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Executive Order 13287 "Preserve America"

National Aeronautics and Space Administration

Section 3 Triennial Report for the Reporting Period FY2018-FY2020

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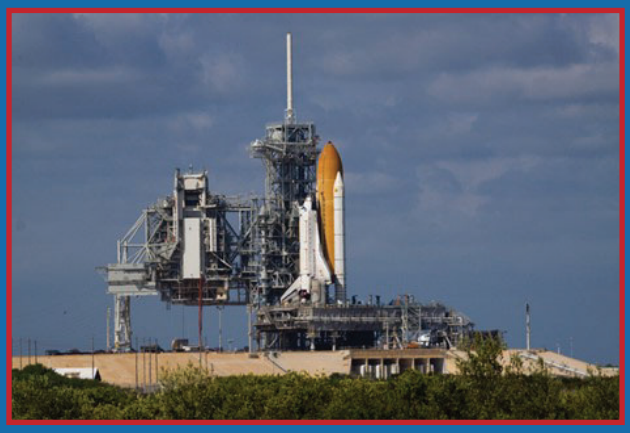

NASA

National Aeronautics and Space Administration

Executive Order 13287
Section 3 Triennial Report

Reporting Period 2018–2020

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ACRONYMS

ACHP	Advisory Council on Historic Preservation
AFRC	Armstrong Flight Research Center
ARC	Ames Research Center
ARPA	Archaeological Resources Protection Act
CCG	Criteria Consideration G
CFO	Chief Financial Officer
CoP	Community of Practice
COVID-19	SARS-CoV-2, 2019 Novel Coronavirus
CRM	Cultural Resources Manager/Cultural Resources Management
EMD	Environmental Management Division
EO	Executive Order
EUL	Enhanced Use Lease
FRED	Facilities and Real Estate Division
FPO	Federal Preservation Officer
FY	Fiscal Year
GDSCC	Goldstone Deep Space Communications Complex
GIS	Geographic Information Systems
GRC	Glenn Research Center
GSA	General Services Administration
GSFC	Goddard Space Flight Center
HQ	Headquarters
HTSF	Highly Technical and Scientific Facilities
ICRMP	Integrated Cultural Resources Management Plan
ISS	International Space Station
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSC	Kennedy Space Center
LaRC	Langley Research Center
LED	Light-emitting Diode
MAF	Michoud Assembly Facility

MOA	Memorandum of Agreement
MOSI	Management Operations Services and Information
MSC	Mission Support Council
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
NCSHPO	National Conference of State Historic Preservation Officers
NEPA	National Environmental Policy Act
NETS	NASA Environmental Tracking System
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NID	NASA Interim Directive
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
NPS	National Park Service
NRHP	National Register of Historic Places
NRP	NASA Research Park
NTHP	National Trust for Historic Preservation
OMB	Office of Management and Budget
OSI	Office of Strategic Infrastructure
PA	Programmatic Agreement
PBS	Plum Brook Station
RPCP	Real Property Capital Planning
RPMS	Real Property Management System
RTF	Reduce the Footprint
SFFAS	Statement of Federal Financial Accounting Standards
SHPO	State Historic Preservation Office
SOI	Secretary of the Interior
SSC	Stennis Space Center
SSFL	Santa Susana Field Laboratory
UAV	Unmanned Aerial Vehicle
WFF	Wallops Flight Facility
WSTF	White Sands Test Facility

SECTION ONE OVERVIEW

This report is submitted to the Advisory Council on Historic Preservation (ACHP) by the National Aeronautics and Space Administration (NASA) in compliance with Executive Order (EO) 13287, entitled *Preserve America*. Section 3 of EO 13287 requires NASA to submit a triennial report on its progress in identifying, protecting, and using historic properties in the agency's ownership, as mandated by the National Historic Preservation Act of 1966, as amended (NHPA). This report is the seventh report prepared by NASA under the EO. It is preceded by a baseline report in 2004, a progress report in 2005, and triennial reports in 2008, 2011, 2014, and 2017. This report covers the three-year period from 2018 to 2020.

1.1 REPORT ORGANIZATION

This triennial report has been prepared for the 2018–2020 reporting period consistent with the ACHP February 2020 draft *Advisory Guidelines Implementing Executive Order 13287, "Preserve America" Section 3: Reporting Progress on the Identification, Protection, and Use of Federal Historic Properties* (Draft Guidelines). The Draft Guidelines have been simplified from previous years, with fewer questions and a deemphasis on quantitative data. Instead, they focus on new information from the reporting period that highlights successes, opportunities, and challenges in identifying, protecting, and using historic properties.

This report has four sections. Section One (Overview) presents the major themes and challenges driving NASA's CRM Program during the current reporting period and into the next. Section Two (NASA's CRM Program) presents the basic framework of the program as it is currently operating. Sections Three (Identifying Historic Properties) and Four (Protecting and Utilizing Historic Properties) respond specifically to the reporting requirements of the EO and the Draft Guidelines.

1.2 A DIFFERENT KIND OF PRESERVATION

The National Aeronautics and Space Act of 1958 ascribed to NASA three primary functions: 1) plan, direct, and conduct aeronautical and space activities; 2) arrange for participation by the scientific community in planning scientific measurements and observations to be made through use of aeronautical and space vehicles; and 3) provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof.[1] As such, NASA is an agency committed to documenting its achievements and sharing them with both the scientific and lay communities since its inception. Out of all federal agencies, NASA is among the most readily accessible to the public—not only because of the inherent human interest in its activities, but also because NASA cultivates its relationship with the public in a way that other agencies do not. The viability of NASA long term depends upon public and political support. NASA engenders that support by telling its story and sharing its achievements through a broad range of media that includes everything from written historical publications through NASA's History Office to live broadcasting of historic launches such as NASA's SpaceX Crew-1 to

[1] Public Law 85-568 (72 Stat. 426), 85th Congress, "An Act to provide for research into problems of flight within and outside the earth's atmosphere, and for other purposes," (H.R. 12575), enacted 29 July 1958.

the International Space Station (ISS) which returned NASA's astronauts to space aboard a U.S. vehicle after a nine-year hiatus.

But the nature of its activities requires NASA to utilize its built assets—many of which are highly technical and scientific facilities (HTSF)—in a manner that is often at odds with traditional historic preservation approaches. As an agency dedicated to the fields of aeronautics research, human exploration and operations, science, and space technology, NASA routinely modifies, upgrades, reconfigures, cannibalizes, and replaces its resources; therefore, traditional approaches to preservation are often not feasible.

When the NHPA was enacted, almost three years before the Apollo 11 Moon landing, it was in reaction to the large-scale demolition of historic properties that resulted from urban renewal and highway construction, and while it applied to all federal agencies that "owned, administered, or controlled historic property," it did not specifically address the kinds of challenges that agencies like NASA would face in implementing the law.[2] Similarly, the suite of tools developed by the Secretary of the Interior (SOI) and National Park Service (NPS) have conventional architectural resources and structure types in mind and are not readily translated into the HTSF environment within which agencies such as NASA, the Department of Energy, and the National Science Foundation operate.

These atypical agencies initially struggled to manage the perceived disconnect between mission and preservation goals, and given the youth of NASA's resources, a formal approach to cultural resources management was not a priority. Nevertheless, several NASA resources were listed in the National Register of Historic Places (NRHP) in the 1970s, including Launch Complex 39 at Kennedy Space Center (KSC), the Redstone Test Stand at Redstone Arsenal in Alabama, and the Saturn V Rocket at the United States Space & Rocket Center in Huntsville, Alabama.

In 1980, however, Public Law 96-344 *An Act to improve the administration of the Historic Sites, Buildings and Antiquities Act of 1935 (49 Stat. 666)* was enacted, directing the SOI to conduct a "study of locations and events associated with the historical theme of Man in Space," and to recommend ways to "permanently safeguard from change the locations, structures, and at least symbolic instrumentation features associated with this theme."[3] The study manifested as the NPS National Historic Landmark (NHL) Theme Study *Man in Space*, published in 1985, which resulted in the designation of 24 NHLs, 20 of which were NASA-owned resources associated with the Apollo Program and the majority of which were less than 50 years of age.[4]

As a result of the study, NASA executed its first Section 106 agreement with the Advisory Council on Historic Preservation (ACHP) that requires NASA to consult with the appropriate SHPO prior to altering any of the newly identified NHLs, and stipulated documentation to be completed prior to alteration. But the visibility that the *Man in Space* study brought to federal agency management of HTSF—not often thought of by non-practitioners as historic properties—

[2] NHPA of 1966, as amended, 54 U.S.C. § 300101.

[3] Public Law 96-344, 96th Congress, *An Act To improve the administration of the Historic Sites, Buildings and Antiquities Act of 1935 (49 Stat. 666),* (S. 2680), 8 September 1980.

[4] A summary of the study is available online at https://www.nps.gov/parkhistory/online_books/butowsky3/space0.htm.

prompted concern among some that the Section 106 process would hamper the ability to use and reuse the resources.

The challenges facing agencies like NASA were acknowledged in the 1991 ACHP publication *Balancing Historic Preservation Needs with the Operations of Highly Technical or Scientific Facilities*, prepared in response to a Congressional request seeking counsel on "how a balance could be struck between the preservation of physical reminders of the scientific legacy of the United States and the ongoing operation and upgrading of scientific and technical research facilities."[5] Issued in part due to NASA concerns about the implications of the *Man in Space* study, the ACHP publication aimed to demonstrate how historic HTSF could be managed consistent with the NHPA, in particular Section 106, if the respective parties—preservation regulators and agency resource managers—understood and accounted for one another's goals. A major theme in this publication was the acknowledgement that modification is expected and necessary to maintain active use of HTSF.

In this publication, ACHP directly addressed a persistent barrier to the preservation of historic HTSF—the lack of awareness within the scientific community of the importance of preserving the physical sites, buildings, structures, objects, and districts where discoveries and advances occurred. ACHP reinforced the need for the scientific community to better acknowledge that it has a responsibility to future generations. It needs to consider its legacy and how it can be preserved and conveyed, and actively promote and encourage this preservation.

Although the development of NASA's CRM Program was a low priority for the agency prior to 2004, EO 13287 has proven itself to be an effective incentive. Since then, NASA's CRM Program has progressed from reactive, Section 106-driven activities with highly variable implementation from Center to Center, to a fully developed and integrated program with established standardized tools and procedures that enable proactive, consistent agency-wide CRM as envisioned in the NHPA. Under the leadership of the Federal Preservation Officer (FPO), with support from Headquarters (HQ) Environmental Management Division (EMD) and the Center Cultural Resources Managers (Center CRMs), NASA has embraced its NHPA responsibilities as an extension of its core mission to share information with the public, and views the triennial report as an opportunity to assess the effectiveness of its efforts to identify, protect, and use historic properties.

1.3 FAMILIAR CHALLENGES, NEW SOLUTIONS

In 2020, NASA's awareness of the importance of its cultural resources continues to grow, and with it the appreciation of the physical sites, buildings, structures, objects, and districts that tell the story of its 62 years of extraordinary accomplishments. However, like many federal agencies, NASA faces challenges in achieving the stated goal of the NHPA to "administer federally owned, administered, or controlled historic property in a spirit of stewardship for the inspiration and benefit of present and future generations."[6]

[5] Available online at https://www.achp.gov/digital-library-section-106-landing/balancing-historic-preservation-needs-operation-highly.

