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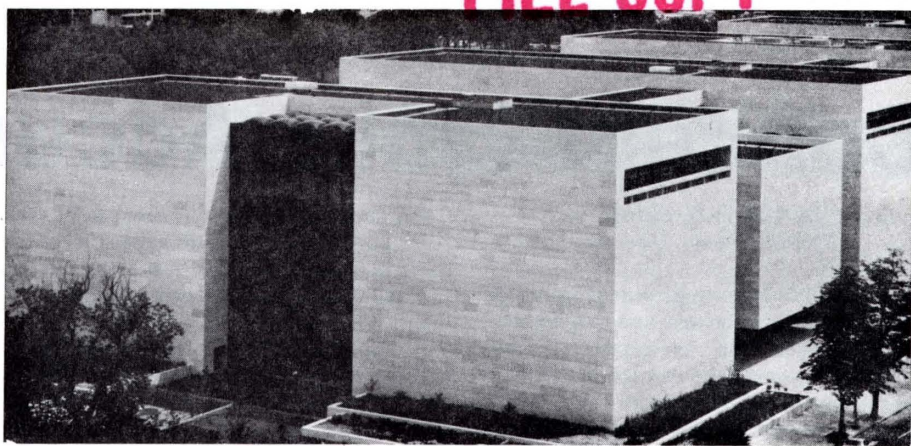


THE SMITHSONIAN TORCH

NASM Special

Smithsonian Institution, Washington, D.C.

July 1976



The National Air and Space Museum, opening July 1, 1976.

NASM SET TO LAUNCH JULY 1

By Linda St. Thomas

The opening ceremonies for the new National Air and Space Museum July 1 mark the culmination of years of intensive effort toward a goal rarely achieved, completion of a multi-million dollar project on time and in budget.

The Smithsonian and the NASM staff, headed by Director Michael Collins, will have accomplished just that when the doors of the \$40 million structure are opened to the public under the eyes of President Ford and a host of high-ranking dignitaries.

Plans call for the President to be joined on the podium by Vice President Nelson Rockefeller, Chief Justice Warren Burger and Secretary Ripley and a number of regents. Chief Justice Burger is Chancellor of the Smithsonian, and Vice President Rockefeller is Vice Chancellor.

President Ford last visited the Smithsonian in October, when he and Mrs. Ford were the honored guests of the Emperor and Empress of Japan at a state dinner held in the Commons dining room of the Castle.

After the dedication speech by the President, the actual ribbon-cutting is to have an aeronautical touch, with National Aeronautics and Space Administration arranging for the Viking spacecraft orbiting Mars to send a signal to the Museum. The signal is to activate a mechanism to snip the ribbon.

The President is then to take a short tour of the building beginning with the Milestones of Flight Gallery, the centerpiece of the National Air and Space Museum.

Upon stepping into that vast hall, a sharp-eyed visitor notes that every exhibit in it points towards the Wright Brothers' Kitty Hawk Flyer. In fact, most of the air and spacecraft in the main halls are displayed "around" the Flyer in a symbolic gesture that took two years to design and execute.

"This project has been a monumental effort," said Director Michael Collins. "Individual creativity combined with dedicated teamwork and plain hard work; that's been our method and it has worked well."

For example, 46 employees of Trans World Airlines worked 3,500 hours to restore one plane, the Northrop Alpha, an excellent example of an early high speed single engine transport.

Installing the DC-3, the heaviest suspended aircraft, in the Air Transportation Hall required applying feather-light control to heavy lifting equipment to raise the eight-ton craft and attach it to steel beams in the ceiling.

But, when the last label was screened and the last plane polished, NASM was ready to

show off its 65 aircraft, wide selection of rockets, missiles and spacecraft with two huge murals in the lobby, and a sculpture at each entrance.

The museum itself has been "in the works" since 1946 when the National Air Museum was chartered by Congress. In 1966, the legislation was amended to change the name to the National Air and Space Museum. Construction of the new building at 6th and Independence Avenue began four years ago.

Architect Gyo Obata, of the St. Louis firm of Hellmuth Obata & Kassabaum, designed the building to harmonize with others on the Mall. From the exterior, the bays of the enclosed galleries form four geometric blocks, faced in Tennessee marble to match the facade of the National Gallery of Art, directly across the Mall. These blocks alternate with three glass-enclosed bays in which air and spacecraft hang in still-flight from exposed steel trusses.

