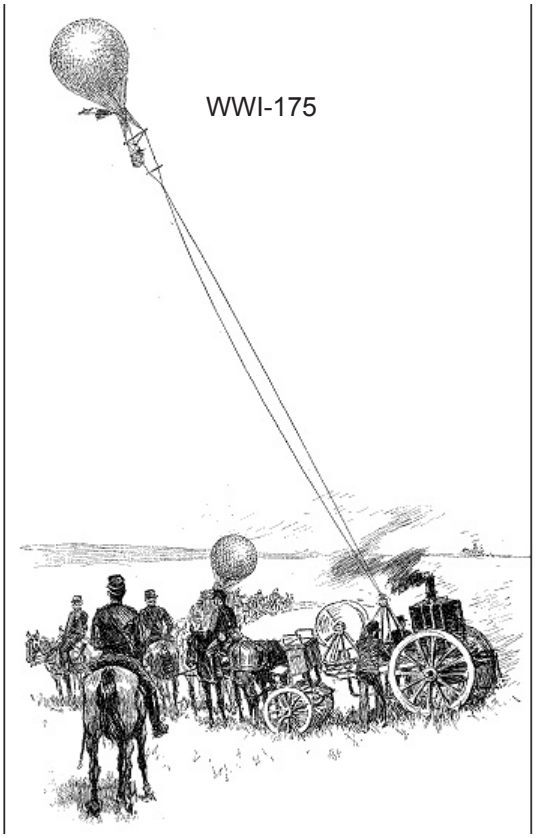
Aircraft Use During The Great War

The ability to observe enemy arms and troop locations and movements has always been a basic need of the military. The advent of the hot air balloon in the late 1700s offered a new way to accomplish this. Balloons were used during the Crimean War and the U.S. Civil War in the mid 1800s. Some use during the French Revolution of the late 1700s, and even earlier in China is reported in historical materials. Balloon use was the first step toward the use of "aircraft" in military operations. Winged powered aircraft were first introduced during the First World War, also known as The Great War.



WWI-175

Balloons were used occcasionally during the Crimean War, which was a bit earlier than the US Civil War. The sketch at the left is from that war. Also, there are reports that balloons were used as early as the French Revolution.

Unmanned hot air balloons are mentioned in Chinese history. Zhuge Liang in the Three Kingdoms era, Shu Kingdom, used airborne lanterns for military signaling.

The first clearly recorded instances of balloons capable of carrying passengers used hot air to obtain buoyancy and were built by the brothers Josef and Etienne Montgolfier in Annonay, France. They were from a family of paper manufacturers who had noticed the ash rising in fires. After experimenting with unmanned balloons and flights with animals, the first balloon flight with humans on board took place on 21 November 1783.

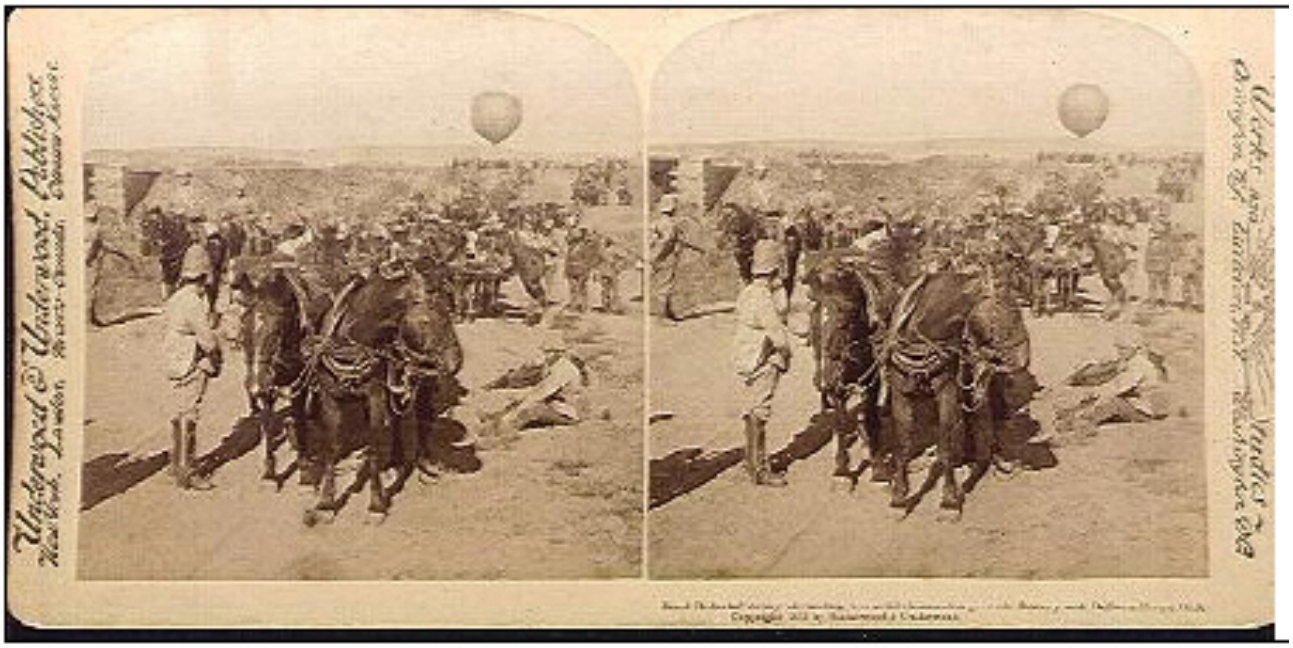
The first military use of aircraft took place during the French Revolutionary Wars, when the French used a tethered hydrogen balloon to observe the movements of the Austrian army during the Battle of Fleurus (1794).

