



**GRADES**

**5-12**

# If These Airplanes Could Talk



history of flight

Aeronautics  
Research  
Mission  
Directorate



# 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 lantern

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

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.



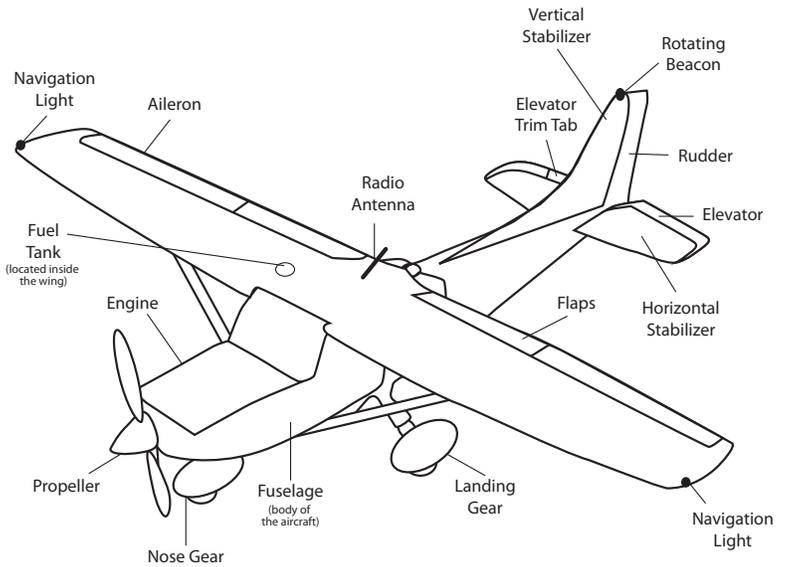
**Img. 3** Reenactors in front of a replica Fokker Dr. I triplane

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

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.

## 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



**Img. 5** Military aircraft insignia

## 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

Choose any airplane in the museum and answer the following questions.  
When you are done show your work in the gift shop and get a prize!

Airplane Name: \_\_\_\_\_

**Who:**

**Who developed the aircraft?**

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**Who used the aircraft?**

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

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**What:**

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

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

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

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

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

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Continued...

**When:**

**When was the aircraft produced?**

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**When was the aircraft used?**

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**When was the aircraft retired?**

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**Where:**

**Where was the aircraft produced?**

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**Where was the aircraft registered?**

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**Where was the aircraft flown?**

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**Why:**

**Why would a museum keep this airplane?**

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

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**How:**

**How was it used?**

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