



# Smithsonian Institution

Office of the Deputy Under Secretary for Collections and Interdisciplinary Support

February 2015

I am pleased to provide the final report of the Smithsonian's Collections Space Framework Plan.

This report summarizes a multi-year, highly collaborative, and interdisciplinary planning initiative designed to assess current collections space conditions and to recommend a framework for addressing current and projected Smithsonian-wide collections space requirements. Many of these recommendations are already being implemented through the Smithsonian's capital plan.

This report reflects the continual strides the Smithsonian is making in adding and improving collections space in a pragmatic, strategic, and integrated manner through facilities capital and collections care projects. Our challenge is great but attainable—to address the Smithsonian's short and long-term collections space needs, to enhance overall collections stewardship, and to ensure Smithsonian collections continue to thrive as the intellectual base for scholarship, discovery, exhibitions, and education.

Thank you for your support in strengthening the Smithsonian's overall commitment to collections and collections space.

Sincerely,

Scott E. Miller, Ph.D.

Deputy Under Secretary for Collections and Interdisciplinary Support

# Securing the *future* for Smithsonian Collections



*Smithsonian Collections Space Framework Plan*



Smithsonian Institution

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# INTRODUCTION

Inspiring Learning and Discovery Begins with Collections

A child stands before the space shuttle *Discovery* at the Udvar-Hazy Center, dreaming of exploring new frontiers in outer space.

A high school student relishes the ArtLab+ digital media workshop at the Hirshhorn Museum and Sculpture Garden, where he has started making his own films after school, often drawing inspiration from nearby gallery walls.

A family whose distant ancestors fought in the Battle of Baltimore stands before, and reflects upon, the actual Star-Spangled Banner.

A teacher in Warsaw, Poland, uses the Folkways website to share with her classroom the protest songs that echoed through the streets when she was their age.

A scientist uses the information captured in invertebrate zoology specimens to work on a predictive model of the impact of future environmental events like the 2010 *Deepwater Horizon* oil spill.

A visitor to the Smithsonian Institution Archives blog spots a 90-year-old photograph of a scientific illustrator at work and realizes it's her grandmother—a revelation that helps bring her family's story to life.



THE SMITHSONIAN'S unrivaled collections—138 million objects and specimens, two million library volumes, and 157,000 cubic feet of archival material, all constantly growing—enable these journeys, which can happen nowhere else on Earth.

For America and the world, the Smithsonian is home to decades of discovery, untold cultural riches, the puzzle pieces to scientific mysteries, and unique resources for research and education.

Outstanding stewardship of these amazing collections is the foundation of a public trust that extends from the Institution's founding in 1846. Stewardship begins with space. Collections space must provide secure, precisely maintained environmental conditions to safeguard irreplaceable objects. It must be sufficient and well-designed to ensure access for experts and the public alike—now and in the future.

## **COLLECTIONS SPARK INQUIRY AND DISCOVERY**

Among the collections are national icons such as The Jefferson Bible; portraits of U.S. presidents; frozen biological materials used in biodiversity research, including genetic analysis; and fascinating memorabilia of popular culture, including uniforms of the Harlem Globetrotters. Objects are as large as a Saturn V launch vehicle, as tall as a Tlingit totem pole, as delicate as Cretaceous fossils belonging to animals that co-existed with dinosaurs, and as small as microbes unseen to the human eye.

Smithsonian collections preserve cultural legacies through landmark projects like Recovering Voices, which has saved the last-known documentation of 130 languages no longer spoken anywhere on Earth. The National Museum of Natural History specimens help advance discovery about the spread of deadly diseases and the loss of biological diversity that only time and advancing technology may reveal.

From school children to scholars, users of collections share a common passion. They are bound together by a thirst for knowledge. Their fascination is piqued by what new insight is just beyond the next horizon. The Smithsonian becomes their university of the world, a window on the past—and a place to glimpse the future, too.

## SPURRING ENGAGEMENT, SAFEGUARDING COLLECTIONS

Collections staff members make the objects they process, preserve, conserve, and protect accessible to researchers and the public. They develop and use best practices, securing the Smithsonian's place as a global leader in collections care and management. They also create exhibitions, scholarship, and other opportunities for objects to tell their stories and acquire greater meaning.

Staff often break new ground—from extracting the sound from experimental Alexander Graham Bell recordings to helping revolutionize online visitor experiences through 3-D digitization—thereby creating precedents for colleagues and peer institutions around the world.

## COLLECTIONS SPACE IS CENTRAL TO THE SMITHSONIAN'S MISSION

The quality of collections space and storage equipment affects the Smithsonian's ability to make collections available to staff, scholars, and the public through traditional methods and new technologies. If facilities are not in excellent condition, access can be impaired, and the collections themselves could be in danger of losing their integrity for future generations.

Capacity is equally important. The Smithsonian urgently needs more space to continue fulfilling its mission to acquire new collections and to protect collections already held in trust. It must be able to continually upgrade and modernize space and equipment, and do so efficiently and cost-effectively.

How well the Smithsonian is able to respond to these needs and challenges impacts the future of its collections, as well as the integrity and vitality of the Institution. The evaluation process, rigorous standards, and recommendations that follow sound an urgent, needed call to action.

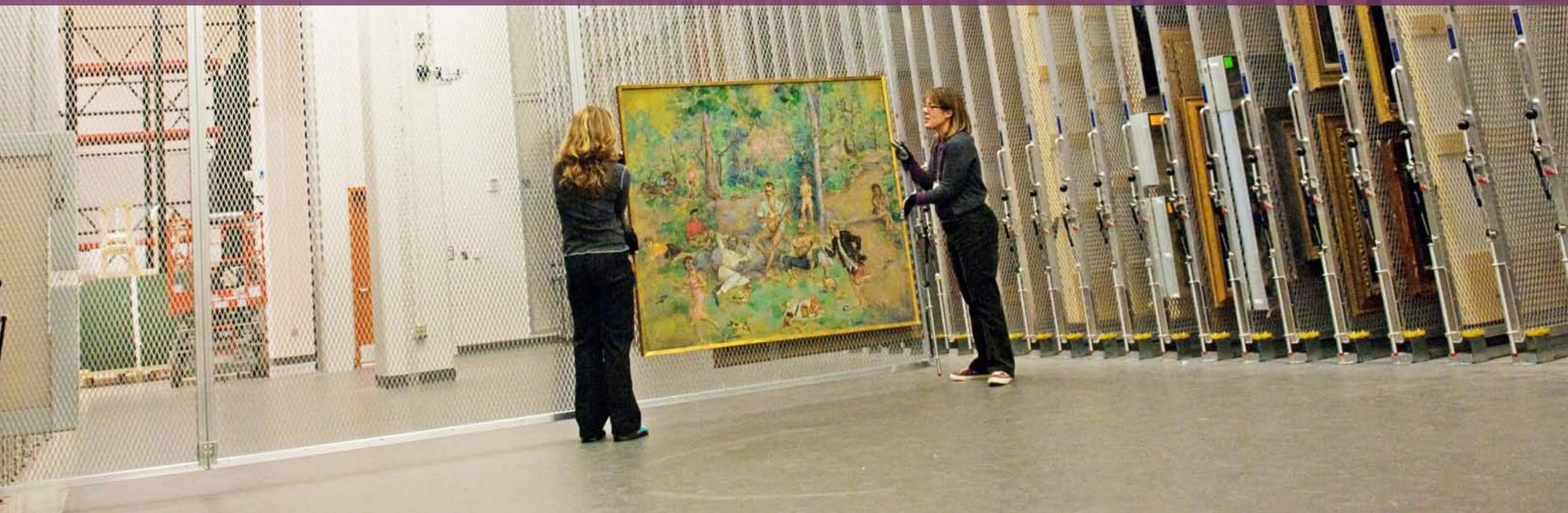


*As vast as the reaches of the human imagination, the **Smithsonian's collections** are only as enduring as the care invested in them. Care begins with the best collections space.*



## THE BIG PICTURE

Reinvigorating a Commitment to Collections—and Collections Space



Progress in improving collections space must be pan-Institutional. It must involve every museum and storage facility, as well as experts in collections, facilities management, and capital planning—all working together.

