

Take the Sig Miniplane and enlarge it to giant scale proportions, and you have a practical and easy project for the weekend monster basher.

# MAXI-MINIPLANE

By the Committee of: Jim South, Bill Howe, Bob Stegemiller and Curt Dunbar

Photos by Jim South

This article is about an airplane built by a committee. Ignoring all old "committee" jokes, building a monster plane in this manner has advantages, the most obvious being the monetary investment and the speed with which a project of this magnitude can be completed. Everyone has their forte when it comes to R/C modeling, and careful selection when forming the committee can enhance the benefits.

Jim South, an engineer, and an excellent builder (whose roots date back to Buzzards, Comets, and Zippers) designed and built the basic airframe. Jim's only fault lies in the fact that, to him, airplanes are only pretty in the uncovered state. Bill

Howe, a businessman, is a finisher—and the driving force behind the completion of our projects. Bob Stegemiller, a physician, has a broad base in modeling and is the most versatile flyer in our group. Curt Dunbar, an engineer, usually gets the dubious honor of the "first flight."

Last year, this foursome built a Nosen Gere Sport. With this forgiving flying machine, we furthered our education in quarter-scale. We proved and disproved many theories but, due to the gentle disposition of this airplane, it remains intact and has logged over 140 flights . . . without incident. From this experience, we established several guidelines for our second project:

- 1). The plane would be built around a Quadra-sized engine.
- 2). The plane must be easy to fly, with a light wing loading (to

maintain friendship among the committee).

3). The most beautiful monster airplanes must have two wings.

The result of several committee meetings was a maxi-Smith Miniplane. Ours is basically two times the size of the Sig kit, and we would recommend that plans for the smaller version be purchased from Sig. If you build the .40-size model, you will find that you have a superb biplane (see *Scale R/C Modeler*, August, 1977) with classic modern day proportions.

Our plane was built to a scale of 5 1/4"-to-the-foot, resulting in a wing span of 88 5/8", with 2600 squares. The body measures 6 ft. 8 in., and will fit in a 1979 mid-size Chevy Malibu Wagon. Our prototype tipped the scales at 25 pounds but, with more careful selection of balsa for the tail, 2 pounds of nose weight

could be eliminated. The plane is very stable, easy to fly, much like a Quadra-powered Gere Sport. It's destined to keep the committee friendship intact.

## CONSTRUCTION NOTES

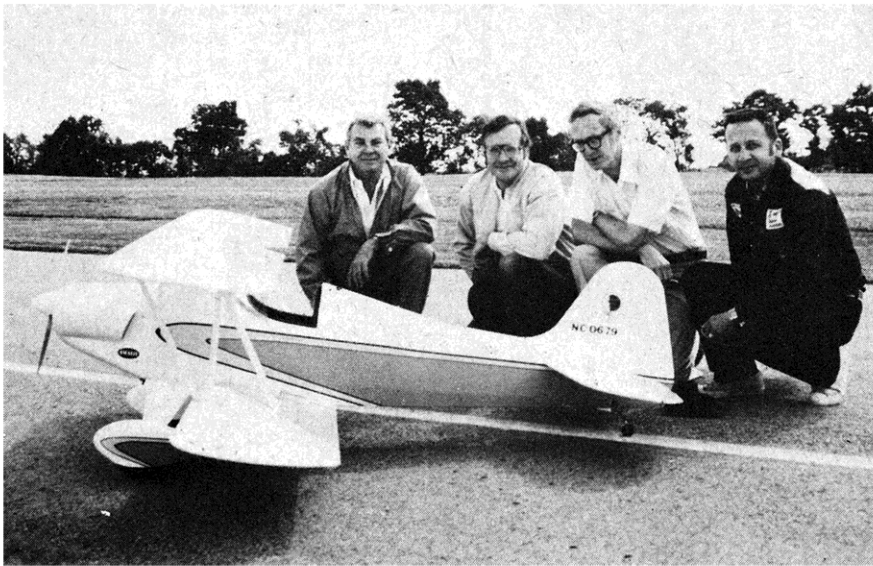
The plans for Frank Smith's cute little 1957 design are available in giant-scale size from: Hal Osborne, 1932 Conejo Lane, Fullerton, CA 92633. Price \$18.00. Technically, the biplane is known as the DSA-1 ("Darned Small Airplane"), and the tiny homebuilt spans only 17 feet. Amazingly, it's stressed for 9 1/2 Gs, and the original 100 hp plane was capable of a top speed of 120 mph.

