National Aeronautics and Space Administration

GRADES 5-12

If These Airplanes Could Talk

history of flight

Aeronautics
Research
Mission
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Museum in a BOX Series

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If These Airplanes Could Talk

Lesson Overview

Through observation and information gathering skills, students will learn the proper way to read and interpret artifacts or museum exhibits. When gathering information, students must ask six questions - "who?", "what?", "when?", "where?", "why?" and "how?" - to get the information needed to fully understand what they are viewing. Though this lesson is tailored to aviation, the concepts can be applied to any type of exhibit or artifact that is on display.

Note: *We have provided photos and fact sheets in the* ***Reference Materials*** *section of four aircraft that are currently on display in a museum. These may be used if no museum exhibits are available.*

Objectives

1. Students will gain a better understanding of the history of an artifact or museum exhibit. Through practice, students will also learn how to interpret other exhibits or artifacts they encounter in the future.

Materials:

Museum exhibits or the aircraft photos and fact sheets located in the **Reference Materials** section

GRADES **5-12** **Time Requirements:** 20 minutes per artifact

Background

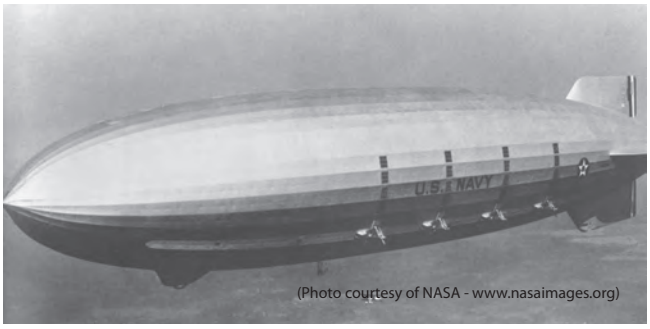
History of Aviation

For many thousands of years, man has looked at the sky and dreamt of flying. Evidence of this can be found in stories such as "Daedalus" from Greek mythology and "Pushpaka Vimana of Ravana" in Hindu mythology. The earliest known attempts to fly were made by fashioning wings, modeled after birds' wings and strapping them to human arms. This method was unsuccessful but it did not deter people from continuing to attempt to fly.

Img. 1 Kongming latern

The kite was the first successful unmanned flying device and was invented in China around 400 BC. Kites work by generating lift, just as today's modern airplanes do. Devices that use this type of technology are referred to as "heavier-than-air" aircraft.

About 100 years later in 300 BC, the Chinese invented the Kongming lantern (Img. 1). Kongming lanterns (also called paper lanterns) were constructed of a thin paper shell with a lamp or candle burning underneath. The heat from the lamp warmed the air in the bag which caused the lantern to rise. The Montgolfier Brothers expanded on this discovery in 1782 and built the world's first hot air balloon, which works according to the same principles only on a larger scale.



Img. 2 Macon Airship

Img. 3 Reenactors in front of a replica Fokker Dr. I triplane

Kongming lanterns and hot air balloons both fly because gases, including air, become less dense when heated. The heated air in the balloon is lighter than the cooler, denser air outside of the balloon, and is therefore able to rise. Devices that use this technology are classified as "lighter-than-air" aircraft.

Throughout the centuries, people around the world studied flight and developed many different kinds of flying devices, including gliders made of lightweight wood, and airships, such as the Macon Airship (Img. 2). In 1485, Leonardo da Vinci designed a hang glider, called The Ornithopter, with fixed wings and some movable control surfaces. Although he never built the device, his design provided the basis for the modern day helicopter. During the early 19th century, several men made "flying machines" which used various technologies to power their aircraft, including electricity and steam.

It wasn't until the early 20th Century that flight as we know it today emerged. Aircraft began to be made of

aluminum instead of wood and fabric. Aviators experimented with several types of wing structures, including monoplane, which means "one set of wings", biplane, and triplane (Img.3). As they refined their designs, monoplanes were made with various wing designs and many control surfaces (ailerons, elevator, rudder, etc.; see Figure 1) were added and modified.

In the years since the Wright Brothers' first flight in a controlled, engine-powered aircraft, the distances we have been able to fly have increased dramatically, from the 120 feet of Orville and Wilbur's Wright Flyer, to several thousand miles. By 1969 aircraft were taking man to the moon and today's longest-range passenger airplanes can fly half way around the world non-stop.

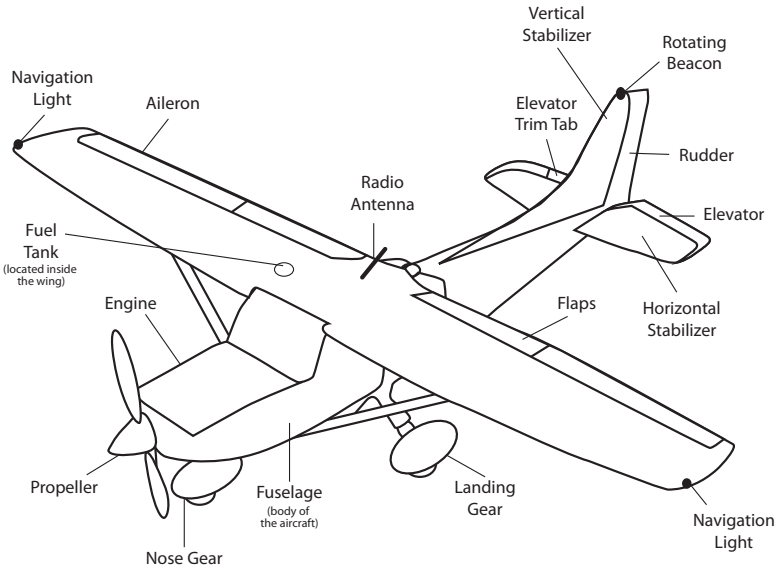


Fig. 1 Parts of an airplane

Img. 4 Civilian aircraft registration number

Aircraft Identification

Every aircraft has a story. You can tell a lot about an aircraft by looking at the markings and inscriptions located on the fuselage and wings. Civilian aircraft have an alphanumeric registration number (Img. 4), which is similar to the license plate on an automobile. The alphanumeric markings for aircraft registered in the United States begin with the letter "N". They are referred to as "tail numbers" because they are usually displayed on the tail of the aircraft, although older aircraft had them displayed on the underside of the wing so they could be read by someone on the ground whilst the aircraft was in flight.