The Smithsonian's commitment to collections stewardship has been steadfast over its history. It has made continual strides in improving the management, care, and accessibility of collections. Smithsonian leaders have balanced strategic thinking and pragmatism. They have developed an integrated approach that has yielded considerable progress and resulted in action and change around a range of issues. Priority initiatives examine the physical care and condition of collections, as well as the digital and intellectual accessibility of collections, pursuing in parallel an examination of the amount and condition of the space used to safeguard collections.

- The 2005 report *Concern at the Core* studied Smithsonian collections for the first time as a whole—how they are acquired, documented, preserved, housed, and used—and focused on the most important challenges and opportunities, including collections space.
- Also in 2005, the **Smithsonian Collections Advisory Committee** was formed to guide Smithsonian senior management in setting priorities for collections. The next year, the Committee recommended making space the highest collections priority, stating, “There is an immediate need for permanent, proactive, Institution-wide planning of collections space.” The committee made sure this priority became part of Smithsonian strategic planning.

- The **2010–2017 Strategic Plan, Inspiring Generations Through Knowledge and Discovery**, reinforced the importance of strengthening collections stewardship, saying the Smithsonian must “continue to improve the quality of collections preservation, storage space, management, information content, and physical and electronic access.” The plan calls for the development of a new cross-disciplinary approach to the way the Smithsonian works—one that promotes collaboration and partnerships.
- In 2010, the Smithsonian established a new position, the **Deputy Under Secretary for Collections and Interdisciplinary Support**, to give a higher visibility to collections and preservation and serve as a central catalyst for pan-Institutional collections initiatives.
- As part of the implementation of the Strategic Plan, the **Smithsonian Collections Space Steering Committee** was formed in 2010 to assess current conditions and develop recommendations for addressing current and projected Smithsonian-wide collections space requirements.
- Also in 2010, the Smithsonian began to view collections through a pan-Institutional lens—as assets and resources shared by all museums—a direct outcome of a decisive cultural shift at the Institution, from a complex of museums to a single, integrated Smithsonian.

#### **COLLECTIONS: THE FOUNDATION OF THE SMITHSONIAN'S PUBLIC TRUST**

The Smithsonian has been in the collections business from the beginning. In 1846, Congress directed the Smithsonian to create a collection of “objects of art and of foreign and curious research, and ... of natural history” (20 USC § 50). More recently, Congress recognized the value of the Federal scientific collections as vital to America’s “scientific enterprise” (42 USC § 6624).

In March 2014, the U.S. Office of Science and Technology Policy reaffirmed the value of “ensuring the proper management, preservation, security, and ethical use of Federal scientific collections to inform scientific research and maintain the Nation’s legacy of exploration and discovery.” The same policy continues, “Scientific collections provide an essential base for developing scientific evidence and are an important resource for scientific research, education, and resource management. Scientific collections represent records of our past and investments in our future. Policies and procedures for maintaining, preserving, and developing Federal scientific collections while also increasing access to those collections for appropriate use are, therefore, central to their value.”



#### FOUR CHALLENGES: ONE SMITHSONIAN

In 2009 and 2010, the Smithsonian undertook a comprehensive strategic planning process to shape its focus and set a course for the future. Four Grand Challenges were chosen that framed the majority of the Institution's work. All of them depend on the depth and breadth of Smithsonian collections:

- Unlocking the Mysteries of the Universe
- Understanding and Sustaining a Biodiverse Planet
- Valuing World Cultures
- Understanding the American Experience

This new Institution-wide commitment is expressed in many ways, with collections often in a significant supporting role. For example, as part of strategic planning, the Smithsonian defined four Grand Challenges to guide its work and inspire greater collaboration among museums and across disciplines. The pan-Institutional groups overseeing these joint projects have organized some of the most ambitious exhibitions ever, which in turn have drawn on collections from many distinct museums, united in a common purpose.

At the collections staff level, the change has had an immediate impact. Historically, the management of collections has been decentralized and delegated to individual museums. The recent cultural shift has resulted in a cross-disciplinary approach to collections-related challenges and opportunities. And it has forged connections between collections management staff and facilities management staff. Together, they have begun crafting holistic strategies that capitalize on economies of scale and enable comprehensive improvements.

Today, there is broad, Institution-wide support for a fundamental new way of thinking about collections: to bring about measurable, sustainable change, *the Smithsonian must consider collections as a whole, across all museums and facilities.*

This concept guided the Smithsonian as it prepared to rigorously examine the totality of its collections space, advance planning and engagement around collections space as never before, and prepare to substantially strengthen both collections space and the Smithsonian's capacity for outstanding stewardship for decades to come.



Ranger Rick's EarthSavers Club Journal  
My Name: \_\_\_\_\_  
Date: \_\_\_\_\_  
Please print your name clearly!

At the spot below and on the  
page opposite, look for signs of  
life. Record your observations. You're  
being a nature poet!

Small container with a lid, containing a dark substance, likely soil or a sample for observation.



## PROCESS & TOOLS

Charting a Roadmap for the Future of Collections Space



The **Collections Space Framework Plan** is a comprehensive, inclusive, Smithsonian-wide project aimed at safeguarding the Institution’s remarkable collections for current and future generations. While not intended to provide detailed solutions to all collections space needs, planning has established a clear yet flexible roadmap for further strengthening stewardship, informing management decisions and maintenance protocols, and guiding short- and long-term allocation of resources.

This work was the first major responsibility of the newly formed **Collections Space Steering Committee**. The Committee brings together a diverse, Smithsonian-wide group of leaders, including collections managers, curators, conservators, facilities managers, architects, engineers, registrars, real estate managers, security specialists, and fire protection engineers. It also leverages the input of external experts, primarily architects, engineers, and collections preservation professionals, who have proven essential to the planning process.

The Committee’s charge was to address current and projected collections space needs for the near term (through 2017), intermediate term (2018–2027), and long term (2028–2037), and to lay the groundwork for how the Smithsonian can:

- Safeguard irreplaceable collections in the best possible conditions.
- Store collections more efficiently, cost-effectively, and sustainably, with centralized quality control.
- Make collections more accessible for staff members who process, care for, and share objects.

- Develop a strategic, integrated approach to addressing current needs, which in turn helps anticipate future needs.

The Committee began by taking a snapshot of current conditions. To do so, the Committee oversaw a first-of-its-kind assessment of more than 2.1 million square feet of collections space in 1,800 individual locations at more than 35 properties and 90 buildings, both leased and owned, including facilities that are National Historic Landmarks.

#### **WHAT IS COLLECTIONS SPACE?**

The Smithsonian defines collections space as “an area, owned or leased, enclosed or outdoors, the primary purpose of which is to permanently protect and preserve, through managed environmental and security controls, collections owned by or in the custody of the Smithsonian Institution in furtherance of its mission; and may include adjacent areas that provide managed environmental and security controls suitable to accommodate temporary use of collections.”

