

THE VOISIN BIPLANE

BY
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A single glance at the Voisin Biplane reveals exactly what one would expect of a vintage aircraft: a somewhat ungainly design with dual, fabric-covered wings; a propeller; an aerodynamic surface protruding ahead of its airframe; and a boxy, kite-resembling tail. But, by 1907 standards, it had been considered “advanced.”

Its designer, Gabriel Voisin, son of a provincial engineer, was born in Belleville, France, in 1880, initially demonstrating mechanical and aeronautical aptitude through his boat, automobile, and kite interests. An admirer of Clement Ader, he trained as an architect and draftsman at the Ecole des Beaux-Arts in Lyon, and was later introduced to Ernest Archdeacon, a wealthy lawyer and aviation enthusiast, who subsequently commissioned him to design a glider.

Using inaccurate and incomplete drawings of the Wright Brothers' 1902 glider published in *L'Aerophile*, the Aero-Club's journal, Voisin constructed an airframe in January of 1904 which only bore a superficial resemblance to its original. Sporting dual wings subdivided by vertical partitions, a forward elevating plane, and a two-cell box-kite tail, it was devoid of the Wright-devised wing-warping method, and therefore had no means by which lateral control could be exerted. Two-thirds the size of the original, it was 40 pounds lighter.

Supported by floats and tethered to a Panhard-engined racing boat, the glider attempted its first flight from the Seine River on June 8, 1905, as described by Voisin himself. “Gradually and cautiously, (the helmsman) took up the slack of my towing cable...” he had written. “I had the controls ready. I waited for a time and then I applied the elevator.”

Virtually catapulted skyward by the air suddenly exerting its effects on its airfoils, it ascended as high as the river-lining poplar trees, but the unstable glider, unable to be controlled about its lateral axis, almost as abruptly nosed toward the water after a 50-foot, bell-curve trajectory, plunging below the surface and briefly submerging its pilot.

Despite the unsuccessful attempt, Louis Bleriot, witnessing the event, subsequently approached Voisin to build a second airframe for him.

Based upon the first, it featured a reduced wingspan with greater curvature and sloping, vertical side panels, and a single-cell tail, but it suffered a similar fate: covering some 100 feet during its July 18 test flight, it side-slipped immediately after taking to the air, once again plunging into the river.

Despite its inherent lack of roll control, it nevertheless served as the foundation upon which subsequent Voisin and other early European designs were based.

Voisin and Bleriot, briefly forming a collaborative partnership, produced equally unsuccessful aircraft due, in great part, to the latter's radical, ever-changing ideas. The Bleriot III, for instance, sported elliptical wings and was powered by a 24-hp Antoinette engine, but failed to achieve sufficient lift when fitted with floats. Reconfigured as a land machine with a wheeled undercarriage and a second engine, it collided with a rock during its acceleration run, bouncing across a ditch, nosing over, and abruptly ending its travel—along with the Voisin-Bleriot collaboration.

Gabriel Voisin, buying out Bleriot's interest in 1906, reformed the company with brother, Charles, creating "Appareils d'Aviation Les Freres Voisin" or "Voisin Brothers Flying Machines," establishing, as an extension of the Bleriot venture, the first European aircraft manufacturer in Billancourt, with financial backing from Enest Archdeacon and three others. The aviation industry was, in effect, launched.

The Gabriel and Charles Voisin team ironically mirrored their Orville and Wilbur Wright Brothers counterparts across the Atlantic. Gabriel, for example—the older of the two and Chief Engineer—provided most of the impetus and direction, while Charles generally assumed a supporting role. As in the case of the two teams, both would be halved in 1912 when one of the two brothers would succumb to non-aviation related deaths, although here the parallel was juxtaposed: Wilbur, the older of the two, died of typhoid fever, while Charles, the younger of the two, perished in an automobile accident. Nevertheless, Gabriel and Charles were slated to rank among Europe's leading early-aviation pioneers.

