

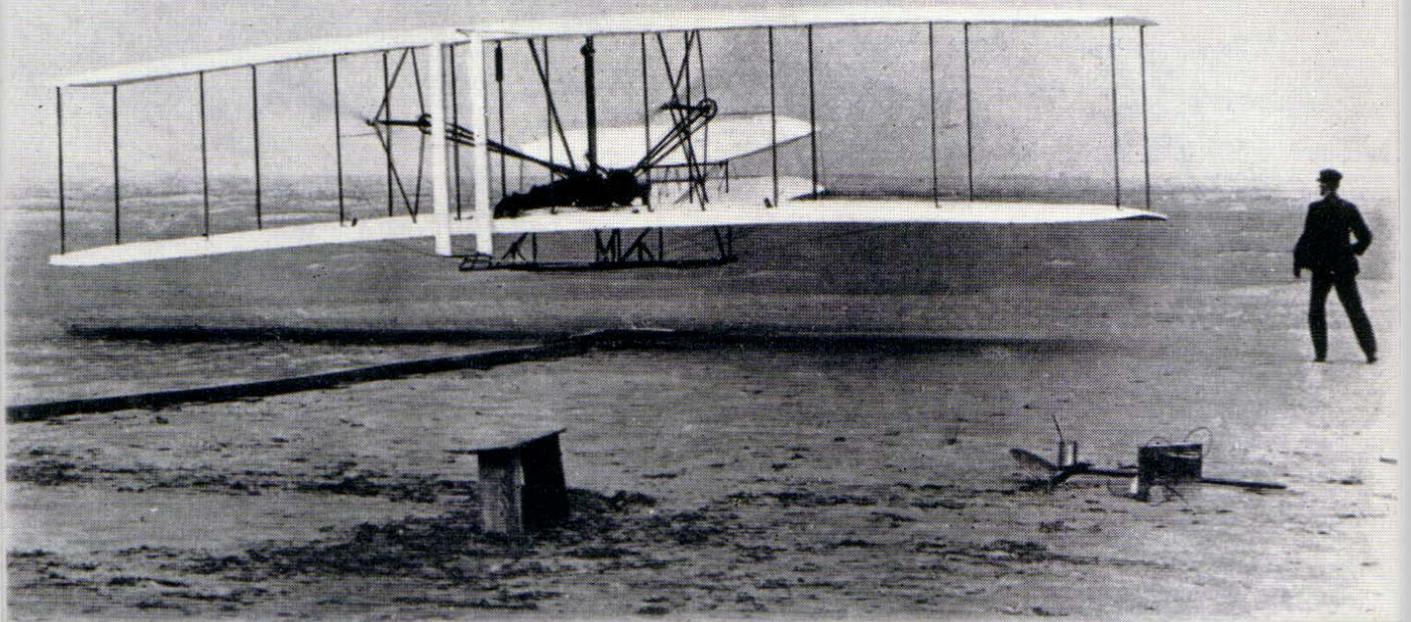
ON FINAL

EAA CHAPTER 25

Minneapolis/St. Paul, MN

January 2001

Dreams of Flight



Have you ever dreamed of flying the 1903 Flyer? The early Wright flyers are getting a lot of attention these days as the 100th anniversary of the first flight approaches. In this issue, we follow the progress of the Wright brothers as they get into the air and transform their prototype into the first practical airplane.

We also look at some modern-day plans to build and fly replicas of the early Wright designs.

Cleared for the Approach



By Frank Hanish

Happy 2001... aka; Y2K1. e.i.
Yankee Two, Kilo One.

We are going to start the millennium much like the recent new years past. This months gathering will be a "Project Review and Plans Night" We did some of this (though impromptu) at last months gathering. There was a below average number of members in attendance. So for most, there will be little repeat! Please come to the meeting. We will all share by giving project reports, etc. If you have a set of plans to show, then by all means please bring them. And of course, pictures are certainly in order.

I have been conversing with a prospective new member. Peter Denny is relocating to the U.S.A. from his native Australia. He is building an RV-6. My hope is that Peter can attend this month. He has offered, via a short presentation, to give us some insights as to the state of building an aircraft, and of general aviation for those in Australia. Welcome aboard Peter.