This study of collections space does not include exhibition spaces. Collections space makes up 18 percent of the Smithsonian’s total space and houses many functions. These range from providing temporary and permanent storage for collections of every possible type and size, requiring every conceivable method of care, to creating safe, productive processing and laboratory space for all staff and researchers who work with collections. The mandate for all collections space is the same: to preserve and protect, and facilitate access to, vital cultural and scientific heritage.

The discovery process set out to identify the greatest needs for collections space across the Smithsonian and to recommend strategies that are realistic, flexible, and proactive—ones that will upgrade space today and meet projected needs in the coming years and decades.

Public and private resources to support this important work are very limited. Given this constant challenge, the Committee realized that it was critically important to show how the Smithsonian can leverage economies of scale and improve collections care across the Institution efficiently and cost-effectively.

## How much space was assessed?

1,800 spaces at  
90+ buildings

*belonging to or leased by*  
25 museums and research/cultural  
centers that store collections

*comprising*  
2.1 million square feet



## GATHERING DATA ABOUT COLLECTIONS SPACE

The first phase of work studied all collections space, noting key features such as location, size, use, and capacity to meet essential criteria. Information gathered led to the establishment of the **Collections Space Database**, the first-ever comprehensive inventory of all 1,800 collections space locations across the Smithsonian.

The Committee's first step was designing a survey to capture data about quality, current conditions, and needs across categories focused on preservation and access:

- ▶ Construction
- ▶ Environment
- ▶ Fire Safety
- ▶ Security
- ▶ Collections Storage Equipment

Completed surveys populated the Database. With conditions always in flux, it became clear that follow-up surveys were needed so that the collections and facilities management staff can report the most recent data, including improvements, new challenges, changes in leased space, and additions of newly built space. The survey has become a multipurpose tool: it helps maintain the Database, helps establish priorities for capital planning and collections care projects, and helps inform the need for feasibility studies and master planning. The Committee now issues an annual request for updates.

## SETTING AND APPLYING RIGOROUS STANDARDS

The next priority was developing a scoring method to quantify survey data and, in turn, seed a grading system for all 1,800 locations.

Because planning included every factor involved in adding, maintaining, and upgrading space and thinking about collections space over decades, the grading system is both demanding and flexible. It can be updated as standards evolve, positioning the Smithsonian for long-term effectiveness.

The grading system's categories are descriptors of conditions based on current Smithsonian standards:

**OPTIMAL:** The space meets or exceeds current standards. Room for improvement, if needed, may include: cosmetic damage to building surfaces and/or minor issues with environment, safety, security, or storage equipment.

**ACCEPTABLE:** The space meets the majority of standards but still can be improved. Areas for improvement may include some of the following: recurring environmental problems; manageable water/pest infiltration or exposure to hazards; safety and security issues in need of corrective action; and/or upgrades to storage equipment.

**UNACCEPTABLE:** The space fails to meet current standards or falls significantly below them. Corrective actions must be taken to address some or all of the following: poor environmental conditions; failing building construction; and problems with safety, security, or storage equipment that pose a risk.

The Committee constructed the grading system to be rigorous. Major shortcomings in one area or minor shortcomings in multiple areas automatically result in an “Unacceptable” rating. In this way, the system casts the most critical eye on current space and its condition, highlights needs, and develops a baseline for collections space planning.

### RESULTS OF THE EVALUATION

More than half of Smithsonian collections space is “Optimal” or “Acceptable,” including the one-third of space that achieves an “Optimal” grade.

The Smithsonian is committed to taking action to upgrade or replace “Unacceptable” space, and the evaluation pointed out tactics that will make considerable headway:

- The average “Unacceptable” score is within 7 percent of an “Acceptable” grade, indicating that a **substantial amount of “Unacceptable” space can improve to “Acceptable” with corrections in just one scoring category.**

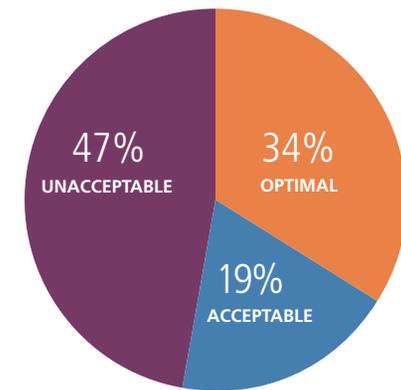
- The Smithsonian undertakes comprehensive projects to upgrade collections space across multiple categories. It is a practical, impactful strategy that takes advantage of cost efficiencies. **That means planned renovations and replacement will often address more than one scoring category at the same time.** For example, replacing and reconfiguring storage equipment may call for upgrades to security, fire protection, and mechanical equipment as well. The best possible outcome is being able to upgrade to “Optimal” collections space that is currently “Unacceptable” and “Acceptable.”

- The Smithsonian can make great headway by prioritizing improvements to the collections space responsible for the majority of “Unacceptable” space. More than half of this space is in two facilities: the Paul E. Garber Facility, comprised of 25 buildings at the Suitland Collections Center in Suitland, Maryland, and the National Museum of Natural History’s Mall building. **By focusing resources on these two locations, the Smithsonian can resolve most outstanding collections space issues.**

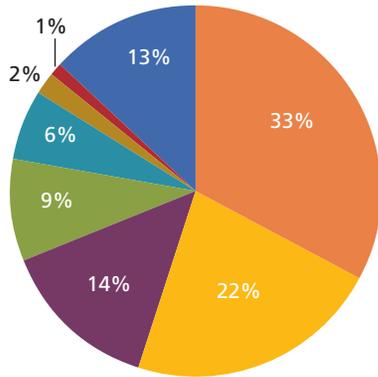
Because planning included every factor involved in adding, maintaining, and upgrading space and thinking about collections space over decades, **the grading system is both demanding and flexible.**

### The Results

Using data from September 2012, the Collections Space Database classified the 2.1 million square feet of collections as follows:

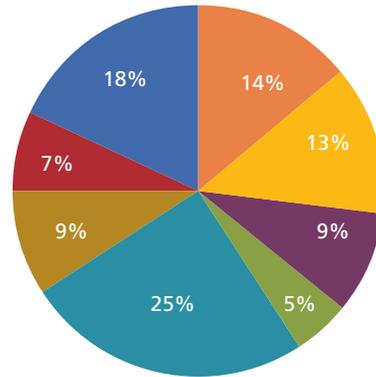


### LOCATION OF UNACCEPTABLE COLLECTIONS SPACE



- Paul E. Garber Facility – Suitland
- National Museum of Natural History – Mall
- National Zoological Park
- National Museum of American History – Mall

### LOCATION OF ALL COLLECTIONS SPACE



- Museum Support Center – Suitland
- Penny Collections and Support Center
- National Air and Space Museum – Dulles
- All Other

### EVALUATING SPACES AND IDENTIFYING NEEDS

As a final step in the discovery process, master planning staff and external experts led a team that conducted an additional research phase. To catalog and analyze site-specific challenges and needs, they interviewed representatives of all Smithsonian museums and facilities that maintain collections. They requested estimates of anticipated future growth and drilled down into the information gathered in surveys about the quality, density, and utilization of storage equipment, enabling new insights about conditions that can impede access to collections.

After aggregating the Database analysis and these evaluations, the Committee had a thorough understanding of existing conditions and the diversity of issues facing individual museums and facilities. Here was the foundation on which to begin planning in a proactive, cost-effective manner, and the starting point for assessing space moving forward—consistently and always through a pan-Institutional lens.

This study of collections space does not include exhibition spaces. Collections space makes up 18 percent of the Smithsonian’s total space and houses many functions.





