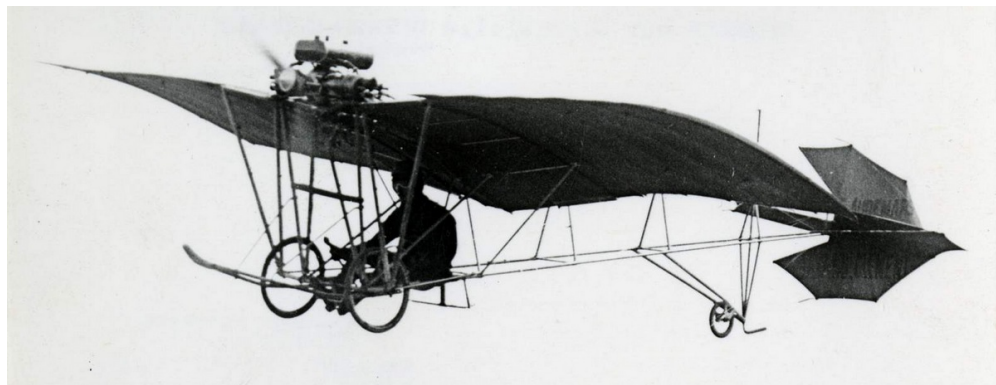


# Replicas of Alberto Santos-Dumont's “Demoiselles”

by Stuart Wier

Boulder, Colorado November 27, 2020



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The Demoiselle, the Dragonfly or Damsel, is the name for a series of five or more airplanes designed and built by Alberto Santos-Dumont and his workshop crew in Paris from 1907 to 1909. Some Demoiselles were also built and sold by the Clement-Bayard corporation in 1910. The Demoiselle, by which most people mean Santos-Dumont's final airplane No. 20 of late 1909 (or the Clement-Bayard models called “Santos No. 20” and “No. 21”), was an attractive, famous, and fairly successful early airplane, and it continues to inspire enthusiasm. The photograph above shows Edmond Audemars, a prominent early aviator, flying a Clement-Bayard “Santos No. 20” Demoiselle in 1910. A detailed history of the original Demoiselles with technical specifications is available in [Superbly Small: The Demoiselle Aircraft of Alberto Santos-Dumont](http://www.westernexplorers.us/Demoiselle-original-history.pdf) (<http://www.westernexplorers.us/Demoiselle-original-history.pdf>). A film of a original Demoiselle flying is at <https://www.youtube.com/watch?v=8XQm3ksFO84> (first 45 seconds).

One possibly-original Demoiselle is the Clement-Bayard No. 21 at the Museum of Air and Space, Paris-Le Bourget Airport. More than 30 custom-made replica Demoiselles have been built since 1950. Today you can buy a kit to build your own Demoiselle-like airplane. There are dozens of aircraft flying today in the Demoiselle tradition.

This report lists “Demoiselles” from around the world. They vary greatly in authenticity (how close they match the original construction), whether they are improved modern designs inspired by the original airplane with no intention of duplicating 1909 construction, and if they are airworthy or are even meant to be airworthy. Information and photographs supplied here are mostly from online sources. For some airplanes very little information is available; in some cases only brief remarks, or nothing more than a photograph. I would be delighted to add more information, where little information is supplied.

## An Original Demoiselle?

The Museum of Air and Space, Paris-Le Bourget Airport

Musée de l'Air et de l'Espace, Aéroport de Paris-Le Bourget

The Museum of Air and Space, Le Bourget, Paris, is one of the world's finest aviation museums. It owns more than 400 aircraft, 150 of which are on display. The collection includes a possibly-original Demoiselle, labeled a Clement-Bayard "Santos-Dumont No. 21." This may be the only surviving original Demoiselle.



A thorough online image search for this particular airplane will discover high quality photographs which are the best guide to its construction details, other than physical examination of this aircraft. The three main longerons are bamboo poles. The near-vertical struts and the horizontal cross struts, painted grey, are small steel tubes welded to short steel tubes holding the bamboo. The front trusses and struts supporting the wings and engine are steel tubes. The wing ribs are thin, of built-up wood. The entire tail is one rigid unit pivoting on a universal joint. The wheels are 20 inch bicycle wheels with no springs in a suspension. The wings have top and bottom fabric covering. The struts and wires above the wings are distinctive for the No. 21, and are not part of the design of the No. 20. The controls include a Bleriot-style "cloche" or stick, unlike the lever and hand wheel of the No. 20. The museum's online information about this aircraft is incorrect. This is clearly a 21, a 1910 design: in late 1908 Santos-Dumont was just beginning to design his final Demoiselle, and Clement-Bayard did not make any Demoiselles until late 1909 or early 1910. Also this was not the first airplane design to be built in series: both Voisin and Wright built and sold several airplanes before the first classic Demoiselle 20 was completed. In 2019 this aircraft was not on display. Check before you go.

The museum does not supply a provenance for this airplane. There appear to be several other nearly identical copies of this plane in France and elsewhere, described below as 'French Replicas of 1952.' Are these *all* copies, made with the same plans and at the same time?

This compilation of early films shows a Demoiselle taking off (briefly), Santos-Dumont, and other important early flying machines and aviators: <https://www.youtube.com/watch?v=4T7K80HXibk>. This early 14-second video shows Santos-Dumont sitting in a Demoiselle: <https://www.youtube.com/watch?v=4XSUQkFirrY>.

## Authentic and Near-authentic Replicas

Some replica Demoiselles are close copies of the original design, especially the impressive ones shown next. Strictly speaking an authentic replica of an historical artifact is as close a copy as is possible, exact in every detail including design and dimensions, and using strictly original materials and methods of construction, and even tools. This is not always practical or even possible. For example, original or exact replica engines are not available. Modern engines of similar size and power are used.

### Fábio Luiz de Almeida's Demoiselle

The pilot Fábio Luiz de Almeida, known as Commander Ratão among aviation professionals in Brazil, spent 2004 to 2007 building a copy of Santos-Dumont's No. 20 Demoiselle. This is quite close to the original construction of 1909, and is clearly the most authentic modern replica Demoiselle. The frame uses bamboo longerons with steel tube struts, and the wing ribs are thin bent bamboo stems. This replica flies, and its tail-high flying attitude duplicates some photos of original Demoiselles in flight, indicating how close a copy this is to the originals. See these news videos: <https://www.youtube.com/watch?v=tNqC8g6agzg> and <https://accessyoutube.org.uk/play/zfmi7xtCfrw>. A translation of the videos' dialogs would be appreciated, as would better pictures and technical details. See also <https://www.gazetadopovo.com.br/vida-e-cidadania/familia-quer-jogar-catos-de-piloto-no-mar-durante-voo-9b2u2bon4zy8rslw6uj8n9dfy/> and <https://www.gazetadopovo.com.br/vida-e-cidadania/instrutor-de-voo-paranaense-constroi-replica-de-demoiselle-anka4g6791p4cblhp2nj5f0we/>.



For the first time in a century, a true copy of a Demoiselle flies out of the mists and fogs of history, piloted by Fábio Luiz de Almeida. Photo from a video.

