



Smithsonian  
*National Air and Space Museum*

## PHASE TWO

*The Flight Continues*



AT THE STEVEN F. UDVAR-HAZY CENTER

## BUILDING ON SUCCESS

With more than a million visitors a year, the Steven F. Udvar-Hazy Center is thriving as one of the world's most popular aviation museums, second only to the Museum's flagship building on the National Mall.

The secret of its success has to do with the unique artifacts it is privileged to collect, preserve, research, interpret, and share with the world.



## WORK IN PROGRESS

**S**ince its opening on December 15, 2003 in conjunction with the centennial of flight, the Steven F. Udvar-Hazy Center has been a work in progress.

On that day, 82 aircraft and 10 exhibit stations with hundreds of small objects were on display in the vast aviation hangar. The adjacent space hangar housed only a few artifacts, most visibly the first Space Shuttle, *Enterprise*, still awaiting final cleaning and repair. Just over 50 space artifacts were housed elsewhere in the Center.

Five years later, the Center's two hangars are filling rapidly, with 158 large aircraft, 153 large space artifacts, and thousands of small artifacts on display.

### AVIATION

The ten story high Boeing Aviation Hangar displays aircraft in 13 thematic areas, with large aircraft exhibited at eye level. Smaller aircraft are suspended at various levels, positioned as if soaring, turning, or diving. Anchoring the commercial aviation end is the sleek white Concorde and at center stage is the imposing black Lockheed SR-71 Blackbird. In the World War II section is the Boeing B-29 Superfortress *Enola Gay*. Among the aircraft overhead are aerobatic airplanes, gliders, and homebuilt aircraft. Small artifact collections include Charles Lindbergh memorabilia, flight jackets and uniforms, engines, and machine guns.

### SPACE

In the James S. McDonnell Space Hangar, *Enterprise* is now surrounded by hundreds of artifacts. Rockets, missiles, and satellites are overhead, silhouetted against the darkness of space. Space vehicles used in human spaceflight and scientific exploration are located around the shuttle. The Apollo Mobile Quarantine Unit recalls a time when we feared "Moon germs." Space as experienced in science fiction is also represented with objects like an R2D2 mailbox. Glass cases display items such as space toys, astronaut personal items, and spacesuits.





### **Steven F. Udvar-Hazy**

*All my life, I have been committed to aviation and the industry's advancement and development, and it is an honor for my family and company to solidify the Museum's mission of restoring, preserving, and displaying our aviation heritage.*

## **EDUCATION**

This unparalleled collection serves as the basis for education programs and events throughout the year. Annual activities have grown in popularity, drawing up to 20,000 people on a single day. Udvar-Hazy Center educators conduct programs for more than 25,000 students each year. These activities include learning labs in the Claude Moore Education Center and artifact-based school programs. Two teachers from local school districts are on staff for two-year rotations, and take back to their schools valuable information and teaching skills that encourage careers in math and science.

The completion of Phase Two of the Udvar-Hazy Center will enhance the educational opportunities available. The new Archives facility will expand and broaden opportunities for researchers. Observing a restoration in progress will bring students a new appreciation for history and the importance of preserving it.

Learning activities presented in a museum setting impart memories that last a lifetime.



## **THE FLIGHT CONTINUES**

The new, and final, wing of the Steven F. Udvar-Hazy Center — “Phase Two” — will be dedicated to the behind-the-scenes care of the Smithsonian’s amazing collection of aircraft, spacecraft, related artifacts, and archival materials. This collection is the largest and most significant of its kind, with some 60,000 artifacts, including many of history’s most rare and iconic artifacts of flight.

The completion of Phase Two will help the Museum accomplish its mission to collect and preserve our nation’s aviation and space history through the objects associated with it.

MARY BAKER ENGEN RESTORATION HANGAR



visualization by Interface Multimedia



## THE MARY BAKER ENGEN RESTORATION HANGAR

**P**reservation and restoration are at the core of the National Air and Space Museum's mission.

The largest area of Phase Two is the Mary Baker Engen Restoration Hangar. Spacious enough to accommodate several aircraft at one time, the facility will give the Museum's specialists the room and equipment to reconstruct, repair, and preserve artifacts. From a glassed-in mezzanine, visitors will be able to view behind-the-scenes work rarely seen by the public.

The Restoration Hangar will also house numerous support shops where Museum staff will complete the many highly specialized functions necessary to preserve this valuable collection.

### ► WHAT WILL BE RESTORED?

The National Air and Space Museum is as much about the future as it is about the past. Objects continue to be added to the collection on a regular basis.

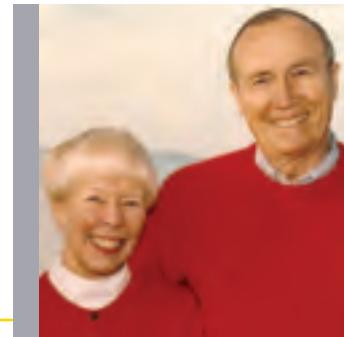
As the official repository of NASA artifacts, the Museum is preparing for the end of the space shuttle program and the disposition of thousands of artifacts. Among the artifacts anticipated are a flown-in-space shuttle orbiter to replace *Enterprise*, a shuttle-era spacesuit, and a variety of vehicle components, crew equipment, and science payloads.

