

Der "Volsplane"

by Gene Rogers

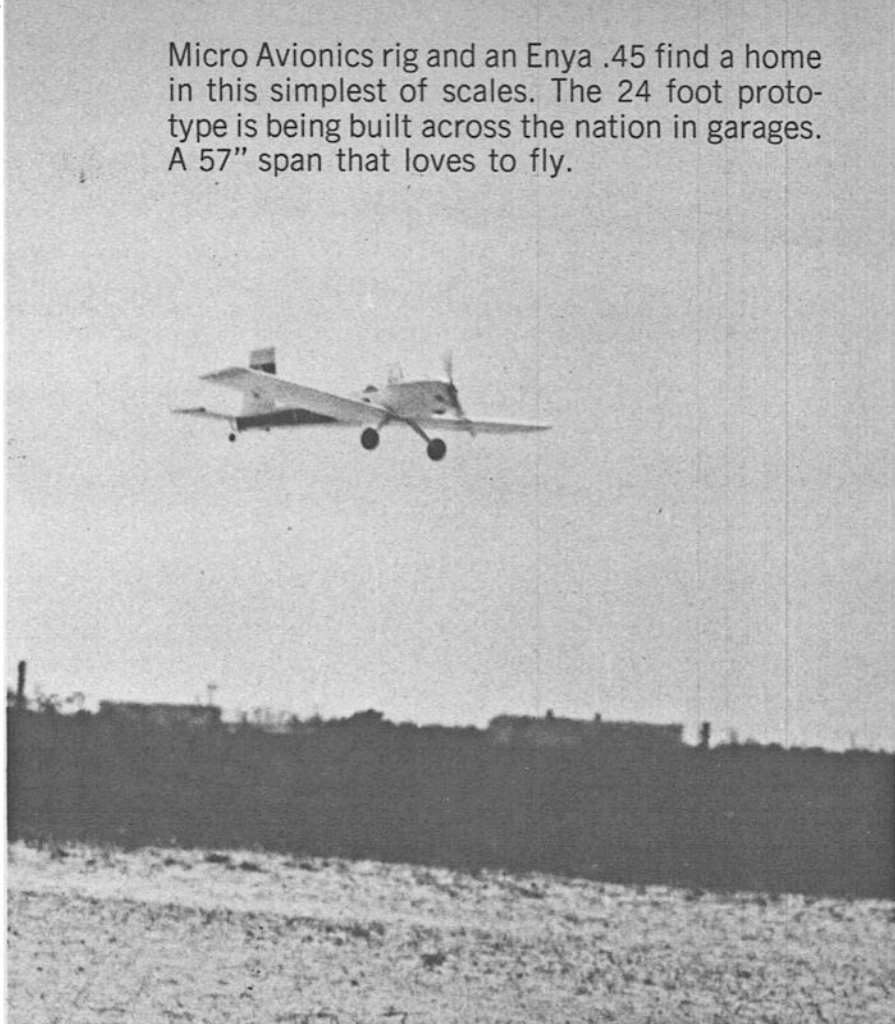
Simplicity should be the objective for all good designs and Mr. W.S. Evans' efforts reached the pinnacle of this goal with his extraordinary "Volsplane" homebuilt. The elimination of difficult aircraft construction techniques and much expensive hardware was obviously his objective.

Simplicity and low cost again show their evidence in Mr. Evans' selection of a powerplant for the plane. Since the Volkswagen engine's design and materials more closely follow aircraft concepts rather than a standard automobile powerplant, it is a natural choice for low powered inexpensive aircraft use.

Aside from stripping the accessories from a standard VW engine, the only real modification is the addition of a magneto to replace the distributor. The engine is bolted directly to the aircraft's firewall, using four bolts, without need for a special aircraft type engine mount.

A .35 would easily do the task, or .45 power for a flyer who wants to turn loose. The full scale "Volsplane" is not exactly highly powered.

In a violent wind the model "Volsplane" aims in on first test flight. Twenty knots doesn't phase it much. Ship is light, clean, penetrates.



Photos by Don McGovern





Taildragger gear is well placed, tracks well. Ship is fully acrobatic.

The Volkswagen engine is mounted in the airplane in the same manner in which it is mounted in the car; that is, with the rear of the car being the front of the airplane. A propeller hub replaces the pulley normally used to drive the engine's generator and cooling blower. This all sounds fine, but this leaves it with a clockwise propeller rotation. This deviation is corrected by using a left handed propeller, as on many European aircraft.

If you're a real scale purist, and you want to duplicate the left handed prop, get yourself a clockwise rotating model engine. Just don't forget to hold LEFT rudder on takeoff!

Mr. Evans' thought in mind was the "easiest-to-build" basic aircraft possible, and my objective with this R/C replica was the same. He wanted more people to give home-building a try, and I also am hopeful more modelers will enter into scale R/C flying through this extremely easy to build and flight-worthy aircraft.

The plans to the model "Volkspplane" are true to scale, with two exceptions. The stabilator has a longer span to give more stability and the wing's airfoil is semi-symmetrical, rather than having a flat bottom. I am certain the ship would fly without changing either of these, but the beginner in scale flying would have some difficulties. The size of the full scale ship's stabilator is about average, however, when scaled down to model size it is not quite large enough, when considering Reynold's numbers. A small stab makes for very tricky turns, resulting in a stall if rapid flying speed is not maintained. The flat bottomed airfoil when applied to a model does not allow a small change in angle of attack without increasing the lift drastically, making pitch control difficult to trim.

A complete packet of information concerning the full-sized "Volkspplane" can be obtained by sending \$2.50 to: Volkspplane, Box 744, La Jolla, California 92037.

This information will give the builder further scale details and will serve as documentation for "proof of scale" as required for AMA scale contest participation.