WWI-136

Hot air balloons were employed during the American Civil War. An early photo of a Union Army observation balloon is shown at the left.

Though the military balloons used by the Union Army Balloon Corps under the command of Prof. Thaddeus S. C. Lowe were limp silk envelopes inflated with coke gas or hydrogen, the Confederate Army did attempt to counter with a rigid Montgolfier style hot air, or "hot smoke balloon." Captain John R. Bryant inflated his rigid cotton balloon with a fire of oil-soaked pine cones. The balloon was soon captured by Union forces as the Confederate's techniques of balloon handling were not competent.

Note that several of the pictures here and on the next page are “double pictures.” These were made with a double lens camera to simulate the spacing between the human eyes, and thus get perspective. The double pictures could then be viewed with a hand held device called a Steriopticon, and one would get a three dimensional impression. For historical interest, I have retained the double images whenever available.



WWI-176 above: Lord Roberts Army advancing toward Johannesburg during the Boer War in South Africa, 1899-1902. Observation balloon in the background.

WWI-174 above: The Parseval-Seigsfeld “Drachen” was invented in 1893 and was built in large numbers during WW I. It was flown up to about 5,000 feet altitude. The elongated shape and the bulbous “rudder” appendage eliminated the problem of the balloon rotating in the air and thus causing confusion for the observer and for people on the ground getting the observer’s reports.

WW I Aircraft--3

WWI-170 Officer in the car of an observation balloon testing the telephone. WWI, date and location not known.

WWI-173 A British balloon during WW I. The date and location are not known.

WWI-171 Car of observation ballon in mid-air, showing the parachute attachment {although the nature of the parachute attachment is not obvious.}

Introduction of the "Powered Balloon," i.e. the dirigible, generally known at the Zeppelin

Count Ferdinand von Zeppelin became interested in constructing a "dirigible balloon" after the Franco-Prussian War of 1870/1871, where he witnessed the use of French balloons during the siege of Paris. He had also encountered the military use of such aircraft in 1863 during the American Civil War, in which he participated as a military observer on the side of the Union. He began to seriously pursue his project after his early retirement from the military in 1890 at the age of 52.

Convinced of the potential importance of aircraft, he started working on various designs shortly after leaving the military. He eventually purchased the rights to the designs of Croatian inventor David Schwarz after that inventor died suddenly before successfully flying. His first aircraft drew heavily on Schwarz's design.

In 1898 Count Zeppelin founded the Gesellschaft zur Förderung der Luftschiffahrt (company for the promotion of airship flight), contributing more than half of its 800,000 Mark share capital himself.

Construction of the first Zeppelin airship began in 1899 in a floating assembly hall on the Bodensee in the Bay of Manzell, Friedrichshafen. This location was intended to facilitate the difficult starting procedure, as the floating hall could easily be aligned with the wind. The prototype airship LZ1 (LZ for "Luftschiff ('Airship') Zeppelin") had a length of more than 300 feet and was driven by two 14.2 horsepower Daimler engines.

The Zeppelin design was elongated, in a kind of cigar shape, for aerodynamic reasons. The gas, however, was contained in several balloons inside that structure. Also, the crew and operating control room, bomb racks, and other equipment were inside the elongated shell. The engines were suspened outside in "nacelles." With some of the early German military Zeppelins, there was access to a machine gun operating station outside the shell on top of the Zeppelin.

