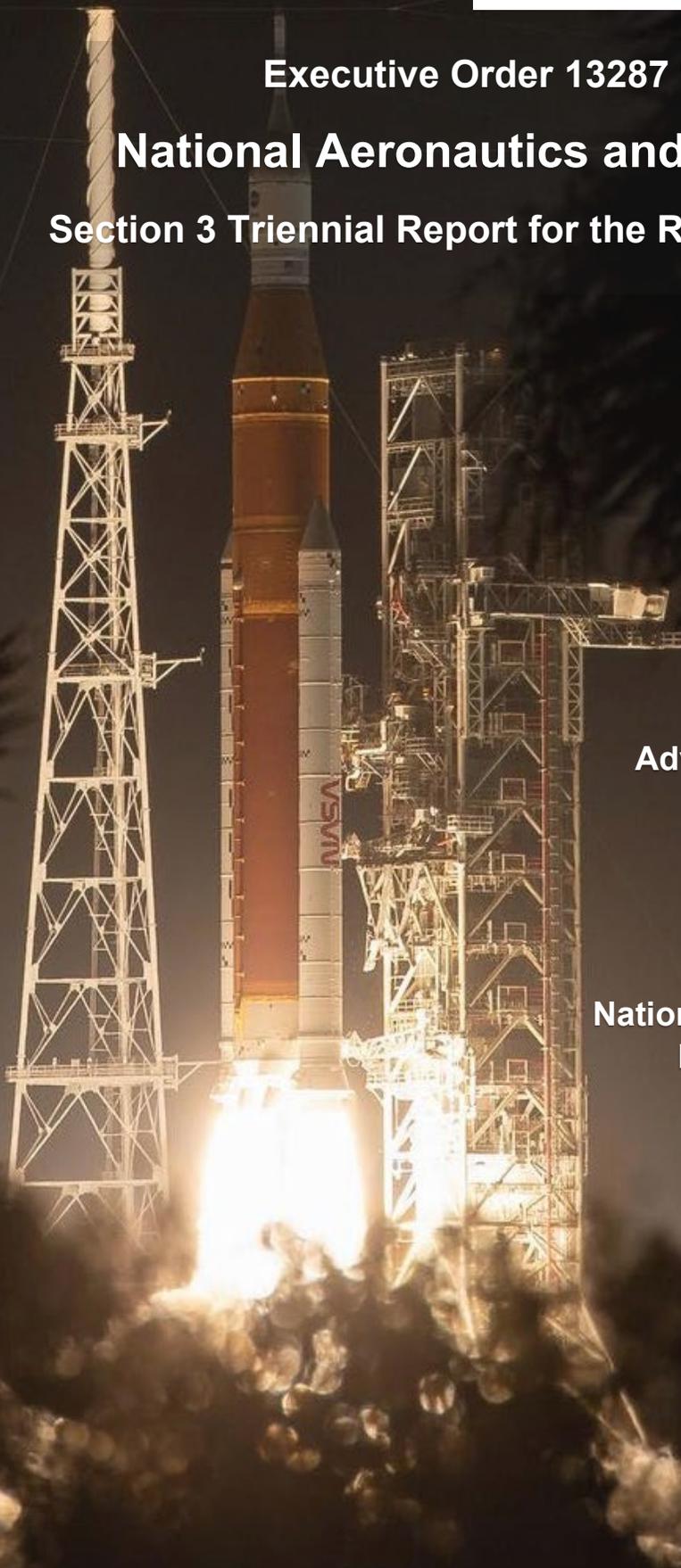




Executive Order 13287 “Preserve America”

National Aeronautics and Space Administration

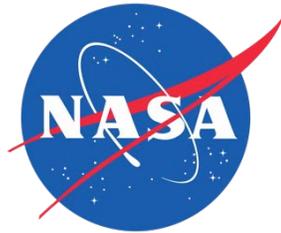
Section 3 Triennial Report for the Reporting Period FY2021-FY2023



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National Aeronautics and Space Administration

**Executive Order 13287
Section 3 Triennial Report**

Reporting Period Fiscal Year 21–23



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ACRONYMS

| | |
|----------|--|
| ACHP | Advisory Council on Historic Preservation |
| AFB | Air Force Base |
| AFRC | Armstrong Flight Research Center |
| AMP | Agency Master Plan |
| APA | Agency-wide Programmatic Agreement |
| ARC | Ames Research Center |
| ARPA | Archaeological Resources Protection Act |
| ATF | Armstrong Test Facility (formerly Plum Brook Station) |
| CCG | Criteria Consideration G |
| CoP | Community of Practice |
| COVID-19 | SARS-CoV-2, 2019 Novel Coronavirus |
| CRM | Cultural Resources Manager/Cultural Resources Management |
| CMP | Center Master Plan |
| DAF | Department of the Air Force |
| DoD | Department of Defense |
| EMD | Environmental Management Division |
| EO | Executive Order |
| ESA | European Space Agency |
| EUL | Enhanced Use Lease |
| FRED | Facilities and Real Estate Division |
| FPO | Federal Preservation Officer |
| FY | Fiscal Year |
| GDSN | Goldstone Deep Space Communications Complex |
| GIS | Geographic Information Systems |
| GRC | Glenn Research Center |
| GSFC | Goddard Space Flight Center |
| HUD | Department of Housing and Urban Development |
| HQ | Headquarters |
| HTSF | Highly Technical or 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 |
| MAF | Michoud Assembly Facility |
| MAIANSE | American Indian Alaskan Native STEM Engagement |
| MOA | Memorandum of Agreement |
| MOSI | Management Operations Services and Information |
| MOU | Memorandum of Understanding |
| MSFC | Marshall Space Flight Center |
| MSR | Mars Sample Return |
| MUREP | Minority University and Research Education Project |
| NACA | National Advisory Committee for Aeronautics |
| NASA | National Aeronautics and Space Administration |
| NCSHPO | National Conference of State Historic Preservation Officers |
| NEMCON | NASA Environmental and Medical Contract |
| NEPA | National Environmental Policy Act |
| NETS | NASA Environmental Tracking System |
| NHL | National Historic Landmark |
| NHPA | National Historic Preservation Act |
| NPD | NASA Policy Directive |
| NPR | NASA Procedural Requirements |
| NPS | National Park Service |
| NRHP | National Register of Historic Places |
| NTHP | National Trust for Historic Preservation |
| O&M | Operations and Maintenance |
| OMB | Office of Management and Budget |
| OSI | Office of Strategic Infrastructure |
| PA | Programmatic Agreement |
| PACE | Plankton, Aerosol, Cloud, Ocean Ecosystem |
| RPCP | Real Property Capital Planning |



| | |
|------|---|
| RPMS | Real Property Management System |
| RSF | Resource Significance Framework |
| RTF | Reduce the Footprint |
| SHPO | State Historic Preservation Office |
| SLS | Space Launch System |
| SOI | Secretary of the Interior |
| SSC | Stennis Space Center |
| SSFL | Santa Susana Field Laboratory |
| STEM | Science, Technology, Engineering, Mathematics |
| TCP | Traditional Cultural Property |
| TCL | Traditional Cultural Landscape |
| TDAT | Tribal Directory Assessment Tool |
| THPO | Tribal Historic Preservation Officer |
| UAV | Unmanned Aerial Vehicle |
| UTTR | Utah Test and Training Range |
| VAB | Vehicle Assembly Building |
| 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 (NHPA) of 1966, as amended. This report is the eighth 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, 2017, and 2020. This report covers the three-year period from fiscal year (FY) 2021 to 2023.

1.1 REPORT ORGANIZATION

This triennial report has been prepared for the FY21–23 reporting period consistent with the ACHP May 2023 *Advisory Guidelines Implementing Executive Order 13287, “Preserve America” Section 3: Reporting Progress on the Identification, Protection, and Use of Federal Historic Properties* (ACHP Guidelines). The 2023 ACHP Guidelines continue to follow the simplified guidelines of 2020 with fewer questions and a deemphasis on quantitative data. These new guidelines also focus on themes related to current ACHP initiatives and administrative priorities, including infrastructure, job creation, equity, and climate change.

This report has five sections. Section One (Overview) presents the major themes and challenges driving NASA’s Cultural

Resources Management (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 ACHP Guidelines and share highlights and challenges. Section Five (Partnerships and Outreach Supporting the Stewardship of Cultural Resources) presents the partnerships, outreach, and education that NASA has completed during the reporting period or is ongoing.

All photos are credited to NASA unless otherwise specified in the caption.

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

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.



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 NASA moments such as the February 2021 landing of the Perseverance rover on Mars which attracted 4.2 million viewers.

But the nature of its activities requires NASA to utilize its built assets — many of which are highly technical or 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. 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.² 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.

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.³ 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, 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.”⁴ The study manifested as the NPS

² 36 CFR § 800.5(a)(2)(ii).

³ NHPA of 1966, as amended, 54 U.S.C. § 300101 et seq.

⁴ Public Law 96-344, 96th Congress, *An Act To improve the*



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.⁵

As a result of the study, NASA executed its first Section 106 agreement with the ACHP that requires NASA to consult with the appropriate State Historic Preservation Offices (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 — 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.”⁶ 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 acknowledgment that modification is expected and necessary to maintain active use of HTSF.

In this publication, the 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. The 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

administration of the Historic Sites, Buildings and Antiquities Act of 1935 (49 Stat. 666), (S. 2680), 8 September 1980.

⁵ A summary of the study is available online at https://www.nps.gov/parkhistory/online_books/butowsky3/

[space0.htm](#).

⁶ Available online at <https://www.achp.gov/digital-library-section-106-landing/balancing-historic-preservation-needs-operation-highly>.



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 2023, 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 65 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”⁷ in an environment of aging infrastructure and stagnant to declining maintenance budgets.

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.

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% |

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 20 years. Mission-critical assets are necessarily prioritized, leaving limited funding to go towards lower mission-relevant 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.

⁷ NHPA, 54 U.S.C. § 300101 et seq.



Right-Sizing the NASA Portfolio

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 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 2019, the Office of Management and Budget (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 “Reduce the Footprint” (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 order to meet these requirements, and to address the specific challenges of NASA’s aging infrastructure, a federal funding gap, and large property holdings, NASA has initiated a new approach to right-size its portfolio, the Agency Master Plan (AMP).