[6] NHPA, 54 U.S.C. § 300101.

Challenge #1 - Managing HSTF

Now that the NHPA itself is over 50 years of age, a greater understanding exists on the part of practitioners, regulators, and federal agencies of the many different types of properties that meet the NRHP Criteria, including Criteria Consideration G (CCG). NASA's inventory of historic properties has diversified from three NRHP-listed structures to include built resources, historic districts, archaeological sites, one traditional cultural property, and one sacred site. Approximately 12 percent, or 594, of its real property assets in the United States have been identified as historic properties. Many of NASA's most important historic properties are also HTSF, which adds another layer of complexity.

But with that expanded inventory of historic properties comes increased management responsibilities, and these can be substantial for an agency that must continually modify its assets to maintain their relevance through successive missions and programs. Alteration inconsistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* is identified as a potential adverse effect under Section 106, but the SOI standards were written with traditional historic buildings in mind.[7] In the case of HTSF, modification that enables continued use may more appropriately be viewed as a character-defining feature rather than an adverse effect, as it is the active use of the resource that ensures its preservation. This is an accepted interpretation in the case of adaptive reuse of historic buildings under the federal Historic Rehabilitation Tax Credit program, administered by the NPS.

NASA is currently considering ways to formalize this understanding through use of a Section 106 Program Alternative, in coordination with ACHP, that implements a streamlined process for modification of HTSF agency wide. NASA seeks an agreement that acknowledges modification as essential to the preservation of HTSF, and establishes standard recordation measures that build upon NASA's already robust information sharing infrastructure to maximize public access and utility. In support of this goal, NASA is conducting an agency-wide survey of HTSF.

Challenge #2 - Aging Infrastructure

When NASA was created by the Space Act of 1958, it inherited the legacy properties of its predecessor, the National Advisory Committee for Aeronautics (NACA), and its inventory of existing buildings dating back to the 1910s. A period of new construction commenced and rapidly accelerated following President John F. Kennedy's *Address at Rice University on the Nation's Space Effort* of 12 September 1962, in which Kennedy promoted a national effort to land man on the Moon. The pace of new construction at NASA leveled off in the 1970s and has remained relatively consistent since (Table 1-1).

Approximately half of NASA's United States real property assets were built in or prior to 1980. This metric is significant for NASA real property management, as once an asset reaches 40 years of age NASA assumes that it has a declining capacity to perform the function for which it was designed.

NASA rates assets based upon mission dependency (mission dependency index [MDI]) and condition (facilities condition index [FCI]). NASA seeks to maintain assets with high-rated MDI above a certain FCI

[7] 36 C.F.R. § 800.5(a)(2)(ii).

threshold, and these facilities are prioritized for upgrades and improvements.[8] Using these metrics, approximately 53 percent of real property assets in its portfolio are categorized as degraded—i.e., they have an FCI below the established threshold. Roughly 32 percent of NASA's real property assets have been assessed as both obsolete (i.e., over 40 years old) and degraded.

Table 1-1. NASA Real Property Assets by Decade.

Construction Date	% of U.S. Real Property Portfolio
1920s	<1%
1930s	<1%
1940s	7.8%
1950s	7.9%
1960s	23.9%
1970s	7.5%
1980s	11.7%
1990s	12.8%
2000s	12.8%
2010s	14.5%
2020s	<1%

The challenge of aging infrastructure is shown to be even more acute when considering square footage. With respect to approximately 117.5M total square feet (ft^2) of real property assets:

- Approximately 84 percent (99.1M ft^2) is functionally obsolete (i.e., 40 years old or older);
- Approximately 60 percent (69.5M ft^2) is degraded (i.e., low FCI); and
- Approximately 52 percent (61.2M ft^2) is degraded and functionally obsolete (i.e., over 40 years old and with low FCI).

Mission-essential buildings planned for active use require regular maintenance, repair, and upgrades to keep them functional, and while work can sometimes be deferred in an office or storage building without compromising the mission, that is not the case for HTSF and other purpose-built assets like laboratories, testing facilities, and buildings housing highly specialized scientific activities that if allowed to decline could severely undermine NASA's ability to carry out mission-critical activities. However, while NASA's real property portfolio ages and the cost of maintenance and upgrades increases, the Operations & Maintenance (O&M) budget from which these costs are derived has remained flat for the last 15 years. Mission-critical (high MDI) assets are necessarily prioritized, leaving limited funding to go towards lower MDI assets, many of which are historic properties. Assets that cannot be maintained consistent with contemporary functional and safety standards must either be modified to conform or disposed of.

This means an increasing number of case-by-case Section 106 consultations for CRMs, who wear multiple hats—i.e., CRM is just one of their responsibilities—and who are generally not SOI-qualified. The agency does not expect to hire dedicated SOI-qualified CRMs in the foreseeable future despite the anticipated increase in Section 106 undertakings. And while Centers utilize SOI-qualified consultants where necessary, this translates into additional cost and time—staff time and longer project schedules.

These constraints underscore the need for Section 106 Program Alternatives that will enable NASA to meet its responsibilities efficiently and focus limited resources on

[8] NASA Business Services Assessment (BSA), "Facilities Deep Dive Update to the NAC Institutional Committee," 3 November 2016.

recognizing historic properties rather than on proving lack of significance. NASA is looking to integrate exemptions for regular maintenance and repair into an agency-wide Section 106 Program Alternative, or into new Center Programmatic Agreements (PAs). Where demolition of historic properties cannot be avoided, mitigation options could be selected from a pre-determined list codified in a Section 106 Program Alternative. An agency-wide Program Alternative would have the benefit of directing mitigation funds into fewer but more impactful mitigation efforts with broad agency and public benefits, rather than many small, isolated projects at the Center level. Knowing the extent of potential mitigation options in advance would enable Center Project Managers to plan more effectively.

Challenge #3 - Applying CCG

In April 2020, the NRHP included 95,592 listings, 3,012 (3.2 percent) of which cited CCG in the statement of significance.[9] According to the NRHP criteria, properties less than 50 years of age are not normally eligible for listing unless they are exceptionally important. As a result, it has become common practice to focus Section 110 surveys on properties 50 years of age, or older. However, NASA is a young agency, with an extraordinary mission that makes it atypical among federal agencies in both the character of its historic properties and the nature of Section 106 undertakings. An analysis of NASA's United States real property assets reveals that in 2020:

- 42 percent of the portfolio is less than 50 years of age;
- 52 percent of these (i.e., resources less than 50 years of age) have been evaluated for NRHP eligibility under at least one context; and
- 17 percent of properties evaluated prior to turning 50 years of age were found to be eligible under CCG.

These statistics suggest that the potential for unevaluated resources less than 50 years of age to be NRHP-eligible under CCG is not *de minimus* and accordingly merits consideration. On the other hand, this also suggests that the overwhelming majority (83 percent) of NASA assets less than 50 years of age are *not* NRHP eligible, and that comprehensive gate-to-gate surveys at NASA Centers is not the most efficient way to identify the 17 percent.

NASA is instead taking a high-level agency-wide approach to identifying historic properties that meet CCG. With an understanding of the exceptional importance of its activities in areas of aeronautics, space exploration, and science, the HQ-directed effort will identify a subset of resource types that can convey that significance under CCG (i.e., the 17 percent). NASA intends for the study to support a Section 106 Program Alternative that will streamline the compliance requirements for properties less than 50 years of age, and has engaged both ACHP and the National Conference of State Historic Preservation Officers (NCSHPO) in preliminary discussions on the subject. Once completed, the Program Alternative and significance study will be used by the Center CRMs to identify the assets that may be NRHP-eligible, thereby saving the time and

[9] Julie H. Ernstein, Supervisory Archeologist, National Register & National Historic Landmarks Program, United States Department of Interior, National Park Service, to Rebecca Klein, Federal Preservation Officer, NASA, 24 April 2020.

expense of retaining a contractor to complete numerous Section 106 reviews.

Challenge #4 - Reduce the Footprint Directive

In order to ensure disposal of obsolete assets and to achieve a more affordable facilities portfolio, NASA has had a funded demolition program in place since 2004. In 2013 this was accelerated by NASA Policy Directive (NPD) 8820, *Design and Construction of Facilities*, which dictated that "construction of new NASA facilities and/or additions to existing facilities are to be offset by a greater than equivalent amount of facility disposal until the NASA footprint reduction goals are met." NASA set the disposal target at 125 percent of new facility square footage.

In March 2015, the United States Office of Management and Budget (OMB) issued an implementation directive per the 2012 Budget Memorandum M-12-12, *Promoting Efficient Spending to Support Agency Operations*. Section 3 of this implementation directive, referred to as "Reduce the Footprint," (RTF) requires that federal agencies "move aggressively to dispose of surplus properties held by the Federal Government, make more efficient use of the Government's real property assets, and reduce the total square footage of their domestic office and warehouse inventory." Agencies affected by the RTF directive are required to submit a five-year implementation plan every year from September 2015 through September 2020.

In November 2019 OMB issued Memorandum M-20-03, *Implementation of Agency-wide Real Property Capital Planning*, which requires NASA and other agencies to "identify, plan for, and allocate resources in the annual budget formulation process to eliminate gaps." Each agency is required to submit a Real Property Capital Planning (RPCP) report annually. OMB M-20-03 reasserted the RTF policy and required a submittal of annual reduction targets for office, warehouse, and owned property as a part of the annual RPCP report.

In 2017 the NASA Mission Support Council (MSC) approved an aggressive 20-year NASA Strategic Rightsizing Goal (MSC-2017-06-002) of a 25 percent facilities consolidation per Center. This strategic facilities consolidation goal aimed to improve facilities affordability, sustainability, and mission suitability.

Between 2015 and 2020 NASA demolished 449 real property assets. Of these, 50 (11 percent) were historic properties that account for almost 35 percent of the square footage demolished. During the next five years, NASA plans to demolish 335 assets, 62 of which are already identified as historic properties. An additional 96 of the 335 assets are yet to be evaluated.

The NASA CRM program is addressing the challenge of aggressive disposal of older assets by heightening awareness of historic properties in the planning and disposition processes, and by encouraging special consideration of the reuse of underutilized historic properties internally or through leases. But leasing historic assets to outside entities does not remove the square footage from NASA's real property inventory and, as a result, does not free up square footage for new construction as required by RTF. NASA's FPO currently serves on an ACHP working group exploring ways to incentivize federal agency lease of historic properties. Even with incentives, decision makers may continue pushing for disposal of degraded, obsolete, or otherwise underutilized historic assets in favor of new construction.

SECTION TWO NASA'S CRM PROGRAM

2.1 NASA LOCATIONS

Agency operations are implemented across 16 NASA Centers and component facilities (collectively referred to as Centers in this report) that range greatly in acreage, from 175 acres to 140,000 acres (Figure 2-1; Table 2-1).

