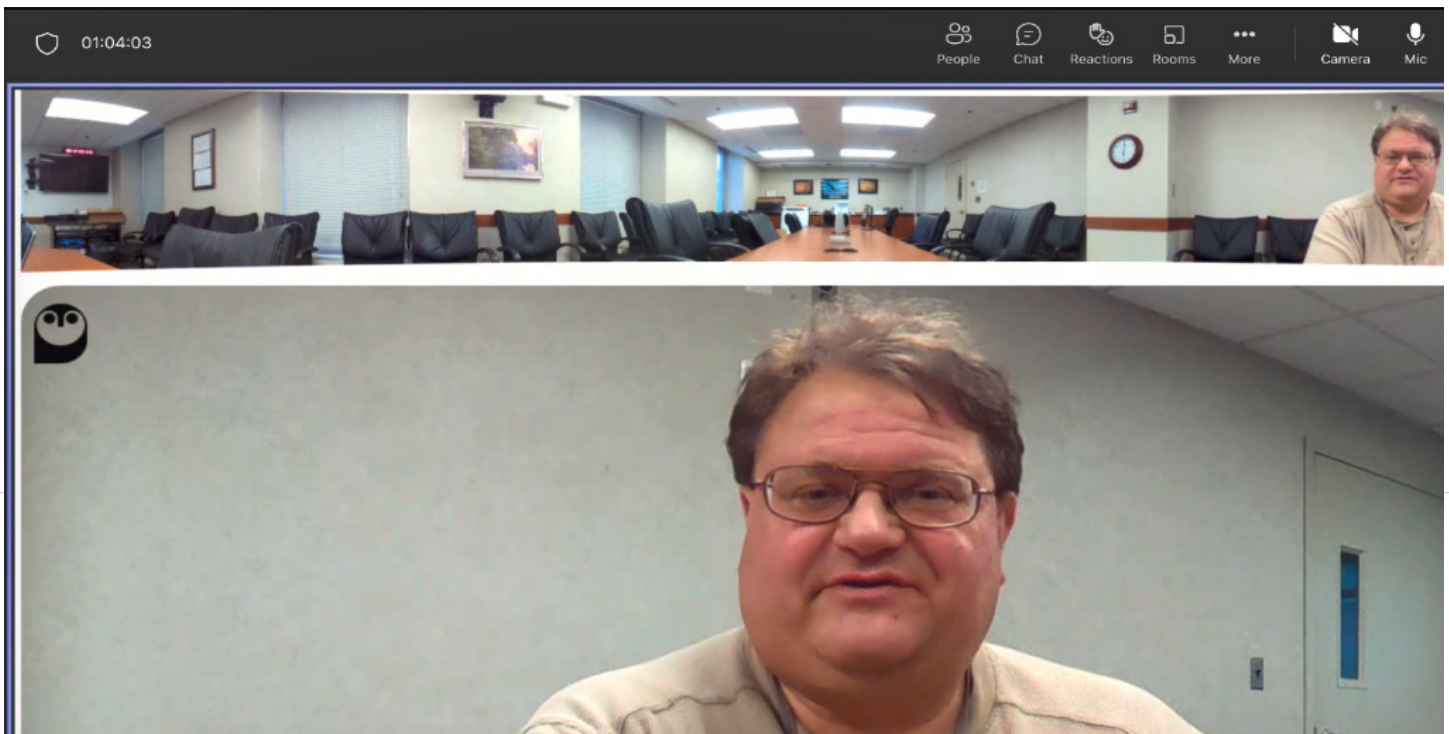
Hybrid Technology Project Technical Lead demonstrating new hybrid meeting technology at Goddard Space Flight Center

These roadmaps will transparently lay out the guardrails, investments, milestones, and success criteria to achieve an integrated future state for NASA's IT ecosystem aligned to mission needs. Successful capability modeling, prioritization, and roadmaps will depend on customer engagement, open information sharing, consistent analysis, and post-implementation reviews to validate that the expected investment benefits were achieved. These integrated activities necessitate the *use of enterprise-level strategy management processes*, well-defined repeatable use cases, and adoption of a suite of supporting enterprise tools to consistently plan, invest, and communicate at scale.

Collectively, these efforts will benefit NASA in several ways. IT investments will be intentionally set and actively managed to optimize the Agency's IT infrastructure, modernize our capabilities, and transform how NASA does business. The Agency will pursue the most effective operating model (i.e., enterprise, federated, diversified) for each capability and service, with rightsizing based on forecasted demand and automation over time. Planning, decision making processes and criteria, and communications with customers will be more agile and transparent, leveraging enterprise processes and a mutual understanding of NASA's capabilities. Our enterprise software management capability will be strengthened to reduce risk to Agency operations through process standardization and automation, training, and monitoring. Moreover, we will effectively address the longstanding technical and process debt that impacts our innovation and risk posture, enabling a flexible and agile enterprise IT ecosystem that adapts to NASA's changing mission needs.

Performance Objectives

2.1.1 Verify that investments meet expected benefits. (Target: 80% meet expected benefits)

2.1.2 Increase percentage/ratio of IT spend used to modernize/enhance and transform the business versus run/operate.

2.1.3 Align investments to NASA-approved enterprise architecture/roadmaps. (Indicator: Percentage of aligned investments)

Strategic Objective 2.2: Excel at IT program and project management to deliver results.

Effective program and project management has been a cornerstone at NASA since its inception. Programs and projects require transparent planning, coordination, and monitoring across numerous stakeholder groups, offices, and project teams to achieve their intended impacts to the Agency's missions. Advances in IT program and project management (PPM), including portfolio management, performance management, risk management, and governance, coupled with continuous improvement, are pivotal to delivering timely, quality, secure, and cost-effective results. We will leverage these best practices and NASA's transition to an enterprise IT operating model to consis-

tently drive improvement and manage change.

IT services, and the programs and projects that create them, are more complex as NASA modernizes, transforms, rationalizes, and secures its capabilities. NASA uses multiple project management methodologies, ensuring the best approach for varying requirements and service delivery models. Effective management and holistic oversight of the enterprise IT portfolio depends on collaboration and integration across all of OCIO. As NASA's IT ecosystem becomes more enterprise-oriented, project management expertise and programmatic oversight skills will ensure IT service lines and projects contribute to achieving NASA's goals. Best practices, training, enterprise tools, strengthened governance, and continuous improvement need to be consistently implemented for OCIO to excel at IT program and project management.

Due to the increasing complexity of NASA's requirements and challenging IT projects of all types and sizes, we must *standardize and coordinate our IT PPM capability* to operate effectively at enterprise scale. As a foundation, we will continuously improve NASA's IT PPM policies, processes, and terminology in alignment with interdependent agency policies and processes. Effective portfolio, program, and project management will ensure alignment with NASA's IT strategy and roadmaps to realize value. Ongoing training in best practices will enable IT project management methodologies (e.g., agile, waterfall, etc.) used by various IT service delivery models across NASA. Appropriate experience will be provided based on IT project scope and requirements, and project managers will be empowered with visibility into cost estimates and resource allocations to improve consistency in meeting budget requirements. Building on this foundation, OCIO will use a requirements-driven approach to identify and adopt an interoperable enterprise PPM tool for portfolio oversight to ensure results are delivered effectively.

OCIO will *evolve IT performance and risk management functions* in alignment with the maturing IT PPM capability. We will adopt and implement industry best practices such as OKRs and Balanced Scorecard, use risk-informed decision making, and align investments and configuration items based on risk and performance reporting. Performance and risk reporting will be intertwined according to industry best practices and will occur on regular operating cadences to inform management processes and timely, effective governance decision making. Performance and risk analysis will foster an awareness of emergent problems during execution and operations, and provide insight into remediation and mitigation opportunities.