Agency Master Plan

NASA has identified the need for a more integrated approach to master planning, in

which individual Center planning objectives are considered within the broader context of Agency priorities. The purpose of the AMP is to establish an Agency-wide, mission-driven approach with a 20-year horizon that ensures NASA real property assets are mission-ready, reliable, and affordable. The overarching goals of the NASA AMP are to 1) identify a mission-driven facility portfolio that is adaptable to transformation; 2) establish a repeatable master planning process with consistent stakeholder engagement and accountability; 3) identify actions to achieve an affordable facility portfolio including reduction of unnecessary redundancies, consolidation, and modernization; 4) identify actions to help proactively mitigate risk to mission; 5) prioritize sustainability best practices; and 6) establish planning principles that help sustain and create facilities and sites that inspire the NASA workforce. The AMP is the first time that NASA has taken on an enterprise approach to planning the entire agency real property portfolio, addressing broader agency challenges, engaging mission stakeholders effectively, establishing clear links to the Agency-wide budget, and identifying specific desired outcomes for all real property for the next 20 years.

A key component of the AMP process is the Asset Inventory Assessment (AIA). During the assessment, each real property asset is reviewed and given a score based on its mission relevance and facility condition. The score is used to determine which of the four buckets it is assigned: sustain, invest, outgrant/repurpose, and divest. (Figure 1-1). Each bucket is described in more detail below.



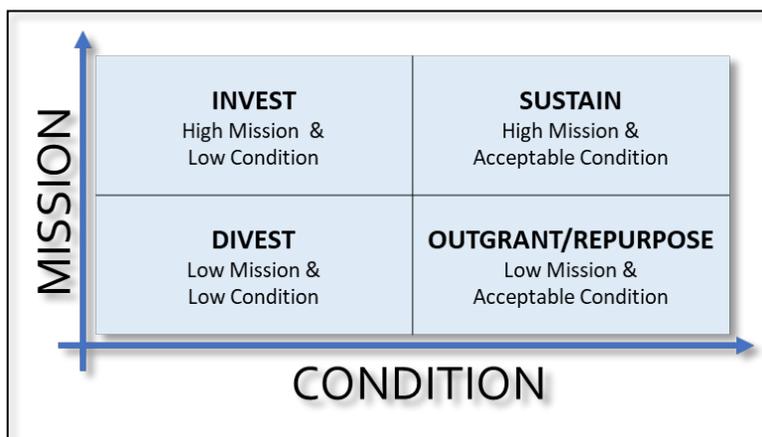


Figure 1-1. AMP Asset Bucket Assignment – Mission/Condition Relevance Matrix.

Sustain:

These real property assets have clear mission significance, a future need, and are in good condition. The goal is to continue general maintenance to sustain these assets in their current condition. No major/significant investments are known to be needed. Section 106 undertakings on this path may include routine maintenance and repair to occur as need and funding arises.

Invest:

These real property assets have high mission significance, a future need, and are in poor condition. The goal is to rehabilitate these assets to a mission ready condition. Section 106 undertakings on this path may include renovation/modification, major repair, and new construction.

Outgrant/Repurpose:

These real property assets have low mission significance and no future need but are in good condition. The goal is to keep these assets and enable their availability for use by NASA partners, or to repurpose the assets for a higher mission need. Section 106

undertakings on this path include outgrants to federal or non-federal entities.

Divest:

These real property assets have a low mission significance, no future need, and are in poor condition. The goal is to terminate NASA ownership of these assets. Historic properties on the Divest list are placed in a “path to divestment” subcategory, indicating that they require additional consideration of alternatives to avoid the adverse effects of partial or complete demolition. Section 106 undertakings on the “divest” path include mothballing, abandonment, resource transfer to federal and non-federal entities, and demolition.

Initial AIA lists were developed in 2021 using facility condition data tracked in NASA’s Real Property Management System (RPMS) and Mission Relevance (MR) data collected through a data call, followed by a robust adjudication process. The data collected was further refined through a series of collaborative workshops in which a proposed future state was solidified through consensus for each real property asset in NASA’s facility portfolio. These AIA



workshops were held throughout 2021 and 2022 at each NASA Center and included the participation of Agency and Center Master Planners, Mission Directorate representatives, Technical Capability Portfolio leadership, infrastructure stakeholders, and environmental personnel including the NASA FPO and Center CRMs. In total, more than 700 internal NASA stakeholders were involved throughout the Agency-wide process. The AIA lists continue to be maintained and refined through stakeholder collaboration.

The AIA lists are the backbone for the AMP and the subsequent Center Master Plans (CMPs), which serve as the localized implementation of the AMP informed by considerations such as Center strategic goals and Center-level environmental review. NASA intends to finalize the AMP by 2024.

NHPA Compliance under the AMP

Implementation of the AMP through individual CMPs will mean an increase in undertakings that could affect historic properties, and NASA has recognized the need for an Agency-wide approach to Section 106 compliance that is aligned with the AMPs Agency-wide approach to real property planning. As such, in coordination with the ACHP and National Conference of State Historic Preservation Officers (NCSHPO), NASA is pursuing an Agency-wide Programmatic Agreement (APA) that outlines effective yet practical processes to consider cultural resources at NASA Centers and showcases its historic properties within their larger geographical and historical context.

The goals of the APA are as follows:

- To consider the nature of NASA Centers as primarily defined by their HTSF, and establish procedures that acknowledge modification as essential to the preservation of those properties;
- To define processes for programmatic consultation as part of CMP development, to facilitate the consideration of alternatives to avoid adverse effects at the earliest planning stages;
- To establish standard recordation measures for all of its historic resources that build upon NASA’s already robust information sharing infrastructure to maximize public access and utility;
- To focus NASA’s limited time, energy, and funding on the most significant resources and on undertakings that have the most potential to affect historic properties; and
- To develop mitigation that effectively tells the stories of NASA historic properties within their larger Center and Agency context, and that is accessible by and valuable to the public. This goal is aligned with NASA’s *2022 Equity Action Plan*, a key component of which is making science data more widely accessible.⁸

The APA is informed by a number of planning-level tools that NASA developed during the reporting period. Details about these tools, some key elements of the APA, and the status of APA consultation are discussed in Section 2.

⁸ NASA, 2022 Equity Action Plan, https://www.nasa.gov/sites/default/files/atoms/files/nasa_-_equity_report_-_v10.pdf, accessed August 2023.



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

Program Organization

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.

Each NASA Center has a CRM responsible for executing the program. 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 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.

Most Center CRMs are not Cultural Resources professionals meeting the SOI's Professional Qualifications Standards for Archaeology or Architectural History. NASA recognizes that this has created a knowledge gap, and during the reporting period, hired an SOI-qualified architectural historian at GRC. In addition, in 2020, NASA made the decision to hire one SOI-qualified archaeologist and one SOI-qualified architectural historian to serve as CRM for their respective Centers, but also to be "Enterprise" subject matter experts, available to support other Centers and NASA HQ as needed. In June 2022, KSC hired an SOI-qualified archaeologist to fill this role. NASA is currently assessing options for hiring an Enterprise SOI-qualified architectural historian.

The Center CRMs are supported by leadership at their Center, as well as support from HQ. The Center Director's role is to foster, through words and behavior, an environment that promotes awareness of and respect for NASA's cultural resources. 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."⁹

⁹ NASA, NPR 8510.1A, NASA Cultural Resources Management.



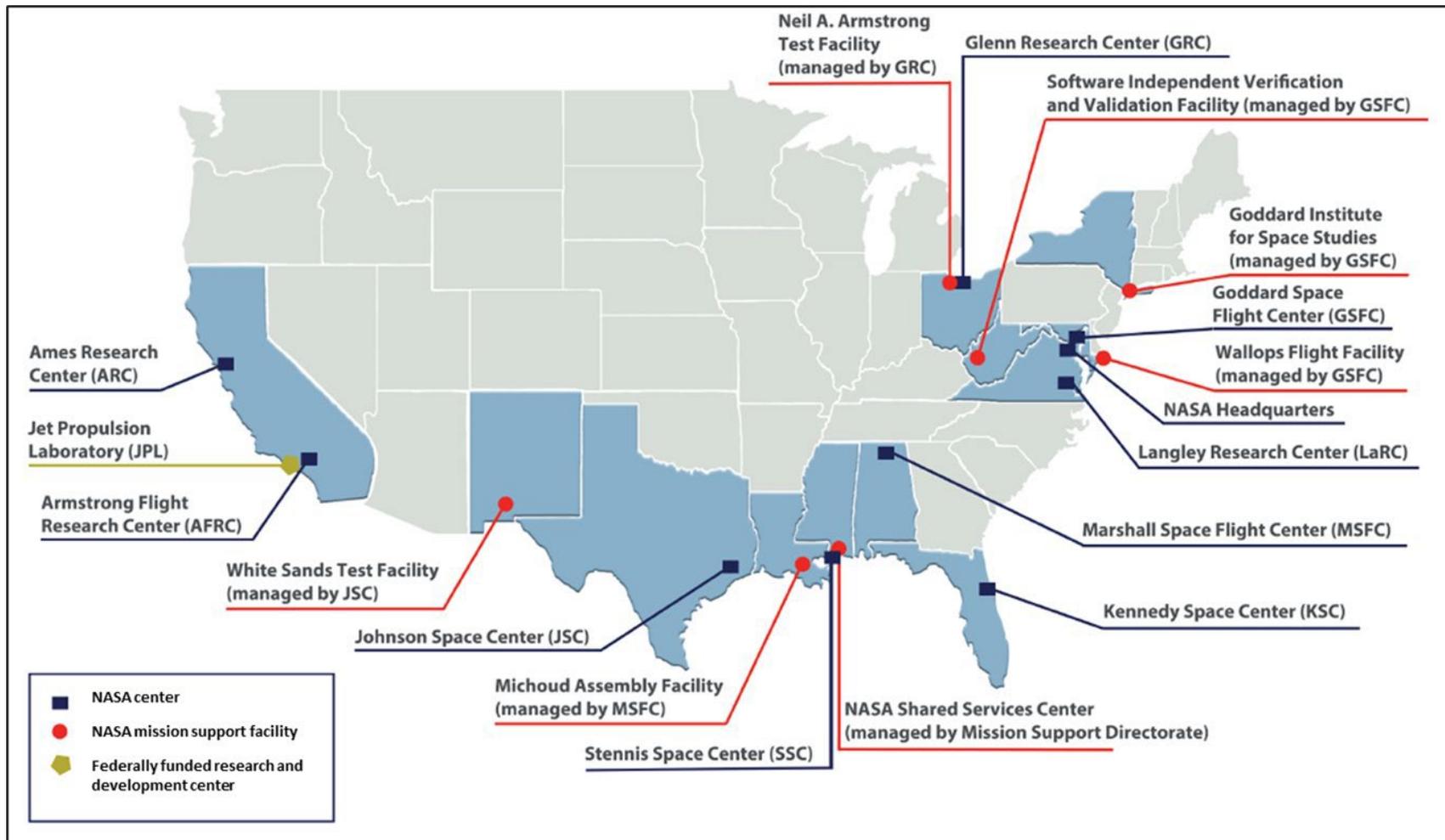


Figure 2-1. Map of NASA Centers and Component Facilities (NEMCON).

