

# WHAT'S TOPS

AT THE UDVAR-HAZY CENTER?



## YOU DECIDE!

**EXPLORE** the four aircraft and two spacecraft in this booklet.

**USE** the map on the back cover to find them.

**VOTE** for your favorite when you finish.



# CAUDRON G.4

**SIGNIFICANCE:**  
Pioneer trainer, bomber, and  
reconnaissance aircraft  
**FIRST FLIGHT:**  
March 1915

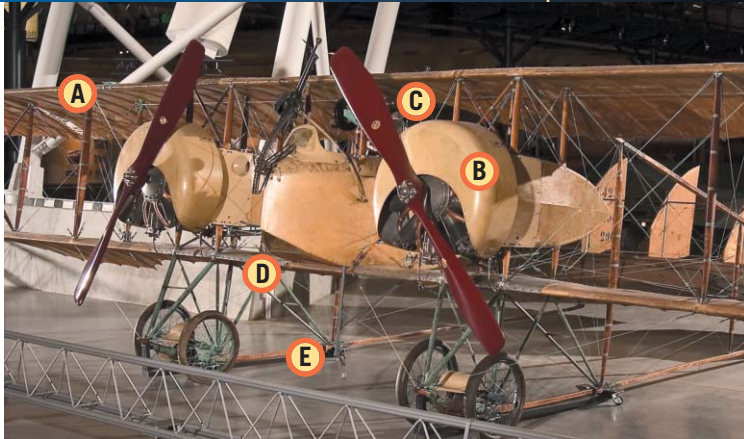


PHOTO BY DANE PENLAND, NATIONAL AIR AND SPACE MUSEUM, SMITHSONIAN INSTITUTION (SI 2005-5187)

**A** What are the two wings covered with?

metal    cloth    wood

The pilot could change their shape by using a stick to pull on the cables.  
This rolled the airplane to the left or right.

**B** The two propeller engines were lubricated with castor oil.

The propellers sprayed oil everywhere.  
Pilots wore silk scarves to wipe it off their faces.

**C** Notice that the two seats are open.

The pilot sat in back.  
The gunner sat in front—just a foot away from the propeller tips.

**D** Can you find the trap door on the bottom?

It was opened to observe and take pictures of the landscape below.

**E** Look for the metal rod underneath the airplane.

It contains a radio antenna that pilots cranked in and out.

PHOTO: NATIONAL AIR AND SPACE MUSEUM (NASM A-51462), SMITHSONIAN INSTITUTION



**The Caudron G.4 comes in for a landing at Paris, France, in 1915. In the background is the factory where it was built.**

# BOEING 367-80

## 707 Prototype

**SIGNIFICANCE:**  
First commercial jet  
transport in the U.S.  
**FIRST FLIGHT:**  
July 15, 1954



PHOTO BY DANE PENLAND, NATIONAL AIR AND SPACE MUSEUM, SMITHSONIAN INSTITUTION (SI 2005-5717)



PHOTO: © BOEING

**!** Test pilot Alvin "Tex" Johnston (left), shown here in the airplane's cockpit, did a barrel roll in the Boeing 367-80 to impress the airline industry with its capabilities.

**A** How many engines does this airplane have?

- 2    4    6

They could fly farther and faster than any previous commercial aircraft.

**B** Notice how the wings sweep back at an angle.

This shape creates less drag and enables the airplane to fly faster.

**C** Why are there so few windows along the sides?

This was a test model and never carried passengers.

**D** How many landing gears are there on this aircraft?    2    3    4

How many wheels are there on this aircraft?

- 6    8    10

**E** Below the tail, on the horizontal stabilizers are two small wing-like structures. These are the elevators. They control the up-and-down movement that helps provide a smooth ride.



# CONCORDE

**SIGNIFICANCE:**  
First successful commercial  
supersonic transport  
**FIRST FLIGHT:**  
March 2, 1969



PHOTOS BY DANE PENLAND, NATIONAL AIR AND SPACE MUSEUM, SMITHSONIAN INSTITUTION (ABOVE: SI-2005-6275; BELOW: SI 2004-276)

**A** The long, narrow body reduces air friction and helps the airplane fly fast. Compare the Concorde with the Boeing 307 Stratoliner next to it. The Concorde is almost three times as long.

