National Air and Space Museum

Exhibition Guidelines

April 2018

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1. Introduction

1.01 Purpose and Scope

This document provides guidance and requirements for the planning, approval, creation, and maintenance of exhibitions at the Smithsonian's National Air and Space Museum (NASM). It is intended to be a "living document" and will be revised periodically as necessary.

Most of these guidelines apply to both the Museum on the National Mall and the Steven F. Udvar-Hazy Center in Chantilly, Virginia. However, the Udvar-Hazy Center has some unique requirements that are not addressed in this version of the *NASM Exhibition Guidelines* but will be in a future revision. If questions arise, please consult the appropriate design manager.

1.02 Background

The National Air and Space Museum is one of the world's most visited museums. It maintains the world's largest and most significant collection of aviation and space artifacts. The collection encompasses all aspects of human flight and includes items ranging from coins and pins, artworks and archival materials, and uniforms and spacesuits to historic aircraft and spacecraft. This vast collection is housed in three facilities: the National Air and Space Museum on the National Mall in Washington, D.C.; the Steven F. Udvar-Hazy Center in Chantilly, Virginia; and the Paul E. Garber Facility (not open to the public) in Suitland, Maryland.

The Museum on the National Mall has about 250,000 square feet of exhibit space on two levels divided into 23 themed exhibit galleries. The Udvar-Hazy Center has about 825,000 square feet of open display storage space that extends up to 10 stories high. In addition to exhibitions, both facilities also offer public programs, educational activities, lectures, and performances that reflect the American spirit and the innovation, courage, and optimism that have led to triumphs in the history, science, and technology of flight.

1.03 Smithsonian Mission Statement

The National Air and Space Museum is part of the Smithsonian, a venerable institution founded in 1846 as "an establishment for the increase and diffusion of knowledge." It is the world's largest museum, education, and research complex, with 19 museums and the National Zoo—shaping the future by preserving our heritage, discovering new knowledge, and sharing our resources with the world. As summarized in the institution's 2014 Annual Report, today's Smithsonian is:

- The world's largest provider of museum experiences through in-person visits, traveling exhibitions and online resources that reach across the nation and around the globe;
- An international leader in science and scholarship, whose experts probe the boundaries of space, explore the evolution and diversity of life and help us understand the American experience and the diversity of human cultures;
- A partner in education, providing informal education for life-long learners, standards-based classroom materials for K-12 students, teacher training

materials and intern and fellowship opportunities that benefit undergraduate through post-doctoral scholars; and

- A national treasure caring for America's most cherished and iconic objects and holding in trust for every citizen its priceless collections.

1.04 Museum Mission and Vision Statement

NASM Mission: "Commemorate, Educate, Inspire"

The Smithsonian's National Air and Space Museum collects, preserves, studies, and exhibits artifacts, archival materials, and works of art related to the history, culture, and science of aviation and spaceflight and the study of the universe. Its research and outreach activities serve all audiences, within and beyond its walls. The Museum commemorates the past and is committed to educating and inspiring people to foster appreciation for the importance of flight to humanity.

NASM Vision: "Helping Build a Nation of Innovators and Explorers "

To keep America on the cutting-edge of discovery and human advancement, the Smithsonian's National Air and Space Museum will help inspire, educate and inform the next generation of innovators and explorers.

1.05 Building History

National Air and Space Museum

The following excerpts are from the "Quinn Evans Concept Development Report, Volume 1" dated November 2, 2014.

> The building was designed in 1965 by architect Gyo Obata of Helmut Obata and Kassabaum Architects. Obata had two objectives in designing the building: "First, the structure had to relate aesthetically to the [existing] buildings of the historic West Mall, and in particular to the National Gallery of Art directly opposite [the site]. Second, the museum had to be designed functionally to house the collection of huge air and space vehicles." Through several iterations, Obata explored design ideas including: the way the building meets the ground, the definition of the entrance, attention to scale, the interplay between solids and voids, and the relationship to the surrounding buildings on the mall.
>
> Obata's solution was skillfully simple: four large marble-clad pavilions, separated by three recessed steel-and-glass atria. Drawing inspiration from neighboring buildings, primarily the National Gallery, Obata reflected formal massing and materials in his design. The alternation of solids and voids are placed and proportioned to respond to corresponding projections and recesses of the National Gallery, which sits directly across the mall. Equivalent volumes face Independence Avenue, but the recessed glass-enclosed bays of the mall façade have been replaced by floating marble cubes, cantilevered to be flush with the south façade. The volumes are clad in the same Tennessee Pink marble that was

used in the construction of its neoclassical predecessor. The entire building is raised on a long, low, two-level terrace that provides a solid base for the building in the classical manner. The wide entrance stairs, symmetrical composition, entries on the central axis, and its distinct rectilinear nature contribute to the classic disposition of the Museum.

The Gilbane Building Company of Providence, Rhode Island was awarded the project by GSA. The building was intended to be complete in 1976 for the Nation's Bicentennial celebration. To meet this deadline, the traditional sequential design and construction process was abandoned in favor of phased design and construction, or "fast tracking." Using this technique, certain phases of design and construction project overlapped. For example, excavation of the site, construction of the foundation, procurement of the marble slabs, and the erection of structural steel all took place while other aspects of the building continued to be designed.

Steven F. Udvar-Hazy Center

The following excerpts are from the chapter "Planning, Design, and Construction" by Lin Ezell in the book *America's Hangar: Steven F. Udvar Hazy Center*.

Throughout the 1980s, NASM made its case that a second facility at an active airfield was required to guarantee the future of its important collection. Dulles met all the Museum's requirements.

Hellmuth, Obata + Kassabaum (HOK), the architectural firm that had designed the Museum on the Mall, was again engaged to assist the Smithsonian. HOK and the Museum remained true to their original concept for a building that would meet the special needs of a large collection of aircraft and spacecraft—along with millions of visitors—but still fit the ambience of an airport. The design featured a large vaulted space, reminiscent of a dirigible hangar, for some 200 aircraft. The Museum told the designers that they wanted to hang many aircraft as if they were flying, and the needed to get the most display space for each construction dollar spent. The Space Shuttle *Enterprise,* along with some 135 other space vehicles, would be housed in the James S. McDonnell Space Hangar. Visitors would also be able to watch specialist restore aircraft, conduct research in the archives, take classes in an education center, and watch IMAX movies. The total complex logged in at 760,000 square feet.

As part of a generous contribution from Virginia, the state funded all the site infrastructure needs of the project. In the spring of 2000, the Virginia Department of Transportation (VDOT) let a contract to clear land for the "Dulles Center."

The Smithsonian awarded the building contract to Hensel Phelps Construction Co. (HPCC) in the spring of 2001. Because the Institution was raising funds for construction while construction was ongoing, the Museum phased the project. HPCC would first build the huge aviation hangar and the architecturally stunning

east wing. In April 2002 construction began on the space hangar. Opening day, in December 2003, was timed to celebrate the anniversary of the Wright brothers' first flight on December 17, 1903.