Military aircraft also have insignia on the fuselage, wings, or tail. This insignia identifies the nation or air force to which the aircraft belongs (Img. 5). Many military planes also have identification numbers similar to civilian aircraft. The first of such markings appeared in 1913.

Img. 5 Military aircraft insignia

Activity 1 Interpreting an Artifact

GRADES 5-12

Time Requirement: 20 minutes per artifact

Materials:

Museum exhibits or the aircraft photos and fact sheets located in the **Reference Materials** section

Worksheets

Artifacts (Worksheet 1)

Reference Materials

1903 Wright Flyer (Fact Sheet 1)

Fokker Dr. 1 (Fact Sheet 2)

SR-71 (Fact Sheet 3)

Boeing VC-137C (Fact Sheet 4)

Key Terms:

Biplane
Fuselage
High Wing
Jet Engine
Low Wing
Monoplane
Triplane

Objective:

Students will gain a better understanding of the history of an artifact or museum exhibit. Students will also learn how to interpret other exhibits or artifacts that they encounter in the future.

Activity Overview:

While at an aviation museum, students will view various aircraft and ask the questions "who?", "what?", "when?", "where?", "why?" and "how?" to gain a better understanding of each aircraft's history.

Activity:

Prior to beginning this activity, provide the students with an oral summary of the **Background** information or have the students read it themselves.

While at a museum, have the students view various aircraft and ask the questions "who?", "what?", "when?", "where?", "why?" and "how?" about each exhibit. Encourage the students to use their background knowledge and the context clues in the exhibit to infer what the answers to these questions might be before looking at the information provided by the museum. (Ex: If the plane has guns attached, it was probably used by a military.) If a museum is not available, have the students look at the photos and fact sheets provided in the **Reference Materials** section. Discuss the answers to each of the questions provided with your students. Be sure to check the validity of any deduced answers; this can be done by asking your museum guide, reviewing the information provided about the exhibit, or by performing additional independent research.

*The provided answers reference the aircraft included in the **Reference Materials** section. Your answers will differ by exhibit.*

Discussion Points:

Who:

Who developed the aircraft?

Who used the aircraft?

Who is associated with this aircraft? (country, group, or individual)

What:

What was the function of the aircraft? (note any markings or inscriptions)

What materials are used? (wood, fabric, metal)

What style of wing design is used? (monoplane, biplane or triplane)

What type of wing placement does the aircraft have? (high wing, low wing)

What propulsion system does this aircraft use? (propeller or jet; single or multiple engines)

When:

When was the aircraft produced?

When was the aircraft flown?

When was the aircraft retired?

Where:

Where was the aircraft produced?

Where was the aircraft registered?

Where was the aircraft used?

Why:

Why would a museum keep this airplane?

Why is this airplane important to local, regional, national or international history?

How:

How was it used?

Answers for 1903 Wright Flyer

Who:

Who developed the aircraft?

The Wright Brothers, Orville and Wilbur Wright

Who used the aircraft?

The Wright Brothers, Orville and Wilbur Wright

Who is associated with this aircraft?
(country, group, or individual)

Orville and Wilbur Wright, from the United States of America; further research indicates they were from Dayton, Ohio

What:

What was the function of the aircraft?
(note any markings or inscriptions)

To become the world's first successful powered heavier-than-air flying machine; to contribute to furthering the science of aviation

What materials are used? (wood, fabric, metal)

The airframe was made of wood with muslin fabric covering the wings; the engine crankcase was aluminum

What style of wing design is used?
(monoplane, biplane or triplane)

Biplane

What type of wing placement does the aircraft have? (high wing, low wing)

N/A

What propulsion system does this aircraft use?
(propeller or jet; single or multiple engines)

Single combustion engine; 12-horsepower Wright horizontal four cylinder engine with twin propellers

When:

When was the aircraft produced?

1903

When was the aircraft used?

1903

When was the aircraft retired?

Unknown from the data provided; further research shows it was damaged beyond repair on the same day of its inaugural flight, Dec 17, 1903

Where:

Where was the aircraft produced?

Unknown from the data provided; further research indicates it was built in the Wright Brothers' bicycle shop in Dayton, OH

Where was the aircraft registered?

This aircraft was never registered; it was built before the registration system was established

Where was the aircraft flown?

Kittyhawk, NC

Why:

Why would a museum keep this airplane?

It was the first powered airplane to fly

Why is this airplane important to local, regional, national or international history?

It was used for the first flight in the world

How:

How was it used?

It was used as a test plane, flown in a dirt field several times over the course of one day (December 17, 1903)

Answers for Fokker Dr. 1

Who:

Who developed the aircraft?

Fokker; further research indicates Fokker was a Dutch aircraft manufacturer named after its founder, Anthony Fokker

Who used the aircraft?

The German army during WWI

Who is associated with this aircraft?
(country, group, or individual)

Manfred von Richthofen (the "Red Baron") is well known for winning many dogfights using this plane during WWI

What:

What was the function of the aircraft?
(note any markings or inscriptions)

It was a fighter plane in WWI; the Iron Cross symbols indicate that it is a German plane

What materials are used? (wood, fabric, metal)

Unable to determine based on information provided; further research indicates it was made from fabric covered steel tubes

What style of wing design is used?
(monoplane, biplane or triplane)

Triplane

What type of wing placement does the aircraft have? (high wing, low wing)

N/A

What propulsion system does this aircraft use?
(propeller or jet; single or multiple engines)

Single combustion engine with a propeller

When:

When was the aircraft produced?

The first of these planes were produced in 1917

When was the aircraft used?

1917 - 1918

When was the aircraft retired?

Circa 1918

Where:

Where was the aircraft produced?

Unknown from the data provided; further research indicates the company that built it, Fokker, started in Schwerin, Germany in 1912, and moved to the Netherlands in 1919

Where was the aircraft registered?

This aircraft was never registered; it was built before the registration system was established

Where was the aircraft flown?