Plans for our February chapter gathering (Wednesday, 2/21/2001) have been confirmed. We will be treated to a presentation by Stacey Leen on her Air National Guard duty in Antarctica. Last year (about this time) Stacey spent a month stationed on "the ice." Stacey's present orders include getting her Flight Engineer rating. She is a graduate of the aviation program at what was St. Cloud State University. She is like us, all pilots just love to fly! This will be an excellent evening for inviting your family out to join in the presentation. It's not all about the guard, or of the flying challenges, in a remote place such as Antarctica. Stacey's presentation will certainly include the geography of the region, as well as the interesting wildlife captured within her photographs.

There is an upgraded version to FAA Advisory Circular 20-27 concerning the certification and operation of amateur-built aircraft. The FAA has asked that the public comment to their draft AC 20-27E by February 22. As of this writing, copies of AC 20-27E could only be obtained by calling the FAA Airworthiness Division in Washington DC at either 202-267-8361 or 202-267-9540.

There is no MN State Sport Aviation Conference & Flight Expo this winter. Official word from Wayne Peterson, MnDOT Office of Aeronautics is that they lost the venue for this years event.

So, remember ... January 17th you are to bring your plans and/or pictures. Then on February 21st invite your family to a presentation on Antarctica. Good flying.

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Flying Wright Replicas

by Pete Gavin

To me, a Wright flyer has a huge forward elevator, wing-warping, big slow propellers, rattling chains and sprockets, and lots of wood and fabric. I understand the purists, who insist that a replica be a replica, down to the last fitting. On the other hand, for many people, an airplane isn't an airplane if no one's flying it. For these folks, you build it to fly it, not to hang it on wires in some musty old museum.

All of the people involved in these projects love old planes. They have all faced those decisions: where to stay faithful to the design; where to use a modern substitute; how to make a design airworthy. The airplanes tell you who their builders are.

I only know about a few of the projects that I'm sure are being built out there. If you have a story about someone who is trying to get a Wright flyer in the air, please drop me an email at petegavin@mn.rr.com. Here are a few projects I've heard about.

AIAA Wright Flyer Project: In the 1950's, the Los Angeles section of the AIAA (American Inst. Of Aeronautics and Astronautics) built a replica of the 1903 flyer. After it was destroyed by fire in 1977, the group decided to construct a flying replica. As they studied the aerodynamic properties of the flyer with 1/6 and 1/8 scale models, their plans changed somewhat. They decided to build one real replica (see below right) to test in a wind tunnel, and then build a "near" replica to fly. The real replica was completed in 1995 and tested in the NASA Ames Research Center in March of 1999. They should be getting going on the near replica now. Check www.wrightflyer.org.

The Wright Experience: As part of its celebration of the 100th anniversary of flight, the EAA has commissioned this Warrenton, Va. Group, headed by Ken Hyde, to construct a replica of the 1903 flyer to fly at Kitty Hawk on 12/17/2003. Ken's past projects include two EAA Grand Champion projects, a 1918 Curtiss Jenny and a Clipped-Wing Monocoupe. Ken's group, the Wright Experience, has focused on rediscovering the secrets of the Wrights through reverse engineering. Look for updates at www.wrightexperience.com.

Wright-brothers.org Projects: This is a group of aviation enthusiasts dedicated to preserving and sharing the Wright story. They have built a most impressive website (www.wright-brothers.org) chock full of early aviation info. They have completed a flying replica of

(Continued on page 8)

Call for Young Eagles

by Mike Dolan

From EAA YE Office: Building on the success of our June Int'l Young Eagles Day, EAA's YE Program has scheduled another major flying day so young people can enjoy the excitement of flight. **The inaugural Winter Flight Fest is scheduled for Saturday, Feb. 3, 2001.** Pilots know that winter flying offers an entirely different perspective, especially for pilots who fly skiplanes.

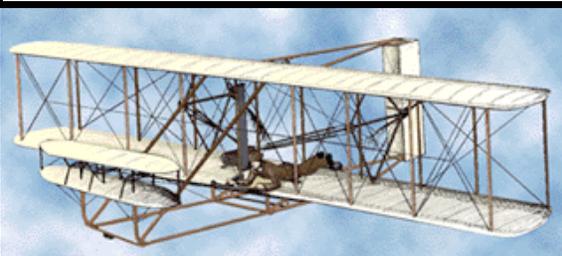
Our Chapter would like to participate in this February 3rd event to kick off our Young Eagle program for 2001. We have flown over 1000 youngsters since we first started in 1993. This program participation by our Chapter has been an ongoing success. We do need leads from Chapter members to continue this success. Do you know of any groups that we can schedule for a Young Eagles Event? How about your Children's (or Grandchildren's) church group, science class, Boy Scout or Girl Scout group? Call me at 952/652-2436 or email me at topgun@pclink.com with your leads.