1.06 Building Description

National Air and Space Museum

According to the "Quinn Evans Concept Development Report":

> Measuring 685 feet long and 225 feet wide, NASM occupies three city blocks and was dubbed a "Super museum." The building is divided into seven modules. The architectural design concept is most clearly seen from the Mall side: four solid marble-clad blocks separated by three voids.
>
> The marble clad blocks each measure 85 feet wide by 225 feet long by almost 83 feet high. These areas contain two theater spaces (an IMAX theater and the Einstein Planetarium), as well as the Museum store, flight simulators, and galleries. These solid blocks are separated by the three glazed atria enclosed by glazed window walls and skylights. Each glazed atria measures 120 feet long by 115 wide by 60 feet tall. The 'voids' are glass-enclosed two-story atriums, with glazed curtain walls on the north side and skylights. Each skylight is supported by three-dimensional trusses (space frames) which span the entire space and from which various artifacts are suspended. These spaces house the most massive exhibits and allow the viewer to look up and view airplanes and spacecraft against the background of the sky. On the south side, the voids are expressed as solid blocks containing galleries that appear to float above a one-story glass curtain wall and are separated by full-height glazing on either side.

1.07 Revitalization and Transformation

The Museum has launched a multiyear revitalization program that will transform nearly every aspect of the building. The original mechanical systems have reached the end of their service life and the building envelope requires significant improvements and renewal to address deficiencies. The Revitalization project now underway will include replacing the deteriorating stone facade; the roof, skylights, and windows; and the aging mechanical, electrical, and plumbing systems. Work is scheduled to begin in 2018 and will be done in two phases, allowing the Museum to remain open during construction. When Revitalization is complete, the Museum will be an energy-efficient building that meets or exceeds best-practice standards for sustainability and energy use.

At the same time, the Museum is taking the opportunity to transform its exhibition galleries and public spaces. Almost all of the artifacts have to be removed for Revitalization, so the exhibitions will be completely redone. Many familiar topics will be readdressed with more interpretive and engaging exhibitions. When the Revitalization and Transformation projects are completed, the Museum will be a vastly different and much improved place.

1.08 Visitor Experience

The National Air and Space Museum is one of the most visited museums in the world. Several conditions contribute to this:

- People make a pilgrimage to Washington to see many of its famous sites of national significance. This museum is often high on their list, even if they have no special interest in aviation or spaceflight.
- The Museum has no admission cost.
- The Museum has an unparalleled, world-famous collection of historical artifacts.

The building was originally designed for 2 million visitors a year but surpasses this every year. It averages 7 million visitors annually. This can make visiting the Museum during its busiest times a crowded and less than ideal experience.

Museum Audience

The Museum's audience is the world. They include toddlers, teenagers, millennials, veterans, engineers, parents—people from all walks of life with diverse perspectives. They come from the local area, from elsewhere in the United States, and countries around the world. While some of our exhibitions are targeted toward particular audiences, most are intended for a very broad audience. We try to incorporate a variety of exhibit elements and approaches to engage different segments of that audience and to reach people with different learning styles and experience preferences.

Visitor Preferences

Each visitor has his or her own way of interacting with the Museum. The Smithsonian's Office of Policy and Analysis (OP&A) has identified four kinds of experience preferences, a model they call IPOP. It stands for Ideas (conceptual, abstract thinking), People (emotional connections), Objects (visual language and aesthetics), and Physical experiences (somatic sensations). In every major exhibition, we try to provide experiences that will appeal to visitors with each of these types of preferences. Smaller exhibits may target specific preferences.

Each exhibit team should think about target audiences and identify these at the beginning of development. Not every exhibition is for a general audience. For information on the IPOP (Ideas–People–Objects–Physical) model of audience preferences, refer to this document:

> ***What Is IPOP***

According to the "Quinn Evans Concept Development Report":

> With as many as 50,000 people visiting NASM on a daily basis, continuous concourses are crucial for circulating visitors through the exhibits. The concourse divides the museum into two parts. The south side of the building contains the smaller and more theatrical exhibits, while the north side houses larger exhibits. Obata believed that good visitor circulation through the galleries was critical to the success of the museum. He remarked, "The solution evolved from studying

> the potential movement of people through the museum . . . This circulation pattern allows the visitor to quickly understand where he can go to view the various displays."
>
> The experience of the museum was not limited to the interior spaces. Obata hoped to encourage an active participation by the public and he hoped to open the interior of the building up to the exterior with large expanses of glass, making the planes and other aircraft legible from the mall. He commented: "Within the skylighted, glass-fronted galleries with open steel trusses, the visitor will view exhibits which visually relate to the sky and greenery outdoors. Variations in the height of the separate display areas emphasize the transition from open to enclosed gallery."

Conditions in and around the Museum have changed since the building was built. Visitors must now pass through security magnetometers at the entrance. From the sidewalk, the building is hard to identify, despite the addition of pylons around the building promoting its exhibitions. Carts and trucks set up by vendors block many of these identifiers.

About 70 percent of visitors enter the building from the Mall side directly into the *Boeing Milestones of Flight Hall,* which serves as an entry space as well as an exhibit gallery. The high number of people moving through the space and touching the displays is hard on the exhibits. Anything that goes on display, especially interactive exhibits, must be robustly constructed.

Since people don't file past an admission booth, they don't receive any personal orientation to the space—no floor plan offered to them or directions provided. The Museum's Welcome Center, which provides these services, is centrally located, but visiting it is optional. Visitors will, more often than not, wander through the Museum without guidance. Wayfinding signage and floor plan maps can be found on the walls in several places, but it is uncertain how much visitors use them. It is important for gallery entrances to clearly indicate their subject matter with an introductory panel, provide a website link, and credit exhibit donors.

Visitor evaluation has been done on an as-needed basis. Results vary depending on the time of year, but several consistent trends have emerged:

- Slightly more than half of visitors are visiting the Museum for the first time.
- The split between male and female is about even over the course of a year.
- About 20–25 percent visit alone.
- About 17–40 percent, depending on the time of year, are from another country.

Museum visitors today expect and demand greater interactivity than in the past. While the Museum strives to meet their expectations and produce exhibitions that appeal to the varied learning styles of a broad audience, the sheer number of visitors, and the destructive behavior of some, make this problematic. Every exhibit must be designed and produced with heavy usage in mind, and artifacts must be securely protected while on display. Ongoing routine maintenance of exhibits and galleries is crucial to keeping the Museum and its displays in a condition befitting a prestigious national institution. This is a never-ending challenge.

1.09 Exhibit Team Roles and Responsibilities

Core Team

The core team consists of the lead curator, lead educator, a collections representative, a designer, and the project manager. These team members lead regularly scheduled meetings and have approval authority in most of the project daily activities.

