National Aeronautics and
Space Administration

Hold for Release Until
Presented by Witness

July 29, 2021

Committee on Science, Space, and Technology
Subcommittee on Space and Aeronautics

U.S. House of Representatives

Statement of:
Mr. Robert Gibbs
Associate Administrator
Mission Support Directorate

117th Congress

HOLD FOR RELEASE
UNTIL PRESENTED
BY WITNESS
July 29, 2021

Statement of

Robert Gibbs
Associate Administrator
Mission Support Directorate
National Aeronautics and Space Administration

before the

Subcommittee on Space and Aeronautics
Committee on Science, Space, and Technology
U.S. House of Representatives

Chairman Beyer, Ranking Member Babin, and Members of the Subcommittee, thank you for the opportunity to appear today to discuss NASA's infrastructure management challenges as the Agency prepares to support the requirements of dynamic and increasing mission goals in Fiscal Year (FY) 2022 and beyond.

NASA has made bold commitments to achieve new discoveries and knowledge in diverse areas of space exploration, science, technology, and aeronautics: the continued and growing presence of humans in space aboard the International Space Station (ISS); a return to the Moon under the Artemis program that will allow humans to explore the Moon and eventually Mars; the development of cutting-edge space technologies and robotic exploration of the universe; advancements in knowledge about Earth systems and our changing climate; and continuing achievements in technology that will meet global needs for safe, efficient, flexible, and environmentally sustainable air transportation. As the Agency moves forward to meet all these inspiring and ambitious goals, NASA must have the physical infrastructure that provide the reliable and durable foundation for these efforts.

NASA must steward reliable, cost-effective infrastructure capabilities that fully support the requirements of its missions and programs. The Agency administers an inventory of over 5,000 buildings and structures, with an asset value over $39 billion. The majority of NASA's physical assets date back to the Apollo era, with approximately 83 percent of facilities beyond their design life. Over time, this has led to a total of over $2.6 billion in NASA deferred maintenance. Additionally, unplanned maintenance can consume up to 30 percent of the maintenance budget in a fiscal year, due to unanticipated disruptions, failures, and natural disasters, creating more unaddressed maintenance issues and failures. Laboratory, engineering, and testing capabilities are the bedrock of mission activities, which depend on reliable assets, including facilities, equipment, and horizontal infrastructure (water; electric; heating, ventilation, and air conditioning [HVAC]; etc.). NASA has a substantial number of critical infrastructure requirements – for repair, modernization, recapitalization, and new capability – across the NASA Centers. These requirements represent executable infrastructure actions that NASA has assessed would go far to effectively offset mounting risks to NASA mission schedules and hardware, continuing operations, and personnel safety. To ensure America's preeminence in aerospace, science, technology, and exploration, addressing and sustaining NASA's infrastructure is paramount.

Infrastructure Funding

NASA's infrastructure funding is divided between two accounts: Safety, Security, and Mission Services (SSMS); and Construction and Environmental Compliance and Restoration (CECR). SSMS provides for the maintenance and management of assets and infrastructure, including some repairs and responses to disruptive events, such as pandemics and natural disasters. CECR provides for the repair of failed or failing assets to restore functionality, modernization to upgrade outdated facilities, recapitalization to replace and consolidate degraded facilities, and the construction of new capabilities. All projects drive down NASA's environmental burden and operational costs through the reduction of NASA's substantial footprint (by consolidation and demolition) and the building of sustainable, Leadership in Energy and Environmental Design (LEED)-certified structures.

Balancing maintenance, management, and construction activities between these budgets is necessary to support Agency health and the long-term sustainability of NASA assets. In a constrained appropriations environment, SSMS and CECR have a symbiotic relationship that must stay in balance for NASA to sustain its critical infrastructure. As the balance shifts, SSMS projects are deferred or simple maintenance projects may become complex construction and repair projects. As one or both budgets decrease, the risk to NASA's mission increases, with unplanned infrastructure failures becoming inevitable.