Enabling responsive, flexible IT governance will empower managers and governance boards to impact IT services more effectively by increasing the quality and speed of decision making. Proactive and mutual engagement with board members will be supported by concise, use-

ful information to inform timely decision making. We will accomplish this by standardizing templates, streamlining materials, training employees on decision package creation and presentation, and simplifying governing boards and working groups. Ongoing collaboration with board members will ensure clarity regarding the decision making process and expectations, and governance content will be organized and accessible to increase transparency. Customer engagement will be solicited at all levels of governance to plan, deliver, and continuously improve our products and services.

Performance Objectives

2.2.1   Execute Enterprise and Center IT projects in conformance with approved project plan schedule and baseline cost. (Target: 90% conformance with schedule; 85% conformance with cost)

2.2.2   Ensure OCIO organizational OKRs measure organizational goals/objectives aligned to NASA IT Strategic Plan objectives. (Target: 95% alignment in FY 2026)

2.2.3   Verify that materials brought before boards are concise and contain sufficient information for the board to make an informed business decision. (Target: 90% contain sufficient information)

Strategic Objective 2.3: Increase the reliability, effectiveness, and efficiency of NASA's IT operations.

NASA's missions require responsive, effective, and affordable IT service delivery to be successful. Before transitioning to an enterprise IT operating model, the Agency's federated IT organization and service delivery model did not leverage Agencywide IT staff and investments to enable NASA's missions effectively and efficiently. The service delivery model was based largely on a framework of best practices for IT service management, which was implemented inconsistently, using tools and processes that were not seamlessly integrated. NASA strengthened integration over time but continual improvement was impeded by longstanding technical and process debt, decentralized planning and service delivery, and resource constraints. OCIO's transition to an enterprise operating model will drive better service delivery, customer experiences, and efficiency through economies of scale and reduced duplication, waste, and technical debt. Our future service delivery model will use modern, integrated best practice frameworks, consistent processes and roles, and an enterprise

IT service management platform for consistent service delivery. These strategies aim to increase service quality, responsiveness, and consistency for NASA's missions and improve our customers' experience within an acceptable level of operational and cybersecurity risk.

We will *implement a consistent and integrated approach to service delivery* by adopting frameworks such as Information Technology Infrastructure Library 4 (ITIL4) and the Scaled Agile Framework enterprise (SAFe). These operating frameworks will integrate with the TBM framework to better inform our IT investments. OCIO will operate in a dual mode that leverages the legacy ITIL3 during the phased multi-year transition to ITIL4. To achieve these desired service delivery improvements, our employees in relevant functions will be trained in the fundamentals of ITIL4 and SAFe, supplemented with intermediate and advanced courses for technical employees. Training will generally be conducted across OCIO's service lines and Centers to encourage collaboration, integration, and relationship building across organizations to better serve our customers.

We will *institutionalize service integration and orchestration across the OCIO IT service delivery organizations,* including IT service lines, Centers, and contracts. Effective integration will require definition of consistent roles, responsibilities, and terminology for service delivery, establishment of service levels and relationships, and end-to-end metrics. Enterprise IT performance and risk management capabilities will inform cross-cutting analytics and value-based service delivery outcome metrics. These metrics will focus on increasing the responsiveness, reliability, and consistency of service delivery and operations in alignment with our customers' strategic priorities. OCIO will track service consumption, quality, value, customer satisfaction and experience, and performance and establish a feedback loop with customers aligned with OCIO's Customer Engagement Office. Effective continual service improvement will depend on integration of customer needs into decision-making regarding where NASA should sustain, enhance, or divest IT services. Successful integration will depend on common tools and communication channels to collaborate seamlessly across OCIO to support customers in a consistent, responsive manner.

This collaboration will enable OCIO to intentionally design and adjust NASA's IT infrastructure and service delivery baseline to adapt to customer expectations and technology trends without compromising service delivery.

Implementation of these frameworks and processes will depend on *establishment and use of an enterprise IT service management platform for all core service management processes,* including management of incidents, problems, service requests, changes, knowledge, configuration, and assets. NASA has approximately ten IT service management deployments, which hinder process integration, optimization, and responsiveness to resolving customer issues since customers often end up with tickets in multiple systems to resolve an issue. We will rationalize IT service management tools and identify an enterprise platform for consolidation of IT service management tools. Successful rationalization and transition will depend on normalization and consolidation of processes across IT service delivery organizations, retaining effective existing practices, coupled with establishment of process governance. Common processes are critical to streamlined, responsive service delivery and will require mindset changes for each process. We will infuse continual improvement activities into our enterprise IT service management capability to ensure consistent service health, service quality, satisfaction, and value.

Performance Objectives

2.3.1   Deliver service requests within agreed service level. (Indicator: Percentage of service requests delivered within agreed service level)

2.3.2   Train staff in basic, intermediate, and advanced IT Service Management (ITSM) courses. (Indicator: Percentage of staff trained)

2.3.3   Transition ITSM processes to an enterprise process. (Indicator: Percentage of processes transitioned)

Strategic Goal 3:
Transform NASA with Information and Technology

NASA is charged with an enduring and inspiring Mission to "explore the unknown in air and space, innovate for the benefit of humanity, and inspire the world through discovery." As NASA looks to the future, we must deliver this bold mission in a radically changing world, which means NASA cannot operate in the same way it did in decades past. The demand is increasing for bolder NASA missions, which is driving increased technical and programmatic complexity. NASA's partner community is growing and becoming more diverse, and embracing these new ideas and approaches is shaping a rapidly transforming global civil aerospace market. Public expectations for efficiency, effectiveness and transparency are leading to new business processes that are outpacing legacy systems. Additionally, top talent is expecting to work in a digitally enabled and agile workspace, with more process transparency and equitable access to tools and data, as well as personal/geographic flexibility in a post-pandemic world.

These challenges affect every organization and Center, and require NASA to strategically focus on digitally transforming the way the Agency works, the experience of its workforce, and the agility of its workplace. NASA needs digital solutions, powered by information and technology, to:

- Increase our decision velocity in the face of mission complexity using data-informed decision making.
- Seamlessly team with an array of traditional and non-traditional partners.
- Increase speed and affordability of our operations.

- Attract, engage, and retain a diverse future workforce.
- Provide a modern Future of Work environment.
- Inspire and immersively engage citizens in our discoveries.

These strategic outcomes and the imperative to responsibly and consistently leverage information and technology to deliver solutions are amplified in numerous Executive Orders (e.g., Executive Order 13859 Maintaining American Leadership in Artificial Intelligence), the President's Management Agenda, the Federal Data Strategy, the Federal Cloud Computing Strategy, and other Federal mandates. In response, NASA established an Agencywide Digital Transformation (DT) strategic initiative, hosted by OCIO, to ignite transformation efforts, connect plans, integrate solutions, and facilitate adoption of enterprise-level DT solutions across NASA. The DT initiative worked with NASA's independent, federated organizations to converge on four Transformation Targets as initial priorities to focus and align collective DT plans and investments:

- *Engineering –* Enable agile multi-center/partner engineering teams to solve frontier problems.
- *Discovery –* Multiply science and technology breakthroughs by leveraging diverse global minds/advances.
- *Decision Making –* Accelerate risk-informed, self-consistent, evidence-based decision making (initially focused on program/project management).
- *Operations –* Optimize and synchronize our work environment to increase efficiencies and effectiveness between mission and mission support.

To digitally transform each of these key value-streams across NASA, the DT initiative conducted internal and external benchmarking and developed five Digital Levers that form a systematic and consistent digital methodology to accelerate and integrate organizational plans. These Digital Levers represent key strategic opportunities to limit duplication and maximize leveraging of digital solutions across organizations and are formalized in three strategic objectives to transform how NASA operates using digital capabilities, enable unbiased insights from equitable access to NASA's data and information, and enable flexible and equitable work options and environments to achieve mission success.