Curator/Content Expert—The Curator is knowledgeable in the subject matter and usually conceives exhibition idea. They research content, select artifacts, and write content document for exhibit development. They work with exhibit team on the concept and ensure that content interpretation is accurate.

Exhibit Design Manager—The Exhibit Design Manager (DM) is responsible for the look and feel of the exhibit space and the physical interpretation of the concept. The DM has knowledge of three-dimensional design and skill in creating two- and three-dimensional drawings and models. The DM translates complex subject matter into safe, physically accessible, intellectually educational, and visually aesthetic spaces that communicate messages and themes. When the design is contracted, the DM works with the Project Manager to manage the design process and deliverables from the contractor.

Project Manager— The Project Manager (PM) is the leader of the Project Delivery Team (PDT). S/he manages scope, schedule, quality, and budget while leading a PDT to successful project execution. This individual is the primary interface in projects between the museum departments and the primary internal advocate for the specific project. PMs manage all project resources, information, and commitments, and integrate and focus the efforts of the PDT. The PM's active role as consultant is essential to ensure that the museum's quality objectives are clearly articulated and that the customer understands the essential professional standards, laws, and codes, as well as public trust issues that must be incorporated into the project. In performing these functions, the PMs must operate consistent with their responsibilities as a public servant. PMs provide PDT leadership and facilitation with responsibility for assuring that the project stays focused on the public interest and on the customer's needs and expectations.

Educator—Educators advocate for diverse audiences and establish learning objectives and take-away messages. They plan for various stages of evaluation, research and write labels with emphasis on active learning, develop interactives, and work to ensure the space meets programming requirements.

Collections—The Collections Department is made up of four separate but interrelated units: the Collections Processing Unit, Preservation and Restoration Unit, Conservation Unit, and Office of the Registrar. The department is responsible for the stewardship of the Museum’s artifacts in perpetuity by guaranteeing intellectual as well as physical control over those collections. That includes the preservation, restoration, conservation, handling, maintenance, transportation, (de)installation, and storage of those collections, as well as the generation and maintenance of collections documentation and tracking information. Collections staff work closely with exhibit designers, fabricators, and artifact move contractors to ensure that artifacts are (de)installed, crated, transported, exhibited, and made available to the public without placing them in jeopardy.

Global Team

The global team includes those who may have input at various stages of the project, internal and external stakeholders, and anyone who has an interest in regular or semi-regular communication.

Writer—Knowledge of history and/or science. Translates complex subject matter into exhibit labels for intended audiences. Works with team on exhibit concept and is responsible for content interpretation and label script.

Exhibit Designer—Knowledge of three-dimensional design. Physically and visually translates complex subject matter into spaces that communicate messages and themes. Works with exhibit team on concept and is responsible for the look and feel of the exhibit space and the physical interpretation of the concept.

Graphic Designer—Knowledge of two-dimensional design. Through use of color, typography, and illustration, creates graphics that translate complex subject matter into layouts that communicate exhibit messages and themes. Is responsible for the graphic interpretation of the concept—the interface between the content and the visitor.

Exhibit Technologies—Designs, develops, installs, and maintains state-of-the-art technologies and mechanical interactives in Museum exhibits, provides technical support for outreach programs, and manages networked building lighting and communications systems. Team members have knowledge of state-of-the-art technologies used in museum and public education environments, including development, installation, and maintenance of new, custom computer interactive or conventional multimedia exhibition components, such as audio-video kiosks; specialized mechanical and electromechanical interactives; specialized electronic circuits, computer databases, and electronic control and data acquisition systems; Internet and LAN configuration; digital video production, editing, and post-edit formats; digital assets storage and management; and computer-based and network control systems. They also have knowledge of collections care and preservation issues as they relate to exhibit design, lighting, installation/dismantling, and maintenance, including accessibility issues and ADA requirements.

Exhibit Production—Exhibit Graphics uses digital files provided by the graphic designer to produce and install finished graphics, such as labels, panels, and murals. Exhibit Fabrication builds and installs artifact cases, risers, panel substrates, walls, and other structures required by the drawing package and provided by the exhibit designer. The artifact mount-maker fabricates and installs mounting devices of metal, wood, acrylic, and other materials for the safe display of artifacts using information provided by the exhibition designer, curators, and Collections staff.

Digital Experiences—Works with the exhibition team to conceptualize, design, and develop digital experiences. At the conceptual stage, Digital Experiences works with content ideas and learning objectives to envision and design interactive experiences for onsite and online audiences. Digital Experiences works with exhibit teams to develop the online digital experience and create content targeted to visitors inside and beyond the Museum walls. Digital Experiences also works with exhibit teams to envision and develop in-gallery digital experiences, opportunities for onsite audience engagement, and ways to bridge between the onsite and online visitor experience. Digital Experiences provides a process for internal

conceptual development and design (identify target audience, learning objectives, conceptual plan, user/visitor experience narrative, audience engagement plan, creating content for a digital audience/context, wireframes, storyboards, prototypes, visitor testing, technology selection, design and build, content maintenance planning), outsourced digital design and procurement (writing statements of work, cost estimation, vendor selection, managing contracts [done by the Contracting Officer's Technical Representative or COTR]), and guiding teams through relevant Smithsonian policies and processes.

Asset Manager (Digital Curator)—Responsible for researching, gathering, and managing all digital content assets (images, video, audio, etc.) for the exhibition, including the clearance of copyright or usage rights for use of all assets in both the physical exhibition and online. Coordinates requests for assets from Archives, photographers, and third parties. Ensures assets are in proper format.

Visitor Services—Acts as the voice of the visitor and advocates on visitors' behalf. Provides input on visitor flow, use of space, and the overall visitor experience.

Archives—The collections of the National Air and Space Museum Archives span the history of flight from ancient times to the present day. They include a wide range of visual and textual materials, including documents, photographs, motion picture film and video, and more than 2 million technical drawings. The Archives' role in exhibit support varies depending on the scope and design of an exhibition. It may include assistance with research, document and photo reproductions, and, on rare occasion, loans for display purposes.

Advancement—Works with the exhibit team to determine possible funders for an exhibition, develop informational materials on the project, engage with potential donors, and secure funding for the exhibition.

Communications—Works in consultation with the exhibit team to prepare materials for public dissemination surrounding the exhibit, as well as for internal communications. Identifies marketing opportunities. Plans and produces press events around the opening of the exhibit.

Smithsonian Facilities (SF) Team

SF provides stewardship of Smithsonian buildings, gardens, and facilities. It reviews, and approves the design and construction of all exhibitions and other building projects.

SF Program Managers (PM)—Provide comprehensive management of the Smithsonian's Facilities Revitalization and Facilities Construction Programs; develop preliminary project scope statements, schedules, and budgets; monitor, direct, and report on updates to scope, budget, and schedule of individual projects and major construction; and coordinate the efforts of stakeholders, designers, and construction execution.