With consideration for affordability, NASA uses risk assessments and life-cycle cost analysis to prioritize critical repairs, and balance these against strategic investments that will modernize facilities and reduce operating costs. Using established tools and indices, NASA assesses the age and condition of individual facilities; the cost to sustain them; and their potential for associated risks to missions, safety, and the environment.

Agency Master Planning

NASA is enhancing its infrastructure planning with the establishment of the Agency Master Plan (AMP), which integrates the Center master plans into a single, cohesive strategy for infrastructure investment, divestment, and sustainment. In addition to utilization metrics and facility conditions, the new planning process uses a Mission Relevance Index to better understand the true mission connection of each asset, including facilities and horizontal infrastructure. The AMP will establish a 20-year vision for physical infrastructure and real property assets that aligns to evolving and future mission requirements. NASA will use this process to identify critical capabilities and areas for asset sustainment, investment, or divestment throughout the Agency, as well as to evaluate and leverage other Federal agency and private sector assets when available.

The master planning process is driven from mission needs but is supported by Center conditions and requirements. By integrating its infrastructure portfolio in this way, NASA is able to better prioritize, sustain, and divest assets, leading to a more affordable, efficient, and overall reduced footprint. Given that Center master plans must respond to changing circumstances, the process is an essential, continuing strategic tool for aligning real property assets with evolving mission requirements and technical capabilities needs. Evolving strategic circumstances, such as resource levels and a growing understanding of the nature and severity of potential climate and extreme weather risks, are critical factors in assessing the suitability of Center master plans over time. The Agency periodically reassesses master plans to ensure that they address NASA's most critical needs within its budget authority. The AMP, expected to be published in 2022, will include specific goals and objectives focused on climate risks and adaptation, and will clearly demonstrate NASA's commitment to integrate climate risk management into Agency management processes and tools.

NASA Maintenance

NASA utilizes funding provided in SSMS to sustain and maintain existing facilities. Maintenance projects include ongoing care, evaluation, and routine upgrades that can help to mitigate expensive repairs and failures and prolong the design life of facilities and systems. Ongoing maintenance is important to protect critical capabilities, mitigate safety and health risks, and sustain assets over the long term, particularly for institutional infrastructure such as electrical, mechanical, life safety, and utility systems. Deferrals of regular maintenance increase the risk of more costly and unplanned repairs in the longer term.

In FY 2022, NASA will invest in improvements to mitigate systemic arc-flash issues in electrical systems across the Agency, as well as invest in Condition-Based Maintenance (CBM). CBM utilizes sensors to detect anomalies before they become failures. CBM's Online Condition Monitoring, coupled with Predictive Testing and Inspection, enables our workforce to provide the right maintenance at the right time. This approach, paired with immediate investments in the replacement of obsolete items for the Agency's higher-criticality assets, can provide corrective mitigation for known risks and avoid mission/schedule impacts. These strategies will focus on increasing asset availability while creating repair cost avoidance that can be reinvested back into the maintenance program, driving NASA toward greater affordability in the long term.

NASA Construction

NASA's CECR budget provides for the construction and repair of infrastructure, including energy-saving projects that reduce the Agency's operating costs and environmental burden. CECR also provides for demolition of unneeded facilities, including those that have fallen into severe disrepair. Demolition is directly linked to construction activities and is critical to reducing the Agency's infrastructure footprint and reaching NASA's environmental goals. The majority of NASA's construction budget, however, is spent stemming the tide of age and degrading support infrastructure.

NASA construction projects, including horizontal infrastructure such as roads and utilities, span mission areas and enable the work of the Agency's Centers. CECR is comprised of both institutional funding for Center-wide or foundational infrastructure, as well as program-specific infrastructure, like the unique testing or assembly facilities associated with individual missions. These facilities support specialized capabilities, some being one-of-a-kind, and are vital for the manufacturing, testing, processing, or operation of hardware. To meet mission requirements, construction projects may involve modification of existing technical capabilities essential to the success of NASA programs. These project lists are dynamic, as they evolve with emerging needs and shifting mission priorities.

