

Motivated by Madison

Building a Mini-Waco

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After being introduced to model airplanes at age 5, I was hooked on aviation. I worked for Goodyear Aerospace after graduation from Tri-State University, with a bachelor of science degree in electrical engineering in 1962, designing flight simulators for several Navy jets. I taught at a vo-tech school for four years and was co-founder of a business called Matric Limited, providing electronic equipment design and manufacture, until retirement at age 50. Later, I became a flight instructor and began training students for private and sport pilot certificates. In between, I designed and built airplanes. I built an ultralight (Grasshopper), an ultralight trainer kit (Preceptor Ultra Pup), one of two two-seat monoplanes with folding wings (Mitchmait I), and now my latest, the Mini-Waco.



The design and development of the Mini-Waco Cabin began in 2002 when I received a three-view drawing of a 1936 Waco Cabin YKS-6 from EAA headquarters. I made a pedal plane for my granddaughter, Madison, who was almost 3 years old. I liked it so much I began drawing prints to build a three-quarter semi-scale Waco Cabin for me to fly around in. The semi-scale was necessary to move the entry door from the left side to incorporate two doors accessible in the front, enabling two people to ride side-by-side. (From 1,000 feet and 75 years since the original took to the air, no one can tell. Only the old-timers and history buffs will know the changes.) I also had to make the fuselage 8 inches wider than three-quarters scale.

I received the airworthiness certificate on December 6, 2006, after three years of building. Being retired, I spent much time designing and fabricating the Mini-Waco. The

aircraft is powered by an AeroVee 80 hp converted VW kit from Sonex, swinging a Sensenich wooden propeller. Inside the cockpit you'll find an electric "elevator trim" system (modified Sears electric screwdriver), a Lowrance GPS 1000, an Icom-200 transceiver, and a Sigtronics Intercom. The plane weighs 690 pounds empty and has a 1,250-pound gross weight.

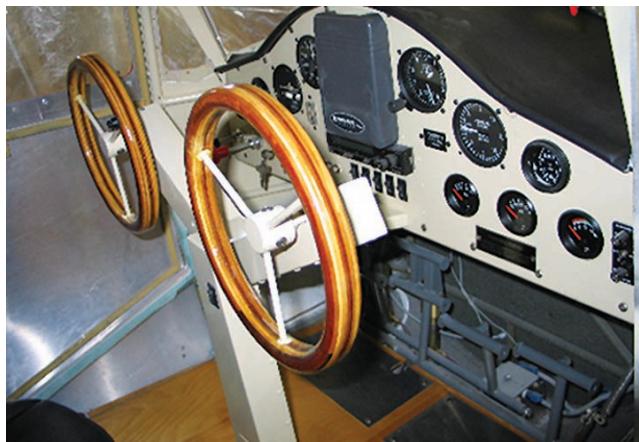
The wings are made from 2-inch diameter 6061-T6 aluminum tubing, with a 0.063-inch wall for the spars, both front

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and rear. Wingspan is 24 feet for the top wings and about 20 feet for the bottom wings. Ribs are made from tubing and are held together with spacers and pulled rivets. All aluminum was 6061-T6, and the steel for the fuselage frame was 4130N. I used 1/16-inch Lexan for the windows. An 8-inch Maule tail wheel replaced the Matco 6-inch. It seems easier to steer on the ground.

To date, I have worked out some minor bugs, such as removing the dual wheel yokes and replacing them with one stick for roll leverage, adjusting the stabilizer to ensure taxiing is only taxiing and not the first flight, and adding some baffling to keep the engine within the ratings listed.

All that remains is flying the 24 more hours left on the assigned 40 hours after the weather warms up, and the annual is completed. It's a joy to fly even though my head sometimes hits the brace where the two external wing struts



attach to the upper part of the fuselage. However, it seems a small price to pay for an airplane under \$20,000, less labor.

The Mini-Waco, which I named *Miss Madison*, is fun to fly and gets better as I adjust to the biplane. The "N" number is Madison's birthday: 5599. It's amazing what one granddaughter can cause a plane-nut grandfather to do.

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