SF Design Managers (DM)—Provide details of project design and planning for occupancy and construction, including design management; architect-engineer (A/E) selection procedures; the parameters, standards, and considerations for inclusion in the design; pre-advertisement review of contract documentation; a discussion on the types of contracts for use in implementing the designed project; and the plan for occupancy of the project after

construction. For projects that potentially impact base building or systems, or involve safety, security, environmental, or historic preservation issues, the DM will manage the SD 410 reviews of these projects to ensure the participation of appropriate SF staff and other groups, in close coordination with the sponsor and SF PM. The PM and DM also determine the required level of the Office of Planning, Design, and Construction (OPDC) participation, including whether design and/or construction services will be required.

SF Construction Managers (CM)—Provide the various aspects of construction management (and oversight), including contract bid package; authority requirements for contract or bid advertising; administration of construction phase roles and responsibilities; procurement methods, bid evaluation and contract award; pre-construction conference; construction changes and cost; operations and maintenance considerations; and contract completion and acceptance, including subsystem and system testing, and facility and safety inspections" through project closeout. Project closeout covers the installation and testing of the equipment and systems, the details of facility outfitting, turnover to the user and the O&M organization, and the post-occupancy evaluations of architect-engineers (A/Es), construction contractors, and the customer's report of Smithsonian staff and contractor performance during the design and construction processes.

Sponsor Review Coordinators—Those with professional qualifications, project experience, and familiarity with design and construction who are authorized by the Office of Planning, Design, and Construction (OPDC) to conduct design reviews for their organization on smaller projects. Museum staff, exhibit designers, Smithsonian Enterprises staff, Office of the Chief Information Officer (OCIO) personnel, and other SF staff outside of OPDC who are qualified to OPDC's satisfaction will be given limited authority to conduct design reviews, in compliance with SD410 review requirements, and are responsible for conformance of all construction documents with Smithsonian codes, standards, and guidelines.

2. Exhibition Proposal, Approval, and Review Process

2.01 Overview of Exhibit Development Process

Most National Air and Space Museum exhibitions are conceived by the curatorial departments or Center for Earth and Planetary Studies (CEPS) and designed and produced by the Museum's exhibits divisions or their contractors. However, even small or temporary exhibitions will typically involve to some extent most departments throughout the Museum.

NASM Exhibit Development Process Summary
Project Phases

2.02 Exhibit Proposal Review and Approval

Exhibit proposals are submitted to and reviewed by the Museum's managers and senior leadership who will accept or reject proposals. The Museum Director has final approval. Any completely new exhibition, large or small (by small we typically mean anything other than a full-gallery exhibition), needs this approval. Revisions to existing exhibitions, unless they involve major changes of significant scope, generally don't.

2.03 Label Script Review and Approval

An exhibit label script is produced by an exhibit script writer-editor from a content document written by a curator, scientist, or team of Museum content experts. (See 3.05 Developing the Label Script.) The exhibit script writer reviews and edits all label scripts. The exhibit script writer may work with the content team during the content document development of a major exhibition or may receive a copy of the draft content document for smaller exhibitions and exhibit updates. For changes or corrections, the content expert may submit the draft labels directly to the exhibit script writer for editing.

The script shall be circulated to the team on a periodic basis as it is being developed to make sure that each area of the exhibition is being treated properly. The team shall sign off on each iteration. The final copy of the script will be submitted electronically via e-mail or posted on an accessible network drive, circulated within the exhibit team, and signed off by the exhibit writer, curator or lead curator, and curatorial department chair using the current version of the NASM Script Approval Sheet.

The exhibit script writer-editor tracks the script through the review and approval process, updates it as needed, and maintains files of the final electronic and paper versions.

Label Script Review and Approval Process
NASM Script Approval Sheet

2.04 Exhibit Graphics Review and Approval

In-House Review Process

Informal reviews of graphics by the exhibit team members take place as the graphics are being developed. The designer, curators, Exhibits Design chair, senior graphics designer, educator, and exhibit script writer-editor review the final graphics proofs, mark them up with corrections and comments, and sign off on the half-page Graphics Signoff Sheet posted near the graphics to indicate that they have seen and reviewed the proofs.

The formal final review and approval takes place once the graphics are in a finished or nearly finished state. This review takes place in the Exhibits hallway (or comparable place where the graphics can be displayed). Posted on the walls are half- to quarter-size graphics printed on the paper to be used in the exhibition, so the true colors can be examined and the labels appear as they will in the exhibition. For a small exhibition, only a single review takes place. For a major exhibition, the review may need to be divided into several reviews covering each major unit.

The project manager sets up the final review with the Director's office, and the exhibit script writer-editor provides the Director with a current copy of the label script to read before the review. The final graphic layouts are reviewed and approved by the key exhibit team members; Exhibits Design chair, senior graphic designer, and exhibit script writer-editor; the associate directors, the chief curator, and the Director. The reviewers sign off on the Graphics Approval Signoff Sheet, which is posted near the graphics, to indicate their approval. The graphic designer and writer-editor incorporate any requested changes into the graphics and label script.

Graphics Signoff Sheet
Graphics Approval Signoff Sheet

Contract Review Process

Informal reviews of graphics with the team will take place as an exhibition is developed as indicated above. However formal reviews will occur at the 35%, 65%, and 95% submissions of the graphics which will be put into the SD 410 review process with the drawings. (see below) Hard copies of submittals, such as half sized proofs and full sized samples, are determined by the "Deliverables Schedule" which is an attachment to the exhibition design contract.

2.05 Exhibit Design Review and Approval

The Smithsonian has its own approved internal review process, the SD 410 review, done by the Smithsonian Facilities (SF) with in-house architects and engineers who analyze all design and construction that is done at the SI. All exhibition CAD drawing packages are also put through this review as outlined below. When contracting exhibitions, the entire submission (35%, 65%, 95%, and 100%) goes through SD 410 review including graphics packages.

During Transformation, NASM exhibition drawings are being reviewed in Bluebeam with comments exported as spreadsheets where responses will be recorded. Graphics are commented on in PDF form. All comments by team members are compiled and reconciled at the end of the review by the Design Manager (DM). These documents are loaded into the SI internal review system for the record.

The SD 410 Review Process

The SD 410 review is performed by the Smithsonian's Smithsonian Facilities (SF), which reviews drawings and specifications to ensure that all Smithsonian projects adhere to official policy and code requirements. This includes new construction, modifications to an existing building, new exhibitions, and modifications to existing exhibitions. Before actual procurement, construction, or fabrication can begin, the drawings and specifications for the task must receive SD 410 compliance approval. A new exhibition is usually divided into two review packages:

- Construction—new work or changes to the actual exhibit space.
- Fabrication—details and specifications of the exhibit elements and components.