2.2 CRM PROGRAM, POLICY, AND PROCEDURES

NASA codifies its policies in NPDs and implementing procedures in NASA Procedural Requirements (NPRs). Cultural resources fall under NPD 8500.1, *NASA Environmental Management*, and are governed by NPR 8510.1A, *Cultural Resources Management* (CRM NPR). Last updated on 20 June 2017, the CRM NPR presents the authorities and responsibilities of the agency with respect to the NHPA and other cultural resources laws (e.g., the Archaeological Resources Protection Act [ARPA]) in a manner that affirms the agency's commitment to "be a steward of cultural resources… [ensuring] preservation of their significance to NASA's mission, communities, and the history of our Nation."

The CRM NPR presents the specific responsibilities of CRM program personnel. Based in EMD at NASA HQ, the NASA FPO is a fully dedicated subject matter expert and policy maker who communicates between HQ and the Center CRMs, drawing from insights gained through coordination with the ACHP and other agency FPOs to add support and grow the program at both the HQ and Center levels. Policies and procedures developed at the HQ level are carried out by the Center CRMs, who are the face of the CRM Program at the Centers, where most of the responsibility for compliance with the NHPA lies. The Center CRMs are a well-trained group skilled at addressing the needs of their particular Center, while responding to the concerns of the respective State Historic Preservation Offices (SHPOs), Native American Tribes, and stakeholders. The development of the agency's CRM Program has benefitted from the long tenure of many of the Center CRMs, who have retained institutional knowledge and forged strong working relationships with the SHPOs and Center personnel.

Center CRMs are not all cultural resources practitioners by trade, and most have other duties outside of CRM, so training is important. The CRM NPR requires at least one training course a year, often fulfilled through participation in the ACHP *Section 106 Basics* course and/or webinars. Additional learning opportunities are available during the annual CRM meetings, where NASA's FPO and Center CRMs come together for face-to-face training sessions and information exchange. In 2019, for example, the meeting included a presentation on the impact of climate change on cultural resources. The FPO periodically visits the Centers to provide CRM training at facilities and real estate meetings to enhance understanding of how CRM fits into these processes and to make others aware of NASA's CRM responsibilities.

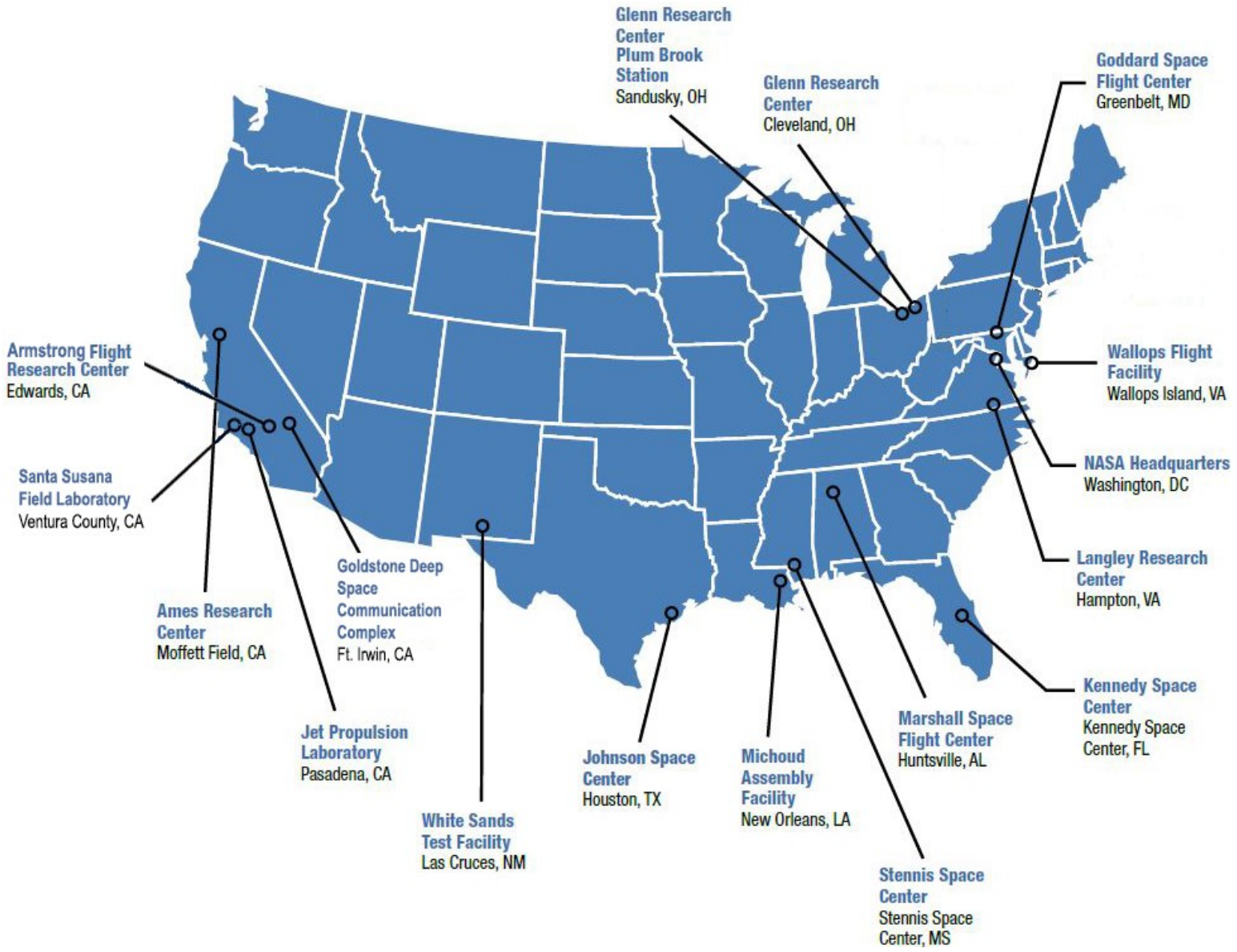

Figure 2-1. Map of NASA Centers and Component Facilities.

Table 2-1. NASA Centers and Component Facilities.

No.	Acronym	Name	Location	Est.	Acreage	No. Built Assets (2020)
1	**AFRC**	Armstrong Flight Research Center	California	1954	1,145	212
2	**ARC**	Ames Research Center	California	1940	1,874	393
3	**GDSCC**	Goldstone Deep Space Communication Complex (component facility of JPL)	California	1958	28,170	143
4	**GRC**	Glenn Research Center	Ohio	1940	307	200
5	**GRC-PBS**	Glenn Research Center – Plum Brook Station	Ohio	1956	6,458	166
6	**GSFC**	Goddard Space Flight Center	Maryland	1959	1,844	488
7	**JPL**	Jet Propulsion Laboratory	California	1958	175	223
8	**JSC**	Johnson Space Center*	Texas	1962	1,634	405
9	**KSC**	Kennedy Space Center	Florida	1958	140,000	859
10	**LaRC**	Langley Research Center	Virginia	1917	764	281
11	**MAF**	Michoud Assembly Facility (component facility of MSFC)	Louisiana	1964	832	166
12	**MSFC**	Marshall Space Flight Center	Alabama	1960	1,841	335
13	**SSC**	Stennis Space Center	Mississippi	1962	13,800	419
14	**SSFL**	Santa Susana Field Laboratory (component facility of MSFC)	California	1975	451	36
15	**WFF**	Wallops Flight Facility (component facility of GSFC)	Virginia	1959	6,200	596
16	**WSTF**	White Sands Test Facility (component facility of JSC)	New Mexico	1962	26,900	214
				TOTALS	**232,395**	**5,136**

* Includes Ellington Field (ELF) and Sonny Carter Training Facility (SCTF).

NASA's approach to successful cultural resources management is based upon the understanding that CRM cannot operate in a vacuum, but must rather be fully integrated into NASA's planning activities, where much of the decision making that will affect historic properties occurs. Center CRMs meet regularly with personnel in departments that deal most often with historic properties, including real property, master planning, facilities and maintenance, and National Environmental Policy Act (NEPA) staff. Maintaining an active personal relationship with individuals in these key departments helps to increase awareness of historic properties and other cultural resources, enables advance planning, and decreases the likelihood that historic properties will be affected without proper consideration. Inter-departmental communications are further enhanced in cases when the Center CRM serves a dual role in CRM and another area, such as real property. Some Center CRMs are physically located in offices with planning, real property, and/or facilities management functions.

The CRM NPR states that successful management and protection of historic properties—known and potential—require consideration by numerous parties early in the planning process, well in advance of any physical activities. Accordingly, personnel engaged in real property management, master planning, mission planning, construction, maintenance, and geographic information systems (GIS) are ascribed responsibilities to proactively communicate with the Center CRMs so that historic properties can be effectively considered.

Other personnel identified in the CRM NPR include:

- Assistant Administrator for the Office of Strategic Infrastructure (also the Senior Policy Official for purposes of EO 13287);
- Agency CRM Program Manager (also the FPO);
- HQ Facilities and Real Estate Division;
- Mission Program and/or Project Managers;
- Office of General Counsel;
- Center Directors;
- Center CRMs;
- Center Construction of Facilities Program Managers;
- Center Facility Project Managers;
- Center NEPA Managers;
- Center GIS Managers;
- Center Chief Counsel;
- Center Master Planner;
- Center Real Property Accountable Officer; and
- Center Property Disposal Officer.

This list demonstrates the many departments and personnel involved in identifying, protecting, and using historic properties, from senior leadership at HQ, whose decisions affect large numbers of resources agency-wide, to individuals managing specific projects that may only affect a single resource.

The broad range of internal stakeholders illustrates the need to integrate consideration of historic properties early into the facility planning process to enable positive preservation outcomes, beginning with senior leadership. The Center Director's role is to

foster, through words and behavior, an environment that promotes awareness of and respect for NASA's historic properties and other cultural resources. The Center Director is responsible for ensuring compliance with applicable laws, including the NHPA, and for seeing that the appropriate funding is available for historic property identification and other CRM Program activities. As the most senior person at the Center, the Center Director is charged with establishing "a process for integrating CRM into Center master and mission planning that includes early coordination with other programs, tenants, and projects, and integration of the Center Integrated Cultural Resources Management Plan (ICRMP) into other Center planning documents."

The role of HQ-level personnel, including the FPO and the Facilities and Real Estate Division (FRED), is primarily to provide oversight and support to the Centers. The HQ project proponents, such as the Mission Program and Project Managers, are required to coordinate with the FPO and/or Center CRMs, as appropriate, so that potential cultural resources impacts can be considered.

Awareness and identification of historic properties is reinforced through cross-referencing in other NPRs, including:

- NPR 4300.1C *NASA Personal Property Disposal Procedural Requirements*;
- NPR 4310.1A *Artifact Identification and Disposition*;
- NPR 8800.15C *Real Estate Management Program*;
- NPR 8810.1A *Center Master Planning*; and
- NPR 8820.2G *Facility Project Requirements*.

At the request of the CoPs, the FPO is participating in the update of these NPRs, to ensure consideration of cultural resources in Center undertakings. In addition, the FPO will reach out to non-CRM personnel when relevant learning opportunities arise, such as FRED personnel attending an ACHP Section 106 training.

The CRM NPR also addresses agency responsibilities beyond NHPA compliance, including treatment of archaeological resources, Tribal consultation, coordination with NEPA, professional qualifications and training, inventory and records management, and NASA artifacts and heritage assets—categories of resources separate from but overlapping with historic properties as identified in the NHPA.