Their first aircraft, broadly based upon the Wright's gliders with a forward elevator and equal-span wings and powered by a 20-hp Buchet engine, was essentially a steerable box-kite built for Henry Kapferer in March of 1907, but failed to fly. The second, commissioned by Leon Delagrangé—a sculptor and Voisin's contemporary at the Ecole des Beaux-Arts—constituted their first full-standard canard, pusher biplane which incorporated characteristics of several then-notable aviators, including Octave Chanute (biplane wings), the Wright Brothers (the forward elevator), and Lawrence Hargrave (its box-kite tail).

Featuring an ash-framed, steel-jointed, square fuselage which served as the common attachment point for its forward elevating plane, its pilot's seat, its wings, its engine, and its tail, it sported dual, rectangular-shaped, superimposed wings which spanned 37.8 feet and their cotton and rubber fabric coverings, designated "continental cotton," were stretched over its ash ribs. They had a 6.56-foot depth, a 5.75-to-1 aspect ratio, and a 496 total square foot area.

Like those of its glider predecessor, they were rugged and strong, but devoid of either the wing-warping or aileron method of lateral control; instead, they contained four vertical planes or partitions, installed at fixed intervals, which subdivided them into individual cells. Although Voisin had intended to provide the necessary lateral stability with them and Berget had highly praised this vertical keel configuration, banking was relegated to wide, sluggish, rudder deflection-induced turns.

A single, 41-square-foot elevating plane protruded ahead of the fuselage frame in a canard arrangement, while a box-kite tail, subdivided into two cells, was attached behind it, a feature which would become characteristic of Voisin's designs until 1910.

Invented in 1893 by Australian Lawrence Hargrave, the structure, subdivided into sidewall-formed cells, featured the tandem-wing concept introduced by Alberto Santos-Dumont with his 14-bis biplane and employed by Samuel Pierpont Langley. Although it resulted in a particularly strong structure, Hargrave himself discontinued his own box-kite hang glider experiments when he experienced a series of hard landings. The construction method, used by European aircraft, ranked, along with ailerons, tractor (as opposed to pusher) biplane configurations, and pitch control relocation from the front to the rear of the aircraft, as one of the four primary design improvements of early- to mid-1900.

A 25-square-foot turning rudder, attached to the center of the aft cells, provided vertical-axis control.

Power was provided by a 50-hp, Leon Levavasseur-designed Antoinette engine installed on the rear of the central frame behind the main biplane, operating in pusher configuration and driving a twin-bladed, 7.6-foot-diameter metal propeller set at a 4.6-foot pitch.

Resting at a nose-high angle on the ground, the aircraft was supported by two large, pneumatic-tired wheels with spring shock absorbers, while two additional, although smaller, units served as tailwheels. Another, attached below the forward elevating plane, provided protection during nose-over landings.

The open cockpit, comprised of a single wicker seat mounted between the main wings' leading edges and the powerplant, sported a circular steering wheel whose forward and aft travel deflected the forward elevating plane by means of pushrods and whose left and right rotations activated the direction rudder through wire connections.

The 1,250-pound Voisin Biplane, first flying in 1907, lifted 23 pounds-per-horsepower and 2.37 pounds-per-square-foot of wing surface, attaining 35-mph speeds.

Progressively familiarizing himself with the type, which had been alternatively designated the "Voisin-Delagrance," Delagrance had been able to cover 500 meters by the fall of 1907.

Crashing during its second of two flights at Issy-les-Moulineaux in November, it was rebuilt as the Voisin-Delagrance II, using as many original, salvageable parts as possible, while the succeeding, more maneuverable "III" featured curtains on its two inner main interplane struts.

Slightly larger and heavier, the next Voisin Biplane, designated "Voisin-Farman," was constructed for Henry (Franch *Henri*) Farman, whose father was a Paris-based English correspondent. Speaking both French and English, Henry had been active in bicycle and automobile racing, but after sustaining injuries in the 1905 James Gordon Bennett Automobile Race, he shifted interest to aviation, first attempting to take to the air in a Chanute-Herring glider before ordering a powered biplane from the Voisin Brothers factory.