# FINDINGS

Drawing Conclusions from Assessment and Evaluation



The study next identified four major findings. While indicating progress and the value of pan-Institutional collaboration, these findings also suggest that the Smithsonian must elevate its overall commitment to collections space, including an integrated approach to capital planning (i.e., renovating existing collections space and building new space).

The findings also offer a reminder of the continual need to upgrade and replace collections space. Some of the space now in “Unacceptable” condition was deemed state of the art not long ago. They also signal the importance of responsible, ongoing maintenance for collections space and of monitoring all space with tools like the Database survey.

**FINDING 1: The Smithsonian is making steady progress in adding and improving collections space to achieve the best possible collections care and management.**

Over the last decade, Smithsonian leaders have begun a program of major improvements, resulting in significant upgrades to a wide range of collections space.

- The Steven F. Udvar-Hazy Center has significantly increased the capacity of the National Air and Space Museum to display, house, manage, preserve, and restore its collections.
- The National Museum of Natural History improved collections and laboratory space for invertebrate zoology on the second floor of the west wing, as well as processing and laboratory space for paleobiology on the northeast ground floor.
- The Hirshhorn Museum and Sculpture Garden has upgraded collections storage and processing spaces.

- A new facility at the Museum Support Center in Suitland, Maryland, named “Pod 5,” was specifically designed and built to more safely preserve scientific specimens in alcohol and formalin.
- Renovations to an existing facility at the Museum Support Center, named “Pod 3,” provide collections space for three art museums as well as physical anthropology and other collections requiring specialized environments from the National Museum of Natural History, including Antarctic meteorites, paleobiology core samples, and frozen tissue samples.
- Major renovations have upgraded space at the Laboratories of Analytical Biology and the Smithsonian Institution Libraries, both in the Natural History’s Mall building.
- Smithsonian Institution Libraries has also upgraded spaces in the Mathias Lab at the Smithsonian Environmental Research Center and the Fox-Miller Townhouses adjacent to Cooper Hewitt, Smithsonian Design Museum.
- When it reopens, Cooper Hewitt, Smithsonian Design Museum will have a number of improved collections processing, conservation, and storage spaces.

The Collections Space Framework Plan has added to this impact. The Smithsonian and its museums have incorporated the plan’s recommendations into ongoing capital projects, and the National Air and Space Museum used them when it recently completed a master plan update. The plan will also inform master planning that is either underway or about to begin at several other museums and facilities:

- ▶ Anacostia Community Museum
- ▶ Hirshhorn Museum and Sculpture Garden
- ▶ National Museum of African Art
- ▶ National Museum of American History
- ▶ National Museum of the American Indian
- ▶ National Museum of Natural History
- ▶ Arthur M. Sackler Gallery and Freer Gallery of Art
- ▶ Suitland Collections Center

These new and updated master plans all address collections space improvements and additions holistically and proactively, especially for mixed-used facilities.



The design prototypes can add a combined 1.3 million square feet of capacity—addressing the current need for new space and, to the extent possible, anticipating future growth.

**FINDING 2: The Smithsonian must upgrade existing collections space and add appropriate space to support the preservation, accessibility, and use of collections.**

To meet immediate needs, the Smithsonian must renovate and maintain 695,166 square feet of existing space, including historic buildings. This is not a “one-design-fits-all” project. It is a major undertaking that requires flexible, conceptual design prototypes, described later, which will upgrade “Unacceptable” space by:

- Using existing collections space more efficiently and cost-effectively and, in some cases, helping reduce the Smithsonian’s reliance on leased space.
- Providing more appropriate environments to preserve collections, often achieved by separating space by function.
- Improving collections accessibility for researchers, curators, and collections management staff by using appropriate, flexible equipment.
- Locating collections-based work areas adjacent to collections storage spaces.

These renovations will lead to better designed, organized, and equipped collections space. They also emphasize the importance of equipment in preserving collections, using spaces efficiently, and reducing energy costs associated with maintaining stable preservation environments.

**FINDING 3: The Smithsonian needs more space to properly store its collections.**

Renovations alone cannot sufficiently upgrade collections capacity or meet the current and future demands for new space. The plan identified the need to build, and then invest in maintaining, approximately one million square feet of new collections space to:

- Replace some “Unacceptable” space that is beyond remediation.
- Accommodate future collections growth.
- Upgrade equipment to reduce overcrowding of collections.
- Replace leased facilities, when financially advantageous, with newly built Smithsonian-owned facilities.

Once in use, the design prototypes can add a combined 1.3 million square feet of capacity—addressing the current need for new space and, to the extent possible, anticipating future growth.

**FINDING 4: Through shared facilities and resources, the Smithsonian must leverage existing opportunities to realize more efficient and effective operations.**

The larger cultural shift across the Smithsonian, which is inspiring new collaborative opportunities, is also changing how people think about organizing collections space. For example, renovating the Museum Support Center so it can store, in close proximity, paintings from art museums, fossils from the National Museum of Natural History, and frozen tissue samples from the National Zoological Park.

Collections space planning has already strengthened interdisciplinary teamwork. This effort positions the Smithsonian strongly for future planning, design, and construction, including projects that have green objectives—from energy efficiency to sustainable land use, which becomes more feasible when museums plan together for future collections storage.

Collaboration also responds to a Smithsonian prerequisite: making a little go a long way. When collections and facilities management staffs collaborate to advance stewardship, they are learning how to think, plan, and work holistically—and learning to conserve resources even as they preserve precious collections.



When collections and facilities management staffs collaborate to advance stewardship, they are learning how to think, plan, and work holistically—and learning to conserve resources even as they preserve precious collections.



# STRATEGIES

Bringing Clear Direction to the Roadmap

The Smithsonian designed a set of strategies to improve collections space and address overall needs. These strategies—and the tactical recommendations below—led directly to the development of the design prototypes.

**STRATEGY 1: Develop customizable, standards-driven solutions for all collections space requiring renovation or replacement.**

The Smithsonian must tailor solutions to individual museums and facilities, as well as to the scope of collections, current conditions of storage space, and anticipated needs. Three overarching approaches rise to the top.

- Renovate as much existing collections space as possible to upgrade it and provide greater efficiency. The Smithsonian identified 695,166 square feet of “Unacceptable” space that could be “Acceptable” with renovations. This comprises 32 percent of all collections space, including many historic buildings, and accounts for the majority of “Unacceptable” space.
- Replace collections space that cannot be improved through renovations. Complete replacement is appropriate for some locations, such as the Paul E. Garber Facility, which stores large objects for several museums, or, for example, a basement storage area at risk of water damage. The Smithsonian needs to replace 336,954 square feet, or 15 percent of collections space, with new construction.

- Relieve overcrowded collections space: The survey and subsequent evaluations defined overcrowding by looking at the volume used for storage and how densely objects are stored in equipment or drawers. The Smithsonian needs 338,877 square feet of additional space for existing collections currently stored on floors, on crowded shelving, and in over-filled cabinets and drawers. These conditions are unsafe, can cause collections damage, and do not allow access for staff and researchers who need to manage and work with collections. Overcrowding also severely limits future collections growth.

**STRATEGY 2: Anticipate collections growth as effectively as possible.**

Adding to collections is an important part of the Smithsonian’s commitment to our nation. Ever-evolving collections ensure the ability of the Smithsonian to tell and share our nation’s continuing story in all its dimensions—across history, art, science, and culture. However, the Smithsonian has never considered collections to be static. Rather, they contribute to global innovation and document the world’s forever changing cultural and scientific heritage. They are teaching and learning tools for one generation after another—sources of inspiration and starting points for countless new journeys.