In addition to the NPR, other key procedural documents and databases utilized in the implementation of the CRM Program include:

- NIDs, which provide direction on a temporary basis until permanent policy and procedures are developed and finalized;
- Center-specific ICRMPs, PAs, and Memoranda of Agreement (MOAs);
- The NASA Environmental Tracking System (NETS), a database in which the agency's historic property inventory and cultural resources correspondence, agreements, reports, and activities are recorded;
- The Real Property Management System (RPMS), maintained by the FRED.
- *Guidance for Implementation of NASA Cultural Resources Management Requirements as Defined in NASA*

Procedural Requirements 8510.1A (2012); and

- *NASA Desk Reference on NEPA and NHPA Coordination* (2015).

2.3 MANAGEMENT TOOLS

NASA recognizes that awareness is an essential part of protecting historic properties. Accordingly, personnel across numerous departments must have ready access to the evaluation status of resources so that they can account for known historic properties in their planning and consider whether additional investigations are needed. NASA's three primary asset tracking databases—NETS, RPMS, and GIS—are fully integrated, ensuring wider access and visibility, and agency-wide consistency and standardization of data. Data is synchronized every day, ensuring that the information on historic properties is consistent and current.

NETS

Since 2010, the NETS database has been the primary vehicle for data management, internal and external reporting, and recordkeeping for the CRM Program. It includes a comprehensive list of all buildings, structures, sites, and objects—both built and archaeological—within NASA's inventory by Center, with the date of construction, resource name, historic status (i.e., NRHP evaluation), and the date of SHPO concurrence. NETS also indicates if assets are located within a historic district, if they are governed by an existing PA, and if they are on the Center demolition list.

When resources are evaluated for listing in the NRHP, the results are entered into NETS by the Center CRMs. The historic status of resources is then imported to the RPMS and Institutional GIS on a daily basis.

NETS may also be used to upload and store cultural resources surveys, agreement documents, consultation documentation, planning documents (e.g., ICRMPs), and other related records that can then be viewed by the other Centers and by NASA HQ. This document-sharing ability facilitates the transfer of knowledge among the NASA CRM community.

NETS' final key feature is in internal and external reporting. The data stored in NETS can be used to generate reports to aid in the management of NASA's resources. NETS also allows NASA HQ to issue and manage data calls to the Centers to assist in meeting reporting requirements on a number of cultural resources topics, including property inventories and status, archaeological surveys, consultation results, and heritage tourism activities.

Significant strides have been made during this reporting period to improve the accuracy of the data, consistency of reporting, and organization of the repository. This is an ongoing task.

RPMS

In addition to NETS, NASA Center CRMs coordinate with personnel maintaining the NASA Real Property Management System (RPMS), a database routinely consulted by real property managers, master planners, Project Managers, facilities and maintenance staff. The results of NRHP evaluations are exported from NETS on a regular basis so that the historic status (i.e., NRHP eligible, NRHP ineligible, not evaluated) of real property assets is available to facilities and real property personnel involved in the management of NASAs infrastructure.

GIS

In addition to NETS and RPMS, NASA FRED maintains a central institutional GIS database for the built environment that is accessible agency wide. It includes information on the historic status of resources, as well as historic district boundaries. During the reporting period, NASA created a CRM-specific GIS application that supplements the Institutional GIS. Accessible only to CRMs, the CRM GIS includes archaeological site information and polygons depicting surveyed areas.

2.4 CENTER ICRMPS

Each NASA Center is required to have in place an ICRMP that "serves as a guide to the Center's CRM Program and outlines the Center's cultural resources management practices and procedures pursuant to Section 110 of the NHPA for historic properties." The ICRMP is developed in coordination with the Center's other significant planning documents including master plans and asset management plans. All NASA Centers have an ICRMP in place, an improvement since the last reporting period.

2.5 CENTER PROGRAMMATIC AGREEMENTS

Proactive, inclusive resource surveys at the Centers have laid the groundwork for more effective, informed, and efficient management of the Section 106 process through Center PAs. In addition to NASA's agency-wide PA for NHLs, six Centers have general Center-wide PAs in place, and they are in development at another four Centers (Table 2-2). Centers are encouraged to include provisions in their PAs for actions that can be taken to avoid adverse effects to historic properties, such as archaeological monitoring and adherence to the SOI's guidelines when modifying historic buildings.

Table 2-2. NASA Programmatic Agreements.

Center	No.	Status	Scope
Agency wide	1	Executed	NHLs
AFRC	0	N/A	N/A
ARC	1	In development	Center wide
GDSCC	0	N/A	N/A
GRC	1	In development	Center wide
GRC-PBS	1	Executed	Center wide
GSFC	1	In development	Center wide
JPL	0	N/A	N/A
JSC	1	In development	Center wide
	1	Executed	Space Shuttle Assets
KSC	1	Executed; Revision underway	Center wide
LaRC	1	Executed	Center wide
MAF	0	N/A	N/A
MSFC	1	Executed; Renewal underway	Center wide
SSC	0	N/A	N/A
SSFL	1	Executed	Center wide
WFF	1	Executed	Center wide
WSTF	0	N/A	N/A

SECTION THREE IDENTIFYING HISTORIC PROPERTIES

3.1 INVENTORY STATUS

NASA's inventory of real property consists of 5,136 United States assets. Half of NASA's real property assets are categorized as buildings and the other half as structures. Tables 3-1 through 3-4 present a breakdown of NASA's inventory of historic properties by Center and the status of archaeological survey.

Of all the assets listed in NETS, approximately 53 percent have been evaluated for NRHP eligibility under at least one context, and 594 (12 percent) have been found to be eligible for listing, either individually or as a contributing resource to another property or district. Historic properties are identified by gate-to-gate surveys, with periodic updates at the Centers and, to a lesser extent, through Section 106 consultation. Two agency-wide surveys have been conducted—the NHL Theme Study *Man in Space*, completed in the 1980s, and an agency-wide Space Shuttle Program Survey in the 2000s.

During the reporting period, NASA initiated two new studies that will help to identify historic properties and support the development of new management approaches. The first, as discussed in Section One of this report, is the development of a historic context and NRHP thresholds for properties less than 50 years of age (Figure 3-1). The second is an inventory of HTSF at the Centers. Building on the ACHP guidance, the NASA FPO is developing a definition and set of criteria for identifying facilities that qualify as HTSF, and is partnering with master planners and real property personnel at both HQ and the Centers, as well as the Center CRMs, to identify facilities at each Center that meet this criteria. Both studies are ongoing and are expected to conclude during the next reporting period.

Figure 3-1. The success of NASA's F-8C "Digital Fly-by-Wire" Program (1969-1985) resulted in the adoption of digital flight controls, now standard in aircraft.

NASA also completed a gap analysis of the agency's archaeological program. This study evaluated the overall effectiveness of the program, identified Centers that are out of compliance, and highlighted issues that are impacting successful program implementation. The gap analysis has enabled the FPO to focus HQ support on the areas where it is most needed, to work with individual Centers to address their challenges, and to consider what tools may be developed to assist CRMs in achieving goals.

Table 3-1. Identified Historic Properties by Center.

Center	Built Resources*					Archaeological Sites
	NHLs**	Individually NRHP Listed***	Individually Eligible	Historic Districts	Contributing Resources****	
AFRC	0	0	1	1	4	0
ARC	4	52	1	2	47	0
GDSCC	1	0	1	0	0	0
GRC/PBS	2	0	3	1	87	0
GSFC	1	0	1	1	31	0
JPL	2	0	8	1	29	0
JSC	2	0	55	1	50	0
KSC	1	45	41	7	77	31
LaRC	3	0	12	1	109	12
MAF	0	0	6	0	0	0
MSFC	4	0	26	0	0	7
SSC	1	0	1	1	27	2
SSFL	0	0	12	3	12	1
WFF	0	0	3	0	0	2
WSTF	0	0	3	2	23	3
TOTALS	21	97	174	21	496	58

*Includes United States real property assets as well as personal property.
**NHLs comprised of multiple resources are counted as a single property.
***Does not include designated NHLs, which are automatically listed in the NRHP.
****Contributing includes individual properties that contribute to historic districts, so there is some overlap between categories.

Table 3-2. NASA Historic Districts by Center.

Center		Name	No. Contributing Resources	Identified 2018-2020
AFRC	1	Armstrong Flight Research, Development, and Test Historic District	4	No
ARC	1	NAS Sunnyvale Historic District (aka Shenandoah Plaza Historic District)	41	No
	1	Wind Tunnel Historic District	6	No
GDSCC	0	N/A	N/A	N/A
GRC/PBS	1	Lewis Field Historic District	87	No
GSFC	1	Goddard Space Flight Center Historic District	31	No
JPL	1	Jet Propulsion Laboratory Space Exploration Historic District	27	No
JSC	1	Johnson Space Center Historic District	50	No
KSC	1	Kennedy Space Center Railroad System Historic District	2	No
	1	Launch Complex 39: Pad A Historic District	25	No
	1	Launch Complex 39: Pad B Historic District	20	No
	1	Solid Rocket Booster Disassembly and Refurbishment Complex Historic District	6	No
	1	Shuttle Landing Facility Historic District	3	No
	1	Orbiter Processing Historic District	2	No
	1	NASA-Owned CCAFS Industrial Area Historic District	19	No
LaRC	1	NASA Langley Historic District	109	No
MAF	0	N/A	N/A	N/A
MSFC	0	N/A	N/A	N/A
SSC	1	Rocket Propulsion Test Complex Historic District	27	No
SSFL	1	Alfa Test Area Historic District	5	No
	1	Bravo Test Area Historic District	3	No
	1	Coca Test Area Historic District	4	No
WFF	0	N/A	N/A	N/A
WSTF	1	300 Area Propulsion Test Area Historic District	11	No
	1	400 Area Propulsion Test Area Historic District	8	No
TOTALS	**21**		**496**	

Table 3-3. Evaluation Status of Real Property Assets by Center.

Center	50 Years of Age and Older			Less than 50 Years of Age			All Ages		
	Total No.	No. Evaluated	% Evaluated	Total No.	No. Evaluated	% Evaluated	Total No.	Total Evaluated	% Evaluated
AFRC	60	60	100	152	93	61	212	153	72
ARC	250	169	68	143	90	63	393	259	66
GDSCC	61	29	48	82	2	2	143	31	22
GRC/PBS	255	230	90	111	75	68	366	305	83
GSFC	108	39	36	378	28	7	488	67	14
JPL	116	82	71	107	10	9	223	92	41
JSC	185	185	100	220	180	82	405	365	90
KSC	231	183	79	628	402	64	859	585	68
LaRC	121	115	95	160	77	48	281	192	68
MAF	102	42	41	64	8	13	166	50	30
MSFC	163	133	82	172	49	28	335	182	54
SSC	96	56	58	323	14	4	419	70	17
SSFL	31	16	52	5	2	40	36	18	50
WFF	279	169	61	317	19	60	596	188	32
WSTF	85	76	89	129	68	53	214	144	67
TOTALS	**2,143**	**1,584**	**74**[10]	**2,991**	**1,117**	**37**	**5,136**	**2,701**	**53**

[10] Note that unevaluated resources over 50 include those that are generally considered to have a low potential to be NRHP eligible, such as utility lines, sewer features, light fixtures, street furniture, pump houses, storage sheds, and other highly utilitarian resources.