Receiving permission to practice on the Issy-les-Moulineaux military parade ground located on the left bank of the Seine River in the shadows of the Societe Astra and Clement-Bayard dirigible hangars, he quickly improved, conducting acceleration rolls on the flat, unobstructed, dusty field, which often turned muddy during rainy conditions. Following his lead, other budding aeronauts also found its surface conducive to aerial experimentation, soon establishing more permanent presences there with wooden sheds until the area, like College Park in Maryland, developed into Europe's first practical "airport." Countless spectators watched an ever-increasing amount of flying activity, which later assumed more structured, air race form.

In order to stimulate aeronautical advancement in France, the Aero-Club had established a series of progressively more difficult challengers as far back as 1904 in return for increasing monetary rewards. A silver trophy, for example, was offered for the 25-meter Coupe Ernest Archdeacon, while a silver medal and 100 francs were awarded to the first ten pilots who could fly 60 meters. The distance and monetary compensation next increased to, respectively, 100 meters and 1,500 francs, and the Grand Prix d'Aviation Deutsch-Archdeacon, requiring a one-kilometer circular pattern, carried a 50,000-franc remuneration.

Transferring his ability from ground-based racing to aerial flying, expressed by his Voisin-Farman I biplane, Farman achieved exponential success. On September 30, 1907, for instance, he completed a 30-meter flight. This increased to 285 meters on October 15, and 11 days later, he covered 2,540 feet in a record 52.6 seconds in his modified Voisin-Farman I-bis, which introduced wing dihedral and a monoplane elevating surface. Unofficially completing a 3,380-foot circuit on November 9, in one minute, 14 seconds, he exceeded the Wright Brothers' December 17, 1903 duration by 15 seconds, the first European attempt to do so. And on January 13 of the following year, he won the coveted 50,000-franc Grand Prix d'Aviation Deutsch-Archdeacon prize at Issy-les-Moulineaux when he flew the one-kilometer circular course in one minute, 28 seconds. Since the lateral control-devoid aircraft had to make very wide turns with the aid of its rudder alone, however, it actually covered a distance closer to 1.6 kilometers. It was then Europe's longest sector.

Continually modifying his aircraft, he recovered its surface with rubberized linen, reduced its tailplane span, and replaced its original Antoinette engine with a 50-hp Renault, although it was quickly restored after a single demonstration, creating the first practical European design in the process.

He continued to rack up distance records: on March 20, he flew 4,500 meters in three minutes, 29 seconds; on June 23 he covered more than 14 kilometers in 18 minutes, 30 seconds in Milan; and on July 6, he won the 10,000-franc Armengoud Prize for the first flight to remain aloft for more than 15 minutes, flying 20.4 kilometers in 20 minutes, 20 seconds in Ghent, Belgium.

One admirer commented, "What George Stephenson did for the locomotive, Farman has done for the aeroplane."

Subjected to continued modification, the basic Voisin Biplane design, which sold in significant numbers, ultimately appeared with both 50- and 60-hp Antoinette, E.N.V., Gnome, Itala, Renault, and Vivinus engines, devoid of its forward elevating plane, and with ailerons, remedying its most significant deficiency.

The Old Rhinebeck Aerodrome example, an original constructed by Norvin C. Rinek of Easton, Pennsylvania, in 1909, incorporated several non-standard features, including a chrome-moly welded steel tube frame, which replaced the original wooden one, and a V-8 engine of his own design.

Disassembled and stored in the rafters of his cord and rope company after only half a dozen flights, it was discovered by Cole Palen some 62 years later. He restored it in his Florida home in 1973, displaying it at the aerodrome until it was loaned to two other prestigious museums in 1979: the National Air and Space Museum in Washington and the Intrepid Sea-Air-Space Museum in New York. Returning "home," it now remains on display in the New Museum Building up on the hill across from the Pioneer, World War I, and Lindbergh hangars.

The classic profile of the canard, pusher, box-kite Voisin Biplane, despite its early lateral control limitations and slow, wide aerial turning maneuvers, nevertheless became one of the most significant practical pioneer aircraft between 1907 and 1910.