### French Replicas of 1952

This British Pathé newsreel from the summer of 1952 shows a good replica Demoiselle (No. 21) at Bagatelle in the Bois de Boulogne in Paris: <https://youtu.be/F5OrPQP4wO0>

The story behind this event and aircraft was discovered and reported to me by André Borges Lopes in January 2019. He says "In January 1952, the French government announced that it was preparing a great tribute to Santos Dumont in the middle of the year. As part of the celebrations, it commissioned construction of a flying-capable replica (or maybe two) of the Demoiselle, based on the original model preserved in the Museum of Le Bourget ... One of the events (in the late afternoon of June 25) was a demonstration flight of this Demoiselle replica at the golf Course located in Champs de Bagatelle, the



site where the pioneering flight of the 14bis took place in 1906. The flight was not completely successful. As usually happens with the Demoiselles, the chosen pilot (Constantin Fedzler, an acrobatic pilot from the French air force) was heavier than Santos Dumont.



“As we can see in the video, the airplane can barely get up from the ground. Notice that this Demoiselle replica is equipped with two small ailerons at the tips of the wings instead of the wing warping system of the original model, an air-cooled engine, and a smaller propellor than the original.

“This Demoiselle replica (or another copy, according to some sources) was donated to the Brazilian government and shipped to Brazil. In October 1952 this giant box arrived in the port of Rio de Janeiro brought by a French freighter. The airplane was assembled in the workshops of the Brazilian Air Force and put on display in the lobby of Santos Dumont Airport in Rio, during the 1952 Semana da Asa (Wing Week) celebrations.” The location of this airplane is unknown now.



Here is a photograph of a replica Demoiselle, taken June 23, 1952, at Orly airport, next to an Air France Lockheed Constellation, at the time of the Pathe newsreel. ([http://aviatechno.net/constellation/suivi\\_matricule.php?mat=F-BAZI](http://aviatechno.net/constellation/suivi_matricule.php?mat=F-BAZI)). The original caption is “A modern but faithful replica of the Demoiselle of Alberto Santos-Dumont provided by the French Museum of the Air, at Orly June 23, 1952. In company with the Constellation F-BAZI.”

This replica Demoiselle looks exactly like the airplane now in the air and space museum at Le

Bourget, and may be that airplane. Unlike the airplane in the Pathe newsreel, this plane has a mock-up or a 1909 engine, it has no ailerons, and it does have wing radiators, all exactly like the airplane at Le Bourget.

“The next year, 1953, the replica was sent to São Paulo to be displayed. Shortly thereafter, it was loaned or donated to the newly created “Santos Dumont Foundation” (a private non-profit association), which was setting up an aviation museum in the capital of São Paulo. This museum operated until the 1980s in a municipal building inside the Ibirapuera Park. Closed to the public into the early 90s, the museum was evicted from the park facilities in 1999. Since then, its collection has been spread to various sites. Some airplanes were lent to the “Museu Asas de um Sonho” of the TAM airline. But the Demoiselle that was exhibited at the TAM museum, which has also been closed lately, was not the 1922 French replica. Unfortunately, there is a good chance that the 1922 French replica has been destroyed or dismantled.”

There is also a *Flight* (London) magazine report – three weeks *after* the Pathé newsreel was filmed – that “a replica of one of the first powered aircraft ever built—the Demoiselle of Alberto Santos-Dumont, has been flown round the Eiffel Tower prior to being shipped to Brazil. ... The replica, although resembling the original, is built of metal tubing, weighs twice as much [about 500 pounds], and has a 28 h.p. engine.” Considering the low engine power, the supposed weight of this replica, and what is seen in the newsreel, any aircraft engineer would wonder how that airplane could round the Eiffel Tower, or even take off. It certainly could fly to a degree but – as suggested by the film – it was, in June, too short of lift to even get over a tree. Surely this aircraft did not weigh as much as *Flight* claimed and perhaps it could fly adequately. Perhaps after the newsreel it was improved with a larger engine or other changes allowing better flying. Or they found a long clear runway to permit more time to climb. Checking Parisian newspapers of the summer 1922 should clear this up, and maybe find a photo of a 1922 replica rounding the Eiffel Tower. Santos-Dumont never flew any airplane around the Eiffel Tower, despite faked photographs

### **AéroRétro (Aérodrome de Saint-Rambert d'Albon, Albon, France)**



AéroRétro's Demoiselle replica, on short-term loan to the Musée de l'Air et de l'Espace in 2016.



The AéroRétro replica Demoiselle (<http://www.aeroretro.fr/fr/information/47700/demoiselle>) looks very similar to the “Clement-Bayard No. 21” in the Le Bourget museum, but without wing radiators. This is also close to the “1952 French replicas.” This probably is the Demoiselle in the 2006 U.S. PBS NOVA TV program “Wings of Madness” (the engine looks identical). The engine is modern, and this aircraft may be airworthy, at least to fly like the original No. 21. The two photographs below are from the Musee de d'Issy-les-Moulineaux in 2016 (<http://www.historim.fr/2016/09/du-musee-lheliport-le-18-septembre-2016.html>).



The AéroRétro's Demoiselle replica, at the Musee de d'Issy-les-Moulineaux in 2016, which looks like the Demoiselle in the air and space museum at Le Bourget, except for the modern air-cooled engine.

### Isle de la Reunion



The aeronautical museum in Saint Denis, on the island of La Reunion in the Indian Ocean, has a monument to Roland Garros, an early Demoiselle pilot, and a Demoiselle No. 21 replica seemingly identical to the airplane now in the Le Bourget museum (See <http://cqborderouge.over-blog.com/2016/03/roland-garros-heros-de-14-18.html>). Garros was born on La Reunion in 1888, and became a famous pioneering pilot in France, first in Demoiselles and finally an ace in WWI (and, it seems, a tennis player).

### **More Near-Authentic Replicas**

#### **Greater St. Louis Air & Space Museum, Missouri, USA**

An impressively close replica of a No. 20, Demoiselle, so far as I can tell from photographs. One of very few near-authentic replicas. Someone deserves credit for this excellent reproduction. Please tell me who made this, and its story, if you know. Photo supplied by Travis Robert.

See photos at <https://www.facebook.com/Greater-Saint-Louis-Air-Space-Museum-112226183957/>.



#### **Museu do Ar, Sintra, Portugal**

A good replica, apparently made in 1972 with an original engine or a copy of a No. 21 engine. See <http://www.museudoar.pt/pagina-001.003.002.004-demoiselle-xx>, and high quality photos at <http://igor113.livejournal.com/787645.html>. Without ailerons and with wing radiators – another replica very much like the airplane AeroRetro and at the Le Bourget museum. Photo by J. Comstedt.





**Museu Asas de um Sonho (Museu Aviação da TAM), San Carlos, Brazil (closed)**



The Demoiselle shown was labeled as a replica of a Santos-Dumont “22” (there never was a No 22 Demoiselle) actually looks like a very good replica of No. 20 (modified with one strut above the engine). The museum closed on Jan 1, 2016. Photo from <https://www.revolvy.com/page/TAM-Museum>

### **Museu Aeroespacial (MUSAL) - Base Aérea dos Afonsos - Rio de Janeiro**

A No. 20 replica (<http://www2.fab.mil.br/musal/index.php/anvs/143-demoiselle>) “designed and built by the Technical School of Paraná, in joint promotion with the School of Special Officers and Guard Infantry, Aeronautical Material Park of São Paulo, and Aeroclub Of Paraná.”