Table 2-1. NASA Centers and Component Facilities.

| No. | Acronym | Name | Location | Est. | Acreage | No. Built Assets (2023) |
|---------------|---------|--|-------------|------|----------------|-------------------------|
| 1 | AFRC | Armstrong Flight Research Center | California | 1954 | 1,145 | 207 |
| 2 | ARC | Ames Research Center | California | 1939 | 1,874 | 396 |
| 3 | GDSN | Goldstone Deep Space Communication Complex (component facility of JPL) | California | 1958 | 28,170 | 143 |
| 4 | GRC | Glenn Research Center | Ohio | 1941 | 307 | 199 |
| 5 | GRC-ATF | Glenn Research Center – Armstrong Test Facility | Ohio | 1956 | 6,458 | 166 |
| 6 | GSFC | Goddard Space Flight Center | Maryland | 1959 | 1,844 | 472 |
| 7 | JPL | Jet Propulsion Laboratory | California | 1958 | 175 | 387 |
| 8 | JSC | Johnson Space Center* | Texas | 1962 | 1,634 | 417 |
| 9 | KSC | Kennedy Space Center | Florida | 1958 | 140,000 | 919 |
| 10 | LaRC | Langley Research Center | Virginia | 1917 | 764 | 283 |
| 11 | MAF | Michoud Assembly Facility (component facility of MSFC) | Louisiana | 1964 | 832 | 166 |
| 12 | MSFC | Marshall Space Flight Center | Alabama | 1960 | 1,841 | 353 |
| 13 | SSC | Stennis Space Center | Mississippi | 1962 | 13,800 | 419 |
| 14 | SSFL** | Santa Susana Field Laboratory (component facility of MSFC) | California | 1975 | 451 | 33 |
| 15 | WFF | Wallops Flight Facility (component facility of GSFC) | Virginia | 1959 | 6,200 | 625 |
| 16 | WSTF | White Sands Test Facility (component facility of JSC) | New Mexico | 1962 | 26,900 | 224 |
| TOTALS | | | | | 232,395 | 5,409 |

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

** NASA is no longer carrying out operations at SSFL but is engaged in environmental remediation in order to excess the property.



Policy

NASA codifies its policies in NASA Policy Directive (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 in 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 is currently being revised to update roles and responsibilities and to outline the required elements of the Center ICRMPs, based on an Agency-wide ICRMP template that was adopted in FY20. The current NPR expires in September 2024.

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 Community of Practices (CoPs), the FPO is participating in the update of several of these NPRs, to facilitate consideration of cultural resources in Center undertakings.

The CRM NPR also addresses agency responsibilities beyond NHPA compliance, including treatment of archaeological resources, Tribal consultation, coordination with National Environmental Policy Act (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.

Training

Because most Center CRMs are not cultural resources practitioners by trade, training is important, and is a requirement of the CRM NPR. If the Center CRM is not a CRM professional as defined by 62 Fed. Reg. 33708, they are required to complete training within six months of starting employment.

Beyond baseline training, the CRM NPR requires at least one professional development training course a year. This is often fulfilled through participation in one of the many online or in-person courses the ACHP offers, as well as National Preservation Institute courses, NPS National Center for Preservation Technology and Training courses, or training offered by a SHPO, such as the Texas Historical Commission's Real Places Training, which brings together professionals and volunteers from diverse disciplines and organizations across the state. 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.



During the reporting period, training on tribal relations was a focus for NASA. In 2022, for example, the NASA Environmental Division hosted an Agency-wide Environmental Operational Meeting at Langley Research Center (LaRC) that included a training session by the former Senior Tribal Liaison for the Department of Defense entitled “Meeting Consultation Obligations to Native Americans.” It was attended by all of the Center CRMs, either in person or virtually, as well as other environmental personnel and EMD leadership.

Several CRMs attended additional training on tribal relations during the reporting period, including the National Preservation Institute’s Native America 101, Forging Meaningful Land Acknowledgements through Conversation and Hard Truths, and the ACHP’s Early Coordination with Indian Tribes for Infrastructure Projects.

The FPO periodically provides training to non-CRM personnel, including facilities, planning, real estate, and demolition program managers to enhance understanding of how CRM fits into these processes and to make others aware of NASA’s CRM responsibilities. In addition, the FPO will reach out to non-CRM personnel when relevant learning opportunities arise, such as FRED personnel attending and the ACHP Section 106 training.

Integration with other Programs

NASA’s approach to successful cultural resources management is based upon the understanding that CRMs 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. 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, geographic information systems (GIS), and NEPA are ascribed responsibilities in the CRM NPR to proactively communicate with the Center CRMs so that historic properties can be effectively considered. Center CRMs meet regularly with personnel in those departments.

At the HQ level, project proponents coordinate with the FPO to programmatically integrate cultural resources considerations. For example, the FPO has been an active participant in the AMP process, and master planners have reviewed drafts of the APA, a collaboration on long-term planning for the agency.

Other personnel identified in the CRM NPR as CRM stakeholders include:

- Assistant Administrator for the Office of Strategic Infrastructure (OSI) (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 Agencywide, to individuals managing specific projects that may only affect a single resource.

Guidance Documents

In addition to policy, NASA has developed guidance for the implementation of the CRM Program including:

- *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 PROGRAM MANAGEMENT TOOLS

NASA utilizes a variety of tools to manage the CRM Program at both the Agency and Center level, including ICRMPs and Programmatic Agreements (PAs). These tools are discussed in more detail below.

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, and includes a five-year program management plan, as well as Standard Operating Procedures to assist non-CRM personnel in navigating CRM situations such as working with tenants or inadvertent discoveries.

ICRMPS are reviewed annually to capture any major changes over the last year, and revised every five years, using a template that NASA developed in 2020.

Center PAs

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, discussed below, six Centers have general Center-wide PAs in place (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 |
| | 1 | In development | Agency wide (APA) |
| AFRC | 0 | N/A | N/A |
| ARC | 1 | In development | Center wide |
| GDSCC | 0 | N/A | N/A |
| GRC | 0 | N/A | N/A |
| GRC-ATF | 1 | Expired July 11, 2023, not intending to renew | Center wide |
| GSFC | 0 | N/A | N/A |
| JPL | 0 | N/A | N/A |
| JSC | 1 | Executed | Space Shuttle Assets |
| KSC | 1 | Executed | Center wide |
| LaRC | 1 | Executed (extended to 2025) | Center wide |
| MAF | 0 | N/A | N/A |
| MSFC | 1 | Executed; Renewal underway, pending update to gate-to-gate survey | Center wide |
| SSC | 0 | N/A | N/A |
| SSFL | 1 | Executed | Center wide |
| WFF | 1 | Executed | Center wide |
| WSTF | 0 | N/A | N/A |

Agency NHL PA

In 1989, in response to the *Man in Space* NHL Theme Study, NASA entered into an Agency-wide PA with the National Conference of State Historic Preservation Officers (NCSHPO) and the ACHP for the management of NASA-owned NHLs. The study recommended 24 sites for NHL designation among 12 types of resources. Those resource types include NACA wind tunnels, rocket engine development facilities, rocket engine test stands, rocket test facilities, rockets, launch pads, Apollo training facilities, Apollo hardware test facilities, unmanned spacecraft test facilities, tracking stations, mission control centers, and other support facilities. The NHL PA categorizes undertakings under three

categories and stipulates specific consultation and recordation requirements for each category. Category A includes demolition, relocation, removal or excessing of significant elements of the Landmark from the NRHP nomination, new construction not compatible with major parts of the original structure, and change in function, purpose, or use of the resource. Category B undertakings include activities that will not alter the characteristics of the resource which were specified as the reason for its Landmark designation, including: replacement of historic hardware or components, modification of the original structure or equipment used in engineering structures, buildings, or housing facilities, and new construction that is compatible with the



existing structure, purpose, and operation of the resource. Category C undertakings involve none of those specified in Categories A or B.

Each year, NASA submits a report that summarizes its activities under the NHL PA, including any mitigation completed, during the past calendar year. In 2021, there were 8 undertakings to NASA NHLs, all of which fell into NHL PA Category C. In 2022, there were three undertakings to NASA NHLs, all of which fell into NHL PA Category C. Data is not yet available for 2023.

The NHL PA continues to provide benefit to NASA by allowing NASA to meet its Section 106 requirements in an expedited manner. All of NASA's NHLs are HTSF, and modifications are essential to keep them active and supporting current and future NASA missions. The majority of undertakings to NASA NHLs do not have the potential to cause adverse effects, so the NHL PA allows CRMs to focus their limited resources on other higher-risk projects.

APA (in progress)

The NASA APA has been in development since 2019 and recent progress has been moving the document towards execution hopefully in FY24. The purpose of the APA is to create an alternate process by which NASA can meet its responsibilities to manage its U.S. real property assets under Sections 106 and 110 of the NHPA in a manner that accommodates NASA's unique challenges; namely, the HTSF nature of its Centers, the aging infrastructure, and the overall unaffordability of its real property portfolio.

The APA will apply at all NASA Centers that are not operating under a Center-wide PA. Several of the Centers who were considering

development of their own Center-wide PAs in 2020 have now decided to join the APA because of the broad benefits and efficiencies generated by programmatic mitigation and consideration of Section 106 from an Agency-wide perspective. Those Centers with N/A in the Status column in Table 2-2 will be Participating Centers in the APA once executed. Further, Centers with currently executed PAs will have the option to utilize the APA once their own PA expires.

NASA delivered the first draft APA to the ACHP, NCSHPO, Tribes, and other Consulting Parties in April 2022, and a revised draft in November 2022. Beginning in December 2022 and continuing through February 2023, NASA hosted a series of virtual working sessions with the Consulting Parties on specific topics within the agreement document to receive feedback and talk through scenarios in real time. Consulting Parties who participated in these sessions included the ACHP, NCSHPO, National Association of Tribal Historic Preservation Officers (NATHPO), individual SHPOs, representatives from Tribes identified by Center CRMs as having an interest in NASA undertakings, and the National Trust for Historic Preservation (NTHP). Along with the traditional draft review and written comment responses, these working sessions provided invaluable feedback and collaborative discussion on ways to improve efficiency for both NASA and the Consulting Parties in the Section 106 process.