In selecting a proper size for the model, a scale of 1/5 the actual size was used. The more common 1/6 size (2 inches to the foot) would result in a model having a 4 foot wingspan, which is a little on the diminutive side for an R/C scale model. As can be seen in the photos, my model has all the scale trim details and leaves only a dummy engine to complete the picture. Before the model enters scale competition however, dummy VW cylinder heads will be attached to the fiberglass cowl. These heads will be fastened on from the inside of the cowl and will be removable for knock-about sport type flying. The information packet as mentioned above contains some good illustrations of the VW engine.

Since the construction is relatively simple, it should be just about "ideal" as your first scale project. Even if you're not an all-out scale enthusiast, a truly scale model can be created with hardly much more effort than is required to build the typical R/C trainer.

In building the "Volkspplane", the results of your efforts will be rewarded with a good flying aircraft, without having the usual scale flying limitations as with most other scale R/C designs. With a .45 sized powerplant installed, the ship will perform stunt maneuvers with the best of the hot jobs. When the wind blows at the scale contest, the way it usually does, grounding half of the entries, you will be flying your "Volkspplane" with ease and confidence! In reality you will be entering scale competition with a ship having all the capabilities of a pattern ship.

The "Volkspplane" was test flown on a very windy and blustery day. From the first moment when the ship tracked

straight and true on a near-perfect take-off, I could tell I had command of a real performer. The entire flight gave absolutely no evidence of the turbulence the ship was boring through. The only indication of the wind's velocity was the rapid downwind passes. With the wind blowing at 20 knots and gusting as well, I flew the model in on a landing approach at about one-half power. Once over the runway threshold, the power was cut, with enough speed left to make a smooth and safe wheel type landing.

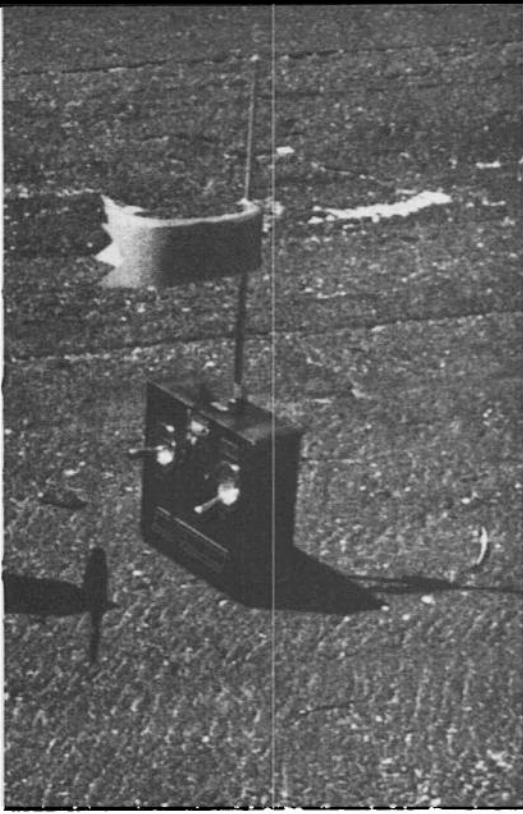
As mentioned, the construction of the "Volkspplane" is about as uncomplicated and as straight forward as can be had with a scale type R/C plane. So let's clear the workbench and get started. Even if you aren't planning on building one now, read on. (Gems of wisdom buried here and there ... Ed.)

Wing Construction

The wing should be constructed in one piece on a building board which allows the dihedral to be built-in. The model has a scale dihedral of 5 degrees. This amount of dihedral gives no problem incidentally, when the model is in an inverted attitude, a maneuver which it handles well.

Select hard balsa for the wing spars and leading edges. Use medium balsa for the ribs and capping. The leading and trailing edges are propped up with blocks as shown on the sectional view of the wing as indicated on the plans. Make certain the leading and trailing edges are warp-free when blocking them up, so that they may be positioned directly over the plans.

The landing gear platform in the center-section of the wing can be best installed after the wing is removed from the building board or wing jig. When installing these two pieces of laminated plywood, final and



accurate notches can be cut in the wing ribs to receive them and insure a good joint for assembling.

All hardwood parts of the wing should be epoxied in place. This is a must for the landing gear platform and wing dowels. The center-section of the wing receives further reinforcement by being covered with fibreglass cloth and Hobbypoxy Formula II cement.

The sheet balsa covering on the leading edge of the wing can be preformed and reinforced by brushing a few coats of clear dope to the underside of these sheets before cementing them to the ribs. The dope will not only reinforce the balsa, but its shrinking qualities will contour the balsa.