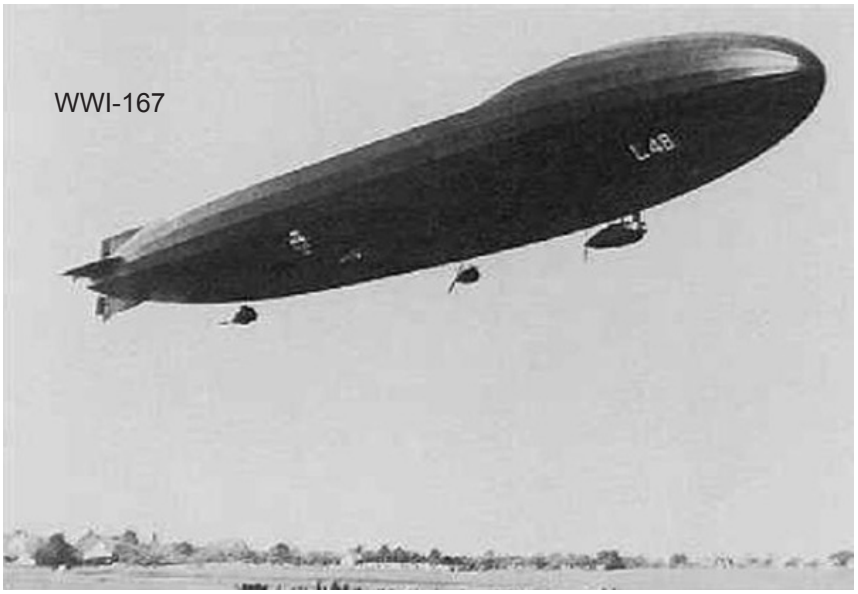
WWI-166 Howard Hughes' 1930 movie "Hell's Angels" was about air warfare in Europe during WW I. In the movie there is a long part about an attempted bombing raid on London by a German Zeppelin. There is extensive film coverage of the arrangements inside the Zeppelin bomber, which appear to be reasonably correct in an historical sense. In the movie the Zeppelin bombing raid ends in total disaster. Jean Harlow starred in the movie.

A large number of actual WWI aircraft were used in the movie. The movie was made only 11-12 years after the end of WW I, so many of the originals of those aircraft were still available.

Drawing of the Zeppelin L3, the first lighter-than-air bomber. This machine had brief life, only one month, because it was destroyed by its same crew forced to a landing of fortune in Denmark (Studio Kronos/Mondadori)

WWI-169 Although the source information for two of these pictures states that they are “drawings”, they appear to actually be photo-graphs.

WWI-167



Drawing of the superb airship Zeppelin L48. Its superior aerial technology was not exploited by the Germans for the fear of the attacks of the English fighters (Study Kronos/Mondadori)

WWI-168

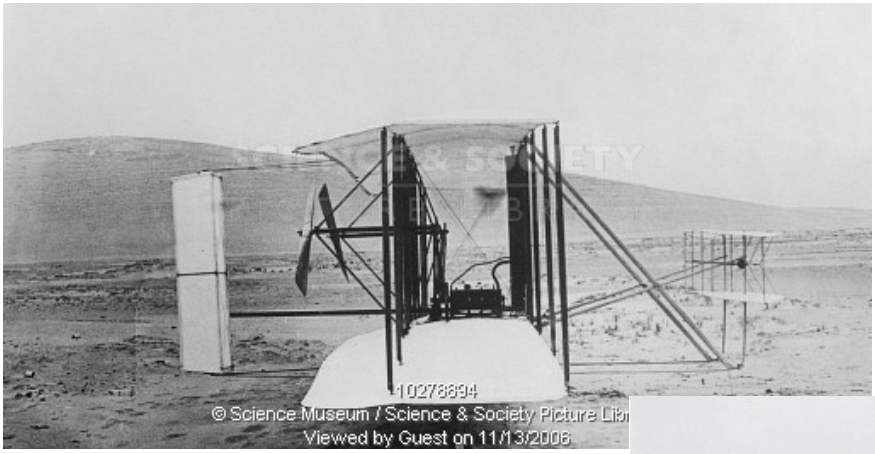
Early Days of Powered and Winged Flight
The Wright Brothers

By 1900 a number of people in the US, Europe, and South America already were trying to develop methods for powered and controllable winged flight. Langley, for example, was one of several doing so in the U.S.

Credit for the first success is almost universally given to the Wright brothers, bicycle mechanics from Ohio. Their work demonstrated that they were developing detailed technical understanding of the many problems, and that especially in the troublesome area of controlled flight they were first.

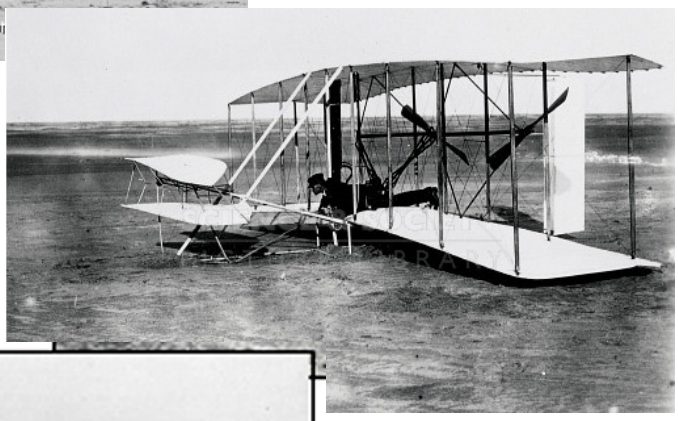
In 1902, the Wright brothers were successful with a glider. Although the 1902 flyer was the first truly effective, heavier-than-air craft, it didn't have a propulsion system, therefore is only as a glider, and not as an airplane. The problem for the Wrights in 1903 was to develop a powered machine.

