Modernizing NASA Websites and Digital Services

A report required by the 21st Century Integrated Digital Experience Act (IDEA), P.L. 115-336

December 2021

Report on Modernization of Agency Websites and Digital Services

Contents

Executive Summary
As required by the 21st Century Integrated Digital Experience Act (IDEA), or Public Law (P.L.) 115-336, the National Aeronautics and Space Administration (NASA) is providing this report as a follow-up to our December 2019 and 2020 reports to Congress and to the Office of Management and Budget. The Congressional reporting requirement specified in Section 3 (b)(2) of that law was completed in December 2020. However, this year's report, along with the 2019 and 2020 reports, will be available on this public website: https://www.nasa.gov/reports, as required by the IDEA, or P.L. 115-336, Section 3(d)(2).

This 2021 report details how the Agency is performing when it comes to website modernization and the progress made in domain assessment and consolidation, redesign of NASA's main websites, content management, archiving and governance. Future budgetary requirements needed for completion of this work will be incorporated into NASA's annual budget submissions to Congress, as needed. NASA remains committed to complying in full with P.L. 115-336 in a timely manner and as appropriated funds are made available to complete the legislative requirements of the law.

NASA continues to work diligently to assess, consolidate, streamline, and modernize NASA's digital portfolio. The NASA Web Modernization Team (NWMT), which convened in August 2019, has focused on the following areas:

- Assessing and consolidating websites.
- Redesigning the Agency's main websites (www.nasa.gov).
- Creating an Agency archiving program.
- Creating an Agency web governance structure.

This year (2021), the NWMT made large strides when it comes to analysis and consolidation of websites, selection of the new Horizon Design for the future main Agency websites, and moving closer to establishing the first-ever Agency archiving program. Two other key milestones include the research and analysis to determine the best content management system (CMS) for the Agency and the selection of WordPress as the future CMS for the Agency; development of a content audit plan and process to assist with future web content migration and content publishing.

Statutory Citation
SEC. 3. WEBSITE MODERNIZATION.

(a) REQUIREMENTS FOR NEW WEBSITES AND DIGITAL SERVICES.—
Not later than 180 days after the date of enactment of this Act, an executive agency that creates a website or digital service that is intended for use by the public, or conducts a redesign of an existing legacy website or digital service that is intended for use by the public, shall ensure to the greatest extent practicable that any new or redesigned website, web-based form, web-based application, or digital service—
> *(1) is accessible to individuals with disabilities in accordance with section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d);*
> *(2) has a consistent appearance;*
> *(3) does not overlap with or duplicate any legacy websites and, if applicable, ensure that legacy websites are regularly reviewed, eliminated, and consolidated;*
> *(4) contains a search function that allows users to easily search content intended for public use;*

(5) is provided through an industry standard secure connection;
(6) is designed around user needs with data-driven analysis influencing management and development decisions, using qualitative and quantitative data to determine user goals, needs, and behaviors, and continually test the website, webbased form, web-based application, or digital service to ensure that user needs are addressed;
(7) provides users of the new or redesigned website, webbased form, web-based application, or digital service with the option for a more customized digital experience that allows users to complete digital transactions in an efficient and accurate manner; and
(8) is fully functional and usable on common mobile devices.

(b) REQUIREMENTS FOR EXISTING EXECUTIVE AGENCY WEBSITES AND DIGITAL SERVICES—Not later than 1 year after the date of enactment of this Act, the head of each executive agency that maintains a website or digital service that is made available to the public shall—
(1) review each website or digital service; and
(2) submit to Congress a report that includes—
(A) a list of the websites and digital services maintained by the executive agency that are most viewed or utilized by the public or are otherwise important for public engagement;
(B) from among the websites and digital services listed under subparagraph (A), a prioritization of websites and digital services that require modernization to meet the requirements under subsection (a); and
(C) an estimation of the cost and schedule of modernizing the websites and digital services prioritized under subparagraph (B).
(c) INTERNAL DIGITAL SERVICES—The head of each executive agency shall ensure, to the greatest extent practicable, that any Intranet established after the date of enactment of this Act conforms to the requirements described in subsection (a).
(d) PUBLIC REPORTING—Not later than 1 year after the date of enactment of this Act and every year thereafter for 4 years, the head of each executive agency shall— (1) report annually to the Director on the progress of the executive agency in implementing the requirements described in this section for the previous year; and (2) include the information described in paragraph (1) in a publicly available report that is required under another provision of law.