Construction

The construction (and/or demolition) drawings, along with CSI format specifications, include new work or modifications to an existing exhibit gallery or space. This includes architectural, mechanical, electrical, facility lighting, plumbing, HVAC, security, fire detection, and fire suppression systems. The documents are also reviewed for accessibility, health, and safety compliance. If the work to be done is to go out to bid to multiple contractors or is to be a negotiated fee with a single 8a contractor, a government cost estimate must be included.

Fabrication

The fabrication package is an extension of the construction drawings and defines in further detail all elements and components of the exhibition, from the look and function to the materials, colors, and techniques to be used. This includes everything from built environments down to the smallest caption label. Among other things, the package drawings identify artifact, graphic, AV, exhibit lighting, prop, and special element placement. SF determines who should review the fabrication package based on the package's content. At the least, it will be reviewed for accessibility, health, and safety compliance.

Review Phases

The SD 410 review occurs in parallel with the Museum's own internal review process and is coordinated by the exhibit project manager in conjunction with the SF design manager (or sponsor review coordinator, as applicable). The drawing packages for large projects are usually submitted in phases of completion for review and comment: 35% (concept stage), 65%, 95%, and 100% (final) submissions. All comments must be addressed in writing and by modifying the submission documents. Refer to section **5.02 Facilities Design and Construction** for detailed guidelines relating to construction and fabrication.

SF Architect-Engineer Information Center
SD 410 Process
SD 410

Sponsor Design Review

When an exhibition is small or simple and will not affect building systems, this type of shortened review can be done. NASM has a sponsor review coordinator on staff to facilitate this review.

From the *Smithsonian Facilities Project Management Handbook*:

> **2.2.2 Sponsor Design and Review**
>
> Projects which have no impact on base building or building systems, but which may impact accessibility, fire and life safety, or Historic Preservation, security, or which alter or change the use or occupant load of a space in any way, may be designated by the PM . . . as projects appropriate for sponsor design and review. Projects that are selected for this outcome are highly dependent on project sponsor review coordinator's capability and recent past performance. Projects still need to be reviewed by appropriate SI organizations, but the project sponsor conducts and coordinates the design and review and takes responsibility for the project meeting the required codes, standards and guidelines, and compiling complete project documentation.
>
> The codes, standards and guidelines can be referenced at the SF A/E Center website. Conforming project review checklists and design documents shall be forwarded to the Zone Manager (ZM), PM and the Deputy Director, Engineering and Design Division (EDD) prior to construction implementation. Project closeout is a critical step in the project process and is more fully addressed later in the manual.
>
> **Projects Qualifying for Sponsor Design and Review**
>
> Specific projects and exhibits for which sponsors may conduct design reviews will be determined based on the level of project complexity and the qualifications of the sponsor's proposed sponsor review coordinator. The SF PM will discuss proposed projects with sponsors and initially determine which project path will be used for accomplishment. The PM will inform EDD of projects planned for sponsor oversight. Normally, projects that do not impact existing base building systems, and that are simple in design are more likely to be managed by the sponsor's review coordinator. Considerations must include whether the project will impact architectural, structural, mechanical/HVAC, plumbing, electrical, handicap access, historical, safety or environmental issues, and telecommunications, security or fire protection, as well as whether any other building tenants will be impacted by the project.

2.06 Evaluation

Visitor Evaluation

Evaluation shall be an integral part of the exhibit planning to ensure that exhibitions resonate with visitors and to provide a way of measuring success once an exhibition opens.

Visitor Evaluation Guidelines

3. Developing the Exhibition Concept and Content

3.01 Developing the Concept

Once a proposed exhibition idea is approved by the Director, a team is designated to develop the exhibition concept. It develops a charter and a main message for the exhibition, as well as learning objectives and interpretive strategies, takeaway messages, and the overall visitor experience. The team decides on possible artifacts to include and discusses display options and design ideas.

The team also prepares documents needed by Advancement for fundraising purposes, such as content summaries, artifact lists, and PowerPoint presentations. The exhibit designer also provides exhibition plans, elevations, renderings, perspectives, 3D model (digital), scaled 3D model (optional), and flyby video representation (optional).

Developing the Exhibition Concept
Exhibition Plan and Guiding Principles
SD 603—Exhibition and Program Planning

3.02 Researching the Collections

The strength and attraction of the Museum's exhibitions lie in the significance and uniqueness of the Museum's aerospace collections, their stories, and the stories of people associated with them. Visitors come to the Museum mainly to see, experience, and learn from the objects on display. The collections are housed in three locations: the National Mall building, the Steven F. Udvar Hazy Center in Chantilly, Virginia, and the Paul E. Garber facility in Suitland, Maryland. The collection records are tracked and accessed by staff using The Museum System (TMS) database. To access TMS, users will need to complete and submit the online TMS Account Request Form. Contractors can also access TMS but need to apply for a network account, complete the Smithsonian's Computer Security Awareness Training, and then request a TMS account online.

Smithsonian Network Access
Network/E-mail Account Request Form
Remote Access Request Form

3.03 Incorporating Archival Materials

Exhibit developers should take advantage of the Museum's vast archival repositories. The archival collections span the history of flight and include a wide range of visual and textual materials, including documents; photographs; motion picture film and video; and more than two million technical drawings. Brief collection descriptions and a limited number of individual images are searchable online (http://airandspace.si.edu/collections/archival/). For more about researching and accessing the archival collections, please consult the Archives Department's Reference Services web page:

NASM Archives Reference Services

3.04 Doing Image Research

Images obtained for use in exhibitions either from internal or external sources will be stored in the Smithsonian's Digital Asset Management System (DAMS). DAMS is a major component of the Smithsonian's digital infrastructure and is used to preserve, locate, and share library, archive and museum collection digital assets. The Smithsonian has been using the OpenText Media Management suite (formerly Artesia) since 2007. Over 40 Smithsonian units are using DAMS to manage their image, audio, and video digital assets. To access DAMS, users must complete and submit a DAMS Account Request Form. When contractors are procuring the images, they will need to acquire a Smithsonian network account to access to the DAMS. Images will be managed and shared through the DAMS.

Smithsonian Network Access
Network/E-mail Account Request Form
Remote Access Request Form
DAMS Account Request Form

When obtaining images for exhibits, it shall be done in the following order:

1. On site image research must first be conducted in the NASM and SI Archives to identify photos in collaboration with curators and Archives staff.
2. If, and only if, the necessary imagery cannot be located within NASM or SI Archives, external public domain government sources should be searched including NASA, the US military, and various other government agencies. Curators shall be consulted to locate possible contacts to obtain imagery from such sources.
3. If image demands are not met with public domain images from government sources, private organizations shall be contacted in consultation with curators in order to obtain free or low-cost imagery.
4. If the above steps still do not meet the imagery demands, outside photo purchases may be considered.

3.05 Developing the Label Script

The lead curator facilitates the team review of the initial proposal, and writes the Exhibition Concept Plan. The curator then composes the content document based on the Exhibition Concept Plan. The exhibit label script is derived from the content document, and is written or edited by an exhibit script writer-editor as it evolves from draft iterations by the lead curator, with input from other content experts. Final scripts should include labels from Education and Digital Experiences and Interactive Media staff, including active learning labels, people stories, and interactive directions.