Fuselage construction is the conventional box method. Medium to light balsa sheeting is used throughout the entire airframe, except in the obvious areas marked on the plans. Join the sides over the top view, using formers F2 and F3A to insure alignment of the front end.

Complete the front end basic structure before the aft end is brought together. Add all diagonal interior cross bracing before removing the framework from the board. Add re-







*The committee proudly poses with their creation. The four specialists got together to make a significant contribution to quarter-scale modeling.*

maining formers, cabine support box and finish the remaining structure as per the plans. The cowl and wheel pants are fiberglass, and are available from the address shown on the plans. Be sure to cover the firewall and access hatch with light gauge aluminum. Quadras are known to be fire breathing monsters, and this will add some heat protection, as well as reducing any possible radio interference.

Wing construction is also conventional and very easy, using the rib alignment tabs. To install the blind nuts for the N-strut clips, sheet the bottom of the top wing and the top of the bottom wing; add N-strut pads and supports; then drill and install the 2-56 blind nuts. Ailerons are constructed as part of the bottom wing. They are cut out and capped after the wing is sanded.

The tail is a balsa and spruce sandwich (glider technology) which we have found to be light, strong and resistant to vibration. The use of the tail braces shown are both scale and functional.

Assemble the cabine wires to the 3/16" plywood wing mounts. Install in the body and then assemble the entire airframe. After aligning all the flying surfaces to 0° - 0°, bend and solder the cabine diagonal braces. A cross-brace on the front cabane wires should be installed, using threaded rods and clevises for adjustment. Recheck alignment, and adjust as necessary.

The basic airframe was sanded, treated with Balsarite, and covered with white Permagloss Coverite. The color scheme, executed in light blue and yellow SuperPox, is somewhat similar to the EAA Acro Sport. One good thing about modeling a home-built is that, generally, no two of them were ever painted alike. One of our committee just returned from

Oshkosh, where he examined five Miniplanes at the annual Fly-In. All five had different paint schemes, so just pick your favorite colors and enjoy the results.

The black striping tape was bought in the automotive department of the nearest discount store for 79¢ a 40-foot roll. Remember that the residue from gas engines is very easy on decorative trim, and does not require the normal amount of fuel proofing. However, we have found that exhaust residue will stain white Permagloss so, if you object to this built-in "weathering," you may wish to fuel proof the fuse bottom and bottom wing center section.

We also coated the N-strut clips and inside of the cowl at attachment points with a thin coating of silicone rubber, to prevent abrasion of the Permagloss at these points. We used live hinges throughout, as we have had the normal pinned type break from vibration-induced wear.

Our radio installation is stock Futaba, using the larger S-7 servos. We use one servo per aileron, and we would suggest two servos on the elevator (one per each half). The radio is encased in a foam-lined balsa box, and the antenna is routed inside the body.