Background

A key requirement of NASA's core mission is to inspire Americans and to share the excitement and scientific knowledge of space exploration–from the depths of Earth's oceans to the farthest reaches of our universe. NASA's use of websites to engage and inform the public is part of the mandate in the National Aeronautics and Space Act of 1958 as recodified and amended at 51 U.S.C. § 20112(a)(3) that NASA "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

NASA's digital portfolio spans a wealth of public information that encompasses real-time events ranging from spacewalks on the International Space Station (ISS) to Mars landings. NASA's explanatory content puts complex science into plain language and captures the Agency's history. NASA servers also host massive archives of scientific data that represent a multi-billion-dollar investment in science and exploration for the benefit of all humankind.

NASA was an early adopter in the use of the Internet in the 1980s to communicate with the public and share science data, and beginning in 1993, via the World Wide Web. This has resulted in the

development of a large number of websites over the last 27 years, making NASA's current digital portfolio as complex and broad as the Agency's missions. NASA peaked at 7,989 Internet-accessible devices, with more than 6,000 of those being public web domains. To reduce risk and better manage costs of maintaining the devices and services with high-risk exposure, NASA reduced the number of Internet-exposed devices to 1,651, with about 2,800 web domains. Today, NASA's web modernization efforts are focused on modernizing and consolidating, but also preserving critical information and maintaining our charter of inspiration while creating a streamlined, 21st Century digital portfolio worthy of the world's greatest space Agency.

NASA and the IDEA

On May 15, 2019, NASA Administrator James Bridenstine issued an Agency-wide memo requesting "a full review of NASA's web footprint and digital presence . . . to result in an enhanced cyber-posture and an improved focus for communicating our messages." The NWMT, led by the NASA Office of the Chief Scientist, was asked to conduct a review of the Agency's digital footprint, provide recommendations to the Administrator and Agency senior leaders, as well as respond to the requirements of the IDEA. The team was charged with recommending ways to strengthen digital security, analyze website usability and user experience, eliminate website redundancy, and find ways to maximize the effectiveness of online communication. With the support of the current NASA Administrator, Bill Nelson, the NWMT conducted an audit of all NASA websites to assess visitor traffic and preferences and identify and eliminate duplication of content. Steps are being taken to properly consolidate websites, revamp/redesign the main NASA website (www.nasa.gov), create an Agency web-archiving program, and finalize and implement a new Agency web governance structure.

Originally, the NWMT was comprised of 16 team members from NASA Headquarters, Goddard Space Flight Center, Marshall Space Flight Center, Kennedy Space Center, Johnson Space Center, Ames Research Center, and the Jet Propulsion Laboratory (JPL), including representatives from the Office of the Chief Information Officer, the Office of Communications, the Mission Directorates, and other programmatic offices. With the creation of seven new sub-teams, the NWMT has grown to 60 active members with representation from all NASA Centers, Headquarters, and JPL. The following is a list of the sub-teams and their areas of responsibility:

- Design: Develop a new, modern, and more engaging main website.
- Platform: Evaluate and select a new content management system and establish new/best processes and procedures for the new consolidated systems.
- Governance: Review or create web policies, guidance, and processes and establish leadership boards and new organizational structures as necessary.
- Archiving: Identify outdated websites and content eligible to be archived and identify necessary tools to establish Agency-wide archiving program and processes.
- Content: Audit content across NASA websites and develop processes for content consolidation, generate best practices to ensure search engine optimization, and establish a future process for management of NASA-wide content.
- Web Consolidation: Review websites and identify which need to be consolidated or decommissioned and identify future web compliance requirements.
- Implementation: Implement NWMT and sub-team recommendations, requirements, and processes.

Agency Efforts

NASA's extensive digital portfolio was developed and is administered across all NASA Centers and JPL.