This Month: Directions to ANG Bldg , MSP: Meeting Wed., Jan 17th, 7:00 p.m.

Eastbound on Hwy 62 past the light at intersection with Hwy 55. Take the exit for Fort Snelling. At the stop sign, the large gray federal building should be ahead and to your right. Continue straight through the intersection. Skip the next paragraph.

Westbound across the Mendota Bridge on Hwy. 55. Proceed on Hwy 55 and take the exit for Fort Snelling. At the stop sign, turn right, proceed under the bridge, and turn right again at the sign for Hwy 55 East. Proceed past the 2nd sign for Hwy 55 East directly to the stop sign ahead. You should see the large grey Federal building ahead and to your left. Turn left.

Follow Federal Dr to the right around the federal building and continue west to the next stop sign. The Air National Guard will be ahead at about your 10 o'clock. As you approach the guard shack, dim to parking lights only. Tell the guard you are here for the EAA Ch. 25 meeting. Go straight until you see a chapel on your right. The parking lot for the ANG center will be ahead on your left. Proceed to the center of the building to the briefing auditorium.



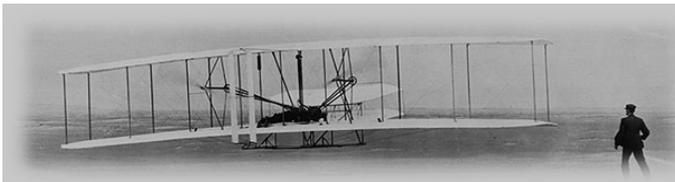
AIAA
"real"
replica

Dreams of Flight

By Pete Gavin

Sources for this article were Crouch's *Bishop's Boys*, Gibbs-Smith's *Aviation*, Westcott & Degen's *Wind and Sand*, Kirk's *First in Flight*, and the very awesome wright-brothers.com website. If you have questions about the source of any information, or have comments or corrections to offer, please email me at petegavin@mn.rr.com

Have I ever dreamed of flying the Wright flyer? You bet! This has long been a fantasy of mine, and in my dreams I would fly around the countryside, landing in open fields and taking people up for rides. I never gave much thought to the fact that the flyer had no wheels, but this was not a problem in my dreams. Over time I have gained a better understanding of the early years of flight, but the whole subject of the Wright flyers still holds a lot of mystery and wonder for me. Maybe this is because they remain part of the distant past.



1903—Getting off the ground

The 1903 flyer itself did not see a lot of service. The first test flight was actually on December 14th of that year. Wilbur allowed the nose to lift too high on takeoff and the machine dropped after 105 ft, with the left wing striking the ground. It took two days to repair the damage. They took off from a hill to compensate for the poor surface wind that day, and discovered how difficult it was to control the machine in a downhill takeoff.

They flew four more times on December 17th, this time on level ground with a headwind of twenty-some mph. Although the wind gusts made control in the air more difficult, it allowed for a lower groundspeed as the flyer became airborne, so that a wing runner could keep up until the pilot gained control. The famous picture of Wilbur standing to the side watching Orville in flight was taken on the first flight of the day. Orville managed to keep it airborne for 12 seconds before it hit the sand 120 ft out. The flyer was again damaged on landing, but this time the damage was limited to a cracked skid.

Wilbur managed 175 ft on the second flight. On the 3rd flight, at about the same distance a strong gust picked up the left wing, and Orville was pleased that the warping control worked to get the left wing back down before he hit the ground. The fourth flight was more successful. Here is the description from Orville's diary, with Wilbur at the controls.

“The machine started off with its ups and downs as it had before, but by the time he had gone over three or four hundred feet he had it under much better control,

and was traveling on a fairly even course. It proceeded in this manner till it reached a small hummock out about 800 feet from the starting ways, when it began its pitching again and suddenly darted into the ground. The front rudder [elevator] frame was badly broken up, but the main frame suffered none at all. The distance over the ground was 852 feet in 59 seconds.”