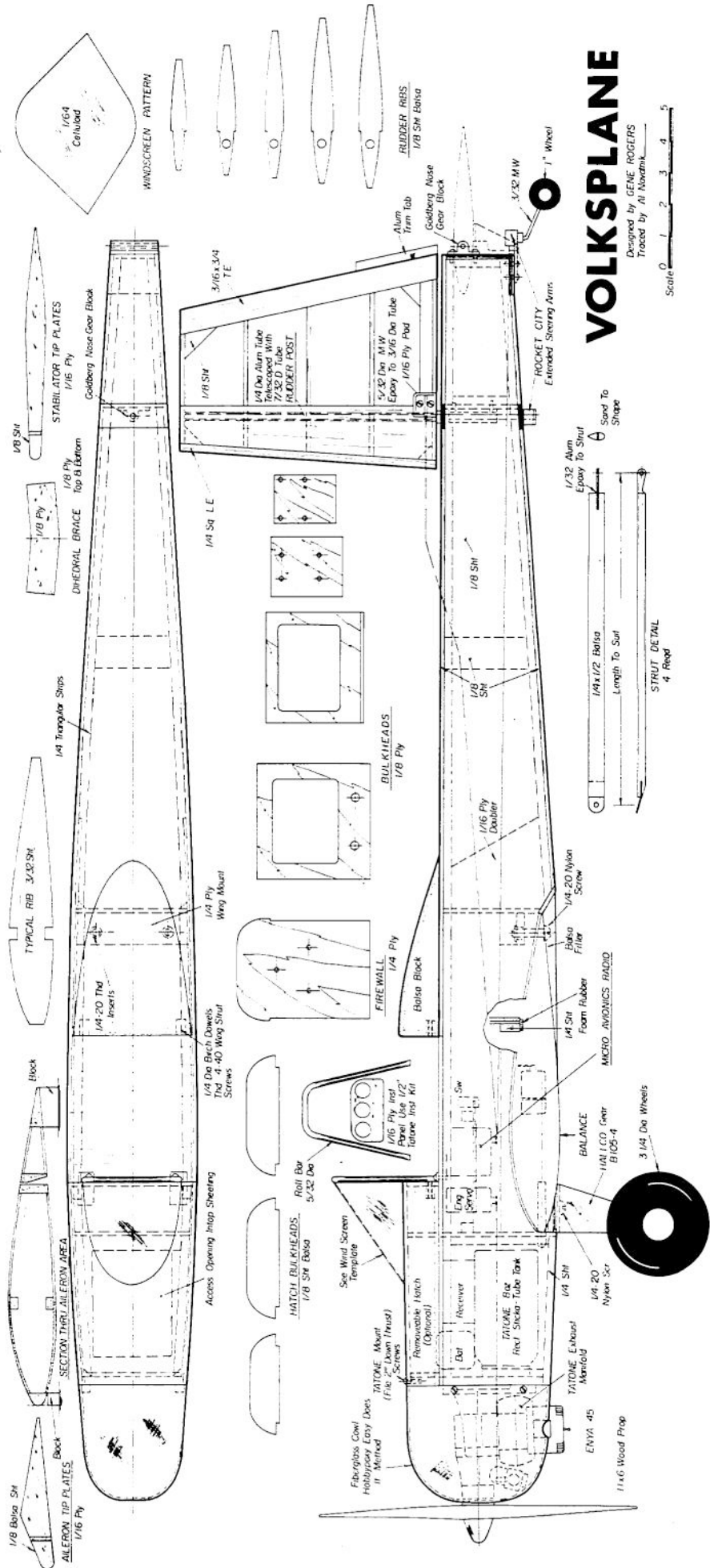
The ailerons are constructed at the same time the main framework of the wing is on the building board. The leading and trailing edges are blocked up to match the structure of the wing.

When constructing the wing and ailerons, be certain to avoid any possibility of warping. With this particular wing design, aligning problems between the wing and the tail are almost nil because of their bolt-on type fastening. It would be simply unjust to ruin the whole set-up with a warp in the wing. If this design is constructed warp-free, is aligned properly and balanced as per the plans, it's got to fly, and fly well indeed!

The Tail Feathers

At first I was a little apprehensive about the full-flying tail on this bird. These fears were immediately dispelled after the first test flight however. The full swinging rudder gives smooth and precise ground and take-off control, while the full swinging stabilizer (stabilator) makes for a fine degree of pitch control. The absence of separate control surfaces also keeps the configuration clean aerodynamically by the fact that hinge crevices and possible control mis-alignments are omitted. It also

FLYING MODELS

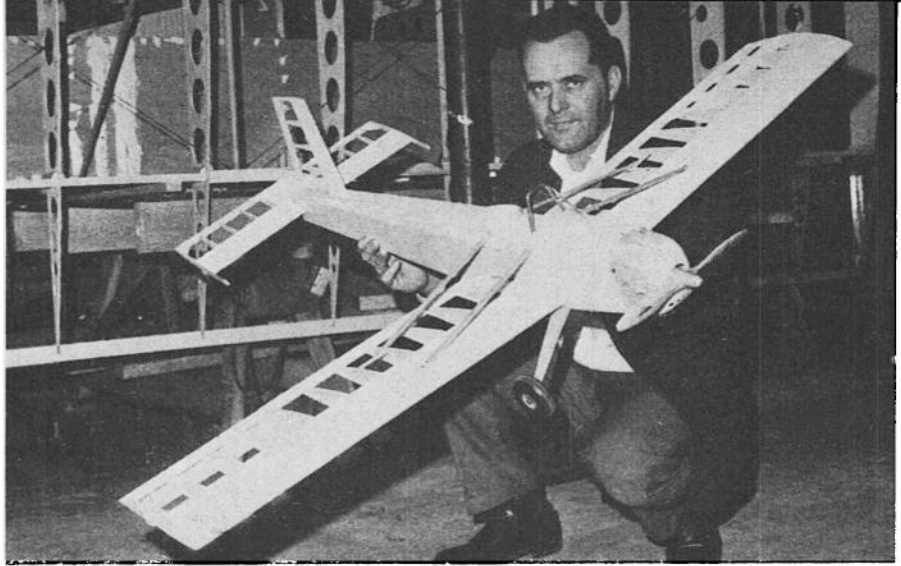
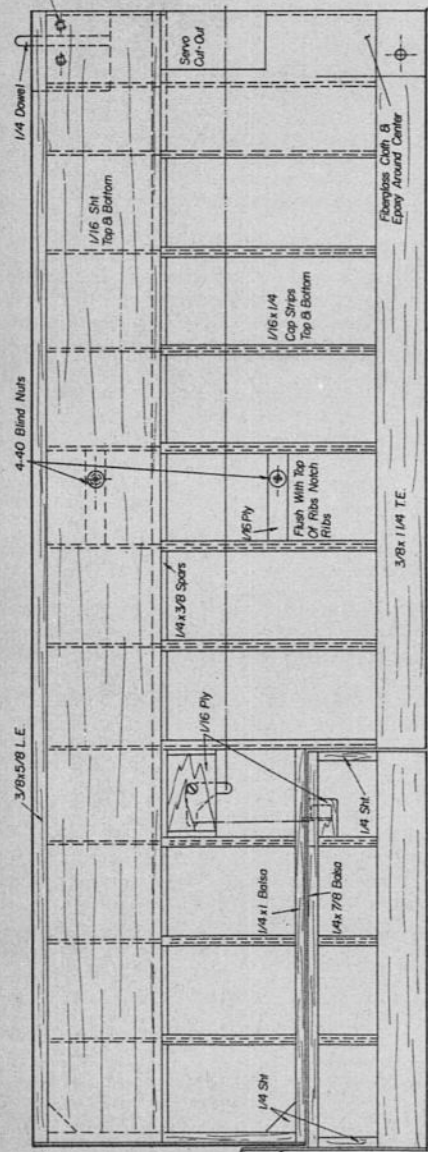
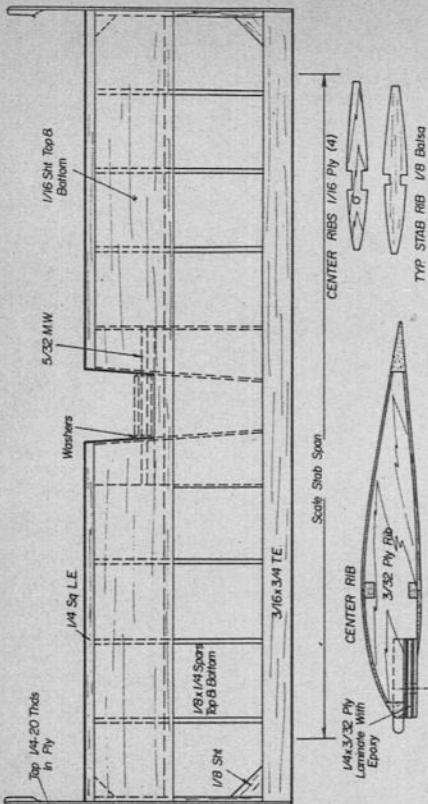