André Borges Lopes reports: “The replica exhibited in the MUSAL was built in 1973 and donated to the museum in 1976. It is a reproduction of a Demoiselle 20. It was built for the celebrations of the centenary of the birth of Santos Dumont, by students and teachers of a technical high school in Curitiba, capital of the state of Paraná. The entire project took about a year to complete, including the three months for the construction. I have some pictures from the newspapers of the time.”

“The technicians at the school wanted to make an accurate replica, but also able to fly. Apparently, they did not have good images of the Le Bourget original Demoiselle. A great problem was to find an engine with power equivalent to the original model. So, they decided to use an automotive one, a 1200 cc 4-cylinder Volkswagen. As the technicians thought the power was not enough, the capacity was increased to 1300 cc and the moving parts were carefully balanced to reduce vibrations. Several pieces were removed to relieve the weight, which dropped to about 60 kg instead of the original 90 kg. Using a single carburetor, the power of this modified engine was estimated at about 30 to 35 HP.”

“The wood propeller was designed and built especially for the replica. It is much smaller than the original model, probably because the VW should operate at higher RPM. The fabric was also changed: polyester Dacron was used instead of silk.”

“Two other modifications were done to make this replica easier to fly: the change of "wing warping" to ailerons and the modernization of the controls.”

“The replica builders were careful to choose two pilots who had weight and size similar to Santos Dumont. And they asked the Aeronautical Technical Center (CTA, a renowned technical institute of the Brazilian Air Force) to accompany the tests and homologate the aircraft for the demonstration flights. Unfortunately, the results were not good. Only in one of several attempts the airplane managed to take off, but did not rise more than two feet. And the engine was not considered reliable. Fearful of a failure during the celebrations (or even a tragedy with the pilot's death) the CTA did not allow the plane to fly - disappointing the builders and pilots.”

“As far as I know, this replica has never really flown. The pilots simply started the engines and made short runs on the track, without leaving the ground. For two years, it was exhibited in several commemorative events in Brazil. At the end of 1975, it was dismantled in a warehouse of the Technical School in Curitiba, when it was donated to MUSAL.”

## Brooklands Museum, Weybridge, England

A “taxiable” replica of No. 20. “This bamboo-based Demoiselle was built by Julian Aubert over three years after a decade of researching the subject. In early 1999, he achieved his ambition 'to build an authentic taxiable replica using original plans, materials and construction methods.' ” From <https://www.brooklandsmuseum.com/explore/our-collection/aircraft/santos-dumont-demoiselle-replica>  
This is UK historic aircraft number BAPC 256.



## Rhinebeck Aerodrome Museum, Red Hook, New York

This Demoiselle in the Old Rhinebeck Aerodrome collection “is a reproduction which had been built by Cole Palen in the 1950s at his parent’s Red Oaks Mills home, the idea for which had come from the simultaneous and similarly-constructed Curtiss Model D. The Rhinebeck example’s last restoration ... occurred in the mid-1990s when Dan Taylor, a Rhinebeck pioneer aircraft pilot, ... attempted to render it more representative of the original No. 20 Demoiselle and for which he had secured a 30-hp, two-cylinder, air-cooled Detroit 5 Aero engine from 1909, the type which had powered the US-built airframes. Paul Savastino, a professional machinist and welder, designed an aircraft-appropriate mount able to support the powerplant without overstressing its bamboo construction.” – Robert Waldvogel. This airplane was used by the the 2006 U.S. PBS NOVA TV program “Wings of Madness” to demonstrate the flying controls.





## Demoiselles in a Movie and on Television

### *“Those Magnificent Men in Their Flying Machines”*



*Those Magnificent Men in Their Flying Machines*, a major motion picture comedy of 1965 and a love letter to early aviation, featured impressive flying replicas of pre-WWI aircraft. Many people fascinated with the Demoiselle in the last 55 years first saw one in this movie. The movie's Demoiselle is not a exact copy, having among other things an all-steel frame and a four cylinder Volkswagen engine, but its size and performance were delightful. Here is a 1965 newsreel about this replica, with flying scenes: <https://www.youtube.com/watch?v=284Ugzlv41o>.

Building and flying the aircraft for the movie is described in the book *Building Aeroplanes For Those Magnificent Men* by Allen Wheeler. Two Demoiselle replicas were made by Personal Plane Services Ltd. at White Waltham airfield, Berkshire, but proved unable to take off with typically-sized pilots. Wheeler himself bounced across a nearby golf course until he realized he was too heavy. A local flight instructor and former WWII bomber transport pilot, Joan Hughes, had no problems flying it, and piloted the Demoiselle for the movie. The original Demoiselle design called for a small pilot – it provided only 86 cm (33.8 in) of space from the seat bottom to the longeron overhead, and it flew best with a pilot weighing less than about 120 pounds (55 kg). These two replica Demoiselles survive, one is on loan from the Deutsche Technik Museum Berlin to the Borkenheide Hans-Grade-Museum. The other was in Ballarat Australia for years, but was sent back to Britain about 2014, in a very worn condition, looking like it had been stored outdoors. In April 2015 it was at Old Warden in the UK. Please tell me if you know where this airplane is now.



Why we love Demoiselles.



Joan Hughes and a Demoiselle replica from *Those Magnificent Men in Their Flying Machines*. The heavy steel construction and 4-cylinder Volkswagen engine are clear. This style of nose skid first appeared on Demoiselles on some Clement-Bayard model No. 20s of early 1910, but not in Santos-Dumont's personal No 20..





Jean-Pierre Cassel (“Pierre Dubois”) in *Those Magnificent Men in Their Flying Machines* demonstrates one classic braking technique used for original Demoiselles – gloved hand on a wheel. Not recommended for beginners!

### ***“Les Faucheurs de Marguerites”***



*Les Faucheurs de Marguerites* (“The Daisy Cutters”) was French-language television drama series about early aviation, shown in 1974 to 1980. “Daisy Cutters” was a name for flyers in the earliest days of aviation, because they flew so close to the grass. Several flying replicas of early aircraft were built for this program. The Demoiselle in *Les Faucheurs de Marguerites* was not used in flying scenes, only appearing very briefly in season 1, episode 5 (photograph above), and season 2, episodes 1 and 2. It may be the Demoiselle from the Museum of Air and Space, Le Bourget, or one of the close “1952-style”

copies of that airplane, described above, and below under “mystery ships.”

See <http://www.aeromovies.fr/articles.php?lng=fr&pg=694> for details of the aircraft used in *Les Faucheurs de Marguerites*. See also the useful list in [http://www.impdb.org/index.php?title=Les\\_faucheurs\\_de\\_marguerites#Santos-Dumont\\_No.\\_19\\_Demoiselle](http://www.impdb.org/index.php?title=Les_faucheurs_de_marguerites#Santos-Dumont_No._19_Demoiselle). Some airplanes built for *Les Faucheurs de Marguerites* are maintained, many in flying condition, by the association L'[Amicale Jean-Baptiste Salis](#) at [La Ferté-Alais](#), the airport of Cerny, France.

### ***HBO's “Santos Dumont”***

“Santos Dumont” is a 6-episode fictionalization of Alberto Santos-Dumont's life shown on HBO in French. There is a replica of a *Demoiselle* based on No. 20, but without wing radiators, and with a modern engine, and rigging above the wings something like a No. 21. It did not fly.