Keeping it quiet

Given the effort being devoted to flight in 1903, one would think that experimenters the world over would have soon repeated the Wrights' success. However, the Wrights kept their technical secrets very close, and even though accounts of their success were widely published, the lack of accurate detail and the lack of a public demonstration left a cloud of doubt over their claims. The Wrights would not publish important details until their patents were granted in 1906. It would be four years before anyone other than the Wrights completed a flight as long as their fourth flight on December 17, 1903. (Henri Farman was airborne for 1 minute and 14 seconds, covering a distance of 1,030 meters at Issy-les-Moulineaux, France in November 1907.)

To me, one of the most interesting aspects of the Wrights' 1903 work is how they reduced the number of problems they had to solve to become airborne. They understood the need for takeoff thrust, and they appreciated the tradeoff between engine weight and horsepower. By moving to the sand dunes of Kitty Hawk with its strong and steady winds, the Wrights gained an effective airspeed of 20 mph before leaving the ground. By leaving their carriage on the ground with the starting rail, they disposed of landing gear. Once airborne, their 12 hp engine would be strong enough to maintain airspeed. And landings in sand on skids would be short and soft. On the downside, at the end of every flight they had to haul their 675 lb. machine back to camp!

1904—Power for takeoff; coordinated turns

That small engine worked fine at Kitty Hawk, but power for takeoff was a major headache back in Ohio the following Spring. They built a new engine with a few more horsepower, and they extended the starting rail to 100 ft, but that was still not enough. The brothers lost many hours that summer on Huffman Prairie waiting for a decent headwind. Finally, in September they solved their

problem by building a catapult to launch the flyer. Imagine cranking a weight of 1600 pounds to the top of a 20 ft derrick as part of your pre-flight! But this technique did get the Wrights back in the air so they could work on flight control. As it turned out, the catapult would be a standard feature of the Wrights' canard design.



The "Derrick", still in use at the 1908 Army trials (wright-brothers.com)

During the fall of 1904, the Wrights launched from the catapult 105 times and learned to complete coordinated turns. During this period they added a long string to the elevator crossbar to serve as a slip/skid indicator. They flew their first complete circuit of the field on September 20th of that year, covering 4080 feet in 1 minute, 35 seconds. This averages out to about 29 mph. By mid-November, they were able to stay up for 5 minutes, circling the field 4 times. However, they still had problems with control, and according to Tom Crouch (*The Bishop's Boys*, p. 286),

"... accidents remained a daily occurrence and voluntary safe landings rare. The airplane was frequently operating out of control... [they] tried altering the center of gravity by moving the pilot position and engine slightly to the rear. Far from correcting the problem, the shift increased the undulations... they took steps in the opposite direction, loading twenty pounds of ballast beneath the forward elevator. This increased the period of the oscillations, and helped to counter the sensitivity of the elevator."

1905—Mastering pitch, getting it together

The brothers made a few changes to their flyer in 1905. They added vertical "blinkers" on the elevator to counter sideslip, and enlarged both the elevator and rudder. They changed wing camber back to the 1/20 ratio used in 1903 to improve lift (the 1904 flyer used 1/25). They also made changes to the controls. Up until that time, a lever to the left of the pilot was used to control the elevator, and the pilot's hips moved a warping cradle to control both wing-warp and rudder position. In 1905, a right-hand lever (forward for left rudder, back for right rudder) was added, and the rudder linkage to the warping cradle was eliminated.

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However, even with all the changes, pitch control continued to be a problem, and on July 14, Orville lost control and dove in at 30 mph. Orville was thrown forward through the top wing and landed in the debris of the elevator, "dazed and bruised". This was their worst accident so far, and the flyer had to be completely rebuilt. To improve pitch control, they enlarged the elevator surface by 57% to 83 sq. ft., and moved it from 7.3 feet to 11.7 feet forward of the wing.