On the Western Front and elsewhere during WWI

Why:

Why would a museum keep this airplane?

It is a replica of a very famous type of plane used in World War I and one of a very few types of biplane ever built

Why is this airplane important to local, regional, national or international history?

It helped the Germans fight in WWI

How:

How was it used?

In military battles

Answer for Lockheed SR-71A

Who:

Who developed the aircraft?

Lockheed Aircraft Corporation

Who used the aircraft?

The U.S. Air Force

Who is associated with this aircraft?
(country, group, or individual)

Maj. Jerome F. O'Malley and
Maj. Edward D. Payne

What:

What was the function of the aircraft?
(note any markings or inscriptions)

To fly long-range, advanced, strategic reconnaissance missions (reconnaissance flights are flown for information-gathering and surveying purposes)

What materials are used? (wood, fabric, metal)

Unable to determine based on information provided, though the photo indicates it is made mostly of metal

What style of wing design is used?
(monoplane, biplane or triplane)

Monoplane

What type of wing placement does the aircraft have? (high wing, low wing)

Low wing

What propulsion system does this aircraft use?
(propeller or jet; single or multiple engines)

Multiple jet engines; Two Pratt & Whitney J58s with 32,500lbs. of thrust each with afterburner

When:

When was the aircraft produced?

Unknown from the data provided; these aircraft first entered service in 1966

When was the aircraft used?

1966 - 1998

When was the aircraft retired?

U.S. Air Force retired its fleet of SR-71s on Jan. 26, 1990

Where:

Where was the aircraft produced?

Unknown from the data provided; further research indicates it was built by Lockheed Aircraft Corporation at The "Skunkworks" in Palmdale, California

Where was the aircraft registered?

The United States of America

Where was the aircraft flown?

The aircraft was used world-wide

Why:

Why would a museum keep this airplane?

"Throughout its nearly 24-year career, the SR-71 remained the world's fastest and highest-flying operational aircraft."; it also set records for speed and altitude

Why is this airplane important to local, regional, national or international history?

It helped the U.S. military gather information about their enemies

How:

How was it used?

In military reconnaissance missions

Answer for Boeing VC-137C (Boeing 707)

Who:

Who developed the aircraft?

Boeing Aircraft Corporation

Who used the aircraft?

Several U.S. Presidents, diplomats and other dignitaries and officials

Who is associated with this aircraft?
(country, group, or individual)

The United States, specifically the President of the United States and the U.S. Airforce

What:

What was the function of the aircraft?
(note any markings or inscriptions)

To fly the President of the United States and other government officials

What materials are used? (wood, fabric, metal)

Unable to determine based on information provided, though the photos indicate it is made mostly of metal

What style of wing design is used?
(monoplane, biplane or triplane)

Monoplane

What type of wing placement does the aircraft have? (high wing, low wing)

Low wing

What propulsion system does this aircraft use?
(propeller or jet; single or multiple engines)

Multiple jet engines; Four Pratt & Whitney TF33 (JT3D-3B) turbofans with 18,000 lbs. thrust each

When:

When was the aircraft produced?

1962

When was the aircraft used?

1962 - 1998

When was the aircraft retired?

1998

Where:

Where was the aircraft produced?

At the Boeing factory in Renton, Washington

Where was the aircraft registered?

The United States of America

Where was the aircraft flown?

World-wide

Why:

Why would a museum keep this airplane?

It was the first airplane made specifically for use by the President of the United States

Why is this airplane important to local, regional, national or international history?

It was the first airplane built specifically for Presidential use and it was flown on many historic journeys, such as returning John F. Kennedy's body to Washington after his assassination in 1963

How:

How was it used?

It was used to transport the President, diplomats and other dignitaries and officials

NATIONAL SCIENCE STANDARDS 5-8

SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

PHYSICAL SCIENCE

- Properties and changes of properties in matter

SCIENCE AND TECHNOLOGY

- Abilities of technological design
- Understanding about science and technology

NATIONAL SCIENCE STANDARDS 9-12

SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

PHYSICAL SCIENCE

- Structure and properties of matter
- Interactions of energy and matter

SCIENCE AND TECHNOLOGY

- Abilities of technological design
- Understanding about science and technology

Reference Materials

Fact Sheet 1 1903 Wright Flyer

Img. 6 The Wright Brothers' First Flight; December 17, 1903

Summary:

The Wright brothers inaugurated the aerial age with the world's first successful flights of a powered heavier-than-air flying machine. The Wright Flyer was the product of a sophisticated four-year program of research and development conducted by Wilbur and Orville Wright beginning in 1899. After building and testing three full-sized gliders, the Wrights' first powered airplane flew at Kitty Hawk, North Carolina, on December 17, 1903, making a 12-second flight, traveling 36 m (120 ft), with Orville piloting. The best flight of the day, with Wilbur at the controls, covered 255.6 m (852 ft) in 59 seconds.

The Wrights pioneered many of the basic tenets and techniques of modern aeronautical engineering, such as the use of a wind tunnel and flight testing as design tools. Their seminal accomplishment encompassed not only the breakthrough first flight of an airplane, but also the equally important achievement of establishing the foundation of aeronautical engineering.

Date: 1903

Country of Origin: United States of America

Dimensions:

Wingspan: 12.3 m (40 ft 4 in)

Length: 6.4 m (21 ft 1 in)