#### NOVEL FEATURES

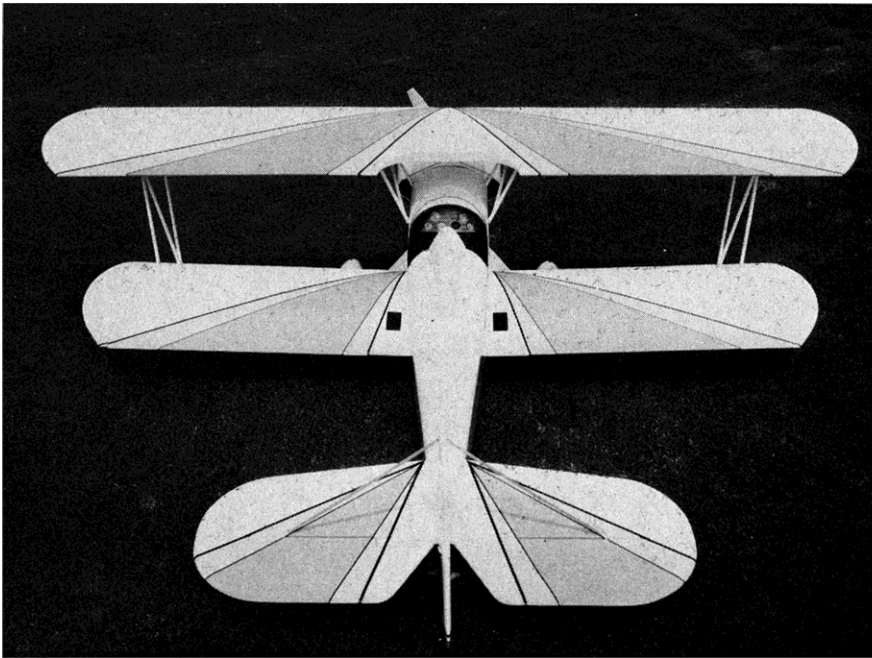
Anyone who owns a Quadra knows how much they like to be choked and this presents a problem on a fully cowled installation. The solution is simple, requiring a brass hinge, two large safety pins, an automotive door bumper and a little ingenuity. The safety pins are cut off and used as springs to keep the choke normally open. The neoprene rubber bumper pad is snapped in a 1/4" hole drilled in one side of the hinge. The hinge is mounted to the carburetor, using existing screws.

After our first couple of flights, we realized we needed some additional nose weight. Instead of just adding dead weight, we decided to add a functional exhaust pipe to our Quarter Headquarters muffler. Since a light weight flexible pipe with a 3/4" i.d. is difficult to find, we simply used a variety of common household 7/8" copper pipe and fittings. After adjusting the correct angles we simply tacked everything together with small #2 pan head screws. After removing from the plane, the whole system was silver soldered into a solid (but heavy) work of art.

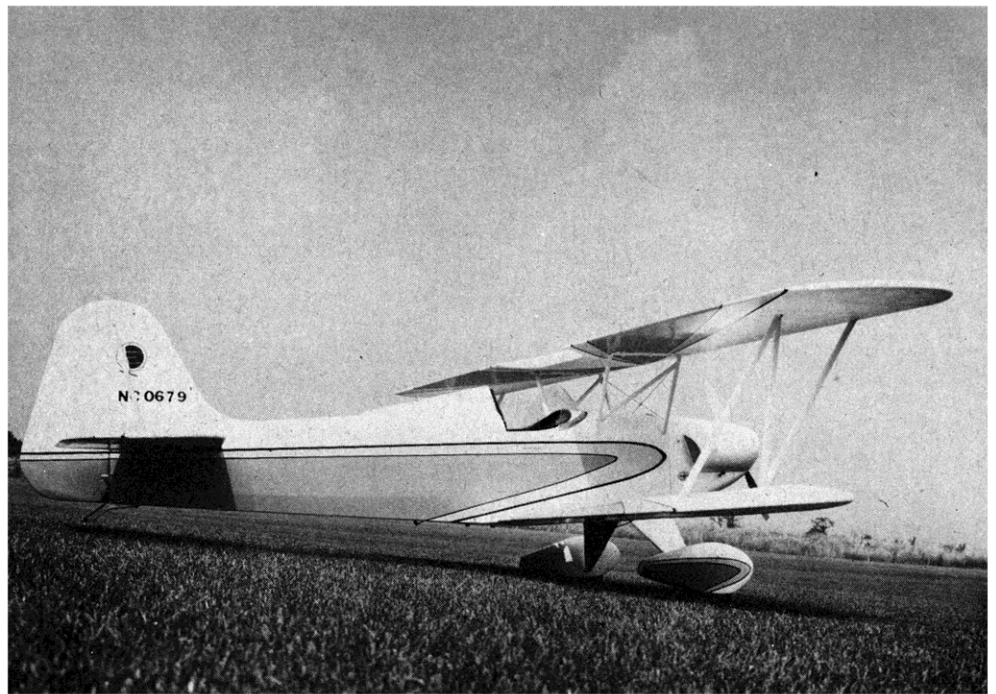
We used a standard C.B. Associates tail wheel assembly, replacing the light gauge leaf springs with a piece of .040" spring steel. Actually we used titanium (a fitting aerospace material) but realized that any material capable of supporting the tail of a 25 pounder will do the job. These big planes should not be "three pointed" on landing, but rather "flown in on the mains" so the tail wheel will probably get more abuse from the ruts in your field taxiing to and from the runway, than when making correct landings.