Table 3-4. Archaeological Survey Coverage at NASA Centers.

Center	Total Acreage	Estimated % of Accessible Land Surveyed	Sensitivity Model	No. of Sites Identified	No. of Sites Evaluated	No. of Sites NRHP Listed or Eligible
AFRC	1,145	100%	No	6	6	0
ARC	1,874	54%	Yes	10	10	0
GDSCC*	28,170	30%	Yes	90	87	12
GRC/PBS	6,765	20%	Yes	8	0	0
GSFC	1,844	7%	No	1	1	0
JPL	175	100%	No	0	0	0
JSC	1,634	100%	No	0	0	0
KSC	140,000	24%	Yes	186	83	31
LaRC	764	59%	No	22	22	12
MAF	832	100%	No	1	1	0
MSFC	1,841	100%	No	22	15	7
SSC	13,800	17%	No	34	2	2
SSFL	451	100%	No	57	1	1
WFF	6,200	<1%	Yes	10	10	2
WSTF	26,900	90%	No	94	8	3
TOTALS	232,395			**396**	**159**	**58**

* Army-owed Ft. Irwin has assumed responsibility for all archaeological survey and management at GDSCC.

3.2 OTHER ASSET CATEGORIES

Personal Property

The CRM NPR states that "efforts to identify, evaluate, and treat historic properties shall consider personal property, either individually or as a contributing element to a property" (Section 2.2.2). NASA defines personal property as "property of any kind, including equipment, materials, and supplies, but excluding real property and certain naval vessels."[11] Only a small percentage of NASA's personal property has the potential to be eligible for listing in the NRHP. Examples include the Crawler Transporters, Payload Canisters, and Mobile Launcher Platforms at KSC, which were identified as historic properties during the agency-wide surveys of Space Shuttle-related resources in the 2000s. The rarity of such examples does not justify significant expenditure on identification efforts; however, NASA acknowledges the responsibility and educates CRMs and other personnel routinely working with personal property accordingly. The manner in which personal property is to be managed is codified in the NPRs for CRM, personal property disposal (NPR 4300.001C), and artifact identification and disposition (NPR 4310.001A), all of which include the requirement for Center CRMs to be consulted prior to disposition.

Artifacts

NASA's definition of artifacts differs from that common across most federal agencies. Within NASA, artifacts are unique objects that document the history of the science and technology of aeronautics and astronautics. Their significance and interest stem mainly from their relationship to the following: historic flights, programs, activities, or incidents; achievements or improvements in technology; our understanding of the universe; and important or well-known personalities (NPR 4100.1D).

Space-related artifacts may include, but are not limited to, objects such as major program vehicle components, unique devices, prototype and proof test articles, payloads or individual instruments, flight spares, astronaut tools and paraphernalia, design concept models, and high-fidelity simulators. Aeronautics artifacts include, but are not limited to, experimental aircraft, test and simulation devices, prototype systems, structural and test models, and flight-tested materials (NPR 4310.1).

The class of assets defined as artifacts by NASA includes some that may be eligible for listing in the NRHP (e.g., space vehicles, models, and simulators) either individually, or as a contributing resource to another property or district, and as such the identification and management of artifacts that are historic properties, however few, falls under the responsibilities of NASA's CRM Program.

Heritage Assets

The Statement of Federal Financial Accounting Standards (SFFAS) 29 on heritage assets and stewardship land defines a heritage asset as "property, plant, or equipment that is unique for its historical or natural significance; cultural, educational, or artistic (e.g., aesthetic) importance; and/or significant architectural characteristics… [consisting of] (1) collection types, such as objects gathered and maintained for exhibition (for example, museum collections,

[11] NPR 8510.1A, *NASA Cultural Resources Management*, Appendix A (Definitions).

art collections, and library collections); or (2) non-collection-types, such as parks, memorials, monuments, and buildings." In the CRM NPR, NASA defines all real property that is NRHP-eligible as a heritage asset.

Reports on heritage assets as required by the SFFAS are prepared by the Chief Financial Officer (CFO), in consultation with the FPO. The efficiency of this process has been greatly improved during the reporting period by the automatic flagging of heritage assets in RPMS, based on historic status. This ensures that the identification of heritage assets is consistent agency-wide, and greatly reduces the amount of time that CRMs need to collect the SFFAS reporting data.

3.3 2018–2020 HIGHLIGHTS

During the reporting period, NASA has continued to identify historic properties among its real property assets through proactive, comprehensive identification via gate-to-gate surveys of resources 45 years and older and updates every five years. Additionally, the inclusion of resources less than 50 years of age is becoming standard practice at NASA Centers, reflecting an increasing appreciation of the exceptional importance of these assets.

As shown in Table 3-4, NASA has evaluated 74 percent of assets 50 years of age and older. The CRM NPR states that gate-to-gate surveys must be completed at all NASA Centers. With the completion of its first gate-to-gate survey at Stennis Space Center (SSC) in early 2020, only one Center remains outstanding.

As NASA considers the challenges facing the agency in coming years, it is seeking new and more efficient ways to identify historic properties. To this end, the FPO is spearheading two thematic agency-wide studies directed towards identification: (1) a survey of HTSF; and (2) the development of a historic context and NRHP evaluation framework for resources less than 50 years of age. This shift in strategy during the reporting period builds upon knowledge gained through past Section 110 and Section 106 surveys and reflects the increasing sophistication of NASA's CRM Program.

Partnerships

NASA actively seeks creative ways to manage its historic properties and has welcomed opportunities to partner with other public and private entities during the reporting period. Such partnerships have allowed NASA to achieve more that it would be able to do on its own due to both staff and budget limitations, and as such they enable NASA to be a better steward of its historic properties. Several examples from the reporting period are presented below.

Tribal Monitors and Tribal Consultation at Santa Susana Field Laboratory

Located in southern California, in an area rich with significant Native American cultural resources that include petroglyphs and pictographs, Santa Susana Field Laboratory (SSFL) was originally used by the federal government for nuclear and rocket testing. Since 2006, NASA and the Department of Energy have been conducting environmental remediation at the site and have implemented the routine practice of having Native American monitors present during ground-disturbing activity to identify and avoid adverse effects to archaeological resources of value to Tribes. During the reporting period, NASA, in collaboration with Tribes, nominated the Burro Flats archaeological site for listing on the NRHP (listed in July 2020) and is currently working with Tribes to

nominate the Burro Flats Cultural District for listing. This positive working relationship between SSFL and Tribes, whose cultural heritage is not always apparent to non-Native individuals, is one that NASA encourages at all its Centers.

Figure 3-2. Pictographs with red, white, and black figures, Burro Flats Painted Cave, SSFL.

Mississippi Department of Archives and History Data Sharing with Stennis Space Center

Pursuant to an MOA executed in 2019 among SSC and the Mississippi Department of Archives and History (MDAH [SHPO]), NASA now has direct access to SHPO GIS data, including archaeological site data not available to the general public, for SSC and the surrounding area. This allows NASA to consider cultural resources sensitivity earlier in the project planning process, prior to formal Section 106 consultation, so that adverse effects can be avoided or their impact reduced. This kind of partnership is built upon and reinforces a trust relationship between NASA and the SHPO.

Preparation of National Register Nomination for Building 3 at Goddard Space Flight Center

In 2019 student Eva Miller prepared a NRHP Nomination form for Goddard Space Flight Center (GSFC) Building 3 (Central Flight Control and Range Operations Laboratory) as part of her coursework at nearby St. Mary's College. Completed in 1961, the Modern-style building was one of the first to be erected at the Center and it contributes to the NRHP-eligible GSFC Historic District.

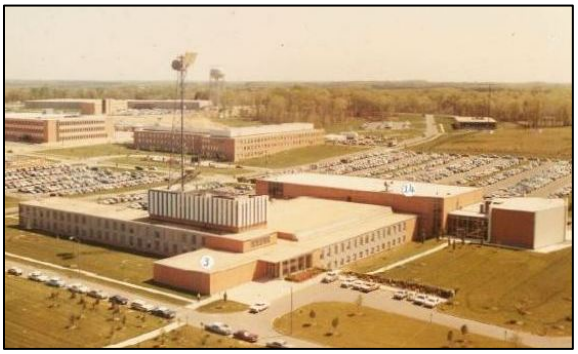

Figure 3-3. Documentary photo of Building 3 at GSFC in 1966.[12]

Challenges

NASA CRMs identified the lack of funding for cultural resources survey to be the most acute identification challenge of the reporting period. At KSC, management of cultural resources is further complicated by the lack of a centralized location and/or repository where the CRM can find historical research about real property assets. NASA has an agency Historian and History Office, and some Centers have historians or archivists, but it is not a required position, and when such individuals are present, they are generally not focused on the assets,

[12] Documentary photo from Christopher Goodwin & Associates, *An Historic Context for NASA's Goddard Space Flight Center* (Final Report), 1 August 2012.

themselves, so much as the Center history in a general sense.

In addition to the broad challenges affecting NASA's CRM Program discussed in Section One, Center CRMs must address more immediate, project-specific issues when they arise. When CRMs find themselves in unfamiliar territory, they consult with one another and with the FPO to determine the appropriate course of action. One such example from the reporting period is presented below.

Research Testing Vessel Evaluation at Glenn Research Center

In 2019 at Glenn Research Center (GRC), Section 106 prompted the NRHP evaluation of a previously unevaluated building. The building itself did not appear to meet the Criteria; however, a potentially eligible structure – a research testing vessel – was housed inside of the building. The CRM consulted with the Ohio SHPO, and it was determined that because the vessel could be moved and still retain its integrity and NRHP eligibility, its historical significance was independent of the ineligible host building.

The independent NRHP evaluation of buildings and structures, which is heavily weighted towards the exterior appearance, and their interiors is one that greatly complicates NASA's identification and management of historic properties. Many of NASA's real property assets are simple, utilitarian shells that were intended to house a general suite of activities. Their interiors are essentially large covered spaces within which specialized craft, equipment, instruments, etc., are located. While NRHP evaluation of architectural resources tends to de-emphasize or completely omit interior spaces from the statements of significance, the reverse is true for NASA. This adds another layer of complexity to NASA's NRHP identification, and the FPO intends to explore developing a consistent agency-wide approach in the next reporting period.

Successes

Ames Research Center Moffett Field Human Remains MOA

During an excavation for new utility lines at Ames Research Center (ARC) Moffett Field, human remains were discovered. In response, ARC partnered with Native American Tribes and the California SHPO to develop and execute an MOA to resolve the unanticipated effects and to avoid further disturbance of as-yet unidentified human remains and other archaeological deposits in the project area. The insights gained from this experience led the CRM to introduce new protocols and proposed standard operating procedures for incorporation into the next ICRMP update.

Space Exploration Historic District at the Jet Propulsion Laboratory

NASA's Jet Propulsion Laboratory (JPL) gate-to-gate survey update of 2018 resulted in the identification of a discontiguous NRHP-eligible historic district associated with unmanned space exploration between 1958 and 1975. The JPL Space Exploration Historic District was found to consist of 40 contributing resources in two central areas and includes landscape. Committed to the protection of its first historic district, JPL developed *Guidelines and Recommendations for Contributors to the JPL Space Exploration Historic District*, a document that provides direction on how to modify and update contributing resources without adversely affecting character-defining features. These guidelines are discussed in greater detail in Section Four.