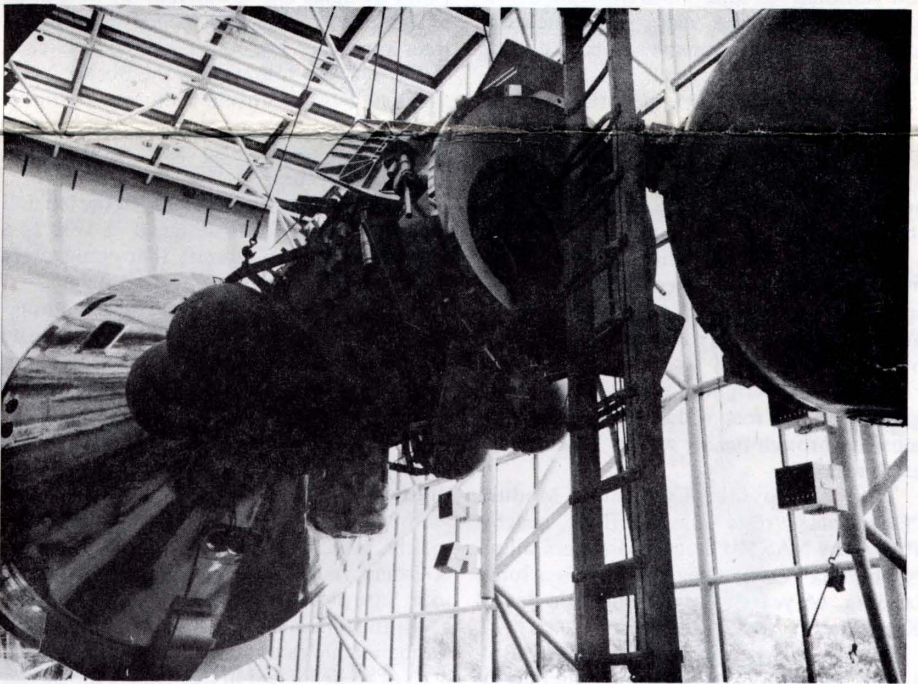
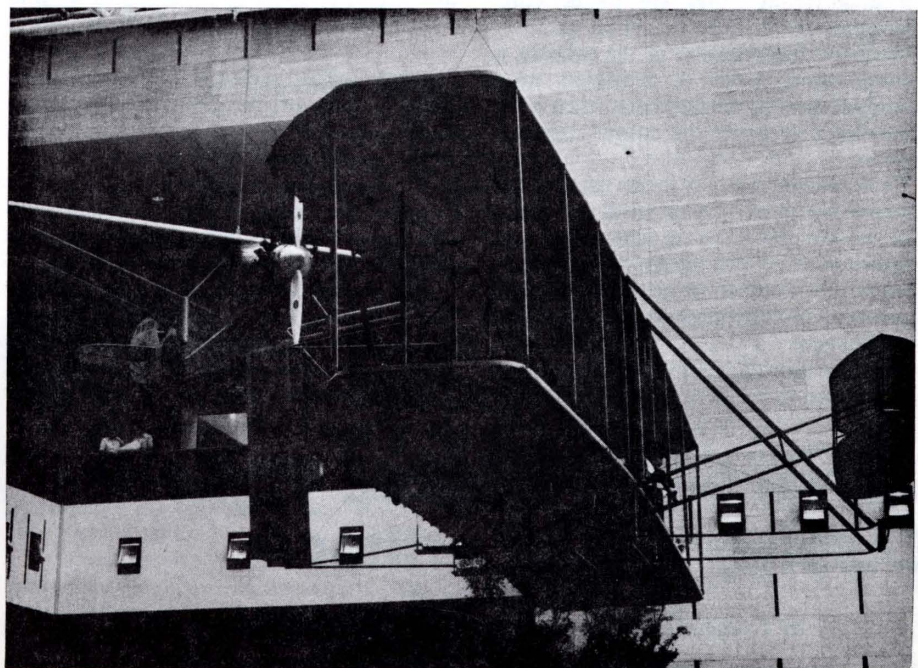
The NASM collection has come a long way since a group of Chinese kites were given to the Smithsonian after the 1876 Centennial Exposition in Philadelphia. The collection grew along with the technology of the last century. Samuel Pierpont Langley, third Secretary of the Smithsonian and an astrophysicist, founded the Astrophysical Observatory. And the fourth Secretary, Charles D. Walcott, was among those who actively petitioned Congress for the establishment of a center for aeronautical research. His efforts resulted in the formation, in 1915, of NASA's forerunner, the National Advisory Committee for Aeronautics.

Today, the 23 NASM exhibit galleries house artifacts representing every era of flight, from balloons to Lindbergh's "Spirit of St. Louis," to a 1973 Skylab Orbital Workshop, which visitors may enter, and a moon rock, which visitors may touch.

Mel Zisfein, the Museum's Deputy Director, has personally directed the massive exhibits program during the past five years. Says Mr. Zisfein, "We stressed the retention of traditional Smithsonian standards of curatorial accuracy and excellence of design while adding many original approaches to really reach the visitor."

"Up until about a year ago, our bywords were communication and creative design. For the past year, our emphasis has shifted to determined management; all designs were completed and we focused on production control and schedule enforcement."

In the Milestones of Flight Gallery, the collection of "firsts" includes the Kitty Hawk Flyer, Robert H. Goddard's rockets, Sputnik, John Glenn's Mercury spacecraft and the Apollo 11 Command Module.



Spanning the history of spaceflight from the first flight to the present day, NASM's collection includes artifacts as diverse as the Wright Brothers' Flyer (above) to the Apollo-Soyuz spacecraft.

A plane that will be fondly remembered by many visitors, the DC-3 hangs in the next large gallery. Shiny and new-looking with its red-and-white Eastern Airlines logo, this plane had clocked more flight hours (56,782) than any other DC-3 in Eastern's fleet, when the plane was retired in 1952 after 15 years.

The World War I Aviation Gallery offers an unusual recreation of an American military airfield near Verdun where a German fighter pilot mistakenly landed his Fokker D-VII two days before the war ended. A taped reconstruction of the pilots' conversations plays continuously while silhouettes of the Americans and the German pilot move on the ready room wall.

In a nearby hangar tent, three mechanics have a never-ending "bull session." Old-timers at the Smithsonian might remember this gallery's preview in the Arts and Industries Building.

The Exhibition Flight Gallery recalls the barnstorming era of the 1920s when pilots would sweep down in their tiny planes to fields throughout the countryside and offer 5-dollar rides to whomever happened to be there. The collection of small colorful planes includes Steve Wittmann's "Buster" and others used in aerobatics and air-racing.

The Satellites Gallery includes early "sounding" rockets and the scientific, weather, and communications satellites that followed.

Focusing back on earth, the Benefits from Flight Gallery describes the many changes, from medical benefits to the influence on rock music, that are attributable to aviation and space exploration. The exhibition even has a juke box with selections of "flight-related" music, such as the "Lindy Hop."

(See 'Launch' back page)

A Museum For Everybody . . .

By Susan Bliss

The new National Air and Space Museum is for everybody — the visitor whose only contact with flight has been to wave goodbye to relatives at the airport, as well as the aficionado with a lifelong interest in the field.

"We planned this museum to appeal to the general public, not just to aviation and space buffs," said Michael Collins, director of the National Air and Space Museum. "Realizing that most of our visitors will be coming long distances to see many parts of Washington we at NASM have the job of interesting them in a perhaps unfamiliar field."

Working closely with curatorial staff, administrators, designers, and planners, Collins is confident the museum will succeed in its difficult job of interpreting the continually changing field of air and space to the general public.

"We've done this in a variety of ways," he said. "Our exhibits and the diversity of our subject matter should certainly appeal to everybody. And for the experts, the 'buffs' who've built elaborate hobbies or lifetime careers in aero- or astronautics, there are technical resources and more detailed exhibits. 'Life in the Universe' is one gallery where detailed information will interest the experts."