As collections grow, the Smithsonian finds it challenging, and sometimes nearly impossible, to predict how quickly expansion will happen. Nevertheless, there are baseline numbers that can help the Institution project space needs into the future and ensure it never turns away collections that deserve to be at the Smithsonian:

- The Smithsonian has historically increased collections at the following rates of acquisition: 0.3 percent annually for museum objects and specimens, 3 percent for library volumes, and 3.6 percent for cubic feet of archives. As a result, the Smithsonian predicts that it will acquire, at a minimum, new collections requiring an additional 12,110 square feet of storage space every year.
- Unpredictable patterns of growth often occur because of history-making events that need to be documented, such as the decommissioning of the Space Shuttle program or the authorization of new Smithsonian museums, as well as unique collecting opportunities, sizeable donations and transfers of objects and specimens, and the development of new collecting initiatives.



**STRATEGY 3: Reduce reliance on leased spaces for collections storage.**

The Smithsonian should own collections space whenever possible and, in the interest of cost-effective management and long-term planning, should consider exit strategies for costly leases. Currently, the Smithsonian rents 324,033 square feet of collections space in more than 10 locations. While leased storage facilities have historically made sense in the short term, further analysis shows that it is not an effective long-term strategy for a number of reasons:

- Leased space generally does not provide the same control of the storage environment afforded by owned space.
- Rent for third-party facilities is a sizeable budget item, and not a cost-effective one since it reflects the cost of landlords' real estate taxes, while the Smithsonian does not pay taxes on owned buildings.
- Leasing space, typically warehouses with limited access, often require significant renovations and physical upgrades to create an appropriate preservation environment and ensure better access to collections. These are capital improvements that call for resources usually better used in the design and construction of new purpose-built owned facilities.

Faced with limited space for expanding collections, the Smithsonian must focus on solutions for the long term rather than immediate crises. While a museum may lease temporary storage facilities when necessary, the Smithsonian should plan on owning all long-term storage space.

**STRATEGY 4: Update internal policy and procedures to reinforce the importance of excellent collections space to the Smithsonian.**

The current strategic plan prioritizes collections space and stewardship, and recognizes this work as an ongoing responsibility that requires consistent attention. Space and equipment that were state of the art a few decades ago are now out of date. The following tactics emphasize the value of incorporating collections space needs into both day-to-day operations and long-term planning.

- Establish the Collections Space Steering Committee as a standing pan-Institutional advisory committee charged with continually monitoring space and contributing to all plans to construct and renovate collections space.
- Create a formal, reviewable process for requesting and approving additional collections space.
- Collaborate with building directors and managers who can work with the collections management staff and facilities management staff, thereby creating a collaborative model to oversee space maintenance and improvements.

The current strategic plan prioritizes collections space and stewardship, and recognizes this work as an ongoing responsibility that requires consistent attention.

- Include budget line items for equipment purchases, maintenance costs, and collections moving costs whenever collections space is part of any facility's capital project.
- Ensure that Smithsonian policies, procedures, and guidance that directly or indirectly affect the design, construction, management, and use of collections space are reviewed by all stakeholders and affected units.
- Reinforce anticipated storage needs in the policies of all museums, specifically at the time of collections acquisition.
- Heighten awareness of collections space and its special requirements by taking advantage of opportunities to educate all Smithsonian staff members.
- Encourage sharing of collections space and related resources within and among all museums and facilities with dedicated collections space.





## DESIGN PROTOTYPES

Realizing the Future of the Smithsonian's Collections Space

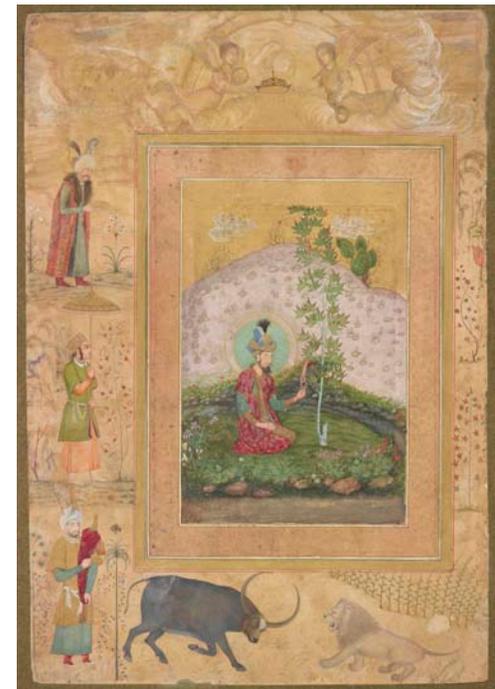


Strategies alone are not enough. With external experts, the Smithsonian created three conceptual design prototypes to support recommendations and serve as adaptable models for future projects. All three are either underway or scheduled for piloting and implementation in the near future. Object size was the primary organizing factor because it affects the type of construction, the collections handling methods that each design prototype must accommodate, and the choice of storage equipment.

- The **Existing Building Prototype** is a plan for flexible, efficient renovation of existing buildings.
- The **Large Object Prototype** is a new construction model designed to house large objects—such as an Old West stagecoach, a postal vehicle, a Vietnam War-era Huey helicopter, industrial machinery, or dinosaur and whale skeletons.
- The **Small and Medium-Sized Object Prototype** is a second new construction model designed for small and medium-sized objects—such as stamps, ancient Chinese bronzes, musical instruments, decorative art, paintings and textiles, ceramics and glass, insects, folk art, botanical specimens, or African masks.

These models allow for different curatorial methods and processing systems. At the same time, they further the pan-Institutional approach to collections space—by establishing common best practices and by offering the opportunity to co-locate similar materials and types of collections, whether or not they are from the same museum’s collections.

Each design prototype emphasizes cost effectiveness in its design, including maintenance costs and energy efficiency. They are replicable and adaptable as needs change with time.





## DECORATED AND VISIONARY

Assemble the military uniforms of the **National Museum of American History** in one long line, and you could traverse history like a commander inspecting the troops. From George Washington's uniform to the blues and grays of Civil War soldiers to present-day Marine combat wear, each battle and peace-keeping mission comes to life—as do the sacrifices and service of those in uniform. This collection, always popular when on display, supports academic historians and historical re-enactors intent on authenticity, and was an early beneficiary of physical improvements under the Smithsonian's **Collections Care Initiative**. This means that space designed to store and preserve military uniforms was a forerunner of the **Existing Building Prototype**, which will upgrade other American History collections space. “How symbolic that these uniforms paved the way for progress,” says museum director John Gray.

*“After all, our Armed Forces are as essential to this nation as our collections are to telling America’s story.”*

## EXISTING BUILDING PROTOTYPE

### Interior Renovations to Current Space

This design prototype renovates existing collections space and, whenever possible, expands its capacity. Much of this space is in historic buildings, where the footprint of the facilities cannot change. The pilot site chosen was the National Museum of American History, which offers excellent opportunities to address diverse issues, including temporary and permanent storage and processing space. Lessons from these projects will help other museums and facilities flexibly apply the design prototype.

The Existing Building Prototype specifies four tactics:

- Renovations for temporary collections space, such as those that are used during ongoing improvements to public space.
- Renovations of collections processing space to improve overall efficiency and enhance preservation environments and security and safety measures.
- Renovation of permanent collections space to improve space utilization, storage capacity and conditions, fire and security protection, and programmatic adjacencies.