SECTION FOUR PROTECTING AND UTILIZING HISTORIC PROPERTIES

4.1 PROTECTION THROUGH UTILIZATION

The *Secretary of the Interior's Standards for the Treatment of Historic Properties* recognize four approaches: preservation, rehabilitation, restoration, and reconstruction. Intended for a broad audience that includes both practitioners and the general public, the standards are described as "common sense principles" that "promote historic preservation best practices." The standards reflect the typical lifecycle of historic buildings–construction, active use, underuse and decline, decay and abandonment, revitalization and reuse. But as anyone who has been involved in the process knows, the level of effort and expense that is required to restore an abandoned building to modern active use is considerable and beyond the capabilities of many potential stewards. It is because of this that the NHPA places the responsibility to steward historic properties under its care on the federal government. This is also why preservationists advocate so strongly for the continued use of historic properties, even when historic fabric and integrity will be compromised.

For an agency like NASA, the four approaches described in the SOI standards don't quite fit and are often not feasible. As previously discussed, NASA cannot afford to maintain assets that do not have a viable, active use that is critical to, or directly supports, mission goals. Accordingly, NASA's preservation philosophy is protection through utilization. Recognizing its limitations, NASA fulfills its NHPA stewardship role through two primary avenues: 1) ensuring active use; and 2) documentation during active use and prior to disposal. Active use generally requires modification, which may compromise historic fabric or integrity, but it ensures the asset's preservation, and in some cases may enhance its significance. When an asset becomes obsolete, alternate uses are considered, but these uses must support mission goals or a viable non-NASA user must be found.

NASA does not generally have the ability to restore or preserve historic properties for the sake of doing so, and if an acceptable use cannot be found the asset will face disposal. Historical significance will be documented, as appropriate, and made available via NASA's robust and diversified public information-sharing programs. While the loss of a historic property is never the preferred outcome, it is mitigated by recordation that is often more readily accessible to the public than the physical resource ever was or could be within the confines of a secure facility.

4.2 ACTIVE PRESERVATION

In practice, preservation of NASA's historic properties is realized at the Center level, where CRMs work with Project Managers and other decisionmakers to identify options that respond to the particular factors at play and local resources available to NASA at the time. An outside partner is often the key to the solution.

NASA's Leasing Program

NASA's Leasing Program has proven to be an effective way of maintaining underutilized historic assets that might otherwise be disposed of. The program primarily operates under two authorities: Enhanced Use Lease (EUL) and Section 111 of the NHPA. NASA uses EULs to enter into agreements with

private sector entities, state and local governments, academic institutions, and other federal agencies for lease of non-excess, underutilized NASA properties and facilities. EULs are intended to reduce the costs of operating and maintaining such assets and help to reduce the rate of increase of the agency's overall deferred maintenance cost. EULs are not limited to historic properties but may be used where they are underutilized. Section 111 of the NHPA authorizes federal agencies to enter into leases for the use of historic properties—i.e., those that are listed in or eligible for listing in the NRHP—and apply the derived proceeds towards the preservation of NRHP-listed properties through maintenance, capital revitalization, and real property improvements.

NASA policy requires that its leases relate to and support the NASA mission of research, education, and exploration. This effectively restricts how, and to whom, Centers can lease properties, making it difficult for Centers to take advantage of both EUL and Section 111 leases. Additionally, NASA's "mission focus" dictates that only those facilities required to support the NASA mission be retained in the real property portfolio.[13] If an asset does not have a known future mission requirement and it is also underutilized, the Centers are to first consider disposal of the facility through demolition or other means. Exceptions may be made in response to legal requirements, executive orders, and other necessities as determined and promulgated in NASA policy documents.

Since its introduction in 2003, the EUL has proven to be successful in helping to offset the maintenance and operation costs of NASA's real property assets. In Fiscal Year (FY) 2018, NASA generated over $6.7M in net revenue from EULs.[14] Centers have used EUL proceeds to fund renovation, roof replacement, elevator maintenance, parking lot repairs, and other improvement projects. EULs also provide the opportunity for NASA to develop relationships with external partners that have similar programs and missions.

EULs are well established at ARC and KSC, which were the first Centers to be authorized to use them. EULs of historic properties at KSC include:

- Shuttle Landing Facility Area, constructed in the 1970s, leased to Space Florida (Figure 4-1);
- Orbiter Processing Facilities 1, 2, and 3, constructed in 1977, leased to Boeing; and
- LC-39A, constructed in 1966, leased to SpaceX.

Figure 4-1. Aerial view of the NRHP-eligible Shuttle Landing Facility Area at KSC.

[13] NASA Real Estate Desk Guide (2016), accessed online at https://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/DeskGuide_TAGGED.pdf, 17 September 2020.

[14] 116th Congress, 1st Session, "NASA Enhanced Use Leasing Extension Act of 2019," (H.R. 5213), accessed online at https://www.congress.gov/bill/116th-congress/house-bill/5213/text?r=7&s=1, 17 September 2020.

ARC leases several NRHP-listed buildings on the main campus within the Shenandoah Plaza Historic District including:

- Building 18 (Unmanned Aerial Vehicle [UAV]) Research Building), constructed in 1933, is leased to InformArt;
- Building 19 (Industry Partners Building, former Bachelor Enlisted Quarters), constructed in 1933, is leased to the U.S. Geological Service; and
- Building 20 (Administration Building, former Bachelor Office Quarters), constructed in 1933, is leased to Singularity University.

EULs are also in place at Michoud Assembly Facility (MAF), including three historic properties determined individually eligible for listing in the NRHP:

- Buildings 103 (Manufacturing Building, constructed in 1943) and 114 (High-bay Addition, constructed in 1982) are leased to multiple tenants for aerospace manufacturing; and
- Building 420 (Acceptance and Prep Building, constructed in 1965) is leased to LM Wind for the manufacturing of windmill blades.

NASA has executed two leases using the Section 111 authority, both at ARC. As with EULs, NASA applies mission-oriented requirements, but Section 111 leases must also adhere to restrictions set by the NHPA. Section 111 allows federal agencies to enter into out-grants of historic property that is not needed for current or projected agency purposes, provided that the agency head determines that the lease will adequately insure the preservation of the asset(s) (Figure 4-2). Additionally, Section 111 leases require consultation with the ACHP and the respective SHPO. Lease proceeds can be applied towards administrative costs, maintenance and repair, code upgrades, and other related expenses associated with the revenue-generating lease asset, or another historic property under the jurisdiction or control of the federal agency, including properties that contribute to the historic district in which the leased property is located.

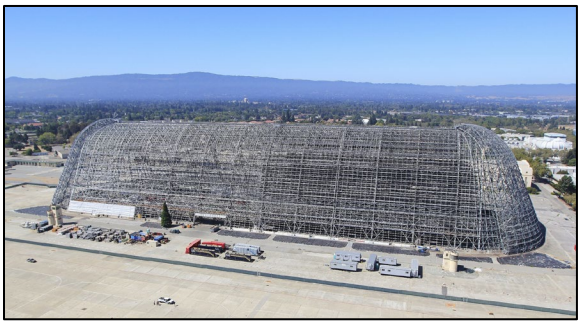

Figure 4-2. The Section 111 lease with Planetary Ventures stipulates the reskinning of historic Hangar 1 at ARC.

NASA HQ is actively promoting the use of Section 111 leases for its historic properties as the preferred lease option for the protection and maintenance of historic properties and, where applicable, the historic districts in which they are located. The additional layer of NHPA requirements may discourage some Centers from utilizing Section 111 leases, but as Center personnel become more familiar with them, it is hoped that the agency will see new leases under this authority in the next reporting period.

Lease agreements for NASA historic properties are reviewed by NASA CRMs and the FPO prior to execution to ensure they include language regarding the historic status and requiring the lessee to maintain and utilize the resource consistent with NASA's stewardship obligations under the NHPA. NASA is currently considering ways to

formalize and standardize this process and language.

Restoration of the Apollo Mission Control Center, Johnson Space Center

In 2019 NASA completed a six-year effort to restore the Apollo Mission Control Center in Building 30, the Christopher C. Kraft, Jr., Mission Control Center (MCC), at Johnson Space Center (JSC) to its Apollo-era condition. Originally constructed in 1964 and designated an NHL in 1985, the MCC houses the Mission Operations Control Room 2 (MOCR-2) which first supported the Gemini IV mission in 1965 and continued managing missions with the Apollo Program from 1967 to 1972, Skylab, Apollo-Soyuz Test Project, and finally the Space Shuttle Program from the mid-1970s through 1992 (Figure 4-3). After the addition of Building 30S, mission operations were transferred to the newly operational White Flight Control Room and in 1992, MOCR-2 was deactivated and began to be used as a tour stop and for periodic NASA events (Figure 4-4). Discussions at JSC about the possibility of restoring the MCC first began around this time but were never completed.

In 2013, JSC received $20,000 from the NPS Heritage Partnership Program, to be matched by JSC, which was used to prepare a historic furnishings report (HFR) on the Apollo Mission Control Center. Cost estimates for a complete restoration came to $5M and exceeded current available budget funds. With the assistance and insistence of legendary Flight Director Gene Kranz and retired Apollo Flight Controller Ed Fendell, the City of Webster, Texas, donated $3.1M with a matching $400,000 if JSC's Visitor Center, Space Center Houston, could raise another $400,000. The "Webster Challenge" was met as $525,000 was raised through a Kickstarter campaign.

Since NASA cannot legally accept private contributions dedicated to specific projects, JSC used a provision of the NHPA that gives the ACHP authority to accept donations from outside entities and provide them to a federal agency for a specific historic preservation project. NASA was the first federal agency to use this provision of the NHPA. Through this mechanism, NASA received the first drop of money in 2017 and subsequent funds through 2018.

JSC added $1.1M to the project and with funding secured, restoration began in January 2018. The period of significance for the restoration was determined to be the period that covers the final seven Apollo missions—from Apollo 11, 16-24 July 1969, to Apollo 17, 6-9 December 1972. These seven flights span the period from the globally significant first lunar landing to the period of lunar exploration and experiments conducted before the program's termination. The Moon landings are now recognized as the culmination of the United States' role in the Space Race, through which it sought to demonstrate the optimism, ingenuity, and limitless capability of the American way of life.

The restoration project involved four rooms in the MCC, including the Apollo MOCR. Although many of the interior features of the MCC had survived, others had been lost or were obscured by later changes. JSC's CRM Sandra Tetley and her team examined old photos and consulted specialists in paint, wallpaper, carpeting, electricity, and upholstery to ensure the restoration was as accurate to the period as possible.

Figure 4-3. Documentary photograph of MOCR-2.

Figure 4-4. MOCR-2 ca. 2013, prior to restoration.

The restoration team identified original materials that remained intact in the room, from wallpaper tucked behind a thermostat cover to an untouched patch of carpet beneath a piece of equipment, to ceiling tiles in a phone booth in the building's lobby (Figure 4-5). These material samples were subjected to forensic analysis and further research to identify the manufacturers and determine whether exact matches could be produced.

Figure 4-5. Section of original wallpaper that remained intact behind a thermostat cover.