In March 2023, the ACHP staff hosted the NASA FPO, KSC Enterprise CRM, and three NASA Environmental and Medical Contract (NEMCON) contractors at their office in the National Building Museum in Washington, DC for a two-day working retreat on the APA (Figure 2-2). Various scenarios were tested



using the process laid out in the current draft of the APA and much progress was made on clarifying and refining the various efficiencies and unique concepts of the APA. The ACHP staff participants included Chris Daniel, Alexis Clark, Chris Koepfel, and Kelly Fanizzo.



Figure 2-2. NASA and ACHP Retreat in March 2023. Back row, left to right: Katie Stefanic and Carrie Albee (Gray & Pape), Chris Daniel (ACHP), and Emily Dabashinsky (HSG). Front row, Rebecca Klein (NASA FPO) and on screen, Katherine Zeringue (KSC CRM).

In June 2023, the NASA CRMs met for a face-to-face retreat with the FPO onsite at KSC. The ACHP's Chris Daniel joined this meeting, for a session devoted to the APA. Center CRMs tested the concepts of the APA using recent and upcoming undertakings from their Centers, to see if they could “break” the APA's process. This real-time testing method showed that the APA worked well for most scenarios and provided efficiencies for both the Center CRMs and the SHPOs.

NASA is hopeful that the APA will meet the intent of Section 106 while responding to NASA's unique resources, mission requirements, and management constraints.

2.4 DATA 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.

Center CRMs are responsible for ensuring the data in NETS is accurate and up-to-date, reflecting the most recent surveys and determinations of eligibility. NETS data is assessed at least annually; however, in FY23 NASA initiated a thorough review of all NETS data and corresponding documentation. This review, which will compare each property record in NETS against its survey report, evaluation, concurrence, applicable agreement documents, and other related materials, will ensure the accuracy and fidelity of the data. It is anticipated to be completed in FY24.

In FY23, NASA updated the NETS system to include the following information for each property:

- Resource Significance Framework (RSF) model score, for unevaluated properties less than 50 years old, discussed more in Section 3;

- HTSF status, based on the 2021 HTSF Inventory, discussed more in Section 3; and
- Asset Management Category, as defined under the draft APA.

When the APA is executed, these data fields will assist CRMs in the identification and management of those resources.

RPMS

NETS data is integrated into the NASA RPMS, a database routinely consulted by real property managers, master planners, Project Managers, and facilities and maintenance staff. The results of NRHP evaluations are exported from NETS into the RPMS on a daily 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 NASA's 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 (Figure 2-3). During the reporting period, NASA created a CRM-specific GIS application for archaeological survey and site information as well. Access to the archaeological site layers is controlled and released on a need-to-know basis to protect site location information.





Figure 2-3. GRC-Lewis Field Institutional GIS, showing Center boundaries (yellow), historic district boundaries (red), and buildings color-coded by historic status.

SECTION THREE IDENTIFYING HISTORIC PROPERTIES

3.1 INVENTORY STATUS

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. Tables 3-1 through 3-4 present a breakdown of NASA’s inventory of historic properties by Center and the status of archaeological survey.

Real Property

NASA’s inventory of real property consists of 5,241 assets within the United States. Approximately half of NASA’s real property assets are categorized as buildings and the other half as structures.

Approximately 52 percent of NASA’s U.S. real property assets have been evaluated for NRHP eligibility under at least one context; approximately 73 percent over the age of 50 have been evaluated. NASA has determined 628 (12 percent) real property assets are eligible for listing on the NRHP, 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. Four Agency-wide surveys have been conducted — the NHL Theme Study *Man in Space*, completed in the 1980s, an Agency-wide Space Shuttle Program Survey in the 2000s, the HTSF study in 2021, and the RSF in 2022.

Archaeological Resources

Unlike the proactive gate-to-gate identification of real property, NASA

archaeological investigations are driven by upcoming undertakings, and limited to Areas of Potential Effects (APEs). This is intentional, as archaeological surveys are in themselves destructive to sites, so NASA avoids unnecessary site disturbance that may be caused by shovel testing. Several Centers have predictive models/sensitivity models that they use to inform identification efforts (Table 3-3).

Tribal Consultation

Centers are responsible for identifying tribes that may have historic/cultural ties to the area, and for establishing relationships to ensure meaningful and timely consultation in the identification and protection of tribal cultural resources. Currently NASA consults with approximately 80 tribes across the agency, to varying degrees.

Centers use various tools to identify Tribes that may be interested in consulting, including the Department of Housing and Urban Development (HUD) Tribal Directory Assessment Tool (TDAT) database, and coordinating with SHPOs and other agencies in the area. Centers revisit their “consulting tribes” list during their annual ICRMP updates, and update and revise as necessary.

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.”¹⁰ 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, the clock and flagpole, 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.

¹⁰ NPR 8510.1A, *NASA Cultural Resources Management*, Appendix A (Definitions).



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 |
| GDSN | 1 | 0 | 1 | 0 | 0 | 0 |
| GRC/ATF | 2 | 0 | 3 | 1 | 87 | 0 |
| GSFC | 1 | 0 | 0 | 1 | 32 | 0 |
| JPL | 2 | 0 | 8 | 1 | 30 | 0 |
| JSC | 2 | 0 | 76 | 1 | 70 | 0 |
| KSC | 1 | 45 | 42 | 8 | 97 | 31 |
| LaRC | 3 | 0 | 12 | 1 | 111 | 12 |
| MAF | 0 | 0 | 6 | 0 | 0 | 0 |
| MSFC | 4 | 0 | 26 | 0 | 0 | 7 |
| SSC | 1 | 0 | 1 | 1 | 23 | 2 |
| SSFL | 0 | 0 | 9 | 2 | 9 | 1 |
| WFF | 0 | 0 | 2 | 0 | 0 | 2 |
| WSTF | 0 | 0 | 4 | 2 | 23 | 3 |
| TOTALS | 21 | 97 | 192 | 21 | 533 | 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 individually-listed or -eligible 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 |
|---------------|-----------|--|----------------------------|
| AFRC | 1 | Armstrong Flight Research, Development, and Test Historic District | 4 |
| ARC | 1 | NAS Sunnyvale Historic District (aka Shenandoah Plaza Historic District) | 41 |
| | 1 | Wind Tunnel Historic District | 6 |
| GDSCC | 0 | N/A | N/A |
| GRC/ATF | 1 | Lewis Field Historic District | 87 |
| GSFC | 1 | Goddard Space Flight Center Historic District | 32 |
| JPL | 1 | Jet Propulsion Laboratory Space Exploration Historic District | 30 |
| JSC/ELF | 1 | Johnson Space Center Historic District | 70 |
| KSC | 1 | Kennedy Space Center Railroad System Historic District | 7 |
| | 1 | Launch Complex 39: Pad A Historic District | 26 |
| | 1 | Launch Complex 39: Pad B Historic District | 21 |
| | 1 | Solid Rocket Booster Disassembly and Refurbishment Complex Historic District | 9 |
| | 1 | Shuttle Landing Facility Historic District | 4 |
| | 1 | Orbiter Processing Historic District | 2 |
| | 1 | NASA-Owned CCAFS Industrial Area Historic District | 28 |
| LaRC | 1 | NASA Langley Historic District | 111 |
| MAF | 0 | N/A | N/A |
| MSFC | 0 | N/A | N/A |
| SSC | 1 | Rocket Propulsion Test Complex Historic District | 23 |
| SSFL | 1 | Alfa Test Area Historic District | 5 |
| | 1 | Bravo Test Area Historic District | 0 |
| | 1 | Coca Test Area Historic District | 4 |
| WFF | 0 | N/A | N/A |
| WSTF | 1 | 300 Area Propulsion Test Area Historic District | 15 |
| | 1 | 400 Area Propulsion Test Area Historic District | 8 |
| TOTALS | 21 | | 533 |



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 | 62 | 61 | 98.4% | 145 | 84 | 57.9% | 207 | 145 | 70.0% |
| ARC | 264 | 183 | 69.3% | 132 | 76 | 57.6% | 396 | 259 | 65.4% |
| GDSN | 72 | 30 | 41.7% | 71 | 2 | 2.8% | 143 | 32 | 22.4% |
| GRC/ATF | 261 | 236 | 90.4% | 104 | 68 | 65.4% | 365 | 304 | 83.3% |
| GSFC | 113 | 41 | 36.3% | 349 | 26 | 7.4% | 462 | 67 | 14.5% |
| JPL | 130 | 84 | 64.6% | 99 | 9 | 9.1% | 229 | 93 | 40.6% |
| JSC | 205 | 205 | 100.0% | 212 | 166 | 78.3% | 417 | 371 | 89.0% |
| KSC | 240 | 192 | 80.0% | 679 | 398 | 58.6% | 919 | 590 | 64.2% |
| LaRC | 127 | 121 | 95.3% | 156 | 72 | 46.2% | 283 | 193 | 68.2% |
| MAF | 103 | 42 | 40.8% | 63 | 8 | 12.7% | 166 | 50 | 30.1% |
| MSFC | 166 | 134 | 80.7% | 187 | 48 | 25.7% | 353 | 182 | 51.6% |
| SSC | 102 | 59 | 57.8% | 317 | 9 | 2.8% | 419 | 68 | 16.2% |
| SSFL | 28 | 13 | 46.4% | 5 | 2 | 40.0% | 33 | 15 | 45.5% |
| WFF | 295 | 170 | 57.6% | 330 | 15 | 4.5% | 625 | 185 | 29.6% |
| WSTF | 88 | 81 | 92.0% | 136 | 68 | 50.0% | 224 | 149 | 66.5% |
| TOTALS | 2,256 | 1,652 | 73.2%¹¹ | 2,985 | 1,051 | 35.2% | 5,241 | 2,703 | 51.6% |

¹¹ 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 Resources at NASA Centers.

| Center | Total Acreage | Sensitivity Model | No. of Sites Identified | No. of Sites Evaluated | No. of Sites NRHP Listed or Eligible |
|---------------|----------------|-------------------|-------------------------|------------------------|--------------------------------------|
| AFRC | 1,145 | No | 6 | 6 | 0 |
| ARC | 1,874 | Yes | 10 | 10 | 0 |
| GDSN* | 28,170 | Yes | N/A | N/A | N/A |
| GRC/ATF | 6,765 | Yes | 8 | 0 | 0 |
| GSFC | 1,844 | No | 1 | 1 | 0 |
| JPL | 175 | No | 0 | 0 | 0 |
| JSC | 1,634 | No | 0 | 0 | 0 |
| KSC | 140,000 | Yes | 189 | 83 | 31 |
| LaRC | 764 | No | 22 | 22 | 12 |
| MAF | 832 | No | 1 | 1 | 0 |
| MSFC | 1,841 | No | 22 | 15 | 7 |
| SSC | 13,800 | No | 34 | 2 | 2 |
| SSFL | 451 | No | 57 | 1 | 1 |
| WFF | 6,200 | Yes | 10 | 10 | 2 |
| WSTF | 26,900 | No | 95 | 8 | 3 |
| TOTALS | 232,395 | | 455 | 159 | 58 |

* Army-owned Ft. Irwin retains responsibility for all archaeological survey and management at GDSN.