Exhibit Label Script Guidelines
Editorial Style Guidelines for NASM Exhibits

3.06 Developing Digital Exhibit Elements

Digital engagement, and the technologies used to facilitate it, are a valuable element of the guest experience. This includes not only physical displays and interactives that form an integrated part of the exhibition narrative, but also the digital tools and behaviors that our guests bring with them.

Digital experience design is similar to exhibit design in that content, visuals, and technology are creatively combined to accomplish a specific experience or achieve a specific learning objective. Part of the digital experience design process is determining when and how digital experiences should be incorporated, and how best to implement them.

Exhibition Digital Experiences
Requirements for Exhibition Digital Experiences
Developing Interactive Exhibitions at the Smithsonian
Captioning Key: Guidelines and Preferred Techniques

3.07 Exhibit Development Resources

Bibliography
Big Idea
Things to Keep in Mind

Exhibit Labels

Label Standards
10 Deadly Sins of Label Writing
Active Learning Label Goals

Interpretation

What Is Interpretation
Six Principles of Interpretation
Standards and Practices for Interpretive Planning
Planning for Interpretation and Visitor Experience
Interpretive Planning for Exhibitions, NMAH, NMNH

Visitors

Mickey's 10 Commandments
What Is IPOP
An Attention-Value Model of Museum Visitors
Videos and Visitors in Exhibitions

4. Developing the Exhibition Design

4.01 Exhibit Design and Structure

The Museum's design goal is to create spaces that are safe, accessible, educational, and aesthetically pleasing and that showcase the priceless artifacts in our collections, present the research of our historians and scientists, effectively engage the millions of people who visit the Museum each year, and inspire them to learn more about aviation and spaceflight. The different elements of the exhibit design embody and support the messages, themes, and learning goals for the exhibition.

Exhibit plans and elevations shall be designed primarily with the visitor experience and safety in mind. Designers shall provide adequate provisions for visitor traffic flow, crowds and clustering, strollers and wheelchairs, sightlines, and artifact protection.

The artifacts shall be properly protected and visually accessible. Exhibit structures should allow artifacts to be displayed in settings appropriate for both conservation and learning. If an artifact is displayed in the open, 4 feet of space must separate it from visitors to prevent them from touching it. The bottom of a hanging artifact must be a minimum of 12 feet from the floor. Design shall include consideration for staff access to artifacts on display for cleaning and care.

An exhibition's physical environment should enhance the exhibit content. It should viscerally echo the exhibition's messages and themes and be multisensory. A successful physical space is one where a visitor may absorb the general meaning of the exhibition by just moving through the space, without having to read a single label. Since many of our visitors do not speak English as a primary language, this will further aid in communicating the content.

Materials and Finishes
Modularity
Proprietary Items
SI Guidelines for Accessible Exhibition Design
NPS 7 Principles of Universal Design

Gallery Spaces

While developing the floor plan, existing conditions need to be examined and investigated. Some exhibit galleries have a separate entrance and exit and some entryways serve both purposes. With the high volume of visitors to our museum, it is very important to leave these entry and exit ways open with minimal exhibitry. Designers shall provide life-safety plans that include egress and occupancy calculations by a licensed (PE) fire protection engineer. Allow for emergency exits and lights, air supply and returns, and fire equipment, to name a few examples. With Revitalization, the galleries will be made into new black box configurations with updates to electrical, IT, and lighting.

NASM Special Event Revitalization Review and Notes
Black Box Galleries

CAD and BIM Standards

The NASM Mall Building Revitalization Project has been selected as a pilot project to inform the development of the Smithsonian's Building Information Modeling (BIM) standards for design development and information management.

With the design, the A/E and CMC will be providing building information models for architectural, structural, civil, mechanical, electrical, plumbing, and fire protection elements as applicable for the respective disciplines. The expectation is that the models shall be able to identify conflicts between the systems and elements being developed by the major design disciplines to the level of detail generated by the BIM software.

The models are to be developed in a manner that will support on-going operations and management of the building and its systems, including a Maintenance Plan with an inventory of facility items and number of systems and items that need servicing, as well as the provision of recommendations for servicing based on the specified design use and not necessarily the standard manufacturer's recommendations.

The models will feature asset information for all facility system equipment in the Smithsonian-provided format, which includes such information as specification ID, serial number, brand name, model number, electrical requirements, filter sizes, tonnage, etc., based on an asset template within the BIM file.

Exhibition designs are presented as BIM drawing packages and shall be created in Vectorworks 2018. BIM models shall be created for each exhibition to integrate with the building BIM model.

BIM File Formats
Vectorworks Standards Manual

Collections

Artifacts can be damaged by a variety of factors, including unsuitable artifact placement, light damage, severe humidity and temperature fluctuations, improper physical support, and exposure to harmful vapors or gases from display materials. Much research has been conducted to determine how these factors are responsible for sometimes unseen damage to museum artifacts. The recommendations in the document referenced below are based on this research and are in keeping with current museum standards and practices.

NASM Conservation Exhibit Design Guidelines

Lighting Design

Lighting design should not be an afterthought but incorporated into the design planning from the beginning. Proper lighting can enhance the ambience and experience within a space, as well as protect the integrity of sensitive artifacts and graphic materials. Lighting design is governed by the allowable light levels for the artifacts.

NASM Conservation Exhibit Design Guidelines

Acoustics

Sound is an important but often neglected consideration in any public space. The acoustic environment in a museum is made up of many sources: visitor voices and movements through the museum, sounds from interactive exhibits and videos, museum-wide announcements, and other sources of sound and noise. The Museum's popularity and the nature of its gallery spaces present particular challenges. Each major exhibition needs an acoustician to analyze planned noise levels and ensure that they meet OSHEA limits for public spaces. While the Museum does not have proscribed standards for acoustics, this document has information that may be helpful in developing standards or guiding principles:

Museum Acoustics

Seating

Seating for visitors must be provided in galleries and public spaces, however, keeping in mind the large numbers of people who visit the Museum. Seating should not block major thorough fares or entrances. We want our visitors to be comfortable but because we don't charge admission, we don't want people coming in and camping out for the day. Seating needs to be durable, attractive, and easy to clean. Benches with arms are preferred to discourage people from lying down across several seats as well as to help people with disabilities to raise and lower themselves.

Public Seating

4.02 Accessibility

Accessible design is essential to exhibit development because people with disabilities are a part of the Museum's diverse audience. Devising exciting, attractive ways to make exhibitions accessible will most directly engage people with disabilities and older adults.

To make the exhibition experience more inclusive, tactile models are often used. These shall be accompanied by raised letters titles also in Braille and include a scale model reference such as a human figure with larger objects.