Over the course of the restoration the team took care to achieve the balance between finding original materials and, when necessary, producing replicas that mimicked the natural wear found on the surviving features. The team searched eBay and vintage shows for ashtrays and cups. They also utilized 3D-laser printing to recreate lids for the back of the seat ashtrays in the visitors' section. Specialists were employed to hand stamp the ceiling tiles to match the ones recovered in the phone booth (Figure 4-6).

Figure 4-6. Ceiling tile stamping technique employed to replicate the original.

Carpeting was custom ordered with special tufting and extra yarn and cut into 28-inch squares. The carpet was then given a lived-in look and a shade that reflected years of nicotine discoloration was chosen (Figure 4-7).

Figure 4-7. Replacement carpet (left) and original Apollo-era carpet (right).

Modern light-emitting diode (LED) lights and flat screens were installed to bring the consoles alive with images and flashing buttons; big screens up front will show key footage from the Apollo 11 mission (Figure 4-8). Informed by the HFR, original furniture and finishes were restored to return the MCC to its appearance during a pivotal time in American history (Figures 4-9 and 4-10). The fully restored MCC features consoles, mission medallions, upholstery, seats, wallpaper, and carpet, that were all either cleaned and restored to their original condition or recreated using original samples.

The team was committed to recreating even the smallest details. The goal, as described by Ed Fendell, former Apollo Mission Flight Controller, was to restore Apollo Mission Control "to a degree of accuracy that will feel to visitors like the day we walked out." Digitized 16-mm film taken during the Apollo 11 mission allowed restoration experts to identify otherwise unknown artifacts and colors as they were experienced in the Apollo-era control room, including the original column markings, paint colors, console displays and even coffee mugs at flight controllers' consoles.[15]

Figure 4-8. Restored MOCR-2, showing recreated computer screens (foreground) and viewing screens (background).

[15] Marcia Dunn, "Restored Mission Control Comes Alive 50 Years After Apollo," accessed online at https://apnews.com/12556818033a470d823168a37f57ed6c, 28 June 2019.

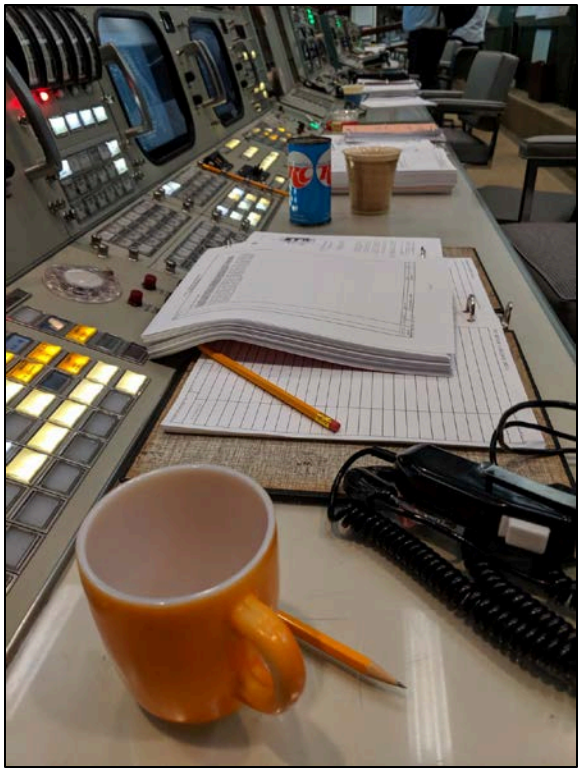

Figure 4-9. Detail of furnishings in restored MOCR-2 employed to replicate the original.

Figure 4-10. Period suit jackets hanging in the restored MOCR-2.

July 2019 marked the 50th Anniversary of the Apollo 11 Moon landing. While the MCC was being restored, anniversary celebrations of the preceding missions were celebrated at JSC between October 2018 and July 2020, during which time JSC received over 250,000 visitors. The Grand Opening and Ribbon Cutting of the newly restored Apollo MCC was celebrated in June of 2019 and on 20 July 2019, the remaining team members of the Lunar Landing Team, White Team, were at their consoles at the exact time of landing, 50 years later.

JSC was awarded the ACHP Chairman's Award for Achievement in Historic Preservation for the restoration of the MCC. ACHP Vice Chairman Leonard Forsman cited the unique public-private partnership between JSC, the City of Webster, the Manned Spaceflight Operations Association, and the Advisory Council on Historic Preservation, as well as JSC prioritizing historic preservation as the primary reasons for granting the award. Vice Chairman Forsman presented the award to NASA Federal Preservation Officer Rebecca Klein, Johnson Space Center Historic Preservation Officer Sandra Tetley, City of Webster, Texas Mayor Pro Tem Andrea Wilson, and Councilwoman Beverly Gaines, and Texas State Historic Preservation Officer Mark Wolfe during a ceremony at the ACHP's summer business meeting at the National Building Museum (Figure 4-11).[16]

[16]Accessed online at https://www.achp.gov/news/preserving-history-apollo-Moon-program, 17 September 2020.

Figure 4-11. Presentation of ACHP Chairman's Award for Achievement in Historic Preservation.

As a true restoration project in keeping with the SOI standards, the MCC project goes well beyond what NASA is typically able to achieve with its historic assets. But, by any standard, the MCC is no typical resource, and if any asset deserves extraordinary effort, this is certainly the one. Few places command such a strong place in the collective conscience of the Nation. The project could not have been achieved without the commitment of the NASA Restoration Team and the efforts of NASA's partners at the City of Webster, Space Center Houston and the ACHP.

Modification of Launch Complex 39A for New Era of Commercial Spaceflight, Kennedy Space Center

Launch Complex 39A at KSC is a remarkable example of a historic property that has been preserved and remained relevant through successive modifications. NASA began construction of Launch Complex 39A (LC-39A) in 1965 to support the Apollo Program's Saturn V rocket (Figure 4-12). The newly built launch structure constructed of steel and concrete jutted out along Florida's natural coastline. On 9 November 1967 the uncrewed Apollo 4 test mission successfully launched from LC-39A, beginning the launch pad's long history of active use. In July 1969 the pioneering Apollo 11 mission lifted off from LC-39A, landed men on the Moon and returned them safely to the Earth, realizing President Kennedy's ambitious goal and changing the world. Five more Apollo missions launched from LC-39A and the program ended with Apollo 17's successful splashdown on 19 December 1972.

The use of LC-39A by Apollo made it one of the most widely recognized structures in the world. The complex was added to the NRHP in 1973 when it was just eight years old, but its role in the Moon landing clearly demonstrated its exceptional importance under CCG.

In 1973 Skylab 1, the first U.S. space station, was launched aboard a Saturn V rocket from LC-39A. After that, the launch complex sat on the Space Coast shoreline, facing the harsh elements of sun and sea, waiting for its next mission. That mission arrived in 1981, and a new chapter began. The complex's facilities were modified to support the first reusable launch and landing system, the Space Transportation System (STS), commonly known as the Space Shuttle Program. During the following three decades (1981-2011), five space shuttles collectively launched 135 times, 82 of these from LC-39A (Figure 4-13).

In 2004, President George W. Bush signed into law the Commercial Space Launch Amendments Act, which laid the groundwork for the development of commercial spaceflight in the United States. Just two years prior, entrepreneur Elon Musk founded the Space Exploration Technologies Corporation (SpaceX) for the purpose of applying private capital and commercial incentives to develop a transportation vehicle

Figure 4-12. First Saturn V liftoff from LC-39A (1967).

Figure 4-13. Space Shuttle *Atlantis* lifts off from LC-39A (1989).

Figure 4-14. SpaceX Falcon 9 liftoff from LC-39A at the start of its Demo-2 mission (2020).

that would carry humans to Mars. At the same time, NASA's own space transportation vehicle, the Space Shuttle, was aging and the agency was evaluating ways to continue space transportation in service of the ISS and for new manned missions.

NASA Administrator Mike Griffin was a strong proponent of commercial spaceflight and, in December 2006, NASA awarded its first Commercial Orbital Transportation Services contract to SpaceX and Orbital Sciences. Similar to what the federal government had done for nuclear power in the 1960s, seeding a commercial industry by sharing previously government-held Cold War-driven technology and fostering development, NASA formed a partnership with SpaceX that would greatly accelerate the company's timeline for launching a manned spacecraft, and would mark a new phase for LC-39A.

NASA's investment in commercial spaceflight is based in part on the need to reduce costs. Since 2011, the United States. has been paying for space on the Russian Soyuz spacecraft to access the ISS, and the per-flight cost for this service has been rising dramatically. The cost of development and operations when carried out by commercial partners has also been shown to be significantly lower than NASA's traditional in-house approach, which is subject to federal budgets and political influence.

In September 2008, the Falcon 1 reusable two-stage-to-orbit rocket, fully funded and developed by SpaceX, was successfully launched into orbit around the earth. Three months later, in December 2008, NASA formally announced the selection of the SpaceX Falcon 9 launch vehicle and Dragon (1) cargo spacecraft to resupply the ISS under NASA's Commercial Resupply Services contract. The $1.6 billion contract called for a minimum of 12 flights, with an option to order additional missions, for a cumulative total contract value of up to $3.1 billion.

In addition to providing nearly half of the development cost for the Falcon 9/Dragon 1, NASA has made available its launch facilities at KSC via lease to SpaceX. As with each successive program use of Launch Complex 39A, modifications were required to accommodate the new vehicle (Figure 4-14). KSC worked through the Section 106 process with the Florida SHPO from 2012-2014 to ensure that the property was documented prior to modification and effects were taken into account.

LC-39A is one of three orbital launch sites regularly used by SpaceX for the Falcon 9. Other sites include Space Launch Complex 40 at Cape Canaveral Air Force Station, located adjacent to KSC and a designated NHL, and Space Launch Complex 4E of the Vandenberg Air Force Base in California.

The partnership between NASA and SpaceX on the Falcon 9/Dragon 1 spacecraft has been a beneficial one for both parties and the American people, who are highly invested in the United States space program. The use of NASA facilities—most notably, LC-39A—has required modifications to historic properties that are outside of the standard preservation approaches but extend their lives. The continued active use of the resources has protected them from abandonment and disposal and has enhanced their historical significance by association with the newest chapter in human space flight. LC-39A demonstrates a successful resolution of NASA's challenge to balance historic preservation with mission needs.

4.3 ADDITIONAL 2018–2020 HIGHLIGHTS

Internal Education and Outreach

NASA looks inward for opportunities to promote the appreciation and use of its historic properties. Center emphasis on internal education and training provide a new way to garner Center support for preservation initiatives and programs.

Langley Research Center Employee Training

As part of the employee onboarding process, the CRM at Langley Research Center (LaRC) coordinates with the Safety Office to ensure new employees receive documents outlining CRM requirements. LaRC also offers a brief overview of the CRM Program during the annual Facility Environmental Coordinator training. The initial training and the yearly briefing provide employees with a working knowledge of CRM resources at LaRC.

Texas SHPO Training at Johnson Space Center

JSC hosted reviewers from the Texas SHPO to lead four classes for facility managers, Project Managers, and master planners on historic properties, the NHPA, the Section 106 process, the role of the Texas SHPO, coordination with CRMs, and contributing features of buildings.