3.2 IDENTIFICATION OF HISTORIC PROPERTIES: FY21–23 HIGHLIGHTS

During the reporting period, NASA has continued to identify historic properties among its real property assets through proactive, comprehensive identification via periodic gate-to-gate surveys of resources 45 years and older. Additionally, the consideration 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 3-3, NASA has evaluated approximately 73 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, every Center has received a gate-to-gate survey.

As NASA considers the challenges facing the agency in coming years, it is seeking new and more efficient ways to identify historic properties.

Changes in Identification Processes during the Reporting Period

HTSF Study

Building on the 1991 ACHP publication *Balancing Historic Preservation Needs with the Operations of Highly Technical or Scientific Facilities*, in 2021 NASA developed a definition and set of criteria for identifying facilities that qualify as HTSF, specifically:

- The facility was built, installed, or established for unique technological engineering or scientific research purposes, including housing unique technological equipment or instruments; and
- The facility is directly associated with scientific experimentation, discovery, or mission, or
- Is integral to research and development, unique equipment manufacturing or assembly, training, observation and communications, mission control, or exploration in support of scientific experimentation, discovery, or mission implementation.

NASA then used these criteria to develop an inventory of HTSF at each Center. Preliminary inventories have been reviewed by master planners and real property personnel at both HQ and the Centers, as well as the Center CRMs. With new data that is being produced as part of the AMP effort, NASA is currently refining the inventories. NASA will use the HTSF study to guide the identification and management of its historic HTSF.

Resource Significance Framework

The RSF, completed in September 2022, provides a historic context and NRHP thresholds for properties less than 50 years of age, along with a predictive model to help identify and manage resources <50 that may be eligible under Criteria Consideration G (CCG), such as the 80x120 foot subsonic wind tunnel at Ames Research Center (ARC), built in 1985 and determined individually eligible for the NRHP (Figure 3-1). The RSF



provides a list of the types of properties with the greatest ability to convey NRHP historical significance under CCG, based on a representative sample of NASA's most historic significant achievements over the last 50 years (1973 in this case). These events cover three major areas of NASA's missions and programs including Aeronautics, Human Exploration and Operations, Science, and also Architecture. The RSF also provides a discussion of the significant themes with which these achievements may be understood for the purposes of NRHP evaluation. This analysis forms the basis of a predictive model (RSF Model) which assesses the likelihood of an individual resource <50 to be eligible for listing in the NRHP under CCG. NASA can use the RSF Model to guide the management of resources <50 at each Center. This model has also been incorporated into the APA's management strategy for Sections 106 and 110.



Figure 3-1. The 80x120 foot subsonic wind tunnel at Ames Research Center (ARC).

APA

The in-progress APA has robust processes for the identification of historic properties, including continued and updated gate-to-gate

surveys at the participating Centers, archaeological investigations and predictive modeling, and incorporating data from both the RSF and the HTSF Study.

Cultural Resources Surveys

Langley Research Center Update Architectural Survey of Historic District

In 2010, a PA with NASA, the Virginia SHPO, and the ACHP was developed and executed to facilitate the implementation of the LaRC Master Plan, which included a 20-year revitalization program to construct new facilities, renovate and/or demolish non-essential facilities, and perform general infrastructure maintenance and improvement activities at LaRC. The PA was extended for an additional five years in 2019 until January 2025.

In anticipation of negotiating an additional 5-year extension to the LaRC PA, an update to the comprehensive survey and evaluation of LaRC is being conducted and anticipated to be complete in December 2023. The original Phase I survey was conducted in 2007 and 2009 and identified the LaRC Historic District, which was listed in the Virginia Landmarks Register in 2011 and the NRHP in 2012.

The original survey and NRHP nomination recorded 252 resources with 143 contributing and 99 noncontributing resources. The historic district includes the current center boundary, as well as the original NACA buildings now owned by Langley Air Force Base.¹²

The current field survey was completed in March and May 2023 (Figure 3-2). The LaRC Historic District has 111 contributing

¹² Denise Lineberry, "The NASA Langley Research Center Historic District," accessed online,

https://www.nasa.gov/centers/langley/news/researchernews/rm_HistoricDistrict.html, July 2023.



resources, 12 of which are also individually eligible and three NRHP-listed NHL resources. The survey evaluated six contributing resources that have been significantly renovated and five newly surveyed resources, which are non-contributing to the LaRC Historic District. In addition, eight resources were identified as demolished, including six contributing and two non-contributing resources to the LaRC Historic District.

As part of the update effort, SHPO files for all historic resources (contributing and noncontributing) at LaRC will be updated with new GIS data, architectural descriptions noting any changes, and digital photographs. Additionally, newly identified resources that have achieved 50 years of age and select resources with potential significance under Criteria Consideration G will be evaluated as potential contributing resources to the LaRC Historic District.



Figure 3-2. Building 1251A, contributing resource to the LaRC Historic District and individually eligible under Criteria A and C.

3.3 IDENTIFICATION OF HISTORIC PROPERTIES: FY21–23 CHALLENGES

NASA CRMs identified the lack of funding for cultural resources survey to be the most acute identification challenge of the reporting period. Other challenges include staff turnover and the constant need for reeducation on the importance of historic resources for facilities management and outside architecture/engineering firms. Most of the NASA CRMs wear multiple hats at their Centers, meaning they have limited time to spend supporting the CRM program in addition to their other job duties. At KSC, management of cultural resources is further complicated by a lack of well-organized records and inconsistent and sometimes inaccurate data.

CRMs also reported that SHPOs often do not respond to Section 110 surveys and determinations of eligibility in a timely manner or at all, which means the status of historic resources are often in question. NASA views these surveys as a valuable management tool well worth the investment, but is finding the lack of SHPO response limits their utility.

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 NASA's mission and are often not feasible for HTSF resources. 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.

Planning

In practice, preservation of NASA's historic properties is realized mostly 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. The inclusion of the “path to divestment” process in the AMP, however, signals a culture shift at NASA towards greater consideration of preservation at the HQ level, and its full integration into Agency-wide master planning. By including historic property considerations in the AMP process, NASA has created an avenue to ensure decisions made at every level are informed by the historic status of the property.



4.2 ACTIVE PRESERVATION: FY21–23 HIGHLIGHTS

Leasing

NASA continues to use leases to generate revenue and to preserve historic properties that might otherwise be demolished. NASA’s leasing 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 not limited to historic properties but may be used when historic properties 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 somewhat 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

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 FY2022, NASA generated over \$9.2M in net revenue from 47 EULs across seven Centers.¹⁴ Centers have used EUL proceeds to fund renovations, roof replacement, elevator maintenance, parking lot repairs, and other improvement projects.

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), https://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/DeskGuide_TAGGED.pdf.

¹⁴FY2022 Agency Financial Report,

https://www.nasa.gov/sites/default/files/atoms/files/fy2022_afr_version5_111522_c.pdf



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 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.

In 2023, SSC executed an EUL of the A-2 test stand, a NHL that was built in the mid-1960s to test liquid rocket engines at altitude-simulated conditions. The tenant, Relativity Space, Inc., plans to modify the test stand in order to conduct Stage 1 tests of their Terran R rocket. This historic resource is currently mothballed, so the EUL is a preservation win for the SSC A-2 test stand, bringing it back into use.

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.

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.





Figure 4-2. The Section 111 lease with Planetary Ventures stipulates the reskinning of historic Hangar 1 at ARC. More information on Hangar 1 can be found below.

NASA is currently considering ways to formalize and standardize this process and language. A new policy is being codified that would make Section 111 leases the default for leasing NASA historic properties.

Modification that Enables Continued Use

Rehabilitation of Building 25 at Ames Research Center

Building 25 is located within the Shenandoah Plaza Historic District at ARC in Santa Clara County, California. Shenandoah Plaza Historic District is significant for its association with coastal defense and naval technology and has made a significant contribution to the broad patterns of our history, and for reflecting the distinctive type, period, method of construction, and high artistic values that are represented in the 1933 station plan and Spanish Colonial Revival buildings. Historically, Building 25 was the entertainment facility for the military

personnel assigned to Moffett Field. Building 25 has been unused for at least 40 years and had peeling paint, some water leaks, and was in need of repair (Figures 4-3 to 4-7). NASA is not currently using the building, and the inside is being renovated for tenant use, including asbestos abatement and replacement of all the lower-level building systems, using the proceeds from the NHPA Section 111 lease at ARC.

During the course of this work, several issues of a never-before seen newsletter entitled “Zero Hour” from 1933 were uncovered and preserved in acid-free storage and digitized for the public to view (Figure 4-8).¹⁵ This discovery preserved a one-of-a-kind memento from the early history of the building.

Building 25 is an excellent example of Section 111 lease proceeds being used to preserve historic properties at ARC.

¹⁵ NASA Historic Preservation Office, Moffett Field History,

<https://historicproperties.arc.nasa.gov/history/index.html#zerohour>.





Figure 4-3. Interior of Building 25's auditorium before renovation.



Figure 4-5. Exterior entry of Building 25 at ARC prior to renovation.



Figure 4-4. Interior of Building 25's auditorium after renovation.



Figure 4-6. Exterior asbestos containment at Building 25.



Figure 4-7. Exterior of Building 25 at ARC after renovation.