SI Guidelines for Accessible Exhibition Design
SD 215—Accessibility for People with Disabilities
ABA Standards (Chapters 1–3)
ADA Standards for Accessible Design
Captioning Key: Guidelines and Preferred Techniques

4.03 Sustainability

When planning an exhibition, designers should also consider the environmental impact of materials and processes used in its fabrication and recognize the impact our decisions about exhibit materials have beyond the Museum.

Exhibit Fabrication Sustainability

4.04 Exhibit Graphics

Exhibit graphic design visually enhances the exhibit content and presents it in a way that will make our visitors want to linger, explore, and revisit. The graphics will convey important information, such as the purpose of the exhibition, interpretive messages, artifact descriptions, and many other exhibit elements. They provide general information and a sense of continuity within the exhibition. Exhibit graphic elements may include stand-alone text, photographs, illustrations, maps, or any combination of text and images within a graphic design layout. They are produced and mounted for display using a variety of processes.

NASM Graphic Design Standards
SI Guidelines for Accessible Exhibition Design
SI Guidelines for Universal Design of Exhibits

5. Producing the Exhibition

5.01 The Exhibit Galleries

Life-safety is the most important factor in the design and fabrication of exhibitions. With Revitalization, the galleries will be made into new black box configurations with updates to electrical, IT, and lighting.

Black Box Galleries - technical requirements-rev 1.

5.02 Facilities Design and Construction

The Smithsonian Facilities (SF) oversee facilities design and construction for the Smithsonian. The two web pages below have links to the required criteria that designers must follow when designing exhibit projects for our institution.

SF Codes and Standards

Smithsonian Codes, Standards and Guidelines
Smithsonian Facilities Design Standards
SI Fire Protection and Life Safety Design Manual
Accessibility
Metrication
Sustainability

SF Construction Specifications

Division One, Small Project
Division One, Large Project
Fire Protection and Life Safety guide specifications
OCIO Cabling Standards

SD 418—Historic Preservation Policy

5.03 Fabrication

Exhibit fabrication links all of the exhibit graphic elements together with the artifacts and interactives on display in a gallery. Fabrication includes cases to display and protect artifacts, along with all of the risers, wedges, or shelving to accommodate the objects. When an interactive is developed, it generally requires a structure to contain it or secure it at a usable height. Fabrication also includes graphic pylons, wall structures, railings, decking, and facades.

Fabricated exhibit components must be durable, structurally sound, secure the artifact, and be esthetically pleasing. Exhibitry and cases shall provide secure access ports for the conservation and frequent inspection of artifacts and the servicing of mechanical and electrical components, especially exhibitry that requires desiccant chambers. All specified materials for exhibit fabrication shall comply with the latest version at the time of the award of the design of the ***Smithsonian Institution Facilities Design Standards***. Surface materials and treatments specified by the designer shall comply with the conservation guidelines included in section 4.01 of this document. Requirements for level of security of exhibitry components are to comply with section 5.09. Climate control measures, including monitoring will be provided at the beginning of design by the design manager, who will coordinate with the Museum's Collections staff.

NASM Fabrication Guidelines
NASM Conservation Exhibit Design Guidelines
SI Fire Protection and Life Safety Design Manual
Acrylic Sheet Fabrication Manual—Plexiglas
Tamper-Resistant Fasteners

5.04 Collections

The artifacts incorporated into Museum exhibitions cover the full range of materials, complexity and scale. Typically, the Museum's Conservation and Preservation and Restoration staff are responsible for planning and performing all artifact treatments. At times, external contractors are hired for specific treatments or tasks related to preparing an artifact for exhibition, and these contracts are managed through the Museum's Collections Division. When exhibits are fabricated by external vendors, it is imperative that they work closely with Collections staff to ensure that the designs meet the requirements for the specific artifacts. Collections staff will need to review and provide written acceptance of exhibition designs, materials selected, lighting designs, environmental controls, and artifact mounts/rigging/display fixtures. When external vendors require physical access to artifacts for design and fabrication needs, Collections staff will ensure that protocols regarding access and artifact protection are followed.

Rigging Best Practices

5.05 Information Technology

Computer-based interactive hardware in the Museum's exhibit spaces is managed and maintained by the Museum's Exhibit Technologies division. The Museum currently houses all computer hardware running exhibit interactives in a controlled basement facility, separated physically from monitors and touchscreens on the Museum floor. Exhibit computers are either restarted daily or run continuously 364 days a year, depending on their locations. All software developed for exhibit display must be configured to enable stand-alone startup and remote management without manual steps required to configure operation. The current standard operating system for exhibit computers is Windows 10. Exhibit computers will be configured to automatically start the interactive application after the operating system has loaded.

The Smithsonian Cabling Standards technical note (linked below) establishes standards and procedures for the design and installation of network cable (both fiber and copper) and the related network infrastructure; e.g., punch down blocks, cross-connect panels, conduit, enclosures, power outlets, fire stopping, and uninterruptible power supplies. This technical note applies to both new construction and renovations of existing Smithsonian buildings.

Exhibit Interactives and AV Installations
Smithsonian Cabling Standards
Mechanical Interactive Design Checklist

For IT related projects, there is a review process with the Smithsonian's Office of the Chief Information Officer (OCIO). Once the project is initiated the Project Manager will contact the **Technical Review Board** (TRB) Coordinator to set up a **Tailoring Agreement Meeting**.

The Project Manager and **Contractor** must fill out the MS Word form "Life Cycle Management Tailoring Agreement Checklist", a standard form provided by the TRB. In addition, the Project Manager and contractor must present a description of the project, and possible tailoring needs, at a meeting of the TRB. A PowerPoint template, "TRB Informational Briefing", is provided by the TRB to structure this presentation.

Once the TRB has reviewed the proposal, and has suggested possible changes, the Contractor is responsible for ensuring the project complies with Smithsonian life cycle management policy.

5.06 Hazardous Materials

Hazardous materials include but are not limited to chemicals, compressed, liquefied, and cryogenic gases, asbestos, lead, and radiation. Any project which requires the use of one or more of these substances or entails disturbing an existing hazardous material in the building must follow all applicable Smithsonian, national, and local codes, standards, and regulations. In the case of conflicting requirements, the most restrictive requirement in the Smithsonian documents and the applicable codes and standards shall be followed. In some instances, making this determination may require consulting with the Smithsonian's Office of Health, Safety, and Environmental Management.