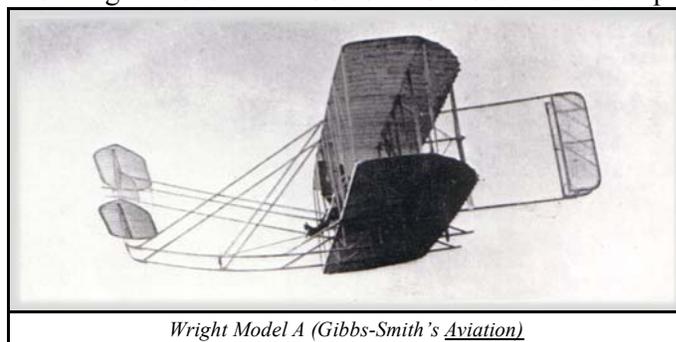
They were back in the air by August 24, and found a dramatic improvement. Their record time aloft jumped to 38 minutes in a flight covering 24 miles on October 5. No one else would match this time aloft for three years. (Henri Farman flew his modified Voisin-Farman I for 44 minutes, traveling a distance of 40 kilometers at Bouy, France in October of 1908.)

1906—Patents and a new engine

Because their patents had still not been approved, the Wrights continued to conceal details and refused to perform demonstration flights. However, they felt they now had a truly practical flying machine, and they focused their energy in on finding buyers and building a new, upright four-cylinder engine. By the end of the year they had received U.S. and foreign patent approvals and completed their new engine.

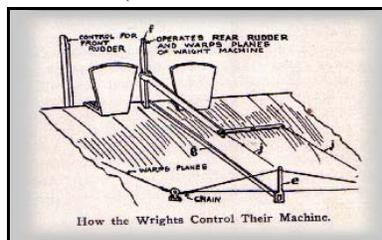
1907—Selling the idea, building the Model A

During 1907, negotiations with U.S. Army and French interests continued as the brothers began building parts for multiple airplanes that would later become known as the Wright Model A. Firsts for this model included up-



Wright Model A (*Gibbs-Smith's Aviation*)

right seating, room for two, the upright engine, outboard elevator controls for two, and a shared lever in the center for turns. This lever was moved forward and back for left and right rudder, and left and right for wing-warping control. (As shown below in Jackman's 1912 *Flying Machines*, p. 109.



On p. 436 of *Bishop's Boys*, Crouch describes the opposite arrangement.)

(Continued on page 6)

1908—Signed contracts!

In February 1908 the Wrights contracted with the Army Signal Corp to deliver a machine capable of 40 mph while carrying two seated passengers for 125 miles. Six weeks later, they contracted with French interests to build several airplanes and provide exclusive manufacturing rights in French territory. Two demonstration flights in France would be required, each covering 50 kilometers in less than one hour.

1908—Getting current at Kitty Hawk

The brothers had not flown since October of 1905, so decided some practice was in order before the contract trials. In order to avoid curious reporters, they shipped their 1905 flyer with the Model A changes to Kitty Hawk. On May 6 Wilbur completed the first flight with minor damage in spite of his rusty skills. For eight days they practiced flying, while reporters spied on their activities. At one point, they were observed taxiing under propeller power with the skids riding on a pair of wide-wheeled trucks.

On the eighth day they flew their first passenger, Charles Furnas. After a couple of dual flights, Wilbur went up alone, and flying downwind, lost control of pitch and made a hard landing at 40-50 mph. The airplane was wrecked, and although Wilbur was “thrown violently forward and landed against the top surface,” he described himself the next day as “practically uninjured”. This was the end of their practice at Kitty Hawk.

1908/1909—The Army trials with the Model A

Orville began the Army trials in August of 1908. After several weeks of very successful flights including new distance and altitude records, Orville suffered a cracked propeller in flight on September 17. When the distorted propeller cut a wire to the rudder, the left wing dropped and the flyer plummeted to the ground, killing Orville’s passenger, Lt. Thomas E. Selfridge. This was the first recorded casualty of an airplane crash. Orville was hospitalized for seven weeks.

Orville completed the Army trials the following June, exceeding by 2 mph the minimum speed requirement of 40. One quote from Benny Foulois, Orville’s passenger during the speed trial, reveals that the problem with pitch control was not entirely solved in the Model A. “The air was bumpy, and I had the feeling that there were moments when Orville didn’t have full control of the machine as we dipped groundward. It was as if someone on the ground had a string attached to us and would pull it occasionally as they would a kite. But each time Orville would raise the elevators slightly, and we

would gain back the lost altitude.”

By the way, if you get a chance to visit the National Air and Space Museum in Washington D.C., stop back in the early flight section. They show a film there that includes actual footage of the Model A in flight, and the apparent instability in pitch confirms Benny’s words.