VOLKSPLANE

Designed by GENE ROGERS
Traced by Al Novotnik

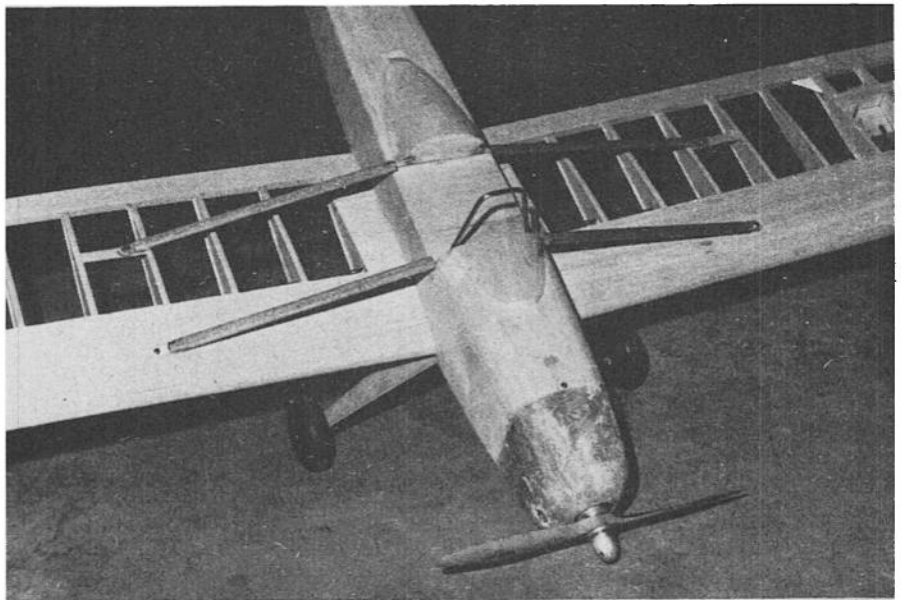
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FULL SIZE PLANS AVAILABLE THROUGH "MODEL PLAN SERVICE"