By early 2018, NASA had begun exploring the use of Accelerated Mobile Pages that deliver streamlined information to mobile users faster as well as developing better writing and structure for search engine optimization and ensuring optimal search results. As of December 2021, the NWMT is tracking 2,713 public NASA web domains, with 90 percent of the online traffic hosted by the Agency's top 40 sites. Over the last couple of years, NASA has been re-examining its digital footprint and online user experience. NASA is continuing to also consolidate social media accounts in order to streamline the distribution and ensure quality of information. In the first phase of this effort, the Agency's Science Mission Directorate (SMD) decreased the number of social media accounts from more than 300 accounts to less than 200. This streamlining allows the Agency to better connect with citizens and provide better and more relevant information to interested audiences. NASA is committed to continued improvement of its public content and user experience.

The NWMT also surveyed public-facing forms that NASA uses when engaging with the public and conducting Agency business, such as those used for contractor reporting, safety reporting, grant monitoring, medical reporting, and qualitative feedback for Agency service delivery. It was determined that all public-facing forms are already available in a digitized format and many can be signed electronically, if a signature is required.

Right-Sizing NASA's Digital Footprint
The NWMT conducted a comprehensive audit and analysis to identify websites eligible for consolidation into modern platforms or eligible for decommission. As a result of further analysis, the NWMT has continued to identify existing web domains that weren't previously tracked, which added 190 websites to the total Agency count. The NWMT established new guidelines and procedures and is working with each NASA Center to decrease the number of publicly accessible domains. In 2021, the NWMT decreased the number of publicly available domains by 158 and is currently working with web managers across NASA Centers to further assess which websites to consolidate, decommission, or archived.

Earlier this year, NASA senior leadership determined that modernization, consolidation, and management of science websites will be led by the SMD. SMD will reduce its web footprint, identify which SMD websites will be archived, and develop a new SMD structure under the www.science.nasa.gov subdomain. SMD and Office of the Chief Information Officer (OCIO) will collaborate (through the NWMT) to ensure a comprehensive and cohesive look and feel to their websites, a seamless user experience, and a sustainable governance structure. Assessments and updates to these shall be made as deemed necessary.

In order to meet this requirement, SMD created a subgroup of the NWMT, a science web modernization team. SMD is currently analyzing science websites and their content to determine which are candidates for consolidation or decommissioning. By consolidating more than 30 top sites–about half of all NASA's traffic in fiscal year 2021–SMD is creating a robust science information portal that provides "deep dive" context behind the Agency headlines and discoveries, citizen science opportunities real-time, and data visualizations. Both new sites (www.nasa.gov and science.nasa.gov) will share a new design and new navigational structure. In 2021, SMD began the content audit of the 30 websites that will transition as part of phase 1 of the consolidation project. Simultaneously, SMD is decommissioning and archiving public URLs. Initially, SMD counted 1755 public-facing websites. However, in 2021, SMD discovered more URLs, increasing its portfolio to 1924. As of December 2021, SMD has decommissioned 456 URLs.

The NWMT is also evaluating the most effective methods of creating and establishing an Agency-wide archiving program. This will allow us to archive older websites that have low usability but rich, unique quality content (e.g., past missions). The Enterprise Archives Program and the OCIO are working with

the Web Services Office to deploy a standards-based archival system that will enable preservation of and access to archived websites. We are also working to assess alternatives for website crawling and emulation—capabilities that will support our overall approach to website consolidation. Currently, technical complexity and expected cost are the primary hurdles.

Modernization Priorities

NASA's web modernization priorities include: redesign of the main NASA websites (www.nasa.gov and science.nasa.gov) and improved search engine optimization, assessment and consolidation of Agency websites, streamlined content management, and the creation and implementation of an Agency web governance structure and an Agency-wide archiving program.

NASA has identified a new unified design system that will redesign and power the future Agency website. Dubbed the Horizon Design System, it implements the best practices of the industry and builds off the Federal Web Design System. The design package is meant to be comprehensive and expansive, built with the input of over fifty different web experts throughout various levels of NASA. This Horizon Design will be the dawn of a modern era of websites at NASA with responsive and accessible support and a significant improvement to the overall user experience. The NWMT Design and Content sub-teams have been meeting with stakeholders across the Agency to share the new Horizon Design with them as well as the implementation plan and timeline.

NASA completed a comprehensive review of key digital assets that effectively represent more than 93 percent of Agency traffic. The extensive analysis resulted in recommendations for a streamlined, optimal digital presence that leverages the best of NASA's websites. The Agency is currently in the first phase of redesigning the main NASA website and the consolidation and integration of our public websites and public content. This will allow for more compelling content, better design, and additional innovative opportunities across the Agency.