## Demoiselles in Museums

These museum 'replica Demoiselles' are not as authentic as the ones listed above.

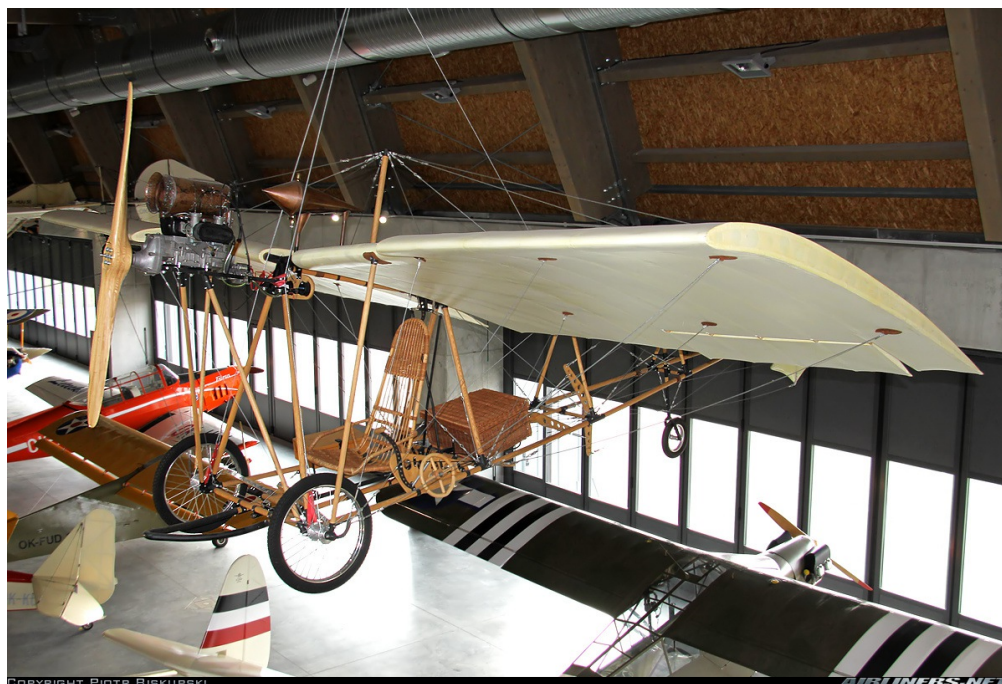
### Flugmuseum Aviaticum, Wiener Neustadt, Austria

See <http://www.aviaticum.at/>. Not a close replica Demoiselle, but perhaps airworthy. Apparently made with aluminum tubes. This plane has a modern two-cylinder opposed engine suitable for a modern Demoiselle, probably a Citroen 2CV.



### Mlada Boleslav, Czech Republic

See <https://www.youtube.com/watch?v=g5xxBVJF7IY>. Looks unflyable, and is somewhat rough as a replica (all the spars appear to be wooden rods, that kingpost, the elevator control is out of reach ...).



## The Australian Vintage Aviation Society (TAVAS) Museum, Caboolture Aerodrome, Queensland



Photos by “Deano”, of the TAVS Demoiselle “replica” are available on his blog: <https://acesflyinghigh.wordpress.com/2019/01/05/the-australian-vintage-aviation-society-tavas-pioneers-the-australian-flying-corps/>. I I have not found any technical or builder details. The photos show this is not a close replica. There are modern materials and design practices, but it appears to be quite airworthy. See also <http://tavas.com.au/>.

## Tettenhall Transport Heritage Centre, Wolverhampton, UK

The Centre has a replica, with number 194 in the British Aviation Preservation Council register (BAPC 194). Photographs indicate this is not the aircraft made for *Those Magnificent Men in Their Flying Machines*, as some claim; the frame is very different. Otherwise I have found nothing about this replica.





## Wings Over Miami Air Museum

This replica of No. 20 is at the Wings Over Miami Air Museum at the Miami Executive Airport. This is a pretty good replica and may even use bamboo, but there are also differences, such as having ailerons, and details of the the frame and engine. It looks like it may be intended to be airworthy. Photo by Malcolm Fillmore, July 2019.



## Flugausstellung Hermeskeil, Hermeskeil, Germany



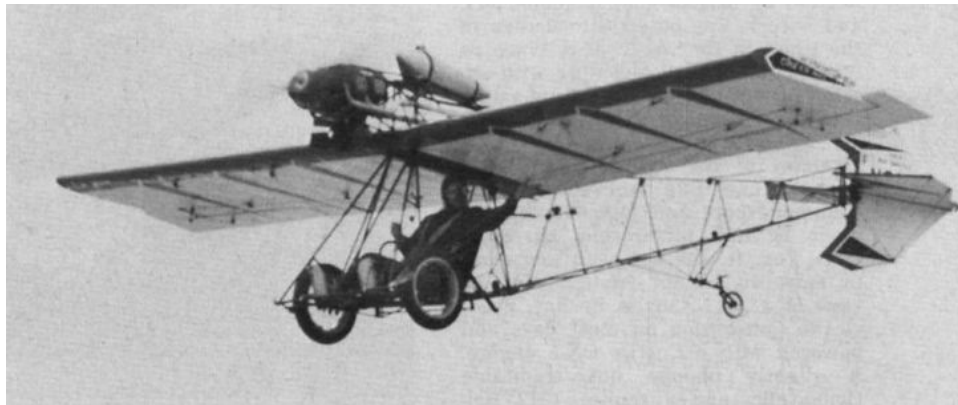
A replica based on No. 20. "The museum is home to over 100 civilian and military aircraft and helicopters displayed on a 18.8 acre site." See <https://www.flugausstellung.de/>. A good small modern two-cylinder opposed engine, perhaps a Citoen. May be airworthy. Photo by Stephan Kahl.

## Welded Steel

Some Demoiselle-inspired aircraft, like the one in the movie *Those Magnificent Men in Their Flying Machines*, use welded steel tube frames, four cylinder engines, and other common mid- to late- 20<sup>th</sup> century airplane technology. The results were in some ways flying machines more like a Piper Cub than an original Demoiselle: significantly heavier, more rigid, and more powerful. Not to say they are inferior *as* airplanes. They surely are better airplanes than the original Demoiselles. Just distinctive and forming a category of their own. All of these are close replicas of the Demoiselle in *Those Magnificent Men in Their Flying Machines* except Roman Weller's which is an *exact* replica of that airplane except for shorter wings. In the U.S. and Germany because of their weight, they are registered as regular aircraft, not ultralights.

### Earl Adkisson

One of the first Demoiselle copies, see [http://www.antiqueairfield.com/features/gone\\_west\\_list.html](http://www.antiqueairfield.com/features/gone_west_list.html). Probably made in the 1960s. Photographed at EAA Oshkosh (U.S.), in 1976. Current location unknown.



### Ray Honey

Old Rhinebeck Aerodrome Museum, Red Hook, New York, has this Demoiselle-inspired aircraft, N6551, which can be flown (and the more authentic non-flying replica No. 20 listed above). According to Vintage Airplane magazine, May 1978, “this aircraft was built by Ray Honey in 1968 from drawings and photos of Earl Adkisson's Demoiselle.” Uses a 65 hp Continental engine. See <https://issuu.com/vintageeaa/docs/va-vol-6-no-5-may-1978>. Photo by Derek Heley.