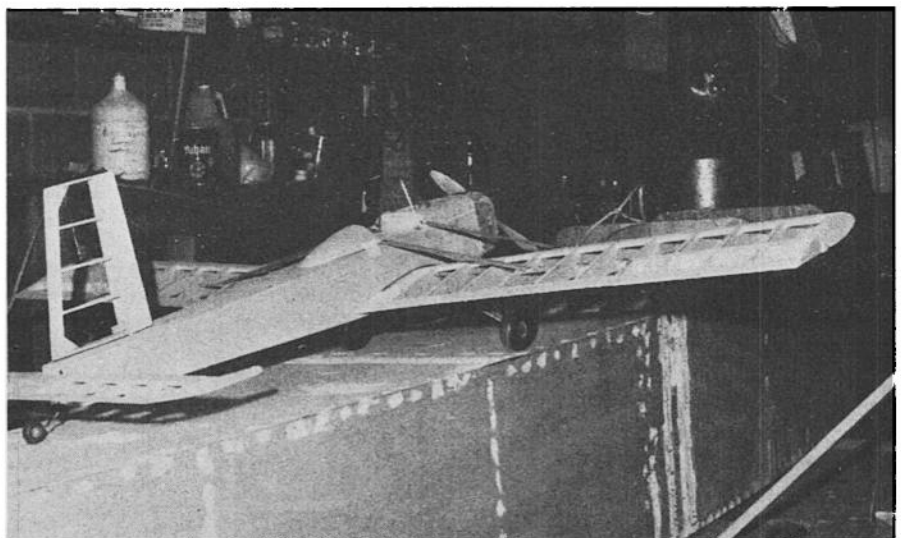


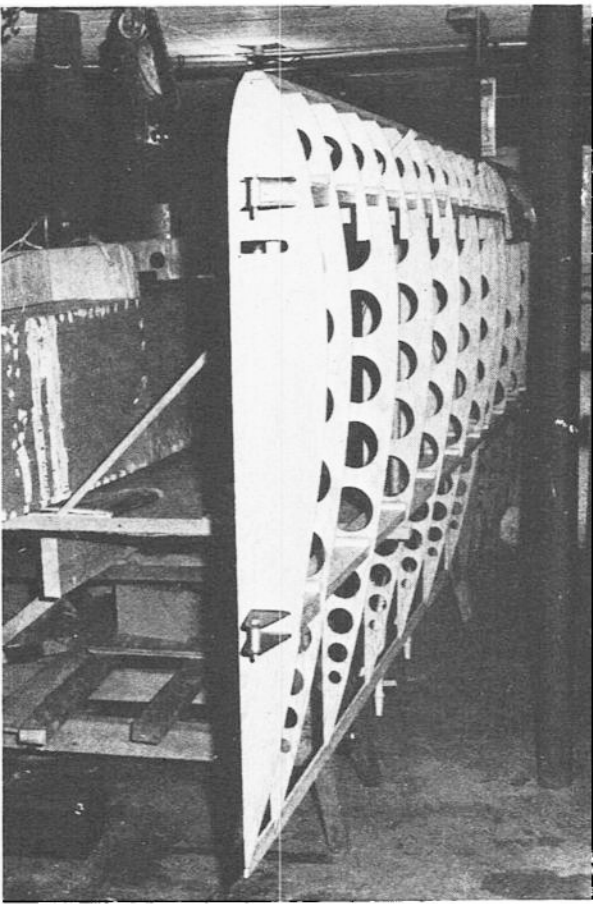
Gene and the frame bones. Art Lederle's full scale Volksplane panel in the background. Select your balsa carefully for warp-free good stock.

Shrink a head to 1/5 life size and impale it in the cockpit. If it looks a bit too big, it's just right. Volksplane windshield keeps your chest warm, but not much else. Many full scale's are being built up.



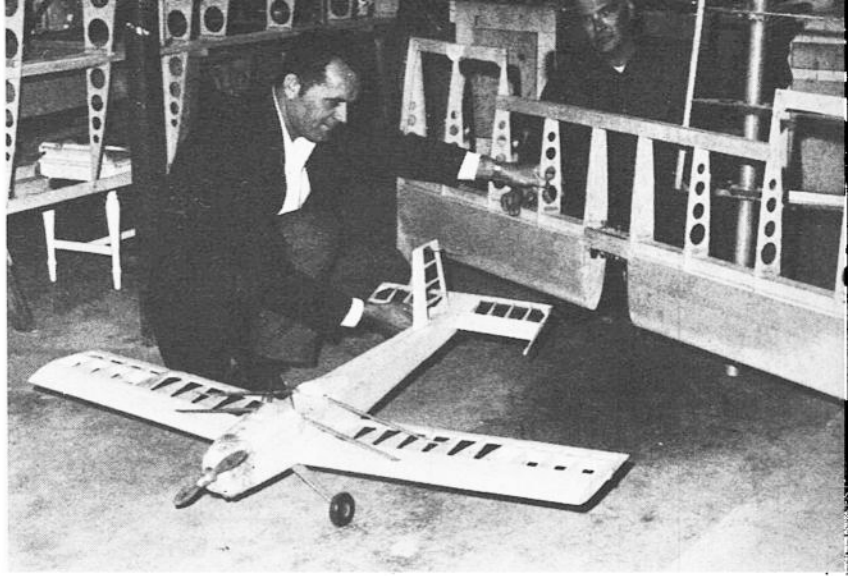
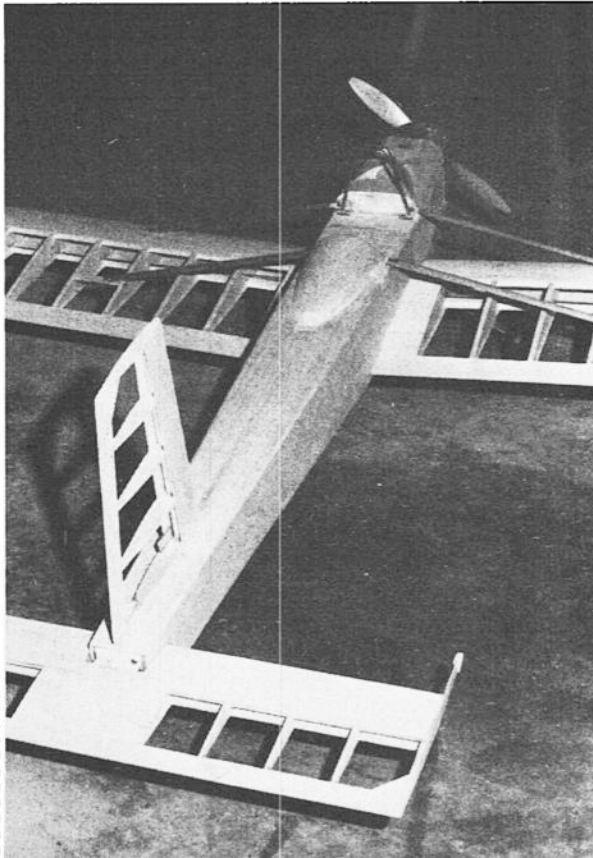
Gene's model atop Art's full scale fuselage. The white filler covers staples and screws, ready to be sanded smooth. Rugged boxlike strength.