The following list includes websites that are the most popular with our online audiences, such as the current main website, www.nasa.gov; websites about our recent missions and discoveries; climate change; images of our planet and solar system; and some of our websites for children and young audiences.

Website/Digital Service	Content
nasa.gov	NASA's primary web portal to share information and inspiration with the public.
mars.nasa.gov	Information and images about NASA's Mars Exploration Program.
apod.nasa.gov	Curated space images with public-friendly scientific captions.
spotthestation.nasa.gov	Enables the public to find out when the ISS will pass over their city.
climate.nasa.gov	Public-friendly, data-driven information about Earth's changing climate.
solarsystem.nasa.gov	A real-time encyclopedia of our solar system's planets, moons, asteroids, and comets and NASA's robotic exploration of them.
earthobservatory.nasa.gov	Images, stories, and discoveries from NASA's Earth science research.

jpl.nasa.gov	Information about JPL and its role in space exploration.
spaceplace.nasa.gov	Science content developed specifically for elementary school children.
science.nasa.gov	Homepage of NASA's SMD with details on the Agency's astrophysics, heliophysics, planetary, and Earth science programs.
blogs.nasa.gov	A public blogging platform that allows the sharing of Agency expertise and knowledge.
voyager.jpl.nasa.gov	Mission homepage for NASA's Voyager 1 and Voyager 2 missions, currently in interstellar space.
history.nasa.gov	Information, images, and documents related to NASA and previous space exploration efforts.
exoplanets.nasa.gov	A complete catalog and public-friendly explanations of the 4,000+ planets discovered beyond our solar system.
images.nasa.gov	Public repository of NASA images and videos.
svs.gsfc.nasa.gov	Public repository of NASA scientific visualizations, images, and videos.
eol.jsc.nasa.gov	Public repository of NASA astronaut photography from the ISS.
moon.nasa.gov	Information, history, and images of NASA's exploration of Earth's Moon.
photojournal.jpl.nasa.gov	Repository of NASA images and videos for the public and science community.
visibleearth.nasa.gov	Catalog of NASA images and animations of Earth.
intern.nasa.gov	Details on how to apply for NASA internships.
ciencia.nasa.gov	NASA science information for Spanish speakers.
jwst.nasa.gov	Mission homepage for the James Webb Space Telescope.

Earlier this year, NASA senior leadership identified the office that would be responsible for Agency web governance in the future, based on the recommendations from the NWMT Governance sub-team. The responsible office for future Agency web modernization efforts will be the OCIO. The OCIO will use an appropriate governance structure, including ongoing, sustainable working leadership boards comprised of stakeholders, subject-matter experts, and content managers from across the Agency to further modernization efforts. It will also require the hiring and placement of a new position, a Director who can lead these efforts. SMD will continue to manage science content and web modernization efforts for the Agency science websites (in collaboration with the NWMT).

In 2022, NWMT expects to achieve the following milestones:

- Continue the consolidation and decommissioning of websites and migration of content to and from www.nasa.gov and science.nasa.gov.
- Debut and use of the new Horizon Design System for the main Agency website, www.nasa.gov, and main science website, science.nasa.gov.
- Begin the implementation of the new CMS.

- Provide training and support as well as an improved service delivery for use of the new CMS.
- Begin operating under a new web governance structure.
- Create and begin operations of the new robust Agency-wide archiving program.

Conclusion

Every day, NASA communicates groundbreaking and life-changing accomplishments in science, exploration, and discovery. As an Agency, our content is compelling, visually appealing, and reaches millions of Americans and people around the world, making NASA one of the best-known and most popular organizations on the planet. As an international leader on digital content with a strong online presence, NASA must continually self-evaluate and ensure that we reflect the Agency's priorities and activities. NASA continues working to improve our presence on the web, which includes examining website usability and eliminating redundancy, consolidating as necessary, and maximizing the effectiveness of public communication efforts. NASA's NWMT and its sub-teams have been conducting analyses and making data-driven recommendations and decisions to ultimately redefine and enhance the Agency's digital presence with the goal of providing the best service to the public. NASA remains committed to complying in full with P.L. 115-336 in a timely manner, and as appropriated funds are made available to complete the legislative requirements of the law.