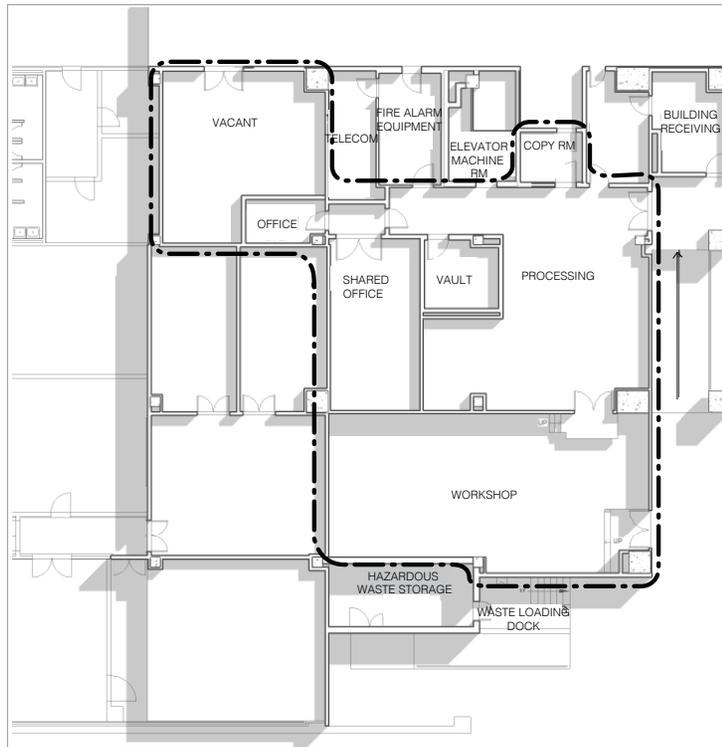
- Relocation of collections from existing space that is vulnerable to risk, such as susceptibility to damage from internal building system failures and water infiltration from building perimeter, which is unsuitable for the storage of collections and might be repurposed for other functions.

One specific variation of the design prototype as shown on page 27 in before and after versions, will:

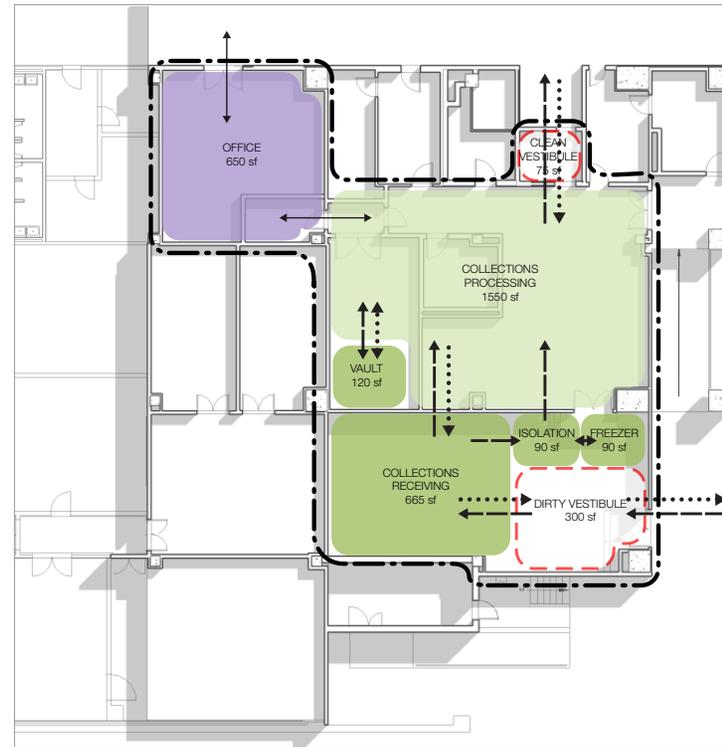
- Combine and reorganize small, inadequate rooms to create larger, more open spaces, reflecting efficient functional design allowing staff members greater flexibility to access objects and process them.
- Allow for collections isolation areas to ensure that potentially contaminated collections are not introduced into clean rooms.
- Provide adequate access to the facility's loading areas.

## Existing Building Prototype

### Interior Renovations to Current Space



Existing Plan



Proposed Programmatic Plan

The **Existing Building Prototype** provides strategies for renovating and reconfiguring collections space in the constrained context of an existing building. This prototype was developed using several collections spaces at the National Museum of American History, and serves as a model for improving space utilization, design, and functionality that will be applied to collections space in other existing Smithsonian buildings. The figure above highlights significant improvements to a collections receiving and processing area.



## WHERE DREAMS TAKE FLIGHT

The National Air and Space Museum's peerless collection of aircraft and spacecraft are among the most captivating and awe-inspiring objects in the Smithsonian. "These artifacts powerfully convey the excitement and beauty of flight," says museum director General John R. Dailey, "as well as embody the imagination, ingenuity, courage, and commitment that make the technology of flight one of humankind's greatest achievements." The future **Dulles Collections Center** will ensure the material heritage of this remarkable story endures. "Unique is a term that applies to much of what the Smithsonian holds," notes General Dailey. "For example, nearly 130 aircraft in the NASM collection are one-of-a-kind or the sole surviving example. You can see them only at the Smithsonian." Proper care of these irreplaceable treasures at the Dulles Collection Center will ensure the National Air and Space Museum will continue to be a place like none other.

## LARGE OBJECT PROTOTYPE

### New Construction

The Smithsonian developed this design prototype to be part of a proposed plan for building additional facilities at the future Dulles Collections Center, currently home to the National Air and Space Museum's Udvar-Hazy Center. This new model will introduce greater efficiency to the storage of large, heavy, and high-density objects, while the new center represents a significant opportunity to develop large-object collections space within the Washington, D.C., metropolitan area.

One of the most important advantages of implementing the design prototype in this setting is the opportunity to establish a permanent facility to take in collections from the aging buildings of the Paul E. Garber Facility, which is being phased out after 60 years of service.

This prototype can help museums with large objects dispersed at several sites to consolidate these collections, thereby providing more efficient management, care, and accessibility of all objects.

The design prototype will:

- Accommodate the most heavy-duty storage equipment.
- Maximize efficiency—and sustainable land use—by designing storage modules with three floor levels and a range of ceiling heights.
- Maximize capacity and minimize risk by incorporating a 30,000-square-foot storage module.
- Make phased construction possible, since its ten modules can be added in pairs.
- Allow for flexible subdivision of space for separate collections, giving each an appropriate environment, sufficient room for curatorial oversight, and optional processing space.
- Provide a sustainably designed building "envelope" to maintain interior environmental conditions and reduce energy costs.

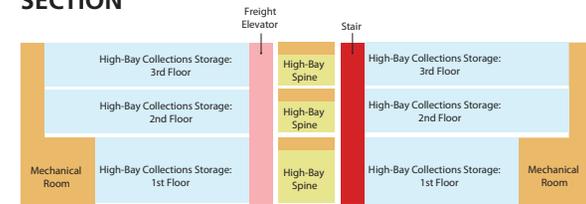
This Large Object Prototype includes 10 distinct collections modules and commits 682,660 square feet to collections space within a total area of 909,530 gross square feet, including central loading facilities and mechanical rooms.

## Diagrammatic Site Plan: Future Dulles Collections Center Chantilly, Virginia



- 10 High-Bay Collections Storage Modules
- Future medium objects and hangar storage
- Udvar Hazy Center, existing buildings
- Additional development area
- Shared utilities and mechanical systems
- Circulation Spine

### SECTION



### PLAN



The **Large Object Prototype** provides new construction for efficient high-bay collections storage of primarily large, oversized objects requiring wider structural spans and greater load capacity for associated heavy-duty storage and handling equipment. This prototype allows for phased construction and incorporates centralized loading facilities and a utility plant. It also has a sustainable design that can efficiently maintain highly controlled interior environmental conditions. The placement of this prototype (10 storage modules) on the undeveloped portion of the Dulles site presents an excellent opportunity to establish a permanent facility to consolidate large objects dispersed at several locations, including collections currently stored in the aging buildings of the Paul E. Garber Facility in Suitland, Maryland.