"The explosion of knowledge in aerospace technology and space exploration presents a special problem for a museum such as NASM," Collins said, adding that it is the only one in the world that offers information on both aviation and spaceflight. "We have the obligation to keep our exhibits up-to-date with rapidly changing data."

"Only the Wright Brothers Flyer is here for all times," he said. "Other exhibits will change to keep up with the volumes of new knowledge. Our most current exhibit as we

open is in the Space Hall, which includes hardware from the last Skylab mission and the Apollo-Soyuz spacecraft."

As new as these artifacts are, Collins emphasized that they cannot be considered permanent as long as we continue to develop knowledge and programs in space exploration.

Collins is pleased with the balance displayed between aviation and spaceflight as NASM. "There's room for expansion in both areas, and neither overshadows the other. In aviation, I hope we'll eventually be able to include an exhibit on early jet travel. Additional exhibits on astronautics will reflect whatever directions our country takes in future space exploration."

Through a cooperative arrangement with the National Aeronautics and Space Administration (NASA), the museum is assured a continuing supply of artifacts. Instituted

(See 'Collins' inside)

Concept Links Accuracy, Style

By Melvin B. Zisfein
NASM Deputy Director

Our goal has been to present the story of flight in all its dimensions, and in a manner understandable and enjoyable to our visitors. We have taken this mission seriously and during the past five years our exhibits program has been the subject of intensive development.

Fundamentally this museum, like others, uses words, images, and physical objects to communicate with the visitor. We employ a range of exhibit approaches from simply labeled objects to the most sophisticated kinds of presentation techniques; the selection of each being a function of the information and feelings that are to be communicated.

The basic organization of the galleries is uncomplicated. Each is dedicated to a separate subject or theme so that when taken in totality they cover the entire subject of flight.

We developed a gallery theme list as one of our first activities. Then, working closely with the architects, as the building design progressed, we refined the gallery subject list to equal the number of galleries we could afford, with each gallery assigned to suitable physical space.

The three giant glass-roofed galleries were reserved for:

- Milestones of Flight — because it is our central and most important gallery, a collection of some of the most significant specimens in the history and technology of flight;

- The Hall of Air Transportation — because it contains the biggest real airliners we can accommodate, plus a theater for showing the story of air transportation, its giant new planes, and its impact on society; and

- Space Hall — because it houses huge boosters and spacecraft like the Skylab Orbital Workshop, and the linked Apollo-Soyuz spacecraft combination.

The 12 windowless galleries were assigned subjects that would benefit from total light and access control. In these spaces we find the simulated forward airfield of the World War I Aviation gallery, in which the visitor is "transported" to a day at the front; and the hangar deck of the Sea-Air Operations gallery, in which the visitor can sample some of the sensations of flight at sea.

At an early date we resolved that the basic exhibit concepts of the 12 windowless galleries could be as different as the subjects of these galleries are from each other.

For example, we are guided through the years in the Flight Technology gallery by drawings and animated puppets of five typical technologists who are the products of our imaginations; whereas in our Sea-Air

Operations gallery we embark on an ocean voyage on the "aircraft carrier" USS Smithsonian-CVM-76, an aircraft carrier for all times.

The design and development of the 23 exhibit galleries has been a taxing and time consuming task, but a labor of love for all of us. We have used special effects copiously where we felt that they would improve communication and enhance the visitor's experience in our museum.

The possibilities for combining education and fun have been limitless. Consider the Technology Transfer Machine in the Benefits from Flight Gallery. It is difficult to keep a straight face while watching the conflict of helpful and hindering figures in this machine, yet the visitor can learn much about the pros and cons of the process wherein flight technology is adapted to improve life on earth.

Or, turning to the automated dioramas in the Exhibition Flight Gallery, it is entertaining to watch the early air meets and the airplane vs. automobile race, however, the units also provide much information on early aviation.

Sophisticated exhibit techniques notwithstanding, the basic fare of a museum is its labeled artifacts. Here we are most fortunate.

All of the airplanes on exhibit are genuine. The spacecraft are the real flown craft if these could be returned from space. If return was not possible, with rare exception we exhibit the real backup vehicles or replica vehicles made from actual flight hardware.

The fact that our visitor can see the real Wright Flyer, the first successful airplane in the world, makes the visual experience significantly different from observing a model or a reproduction. Similarly, seeing the real Apollo 11 Command Module, the "Columbia" of mankind's first voyage to the Moon, is a unique visual experience, as is walking through the Skylab Orbital Workshop, or beside the real Spirit of St. Louis.

In keeping with our mandate of authenticity, the information in our exhibit gallery labels went through three internal content reviews, various editorial and proof-reading reviews, and five or more additional reviews by outside experts.

While not an absolute guarantee of error-free labels, the process should inspire a high level of confidence in the facts that finally appear on the walls.

* * *

Melvin B. Zisfein, deputy director of the National Air and Space Museum, joined the Smithsonian Institution in March 1971 coming from the Franklin Institute Research Laboratories in Philadelphia.

Born in Philadelphia, Mr. Zisfein pursued an honors program at Massachusetts Institute of Technology which culminated in the simultaneous award of bachelor of science and master of science degrees in aeronautical engineering in 1948.

Following graduation, Mr. Zisfein worked in various companies as an aerodynamicist. He joined Bell Aerospace Company, then Bell Aircraft Corp. in 1953, and remained with Bell as chief of the Dynamics Department, until 1960.

He became general manager of the Astromechanics Research Division of Gianini Controls Corporation in 1960 remaining there until he became associate director of Franklin Institute Research Laboratories in 1966.



(SI Photo by Dick Farrar)

Two workers prepare *The America*, first balloon to fly over the Rockies, for display in the Balloon Gallery.

Three Glass-Walled Galleries Display Major Artifacts

By Lynne Murphy

Window peekers on the Mall side of the new National Air and Space Museum could have described the main glass-enclosed galleries and their contents any time during the past year.

But, with the museum open, they may be surprised to find that artifacts have been moved around. Now that the complete inaugural collection is installed, here is a quick look at what is displayed in those showcase bays.

The Milestones of Flight Gallery summarizes major developments in aviation and spaceflight, beginning with the original Wright brothers' Kitty Hawk Flyer that flew in 1903.