Many significant artifacts already in the collection are in the queue for restoration. One of them is the Curtiss SB2C-5 Helldiver, the type of aircraft former Museum director Don Engen flew in World War II.

The Museum has long planned to restore the Helldiver, but limited space and resources at the Paul E. Garber Restoration and Storage Facility have kept the project grounded. When Phase Two is completed, the Helldiver will be one of the first aircraft to be restored.



CURTISS SB2C-5 HELLDIVER



Mary Baker Engen and Vice Admiral Don Engen

### Travis and Anne Engen

*My parents were deeply engaged with the National Air and Space Museum. Our gift for Phase Two was inspired by their commitment and our desire to allow future generations to stand in awe of the accomplishments of those who have gone before us.*

In recognition of this gift, the restoration hangar is named in honor of Mary Baker Engen.

## ARCHIVES



**Agnes Brown**

*Having spent many years helping children to learn and to explore ideas, it is gratifying to know that the charitable gift that I make today will ensure that the National Collection of aircraft and artifacts will be preserved and displayed for the education and inspiration of future generations. It is hoped that our children will be motivated to continue the great work and to build on the accomplishments represented by the Collection, for the future is in their hands.*

The National Air and Space Museum Archives is the foremost facility of its kind, with valuable documentary records of the history, science, and technology of aeronautics and space flight. Most of this documentation is unpublished, primary source material not found anywhere else, and priceless.

The new Archives facility will accommodate more than 12,000 cubic feet of documents. It will also house the most complete collection of historic aviation and space visual imagery — more than 1.75 million photographs and 14,000 film and video titles.

An Archives Reference Room will have workstations to accommodate 16 researchers and their lap top computers. In addition there will be microfilm reader stations, listening stations for sound recordings, and a motion picture viewing room.

### ► WHO USES THE ARCHIVES?

Archivists respond to thousands of requests a year from other museums, visiting scholars, historians, restorers, writers, film producers, modelers, government agencies, students, and the general public.

They also work behind-the-scenes supporting the Museum's needs. One example is the role Archivists played in the reassembly of the B-29 Superfortress *Enola Gay*, for which they supplied thousands of pages of technical information and numerous drawings in preparation for the project. Archivists also used technical manuals to help identify thousands of specialized parts that had been stored in boxes and bags for many years.







# THE EMIL BUEHLER CONSERVATION LABORATORY

The conservator's mission is to determine the best possible ways to preserve artifacts for future generations. With backgrounds encompassing chemistry, engineering, studio art, and history, conservators devise innovative treatment plans and offer guidance on storage and exhibition conditions.

The Emil Buehler Conservation Laboratory will provide much-needed space for this vital part of caring for the Museum's historic collection.

## ► HOW DO CONSERVATORS UNCOVER HISTORY?

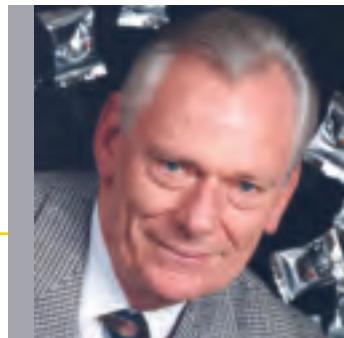


The nature and appearance of some artifacts change over the course of its lifetime. Conservators are able to reveal an artifact's hidden aspects and uncover its most historically significant characteristics.

For instance, Museum conservators are working to identify the original camouflage color scheme for the Heinkel He 219, a World War II German night fighter, which was painted over. In so doing, they are unlocking some of the secrets about late WWII German aircraft paints.

Analytical tools such as X-ray fluorescence are used to identify the kind of paint and number of layers. This process will determine how to remove the newer paint while preserving the original colors and markings.

Thus, when the Heinkel He 219 goes on display at the Udvar-Hazy Center, it will put its most historic face forward.



**Herb Kelleher**

*After just one visit, you'll understand why I support the National Air and Space Museum. Standing in the middle of the Udvar-Hazy Center, nose to nose with legends like the Shuttle Enterprise and the SR-71, is an awe-inspiring experience. I'm thrilled to play a role in helping to conserve what is truly a world-beating collection.*

## COLLECTIONS PROCESSING UNIT

The Collections Processing Unit will serve as entry point for Museum objects. A dedicated loading dock and specially designed secure area will be staffed by collections specialists who perform initial inspection and analysis of artifacts.