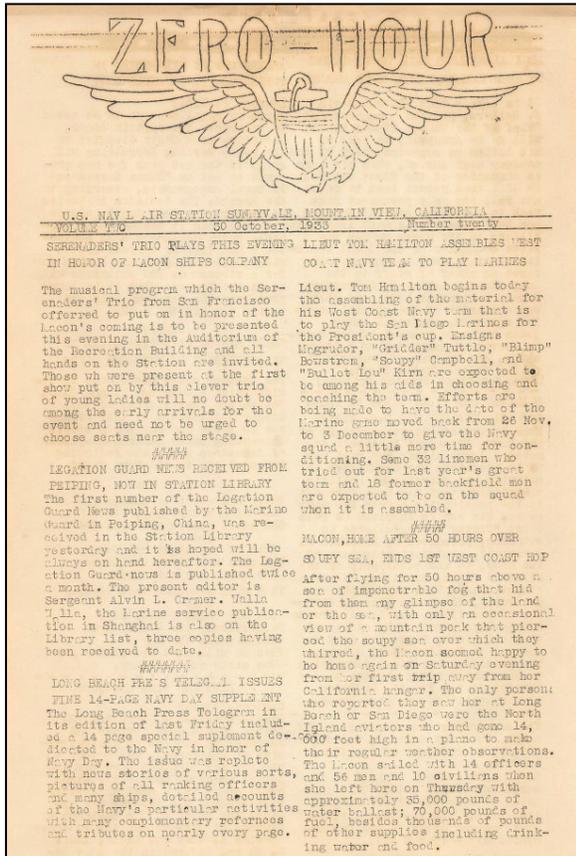


Figure 4-8. Scanned copy of the Zero Hour newsletter from October 30, 1933 found during the renovation of Building 25 at ARC.

Re-cladding of Hangar 1 at Ames Research Center

Historic Hangar 1 at ARC has been leased to Planetary Ventures, LLC since 2014 as part of the Section 111 lease of the Moffett Federal Airfield. Pursuant to the lease agreement, Planetary Ventures is responsible for the rehabilitation and adaptive reuse of Hangar 1. After several years of consultation with NASA and the California SHPO (CA SHPO), Planetary Ventures adopted a design that is reminiscent of the original Hangar skin (Figure 4-9). The re-cladding of Hangar 1 began in mid-2022 and is currently in progress (Figures 4-10 and 4-11).



Figure 4-9. Historic photo of the completed Hangar 1 (Moffett Field Historical Society Museum).



Figure 4-10. Status of the Hangar 1 re-cladding project on July 12, 2023.

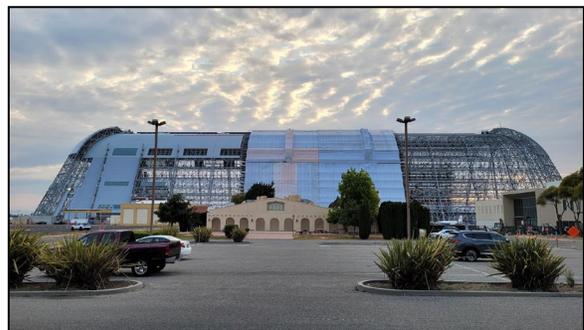


Figure 4-11. Status of the Hangar 1 re-cladding project on August 22, 2023.

Hangar 1 was built in 1933 at Naval Air Station Sunnyvale to house the USS Macon airship. At 1,133 feet long, 308 feet wide, and 198 feet high, the hangar is a focal point of the Shenandoah Plaza Historic District, which is listed in the NRHP under Criterion A for its association with coastal defense and naval technology and Criterion C reflecting the distinctive type, period, and method of construction and high artistic value in the 1933 naval station plan and buildings. Hangar 1 is also designated as a Naval Historical Monument and as a California Historic Civil Engineering Landmark by the San Francisco section of the American Society of Civil Engineers.¹⁶

Artemis I Launch from Launch Complex 39B, KSC

Artemis I is the first in a series of increasingly complex missions that will enable human exploration to the Moon and Mars. The primary goals for Artemis I are to demonstrate Orion’s systems in a spaceflight environment and ensure a safe reentry, descent, splashdown, and recovery prior to the first flight with crew on Artemis II. The launch of Artemis I on November 16, 2022 from historic Launch Complex 39B had 960,000 peak live viewers and as of August 2023 has had more than 10 million YouTube plays. Launch Complex 39B was first used on May 18, 1969, for the Apollo 10 launch to rehearse the first Moon landing. In Figure 4-12, Artemis I is stacked on top of the Space Launch System (SLS) in High Bay 3 of the historic Vehicle Assembly Building (VAB) on August 16, 2022. All of the work platforms have been retracted in preparation for the rollout to Launch Complex 39B.

The VAB was completed in 1966 for the construction of the Apollo/Saturn V moon rocket, the largest rocket made by humans at that time. The VAB is one of the largest buildings in the world by area, covering 8 acres, and is 525 feet tall and 518 feet wide. The VAB doors are the largest in the world at 456 feet high and take 45 minutes to completely open or close. In Figure 4-13, the SLS, the most powerful rocket in the world, carries the Orion spacecraft, launched the Artemis I flight test at 1:47 am EST from Launch Complex 39B at KSC.



Figure 4-12. Artemis I stacked on top of the Space Launch System in High Bay 3 of the historic VAB at KSC on August 16, 2022.

¹⁶NASA Ames, “Hangar One Restoration Project,” <https://www.nasa.gov/feature/ames/hangar-one-restoration-project>, accessed July 2023.



Figure 4-13. Artemis I Launch from KSC’s historic Launchpad 39B on November 16, 2022.

4.3 ACTIVE PRESERVATION: FY21–23 CHALLENGES

Balancing Environmental Remediation with Historic Preservation at Santa Susana Field Laboratory

The Santa Susana Field Laboratory (SSFL) is located on 2,850 acres in southern California. The SSFL opened in 1948 as a site for developing and testing rocket engines for defense and exploration purposes. NASA administers approximately 451 acres of SSFL that was used historically for research, development, and testing of rocket engines associated with the Apollo and Space Shuttle Programs through the 1980s. These operations resulted in the release of chemicals into the soil and groundwater. Inactive since 2006, NASA is currently conducting environmental remediation activities in the NASA-administered portion of the site.

SSFL is located in an area rich with significant Native American cultural resources that include some of the best-preserved pictographs in southern California (Figure 4-14). Native American tribes

including the Chumash, Fernandeño-Tataviam, and Gabrieleño-Kizh have identified the SSFL as a Traditional Cultural Property/Traditional Cultural Landscape (TCP/TCL) and Sacred Site under EO 13007, and continue to use the area today for ceremonies.

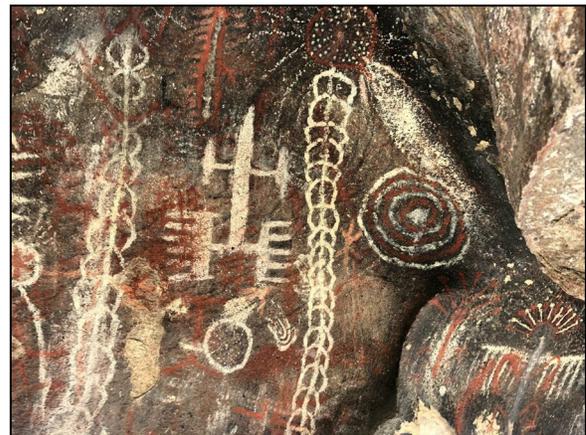


Figure 4-14. Detail photo of the Burro Flats Painted Cave site.

The SSFL cleanup activities have the potential to adversely affect the identified cultural sites of importance to the tribes. In 2014, NASA entered into a PA with the CA SHPO and the Santa Ynez Band of Chumash

Indians to consider the impacts of the cleanup to Native American resources, and NASA continues to engage with the Native American community in order to understand the Native American perspective on SSFL and the surrounding region, including the uses and associations of the Burro Flats Site and other archeological and cultural sites located in NASA-administered areas (Figure 4-15). In 2014, the Sacred Sites Council was created and serves as an advisory board made up of representatives from tribes that have historical ties to the area. It ensures transparency and strong communication regarding the protection of Native American cultural resources throughout demolition and

cleanup activities at SSFL.

NASA is currently facilitating and participating in engagement activities between the Sacred Sites Council and the state agencies overseeing the cleanup to determine how NASA can achieve a cleanup at NASA-administered areas of SSFL that is protective of public health and the environment with the least possible impact to Native American cultural resources. This remains an example of the inherent challenges agencies may face in balancing cleanup responsibilities and stewardship responsibilities.



Figure 4-15. A view of the culturally significant landscape at SSFL.

SECTION FIVE PARTNERSHIPS AND OUTREACH: SUPPORTING THE STEWARDSHIP OF CULTURAL RESOURCES FY21–23

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 than 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.

5.1 TRIBAL PARTNERSHIPS AND CONSULTATION

Oak Grove Revitalization Project in Burro Flats Cultural District, Santa Susana Field Laboratory

As previously mentioned, SSFL is located in an area rich with significant Native American cultural resources that include petroglyphs and pictographs. Native American tribes have identified the entire SSFL as a TCP/TCL and Sacred Site under EO 13007. NASA submitted the nomination of the Burro Flats Cultural District to the NRHP as a TCP to the CA SHPO for review and concurrence in February 2021.

Within the Burro Flats Cultural District is a grove of coastal live oak trees, a species of concern in California. The tribes identified this grove as culturally significant, and it is a contributing element of the TCP. The trees also attract and provide shelter for wildlife. In 2018, after nine years of drought, the Woolsey wildfire burned through SSFL and destroyed much of the oak grove (Figure 5-1). A NASA post-fire assessment indicated

concerns about the next generation of oaks. With the canopy mostly gone, there was limited shade to protect new seedlings as they grow. The NASA SSFL team gathered thousands of acorns, and in consultation with tribes, began experimenting with growing seedlings in an onsite greenhouse and then transplanting them when they were mature enough. Oak acorns are now collected each fall from native oak trees. Once mature enough, the seedlings are planted along the drip line of the existing oak trees to augment the population (Figure 5-2). Currently, 13 oak trees survive in Burro Flats of the 24 that were transplanted as seedlings. This project has been ongoing since 2021. 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, and has been enhanced by the FPO's increased collaboration with tribes Agencywide as part of the 2021 Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships.



Figure 5-1. The SSFL Oak Grove destruction after the 2018 Woolsey fire.



Figure 5-2. Seedlings in the SSFL greenhouse for the Oak Grove revitalization project.

NASA Carbon Monitoring System BlueFlux Outreach

The BlueFlux project began in 2020 as a three-year, 1.5-million-dollar project led by NASA Goddard Space Flight Center (GSFC). The project aims to develop a database of carbon dioxide and methane fluxes (intakes and emissions) for mangrove ecosystems in Florida and the Caribbean.

Mangrove ecosystems take carbon dioxide out of the atmosphere and produce methane in the oxygen-deprived soils, which is emitted into the atmosphere. The objective of the BlueFlux project is to track carbon dioxide removals and methane emissions to better understand the role of mangrove ecosystems in mitigating climate change.

Data collection for this project includes collecting measurements in the air, vegetation, soil, and water. This involves a series of low-level flights over Everglades National Park and Big Cypress National Park to take measurements from the air; and

pedestrian surveys through flooded mangroves to test soil, water, and vegetation. A total of five field campaigns are planned over a two-year period from 2022 to 2023.