Though the Wrights only flew 100 feet (the gallery is 115 feet wide), they did get us moving through the air on our way to space exploration.

The Apollo 11 Command Module, "Columbia," rests on the floor nearby. Piloted by NASM Director Michael Collins, "Columbia" carried men to the first lunar landing, 66 years after that historic day at Kitty Hawk.

Also in this gallery are the "Spirit of St. Louis," in which Charles Lindbergh flew his historic solo transatlantic flight in 1927; the Bell X-1, first supersonic aircraft; the North American X-15, half aircraft, half spacecraft; "Friendship 7" in which John Glenn became the first American to orbit Earth; Gemini 4, from which the first American spacewalk was taken; and the first touchable moon rock.

From the floor in the Hall of Air Transportation, a fleet of five aircraft, significant to the history of air transport, soars overhead. High in the lead is an American Airlines Ford Trimotor, that

rugged, dependable aircraft of the 1920s and 1930s.

Behind and a little below is the Eastern Air Lines Douglas DC-3 which at the time of its retirement in 1952 had logged more hours than any other DC-3 in Eastern's service.

The DC-3 is followed by the Boeing 247D flown by Roscoe Turner to third place in the 1934 MacRobertson London-to-Melbourne Race. This 247D also saw service with United Air Lines.

The TWA Northrop Alpha, to the left and below the DC-3, was designed in 1930 as a high-performance aircraft that could carry mail and passengers from small fields.

The Fairchild FC-2, high in the left corner, made the first international airmail and passenger flight, from Lima, Peru, to Guyana, Ecuador, in 1928. Completing the group of aircraft is the Pitcairn Mailwing, which helped establish major air mail routes from 1927 to 1934, the pioneer days of air transportation.

Space Hall, the astronautics counterpart of the Hall of Air Transportation, displays German rockets and missiles (ancestors of our Saturn V), including a V-1 and a V-2.

In the "missile pit" area are three satellite launch vehicles and two ballistic missiles.

Not to be missed in this Hall is the Skylab Orbital Workshop — a huge golden cylindrical spacecraft near the balcony. Skylab hosted three crews of astronauts in 1973-74.

Visitors can walk through Skylab and see the ward room, sleeping quarters, and exercise areas of the astronauts' home away from home.

Next to the window are the Apollo and Soyuz spacecraft in a docked position as they were in space a year ago. A team of Soviet specialists assembled the Soyuz and Apollo was mated to it — an operation that took a week.

Theater Features Novel Film

NASM Chief of Presentations and Education Von Del Chamberlain believes the Museum theater's new IMAX system will offer "the finest motion picture experience in the world."

"In seeing the IMAX image, people will sense and experience the phenomenon of flight," Chamberlain said, "and then will see our exhibits in a quite different way as a result. You have to see it to believe it."

The NASM theater is one of only six in the world to adopt the system, which projects a 70-mm film horizontally onto a screen five stories high and 75 feet wide. The image is remarkably clear and well defined, compared to 35-mm film, since nine times the amount of material is contained on each frame.

A 28-minute film, "To Fly," funded by Continental Oil, was produced specifically

for an exclusive one-year premiere at the NASM theater.

Museum Deputy Director Melvin B. Zisfein described the motion picture as a "Bicentennial view of the United States through flight-oriented eyes; an odyssey beginning with a balloon ascension in the early 1800s, and concluding with a spectacular perspective of the Earth seen from a spacecraft."

Sequences include barnstorming with the "Blue Angels," a ride with a hang glider pilot over Hawaiian cliffs, a view of the country from a 747, and closeups of a booster breakaway as a rocket launches into space.

"The viewer has the feeling of being completely enveloped in the picture because of the concentric screen, the extreme sharpness of the image, and most of all because the 485 seats are installed in a 24-

degree incline on 14 steeply rising tiers close to the screen," said Ronald Wagaman, theater manager.

Sound for the IMAX system is produced from an independent 35-mm six-track tape. Designed specifically for this theater, the sound system powers more than 30 multi-horn speakers mounted throughout the auditorium.

The theater will screen the premiere film on a continuous basis except for occasional lectures and films on air and space subjects, Wagaman said. It is also equipped for 35-mm motion picture film and slides.

Admission is \$1 for persons 16 and over and 50 cents for children, students (including university), and senior citizens. A staff of eight theater aides and three cashiers will assist Wagaman, who was formerly manager and projectionist for the McLean Theater in Virginia.

Spacearium Offers Unique View Of Skies

By William Eilers

The Albert Einstein Spacearium with its 70-foot dome is the only fully automated planetarium of its type in the world, according to Planetarium Officer Jerry Barbely.

A Gyroscopes computer controls the Carl Zeiss planetarium instrument which can accurately project some 9,000 stars, the Milky Way, nebulae, star clusters, certain distant galaxies and the five planets in our solar system visible to the naked eye.

It also programs some 200 projectors synchronized with the Zeiss instrument, making possible simulated eclipses of the sun and moon, Donati's Comet, an artificial satellite and a glimpse of the earth as seen from a nearby orbit.

Helping Barbely assemble and troubleshoot the enormously complex installation were Aloysius J. Eftink and Forrest Wilson. Eftink installed the 2,040-watt sound system which has 36 speakers hidden behind the dome. With Wilson's help he also directed the production of special effects, building many himself.

Described by Barbely as the Spacearium's electronic whiz is Greg Miller, who installed, among other devices, a computer-triggered circuit which counts off for the audience billions and trillions of years for different types of stars in much the same way that one handles numbers on a pocket calculator.

One exacting task assigned to Ron Miller was the preparation of absolutely accurate illustrations of the earth, moon and Mars as seen from space. To do this he consulted with Director Farouk El-Baz, Geologist Delia Mitchell and the staff of the Center for Earth and Planetary Studies, NASM's principal research arm.

Miller drew the visuals for most of the 200 projectors, which include zoom projector, a binary star projector and constellation outline projector. One task called for painting 12 panels to produce a 360-degree panorama for use in the sophisticated 12-bank projector system.