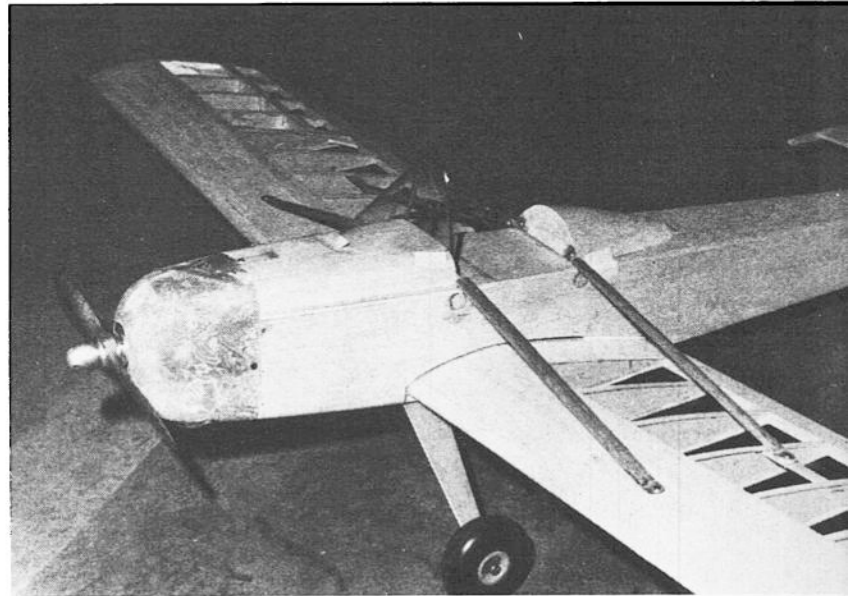


The full scale wing panel nears completion. Of varnished ply, sheet aluminum wing cap on leading edge, visible toward tip end. The easiest of the homebuilts.

Just a simple basic box. No excuses left, so start building yours.

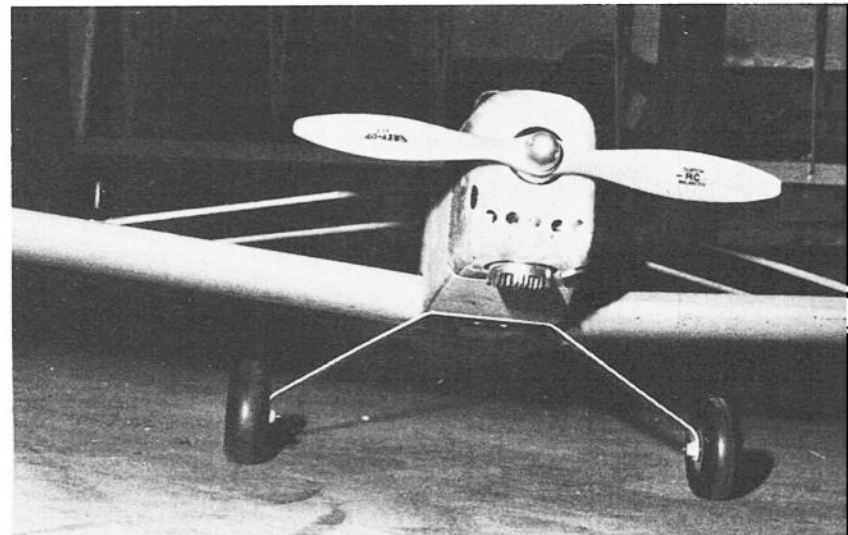


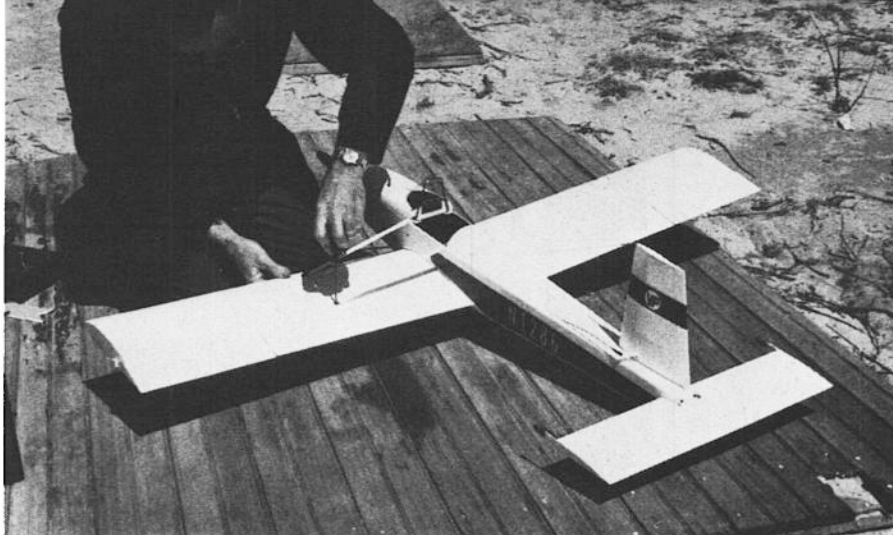
Gene and Art Lederle compare stabilizers. A boo-boo was found on the model at this point, and we spent the rest of the evening trying to con Art into rebuilding his fuselage to match Gene's model. A lost cause.



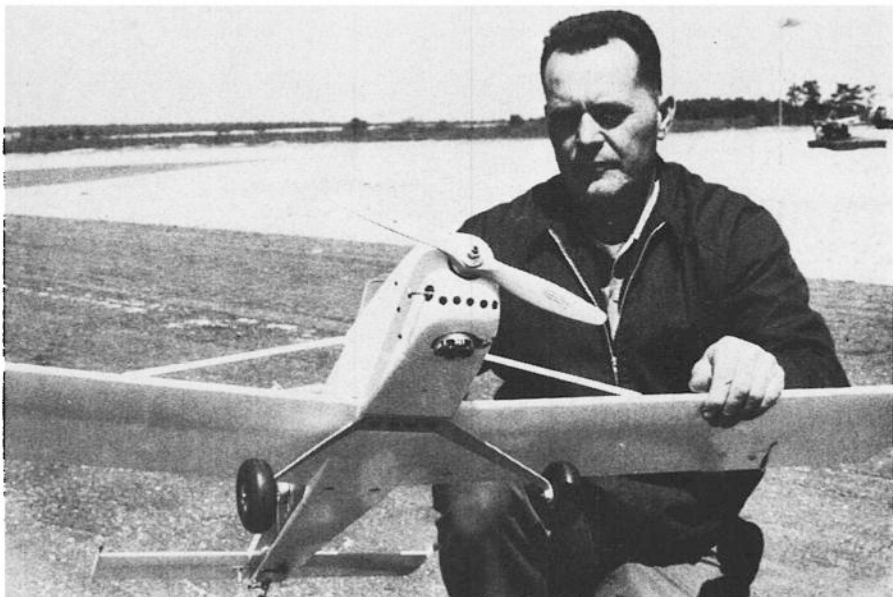
The frame is well stressed, truly simple, very easy. The Hobbypoxy balloon method forms fibreglass cowl, allows proper engine cooling too.