To mount a spinner on a Quadra requires a bit of drilling and tapping. The front plate of the EWH prop hub is tapped 3/8-16 and fitted with an aluminum stud (taken from a discarded plastic commode seat). The stud is drilled and tapped to accommodate the 8-32 screw that holds the Midwest spinner together.

The landing gear is a conventional arrangement, with the exception of the tie wire, which extends through the body and around a heavy piece of garden hose. Small sections of wire pin the gear to the body, and prevent it from sliding sideways. Our first gear was made of 3/16" music wire but, in trying to stretch the glide to reach the runway, we made



*Constant-chord wings ensure rapid building. Although there have been modifications to the original Sig design, the Miniplane still preserves that easy buildability.*



*Frank Smith's little biplane emphasized simple, yet flowing lines, and it has become a classic in the two-winger fraternity.*

one of those "three pointers"—convincing us that something stronger was needed. Thanks to the availability of Sig's 7/32" wire, our second gear hasn't shown any weakness in the 30+ flights put on since the change. After you finish bending the 7/32" wire, you'll appreciate how much force a hard landing puts on the airframe. Do not use heat to make this job easier, as you will destroy the inherent strength of the cold drawn wire.

#### **OUR FIRST FLIGHT**

After struggling through the first 20 flights last year with a grossly underpowered Gere Sport (a bad experience with a prop drive) we felt we were ready for anything the

Miniplane had to offer. Most people, preparing for the first flight, are only risking time and money but, in our case, add the friendship and/or wrath of three flying buddies. There really wasn't any need to worry, as the Smith is really just another Gere Sport in disguise. The only fault that we could find with the first flight was a slight tendency to fly nose high and a slight sensitivity to pitch control . . . indicating a need for more nose weight. These big bipes have a tremendous amount of drag at any positive angle of attack, so remember to keep the nose down.

After adding a pound and a half of lead and our exhaust pipe, the Smith became a solid flying machine and we were ready to opti-

mize the power of the engine with prop selection.

One thing that we have learned about large airplanes is the importance of prop size. It is dependent upon many factors, such as engine power and uncovered frontal area. A change in props will make you think you're flying a different airplane. We first tried an 18-6 Grish, and found the plane barely comfortable to fly. An 18-8 EWH was not much better, but we got a substantial improvement with a 20-6 Zinger (more uncovered frontal area). After a half dozen flights, our enthusiasm waned and we began to talk about what we could do to get more power. By cutting the Zinger down to 19-6, the Smith became a solid flying bipe. We



*The 88" span biplane has 2,600 sq. in. of area, and comes out at a projected weight of 26 pounds. As with any biplane, the more cubic inches you can pack under the cowl, the better aerobatics will be.*

are getting 7400 rpm with our older Quadra, which has over 25 hours of flying time on it.

The Smith will take off in about 30 feet, or will run tail-high the length of the runway—until a slight tap of up breaks it skyward. It can best be described as mildly aerobatic . . . capable of loops, spins, snap rolls and beautiful stall turns. The ailerons are more than adequate for normal flight, with the rudder required only for takeoffs and cross-wind landings. It is the perfect "scale" project for four non-scale Sunday fliers, like ourselves.

After attending several "fly-ins" in our area, we have found that the Maxi-Miniplane will attract a great deal of attention. This is largely due to its size, bright color scheme and the intrinsic appealing lines of the plane's design. We are now seeking ways to increase the power of our Quadra to enhance the aerobatic qualities of the Miniplane. Everyone who has flown this plane, including Dave Brown and Don Lowe, agree that the Maxi-Mini is truly a delight to fly. □