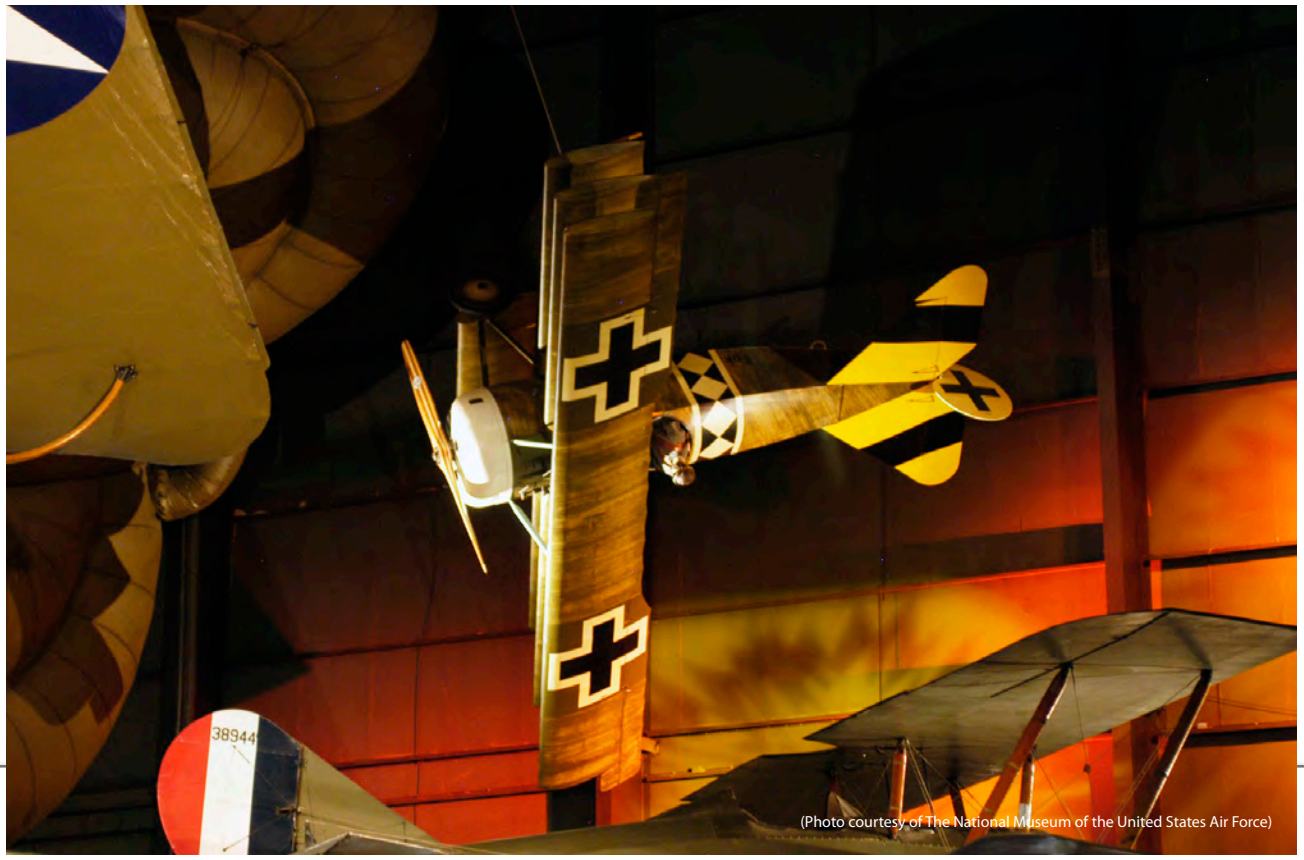
Height: 2.8 m (9 ft 4 in)

Weight: Empty, 274 kg (605 lb) / Gross, 341 kg (750 lb

Materials: Airframe: Wood / Fabric Covering: Muslin
Engine Crankcase: Aluminum

Physical Description: Canard biplane with one 12-horsepower Wright horizontal four-cylinder engine driving two pusher propellers via sprocket-and-chain transmission system. No wheels; skids for landing gear. Natural fabric finish; no sealant or paint of any kind.

Fact Sheet 2 Fokker Dr. 1



Img. 10 1917 Fokker Dr. 1

Summary:

Few aircraft have received the attention given the Fokker Dr. I triplane. Often linked with the career of World War I's highest scoring ace, Germany's Rittmeister Manfred von Richthofen (the "Red Baron"), the nimble Dr. I earned a reputation as one of the best dogfighters of the war.

The German air force ordered the Fokker Dr. I in the summer of 1917, after the earlier success of the British Sopwith triplane. The first Dr. I planes appeared over the Western Front in August 1917. Pilots were impressed with its agility, and several scored victories with the highly maneuverable triplane. Von Richthofen score 19 of his last 21 victories were achieved while he was flying the Dr. I. By May 1918, however, the Dr. I was being replaced by the newer and faster Fokker D. VII.

Although Fokker built a total of 320 of these aircraft, none have survived. This reproduction is painted to represent the aircraft flown by Lt. Arthur Rahn in April 1918 when he served with Jagdstaffel 19. Lt. Rahn is credited with six confirmed victories. The aircraft was placed on display in April 1994.

Armament: Two 7.92mm Spandau LMG 08/15 machine guns

Engine: Oberursel Ur II of 110 hp or LeRhone of 110 hp

Maximum speed: 103 mph

Range: 185 miles

Ceiling: 19,685 ft.

Span: 23 ft. 7 in.

Length: 18 ft. 11 in.

Height: 9 ft. 8 in.

Weight: 891 lbs. empty; 1,291 lbs. loaded

Fact Sheet 3 Lockheed SR-71A

Img. 11 Lockheed SR-71A

Summary:

The SR-71, unofficially known as the "Blackbird," is a long-range, advanced, strategic reconnaissance aircraft developed from the Lockheed A-12 and YF-12A aircraft. The first flight of an SR-71 took place on Dec. 22, 1964, and the first SR-71 to enter service was delivered to the 4200th (later 9th) Strategic Reconnaissance Wing at Beale Air Force Base, Calif., in January 1966. The U.S. Air Force retired its fleet of SR-71s on Jan. 26, 1990, because of a decreasing defense budget and high costs of operation.

Throughout its nearly 24-year career, the SR-71 remained the world's fastest and highest-flying operational aircraft. From 80,000 feet, it could survey 100,000 square miles of Earth's surface per hour. On July 28, 1976, an SR-71 set two world records for its class -- an absolute speed record of 2,193.167 mph and an absolute altitude record of 85,068.997 feet.

On March 21, 1968, in the aircraft on display, Maj. (later Gen.) Jerome F. O'Malley and Maj. Edward D. Payne made the first operational SR-71 sortie. During its career, this aircraft accumulated 2,981 flying hours and flew 942 total sorties (more than any other SR-71), including 257 operational missions, from Beale Air Force Base, Calif., Palmdale, Calif., Kadena Air Base, Okinawa, and RAF (Base), Mildenhall, England. The aircraft was flown to the museum in March 1990.