Since digital transformation is exponentially growing with digital disruptions occurring daily around the world, the DT initiative proactively assesses future digital disruptions that have the potential to transform NASA practices, advises NASA organizations on opportunities, and facilitates partnerships to enable NASA to capitalize on external advances. Partnership efforts, with other Federal aerospace partners as well as industry and academia, are explored in multiple rapidly evolving technology areas, which currently include: Modeling and Simulation, Artificial Intelligence/Machine Learning, Intelligent Automation, Extended Reality, Zero Trust Architecture, and Internet of Things solutions.

First successful test and deployment of an Artificial Intelligence and Machine Learning (AIML) prototype model to inspect astronaut glove readiness for spacewalks on the International Space Station

Strategic Objective 3.1: Transform how NASA operates using digital capabilities.

To transform NASA with information and technology, the Agency must intentionally reinvent how it works to accelerate results, increase productivity and quality, foster equitable and effective decision making, and innovate and enable discoveries. NASA intends to transform how it operates using modern, secure digital capabilities, enabled by accessible data as discussed in IT Strategic Objective 3.2. This approach is consistent and compatible with global industry best practices, supports Federal mandates and enables progress toward NASA's Transformation Targets to evolve the way we perform Engineering, Scientific Discovery, Decision Making, and Operations. The key beneficiaries include: NASA's missions who will be able to solve more complex problems faster and more affordably; industry who will be able to partner more seamlessly on those missions; and employees who will thrive with more streamlined processes, better synchronized information, and access to better tools to execute their work and automate labor-intensive, repetitive functions. With cybersecurity threats increasing, and mission cadence accelerating, NASA intends to deploy three strategies to transform how NASA operates using digital capabilities.

NASA's strategy to *establish and use interoperable architectures* is the enabling backbone for transforming how the Agency operates. Many of NASA's IT systems need to work seamlessly together to enable information sharing and automation of business processes across the Agency and our partners to effectively support NASA's Vision. We must shift from focusing on individual systems to focusing on enterprise platforms that embrace modern architectural patterns (decoupled when appropriate), integration, and agile, cost-effective methodologies that leverage automation

and cloud capabilities. NASA will use interoperable architectures as building blocks that communicate how information systems should exchange data with other systems to perform related functions. The Agency will develop this reference architecture in a phased approach that describes system components and their relationships as well as principles, standards, and guidelines that govern their design and evolution. Initial focus will be on developing reference data and platform architectures that will enable downstream development of NASA's applications architecture. The Agency will *transition to a Zero Trust Architecture* to provide more flexibility and enhanced cybersecurity to support the Agency's digital transformation and hybrid work environment. This architecture will provide NASA's employees and partners with timely, equitable data and resource access by consistently requiring IT user identity and device authentication. These architectures will depend upon information sharing across NASA and convergence on standards that enable effective integration and automation. The resulting business and technical architecture guidance will drive interconnected information systems while retaining independence that preserves the intended purpose of each component.

We will *transform critical processes* to modernize how NASA operates, building on our secure interoperable architectures. NASA has identified several opportunities to increase productivity and effectiveness across multiple organizations, including: enabling collaborative engineering concept development with industry partners, streamlining software/model/data release with external scientists, reducing manual labor in assembling project/program review information, and reducing time to hire and on-board new employees. NASA's process transformation strategy integrates a blended human-centered design/inclusive design thinking/agile approach to rapidly identify the most impactful dimensions of the process to transform that would

most benefit the people performing the work. This approach will include widely mining internal solution options (aligning with enterprise architecture solutions and plans), and external benchmarks (including Federal agencies, industry, and solution providers) before converging on a particular solution approach. Iterative prototyping of solution features and piloting with customers will enable rapid refinement and release of features to production, resulting in immediate customer benefits.

NASA will introduce several new approaches and methodologies to enable inclusive and effective process transformation. We will establish coordination forums for organizations to do joint planning on community roadmaps to achieve each Transformation Target, including converging on a vision, creating high level roadmaps for activities, and prioritizing specific activities and process transformations. Prioritization will be informed by drivers such as business systems and platforms reaching end of life, which create opportunity for radical process improvements that make use of next generation systems and for cost savings by intentionally favoring low-customization solutions. Next, we will deliver and/or enhance accessible enterprise services for the key digital technologies that will power the process transformations. These services include intelligent automation, artificial intelligence/ machine learning tools, and low/no-code development platforms that enable "citizen developers" across organizations to leverage enterprise capabilities and data to create and automate solutions. When procuring new tools and data sets, NASA's assessment will include a review to identify explicit bias. The Agency will update its selection criteria to emphasize the importance of vendor willingness to address identified bias in any artificial intelligence and data products used by NASA. Finally, NASA will pilot approaches and institutionalize a rapid digital solution design/ build/test/ scale capability for more complex organizational challenges to maximize use of enterprise platforms, automation, tools, and data. These approaches will concurrently prototype, pilot, and scale digital solutions to production for the priority process transformations identified by each Transformation Target community. This will allow NASA to realize cost savings and productivity improvements while learning and refining how best to deliver this new integrated digital solutioning service, including when to use Federal capabilities to include partnering with the General Services Administration 18F and United States Digital Service.

The Agency will drive *adoption of common tools* to execute transformed processes, with initial focus on common business platforms and associated business applications for enterprise mission support services. NASA will adopt common low code platforms (system and software that provides reusable modular cross-cutting functionalities) as a foundation on which to build and host shared, interoperable business applications or services. Currently, many platforms exist across the NASA portfolio for different purpos-

es. NASA will prioritize selection and adoption of common platforms to reap the following benefits: the ability to share data from applications on the platform across multiple functions; single, authoritative data sets that support unbiased algorithms and assumptions; use of common data analysis and visualization tools; simplified and consistent cybersecurity; citizen development; rationalization; and potential cost avoidance by leveraging economies of scale in licensing and integration of disparate single function systems. To achieve the anticipated benefits of a common low code platform strategy, the necessary business leadership for each platform must be identified and resourced. In addition, a rationalization strategy must be developed to direct existing capabilities onto common platforms.

Performance Objectives

3.1.1 Increase the cumulative annualized person hours saved through automation. (Target: 60,000 cumulative hours saved through FY 2025)

3.1.2 Interoperable Architectures: Increase the number of systems/platforms decommissioned or modernized. (Indicator: Number of systems/platforms decommissioned or modernized annually)

3.1.3 Zero Trust Architecture: Complete phased implementation of NASA's Zero Trust Architecture Plan. (Target: Phasing across enterprise corporate architecture, mission operations, and NASA Jet Propulsion Laboratory/JPL through FY 2026)

3.1.4 Process Transformations: Increase the number and/or ratio of process transformations in the stages of the transformation pipeline, maturing from prototype to pilot to operational solutions. (Indicator: Number and/or ratio of process transformations in pipeline)

3.1.5 Common Tools: Reduce redundant IT offerings, e.g., applications, tool, products. (Indicator: Number of redundant IT offerings reduced)

Strategic Objective 3.2: Enable insights from NASA's data and information.