1908—The French trials—world-wide recognition

Wilbur began the French trials, also in August of 1908, with a demonstration over the racetrack at Hunaudières. The problem of control in roll had plagued the Europeans for years, and the leading experimenters of France were on hand to observe. Although the Wright brothers’ superior airmanship was widely reported, neither the French aviators nor the French press could bring themselves to believe the claims. After a short flight of less than two minutes, including a couple of tight, coordinated turns around the track followed by a smooth, precise landing, the French were believers.

Wilbur stayed in France through the remainder of 1908, giving rides, training pilots under the French contract, and competing for prizes. On December 18th he set a new altitude record of 360 feet, and on December 31st he won the Michelin prize for a duration record of 77 miles in 2 hours and 20 minutes.

1909—Rheims—the world catches up!

In 1908 and 1909, the Wright brothers finally received the recognition they deserved. At the same time, once the public demonstrations began, the rest of the aviation world quickly adopted their methods. By incorporating the best Wright features into their existing designs, others quickly produced airplanes that, while technically inferior in many respects, were more practical for the typical pilot. After consulting with Wilbur, Louis Bleriot discarded ailerons for wing-warping in his new Bleriot XI monoplane, and crossed the English Channel in July of 1909.

In August of 1909, twenty some pilots gathered at Rheims for the now-famous aviation meet. Voisin, Farman, Bleriot, Antoinette, Breguet, Esnault-Pelterie, Wright, and Curtis airplanes were all represented. Crowds of several hundred thousand witnessed flight for the first time, and new records were set in every category. Glenn Curtis took long distance speed prizes at 47 mph, and Louis Bleriot took the short distance speed trophy at 48 mph. Farman took the distance trophy at 112 miles, and Latham in his Antoinette VII took the altitude prize at 508 ft. The Wrights chose not to compete, although three of their machines were represented. Clearly, the Wrights were no longer ahead of the pack.

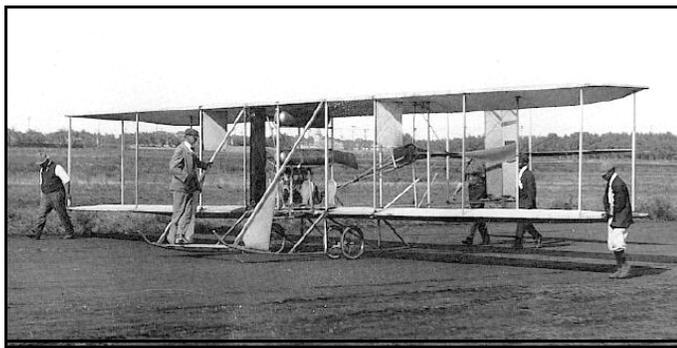
In retrospect, the Wright brothers picked one of the most challenging designs possible for their first airplane. The Wrights chose the canard design because of the natural protection it offered the pilot in stalls and uncontrolled landings. They had mastered the canard design during two years of gliding experiments, where they completed more than 1000 flights and set national gliding records for distance and time aloft. This experience prepared them to scale their design up to the size and strength of a powered machine. It also gave them the piloting experience needed to fly the powered version. But the unstable tendencies and narrow CG range of the canard design would make it difficult to adapt to the needs of less skilled pilots.



Wright Model A-B (tailplane added) (wright-brothers.com)

1909-The end of an era

In the fall of 1909, the Wright's began to experiment with a rear elevator. This was the first in a series of changes away from the key features of the Model A design. Here is a rundown of the major features changed by model and year. This information along with a number of the pictures on this page were found on the wright-brothers.com website.



Wright Model B (wright-brothers.com)

- 1909-1910 transition model A(-B), rear elevator added
- 1910 early model EX, wheels added
- 1910 model B, wheels added, elevator moved to tail
- 1913 model E, went to a single propeller
- 1913 model F, enclosed pilot in a fuselage, first T-tail

- 1913 model CH, model C with a single pontoon
- 1913-1914 model G, first Wright flying-boat
- 1915 model K seaplane, first Wright tractor design, first Wright design to use ailerons
- 1916 model L, last Wright design, conventional tail-skid, tractor biplane with ailerons



Wright Model L, manufactured the year after Orville sold the company (wright-brothers.com)

Wilbur died of typhoid fever in 1912, leaving Orville to manage the business. In 1915 Orville sold all remaining rights including the Wright company name to a group of investors. The surviving company reemerged as the Wright Aeronautical Co., a very successful manufacturer of aircraft engines during the 1920s. The 1903 flyer was put on display at the Smithsonian following Orville's death in 1948. The 1904 flyer was burned. The 1905 flyer was restored and is displayed in a Dayton museum. The only known surviving Model A is stored in the Deutsches Museum in Munich.