Relocation of the National Historic Landmark Variable Density Tunnel, Langley Research Center

In 2019 LaRC relocated the Variable Density Tunnel (VDT), a designated NHL, following demolition of LaRC's old conference center (Figure 4-15). The VDT was moved to a more centralized location adjacent to the newly constructed conference center/cafeteria. The new location, which includes new interpretative signage and a dedicated sidewalk, maximizes accessibility and visibility of the exhibit to Center employees and visitors and has become the starting point for tours of LaRC's historic resources (Figure 4-16).

Figure 4-15. The Variable Density Tunnel in transit to its new location at LaRC.

Figure 4-16. The new Variable Density Tunnel exhibit at LaRC.

External Education and Outreach

During the reporting period, NASA has continued to develop and maintain partnerships that not only seek to preserve historic properties but also maintain its place in the public consciousness. While NASA makes an extraordinary amount of

information available to the public via the Internet, the agency is keenly aware that the physical locations and assets resonate with the public in a way that online sources do not. One indicator of this is the yearly attendance figures: the two most popular Centers are JSC and KSC, both of which receive over 1.5M visitors a year. As NASA considers the challenges facing the agency in coming years, it is seeking new ways to encourage community engagement and overall investment in protection and use of historic properties.

Annual Breakthrough Prize Ceremony at Ames Research Center

The Breakthrough Prize is a set of international awards consisting of three categories (Mathematics, Fundamental Physics, and Life Sciences) that recognizes scientific advancement. In November 2018, ARC hosted the 2019 Breakthrough Prize at Hangar 1 (Figure 4-17). The event, hosted by Pierce Brosnan, featured live performances by Lionel Richie and G.E.M., and a variety of presenters including Mark Zuckerberg, Lupita Nyong'o, Lucy Hawking, Sergey Brin, Ron Howard, and Susan Wojcicki, among others.

Figure 4-17. 2019 Breakthrough Prize winners being recognized at ARC's Hangar 1.

Public Outreach and Programs

Centers offer a variety of programs to encourage community engagement and investment. At LaRC, the CRM collaborates with Center intern and post-doc program coordinators to provide tours of cultural resources. AFRC hosts an annual Earth Day celebration as well as other conservation events which generally attract between 30 and 200 people.

ARC offers year-round on-site tours of historic properties, events in Shenandoah Plaza Historic District, and virtual tours of facilities, among other events. In 2019, ARC hosted the Summer Students Barbecue Picnic and Poster Symposium, and Annual Diversity and Inclusion Day in Shenandoah Plaza NRHP Historic District. The event included a barbecue lunch, student research poster displays, cultural exhibits representing the diversity of the workforce, and several other events, including the Sustainability Fair, Safety Day, and the 4th Annual Innovation Fair. These events attracted an estimated 3,500 people.

Vice President Pence Visits Ames Research Center

On 14 November 2019, Vice President Mike Pence visited ARC to discuss the role the Center will play in the agency's plan to return astronauts to the Moon. During his visit, Vice President Pence addressed ARC employees, noting the Center's historic and current contributions to the understanding of the Moon. He also participated in a Center tour that featured highlights of facilities and projects critical to the Artemis Program (Figure 4-18).

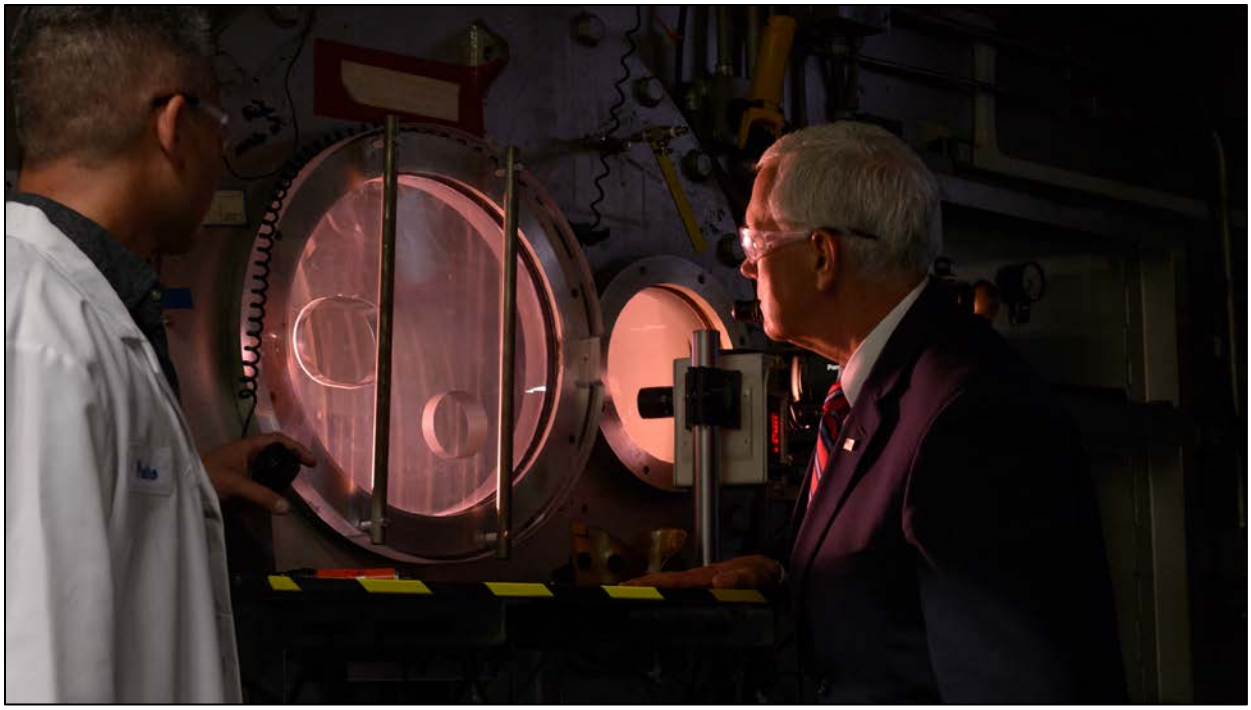

Figure 4-18. Vice President Pence views a test run at the ARC Jet Complex.

Process Improvements

As NASA's CRM Program matures, the Centers are becoming more adept at developing and integrating historic preservation processes to effectively manage its historic preservation responsibilities. Several successful examples are presented below.

Goddard Space Flight Center Environmental Safety Checklist Integration

In 2019 GSFC reviewed CRM as part of the roll-out conversation for its new Environmental and Safety Review System in GSFC's Management Operations Services and Information (MOSI) online portal. Integration into this portal replaced a less efficient paper process and allows for the initiation of fluid conversations for both facilities and mission related projects. This also allows for better visibility to adverse effects earlier in the planning process. To date, over 50 projects have been reviewed in 2020.

Wallops Flight Facility Revolutionary War Earthworks Maintenance Plan

Located on the Virginia coastline, Wallops Flight Facility (WFF) prepared and submitted in 2018 a maintenance plan for the Revolutionary War Military Earthwork archaeological site (Site No. 44AC0089), one of the few surviving examples of coastal defenses from the Revolutionary War. The fort acted as a small, coastal battery to restrict enemy boat activity and is eligible for listing in the NRHP under Criterion C and D.

Due to the close proximity of the earthwork to a UAV runway, a 25-ft protective buffer zone was created. Per the plan, no foot traffic or machinery is permitted in this zone, and all vegetation maintenance must be done by chemical rather than mechanical means. Implementation of the maintenance plan has

been delayed due to COVID-19, but NASA expects it to be in place once health restrictions are lifted.

Jet Propulsion Laboratory Historic Preservation Guidelines

During the reporting period, JPL developed two documents to guide management of its historic properties. The *Guidelines and Recommendations for Historic Buildings* apply to eight of its buildings identified as individually eligible for listing in the NRHP, and for its newly identified historic district, the *Guidelines and Recommendations for Contributors to the JPL Space Exploration Historic District.*[17]

The documents describe the history of the historic properties, which range in construction date from 1942 to 2002, including changes over time, and identify character-defining features. Interior spaces are color-coded according to one of three significance levels, which ensures that Project Managers are aware of the most important aspects of the resources (Figure 4-19). The guidelines and recommendations are based on the SOI's *Standards for the Treatment of Historic Properties* and historic preservation best practices, are directed towards avoidance of adverse effects.

4.4 SUMMARY

NASA's efforts to protect and utilize historic properties during the reporting period have been positive, and as shown above, Centers are making use of a range of tools available to them to meet NHPA stewardship goals. But agency experience has also reinforced that the most successful protection is active utilization—either for educational or heritage tourism purposes, or in direct support of mission.

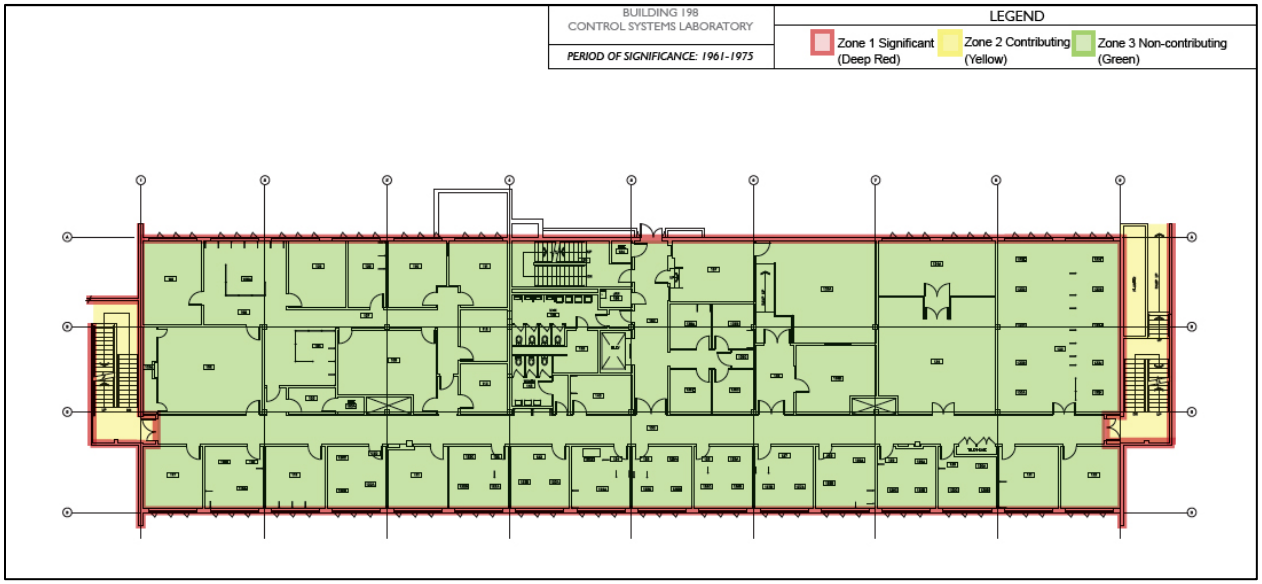

Figure 4-19. Diagram of a Building 198 from *Guidelines and Recommendations for Contributors to the JPL Space Exploration Historic District*, showing color-coded levels of significance.

[17] Page & Turnbull, *Guidelines and Recommendations for Historic Buildings* (2018); Page & Turnbull, *Guidelines and Recommendations for Contributors to the JPL Space Exploration Historic District* (2019).