Armament: None

Engines: Two Pratt & Whitney J58s of 32,500 lbs. thrust each with afterburner

Crew: Two

Maximum speed: Mach 3+ (three times the speed of sound) or over 2,000 mph

Range: More than 2,900 statute miles

Ceiling: Over 85,000 ft.

Span: 55 ft. 7 in.

Length: 107 ft. 5 in.

Height: 18 ft. 6 in.

Weight: 140,000 lbs. loaded

Serial number: 61-7976

Fact Sheet 4 Boeing VC-137C (Boeing 707)

Img. 12 SAM 26000, a Boeing VC-137C landing at the National Museum of the United States Air Force in Dayton, OH

Summary:

This U.S. Air Force Boeing VC-137C aircraft (civilian designation 707-320B) was the first jet made specifically for use by the President of the United States. Built in 1962, it served many presidents over three decades, carrying heads of state, diplomats and other dignitaries and officials on many historic journeys.

Popularly known as "SAM 26000" (Special Air Mission; tail number 26000), the aircraft has also been called "Air Force One" -- though this designation was used officially only when the president was aboard. During the 1950s, the call sign of the presidential aircraft was the prefix SAM followed by the aircraft's tail number, and the name "Air Force One" was later chosen to ensure there was no question as to where the president's aircraft was and whether the president was aboard. Because President Kennedy did not name his aircraft as had former presidents, the news media popularized the call sign "Air Force One" as this aircraft's name.

On Oct. 10, 1962, VC-137C number 26000 entered USAF service directly from the Boeing assembly line in Renton, Wash. President Kennedy had the aircraft painted in striking blue and white instead of the usual military colors to give it a distinctive look. The title "United States of America" was emblazoned on the fueselage and an American flag was painted on the tail. This aircraft carried eight presidents: Kennedy, Johnson, Nixon, Ford, Carter, Reagan, George H.W. Bush and Clinton.

In December 1972 another Boeing 707-320, aircraft 27000, became the primary presidential aircraft and 26000 became a back-up, flying vice presidents and other high-ranking government officials. In 1990 SAM 26000 left the presidential fleet, but it continued to fly government officials, including Secretary of State James Baker. Prior to the 1991 Gulf War, he went abroad in 26000 for talks with Iraqi leaders about removing their troops from Kuwait.

SAM 26000 flew President Kennedy to Berlin in 1963, where he declared to West Berliners, "Ich bin ein Berliner," assuring them of continuing United States support in

Continued >>

Fact Sheet 4 Continued

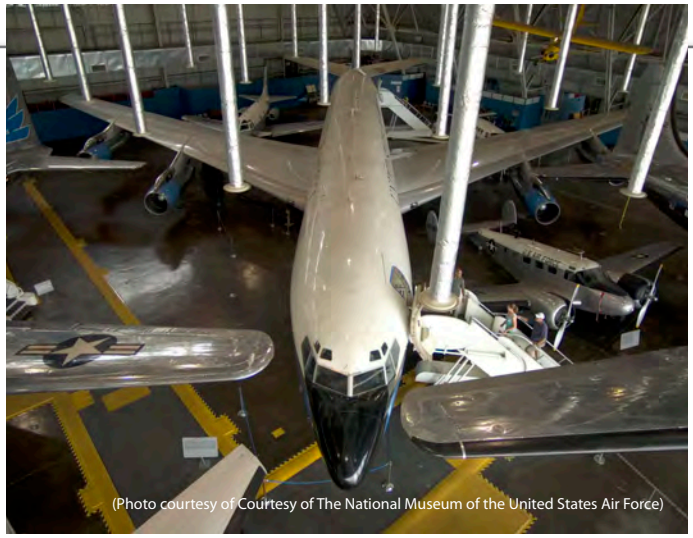
<< Continued

the face of Communist threats and the construction of the Berlin Wall. Kennedy also flew aboard SAM 26000 to Dallas, Texas, where he was assassinated on Nov. 22, 1963 -- and it was on this airplane that Vice President Lyndon B. Johnson was sworn in as the new president. SAM 26000 then carried John F. Kennedy's body and President Johnson back to Washington, D.C. Johnson also used 26000 to visit U.S. troops in Vietnam during the Southeast Asia War.

Beginning in 1970, President Nixon's national security advisor, Dr. Henry Kissinger, used the aircraft for 13 trips to Paris, France, for secret meetings with the North Vietnamese. In February 1972 President Nixon flew aboard SAM 26000 on his historic "Journey for Peace" to the People's Republic of China (the first visit by an American president to China). In May 1972 SAM 26000 carried Nixon to the Soviet Union.

In October 1981 the aircraft flew Presidents Nixon, Ford and Carter, and former Secretary of State Dr. Kissinger to the funeral of the slain Egyptian president Anwar Sadat. In March 1983 Queen Elizabeth II of the United Kingdom flew on SAM26000 during her trip to the United States when she visited the West Coast.

At a nationally televised event in May 1998, the USAF retired SAM 26000 at the museum. This aircraft provided 36 years of service and accumulated more than 13,000 flying hours.



Img. 13 SAM 26000 on display at the National Museum of the United States Air Force in Dayton, OH

Maximum speed: 604 mph

Ceiling: Above 43,000 ft.