Their first successful powered flight was in the "Flyer" at Kitty Hawk, NC on December 17, 1903. Their success encouraged the brothers to abandon their bicycle business and to start an aircraft production company in 1909 ..... only a few years before the start of WW I.



WWI-165 Three views of the Wright brothers 1903 "Flyer" are shown here.

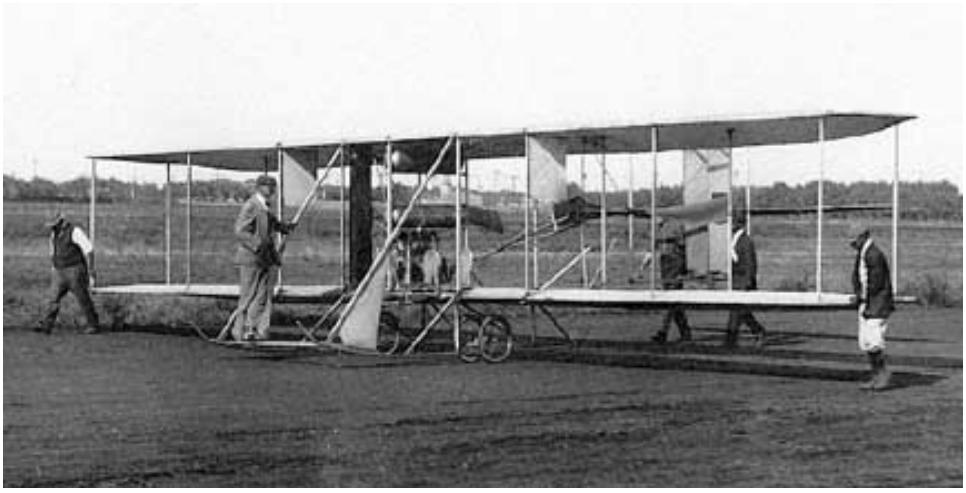
WWI-164



WWI-177

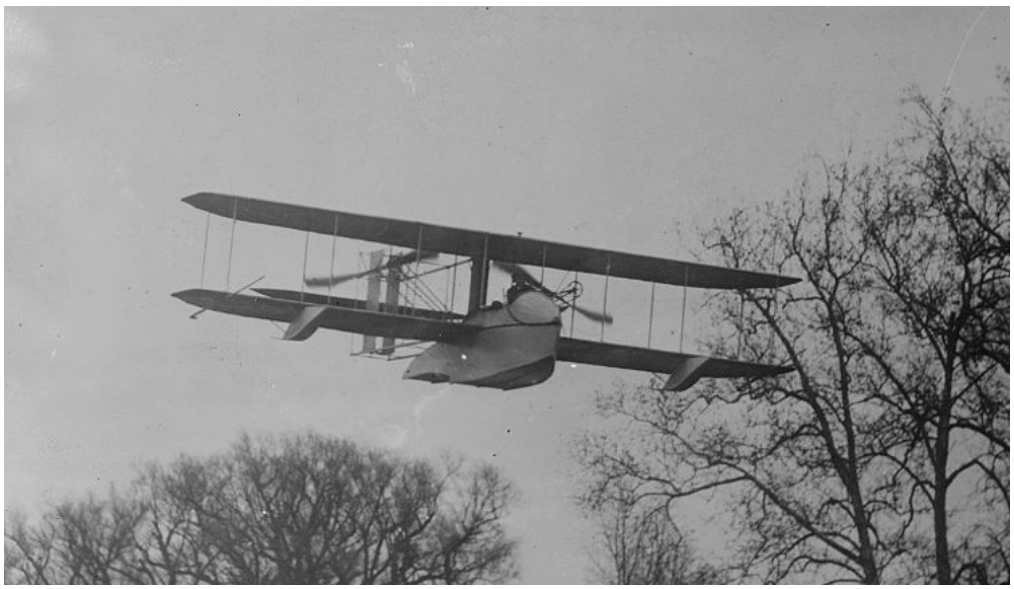
Progress Before the Start of WW I

WWI-160 Wright brothers
Type A, in flight August 24, 1909



WWI-162 Wright brothers 1912 Model B.

WWI-161 Wright Model G Aeroboat, over the Miami River near Dayton, Ohio, 1913.



Progress Before the Start of WW I

The Bleriot XI, designed by Louis Bleriot, was constructed of oak and poplar. Flying surfaces were covered with cloth. It used a three cylinder 25 HP engine, which offered one hour of flying time. Wing warping {instead of ailerons} was used for flight control, a method introduced earlier by the Wright brothers.

On July 25, 1909 Bleriot successfully crossed the English Channel from France to England in 36.5 minutes. There was fog and generally bad weather. He did not even have a compass to help guide his flight. The rain, fortunately, helped keep the engine cool. He made a very rough landing on the English coast and won a one thousand pound award from the London Daily Mail newspaper.