When the Wright brothers began their experiments, they promised their father that they would never fly together on the same airplane. They broke that rule only once, on May 25, 1910, the same day they took their father up for his only ride.



Wilbur training a French pilot in 1909 (Crouch's Bishop's Boys)

Note-EAA-M's

Notes to EAA Chapter 25 Members

Chapter Gatherings

**Jan 17—EAA Chapter 25 Meeting
Project Review & Plans Night
7pm, MSP ANG Pilot Briefing Rm
North side of MSP**

**Feb 3—EAA Young Eagle Winter
Flight Fest Ch 25 site(s) tbd**

**Feb 21—EAA Chapter 25 hosts a
presentation on Antarctica by
Stacey Leen
7pm, MSP ANG Pilot Briefing Rm
North side of MSP**

Fly-Ins / Special Events

Jan 13—Eden Prairie, MN
Proposed Class B Airspace Mods
Hennepin Tech College
Flying Cloud Campus

Jan 16—HHH Metrodome 3-7pm
MMAC Model Airplane Flying
Jim Ladwig 612-920-1245

Jan 21-22 - Chicago IL
Chicago Aviation Expo 2000
Northbrook Radisson Hotel.
Info: 847-573-0919

Jan 27—Iola, WI (68C)
EAA Annual Ski Plane Fly-In
Central County Airport
Norm Peterson 920-426-6530

Feb 17—FCM, Charlie Lane
Mid-winter Pancake Breakfast
Stan Getten hangar

Apr 8-14 Lakeland, FL.
Sun 'n Fun EAA Fly-In

EAA Workshops

Jan 20-21 Oshkosh, WI
Many different topics
800-967-5746 or check
www.sportair.com)

Wings Safety Seminar

Jan 10 Inver Hills Comm College
7-10 p.m. Topics: Aircraft Icing,
Multi-Engine Operations,
Aircraft Weight & Balance

Flying Wright Replicas

(Continued from page 3)

the Wright 1902 glider (right) that is used in a traveling educational program. They are also sponsoring a 1903 flyer replica contest in



Carlisle, Ohio on July 4, 2003. Builders of static and flyable replicas are invited to compete for trophies in a number of categories. Builders of replicas with airworthiness certificates and insurance will be allowed to fly them.

Wright-brothers.org 1905 Flyer Project: Wright-brothers.org is working with Wright Recreations and Ohio schools to build a flying replica of the original 1905 flyer now housed at Carillon Park in Dayton. Children will be trained to build ribs for the replica. When completed, the replica will be flown as part of a program to recreate Huffman Prairie. This project includes a catapult that will be used to launch the flying replica. The current schedule calls for aircraft certification by the FAA in mid-2002.

Wright Recreations, Inc: In 1996, Dana Smith and Ken Whiting decided to reproduce the last of the Wright canard aircraft, an early Model EX with wheels. They say their EX is the first Wright canard design to fly in over 80 years. They have also built a late Model EX Vin Fiz reproduction. Both will be airworthy and fly cross-country. The full story is on the wright-brothers.org website. Just follow the virtual hangar links.



Wright Recreations Model EX is above, Vin Fiz below



Stuff for Sale

For Sale: George Jevnager's RV-6A partners are selling their half. Plane located at FCM. Contact George @ H. 952-933-2485

FOR SALE - Complete set of Hummelbird plans and 7-hour construction video. Value--\$255. Price--\$150. Contact Dick Reinke (952) 888-7065 <dreinke@uniquel-software.com>

Wanted: PA-11 or J-3 project with at least 85 hp eng. \$100 finders fee, if purchased. Call Larry (EAA #560368) 800-439-6038 fax 218-439-6246

For Sale: J-3 project in Hutchinson, MN No engine, prop, data plate or logs. Fabric removed, splices in longerons. Instruments and tanks in unknown state. Owner working on SuperCub project. Contact Jim Weekman 234-587-1114