Data underlie the success of all NASA activities, from effective mission planning and execution to understanding NASA's operational posture, anticipating organizational needs and opportunities, and charting the path for future

missions. Reliable access, understanding, use, and sharing of trusted and unbiased data are essential for collaboration across NASA, its partners, and the public to accelerate innovation, exploration, discovery, and learning. NASA historically managed data and related platforms in a decentralized manner, which led to disjointed and duplicative efforts and infrastructure. Fragmentation and interoperability issues left much of the Agency's data siloed and inaccessible, constraining NASA's ability to fully leverage its rich array of scientific, research, and operational data products and limiting progress on enterprise transformation. Without a consistent methodology to understand, tag, and categorize data sources, progress toward enforcement of data governance and enterprise data security has also been limited. The Agency's success will depend on the unified data-centric approach articulated in NASA's Data Strategy, in alignment with the Federal Data Strategy and guiding data principles of findability, accessibility, interoperability, and reusability. Keeping NASA and its partners on the forefront of data management and data science is necessary to strengthen the Agency's scientific leadership in an era of increasing global competition. Effective understanding and use of NASA's data as a strategic asset will enable leaders, scientists, engineers, operators, and mission support personnel to harness insights, make data-informed decisions, and capitalize on strategic opportunities. Open, unbiased, and transparent data access will foster innovative research and trust in NASA's operations while machine learning and other advanced analytical techniques offer opportunities to drive productivity and operational efficiency.

NASA will pursue strategies to recognize and embrace data best-practices, advance its data science capabilities, and capitalize on opportunities for greater data interoperability and access to better serve all stakeholders. The Agency will *strengthen data governance and culture* to derive information more effectively from data, extract unbiased knowledge from information, and develop insights from this knowledge to inform its policy and advance mission discoveries. By establishing effective Agencywide data governance, management, and policy oversight, NASA will advance its data-driven culture. Everyone will share the responsibility to treat data as an asset that must be managed, secured, and used to successfully deliver NASA's missions. We will *advance a data-driven workforce*, enhancing the Agency's work, workforce, and workplace through modernized data policies, personnel skills, equitable and secure access, and data capabilities that apply to NASA's employees and partners. We will cultivate data talent and skills across NASA's workforce, from baseline data literacy to data stewardship and advanced skills.

We will *strengthen NASA's data principles and products* to enable focused building, sharing, and use of data tools and analytic models for unbiased decision-making and data transparency, and to encourage more research and innova-

tion. Embracing new data-driven concepts and leveraging data-backed innovations will improve our ability to learn from past missions, lead current technological advancements, and drive future exploration and discovery. In order to *establish and adopt an enterprise data architecture*, the Agency must understand its data inventory, improve accessibility, and connect its data, and apply modern data science tools and techniques to extract more value through insights and decision making. Pursuit of these advances will depend on accurate, useful, timely, and accessible data and a role-based enterprise search capability.

From enterprise governance and data architecture to enhancements in enterprise search, analytics, artificial intelligence, and visualization, NASA must embrace transformation into a data-centric enterprise. Adoption of leading data policies and evolution of capabilities such as the Enterprise Data Platform (EDP) will be part of NASA's digital transformation effort. This evolution will build on Agency successes and lessons learned while seizing opportunities and momentum from new trends and capabilities. NASA's ability to continue leading in exploration and discovery depends on being leaders in operationalizing, protecting, and effectively sharing our data resources at scale and speed.

Performance Objectives

3.2.1   Data Stewards appointed by each NASA organization. (Target: 100% in FY 2024)

3.2.2   Inventory and evaluate data sets for quality (in situ). (Indicator: Number of data sets evaluated)

3.2.3   On-board data sets evaluated in 3.2.2 into EDP. (Indicator: Number on-boarded through FY 2025)

Strategic Objective 3.3 Enable flexible and equitable work options and environments to achieve mission success.

To maintain its leadership in aerospace, science, and exploration, NASA must evolve how we work and empower employees to meet mission requirements in a rapidly changing technology-enabled world. NASA's response to the COVID-19 pandemic prioritized employee safety and implemented extensive mandatory telework as well as on-site mitigation measures, which required a paradigm shift in how NASA's workforce meets the Agency's Mission. NASA accelerated many shifts that were already underway, such as use of collaboration tools and capacity

enhancements to bandwidth and virtual private networks. The hybrid form of work that emerged made heavy use of virtual collaboration tools and new ways of working, while surfacing opportunities and solutions to address challenges in the way we historically worked.

NASA's vision for the future of work focuses on agility and continuing to provide employees the best work options and environment to achieve mission success. This vision reinforces the motto People First, Mission Always and aligns with NASA Strategic Objective 4.1 and IT Strategic Goal 5 about our people and Agencywide DEIA efforts. Providing our employees flexibility and agility in where and when they perform the mission will increase NASA's access to diverse top talent and must build on constancy and equity across the Agency, while providing flexibility for implementation. To enable this future, NASA must maximize the use of evolving technology, automation, and inclusive teaming efforts to innovate, connect, and collaborate in ways not bound by geography or organization. The future will depend on concerted efforts to rethink and rewire how we perform work across the Agency and with our partners, while ensuring employees are equipped with a broad range of digital skills to contribute their talents and insights in these new work environments.

NASA's internal architectures were optimized to Center specifications over the decades since the Agency's inception. As a result, geographic location and organizational access have been hard wired into the systems we use to budget, plan, manage information, communicate, and manage identity and access permissions. NASA will prioritize investments to *become more geographically agnostic and organizationally inclusive, ideally enabling role-based access*, such as expanding use of enterprise IT platforms, modernizing systems, and focusing cybersecurity paradigms on users, assets, and resources, to accelerate the shift toward a more flexible, agile work environment. We will act on opportunities to streamline and optimize our processes, infrastructure, and tools that help us work together, regardless of location, to provide each employee with the best work environment possible.

Consistency is critical to employee experience, so we must *enable an effective and consistent employee experience regardless of location, and accommodate different digital skill levels.* Creating a consistent technical environment across collaboration tools, conferencing, and IT support with a focus on user experience will provide benefits including work flexibilities through geographic distribution, improved knowledge transfer, increased product learnability and predictability, and enhanced collaboration. To support these changes, we need to *systematically identify, evaluate, and implement the necessary updates to processes and equipment needed to perform work.* This strategy includes process digitization and automation to minimize dependence on paper records and processes, and supporting design and implementation of collaborative workspaces such as office hoteling.

With the high degree of uncertainty and the pressing need to continue satisfying the diverse needs of our workforce in pursuit of NASA's Vision, the Agency must approach its cultural and technical changes like our mission-related challenges – empirically and methodically. We will *leverage NASA's extensive data network to enable the creation of integrated and informed planning and decision models to enhance the Agency's infrastructure* in a sustainable manner. NASA's future of work will be hybrid, embracing employee flexibility to ensure mission success. This future will be enabled by a new way of thinking through which we will evolve together, supported by information technology and digital practices to achieve NASA's Vision.

Performance Objectives

3.3.1 Outfit conference rooms with hybrid conferencing capabilities. (Indicator: Number of conference rooms outfitted)

3.3.2 Increase percentage utilization of NASA's external collaboration capabilities through expansion of Microsoft Office 365 capabilities, training, and adoption. (Indicator: Percentage of collaboration capability utilization)

Strategic Goal 4
Ensure Proactive, Resilient Cybersecurity

While the success of NASA's missions depends on effective IT service delivery, sustainable long-term success requires proactive and consistent cybersecurity of IT systems and data. Effective cybersecurity decision-making requires the strategic management of cybersecurity risk, which necessitates continuous balancing between information availability and securing access to that information. The Agency's goal to ensure proactive and resilient cybersecurity will support NASA's workforce and missions by providing customer-focused cybersecurity risk mitigation services while maintaining data availability and interconnectivity of IT.

As IT evolves globally, cybersecurity threats are increasing in frequency and sophistication. This trend has the potential to exploit the complexity and interconnectedness of NASA's systems and data, placing the Agency's missions at risk. NASA's increasing geographically hybrid workforce offers opportunities and challenges, including managing risk for IT in space, the office, and in alternative worksites. NASA also collaborates with several public and private partners to enable successful mission delivery. While public-private partnerships create efficiencies and opportunities for NASA's missions, these partnerships create complex IT challenges, and cybersecurity practices must scale to ensure NASA and partner systems and data are secured appropriately. Additionally, like many Federal agencies, NASA is evolving from a Center-oriented culture, where local program and project teams with a high level of autonomy often invested in duplicative cybersecurity capabilities to mitigate divergent priorities and threats. As interconnectivity and interoperability increase, NASA will reconcile the diverse mission cybersecurity requirements using an enterprise approach to deliver effective cybersecurity services.