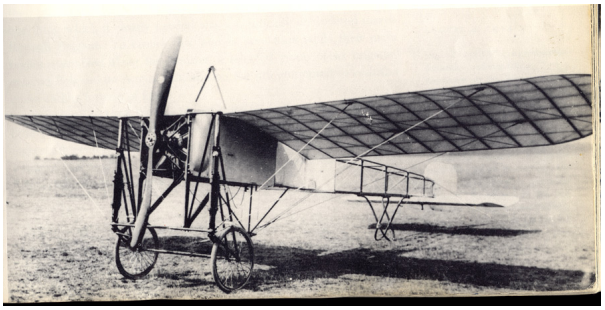
The flight across the English Channel generated great publicity. By September, 1909 Bleriot had received orders for 101 of his Bleriot XI from private owners as well as from the French military.

At the outbreak of WWI in 1914 the British Royal Flying Corps brought 23 Bleriot XIs into France that it had purchased earlier The specifications were:

80 HP Gnome engines
Wing span 33 ft 9 in
Length 27 ft 6 in
Empty weight 770 lb
Gross weight {with a crew of two} 1,307 lb
Max speed 75 mph {the English Channel was crossed in 1909 at a maximum speed of 47 mph}

Amongst military people, interest was emerging in the possibility of using such aircraft for military observation, as an extension of the observation work done previously by tethered balloons.

WWI-159 The original Bleriot XI that flew the English Channel in 1909.



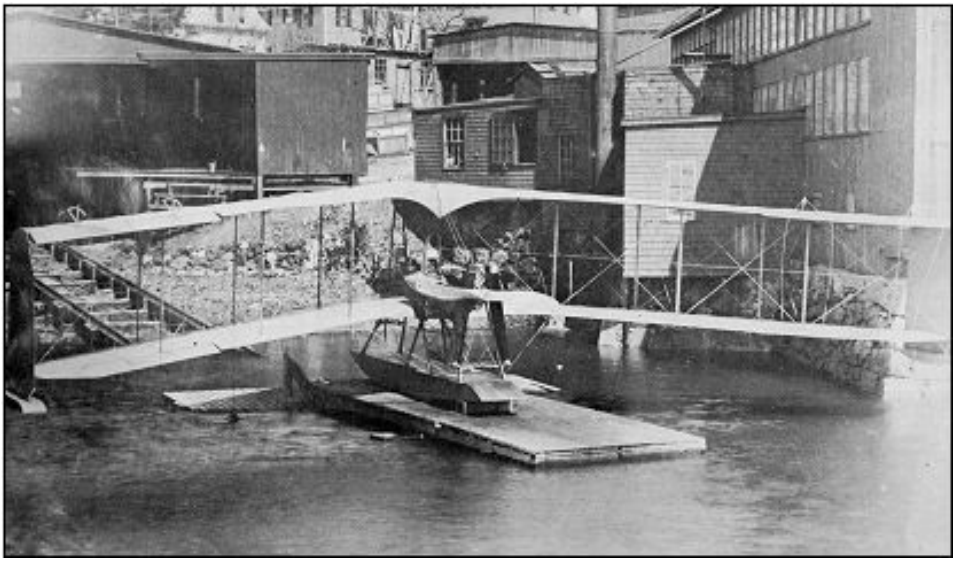
WWI-158 Another early photo of the Bleriot XI

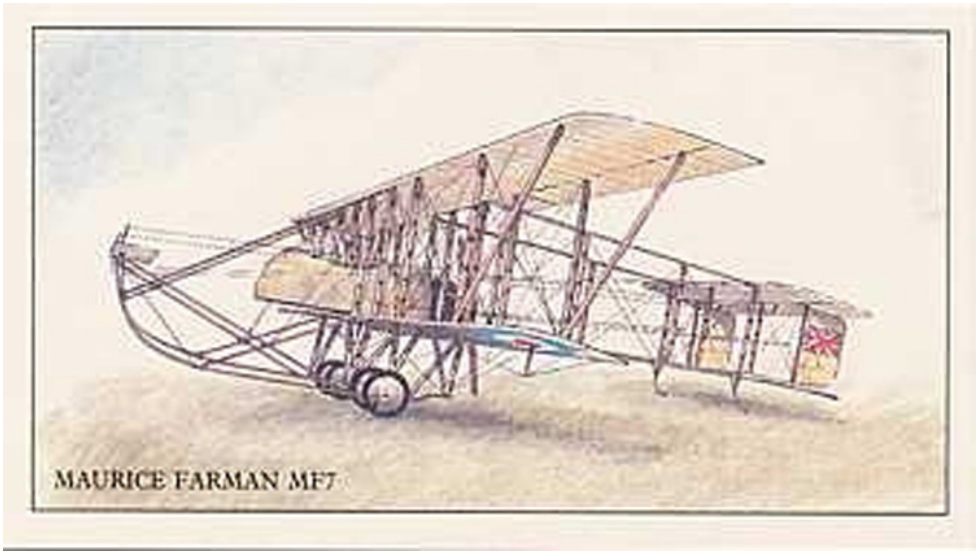
WWI-157 Another illustration of the Bleriot XI.