The concept of a "spacearium" for NASM was first advanced by Secretary Ripley in his column, "View from the Castle," in the March 1972 *Smithsonian*, saying "A Spacearium . . . will give people the illusion of journeying into space. . . . And they will begin to comprehend the significance of what they see — and judge for themselves the relationship of Man to his universe."

The Spacearium seats 256 in an "epiconcentric" pattern. By having the concentric rows of seats offset from the center of the room by several feet, almost everyone in the audience faces 50 percent or more of the dome.

Headphones and small transistorized receivers permit visitors to tune in one synchronized narration in French, German, Spanish and Japanese.

Smithsonian Pioneers In Air-Space Effort

By Kathryn Lindeman

The Smithsonian's interest in air and space dates back to before the Civil War, when it began monitoring storms and tracking weather changes.

Thaddeus S. C. Lowe proved, in a flight from Ohio to South Carolina on April 20, 1861, that balloons could be used for long-distance travel. The Civil War was just beginning, and he offered to build a balloon corps for the Union Army.

Turned down by General Winfield Scott, Lowe approached Joseph Henry, first

Secretary of the Smithsonian with his idea.

Henry took Lowe to visit President Lincoln and from the resulting experiments and trial flights with observation balloons, the Union Aeronautics Corps, the first American military air arm, was developed and used successfully for two years at the front.

Samuel Pierpont Langley, the Smithsonian's third Secretary, took up the study of heavier-than-air flight in 1887, in addition to his other studies in astrophysics. His early experiments in measuring the "lift" of inclined surfaces moving through air

resulted in his premise that mechanical flight was possible with already existing engines.

Langley, through trial and error, tried to construct small flying machines or "aerodromes" without success for five years until, on May 6, 1896, he successfully launched *Aerodrome Five* from a houseboat on the Potomac. The aircraft, nearly 14 feet in span with a one-horsepower steam engine, flew for more than half a mile.

In November 1896, *Aerodrome Six*, an improved model, made an even better flight and Langley felt he had accomplished what he set out to prove.

In 1898, when the Spanish American War broke out, the War Department asked Secretary Langley to develop an air machine capable of carrying a man.

Langley experimented another five years before his first trial run, but failed in two attempts at flight. Nine days after Langley's second try, the Wright Brothers successfully launched their manned flying machine, at Kitty Hawk.

The Wright Brothers' flyer would not come to the Smithsonian for display for 45 years, until 1948.

The fourth Secretary, Charles D. Walcott, and Smithsonian Regents Alexander Graham Bell and Ernest W. Roberts were among those who, realizing the need to place American aviation on a firm scientific footing, began in 1912 to actively petition Congress for an aeronautical research and policy center.

In 1915 their efforts resulted in the creation of NASA's forerunner, the National Advisory Committee for Aeronautics (NACA).

Charles Greeley Abbot, fifth Secretary of the Smithsonian, continued his research of the sun as a key to understanding the weather. A letter from Robert H. Goddard concerning his efforts to build a rocket that could reach into outer space suggested great possibilities to Abbot for his own studies and sparked a Smithsonian grant for Goddard's continued rocket research.

The Smithsonian supported Goddard's research through years of discouragement and a certain amount of adverse publicity. He finally made history on March 16, 1926, when he launched a 10-foot rocket to 40 feet, marking the first flight of a liquid fueled rocket.

The Institution's aeronautical collection began after the 1876 Philadelphia Exhibition when a group of kites was acquired from the Chinese Imperial Commission.

In 1920, a World War I quonset hut was opened to exhibit the collections related to flight. Some items from the collections were also displayed in the Arts and Industries Building next door.

The National Air Museum was established officially by Congress in 1946 as a Smithsonian bureau, and in 1958 the present site for the new Museum was specified.

Twenty years later, Congress changed the name to the National Air and Space Museum and authorized preparation of plans and construction of the new building.

NASM Makes Space For Art

By Susan Bliss

In a museum where everybody comes to look at airplanes and spacecraft, how do you interest the public in art? Jim Dean, curator of NASM's art collection, started to plan his strategy in the museum's six-story Independence Avenue lobby.

"There's no doubt about where you are," said Dean, standing among the rubble of preparations for the opening of "Flight and the Arts," the gallery housing NASM's collection.

He alluded to the lobby's two colossal murals, "The Space Environment — A Cosmic View," by Robert McCall, and Eric Sloan's "Earth Flight Environment," which face each other on the lobby's opposing walls.

The space painting, with its gargantuan superreal astronaut, has already become a photo backdrop "second in popularity only to the Washington Monument," Dean smiles. "This thrills the artists as well as museum staff," he continued, "since it means the murals are setting a tone for the experience the visitors are about to have."

"Superrealism seems particularly well suited to the depiction of flight," reflected Dean, pointing to the sharp-focus images of two paintings by Ted Wilbur. "The elegance of shiny surfaces and the intricate detail of

the machinery as depicted by these artists should appeal to NASM visitors."

The gallery on World War II Aviation features a mural of the B-17 "Thunder Bird" by aviation artist Keith Ferris. Painted in an alarmingly realistic style, the plane seems to fly at the viewer, and its overwhelming presence is a good example of how art can demand attention.

The dramatically-lit entrance to the nearby "Flight and the Arts" Gallery should be an attractive lure for the crowds who will come mainly to inspect NASM's technological artifacts.

Inside, Richard Lippold's "Variation on a Sphere," an eye-catching sculpture of gold-filled wire, is suspended over a special platform near the entrance. Installation of the sculpture, on loan from New York's Metropolitan Museum, took three days and was personally supervised by the artist.

Another work by Lippold is one of the museum's monumental sculptures which complement NASM's main public entrances. Facing the Mall, his gilded sphere rises slightly above the museum roof. On the building's south side stands a 16-foot globe of cast bronze by Charles Perry.

"Throughout history, we find that some of our most effective art has been that which records significant events," Dean said. "The history of flight is no exception."

'Collins'

under Smithsonian regent and former NASA administrator James Webb, the program provides for all obsolete NASA hardware to be first offered to the Smithsonian for use by the National Air and Space Museum.

With projected attendance figures of 7 million visitors each year, the National Air and Space Museum could become the Smithsonian's largest-drawing entity, and Director Collins said NASM will be an important part of the Institution's mandate for the "increase and diffusion" of knowledge.