## PROLIFIC PARTNERSHIPS

Caring for 93 percent of the Smithsonian object/specimen collections, from microscopic meteorites to colossal skeletons, the National Museum of Natural History is central to improving and maintaining collections space. Scientific richness beyond scope inspires collaboration with federal agencies such as the U.S. Departments of Agriculture, Commerce, Defense, and the Interior. These roles often converge. When the USDA needed a home for a 100,000-lot parasite collection and a research partner, they turned to Natural History. At a laboratory space in the Museum Support Center in Suitland, Maryland, which is comparable to what will be provided by the **Small and Medium-Sized Object Prototype**, the museum's entomology staff works with USDA scientists and the Walter Reed Biosystematics Unit to expand knowledge of injurious species. Improved collections space conditions can enhance and foster new collaborative opportunities. "The project with the USDA continues an excellent relationship, supports our researchers, and makes good use of federal resources," says Carol Butler, assistant director for collections.

*"It asks the Smithsonian to do what we do best: serve as a center of expertise and discovery for the nation and the world."*

## SMALL AND MEDIUM-SIZED OBJECT PROTOTYPE

### New Construction

This design prototype addresses replacement space for small and medium-sized objects, with the flexibility to include some larger objects. The model is highly adaptable and able to incorporate a range of specialized storage spaces and laboratories, as well as processing, research, and program support units.

The prototype will be further tested through feasibility studies and piloted at the Suitland Collections Center in Suitland, Maryland, which currently houses a range of collections for 13 Smithsonian museums. Implementing this prototype will first require moving a sizeable amount of collections from the Paul E. Garber Facility to the Large Object Prototype at the Dulles Collections Center. Accordingly, these two prototypes are dependent on one another, as well as on near term projects to add Pod 6 to complete the Museum Support Center, update the Suitland master plan, and build additional medium object storage modules adjacent to the Udvar-Hazy Center.

Flexible enough to accommodate a broad range of collections, the Small and Medium-Sized Object Prototype shares several advantages of the Large Object Prototype in that it will:

- Maximize efficiency, especially with compact shelving and storage equipment, and relieve overcrowded storage equipment.
- Allow for flexible subdivision of space for separate collections and phased construction.
- Maximize capacity and minimize risk by incorporating a single 30,000-square-foot storage module.
- Provide a sustainably designed building "envelope" to maintain interior environmental conditions and reduce energy costs.

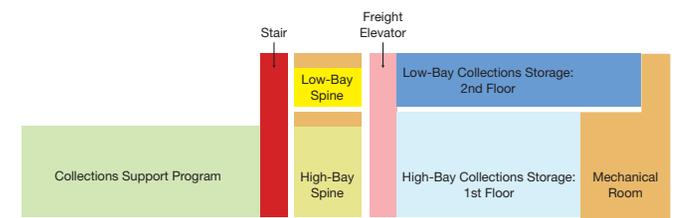
This prototype provides approximately 517,000 square feet of collections space within a total area of more than 750,000 gross square feet, including mechanical rooms.

## Diagrammatic Site Plan: Future Suitland Collections Center Suitland, Maryland



- 8 Low- and High-Bay Collections Storage Modules
- Existing buildings
- Additional development area
- Pod 6 (currently in detailed planning phase)
- Shared utilities and mechanical systems
- Circulation spine
- Collections support programs
- Loading dock, security and central services

### SECTION



The **Small and Medium Object Prototype** provides new construction for efficient high- and low-bay storage of small and medium objects. The prototype includes sustainable land use, phased construction, flexible storage equipment (such as compact storage units), flexible space division for specialized environments with adjacent collections support program space, central loading dock and utility plant, and a sustainable design that can maintain highly controlled interior environmental conditions and reduce energy costs. This prototype (8 storage modules with required programmatic support adjacencies) at the Suitland Collections Center addresses new construction needs as part of the replacement of the Garber Facility.



## CONCLUSION

Taking Action, Serving Future Generations



## The Smithsonian must take immediate action to ensure that its collections have sufficient, well-maintained space to continue to serve America and the world—as well as room to grow.

This roadmap emerges from the assessment of more than 2.1 million square feet of space in 1,800 individual locations at more than 35 properties and 90 buildings. The process was not only unprecedented; it was groundbreaking. It informed strategies for resource planning and provided an ongoing framework for managing improvements and adding new collections space. The vision is for all audiences—experts and the public alike—to enjoy access to the Smithsonian’s vast, unrivaled collections.

### FROM PLANNING TO IMPLEMENTATION

The three conceptual design prototypes that emerged from planning are all about a successful, expansive future. Implementation of the Existing Building Prototype will upgrade collections space, beginning with the National Museum of American History and plans to renovate other buildings. The Large Object and Small and Medium-Sized Object Prototypes—for new construction at the Dulles and Suitland Collections Centers—are largely dependent on one another and will take place across an overlapping timeframe of many years.

The work to implement these design prototypes is captured in the Smithsonian’s capital plan, and it also informs projected annual operations and planning costs for all museums and facilities that house collections.

Given the long-term, substantial nature of this work, the Smithsonian will identify diversified financing opportunities for construction projects and for the operations of Dulles and Suitland. With an estimated overall need of more than \$1 billion over 30 years, funding sources may include Federal appropriations, alternative financing, and private philanthropy.

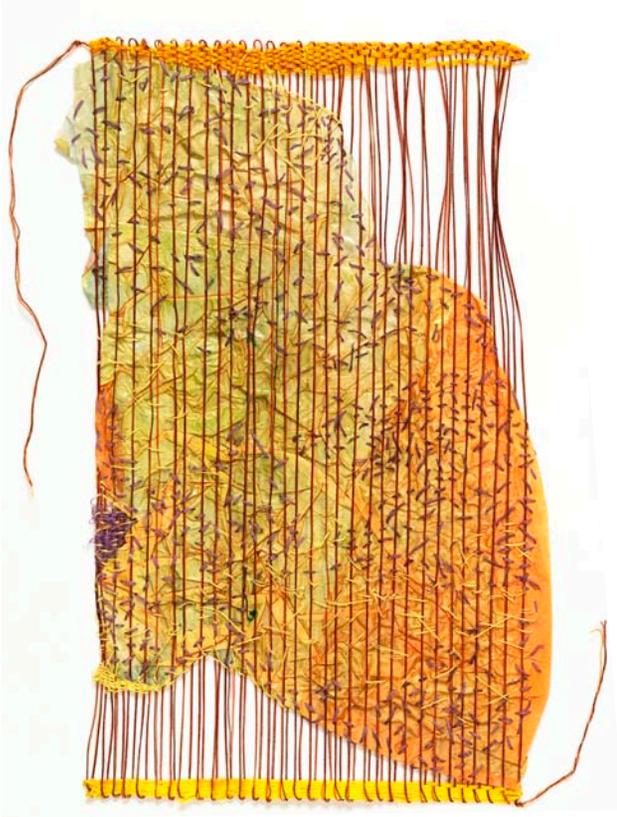
### A NEW SPIRIT OF COLLABORATION

Assessing space and planning for the future underlines the value of collaboration. The result is a holistic approach integrating stewardship and collections space across the Institution. This enables comprehensive improvements, emphasizes efficiency and cost-effectiveness, and benefits as many collections and audiences as possible.