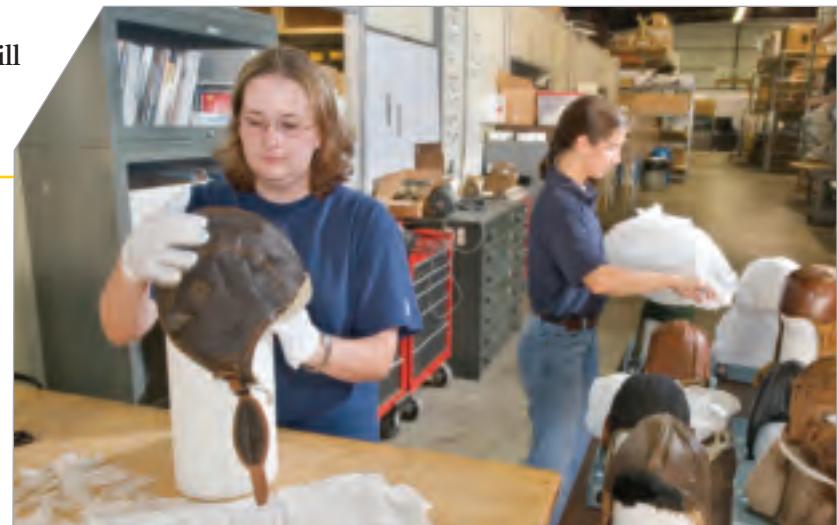


**Javier Arango**

*As someone who has been dedicated to the restoration of some of the oldest and rarest aircraft in the world, I understand the critical need for Phase Two. We must take action to ensure that the Museum's incredible collection of aerospace artifacts and archival treasures are given the world-class home they deserve.*

### ► WHAT DO COLLECTIONS SPECIALISTS DO?

They assist curators and conservators in determining how objects can best be stored, considering retrieval and environmental requirements. This often includes cleaning; assembly and disassembly; wrapping and protecting; preserving; and storing artifacts. In addition, they catalog the objects in the Collections Information System database.



## COLLECTIONS STORAGE FACILITY

The sheer size, scope, and historic significance of the Museum's collection require a unique combination of ample space, state-of-the-art equipment, and sophisticated environmental controls. This facility will be equipped to preserve objects made from such diverse materials as metal, paper, leather, rubber, plastic, and even wolf fur used in the Arctic.

### ► WHY IS PROPER STORAGE IMPORTANT?

A good example of the need for proper storage is the Museum's spacesuit collection. Spacesuits consist of many different types of materials and over the last 50 years have changed considerably. Not only must the suits themselves be preserved, but the irreplaceable "Moon dust" on them as well. This requires a careful balance of environmental conditions such as temperature, humidity, and light.

The National Air and Space Museum developed the standards and techniques used by institutions all over the world to preserve spacesuits. Our new facilities will reflect this research and ensure these historic artifacts will be available for display and study now and into the future.



## A COLLECTION LIKE NO OTHER

The National Air and Space Museum collection has more “one-of-a-kinds” and “firsts” from the history of flight than any other institution. Virtually every milestone in history is represented in the aircraft, spacecraft, and archival collections.



**Earl Clayton**

*Supporting the Udvar-Hazy Center is one of the most rewarding things I've ever done. I visit the Center every chance I get and I can't wait to see what Phase Two has in store.*



### AVIATION

Fully one-third of the aircraft in the collection are one-of-a-kinds or the world's last surviving examples. Here are ten examples:

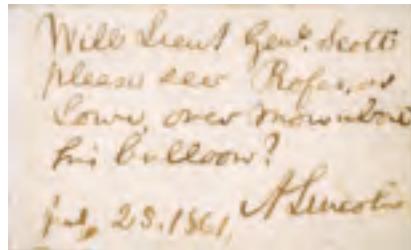
- 1903 Wright Flyer
- Ryan NYP *Spirit of St. Louis*
- Bell X-1 *Glamorous Glennis*
- Macready *Gossamer Condor*
- Breitling Orbiter III
- Rutan Voyager
- Aichi M6A1 Seiran
- Hiller XH-44
- Turner RT-14
- Halberstadt CL.IV



### SPACE

Thanks to a special agreement with NASA, the space collection contains many historic objects. For instance, seven of the ten listed here are from NASA:

- Space Shuttle *Enterprise*
- Apollo 11 Command Module, *Columbia*
- V-2 rocket
- Hubble telescope back-up mirror
- Viking Mars lander
- “Close Encounters of the Third Kind” studio model
- Apollo 11 Mobile Quarantine Unit
- Gemini VII capsule
- 1935 Goddard rocket
- Mercury *Friendship 7* capsule



### ARCHIVES

Both the Smithsonian Institution and National Air and Space Museum Archives contain significant historic items found nowhere else. Here are five examples:

- 1899 handwritten letter from Wilbur Wright to the Smithsonian requesting information on aeronautics
- 1861 handwritten note from President Lincoln to Thaddeus S.C. Lowe regarding his observation balloons
- Audio recordings of Charles and Anne Morrow Lindbergh reading from their writings
- Personal diaries of a World War II Japanese aircraft ground crewman with colored pencil drawings
- “Black Sheep Squadron” commander Gregory “Pappy” Boyington’s logbook from 1937-39

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**PHASE TWO:  
ARRIVING ON SCHEDULE**

With the help of our generous partners, this world-class resource is scheduled for opening in 2010. As these renderings suggest, the Phase Two facilities are vast in scale, and will be a critical and dynamic component of the mission of the Smithsonian's National Air and Space Museum.





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