Architecturally as well as philosophically, Collins believes that NASM fits well into the Smithsonian's function. "Our floor area has quintupled since the days when we occupied the Arts and Industries Building and the quonset hut. Still, I think this building complements, rather than overwhelms the Mall, with its wonderful variety of architectural styles."

Reflecting on the many stages of the museum's evolution, Collins, who has been director since 1971, said "It's hard to say at what point the work on a building really begins. Every stage, from approval of funds, to choosing a design, to turning over the first shovel of dirt, takes work and an enormous amount of coordination.

"Then comes the tasks of planning the collection, choosing the staff, and creating a program.

"For NASM's future, I see two main goals: First, to make sure the museum works."

This, Collins said, will be done by several testing methods to determine which exhibits people like best, visit most often, and learn the most from.

"Our second mission will be to begin functioning as a mature museum. Because our emphasis for the past several years has been on filling the new museum, we have had to deal primarily with exhibit development. As a mature museum, we must continue to refine exhibits, but now we can also divert program energy to research and education," he said.

"Curatorial staff has been waiting a long time to begin work on certain research projects, an important function in a mature museum. And lacking a museum to use as a laboratory, we have been limited in our ability to educate. I am looking forward to working with an education staff to develop interpretive programs for our visitors, and to create ways of reaching our beyond our walls into the Washington community, and eventually beyond."

Collins wouldn't say which of NASM's exhibits is his favorite. "I like them all," he said with a smile.

Director of the National Air and Space Museum since 1971, Collins joined the Air Force after graduation from West Point, was selected for astronaut training in 1963, and was a member of the team for the historic 1969 Apollo 11 mission which placed the first man on the moon. He left the space program in 1970 to accept an appointment as Assistant Secretary of State for Public Affairs.

In 1963, National Aeronautics and Space Administration Director James E. Webb initiated a program to record U. S. spaceflight history as it happened.

American artists with established reputations were invited to Cape Canaveral to observe the space mission activity. They were paid an honorarium, given artistic license, and asked to donate to NASA whatever art came from their experience.

The last Mercury flight was the beginning for NASA's art program, for which Dean was coordinator until he joined the NASM staff a year-and-a-half ago. With the opening of the Air and Space Museum, NASA, which continues to administer the art program, has transferred most of the resultant artwork to the Smithsonian.

Norman Rockwell, one of NASA's participating artists during the Gemini phase of the U. S. Space Program, visited Cape Canaveral and returned to his studio complete with a spacesuit, to insure accuracy in his painting of Gus Grissom and John Young. The finished painting hangs in NASM's gallery.

Jamie Wyeth, only 17 at the time, made two trips to the Cape. Near the entrance, a striking Robert Rauschenberg silkscreen shows a rocket liftoff, and a watercolor by William Crutchfield interprets the countdown itself. Lowell Nesbitt recorded the intricate steel structure of a rocket service gantry.

Not all the museum's collection is from NASA. Some works have been loaned by museums, galleries, private collections, and the artists themselves. Two Washington artists, Alma Thomas and Gay Gladding never went to Cape Canaveral, but their work is included here. Their paintings, both done in brilliant colors, are expressions of their own involvement with the concept of extraterrestrial space. Gladding's painting, "Second Shield of Venus," emerged after several sessions spent studying the planet through a telescope.

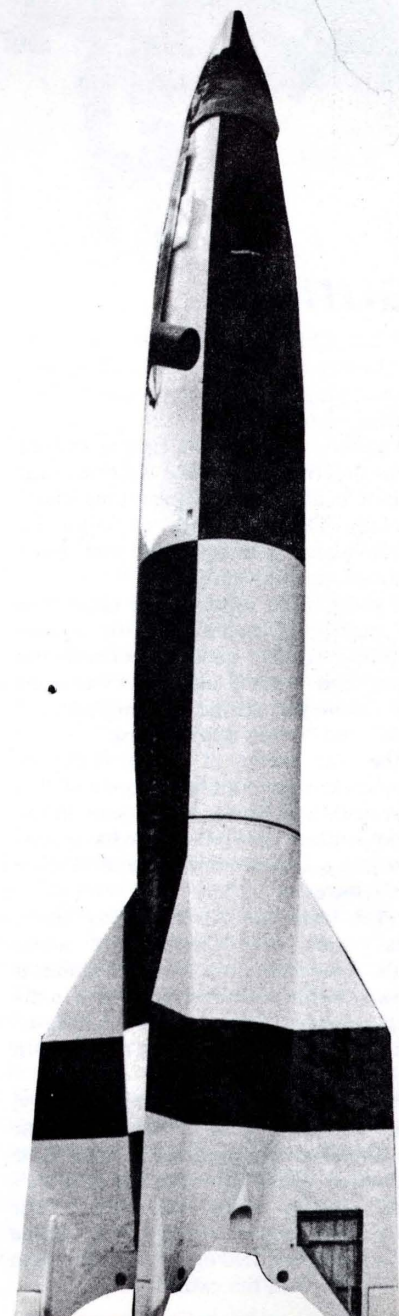
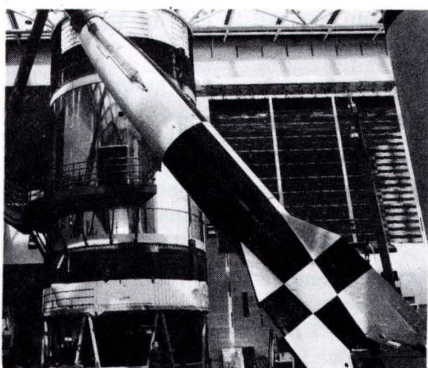
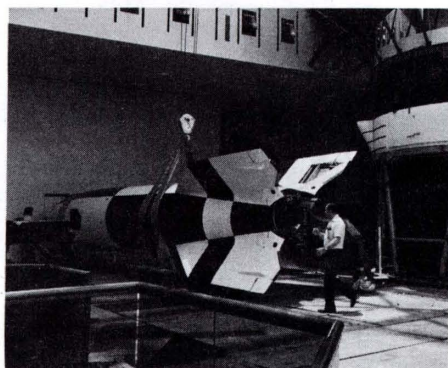
A beautiful painting called "Blue A" by Georgia O'Keeffe was similarly produced because of the artist's own interest. Along with works by Alexander Calder, Lowell Nesbitt, and Nancy Graves, it will be reproduced as a poster to be sold by the Smithsonian Associates in commemoration of NASM's opening.