These challenges affect every mission partner and Center at NASA, and a collaborative, unified Agency approach is needed in order to strengthen NASA's cybersecurity posture. NASA's transition to an enterprise IT operating model will facilitate implementation and adoption of best practice cybersecurity risk management strategies. We will ensure resiliency by moving towards a Zero Trust Architecture model, as discussed in Objective 3.1, and by adopting core tenets of Executive Order 14028, "Improving the Nation's Cybersecurity," such as enhanced authentication, cybersecurity hygiene, and event logging. Additionally, NASA will integrate risk-based cybersecurity directly into mission development, leveraging opportunities for collaboration among NASA's missions to mitigate IT vulnerabilities and integrating cybersecurity into the mission project lifecycle.

Significant collaboration will be required to accomplish these changes. NASA will improve coordination with mission stakeholders to ensure cybersecurity is a strategic priority within all mission projects. Additionally, NASA will collaborate with Federal agencies as well as private stakeholders to procure and adopt cybersecurity tools and best-practices in order to simplify and deliver cybersecurity services at scale. NASA is dedicated to taking bold action to strengthen the Agency's cybersecurity posture and advancing towards a sustainable, proactive, and resilient IT ecosystem.

Strategic Objective 4.1: Simplify, strengthen, and scale NASA's cybersecurity.

As NASA's mission requirements evolve, IT service delivery, including cybersecurity, will adapt to meet customer needs. OCIO will employ several strategies to deliver effective cybersecurity and privacy services that strengthen customer engagement, simplify service delivery, and achieve cost-effective management.

OCIO will *centralize cybersecurity services* that NASA's customers can easily identify and request in the cybersecurity service catalog. We will provide enhanced cybersecurity services that attract customers from every Center and minimize reliance on duplicative and nonstandard

local resources. Additionally, OCIO will add core enterprise cybersecurity services to the service catalog that provide cost-effective solutions for NASA's missions to achieve Agencywide protection and resilience.

OCIO is not solely responsible for cybersecurity at NASA – every IT user at NASA has a role in managing cybersecurity risk. Since every employee is responsible for using IT appropriately, OCIO will leverage employee engagement opportunities to *train NASA's workforce on cybersecurity and privacy best practices.* Any NASA employee or partner can unintentionally lead to exploitation of an IT vulnerability, and OCIO will facilitate engagement through effective cybersecurity and privacy awareness training.

The Agency maintains a dedicated workforce to deliver effective cybersecurity services, at scale, in support of NASA's missions. However, as IT becomes increasingly complex and interconnected, clearly defining the work being performed to support customers can be challeng¬ing. To *deliver effective cybersecurity services*, a flexible, organized, and enduring workforce is essential to support NASA's complex mission and business IT requirements. OCIO will standardize work roles and realign resources to provide cost-effective strategic workforce management solutions and enable the flexibility and agility required by NASA OCIO's workforce to provide effective cybersecurity services.

Performance Objectives

4.1.1   Migrate all existing Center cybersecurity portfolios to an enterprise cybersecurity portfolio. (Target: Migration complete in FY 2025)

4.1.2   Provide independent security control assessments (SCAs) for all system security plans. (Target: SCAs provided by FY 2026)

4.1.3   Enforce foreign travel cybersecurity requirements and reduce unapproved NASA user logins. (Target: 50% reduction in FY 2025 and 80% reduction in FY 2026)

Strategic Objective 4.2: Reinforce operational resilience through strategic cybersecurity risk management.

Improvement of NASA's IT posture is directly correlated to cybersecurity risk management decisions. The Agency's mission work is performed on a variety of IT networks, whether on NASA's premises or in the cloud, and is operated by employees around the world. Cybersecurity risk management practices must adapt to this evolving IT landscape. The Agency requires resilient cybersecurity capabilities and processes to deliver effective cybersecurity risk management. Therefore, NASA will adopt cybersecurity hygiene practices in Executive Order 14028, "Improving the Nation's Cybersecurity," strengthen NASA's network perimeter, and transition NASA to a Zero Trust Architecture.

Executive Order 14028 provides specific requirements to *develop and implement risk mitigation activities aimed to help identify, deter, protect against, detect, and respond* to persistent and increasingly sophisticated and malicious cybersecurity threats. The Executive Order provides direction to NASA and serves as a significant driver for the Agency to improve its cybersecurity posture. OCIO will develop, implement, and enforce processes and capabilities that improve NASA's cybersecurity hygiene, endpoint detection and response, and cybersecurity event logging to improve upon the identification of, protection against, and response to cybersecurity threats, including those directed against operational technology systems and devices.

NASA Headquarters conference room enabled with Video Teleconferencing Services (ViTS) Microsoft Teams integration technologies

As the threat landscape evolves, NASA identifies increasingly sophisticated IT attack patterns and advanced persistent threats. OCIO will make strategic risk mitigation decisions to *strengthen capabilities at NASA's network perimeter* by refining network security policies, increasing restrictions on unauthorized inbound and outbound IT traffic, and migrating NASA's IT behind the Agency's firewalls. NASA's network perimeter will be more resilient as IT attacks increase in scale and complexity.

The increasing types and needs of participants in NASA's missions, such as hybrid and remote workers, university partners, FFRDCs, and foreign governments, create an environment with complex cybersecurity risk. NASA will *transition to a Zero Trust Architecture*, as discussed in Objective 3.1, to provide more flexibility and enhanced cybersecurity to support Agency's digital transformation and hybrid work environment. The shift towards a robust Zero Trust Architecture will provide assurances that IT user identity and device authentication is required consistently, ensuring the right level of access at the right time.

Performance Objectives

4.2.1 Implement enhanced Endpoint Detection and Response capability. (Target: Implemented in FY 2023)

4.2.2 Increase multi-factor authentication (MFA) on mission systems. (Target: 80% in FY 2024)

4.2.3 Implement centralized event logging capability - OMB memo M-31-21. (Target: Implemented in FY 2025)

4.2.4 Update network security policies to block all unauthorized applications. (Target: Implemented in FY 2023)

4.2.5 Implement Secure Shell (SSH) proxy capability. (Target: Implemented in FY 2023)

4.2.6 Integrate all Center public webservers Agency Web Application Firewalls. (Target: Integrated in FY 2024)

4.2.7 Implement enterprise operational technology device discovery and management capability. (Target: Implemented in FY 2025)

Strategic Objective 4.3: Integrate risk-based cybersecurity into mission development and operations as a shared responsibility.

Per FISMA and Space Policy Directive 5, "Cybersecurity Principles for Space Systems," NASA is responsible for managing its information security risk, including "Space Systems." Work will be performed across multiple tiers, from individual system administrators to engineers and senior Agency officials. In order to effectively manage risk, each tier needs to understand the current state of security controls, active threats, and any resulting risk related to information and information systems for which they are responsible. Providing appropriate cybersecurity risk management requires significant collaboration between NASA's stakeholders and an agreed-upon shared responsibility and ownership of cybersecurity.

As cybersecurity is a shared responsibility across NASA, OCIO will *refine relevant guidance and policies aimed at mitigating IT vulnerabilities*, particularly vulnerabilities within critical mission systems including those that are or contain operational technology. Additionally, OCIO will provide guidance and expertise to support specific mitigation activities such as reducing unsupported IT, increasing application of IT patching, and securing identified critical infrastructure. OCIO will be accountable to identify and steer results for demonstrable cybersecurity improvements within mission IT. This effort will depend on improved communications and coordination between OCIO and NASA's missions.