Smithsonian Guidelines

SD 419—SI Safety and Health Program
SF Codes and Standards
SF Construction Specifications
SI Safety Manual

National and Local Standards

Code of Federal Regulations (CFR) 29, Part 1910 including:
- Subpart G – Occupational Health and Environment Control
- Subpart H – Hazardous Materials
- Subpart Z – Toxic and Hazardous Substances

Code of Federal Regulations (CFR) 29, Part 1926 including:
- Subpart D – Occupational Health and Environmental Controls
- Subpart Z – Toxic and Hazardous Substances

National Fire Codes
U.S. EPA laws and regulations
U.S. DOT laws and regulations
Washington, D.C., environmental laws and regulations
Virginia environmental laws and regulations
Maryland environmental laws and regulations

5.07 Fire Protection and Life-Safety

To provide all employees, volunteers, and visitors with the safest environment possible, the Museum is committed to designing and constructing spaces that meet all applicable fire protection and life safety codes, standards, and regulations. Several Smithsonian documents outline the organizational guidelines for these areas and reference the codes and standards listed below. The Smithsonian Fire Protection and Life Safety Design Manual establishes the minimum requirements for Smithsonian design projects, so it should be consulted first. In the case of conflicting requirements, the most restrictive requirement in the Smithsonian documents and the applicable codes and standards shall be followed. In some instances, making this determination may require consulting with a Fire Protection Engineer within the Smithsonian's Office of Health, Safety, and Environmental Management.

Smithsonian Guidelines

SD 419—Safety and Health Program
SI Fire Protection and Life Safety Design Manual
SF Codes and Standards
SF Construction Specifications
SI Safety Manual

National Standards

Code of Federal Regulations (CFR) 29, Part 1910 including:
- Subpart E – Means of Egress
- Subpart H – Hazardous Materials
- Subpart L – Fire Protection
- Subpart S – Electrical

Code of Federal Regulations (CFR) 29, Part 1926 including:
- Subpart F – Fire Protection and Prevention
- Subpart G – Signs, Signals, and Barricades

National Fire Codes
International Code Council (ICC) Codes latest editions:
- International Building Code (IBC)
- International Fire Code (IFC)
- International Mechanical Code (IMC)
- International Plumbing Code (IPC)

Factory Mutual Global Loss Prevention Data Sheets

5.08 Lighting and Electrical

Provide lighting system designs in accordance with the Museum's exhibit electrical guidance document (link below). For areas or rooms not specifically covered, comply with the requirements of the Illuminating Engineering Society of North America's (IESNA) *Lighting Handbook Reference and Application* (hereafter called the *Lighting Handbook*).

Typical Light Levels for Museum Applications

NASM Infrastructure Requirements for Lighting and Electrical
NFPA 70 – National Electrical Code

5.09 Security

The information in the documents referenced below will guide Museum staff, in particular exhibit designers and fabricators, in constructing and alarming exhibit cases. It may be advantageous from a manpower point of view to install alarm devices and locks in exhibit cases during fabrication. These guidelines provide guidance for these situations, as well as those where Smithsonian or Office of Protection Services (OPS) staff may be installing alarm equipment.

Deciding on the physical construction of the cases, and the need to alarm them, should be a joint decision between the Museum and OPS. The need to provide alarms depends of the nature of the objects to be displayed. OPS security standards require that firearms and items made of precious metals, such as gold and silver, require a higher level of physical construction with electronic alarms, suitable locking devices, and assessment CCTV. Any alarmed case requires CCTV.

Exhibit Security Guidance
SI Security Design Criteria

6. After the Exhibition Opens

6.01 Final Deliverables

Upon completion of construction and installation of any exhibition, the drawings and models will be updated to as-builts per CAD and BIM standards (see section 4.01).

Final Deliverables
Video and Interactive File Deliverables

6.02 How We Maintain the Galleries

In 2017, NASM launched an Exhibit Maintenance team to evaluate the current maintenance conditions as well as plan for maintenance during and after Revitalization and Transformation.

20171101 NASM Exhibit Maintenance Plan - Final Report Update

6.03 How We Maintain Digital Content

Content Maintenance Plan

For each gallery, a Content Maintenance Plan will be developed for the digital experiences. This plan includes:

1) Estimated frequency of content updates
2) Process for making updates
3) Content monitoring protocol
4) Short-term and long-term maintenance
5) Roles and responsibilities, including a content manager responsible for routinely reviewing content and making or coordinating any required updates

Content Management System

Depending on the frequency and complexity of updates, a remote web-based method may be required to support the original design of the digital experiences. This content management system (CMS) will allow content managers direct access to updating the content from their desktop. Contractor and NASM should work together to determine the best CMS solution—Drupal is the current platform used to support several in-gallery interactives. The CMS may incorporate editorial workflows and user permissions to ensure content is properly reviewed and approved prior to display in the Museum. The conceptual design and workflow of the CMS is developed in consultation with staff from the Digital Experiences team in Education and Public Engagement, and the technical feasibility is reviewed and supported by ITD/Exhibits Technology.

Guest Contributed Content

Digital content collected from or shared by Museum guests (e.g., e-mails, names, photos, etc.) that qualifies as personally identifiable information (PII) must be collected and handled according to Smithsonian privacy policies. The types of content collected,

how that information is used, and how long Smithsonian maintains or stores that content are all factors that must be identified, reviewed, and approved prior to launching the experience. There are also specific guidelines related to content or experiences that target children under the age of 13. Privacy policies impact the design of digital experiences and interactives, so must be considered early in the process. Any plans for guest contributed or collected content should be coordinated with NASM's Privacy Point of Contact whose can help ascertain whether it qualifies as PII and if so, the process to follow and design solutions.

6.04 How We Determine Success

After the exhibition has been open for a predetermined period of time, a summative evaluation will be done (see section 2.06), and the exhibit team will present the results to the NASM managers.

A successful exhibition…

- Is safe, inviting, and easy to navigate.
- Makes artifacts as accessible to visitors as possible while maintaining the highest preservation standards.
- Is physically and intellectually accessible to visitors.
- Has learning objectives and clear messages.
- Engages people who have varied learning styles.
- Fosters active learning through layered information, interactivity, and inquiry.
- Offers interactive and digital experiences that are fun and rewarding.
- Incorporates technology that is intuitive, accessible, and easy to use.
- Has lighting that enhances the visitor experience.
- Holds up under repeated and heavy use.
- Can be readily maintained.
- Compliments the rest of the Museum.
- Meets the intended outcomes outlined in the exhibit proposal.
- Is completed on time and within budget.

6.05 Gallery Deinstallation

Gallery deinstallation requires detailed planning and coordination between curators, Collections, Exhibits, and the Registrar's Office. Exhibits Production assists early on in the deinstallation process by opening cases for the removal of small to medium artifacts by Collections. Exhibit Production then takes care of the removal and disposal of all exhibit components as access to them is acceptable. Often, removal of exhibit components is conducted in coordination with the removal of large artifacts by Collections. Exhibits Production also works closely with Exhibit Technologies where matters of electrical or audio/visual are involved.

Gallery Deinstallation Notes

7. Appendix

7.01 Other Organizations' Guidelines

These guidelines developed for the National Park Service contain much useful information.

NPS Standard Exhibit Planning and Design Specifications
NPS Standard Exhibit Fabrication Specifications

The Smithsonian Institution Exhibits Unit has developed these guidelines.

SIE Guide to Exhibit Development