NASA's construction budget focuses on the following distinct categories:

***Repairs*:** Repair projects are those undertaken to address immediate needs to fix problems, damage, or failures that inhibit operational capability and impact mission success. Generally completed within one to two years, these projects predominantly include necessary upgrades to aging horizontal infrastructure, building systems and projects that address safety risks, such as arc-flash mitigation projects or earthquake hardening. Repair projects are identified by observation of recurring system failures, breakages, and increasing maintenance costs. Over the past 10 years, NASA has seen a significant increase in the number of repair projects – including electrical, water, stormwater, mechanical, and fire safety – that address degraded horizontal infrastructure and building systems needed to support critical mission capabilities.

In FY 2022, a key NASA repair project includes the 22-kilovolt (kV) upgrades to the electrical distribution system at the Langley Research Center (LaRC) in Virginia. This project completes the

underground infrastructure for the final two 22kV loops in the Center's site-wide electrical distribution system, and corrects the persistent failures that are caused by obsolete design and equipment. Other repair examples include the Utility Control System Risk Reduction project at the Marshall Space Flight Center (MSFC) in Alabama, and the Repair Center-Wide Fire Systems project at the Armstrong Flight Research Center in California. NASA will also undertake the final phase of work to upgrade the safety and reliability of institutional power systems at Kennedy Space Center (KSC), and will replace potable water storage and tanks to ensure reliable potable water supply for Center-wide operations at the Johnson Space Center (JSC) in Texas. At the Jet Propulsion Laboratory in California, NASA will replace the electrical substation to address vital electrical needs and improve reliability, and undertake seismic bracing to protect equipment, assets, and research against earthquakes.

***Renewal*:** NASA facilities renewal projects address the strategic sustainability of NASA infrastructure for the longer term through modernization, recapitalization, the construction of new capability and/or consolidation tasks. These include major repair-by-replacement or refurbishment efforts that result in a full retirement of risk associated with obsolete structures and systems, and effectively align with NASA's facilities master planning goals. Renewal projects often engage demolition and construction efforts for removal and replacement of structures, and generally take longer to complete (more than three years).

Renewal projects replace old, obsolete, failing facilities with sustainable, flexible, energy-efficient facilities that often consolidate functional use and improve work efficiency and collaboration. In FY 2022, a key NASA renewal project is the Operations and Maintenance Facility at JSC. This new construction project consolidates the functions of 28 1960s-era outlying metal buildings into a single operations and maintenance facility. With the construction of this 63,000-square-foot facility, approximately 100,000 square feet of existing building will be demolished, resulting in a reduction in deferred maintenance, a significant footprint reduction, energy savings, and cost avoidance due to reductions in operations and maintenance.

NASA will also continue upgrades and modifications to various facilities at KSC, including the Launch Control Center, Booster Fabrication Facility, and Vehicle Assembly Building, in support of the Artemis Program, specifically the Space Launch System (SLS) activities. NASA will continue the phased replacement of the Building 103 roof at the MSFC Michoud Assembly Facility in Louisiana. The Building 103 facility is home for the production and assembly of the SLS core stage. This work will advance hardening of the roof of this almost-80-year-old deteriorating building, which has been subject to hurricanes and a tornado, against further extreme weather.

***Energy Savings Projects*:** NASA invests in projects that reduce energy consumption, improve energy efficiency, reduce utility bills, and, where possible, increase renewable energy production. Energy savings projects help mitigate the risk to NASA missions and operations from rising energy costs and improve the ability to monitor and control consumption. At NASA Centers, these projects often include installation upgrades or efficiency improvement measures to existing operational systems, such as HVAC and energy monitoring and control.

In FY 2022, NASA will invest approximately $8 million on energy-savings projects that will avoid an estimated $1.2 million in utility costs. These projects support NASA's dedication to environmental stewardship and efficiency. Specific projects include the construction of a second thermal energy storage tank at MSFC, and an upgrade of the energy monitoring and control system at the Glenn Research Center in Ohio.