NASA's missions need a consistent, clear, repeatable, and faster approach to implement cybersecurity controls tailored to mission IT needs and performed in a risk-based manner. OCIO will provide simple, standard, and effective guidance and support to NASA's missions to *ensure mission application of Assessment and Authorization (A&A) policy and in the development of compliant Authorizations to Operate (ATOs).* The purpose of the A&A process is to evaluate the effectiveness and implementation of NASA's cybersecurity requirements. Historically, the Agency has had inconsistent approaches to cybersecurity A&A and ATO requirements. With an ATO, a NASA mission system is authorized to operate using specific cybersecurity criteria and a prescribed set of safeguards to function at an acceptable level of risk.

Performance Objectives

4.3.1 Increase overall Agency performance on NASA's cybersecurity scorecard. (Target: Score ≥ 94 out of 100 in FY 2025)

Strategic Goal 5
Develop an Exceptional OCIO Team

NASA's talented and innovative workforce is the most important asset for how we continually achieve our extraordinary missions and a fundamental reason for the Agency's celebrated history. The workforce is the repository of our expertise and skillsets and the implementor of our strategies. People are the enabler of what NASA researches, engineers, discovers, and shares with the world. OCIO's workforce supports achievement of NASA's Mission through the efficient, secure, and innovative use of data and IT. OCIO requires inclusive, skilled, and diverse teams to deliver the IT required for mission success. To ensure our workforce is positioned to successfully support our mission, we will develop and retain an exceptional OCIO team in partnership with the Office of the Chief Human Capital Officer (OCHCO).

A key component of any team is staffing with the right employees. OCIO will use several strategies to attract, hire, and retain a diverse and strategically aligned OCIO team. To accomplish this, we will utilize an enterprise approach to hiring, move to standard definitions for positions across OCIO and use open and diverse staffing processes. It is also critical that we are able to enhance employee experience by ensuring team members feel included, engaged, and valued. OCIO will create a culture of inclusion, offer opportunities for employee feedback and engagement, and emphasize awards and recognition. We will develop team members' talents and support career development to meet mission needs. OCIO will implement high-level career planning, a workforce learning and development model, and an enterprise approach to succession planning.

Strategic Objective 5.1: Attract, hire, and retain a diverse and strategically aligned OCIO team.

NASA is known for its workforce quality and has been awarded the "Best Place to Work" in the Federal Government for ten consecutive years as of 2022. We accomplished this by recruiting top talent and developing our workforce. To attract highly qualified employees invested in NASA's mission success, OCIO will provide a work environment that entices top-tier talent. OCIO ensures that accomplished leaders are in place to provide leadership, coaching, and mentoring that enables employees to support achievement of NASA's goals. An integrated approach will ensure that key employee lifecycle elements (e.g., recruiting, hiring, and retention) align talents with NASA's mission requirements and desired workforce culture. To better serve our customers, we will use an enterprise workforce approach instead of distinct IT communities and processes in the previous federated model. This approach will include enterprise baselining of civil servant positions for our organizations, which will enhance autonomy and efficiency by using a standardized approach and best practices for hiring, and a clearly articulated IT Workforce Plan. We will empower leaders to prioritize and fill required positions, which will expedite hiring actions, reduce the time to fill positions, and nimbly address our customers' needs with evolving skills and talents.

NASA's IT community will *seek creative ways to recruit and hire* the most qualified and competitive IT talent, capitalizing on established workforce pipelines from underrepresented groups and expanding on programs that increase diversity. We will compete positions broadly for access to a larger pool of qualified candidates by removing geographic and organizational barriers when possible. This approach will address challenges in the national talent marketplace, including high demand in the tech industry, and will facilitate recruiting in difficult markets while enabling diversity. We will leverage diverse panels to review and interview applicants in hire actions, both internal and external, in an open and transparent process. Panels ideally will include leadership from the organization with the vacancy and leaders of diverse backgrounds from across the enterprise, stakeholders, and customers. We will leverage Term hires to add flexibility in alignment with Agency workforce strategy, centrally administer the OCIO Pathways program to ensure a robust student pipeline and emphasize Early Career hires where possible to create a vibrant workforce pipeline and manage workforce costs. OCIO's workforce will evolve over time, requiring collaboration within OCIO and OCHCO to establish the best mix of civil servant/contractor and permanent/term team members to meet mission needs while enabling flexibility and efficiency as requirements change. OCIO will partner with OCHCO for outreach to attract diverse candidates, using recruitment events, social media, and internal resource groups. Additionally, NASA has been very flexible in the areas of remote work and "work from anywhere" opportunities which have become increasingly attractive to job seekers. OCIO will continue to utilize and evolve these new ways of working to recruit and retain employees in alignment with NASA's Organizational Health initiatives.

To establish a representative and diverse workforce that

strategically aligns with mission needs, OCIO will use *enterprise-level oversight of its hiring framework.* OCIO will institute uniform practices such as diverse panels, which include customers and mission stakeholders, use full-time equivalent employee baseline targets to allow local OCIO supervisors to manage the workforce, identify where efficiencies can be gained, and provide for a more effective use of resources.

Employees thrive in a well-defined career environment where positions and the skills needed are documented and supported. OCIO will *utilize consistent, well-defined positions and career paths* to create an environment where employees are empowered and in control of their careers. In addition, use of consistent roles will enable flexibility and reduce the learning curve when moving between positions, expanding opportunities for our existing workforce. OCIO will also support employee retention by ensuring consistent, fair, and standardized performance management, offering training, mentoring, rotational assignments, flexible work schedules, and remote work opportunities as appropriate.

A "cheer wall" of video greetings from people across NASA and its partners for SpaceX Crew Dragon Demo-2 astronauts

Performance Objectives

5.1.1   Increase positive responses to questions on Federal Employee Viewpoint Survey (FEVS) and other survey instruments related to updated internal approach to recruiting/hiring and move to consistent roles across enterprise. (Indicator: Percentage increase in positive responses)

5.1.2   Decrease the time to hire personnel. (Indicator: Time to hire personnel)

Strategic Objective 5.2: Enhance employee experience by ensuring team members feel included, engaged, and valued.

An extraordinary employee experience is a proven way to create a more stable, productive workforce that drives results and great customer experiences aligned with NASA's needs. NASA leaders at all levels serve as role models, develop their people, and facilitate NASA's culture and operating environment, thereby establishing our leaders as a critical component to building a positive employee experience. Results from the annual FEVS will be used in an ongoing process to define areas for enterprise-wide improvement. In partnership with OCHCO, OCIO will analyze employee feedback to validate findings, identify areas needing attention, and act on priorities that contribute to improving OCIO's employee experience. OCIO will employ several strategies to create a positive employee experience, working with all facets of the organization.

OCIO leadership will *foster an inclusive work environment* for its employees. We will develop and retain effective, skilled IT leadership that fosters an inclusive environment where employees feel engaged, productive, and valued. OCIO leadership will focus on effective communication and listening competencies to build relationships and trust, leading to a higher performing team and fosters a culture that promotes psychological safety. Supervisors and managers are also critical to employee engagement. OCIO leadership will engage regularly with supervisors and managers through recurring forums and communications that provide guidance, tools, and best practices to encourage transparency and inclusion. We will use an inclusive, open, and transparent approach for hiring, using diverse panels to review and interview a more diverse candidate pool by opening positions across the enterprise that can work from any NASA duty station where possible. OCIO will ensure employees have more flexibility in shaping their careers and improving work-life balance. Additionally, OCIO will implement an enterprise-wide approach for recognition and awards to promote employee behaviors that will help advance our desired culture and create excitement in the workforce.