Scale holes in the cowling cool the Enya. Molding the fibreglass cowl is not difficult to master. Provides good ventilation, great strength.



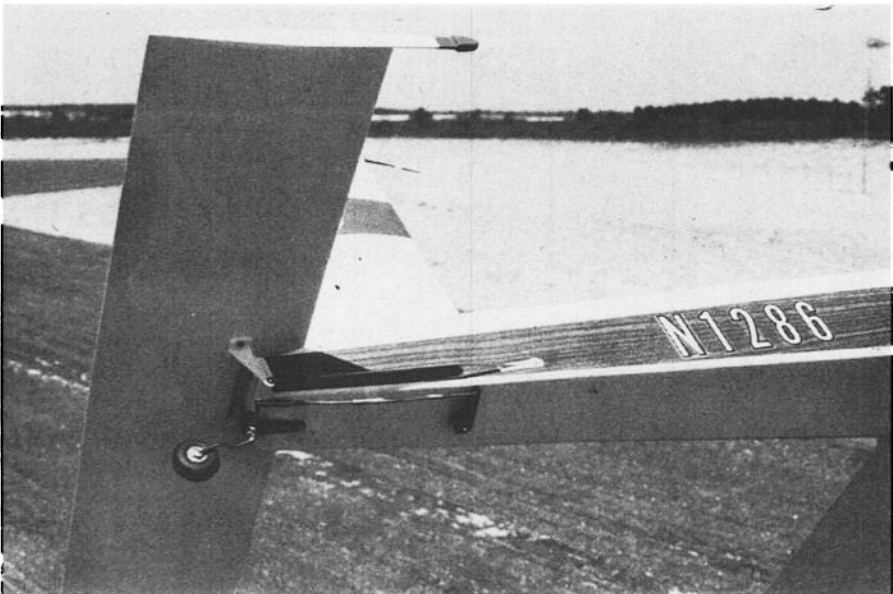


Mahogany wing struts (gilding the lily) bolt on in scale-like fashion, but serve no real purpose as for bracing. The structure is well beefed.



Hallco's gear fits to perfection. Scale in all respects, unless you're a knitter. You can get airborne pretty fast with this easy scale type.

Goldberg's gear brackets form the pivot for the stabilator. Less parts with flying stabs and rudder. Note tailwheel bellcrank, works well.



makes for less parts when constructing and maintaining the airframe.

The rudder and stabilator are made in the same manner as the wing construction. Once again, be certain to build these on a flat surface and use plenty of cement to insure a torsionally stiff and warp-free flying surface.

You will note from the plans that the rudder and stabilator are hinged from standard nylon nose gear blocks. When I saw Carl Goldberg at the recent WRAMS show and told him of my use for his gear blocks, he was very surprised to find that I had found a good use for two of them on the rear of an airplane!

These nylon blocks hold the control surfaces rigidly and provide a very low friction pivot. I fastened the stabilator pivot block to the fuselage with #4-40 nylon screws to provide a shear-off feature, when squeezing through narrow doorways. (The event of an abrupt contact with terra firma was never considered, honest!)

The stabilator pivot block must be installed on the stabilator while the framework is being constructed. Epoxy the music wire serving as a hinge pin to the plywood ribs. Use washers between the pivot block and these ply ribs.

The Fuselage

A better name for the fuselage would be a "box". It even has a square back! What it lacks in beauty however, it sure gains in practical utility. It's not only brutally strong, but it has a small frontal area for a scale model.

The plans show an optional removable hatch on the top of the fuselage. The hatch is more of a convenience than a necessity, depending on personal preference and radio installation requirements. Since the top of the fuselage is sheeted under the hatch, the hatch design doesn't necessarily weaken the fuselage structure. A rectangular cut-out is made in the top sheeting to gain access to the fuel tank, battery pack and radio receiver.

The sides of the fuselage are each cut from a single sheet of balsa. The balsa siding is backed up with plywood doublers, starting at the firewall and extending aft of the wing cut-outs. Epoxy this doubler to the inside surfaces of the balsa sides, making certain to make left and right hand sides. Complete each side panel by cementing the beveled corner strips in place.

Join the two sides together to form the "box", by first epoxing the firewall and rear bulkhead in place. It's a good practice to drive small wire brads through the sides into the plywood firewall. This holds things together while you're working and adds strength to the joints.

Stand the fuselage in the vertical position, with the firewall resting on a flat surface. Draw centerlines on all bulkheads and epoxy in place. Check for squareness using a large carpenter's square with the short side resting on the firewall. Clamp an extension leg on the square if necessary. When checking the fuselage for alignment, all bulkhead centerlines should fall on the same plane and centered from the firewall. Be certain to fasten the rudder pivot nylon bearing block to the bulkhead before installing and enclosing the fuselage! Coat these fastening screws and nuts with ce-

ment to insure tightness under vibrating conditions. It's also a good idea to use blind nuts on the rear bulkhead for fastening the stabilator bearing block.

Finishing (Dope Fume Time)

The entire "Volksplane" was covered with medium weight white Silkspan, with the open areas of the structure receiving two layers of Silkspan paper. The first layer of paper covering just the open areas needs the grain of the paper running spanwise. This Silkspan is clear doped (after water shrinking) before applying the second layer of paper with the grain running chordwise.

The paper then received two coats of brushed-on clear dope. This was followed with a brushed-on coat of talcum powder and clear dope mixed. The entire job is then sanded down with #320 production paper and followed by a brushed coat of thin clear dope. The plane is next sprayed with two thin coats of white dope. This was followed by two sprayed coats of thin clear dope. After allowing the doped finish to cure, it was rubbed down with white polishing compound, followed by a coat of wax.