***Demolition and Disposal*:** Demolition is an integral element of the Agency's facilities management strategy. Demolition and disposal of obsolete, unneeded infrastructure is one of the most direct and effective ways to reduce facilities burden, deferred maintenance, and operations and maintenance costs. Demolition is critical to reducing risk to NASA's missions posed by safety or environmental liabilities.

NASA has achieved a five-percent reduction in footprint since 2015, and is projecting another ten-percent reduction by 2024 with sustained CECR budgets. In 2021, NASA demolished or disposed of 29 facilities, resulting in a reduction of 845,000 square feet, eliminating approximately $138 million in current replacement value and approximately $12 million in deferred maintenance. Under current budget authority, NASA maintains a five-year backlog of demolition projects and re-assesses its demolition requirements annually, adjusting priorities to ensure mission success. In FY 2022, NASA plans to spend an estimated $15 million to demolish approximately 11 facilities totaling more than 253,000 square feet, including the Research Laboratory and the Pearl Young Conference Center at LaRC.

NASA also reduces its operational and environmental burden by transferring assets to other agencies or disposing of them through the Federal Facilities Disposition process administered by the General Services Administration, when the circumstances meet the applicable regulatory and strategic thresholds. NASA will continue to explore the disposition of land and structures through sale, when it is economically feasible, to reduce leased space from its inventory.

***Facilities Disposition*:** Depending upon the utilization profile, physical circumstances, and the outlook for future mission needs, NASA pursues available options for leasing facilities that are underutilized. NASA's complement of Federal out-grant authorities, such as the National Aeronautics and Space Act ("Space Act") and the National Historic Preservation Act, offer flexibility to the Agency in finding paths for the reutilization of facilities that would otherwise be subject to disuse, decay, and rising maintenance costs.

NASA has found particular utility in its Enhanced Use Leasing (EUL) authority provided by amendments to the Space Act. NASA's EUL authority enables the Agency to enter into out-lease agreements with commercial, academic, or other nongovernmental entities for use of NASA underutilized facilities. NASA may collect and retain fair-market-value proceeds from these leases, which may be used for maintenance, capital revitalization, and/or improvements to real property assets. By entering into EUL agreements with public and private sector entities, currently underutilized NASA facilities may be leveraged into more productive properties, maximizing asset utilization and mitigating NASA property maintenance and repair costs. NASA is presently engaged in 70 EULs at six NASA Centers. NASA's current EUL authority expires on December 31, 2021.

Environmental Compliance and Restoration

NASA's budget supports the Environmental Compliance and Restoration (ECR) program, which cleans up hazardous materials and waste products that have been released to the surface or groundwater at NASA installations or associated facilities. These include current or former sites where NASA operations have contributed to environmental problems, and other sites where the Agency is legally obligated to address hazardous pollutants.

All NASA Centers and supporting facilities have some level of clean-up activity. NASA prioritizes these cleanups to protect human health and the environment, and preserve natural resources for the future, with the greatest priority on sites impacting neighboring communities. NASA's FY 2022 budget request for ECR is $74.7 million to continue support for a portfolio that includes 134 cleanup projects at NASA Centers. NASA continually strives to minimize impacts on its surrounding communities, and in accordance with applicable regulations and the Administration's Environmental Justice priorities, communicates with and provides opportunities for community feedback during the cleanup processes.

The ECR program addresses a variety of chemical pollutants that have been associated with NASA's long history of space and aeronautics hardware development and flight operations. Further, the ECR program encompasses proactive efforts in the area of emerging chemicals of concern, such as per- and

polyfluoroalkyl substances (PFAS). The Agency has undertaken work to begin a Preliminary Assessment effort, under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidelines, to identify areas of potential concern for the presence of PFAS at all NASA Centers. The first phase of this assessment process, which is based on historical and administrative records reviews, will conclude toward the end of Summer 2021, and transition to a second phase of Center site investigations and sampling. NASA looks forward to communicating with the Subcommittee about the early results of its PFAS efforts when information is finalized.