WWI-156 A pilot flying a more recently built model of the early Bleriot XI.

WWI-155 Bristol BoxKite, 1911, flying over Stonehenge in England.
This was produced in England's first aircraft factory.

WWI-154 Burgess-Dunne float plane at its hangar somewhere in Canada, 1914. When Canadian troops left for Europe on September 30, 1914 one such sea-plane was loaded onto the SS Athenia for the trip. But, in transit the aircraft was heavily damaged and was no longer flyable.





WWI-153 Maurice Farman MF7. A larger open structure airplane in England just before WWI.

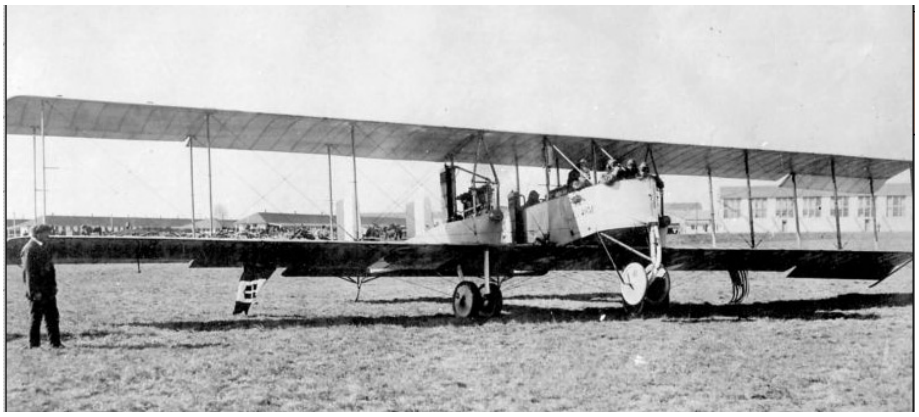
Early Years of the Great War

WWI-152 AIRCO DH2, which shows the progress toward an enclosed fuselage in the very early years of WW I.

This is unarmed and probably was used for observation.

Later models were armed and were used as fighters to attack enemy observation aircraft.

WWI-151 This may possibly be an armed fighter version of the AIRCO DH2 shown above. Note that the gunner had to stand in his gun position. Also, note that these aircraft used pusher propellers, at the rear of the body. At this time, no one had devised a method to use fixed position machine guns to fire forward thru the propeller.



WWI-150 Caproni CA 36. An Italian single engine bomber used early in WW I.

A triplane Caproni Ca.42. From its evolution had born the better bomber of World War 1: the Caproni Ca.46

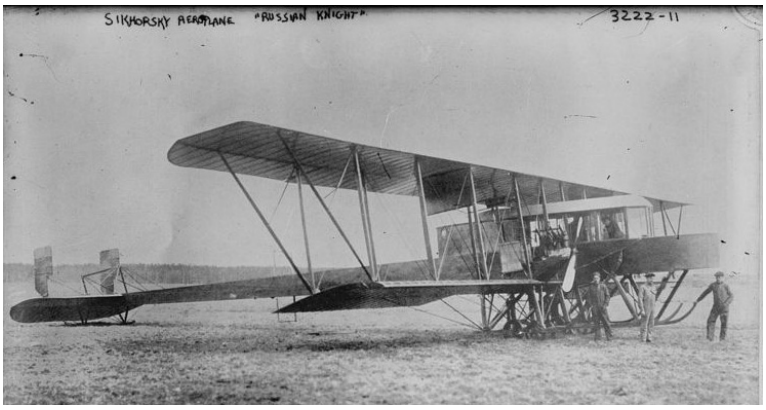
WWI-149 Caproni CA 42. An Italian twin engine triplane bomber that evolved from the CA 36 above.

Through the Great War

WWI-148 Vickers F.B.5 Gunbus, from ca. 1915. This was an early British fighter plane. Note the front mounted machine gun and the backward facing engine and propeller.

Vickers was a major British manufacturer of military materials and was famous for the Vickers machine gun.