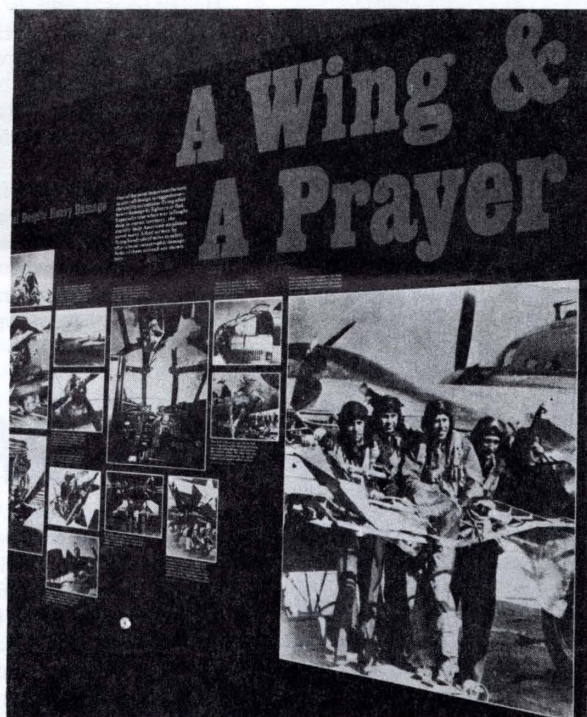
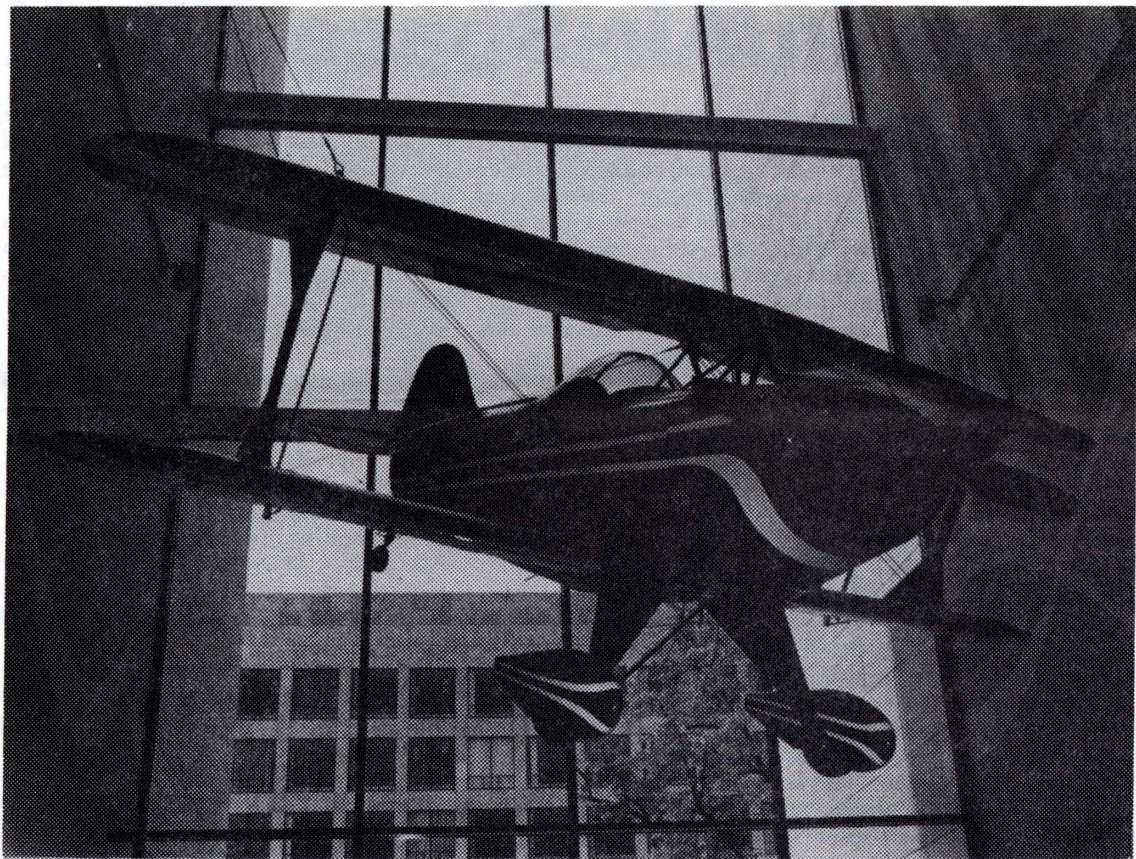
One section of the gallery which should appeal to space flight enthusiasts is the science fiction corner. A remarkable painting of a planet with an eye sets an eerie tone for this black-walled corner. Dean said he hoped to have an all science fiction show sometime.

Dean, an artist himself, has exhibited locally at Franz Bader and the Corcoran Gallery. His years with NASA, and his future with NASM indicate his longstanding interest in aerospace.