An employee engagement team will *encourage collaboration and communication of employee perspectives* of their work environment, working relationships, mission, and leadership values, as well as perspectives on OCIO's technical work and opportunities for innovation. Leadership will facilitate and champion forums such the enterprise-wide employee engagement team. OCIO will increase transparency of its organizational decisions, in addition to clarifying employee roles and responsibilities in relation to OCIO's and NASA's Mission.

We will employ an enterprise approach to onboarding and use this opportunity to *reinforce our culture, values, and inclusive mindset.* Onboarding within OCIO will include intentional practices to instill NASA and OCIO's values and culture, in addition to traditional onboarding activities. Addi-

tionally, OCIO will foster a culture of continuous learning and encourage curiosity and a growth mindset through mentoring, rotations, details, micro-opportunities, and broader opportunities that enable employees to be more effective in supporting NASA's Mission.

Finally, OCIO will develop an *enterprise approach to recognizing the achievements* of employees' and teams' efforts internal to OCIO, utilizing the Workforce Management Working Group to create a comprehensive approach to non-ratings-based awards enterprise-wide.

Performance Objectives

5.2.1   Increase positive responses to questions on FEVS and other survey instruments related to inclusion and the employee experience. (Indicator: Percentage increase in positive responses)

Strategic Objective 5.3: Develop team members' talents and support career development to meet mission needs.

OCIO will modernize how we retain and develop our distributed and digitally enabled workforce to meet the Agency's mission needs as we evolve into an enterprise operating model for IT. In partnership with OCHCO, we strive to strengthen professional development and offer employees broader career opportunities and growth as we refine and optimize our workforce within a unified OCIO. By establishing transparent and clearly defined IT career paths across OCIO with criteria for progression in technical and leadership positions, we will enable IT staff to identify and manage their careers more effectively. We will implement a standardized approach to employee development that enables workforce flexibility for critical mission-focused, enterprise, and local assignments.

Supported by IT leadership and supervisors, employees will be able to *establish development plans consistent with OCIO IT Career Paths.* These career paths will include training, mentoring, and other relevant growth opportunities to ensure that employees understand and are prepared to accomplish NASA's Vision and Mission. As NASA's mission and IT needs evolve, the knowledge, skills, and competencies of our people in the IT community need to evolve as well. NASA will provide training and professional development opportunities for its IT workforce to facilitate this evolution. NASA will strengthen the ability for its people to execute their responsibilities through supporting information technology and processes.

OCIO will *establish a standard approach to developing the "Complete IT Professional"* in collaboration with the OCIO Workforce Management Working Group. This

working group includes representation across OCIO and interfaces with external subject matter experts and stakeholders. The Complete IT Professional model will focus on knowledge domains including mission awareness, leadership, Center/Enterprise/Agency Awareness, Power Skills (e.g., communication, problem solving, analysis, consulting, project management), deep and ongoing knowledge in one or more specific IT disciplines, and foundational IT knowledge. We will define multiple IT knowledge domains and align skills and competencies to the domains, and our workforce will create and use optimized career paths to meet organization and mission needs more effectively.

OCIO Career Paths will be defined and linked with training, mentoring, rotations, and other developmental activities. We will identify consistent roles and responsibilities for OCIO positions to better support customers and internal operations, reduce duplication, and realize efficiencies. Well-understood positions and responsibilities will facilitate better candidate matches for competed positions. Better candidate matches will result in higher quality hiring and enhance OCIO's Agencywide support while enabling successful completion of the OCIO Career Paths activity. Employees will be better informed about specific opportunities available to them across the OCIO. With more insight into the desired requirements and experience for each position, employees will be comfortable applying for new roles, even when those opportunities are not in their home organization. The establishment of OCIO Career Paths will support the Complete IT Professional development model and annual succession planning activities.

OCIO will establish and *conduct annual enterprise succession planning*, which will include a skills assessment to identify organizational skill gaps and resulting developmental and recruiting priorities to meet NASA's evolving mission requirements. Use of organization-wide succession planning will prepare OCIO to address the anticipated attrition of critical skills. The results of annual succession planning will inform training and development of current employees, highlight skills needed in future hires, facilitate the determination of appropriate recruiting strategies, identify employee readiness levels, and optimize overall bench strength for critical and hard-to-fill positions. The succession planning process, Complete IT Professional model, and OCIO's Career Paths will be integral components of our enterprise approach to developing and optimizing the workforce of the future.

Performance Objectives

5.3.1   Increase positive responses to questions on FEVS and other survey instruments related to identification of OCIO Career Paths and expanded development opportunities. (Indicator: Percentage increase in positive responses)

Policy & Governance

NASA CIO Authorities

Per NASA policy, OCIO provides leadership, planning, policy direction, and oversight for the management of NASA information and all NASA IT in accordance with the responsibilities required by the Clinger-Cohen Act of 1996, FITARA, the Paperwork Reduction Act of 1995, the E-Government Act of 2002, FISMA, and the Privacy Act of 1974. Authorities and responsibilities for Federal chief information officers are documented in United States Code, 40 U.S. Code Section 11315 - Agency Chief Information Officer and 44 U.S. Code Section 3506 - Federal Agency Responsibilities, as well as numerous Executive Orders.

The NASA CIO's authorities are described in *NASA Policy Directive (NPD) 2800, Managing Information Technology*, in NASA's policy management system. The development and use of enterprise architecture (EA) to facilitate NASA's abili¬ty to provide consistent IT services, accessible information, scalable infrastructure, and flexible technology integration across the Agency is detailed in *NPD 2830, NASA Enterprise Architecture*.

IT Governance

NASA's governance is critical to mission success and supporting strategies to deliver on our commitment to be good stewards of resources entrusted to us by taxpayers. Governance relates to consistent management, cohesive policies, and highly effective guidance, process, and decision-making. To enable mission success, the Agency's governance framework is documented in the *NASA Governance and Strategic Management Handbook*.

NASA's IT governance model is consistent with the Agency's overall approach to governance. The Agency relies on NASA's IT governing entities to evaluate the Agency's business conditions and needs, set strategy and direction for investments in IT, and oversee achievement of expected performance outcomes and conformance with legislation and policy. IT governance is engaged during the life cycle of IT investments, from strategic planning, policy, and architectural decisions, the initial decision to fund a proposed investment, to oversight of implementation and operations, and eventual decommissioning. Each phase includes milestones and metrics that require different activities, governing structures, decision making information, and artifacts. NASA established its IT governance by chartering boards with diverse stakeholder representation

and maintains specific decision criteria and thresholds in the entity's charter for each governing entity.

Strategic Sourcing

NASA's Strategic Sourcing Plan supports identification and pursuit of opportunities to increase savings and enhance mission performance through strategic sourcing initiatives. Strategic sourcing is a collaborative and structured process of analyzing spending and using information to make business decisions about acquiring commodities and services more effectively and efficiently. NASA's Strategic Sourcing Plan formalizes the process for Agency-wide Strategic Sourcing Initiatives and provides maximum value to the taxpayer. The OCIO plays a key role in the Strategic Sourcing Plan and has representation on the Agency Strategic Sourcing Team and relevant working groups. NASA's approach balances the goals of strategic sourcing, value to the Government, optimization of Agency resources, and customer experience to align the sourcing effort with the best procurement vehicle to support NASA's requirements. IT products and services are subsets of NASA's acquisition portfolio and strategic sourcing effort. NASA makes supporting information available through *Agency-level strategic sourcing guidance* and the *NASA Federal Acquisition Regulation Supplement*.