The planning process united diverse Smithsonian leaders to collaborate around issues that affect all of their responsibilities. These leaders have now forged solutions that will improve the sharing of information and resources among museums. Colleagues in seldom-associated fields—engineers and curators, facilities managers and conservators—are working side-by-side to solve longstanding problems creatively and cost-effectively.

This collaborative spirit has also reached into the broader museum world. In March 2013, the Smithsonian held a Summit on the Museum Preservation Environment to bring together staff members from every corner of the Institution and representatives from peer institutions around the world.

The Summit considered the value of environmental specifications for collections space and the ways in which standards have evolved to reflect scientific research, institutional capabilities, and sustainable choices. Participants shared ideas and proven approaches and envisioned best practices. A key takeaway was the importance of interdisciplinary decision-making and planning in managing collections space, especially in a way that enhances preservation environments, conserves energy, and increases cost savings.



### THE ULTIMATE IMPACT OF PLANNING

Without proactive measures, the Smithsonian's collections will run out of room to grow, jeopardizing safety and access. Decisive action to guide renovations and new construction—and the upgrades and maintenance both require—is the order of the day. It impacts everyone who interacts with the Smithsonian in person, in their communities, and, increasingly, online.

Collections space will be better able to accommodate growth and be more adaptable to changing circumstances. Implementation of the Collections Space Framework Plan will strengthen Smithsonian collections stewardship—ensuring the long-term preservation and accessibility of Smithsonian collections. As collections begin to encompass a new level of innovation, the challenge of predicting their current and future needs becomes even more daunting.

Stewardship of collections is not a once-and-done task. Keeping space on the leading edge and meeting optimal conditions are complex, constantly evolving enterprises. They call for continued vigilance and leadership.

Ultimately, the purpose of collections space extends beyond objects that are unique and irreplaceable. It is about learning that never ends. Outstanding collections space helps to assure that, centuries from now, the Smithsonian continues to fulfill its mission of inspiring learning and discovery in support of the most vibrant, sustainable future for later generations.

Implementation of the Collections Space Framework Plan will **strengthen Smithsonian collections stewardship—ensuring the long-term preservation and accessibility of Smithsonian collections.**



STAIRS

EXIT

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## SPECIAL THANKS / ACKNOWLEDGMENTS

The development of the Collections Space Framework Plan is the result of a multi-year highly collaborative and interdisciplinary planning initiative conducted by collections and facilities management staff from across the Smithsonian. The Framework Plan would not have been possible without the hard work, dedication, and expertise of the Smithsonian Collections Space Steering Committee, unit points of contact, subcommittee members and the team of consultants led by the architecture and planning firm of Ayers Saint Gross. We thank all who have contributed to the success of this important planning initiative that will ultimately strengthen Smithsonian collections stewardship.

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## PHOTO CREDITS

**Cover (left to right), Jeff Malet** / A student explores the Discovery Room in the National Museum of Natural History.

**Hugh Talman** / The Jefferson Bible, created by Thomas Jefferson who cut out Biblical passages that were important to him and glued them into folios of blank papers. National Museum of American History collection.

**Mark Gulezian** / National Portrait Gallery.

**Adrian James Testa** / Lynne Parenti, curator in the Division of Fishes, Department of Vertebrate Zoology, National Museum of Natural History. The National Fish Collection is the largest in the world.

**P. 1: Eric Long** / Morning sunrise at the Smithsonian Institution Building, popularly known as the Castle. Completed in 1855, it originally housed all Smithsonian operations.

**P. 2: Jeff Malet** / A young visitor learns about gravity and air in "How Things Fly" at the National Air and Space Museum.

**P. 4: Eric Long** / Uniform worn by Hubert "Geese" Ausbie, a Harlem Globetrotter from 1961 to 1985. National Museum of American History collection.

**P. 5: Ken Rahaim** / Archives' cold storage at the National Museum of American History. It houses the Photographic Services collection, which is scheduled to relocate to Penny Drive Collections and Support Center.

**P. 6: Nelson Young** / Recent renovations to Pod 3 of the Museum Support Center provided additional collections space for three art museums, including painting storage for the Hirshhorn Museum.

**P. 8:** The four Grand Challenges. Top row: **NASA, Chip Clark**. Bottom row: **Jeff Malet, Chip Clark**.

**P. 9: Susana Raab** / Students hike on the Carver nature trail outside the Anacostia Community Museum.

**P. 10: Chip Clark** / The U.S. National Entomological Collection at the National Museum of Natural History is the second largest insect collection in the world, with 35 million specimens.

**P. 12: Donald E. Hurlbert** / Yup'ik snuff box, accessioned 1882. Small boxes for storing chewing tobacco provide some of the finest examples of traditional Yup'ik carving. National Museum of Natural History.

**P. 15: Walter Larrimore** / Students explore the National Museum of the American Indian collections in Suitland, Maryland, which represent more than 12,000 years of history and 1,200 indigenous cultures.

**P. 16: Dane A. Penland** / The Steven F. Udvar-Hazy Center in Virginia — companion to the National Air and Space Museum — displays aviation and space artifacts and houses a restoration facility, conservation laboratory, and archives.

**P. 18: Harold Dorwin** / The carbon-filament bulb Thomas Edison used in 1879 for the first public demonstration of the electric incandescent lamp. National Museum of American History collection.

**P. 19: Jon Crispin** / Martin Kotler, a frames conservator at The Lunder Conservation Center where visitors have the unique opportunity to see conservators at work and learn the importance of conservation.

**P. 20, Smithsonian American Art Museum** / Inventorying artwork in Graphic Arts storage at the Smithsonian American Art Museum.

**P. 22: James Di Loreto** / Doug Owsley, forensic anthropologist, trains researchers and serves the FBI, State Department, and national law enforcement in work ranging from individual criminal cases to mass disasters and war crimes.

**P. 23: Hugh Talman** / First Lady Michelle Obama's first inaugural gown. White House collection, on display at National Museum of American History through January 19, 2015.

**P. 24: Adam Metallo** / The Smithsonian is digitally scanning a T. rex bone by bone. Digitization will exponentially broaden access to Smithsonian treasures as well as safeguard them for future generations.

**P. 25: John Tsantes** / *Humayun Seated in a Landscape*, from the Late Shah Jahan Album, India, Mughal dynasty, ca. 1650. Arthur M. Sackler Gallery collection.

**P. 26: Jeff Tinsley** / Blue wool coat, part of a suit of regimentals made for George Washington in 1789. National Museum of American History collection.

**P. 28: Eric Long** / 1903 Wright Flyer. The Wrights' first powered airplane flew at Kitty Hawk, North Carolina on December 17, 1903. National Air and Space Museum collection.

**P. 30: USDA, Scott Bauer** / *Varroa jacobsoni* mite, a parasite that attacks Asian honey bees and can weaken or destroy the colony. U.S. National Parasite Collection at the National Museum of Natural History.

**P. 32: James Di Loreto** / Children explore National Museum of Natural History collections during Bring Your Child to Work day.

**P. 34: Matt Flynn** / Textile, *Papillion*. 1997–2004, designed and made by Sheila Hicks (American b. 1934). Cooper Hewitt, Smithsonian Design Museum.

**P. 35: Donald E. Hurlbert** / Opened in 2007, Pod 5 was specifically built to store the National Museum of Natural History's biological collections preserved in flammable fluids such as alcohol and formalin.

**P. 36: Ken Rahaim** / *Electronic Superhighway: Continental U.S., Alaska, Hawaii*. 1995, Nam June Paik. Smithsonian American Art Museum, gift of the artist © Nam June Paik Estate.



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