In FY 2022, NASA will continue cleanup activities at all of its Centers, with priority given to protecting public health and the environment and conforming to environmental regulations and statutory requirements. In particular, NASA will continue to conduct essential cleanup work at the Santa Susana Field Laboratory (SSFL) in California, including planned demolition of test stands, ongoing groundwater cleanup and treatment, and long-term air and groundwater monitoring. This effort continues as NASA awaits the Department of Toxic Substances Control's (the State of California's regulator) finalization of their Program Environmental Impact Report and publication of their Notice of Determination. NASA's unwavering commitment at SSFL is to undertake and complete a cleanup that is based in science and protective of public health and the environment.

Conclusion

To maintain its benefit and capability as a national symbol for progress, discovery, and science, NASA must have the enabling technical infrastructure capabilities and facilities necessary to efficiently and effectively support its programs. The decline of NASA's infrastructure and reliance on degraded, Apollo-era facilities is the single greatest threat to mission success.

NASA's FY 2022 budget request reflects encouraging support for NASA's mission goals by the Administration. NASA infrastructure funding is an essential part of the equation to provide safe and efficient, healthy facilities to support the continued success of those missions in the future. Investment in NASA's infrastructure ensures America's leadership in human exploration, scientific research and discovery, and technology advancement. At a moment of increased international competition, industry participation, and global interest in space, full support for NASA's FY 2022 SSMS and CECR budgets provides vital investments in the foundation of the Nation's preeminent space program that will advance national interests, scientific benefit, and technological innovation.

We look forward to working with Congress to address these important requirements for continued mission success. In conclusion, I thank the Subcommittee for the opportunity to testify before you today. I would be happy to answer any questions that you may have.

Robert Gibbs, Associate Administrator for the Mission Support Directorate

Robert Gibbs, Associate Administrator for the Mission Support Directorate
Credits: NASA/Joel Kowsky

Mr. Robert (Bob) Gibbs is the Associate Administrator for the Mission Support Directorate (MSD) at NASA Headquarters in Washington. Gibbs joined NASA as the assistant administrator for the Office of Human Capital Management and NASA's chief human capital officer in May 2017. In this role, Gibbs had stewardship responsibility for NASA's workforce and for carrying out responsibilities in accordance with the Chief Human Capital Officers Act of 2002. His responsibilities included: setting the agency's workforce development strategy; assessing workforce characteristics and future needs based on the agency's mission and strategic plan; aligning the agency's human resources policies and programs with organizational mission, strategic goals, and performance outcomes; and, serving as a member of the Office of Personnel Management-led Chief Human Capital Officers Council.

From 2013 to 2017, Gibbs served as the chief human capital officer at the Department of Energy, where he was responsible for implementing agency-wide efforts on shared services, accountability, engagement and human capital transformation.

Prior to becoming a member of the Senior Executive Service, Gibbs completed the nuclear training pipeline and served at sea onboard the USS. Daniel Webster, the USS Henry L. Stimson and USS Simon Bolivar, completing numerous strategic deterrent patrols; and ashore at nuclear repair facilities including the Trident Refit Facility, Bangor, Maine, and the Washington and Naval Reactors Headquarters.

His assignments at Naval Reactors, a joint Department of Energy and Department of Navy program, included positions in the Office of Resource Management, ultimately serving as director of navy budgets and selection by Adm. F. L. Bowman to serve as director of civilian programs. While still on active duty, he was selected by Adm. K. H. Donald to serve as director of management and administration. In that capacity, he was responsible for management, personnel, and support programs and policies. He has led several enterprise-wide initiatives (total force management, succession planning, pay for performance, industrial relations, outreach and enterprise consolidation) to structure the workforce to meet current and future requirements in a challenging and diverse environment across two federal agencies and multiple field offices.

Gibbs was born and raised in Boston. A retired naval officer, he holds a Bachelor of Arts in business management from the University of Washington and a Doctor of Jurisprudence from George Mason University. He is a member of the Maryland and American bar associations. Gibbs is the recipient of numerous military awards and citations. He resides in Southern Maryland with his wife and four children.