## Burling Demoiselle Model A

At Fantasy of Flight, Polk City, Florida, their “Burling Demoiselle Model A” is U.S. aircraft number N65269, built in 1976. The Fantasy of Flight facility is now open only in a limited way, and this plane may not be on view. Check for closures; <https://www.fantasyofflight.com/collection/aircraft/>.



“Burling Demoiselle Model A.” photograph by “Valder 137,” 2010, from wikimedia.

## Roman Weller' s “Demoiselle II”

Built in 2004-2005 by Roman Weller of Weller Flugzeugbau in Biberfeld, Germany. This is actually a replica of a replica: Weller made a measured copy of one of the “Demoiselles” from *Those Magnificent Men in Their Flying Machines*, the one in the Borkenheide Hans Grade Museum. The wings are improved in wing section and construction, and other improvements were made. This replica is perhaps the only flying replica sone which use a wing aspect ratio as low as the original Demoiselle's wing, improving the authentic appearance. Photos from Roman Weller and from this report:

[https://www.fliegermagazin.de/download/files/flm\\_2016-12\\_UL.pdf](https://www.fliegermagazin.de/download/files/flm_2016-12_UL.pdf).

See also <https://weller-flugzeugbau.de/> (in German). Flying video:

<https://accessyoutube.org.uk/play/IgzU8mmAVkk>





“The Little Time Machine:” Roman Weller's “Demoiselle II”:



See also Weller's great “Rebell” airplane at <https://www.youtube.com/watch?v=1V66j-9FqTM>, and at <https://www.youtube.com/watch?v=PEjeWulCTXE> & [https://www.youtube.com/watch?v=ary9tcG\\_2ug](https://www.youtube.com/watch?v=ary9tcG_2ug)

## Medve Demoiselle

Built by George Medve in Ohio, USA, in 2015. U.S. Registration NX200GM. Photo by Courtney Caillouet, from Facebook. No other information available.



Medve Demoiselle.

## Light Modern Airworthy Demoiselle-inspired Aircraft

Some recent Demoiselle-inspired aircraft are built for regular flight, using modern light materials, frame design and construction, wings and airfoils, engines, and so on, to make high-quality, light, and airworthy aircraft in the Demoiselle tradition, for modern-sized pilots. These airplanes all fly well. And note that they mostly all use the original Demoiselle's all-flying tail and distinctive rhomboid tail form.

### Lee Fischer and the “Winchester Skonkwerks Ultralight Research and Development Facility”

The Skonkwerks (Larsen, Wisconsin) has made three light flying machines inspired by the Demoiselle, the first named “23 Bis” and then two similar airplanes called “the 24’s Model L and Model M.” “The 23 Bis was called such because we wanted it to project an aura of an aircraft that Santos-Dumont might have built next” (Lee Fischer). The Skonkwerks 23 Bis and the “24’s M and L” flying machines are all completely new and successful Demoiselles with modern construction and materials, with much of the look and feel – and flexibility – of the original Demoiselles. For me these three aircraft are the best Demoiselle-like replicas with the spirit of Santos-Dumont’s original No. 20 of late 1909.

#### Skonkwerks 23 Bis

“Lee Fischer was the founder of Skonkwerks, formed after he first showed a modified Robertson B1-RD at EAA AirVenture. So much interest was shown in that Demoiselle style of aircraft that he decided to build 23 Bis, completed in 2016.” Roll control is by wing warping as in the original Demoiselle. The materials and construction are modern but the simple approach to construction, the light and open structure, the spirit of the project, the wings and tail, and how it flies are close to Santos-Dumont’s original airplanes.



Skonkwerks 23 Bis. Photo by Rod Bearden (<http://www.rodbearden.com/Oshkosh%202016/T-Z/Winchester%20Skonkwerks%20Demoiselle%2023bis%201.html>)



Skonkwerks 23 Bis link:

<https://www.eaa.org/en/airventure/aaa-airventure-news-and-multimedia/aaa-airventure-news/2015-aaa-airventure-oshkosh/07-21-2015-santos-dumonts-23-bis-flies-again>

Skonkwerks 23 Bis videos:

first flight, June 2015: <https://www.youtube.com/watch?v=ZKKaCj2v9pg>

<https://www.youtube.com/watch?v=SdJu8KQDeao&list=UUPXJ1aqWCBnWKWZdRfEteDg&index=6>  
construction:

<https://www.youtube.com/watch?v=TvI3sPaNwk8&index=9&list=UUPXJ1aqWCBnWKWZdRfEteDg>

August 2015: <https://www.youtube.com/watch?v=SdJu8KQDeao>

<https://www.youtube.com/watch?v=8MPOCiYd2AY&list=UUPXJ1aqWCBnWKWZdRfEteDg&index=7>

<https://www.youtube.com/watch?v=3kf7oPmIYZI&index=20&list=UUPXJ1aqWCBnWKWZdRfEteDg>

<https://www.youtube.com/watch?v=TvI3sPaNwk8>

<https://www.youtube.com/watch?v=8MPOCiYd2AY>

<https://www.youtube.com/watch?v=kF0H8hEU6kg>

<https://www.youtube.com/watch?v=jZYtGHKEigU>

Skonkwerks 24's Model L and Model M

“At AirVenture, Lee Fischer's friend Mark Solper hinted that it would be great project to build a pair of evolved Demoiselles for a subsequent AirVenture.” This suggestion led to the “24's Model L and Model M.” Note the drop ailerons, replacing wing warping. “The apostrophe in 24's denotes ownership, for Lee and Mark.”



Skonkwerks 24's L. Photo by Rod Bearden (<http://www.rodbearden.com/Oshkosh%202016/T-Z/Winchester%20Skonkwerks%20Demoiselle%2024's%201.JPG>)

For more see:

<https://www.eaa.org/en/airventure/aaa-airventure-news-and-multimedia/aaa-airventure-news/aaa-airventure-oshkosh/07-24-2017-scratchbuilt-ultralights-carry-on-santos-dumont-designs>

<https://www.bydanjohnson.com/skonkwerks-ultralight-aircraft-tribute-aviation-pioneer/>

<http://www.ultralightaircraftmagazine.com/santos-dumont-demoiselle-24-bis-winchester-skonkwerks-ultralight-research-and-development-facility.html>

24's Flying movie:

<https://www.youtube.com/watch?v=CdIS3gzhrTw>

### **Demoiselle Project – Institute Arruda Botelho (IAB)**

The Instituto Arruda Botelho (IAB, <http://www.institutoarrudabotelho.org.br/>) commissioned the design and construction of five modernized No. 20 Demoiselles in 2004 to 2007. Good flyers.

### **René Mouret, Association René Grandjean, Avenches, Switzerland**



René Mouret finished this Demoiselle replica in 2010. See [www.aviongrandjean.ch/](http://www.aviongrandjean.ch/). The high-quality tapered wings and the three spar-support above the wing are distinctive. The engine is a modern ultralight aircraft engine. I am not sure if this airplane has flown; it clearly looks airworthy. More information about this airplane would be welcome.