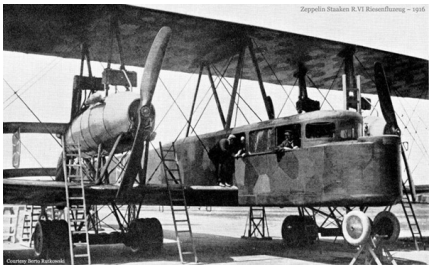
WWI-147 Curtiss 1911 Model D, Type IV, 1911. This was the second military airplane purchased by the U.S. Army Signal corps. Note the similarity to the early Wright design. The Wright brothers provided the first such airplane purchased by the

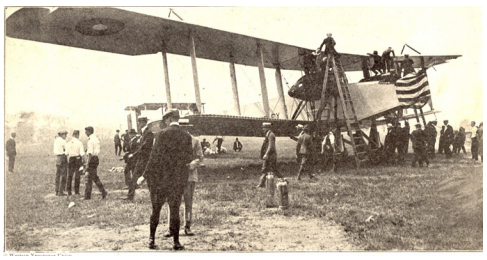


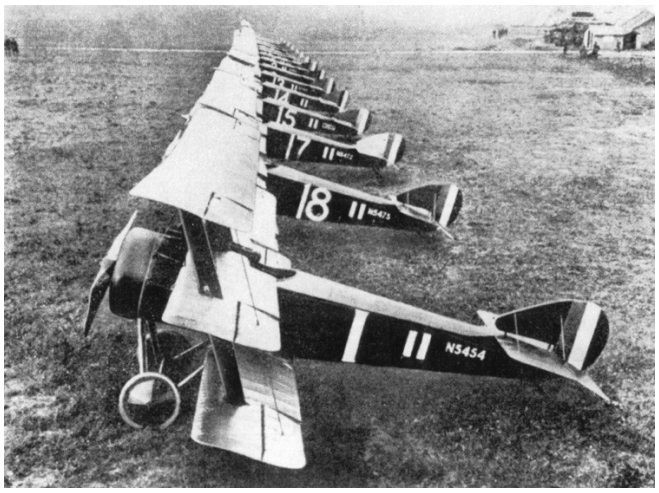
WWI-146 The twin engine Russian Sikorsky LeGrand which was designed by the young Igor Sikorsky before WW I. He later came to the U.S. and became the moving force for the development of helicopters..... This aircraft initially was designed for passengers. The passengers could stand up in the cabin, and if they had sufficient nerve they could open a rear door and stand in the open on a small sort of deck.

The aircraft later was modifed to operate as a bomber in WW I.

WWI-138 and WWI-137 below. Other configurations of the Sikorsky LeGrand.





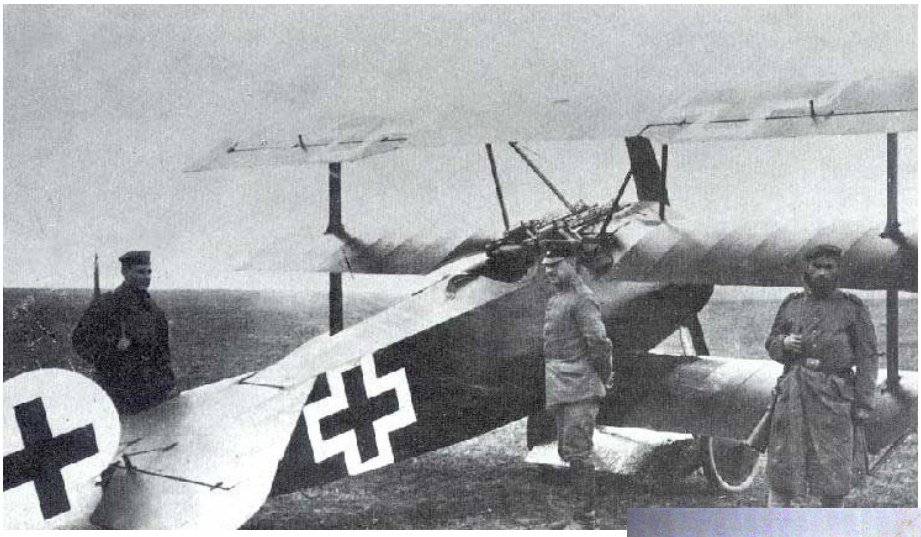


WWI-145 British Sopwith triplanes in Russia. Both Britian and the U.S. engaged in military operations in Russia after the end of WW I and after the Russian Revolution ... to no avail.

The tri-wing design was used to provide greater wing lift and greater maneuverability. Germany also built many Fokker triplanes.

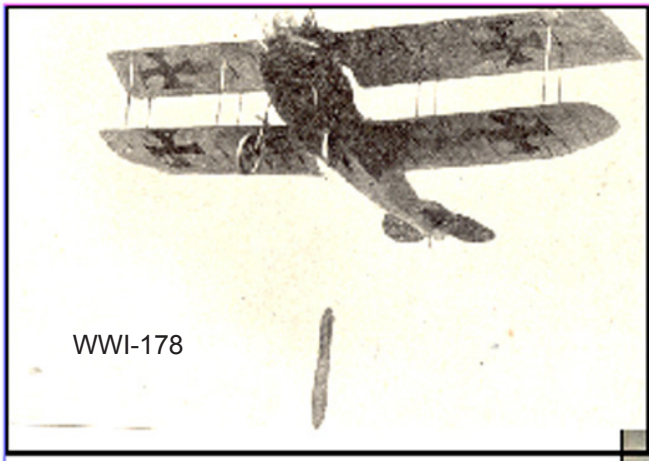
Earlier Sopwiths had two wings, i.e. a biplane configuration.