One of our greatest opportunities for IT cost optimization is in software and license asset management. The NASA CIO established the Enterprise IT Acquisition Management Branch to work closely with the Enterprise License Management Team and the Software License And Management team on licensing and contract consolidation initiatives. These initiatives drive economy of scale pricing and cost savings by leveraging the pooled purchasing power of the Agency. These teams work across NASA's Centers to oversee license renewals, eliminate duplication in the license portfolio, co-term like licensing to consolidate purchasing, and review unused licensing. NASA continues to leverage Agency-wide and Federal enterprise IT contracts for the procurement of hardware, software, and services. In addition, NASA's strategic sourcing approach aligns with our transition from acting predominately as a service-provider to being a hybrid of service provider and service broker. We will procure services in addition to managing systems, broker IT services for our NASA customers, and invest in owned infrastructure when commercial services that meet NASA's specific requirements do not exist or cannot be acquired effectively.

Accessibility

To ensure that NASA's information and communication technology are accessible to individuals with disabilities in alignment with our workforce diversity strategy, the Agency developed _NASA Procedural Requirements (NPR) 2800.2: Information and Communication Technology Accessibility_. This guidance helps our workforce understand accessibility legislation and assigns responsibility to key stakeholders in order to achieve and maintain compliance. The scope of these requirements includes the procurement of goods and services, as well as any information and communication technology development by NASA or its contractors for the use of NASA employees, employees of other Federal agencies, and the public. To facilitate ongoing awareness and implementation of these accessibility requirements, NASA maintains the online resource center that includes contact information for Agency and Center accessibility coordinators, an accessibility checklist, tools, and links to the _United States Access Board website_. Furthermore, accessibility compliance is validated as a standard part of our implementation processes.

IT Investment Management

The Federal Government spends billions of dollars annually on IT investments to enable agencies to achieve their missions. To drive effective planning, execution, and oversight of these investments, the Clinger Cohen Act of 1996 requires Federal agencies use the Capital Planning and Investment Control (CPIC) process outlined by OMB Circular A-130. CPIC is a systematic approach to selecting, managing, and evaluating IT investments and NASA's process is outlined below.

During the IT Investment Selection Phase, NASA seeks to ensure that only sound and viable investments are selected (approved) for funding and inclusion in NASA's IT investment portfolio. NASA focuses on investing resources in IT investments/projects that meet the following criteria:

- Alignment with strategic NASA business objectives and priorities
- Anticipate a positive return on investment as determined by an analysis of project costs and benefits
- Have an acceptable level of risk with an appropriate risk mitigation strategy
- Have an acceptable technical strategy that complies with NASA's Enterprise Architecture
- Have an acceptable acquisition strategy with defined trade space and measurable milestones
- How the investment resolves audit findings and material weaknesses, when applicable

During the IT Investment Control Phase, NASA seeks to ensure that selected IT investments/projects continue to meet mission needs at expected levels of cost and risk as projects are executed in compliance with Federal laws and NASA policies, architecture, and cybersecurity standards. IT investments/projects are managed and implemented in a structured manner, using sound project management practices, and engaging business stakeholders and technical experts throughout the remaining life cycle. If the investment/project is not meeting expectations or if problems arise, steps are quickly taken to address the deficiencies. If mission needs change, NASA is able to adjust its objectives for the investment/project and appropriately modify expected outcomes.

During the IT Investment Evaluation Phase, when the IT investment/project is operating in production, NASA assesses how well the IT investment/project achieved the expected business objectives. Actual versus expected results are compared to assess the impact of the investment/project on mission and mission support performance Also, in a continuous improvement mindset, the Agency identifies enhancements or modifications that may be needed, appropriately disposes of legacy systems, and revises the investment management process based on lessons learned.

Every year, agencies report IT investments to OMB to inform the President's Budget. Per the Clinger-Cohen Act of 1996, OMB is required to establish a budget process for analyzing, tracking, and evaluating, the risks and results of IT projects. As such, OMB established a public website, _the IT Dashboard_, which provides detailed information on major Federal IT investments, including major NASA IT investments.

List of Acronyms

Acronym	Meaning
A&A	Assessment and Authorization
AFRC	Armstrong Flight Research Center
ARC	Ames Research Center
ATO	Authority to Operate
CPIC	Capital Planning and Investment Control
CRM	Customer Relationship Management
CyPrESS	Cybersecurity and Privacy Enterprise Solutions and Services contract
DEIA	Diversity, Equity, Inclusion, and Accessibility
DT	Digital Transformation
EA	Enterprise Architecture
EDP	Enterprise Data Platform
FEVS	Federal Employee Viewpoint Survey
FFRDC	Federally Funded Research and Development Center
FISMA	Federal Information Security Modernization Act
FITARA	Federal Information Technology Acquisition Reform Act
FY	Fiscal Year
GAO	Government Accountability Office
GRC	Glenn Research Center
GSFC	Goddard Space Flight Center
IT	Information Technology
ITIL	Information Technology Infrastructure Library

Acronym	Meaning
ITSM	IT Service Management
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSC	Kennedy Space Center
LaRC	Langley Research Center
MFA	Multi-Factor Authentication
MSFC	Marshall Space Flight Center
NPD	NASA Policy Directive
OCHCO	Office of the Chief Human Capital Officer
OCIO	Office of the Chief Information Officer
OKRs	Objectives and Key Results
OMB	Office of Management and Budget
PPM	Program and Project Management
SAFe	Scaled Agile Framework enterprise
SCA	Security Control Assessment
SMD	Science Mission Directorate
SSC	Stennis Space Center
SSH	Secure Shell
SSP	System Security Plan
STEM	Science, Technology, Engineering, and Mathematics
TBM	Technology Business Management

Captions for photo montage on p32:

R1L: Telemetry test for NASA's first all-electric X-plane at Armstrong Flight Research Center

R1C: NASA's Hoteling Reservation Tool for reserving onsite "hotel" working locations across centers

R1R: Still image from the Video Teleconferencing Services (ViTS) Microsoft Teams integration instructional video
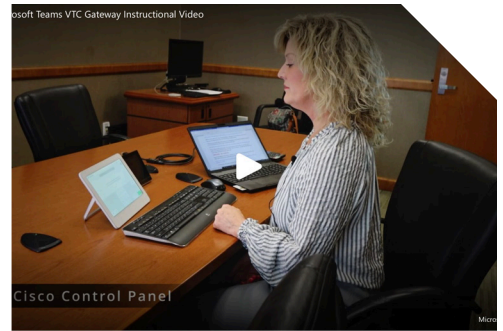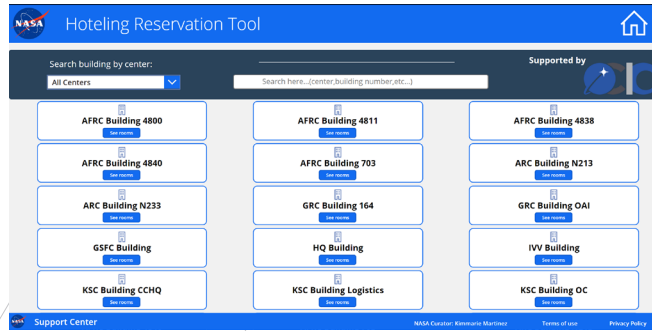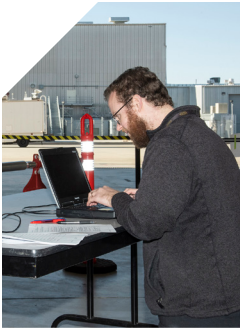
R2L: NASA's live feed of the December 4, 2021 total solar eclipse, enabled by the Enterprise Video Content Delivery Network (EVCDN)

R2R: Biology Experiment-1 packaged and ready for Artemis 2 at Kennedy Space Center

R3L: The IT hardware Material Automation Exchange (MAX) vending machine at NASA's Jet Propulsion Laboratory

R3R: Visitors looking through virtual reality goggles at a NASA Earth Day exhibit in Washington, DC

R4: Johnson Space Center conference room equipped with ViTS and MS Teams integrated hybrid meeting technology

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