The Mouret Demoiselle replica displayed in a characteristic period setting by the Association René Grandjean, Avenches, Switzerland

### **The Demoichelle, Association pour la Promotion des Échelles Volantes (APEV), France**



In 2008 – 2009 Daniel Dalby and the APEV designed and built this ingenious, highly innovative, and high-quality Demoiselle-inspired aircraft in Blois, France. The tapered wings are a special feature, as is roll control by differential wing rotation ( $+2^\circ$ ,  $-4^\circ$ ), not ailerons. The Demoichelle is powered by Rotax 377, 447, or 462 engines, and uses wing section NACA 23112. The Demoichelle has also been powered and flown with an electrical engine. Unlike many other Demoiselle replicas, complete documentation and specifications are published online by the builders, and plans and kits are available. With an empty weight of 286 pounds and a stall speed of 35 mph this plane unfortunately does not qualify as a U.S. ultralight. Photo by Charles Donnefort ( <https://commons.wikimedia.org/w/index.php?curid=9294523>)

Demoichelle web site with complete details and specifications:



<https://sites.google.com/site/demoichelle13/>

Plans (for 60 €) and kits (for 5110 €, less engine) are available at

[http://www.pouchel.com/english/index\\_eng.php?p=plans\\_eng.html](http://www.pouchel.com/english/index_eng.php?p=plans_eng.html)

See also

<https://www.dailymotion.com/video/xa6tgc> first flight video – 7 minutes

[http://www.pouchel.com/english/index\\_eng.php?p=demoichelle\\_eng.html](http://www.pouchel.com/english/index_eng.php?p=demoichelle_eng.html)

<https://demoichelle.wordpress.com/> “The adventure of an ultralight aircraft builder”

<http://fr.wikipedia.org/wiki/Demoichelle> Wikipedia (in French)

<http://www.pouchel.com/> web site of APEV, the [Association pour la Promotion des Échelles Volantes](#) “Association for the Promotion of Flying Ladders” – their first plane used a retail aluminum ladder for the wing spars.

[http://www.pouchel.com/english/index\\_eng.php?p=videos\\_eng.html](http://www.pouchel.com/english/index_eng.php?p=videos_eng.html) flight video

<http://www.pouchel.com/demoichelle/album/index.html> photo gallery

[http://www.ulmag.fr/mag/essais/demoichelle/demoichelle\\_1.php](http://www.ulmag.fr/mag/essais/demoichelle/demoichelle_1.php)

<https://www.youtube.com/watch?v=9V2S2tYidMU> flight video

<https://www.youtube.com/watch?v=2fR07tA9Db4> electric version flight video

<https://www.youtube.com/watch?v=N-a8Ux4qY-k> flight video

<https://www.youtube.com/watch?v=rdAXo0LIjU> making NACA 23112 wing ribs in styrofoam

<https://www.youtube.com/watch?v=NmnOZWLH62Q> hot wire rib cutting

## Mystery Ships

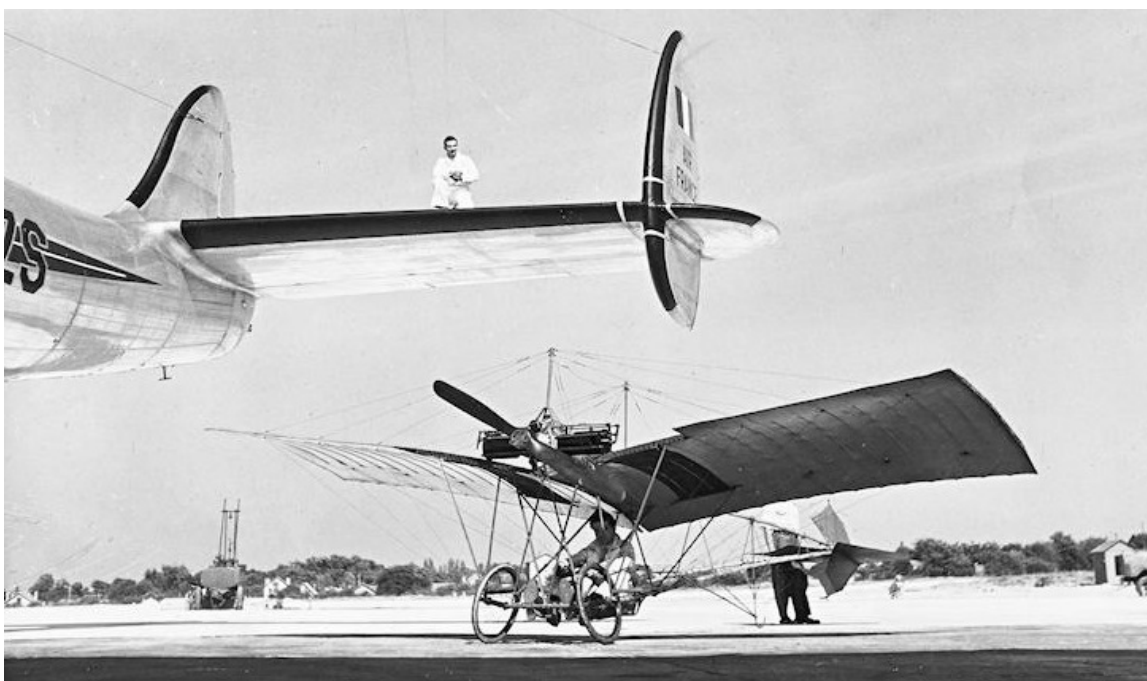
You can find the darnedest things online, including photographs of 'replica' Demoiselles, sometimes with little or no other information. Please send any information about these airplanes to this report's author.

**Mystery Ships #1:** the multiple near-identical copies of No. 21 from 1952.

The No. 21 Demoiselle photographed June 23, 1952 at Orly airport (below, and on page 4), the AeroRetro replica, the replica at La Reunion, and the airplane in “The Daisy Cutters,” all appear to have the same construction as the Demoiselle No. 21 now at the Le Bourget Paris Air and Space museum, based on photographs. Note that none have ailerons, and they all have wing radiators and seemingly identical copper fuel tanks. The replica Demoiselle shown in the 1952 Pathe newsreel does have ailerons but otherwise it too appears to be the same as these other Demoiselles. Surely that did not happen by chance. Are these planes essentially identical? Were they all built from the same plans?

My guess is that the airplane shown below at Orly in 1952 is the Demoiselle now in the Le Bourget museum, and that the same airplane was also used in static display in “The Daisy Cutters.” It seems that the airplanes at AeroRetro and La Reunion were copies based on the Le Bourget airplane, or were built along with the Le Bourget airplane. So was the replica shown in the 1952 newsreel, but modified to have ailerons and perhaps other improvements.

What is the origin of these airplanes? Were all of these seemingly-identical replicas built in the same place, or at the same time? Did they all use the same plans? Do construction plans survive for this airplane? Where is the 1952 French replica shown in the newsreel now? Was the plane photographed at Orly on June 23, 1952 another one of these replicas? Is it the airplane now at Le Bourget or AeroRetro?



Replica of a Demoiselle No. 21 photographed at Orly, Paris, on June 23, 1952, with an Air France Lockheed Constellation. (news photograph). This machine looks *exactly* like the No. 21 Demoiselle now in Le Bourget.

Is the airplane at Le Bourget from 1910, or is it from 1952? The Le Bourget museum is willing to ship their Demoiselle elsewhere. In 2017 they shipped it to London for exhibit about Parisian jewelry, nothing to do with aviation, a bizarre way to treat a unique, historic, and important survival of early aviation. Maybe the Le Bourget Demoiselle is one of the replicas from 1952, one of several near-identical copies.