**B** What shape are the engine openings?

round    rectangular    triangular

The powerful Rolls-Royce engines carry the airplane at 2,173 kilometers per hour (1,350 miles per hour). That's twice the speed of sound.

**C** The long, pointy nose blocks the view during landing. Pilots have to lower it to see the runway.

**D** Stand underneath the airplane's wings.

The whole underside is one enormous triangle that helps lift the airplane.

**E** Notice how tiny the windows are.

Keeping the openings small strengthens the body of the airplane.



Walk up the spiral staircase and along the elevated walkway for a bird's eye view of the Concorde and other aircraft in this guide.



# LOCKHEED SR-71 BLACKBIRD

**SIGNIFICANCE:**  
World's fastest jet aircraft  
**FIRST FLIGHT:**  
December 1964

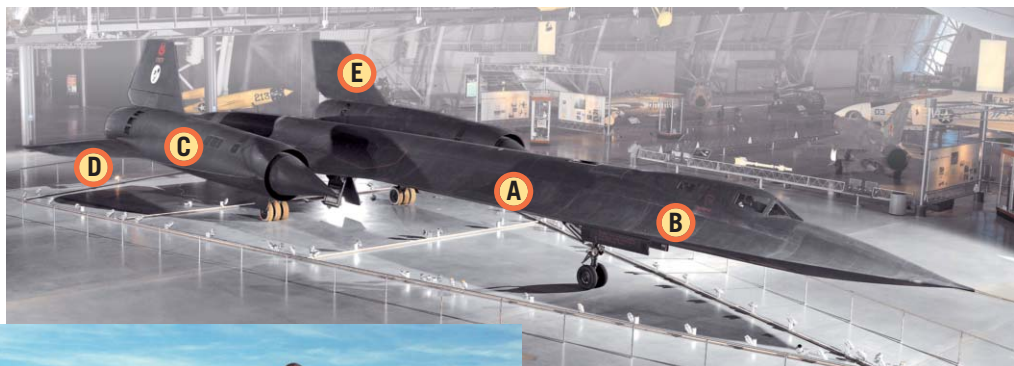


PHOTO BY DANE PENLAND, NATIONAL AIR AND SPACE MUSEUM, SMITHSONIAN INSTITUTION (SI 2005-6025)

**In 1990, Lt. Col. Ed Yeilding (right) and Lt. Col. Joseph Vida (left) flew this very aircraft from Los Angeles, CA., to Washington, D.C., in 1 hour, 4 minutes, and 20 seconds.**

## **A** The Blackbird got its name from its color.

The black paint absorbs radar signals. It makes the aircraft hard to track.

## **B** The airplane's skin is made of titanium.

This metal prevents the internal structure from melting. The airplane gets extremely hot when traveling at high speeds.

## **C** What's at the front of each engine?

a sphere    a cone    a rectangle

This feature prevents engine problems by slowing down air entering the engines.

## **D** Like the Concorde, this airplane's wings form a triangle.

This delta shape helps the airplane travel more than three times the speed of sound.

## **E** Why are there two tail fins?

They help keep the airplane stable at high speeds.

PHOTO: COURTESY OF LOCKHEED MARTIN

# SPACE SHUTTLE DISCOVERY

## SIGNIFICANCE:

The longest-serving reusable spacecraft, *Discovery* flew 39 times from 1984 through 2011—spending altogether 365 days in space.