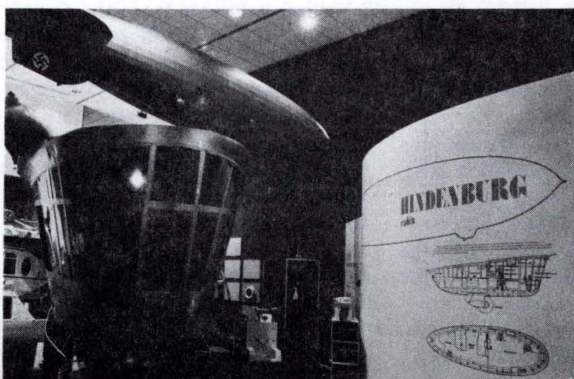
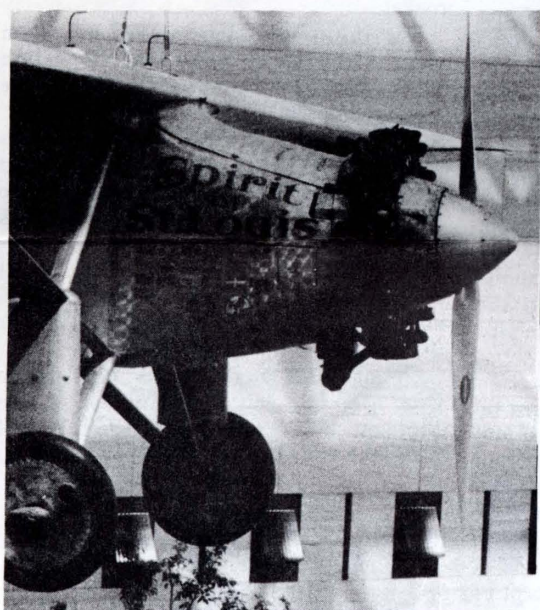
Bringing together these two fields in his own life was the basis for this gallery's design, which aims to make the same connection for thousands of NASM visitors in the years to come.

Frank Murray and Phil Kelly, both of United Rigging, supervise installation of the V2 rocket in NASM's Space Hall.





Clockwise from upper left: Pitts Special; World War II Gallery; Wicker gondola; Thunder Bird mural; Russian specialists assemble Soviet docking system to the Apollo docking module; Hindenburg cabin and scale models; Spirit of St. Louis.



(SI Photos by Dick Farrar)

'Launch'

named for Charles Lindbergh. and "Jet Plane," by Peter, Paul and Mary; electronic music; a miniature solar-cell powered train, and airline travel posters.

This gallery uses cartoon figures behind doors to describe the federal agencies that participate in air and space programs, and a Technology Transfer Game explains the factors involved in bringing air and space innovations into our daily lives.

Ping pong balls, representing ideas, run down tracks and encounter little figures representing the bad luck of "bureaucratic bungling" and "limited usage," or the good luck of "money available," "Congressional interest," and "broad applications."

In the rear center of Space Hall, the Apollo-Soyuz spacecraft have been installed by American and Soviet technicians in the docked position. The Gallery also has manned spacecraft, ballistic missiles and satellite launch vehicles.

Not far from the Apollo-Soyuz sits a wingless craft that resembles a silver bathtub. Television fans will recognize it right away as the aircraft that crashes in the opening scenes of "Six Million Dollar Man." That craft and others like it were later used in many successful re-entry tests.

In the Balloons and Airships Gallery, exhibits tell the history of lighter-than-air flight. Universal Studios donated a full-scale reproduction of the Hindenburg dirigible's control gondola which was used in the recently-made movie, "Hindenburg." China tableware actually used on the Graf Zeppelin is also included in the exhibit.

Flight and the Arts, NASM's art gallery, has successfully merged art and science in its collection of paintings, drawings and prints. Art work, however, is not confined to this gallery, but is an important part of the colorful wall graphics and displays throughout the building.

NASM exhibits cover all important aspects of aeronautics and space flight, but even three city blocks are not enough space to exhibit everything. The fuselage of a Boeing 747 is longer than the building is wide, and the Saturn V, which boosted men to the moon, is four times taller than the Museum. In the absence of these artifacts, sophisticated exhibit techniques are used to tell their story.

"It's important that we convey to the visitors the story of flight, that is, the people, events, machines and feelings," says Mr. Zisfein. "To do this within the limitations of a museum, we had to develop many novel exhibit approaches."

One approach uses a technique that's no secret to anyone who has ever been to a carnival — mirrors. To make a single Saturn V engine appear as five engines, mirrors were strategically placed around it giving the illusion of the rocket cluster which actually powered the Saturn V to the moon.

Another engine in the Flight Technology Gallery splits open to reveal its internal parts in motion. This Gallery also uses working wind tunnels and puppet shows to explain basic aerodynamic concepts.

Another way of conveying the idea of flight to the visitor is the film "To Fly." Viewers in the 485-seat auditorium are surrounded by more than 30 speakers while watching the 25-minute film on a five-story screen. The film takes them down Niagara Falls in the basket of a balloon, over Manhattan in a plane, through the St. Louis Gateway Arch, over Hawaii on a glider, and in a spacecraft among the planes.

"To Fly" was produced by Francis Thompson, Inc., of New York City and funded by the Continental Oil Company as a Bicentennial public service.

Under a giant dome nearby is the Albert Einstein Spacearium where visitors may stop for a 45-minute refresher course on just about everything man has learned of the universe over the past 200 years.

Given to the Smithsonian by the Federal Republic of Germany, the planetarium projects some 9,000 stars, the Milky Way, distant galaxies, and the five planets in the solar system that are visible to the naked eye.

So much for finding our way around the universe; how do we find our way around the Museum?

Illustrated directories and signboards are located throughout the building. Visitors from abroad also should have no trouble because most signs and directories are written in French, German, Spanish, and Japanese, as well as English.

A library for historical research on aeronautics and space flight is located on the third floor, overlooking the Hirshhorn

Museum and Sculpture Garden. Open to staff members and the public by appointment, the library contains some 20,000 bound volumes, extensive picture archives, and a rare book collection.

Public and staff dining rooms and administrative offices are also located on the third floor. While standing in line in the food carousel area, diners may gaze out over the Capitol and its grounds. The cafeteria will be open for lunch and dinner during the summer months.

The Museum Shop on the first floor will sell models, books and slides. "Cavalcade of Flight," an exhibit of models, will be displayed in the shop.

One of NASM's most interesting features, located in the basement and hidden from public view, is the automatic central control system.

Monitoring more than 80 audiovisual units and the security, fire, and environmental control systems, it is the only one of its kind in the world. The system, coordinated by Hernan Otano, NASM's audiovisual chief, was manufactured by Hughes Aircraft Company.

But no matter how many galleries visitors walk through, they will probably want to return to the Kitty Hawk Flyer for one last look. It is that small wooden, propeller-driven plane, hung in the center of this museum, that brings together the old balloons and new rockets, the earliest ideas of flight and the latest solar system theories, as well as the distinct worlds of aviation and space exploration.