**Mystery Ship #2** All details unknown are to me. Looks very well done. The pylon, frame, and wings are unusual and interesting. This appears to be a Demoiselle-inspired airplane, as per the tail plane shapes and wing recess. Anyone recognize the airplane, or the city? I suspect this is a custom-built U.S. or European ultralight. Congratulations to whoever designed and built this fine airplane.



### **Mystery Ship #3**

Michael Monson and his Dad built this replica in Bountiful Utah in 2016. The photo is from a defunct web posting. No further details are available.





## Commercial Airplanes Like the Demoiselle

### The Airdrome Aeroplanes Dream Classic



Airdrome Aeroplanes, Holden, Missouri, USA, run by Robert Baslee, makes kits for light planes based on WW I aircraft, for the Bleriot XI, and for the Dream Classic ultralight airplane. The wire-braced Dream Classic is most like the Santos-Dumont No. 20 among aircraft kits available today. If you want a new Demoiselle-like airplane, this may be the simplest way to go. Information is at <http://www.airdromeaeroplanes.com/thedreamclassic.html>



Photos are by Grass Strip Aviation, UK, of a plane built by their customers, with a unique Demoiselle-inspired rudder design, and fabric paint color.

In the fall of 2007 Airdrome Aeroplanes reported that 49 Dream Classics were flying; more recent figures are not available.

## The Robertson B1-RD



The Robertson B1-RD is an American ultralight which was sold from 1982 to 1984. Lee Fischer says “Glen Bashford and Harry Powers were all heavily influenced by the Demoiselle during the after-hours B1-RD design and prototype construction at the Robertson Aircraft Corp. circa 1980. In fact they even advertised a B1-RD made out to look a little more like a Demoiselle.” The construction was all aircraft grade, and the wooden propellers were handmade by Bob Blake. With a lot of exposed structure and wires, the response is a little slow, but this is also a true STOL aircraft, with flaperons. Take off runs are very short, about 75 feet (22 m).

Robertson was a manufacturer of commercial aircraft components. B1-RDs are still flown, and used ones in good condition can be found for sale in the U.S. For details see

[https://en.wikipedia.org/wiki/Robertson\\_B1-RD](https://en.wikipedia.org/wiki/Robertson_B1-RD).

Specs:

<http://www.all-aero.com/index.php/54-planes-p-q-e-r-s/9016-robertson-b1-rd>

Videos:

<https://www.youtube.com/watch?v=W1-2W5W40uU>

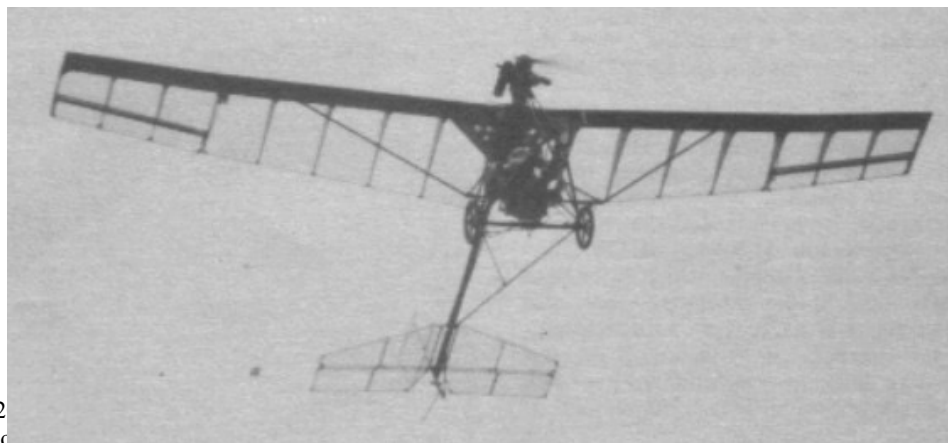
<https://www.youtube.com/watch?v=wXbonvavXNY>

<https://www.youtube.com/watch?v=Pp6cjcOosCQ>

<https://www.youtube.com/watch?v=DTpKYWnlspg> Arlington Washington 2012

## The Meadowlark

A clean, well-designed, and well-engineered U.S. ultralight by John Higgs. “Higgs completed construction of the Meadowlark in 1982 and showed it at the 1983 Sun’n’Fun exhibition in Florida where it was considered one of the best designs on the American market.” Covering was transparent Mylar on tapered, double-surface, strut-supported wings. The Meadowlark has full conventional 3 axes control and wheel suspension with springs. Structural limits +3.8 Gs and -1.5 Gs; glide ratio 8 to 1. Take off distance 75 feet and 1000 FPM max climb rate. I would like to know about, and have construction plans for, this forgotten but excellent design. See Meadowlark video at <https://www.youtube.com/watch?v=Q2h7VWdbY-0>, at 3:06 and at 6:02.



## The Flitplane

The Flitplane was designed by Ed Fisher, and built by Wings of Freedom Aviation. It was available from 1996 to about 2018 as a kit or complete airplane. Some 50 were reported as sold.

(Dan Johnson's report: <https://www.bydanjohnson.com/pilotreport/wings-of-freedom-flitplane/>;

<http://www.n-lemma.com/flitpln/flitb.htm>;

archived web site: <https://web.archive.org/web/20090617061703/> ;

<http://www.wingsoffreedomaviation.com/flitplanehomebuilding.htm>)



Flitplane photo from Dan Johnson

## Skycraft Scout



First built near Sydney, Australia by Ron Wheeler in 1975, and sold commercially until 1978. Improved in later versions up to 1978. The first video below shows a quick and agile style of flying and response very much in the spirit of the original Demoiselles. This machine is also, in configuration, power, and



weight, similar to Santos-Dumont's first design for the Demoiselle, his No. 19 (which did not fly). That is not to say I know Wheeler had any intention of basing his plane on any Demoiselle. This plane is remarkably light and simple. Wing span 28.5 feet, wing area 149 square feet. The Mark III had wing warping, a 18 to 35 hp engine, empty weight 130+ pounds, take off speed 24 knots, stall speed 18 knots, cruise 36 knots. Climb 180 fpm, duration 40 min. Sailboat hardware was used throughout, including masts for the wing spars. An improved Australian light airplane was the CAB Wasp, which in turn lead to changes in the Scout (see <http://celrprod.cit.edu.au/cit/file/6d66e5f5-918d-96ee-ca73-f3b76c0858ef/1/pdf/CABWaspAssignment2.pdf>).

Specs at <http://all-aero.com/index.php/54-planes-p-q-e-r-s/9873-skycraft-scout>

Videos:

<https://www.youtube.com/watch?v=7WONIHjrpNE> – from about 1978

[https://www.youtube.com/watch?v=d43-sVc1\\_uM](https://www.youtube.com/watch?v=d43-sVc1_uM) – “docile handling”

– also from about 1978, 21 minutes, 4 airplanes, with music from TMMFM, and a kangaroo.

[https://www.youtube.com/watch?v=c2\\_p4WnxELw](https://www.youtube.com/watch?v=c2_p4WnxELw) – “the worst airplane in the world”

[https://www.youtube.com/watch?v=9iVry\\_ao2r8](https://www.youtube.com/watch?v=9iVry_ao2r8) – 2015 video

<https://www.facebook.com/pg/9510aircraft/posts/>

## The Weedhopper and Others

There are many ultralights from the past 40 years which have a fair resemblance to the Demoiselle. One example is the Weedhopper, a popular U.S. ultralight “developed by John Chotia during the height of the 1970s ultralight boom and introduced in 1977.” It is often repeated that 13,000 Weedhoppers were sold, and some are still flying. The V tail and tricycle landing gear is of course not like the Demoiselle.