NASA GSFC, in consultation with the NPS, determined that the fly-overs and field surveys constitute an undertaking requiring consultation under the NHPA. NASA GSFC coordinated with NASA KSC, the nearest Center, to identify tribes that might have ties to the area to consult under the NHPA and NEPA. NASA's consultation, which concluded in August 2022, included 3 tribes: the Seminole Tribe of Florida, the Miccosukee Tribe of Indians of Florida and the Seminole Nation of Oklahoma. Based on concerns expressed by one tribe, NASA GSFC agreed to change the flight path of the Florida Everglades flyover, to avoid ancestral lands and a tribal reservation.

During consultation, the Miccosukee Tribe of Indians of Florida expressed interest in being part of the discussion regarding mangrove reforestation and greenhouse gas research; the research aligns with the Miccosukee's dedication to understanding climate change and the protection of the mangroves, which are an integral part of both their history and future. NASA GSFC coordinated with the Miccosukee to encourage attendance at NASA's Community Day Open House in October 2022. The open house was open to the public with displays, guest speakers, and a tour of a Beechcraft King Air aircraft, (Figures 5-3 to 5-5). Approximately 50 people attended, including high school students, the public, Park representatives, and members of the Miccosukee.¹⁷ NASA GSFC continues to work with the Miccosukee to develop further plans for educational outreach for the tribal student population over the course of this project.



Figure 5-3. Field survey team in flooded mangrove system.

A flyer invitation for a Community Day Open House. At the top is the NASA Carbon Monitoring System BlueFlux logo. The main text reads: "Connecting climate change, mangroves and communities of the Everglades: The NASA BlueFlux Mission" with a URL: <https://earth.gscf.nasa.gov/local/commissions/nasa-carbon-monitoring-system-blueflux>. It invites people to a Community Day with guest speakers, posters, field demonstrations, an aircraft tour, and a food truck. The event is at Homestead Airport, Homestead, Florida, on Sunday, October 16, 2022, from 10am-2pm. An RSVP link is provided: <https://forms.gle/Bcjrj8a8XXMzmguc9> and a QR code. Logos for NASA, GODDARD SPACE SCIENCES, ECU, YALE, and FIU are at the bottom.

Figure 5-4. Flyer invitation for Community Day Open House.



Figure 5-5. Tour of a Beechcraft King Air aircraft for the BlueFlux open house event.

¹⁷ Ben Poulter, newsletter for the Florida Coastal Everglades Long Term Eco Research Network, dated October 20, 2022.

2021 EO 13175 Tribal Forum and Listening Session

In January 2021 President Biden issued a Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships. Reaffirming the commitment to meaningful consultation with tribal officials originally laid out in the 2000 EO 13175, Consultation and Coordination with Indian Tribal Governments, the 2021 Memorandum required each agency to develop a detailed plan of action to implement the policies and directives of EO 13175. In support of the 2021 Memorandum, NASA hosted a virtual forum and listening session with tribal leaders and representatives on January 11, 2023. The goal of the forum was to begin conversations with federally recognized tribes, and to solicit feedback on how NASA can enhance its consultation process and its engagement in areas of potential shared interests.

The virtual forum and listening session was attended by 48 tribal leaders and representatives from 19 tribal nations and 17 NASA representatives (Figure 5-6). Participating tribes included Blue Lake Rancheria, Chmehuevi Indian Tribe of the Chemehuevi Reservation, Chickahominy Indian Tribe, Choctaw Nation of Oklahoma, Confederated Tribes of Grand Ronde, Hoopa Valley Tribe, Jamestown S’Klallam Tribe, Kiowa Tribe of Oklahoma, Knik Tribe, Lummi Nation, Mille Lacs Band of Ojibwe, Native Tribe of Kanatak, Native Village of Atka, Northwestern Band of the Shoshone Nation, Passamaquoddy Tribe, Pinoleville Pomo Nation, Saginaw Chippewa Tribal of Michigan, Santa Ynez Band of Chumash Indians, Skagway Traditional Council, Tolowa Dee-ni’ Nation, and United Keetoowah Band of Cherokee Indians. Welcoming remarks were prerecorded by

NASA Administrator Bill Nelson, Deputy Administrator Pam Melroy, and Colonel Nicole Mann, the first indigenous woman in space, who provided comments from the International Space Station (ISS). An opening invocation to the virtual forum was offered by Ms. Nakia Zavala and her daughter, Hannah Lint, of the Santa Ynez Band of Chumash Indians. In addition, the pair offered a performance of the Chumash Red Tail Hawk song.

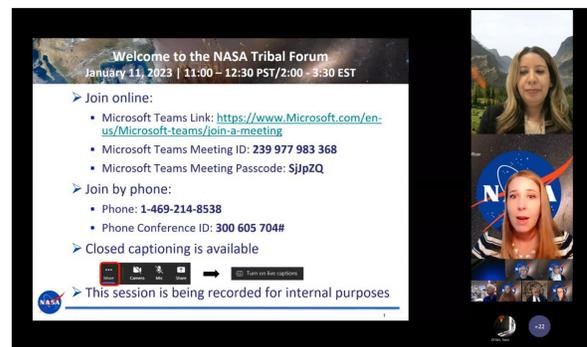


Figure 5-6. Screenshot of the opening of the virtual forum and listening session.

The remainder of the session was opened to the participants, to offer comments, concerns, requests, or recommendations regarding opportunities to improve NASA’s engagement with tribal governments. Tribes were also invited to submit written comments via an online comment form or through email. Input received can be summarized as follows:

- Comments expressed limited familiarity with NASA’s work and its current engagement and consultation activities with tribal nations.
- Interest in Science Technology, Engineering, Mathematics (STEM) partnerships and educational opportunities for pre-college students and rural communities. Those comments were provided to the Minority

University and Research Education Project (MUREP) for American Indian Alaskan Native STEM Engagement (MAIANSE) within NASA's Office of STEM Engagement for further action.

- Interest in science opportunities, specifically areas for collaboration between NASA and tribes.
- Comments focused on providing tribes access to NASA data for their tribal research projects, particularly in regard to landscape monitoring and management. Suggestions and comments from the forum were provided to NASA's Earth Science Division and Indigenous Peoples Initiative for further action.
- Recommendations for NASA's consultation process with tribes emphasized the importance of meaningful consultation, need for transparency, and requests for sufficient notice and adequate information to engage in consultation.
- One comment requested information on small business opportunities and was forwarded to NASA's Office of Small Business.
- Comments expressed general appreciation of NASA's support, partnering, and outreach efforts.

NASA-specific resources were shared during the forum in response to specific comments or questions. These resources included NASA's Office of STEM Engagement; the MAIANSE Program; NASA's Office of Procurement; the Develop National Program; the Prizes and Challenges Program; and the Plankton, Aerosol, Cloud, Ocean Ecosystem (PACE) mission. NASA is working to review the feedback and determine the best path for addressing the comments related to processes

for compliance with EO 13175, which will be considered in the development of the Plan of Action.

5.2 INTERAGENCY PARTNERSHIPS

Partnership with Air Force on Mars Sample Return

Mars Sample Return (MSR), a joint project by NASA and the European Space Agency (ESA), is a proposed mission to return Mars surface samples back to Earth. The mission would return Mars samples being collected by the Perseverance rover, already on Mars, and land them in Department of Defense's (DoD's) Utah Test and Training Range (UTTR), under the jurisdictional control of the Department of the Air Force (DAF), managed by Hill Air Force Base (AFB). The collection, containment, retrieval, and return of the samples is considered Tier 1 of the MSR project. Once the landing is secured on earth, the samples would then be moved for study and better understanding of Mars, the second Tier of the mission.

The Utah landing site required Section 106 consultation under the NHPA, including government to government consultation with 21 tribes.

In 2023, NASA executed a Memorandum of Understanding (MOU) with the DAF, designating the Air Force as the lead Federal Agency on the MSR Tier I Section 106 consultation effort, in order to leverage the new PA that the Air Force recently executed with the Utah SHPO. The Air Force, specifically AFB, partnered with NASA to ensure their PA covered Earth Return Retrieval Actions, such as MSR. NASA's ability to utilize DAF's PA streamlines the consultation and mitigation for MSR and



future NASA actions. The PA includes stipulations for archeological monitoring and outlines potential mitigation measures to resolve any adverse effects. Under the MOU, NASA will remain the lead for tribal consultation throughout Mars Sample Return Tier I.

5.3 OUTREACH AND EDUCATION

Internal Outreach and Education

Center emphasis on internal education and training provides a new way to garner Center support for preservation initiatives and programs. NASA CRMs regularly give awareness trainings to NASA personnel during pre-construction meetings, and Permit Review Board meetings. CRMs also brief new hires in the Facilities Engineering Branch to educate them about CRM and the Section 106 process. At ARC, the CRM regularly meets with the NASA Native American Advisory Group and the NASA Native American Artifacts Working Group to educate about cultural resources, land acknowledgements, and consultation with tribes. At LaRC, the CRM conducts quarterly history tours for new hires.

Kennedy Space Center Tour of Elliot Plantation

Elliot Plantation is the southern-most intact British sugar plantation in North America, dating to the 18th century. At its height, the plantation consisted of 2,585 acres between the Indian River and Mosquito Lagoon. Records indicate between 75 and 90 enslaved

Africans were brought to construct and run the plantation. It contained two working settlements, indigo works, a sugar factory, rum distillery, two villages to house enslaved people, two overseer houses, several outbuildings, roads, canals, bridges, and docks. The plantation was abandoned, and the livestock and machinery were sold after it was raided by Spanish privateers following Spain's declaration of war against Great Britain in June 1779.¹⁸

Archaeological investigations led by NPS' Southeast Archaeological Center in 2008 and 2009 recorded and mapped features associated with Elliot's plantation within the KSC property (Figure 5-7). The Elliot Plantation sugar works area contains the oldest standing sugar processing facility in North America and the plantation is considered to be one of the most significant and well-preserved known African American landscapes. In 2022 and 2023 during Juneteenth and Black History Month respectively, events were planned to honor the contributions of Black Americans in history. A virtual tour of the Elliot Plantation site and a pre-recorded webinar featuring the NPS archaeologist who led the archaeological investigations was available to KSC staff. Additionally, in person tours for staff were held on June 14, 2022 and on February 16, 2023. The tours had 96 attendees in total and discussed the Black individual's perseverance in the face of great adversity (Figures 5-8 and 5-9). In 2023 for Juneteenth, KSC also published a short video describing the history of the plantation and provided a virtual tour of the ruins on YouTube for the public.¹⁹

¹⁸ Susan Parker, Canaveral National Shoreline Historic Resource Survey, National Park Service, Titusville, Florida, 2008.