## FIRST FLIGHT:

August 30, 1984

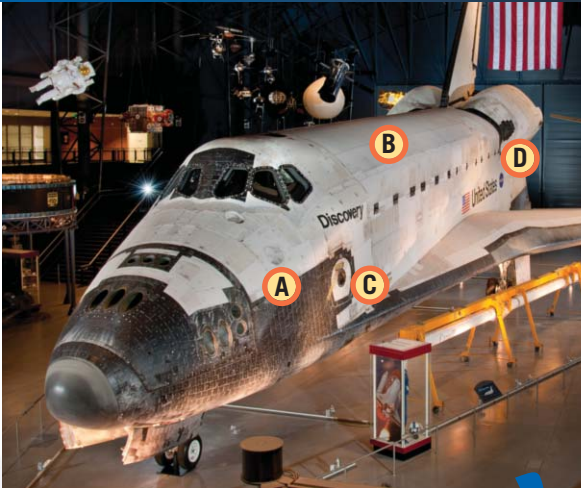


PHOTO BY DANE A. PENLAND, SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM (NASH 2012-02313)



PHOTO BY DANE A. PENLAND, SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM



### **A** What color are the tiles on the front and bottom of the spacecraft?

- White  Black

Black tiles protect the spacecraft against temperatures of up to 1,260°C (2,300°F). They are more heat-resistant than the white tiles. That's why they are located on areas that get hotter during return to Earth.

**A Boeing 747 gives *Discovery* a piggyback ride to its permanent home—the Smithsonian National Air and Space Museum's Steven F. Udvar-Hazy Center located in Chantilly, VA.**

### **B** The huge cargo bay is big enough to hold a yellow school bus.

It carries scientific equipment, parts for the International Space Station, and satellites for use in space. When the two long cargo bay doors on top are open, the astronauts have plenty of room to work in space.

### **C** Take a closer look at the Space Shuttle *Discovery*

Can you find the crew hatch? This is where the astronauts enter *Discovery* for launch and leave after landing. The hatch opens into the cabin where the crew lives while in space. This door is never opened while in space; can you guess why?

### **D** The two white bulges at the base of the tail are OMS pods.

That stands for Orbital Maneuvering System. They contain smaller engines and fuel for adjusting the Shuttle's position and speed in space. Can you guess why the Shuttle might need to adjust its position and speed in space?



# MARS PATHFINDER AND SOJOURNER

## TEST VEHICLES

**SIGNIFICANCE:**  
Landed on and explored Mars

**LANDING DATE:**  
July 4, 1997

PHOTO: NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) VIA NATIONAL AIR AND SPACE MUSEUM, SMITHSONIAN INSTITUTION (SI GPN-2000-0000484)



Each of *Pathfinder's* four airbags was made up of six balloons. The balloons could be deflated in any order to flip the spacecraft over if it landed upside down.

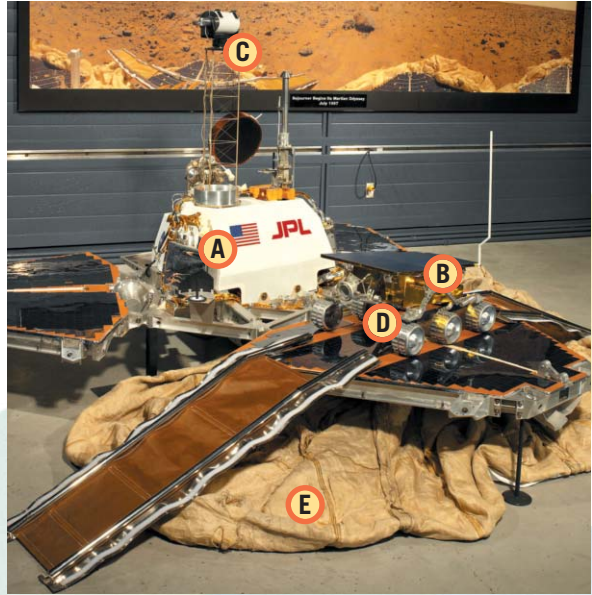


PHOTO BY DANE PENLAND, NATIONAL AIR AND SPACE MUSEUM, SMITHSONIAN INSTITUTION (SI 2005-1520)

**A** Our *Pathfinder* is an engineering model of a craft that landed on Mars. How many blue tiled panels does it have?

2    3    4

These solar panels opened up like flower petals after landing. They collected power from the Sun to operate equipment.

**B** Our *Sojourner* is also an engineering model of the rover that explored Mars. After landing, it rolled off *Pathfinder* and traveled around the area. It took photographs and collected information about rocks and soil.

**C** *Pathfinder's* camera sent images back to Earth. One—a panoramic image of Mars—is on the back wall. Do you see *Sojourner*?