The Weedhopper. Photo by Dean Scott , 2007

Both the Meadowlark and the Weedhopper change the original Demoiselle configuration in having tricycle landing gear, which is easier to control and land. Whether the designers of the Flitplane, Meadowlark, and the Weedhopper were consciously inspired by the Demoiselle is unknown to me.

## How many “Demoiselles” are there now? Where can I get one?

There appears to be no surviving Demoiselle which is unquestionably a survival from the 1909-1910 period. The Le Bourget airplane is presented as if it were original, but there are seemingly several identical copies of it around the world, and they may have all been made in the 1950s.

More than thirty different custom-built Demoiselles “replicas” are shown here, built from the 1960s to 2019, varying greatly in authenticity and construction. Approximately ten or fifteen of these may have been or are now airworthy. Several have disappeared from public view since they were made.

There are Demoiselle-like commercial airplane designs, and perhaps more than 100 Demoiselle-like kit-built and commercial ultralight airplanes are in the U.S. alone. All of these were built to fly.

If you want a “Demoiselle” of your own to fly, you could buy an Airdrome Dream Classic, or consider a used Robertson B1-RD or a Flitplane. Lee Fischer's custom planes are close near-replicas in modern construction if you can build a plane from scratch. In Europe the APEV Demoichelle appears to be excellent, and is available as a kit and plans.

If you get one, learn all about engine and about aircraft maintenance. Put time training in flying a light stick-and-rudder tail-dragger airplane, such as a Citabria or Piper Cub. In the U.S. flying an ultralight does not *legally* need a pilot's license, but flying one successfully and safely *demands* training. There are special skills that apply to ultralights, and special hazards. In very slow airplanes, a wind gust from the rear can drop your airspeed below stall speed, meaning zero lift. Then what do you do?

The original Demoiselle was fairly advanced by the standards of 1909, but now it would be a very marginal flyer, with limited range and altitude, and very prone to breakages. If someone gave you a brand-new factory-made Demoiselle from 1910, there is a good chance it could not even lift you off the ground. We have learned a lot about aircraft design and construction in the 100 years since Santos Dumont. The more you fix and improve obvious weaknesses in the original Demoiselle to make an improved modern 'replica', the further you move from the original. The closer you copy the original, the less capable flying machine you make. There are modern light flying machines which look a lot like the Demoiselle and which are good flying machines, but an exact replica would be a sketchy and dangerous airplane.

An authentic replica Demoiselle would be an asset to an aeronautical museum, to show what flying was like in 1909. It would have main longerons made of bamboo poles and wing ribs made of curved bamboo stems, fabric covering of yellow silk, 20 inch diameter bicycle wheels with no suspension, a seat made of a cloth strap 4 inches above the ground, wire stays made of real single-strand piano wire, a wing span of 5.5 meters (18 feet), a wing area of 110 square feet (10 square meters), an airfoil with sharp leading and trailing edges, and an engine copied from the engine of August 1909.

## Did Santos-Dumont “Invent the Airplane?”

No. The Wright brothers had built three airplanes and flown dozens of miles under complete control, more than 100 times, for years, before Santos made his first wobbly hop. This was settled by 1910, as reported in the Parisian newspapers of the time.

Thanks to Lee Fischer (U.S. airplane designer and builder) and Roman Weller (professional German airplane designer and manufacturer) for their help and information, and to André Borges Lopes (historian and journalist) for his detailed reporting about replicas repeated at length above. Travis Roberts supplied the photo of the airplane now at the St. Louis museum, and Malcolm Fillmore sent the Wings over Miami photo.

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#### Report versions

original July 31, 2018

updates:

- Oct. 4, 2018 added the Les Demoiselles de St. Cyr Aviation Meet proposal (final page).
- Jan. 18, 2019 added the 1952 French replica account contributed by André Borges Lopes.
- Jan. 23, 2019 added MUSAL replica account & info contributed by André Borges Lopes.
- Feb. 28, 2019 added the Skycraft Scout, the Medve replica, and the St. Louis Museum replica
- Mar. 1, 2019 added the La Reunion replica, the Mystery Ship #4, and the Rene Mouret replica.
- Mar. 17, 2019 added Fábio Luiz de Almeida's 2007 Demoiselle
- Mar. 30, 2019 more about the Mystery Ships #3.
- Apr. 11, 2019 more about the Le Bourget airplane.
- July 29, 2019 added the photo from Malcolm Fillmore; some wording improvements.
- Nov 28, 2019 added the HBO "Santos Dumont" airplane.
- Nov 30, 2019 several small changes, and changed title.
- Dec 18, 2019 there were *two* replicas made for the Magnificent Men movie, and more about the Roman Weller Demoiselle II and the Airdrome Dream Classic.
- Jan. 22, 2020 wording changes, and more about the HBO "Santos Dumont" airplane.
- Oct. 26, 2020 added the Flitplane U.S. Ultralight. (from Ronald Smith).
- Nov. 27, 2020

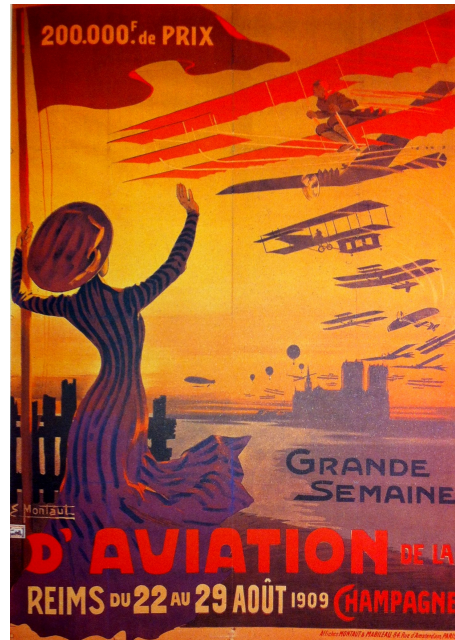
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## Les Demoiselles de St. Cyr Aviation Meet

I propose an international air meet in St. Cyr France, bringing together Demoiselle-inspired aircraft from all over the world, to recapture the spirit of the Demoiselle and of aviation in 1909. The event could be called “Les Demoiselles de St. Cyr – Une Grande Semaine d'Aviation” (The Ladies of St. Cyr – a Grand Aviation Week).

Santos-Dumont made his best Demoiselle flights at Saint Cyr. It remains rural, it's near Paris, and it has a small modern airport. A perfect place for a flying meet and a vacation. All we need is a staff for organization, a rich sponsor, and a graphic artist for an event poster something like these wonderful examples. Contests could be held for speed covering 10 and 20 km, greatest distance flown, shortest takeoff, people's choice, and more.



St Cyr web sites: airport (<https://www.parisaeroport.fr/en/professionals/business-aviation/presentation-of-the-general-aviation-aerodromes/saint-cyr>); town Saint-Cyr-l'École (<https://en.wikipedia.org/wiki/Saint-Cyr-l%27%C3%89cole> )