¹⁹ NASA's Kennedy Space Center, "Elliot Sugar Plantation Ruins at Kennedy Space Center," accessed online, <https://www.youtube.com/watch?v=DMEiZ1dAnm4>, July 2023.





Figure 5-7. Archaeological remains of the Elliot Plantation on NASA's KSC. Credits: NPS.²⁰



Figure 5-8. NASA staff at the morning tour of the Elliot Plantation at KSC.

²⁰ Costa, <https://www.nasa.gov/feature/plantation-ruins-250-year-old-history-preserved-at-kennedy>, July 2023

Development of Internal CRM SharePoint Site

During the reporting period, NASA developed an internal CRM SharePoint site. This site is intended for non-CRM NASA personnel and provides for the first time an Agency-wide resource where staff can look around, learn, and ask questions about NASA’s historic resources. There is general program information, points of contact, a document library, and a schedule with upcoming Community of Practice meetings and training opportunities (Figure 5-9).

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 a 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 Johnson Space Center (JSC) and KSC, both of which received, prior to the SARS-CoV-2, 2019 Novel Coronavirus (COVID-19) pandemic, over 1.5M visitors a year. During the pandemic, Centers were not open to the public for short periods of time, but many offered virtual programs during this time. Visitation is now climbing back towards pre-pandemic numbers. 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.

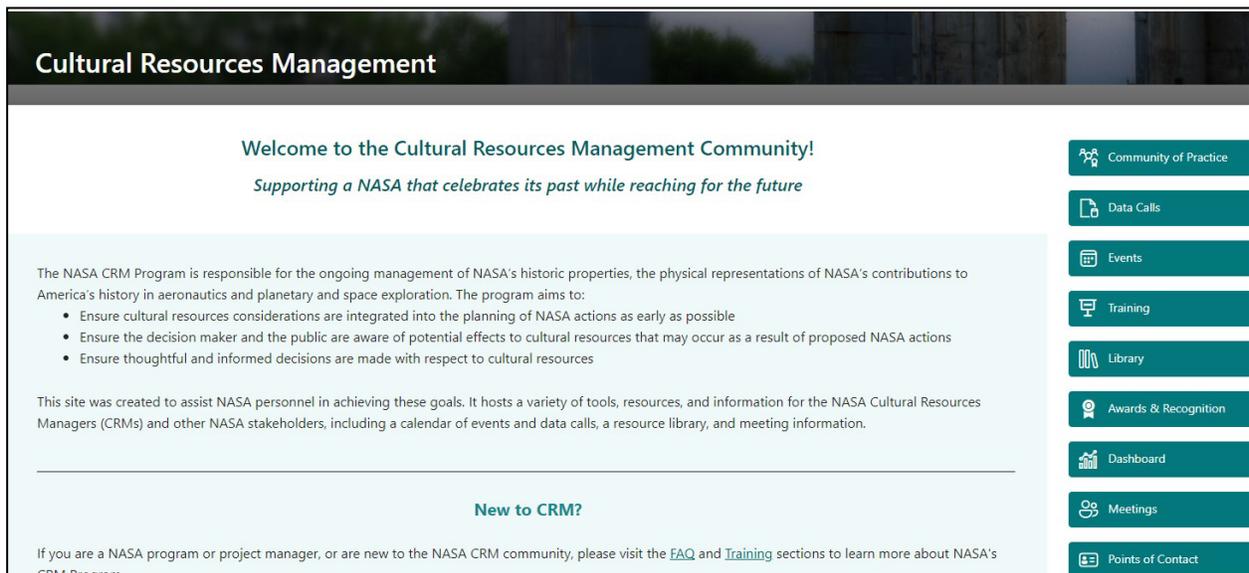


Figure 5-9. Screenshot of the NASA Internal CRM SharePoint site.

CRMs Present at NPS Symposium

NASA CRMs were able to attend sessions at the NPS National Center for Preservation Technology and Training's *Preserving the Race for Space: Small Steps and Giant Leaps 2023* symposium while in Florida for the NASA CRM face-to-face. The symposium included two NASA speakers on the agenda: Katherine Zeringue, KSC CRM, gave a presentation on "Historic Preservation through Adaptive Reuse at Kennedy Space Center;" and Sandra Tetley, JSC CRM, presented "Preserving the 'Cathedral': Restoration of the Apollo Mission Control Center" with Dr. Adam Graves.

Increased Visitation at Johnson Space Center

In 2019, NASA completed a six-year effort to restore the Apollo Mission Operations Control Room 2 (MOCR-2) to its Apollo-era condition. MOCR-2 is located within Building 30, the Christopher C. Kraft, Jr. Mission Control Center (MCC), at JSC, which was originally constructed in 1964 and designated an NHL in 1985. MOCR-2 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. In 1992, the room was deactivated following the addition of Building 30S, when mission operations were transferred to the newly operational White Flight Control Room. MCC was used as a tour stop for periodic NASA events. Discussions at JSC about the possibility of restoring the MOCR first began around this time but were never completed. Funding efforts began in 2013 and concluded in 2018, when the restoration work commenced.

The fully restored MOCR 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 (Figure 5-10). The Grand Opening and Ribbon Cutting of the newly restored Apollo MCC was celebrated in June of 2019 and on July 20, 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.

The opening of this new publicly accessible exhibit space has increased heritage tourism at JSC, even despite the closure for several months in 2020 during the COVID-19 pandemic. After the shutdown, timed tickets were required for the visitor center, limiting the number of people inside. Regular ticket sales resumed in 2022. As part of the restoration and long-term preservation plan, NASA placed limits on the numbers of people who can access the MOCR floor, and has recently raised ticket prices by 50%. It is not yet known how this price increase will impact overall visitation numbers.



Figure 5-10. Restored MOCR-2, showing recreated computer screens (foreground) and viewing screens (background).

In 2021, JSC received 881,928 visitors, and by 2022, the number climbed to over one million, with 1,147,868 people visiting the space center that year. As of May 27, 2023, 501,100 people have already visited JSC, making it likely that this calendar year will also soar past the one million visitor mark. By preserving this incredible space, NASA allows future generations to learn about the Apollo 11 Moon landing in the restored rooms of the Mission Control Center where history was made.

Public 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. The Armstrong Flight Research Center (AFRC) hosts an annual Earth Day celebration as well as other conservation events which generally attract between 30 and 200 people. Additionally, the AFRC Visitor Center reopened in the spring of 2023, which included new exhibits and refurbished attractions. Glenn Research Center (GRC) hosts open houses as well as tours of the historic facilities at Lewis Field and Neil A. Armstrong Test Facility. There is also an offsite visitor center at the Great Lakes Science Center in Cleveland, Ohio.

At ARC, large public events remain suspended since the COVID-19 pandemic, but the new, offsite Ames Visitor Center at Chabot Space & Science Center in Oakland, California opened in November 2022. There are also self-guided tours in Shenandoah Plaza Historic District for the public, and virtual tours of facilities, among other virtual events.

SSFL Donation to Edwards Air Force Base Museum

As part of the mitigation for demolition of some historic resources, often through MOAs, NASA is able to donate artifacts to museums to share NASA knowledge with a larger audience. In December 2020, the SSFL CRM worked with interested parties from the Edwards U.S. Air Force Base Flight Test Museum to identify items from the Bravo Test Stand area that had value for curatorial institutions. The Bravo test area was built between 1955 and 1956 and was used to test rocket engines and components from the Apollo era to the Space Shuttle era (Figure 5-11). In 2021, the Bravo Test Stand “tiki torch” flares were removed and stored on site for future curation. In 2022, they were delivered to Edwards Air Force Base for curation at the museum (Figure 5-12). The CRM is currently working to identify artifacts for future curation at the Coca Test Stand area.



Figure 5-11. 1960 Photo of Bravo Test Stand undergoing a hot fire test.



Figure 5-12. 2022 Transport of Bravo Test Stand “tiki torches” to U.S. Air Force Flight Test Museum at Edwards Air Force Base.

Use of CRM Website for APA Consultation

Since November 2022, NASA has used the CRM website to share drafts of the APA with the Consulting Parties and the general public, along with flow charts, recordings of past meetings, consultation meeting schedules, and other relevant updates about the APA’s

progress (Figure 5-13). The final copy of the RSF is also on the CRM webpage. The APA subpage has a frequently asked questions section and contact information for how to get in touch with the APA team.

5.4 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. As NASA enters FY24, the agency hopes to continue to take a comprehensive approach to its historic resources, looking Agencywide at how it can best use its limited funds to preserve the most significant historic resources.

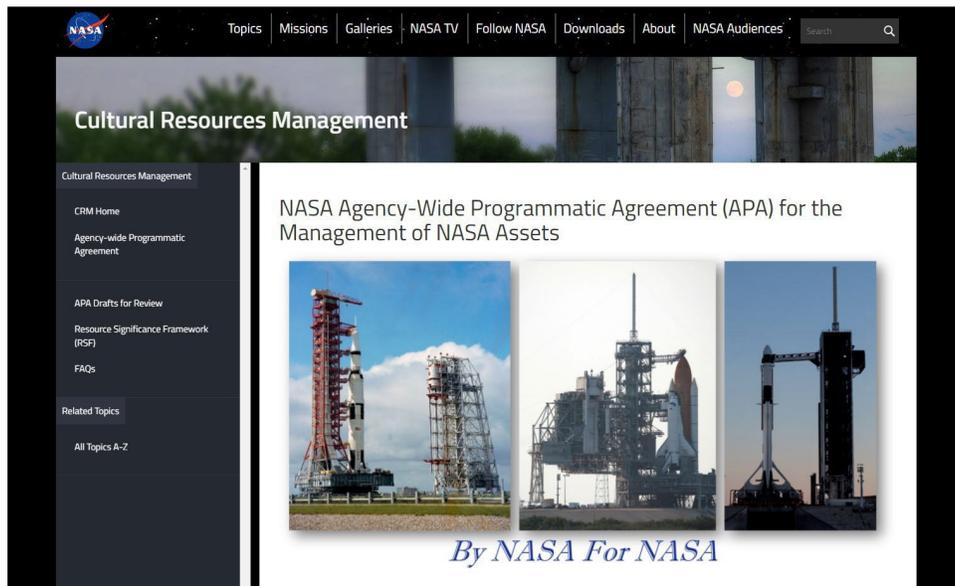


Figure 5-13. Screenshot of NASA CRM website with the APA subpage shown.²¹

²¹ NASA, Cultural Resources Management, https://www.nasa.gov/emd/crm/nasa_apa.