Range: 6,000+ miles

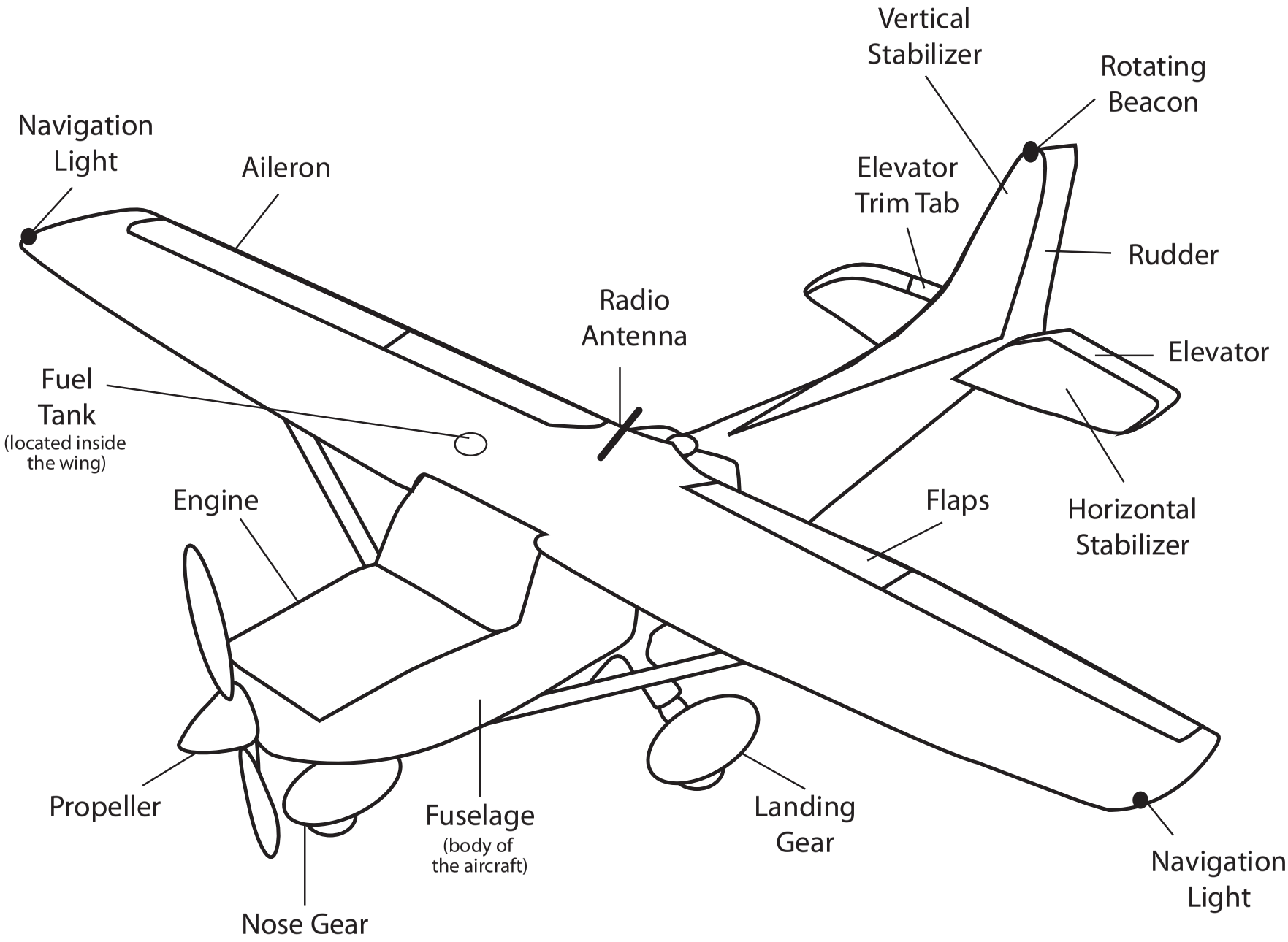
Engines: Four Pratt & Whitney TF33 (JT3D-3B) turbofans of 18,000 lbs. thrust each

Load: 40 passengers or 26,200 lbs. of cargo

Crew: 7 or 8

Content from The National Museum of the United States Air Force

Fig. 1 Parts of an airplane



Glossary

Biplane:
An airplane with two pairs of wings stacked vertically on top of each other

Control Surface:
Attached to the wings and tail, these moveable parts are used for steering or controlling an aircraft (example: ailerons, elevator, rudder)

Fuselage:
The main body of an aircraft where the wings and tail are attached

High Wing:
The design of an airplane where the wings are level with or above the top of the fuselage

Jet Engine:
An engine design which use turbines to create thrust

Low Wing:
The design of an airplane where the wings are attached to the center or bottom half of the fuselage

Monoplane:
An airplane with one main set of wings

Triplane:
An airplane with three vertically stacked wings

Student Worksheets

Worksheet 1 Artifacts

Artifact Name: _____

Who:

Who developed the aircraft?

Who used the aircraft?

Who is associated with this aircraft? (country, group, or individual)

What:

What was the function of the aircraft? (note any markings or inscriptions)

What materials are used? (wood, fabric, metal)

What style of wing design is used? (monoplane, biplane or triplane)

What type of wing placement does the aircraft have? (high wing, low wing)

What propulsion system does this aircraft use? (propeller or jet; single or multiple engines)

Worksheet 1 Continued

When:

When was the aircraft produced?

When was the aircraft used?

When was the aircraft retired?

Where:

Where was the aircraft produced?

Where was the aircraft registered?

Where was the aircraft flown?

Why:

Why would a museum keep this airplane?

Why is this airplane important to local, regional, national or international history?

How:

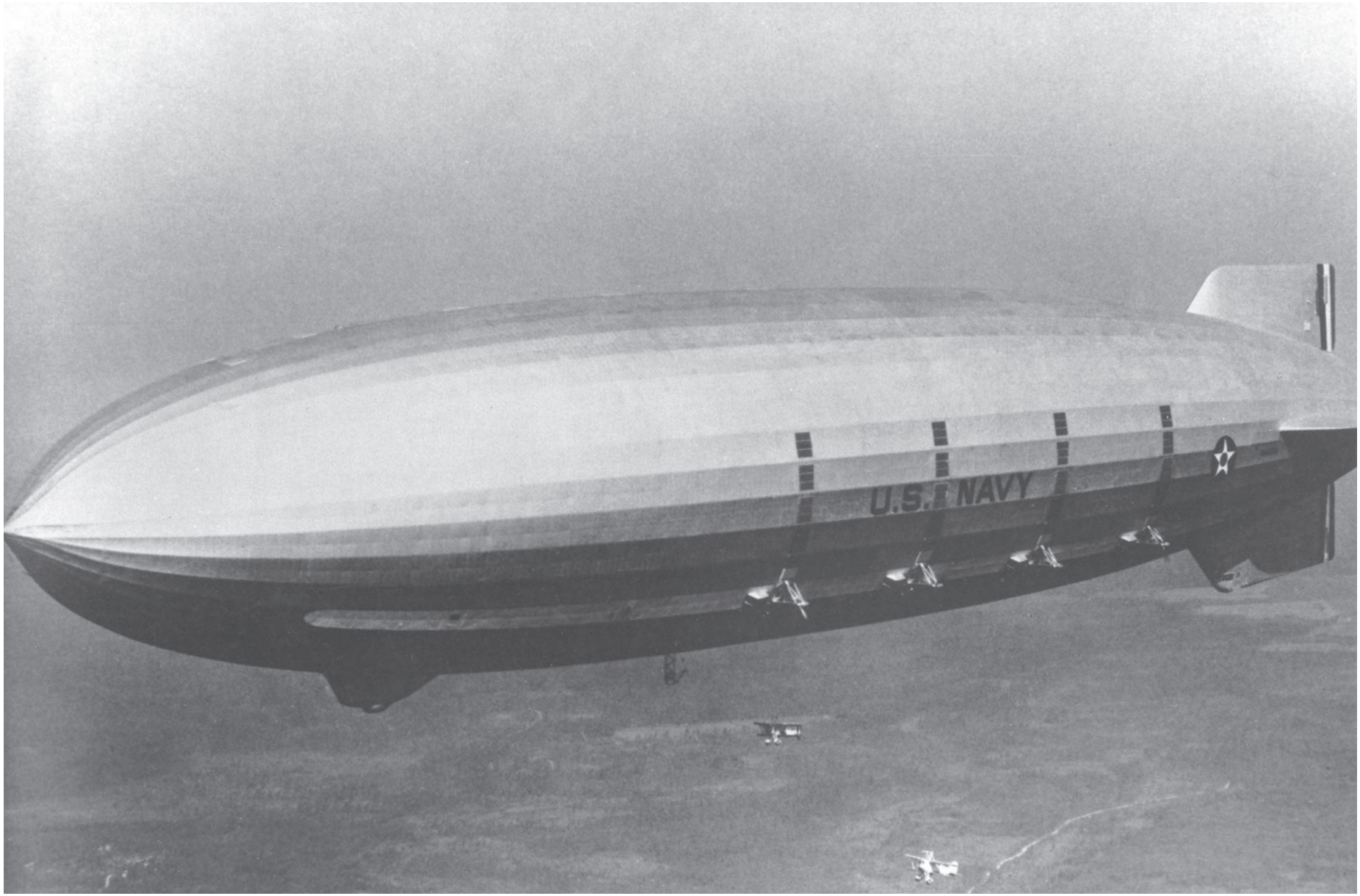
How was it used?

Images

Img. 1 Kongming latern

(Photo courtesy of Wikipedia, GNU Free Documentation License)

Img. 2 Macon Airship



(Photo courtesy of NASA - www.nasaimages.org)

Img. 3 Reenactors in front of a replica Fokker Dr. I triplane

(Photo courtesy of The National Museum of the United States Air Force)

Img. 4 Civilian aircraft registration number

(Photo courtesy of NASA - www.nasaimages.org)

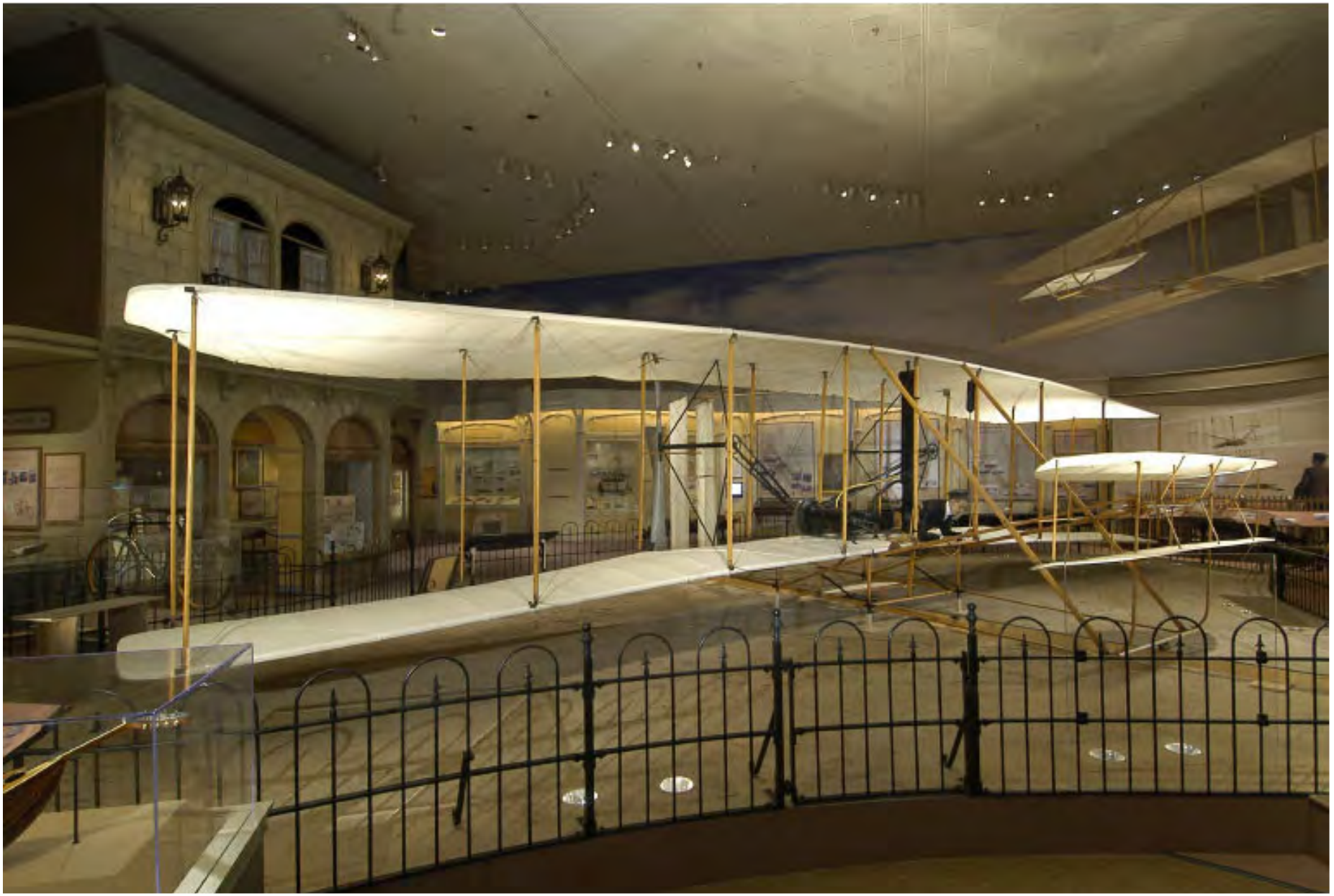
Img. 5 Military aircraft insignia

(Photo courtesy of NASA - www.nasaimages.org)