**D** Each of *Sojourner's* wheels can move up and down on its own. This helps it move over rocks in its path.

**E** The large airbag on the ground protected *Pathfinder* during landing. Four airbags surrounded the spacecraft and bounced like a rubber ball after landing.

# MAP AND BALLOT

USE THIS MAP to find the four aircraft and two spacecraft.  
**CIRCLE** your favorite when you finish.

**Mars Pathfinder**  
 (test article) and  
**Sojourner** (model)  
 Landed on and  
 explored Mars



**Lockheed SR-71 Blackbird**  
 World's fastest  
 jet aircraft



**Space Shuttle Discovery**  
 Reusable spacecraft spent  
 39 missions and 365 days  
 traveling 150 million miles.



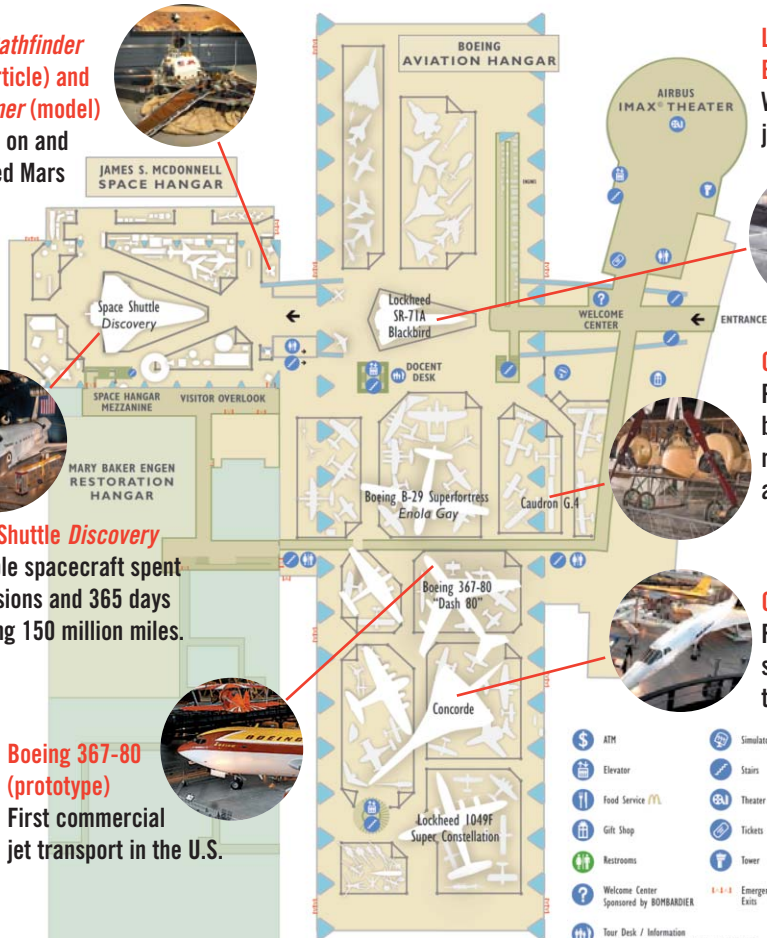
**Caudron G.4**  
 Pioneer trainer,  
 bomber, and  
 reconnaissance aircraft



**Boeing 367-80**  
 (prototype)  
 First commercial  
 jet transport in the U.S.



**Concorde**  
 First successful  
 supersonic  
 transport



PHOTOS BY DANE PENLAND, NATIONAL AIR AND SPACE MUSEUM, SMITHSONIAN INSTITUTION (COVER: SI 2006-4267; QUARANTINE FACILITY: SI 2004-22934)

## MISSION ACCOMPLISHED!

Before you return to Earth, visit the **Mobile Quarantine Facility**. Astronauts returning from the Moon were isolated there to prevent the spread of any germs. Then explore the inside of your favorite craft at the **Interactive Kiosks** nearby.



GO TO THE VISITOR SERVICES DESK  
 to have your booklet stamped with an  
 official museum seal.



Smithsonian  
 National Air and Space Museum  
 Steven F. Udvar-Hazy Center