As one can see from the series of photos in this aircraft section, there was very rapid development in aircraft technology from 1914 to 1918. During the latter part of WWI, designers developed ways to synchronize machine guns with the propeller so that the guns could be mounted firmly, aimed by the pilot and fired in a forward direction. ..... Another interesting but short lived innovation was the “rotary engine.” The propeller was fixed to the engine and the entire engine rotated when running. It was an excellent way to keep the engine cool.... BUT.... the rotating engine was a giant gyrosope which made it difficult and dangerous to try to steer the aircraft. This technique was used briefly on some of the early Sopwith aircraft.



WWI-144 A Fokker DR 1 German triplane of WWI.

WWI-109 The markins on the aircraft at the left indicate that it was part of an American unit. But, it is not a Spad and I’m unsure just what kind it is. The engine cowling and landing gear look similar to those on the British Sopwith Triplane at the top of this page.



WWI-178

Left: A bomb dropped by hand over the side of a German plane. In many cases the bombs were simply artillery shells that had been adapted by adding small tail fins to keep them pointed downward. WWI-178

WWI-142

WWI-141

WWI-141 and WWI-142 are photos of the Spad fighter plane that became famous for its widespread use and performance during the last year of the war. This was the fighter plane used by Captain Eddie Rickenbacker, the most famous "ace" of all the American fighter pilots.

WWI-139 Below: Allied fighter planes arrayed at an unknown airfield during the last year of WW I. The location is unknown, but probably is somewhere in northeastern France.

Manned observation balloons floating high above the trenches were used as stationary reconnaissance points on the front lines, reporting enemy troop positions and directing artillery fire. Balloons commonly had a crew of two personnel equipped with parachutes: upon an enemy air attack on the flammable balloon the balloon crew would parachute to safety. At the time, parachutes were too bulky to be used by pilots in aircraft, and smaller versions would not be developed until the end of the war.

Captain Eddie Rickenbacker and his Spad Fighter Plane 1918 in France

WW I Aircraft--14

WWI-140

Eddie Rickenbacker (October 8, 1890 – July 27, 1973) was best known as a World War I fighter ace. He was also a race car driver. From 1912 through 1916 he was a driver in a large number of races at the Indianapolis Motor Speedway. Later in his life he owned the Speedway.

Rickenbacker helped organize an advance group of soldiers to be ready if the United States joined the war. When, in 1917, the United States declared war on Germany, Rickenbacker had enlisted in the U.S. Army and was training in France with the very first American troops. Rickenbacker arrived in France on June 26, 1917 as sergeant first-class.

The military awarded Rickenbacker a place in America's first air-combat squadron, the 94th Aero Squadron, informally known as the Hat-in-the-Ring Squadron. He flew rudimentary aircraft, sometimes without weaponry, alongside French pilots. The 94th periodically faced Germany's legendary Flying Circus, led by the Red Baron, Manfred von Richthofen, until von Richthofen's death in combat. On April 29, 1918, Rickenbacker shot down his first plane.

Respect for him grew as his successes mounted. Rickenbacker was awarded the French Croix de Guerre in May 1918, for shooting down five German airplanes. On September 24, 1918, now a captain, he was named commander of the squadron, and on the following day, he shot down two more German planes, for which he was belatedly awarded the Medal of Honor in 1931. Rickenbacker's 26 victories constituted an American record that stood until World War II.

In 1927, Rickenbacker bought the Indianapolis Motor Speedway, which he would operate for nearly a decade and a half before closing it down due to World War II.

Rickenbacker's most lasting business endeavor was his lifelong leadership of Eastern Air Lines. With the help of friends he had met in the war, or in car racing, or in other walks of life, Eddie Rickenbacker combined Eastern Air Transport with Florida Airways to form Eastern Air Lines, an airline that would grow from a company flying a few thousand air miles per week to a major international transportation company.

For a time, Eastern was the most profitable airline in the post-war era. In the late 1950s, Eastern's fortunes changed, and Rickenbacker was forced out of his CEO position on October 1, 1959. Eastern was an early victim to a changing business enviroment that brought down other airlines during the late 20th century.

Performance Data of the Spad S.XIII	
Type	fighter
Engine	235 hp Hispano-Suiza
Wing Span	26 ft 11 in (8.2 m)
Length	20 ft 8 in (6.3 m)
Height	7 ft 11 in (2.42 m)
Maximum Speed	138 mph (222 kph)
Maximum Height	21,820 ft (6,650 m)
Endurance	2 hours
Armament	2 machine-guns

WWI-127 at left: Specifications for the French Spad fighter aircraft, used during the last year of the First World War in France.

It had come a very long way from the primitive designs used ca. 1913-1914 during the early years of the war.

WWI-143 above: A three wing German Fokker fighter aircraft introduced during 1918, in the latter part of the First World War. This also illustrates the rapid advances in aircraft design during the war.