Img. 6 The Wright Brothers' First Flight; December 17, 1903

(Photo courtesy of Wikipedia, GNU Free Documentation License)

Img. 7 The Wright Brothers' 1903 aircraft, the Wright Flyer, in the Smithsonian National Air and Space Museum



(Photo courtesy of Smithsonian National Air and Space Museum)

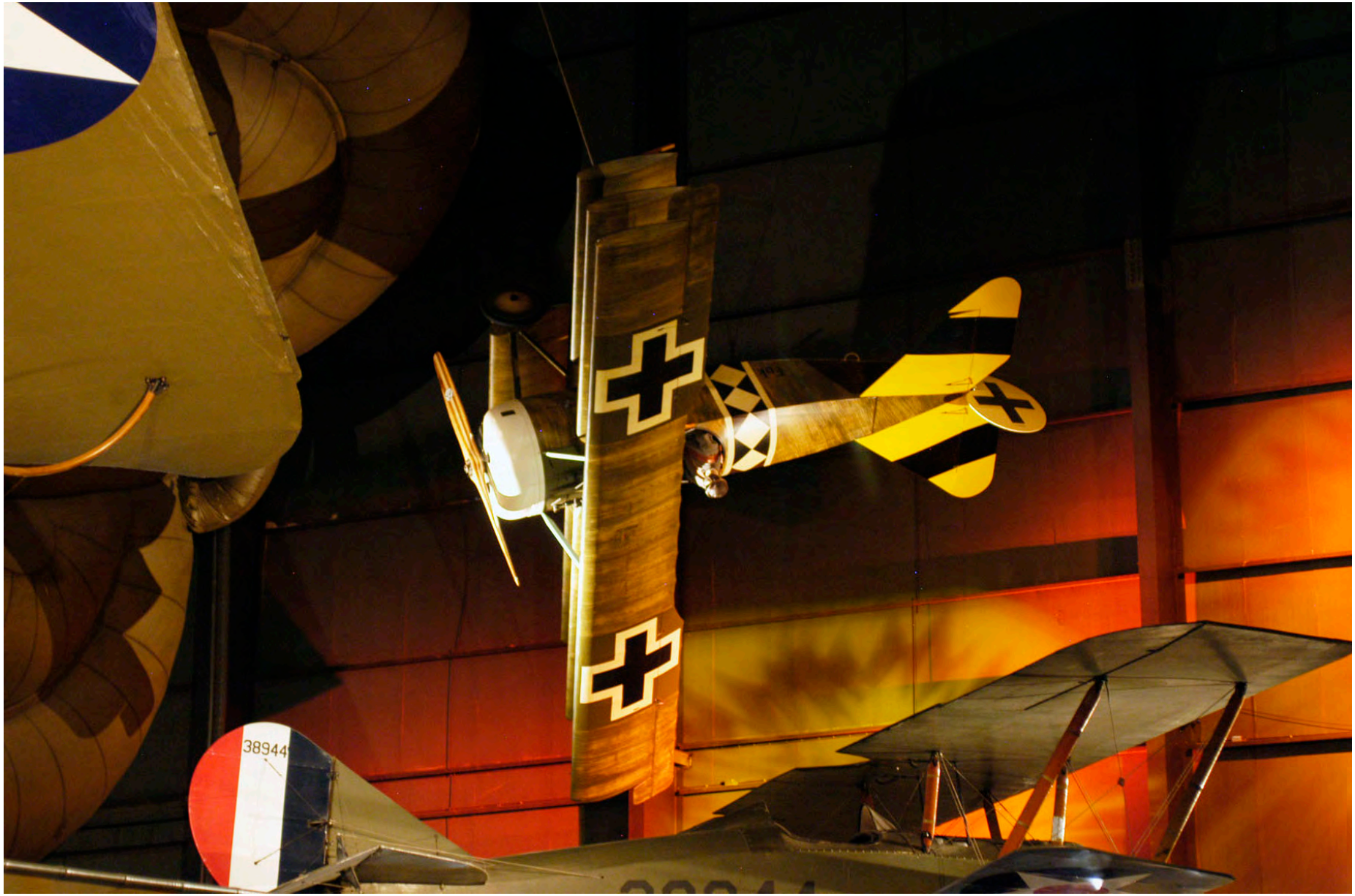
Img. 8 The Wright Brothers' 1903 aircraft, the Wright Flyer, in the Smithsonian National Air and Space Museum

(Photo courtesy of Wikipedia, GNU Free Documentation License)

Img. 9 The 1903 Wright Flyer in the Smithsonian National Air and Space Museum, May 1982

(Photo courtesy of Wikipedia, GNU Free Documentation License)

Img. 10 1917 Fokker Dr. 1



(Photo courtesy of The National Museum of the United States Air Force)

Img. 11 Lockheed SR-71A

(Photo courtesy of Wikipedia, GNU Free Documentation License)

Img. 12 SAM 26000, a Boeing VC-137C landing at the National Museum of the United States Air Force in Dayton, OH

(Photo courtesy of The National Museum of the United States Air Force)

Img. 13 SAM 26000 on display at the National Museum of the United States Air Force in Dayton, OH

(Photo courtesy of Courtesy of The National Museum of the United States Air Force)

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EP-2010-12-460-HQ