If the above sounds like a lot of work to you, then go to a Hobbyoxy finish or MonoKote. The doped job looks very professional when it's completed, but the fumes of the stuff sure make me unpopular around the house while it's being applied and for as long as its odor lingers on!

Miscellaneous Details

The fiberglass cowling was made using the Hobbyoxy Easy-Does-It method. Complete information on this excellent technique can be had directly from Hobbyoxy Products, 507 Main Street, Belleville, New Jersey.

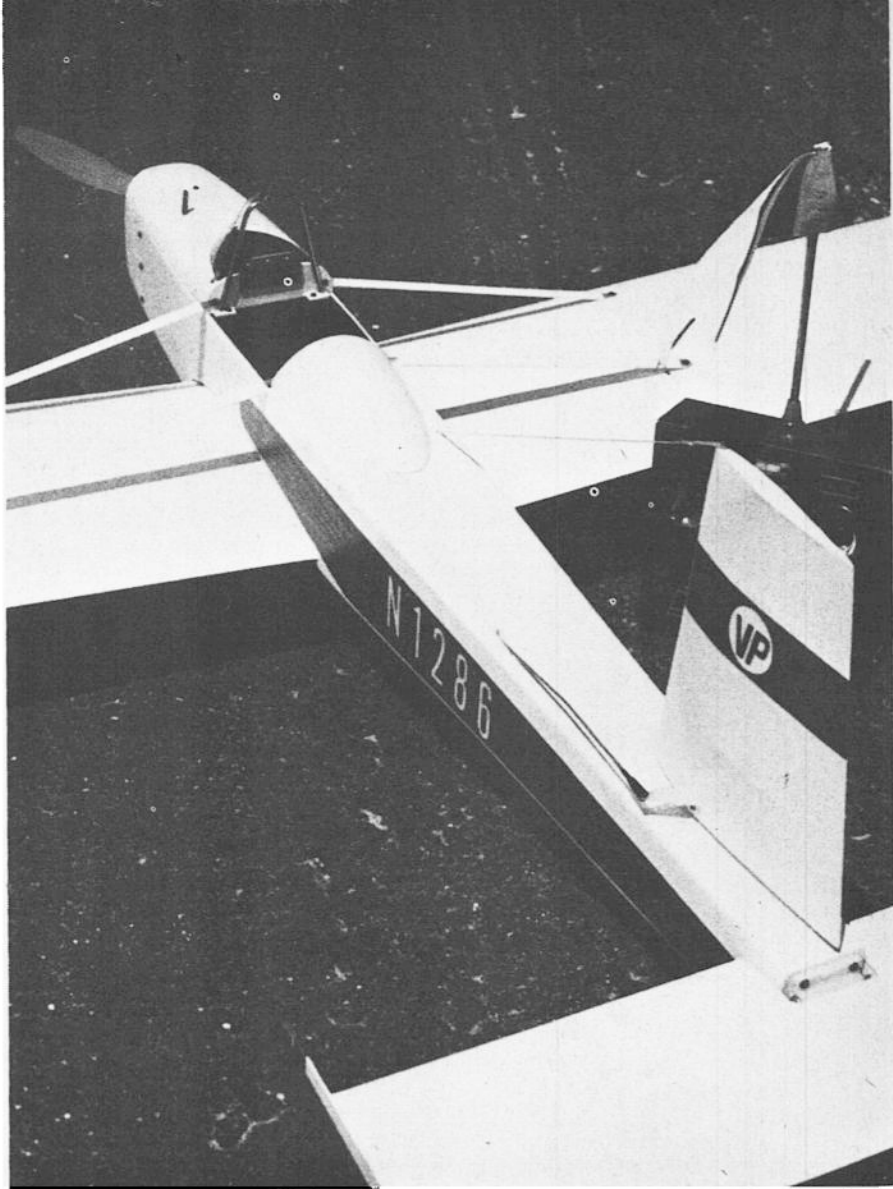
The engine's exhaust is ducted out of the fiberglass cowling using one of John Tatone's new EM-3 Exhaust Manifolds. This excellent bit of hardware came along just in time for my project. In this application the manifold allows the exhaust to be routed out through the bottom of the cowl, with the sides of the cowling kept clear for mounting the dummy VW engine cylinder heads. The oily exhaust is also blasted out past the bottom of the plane.

The landing gear is a standard Halleco gear and it just happens to be so close to scale size that a contest judge would have to use a pair of vernier callipers to penalize you for being out of scale! The gear is made knock-off by the use of nylon screws.

The roll bar was made by bending music wire over a metal form while heating it cherry red. Brass tubing could be used for the same purpose and would probably be easier to fabricate.

The varnished mahogany siding of the fuselage on the full sized aircraft was simulated on the model using plastic contact paper, having a wood grain. It looks really authentic. (I'm gradually working toward MonoKote!)

The wing struts are fastened to the fuselage and wing panels using #4-40 nylon screws. Once again these will shear when you get the wing up caught on that door jamb, if you're too lazy (like me) to remove the wing for transporting the model to the field. Of course, every once in a while I



Pushrod to the flying rudder exits top of fuselage. Rudder pivots in the tubing as in the full scale prototype. Note cockpit's instrument panel.

bring the models home in very compact form!

Pre-Flight Trimming and Flying

If you have had any experience in flying proportional R/C, you will find that the "Volksplane" has no bad tendencies at all. The first flight on my ship looked and made me feel as if I had flown the plane for a couple of seasons. It just goes where you aim it.

Adjust the stabilator to have about one half the throw you would normally allow on conventional elevators. You will find smooth pitch control without it being over responsive. An angle of about 8 degrees in each direction should work well.

The rudder is set to travel about 10 degrees in each direction, with neutral being slightly to the right for the test flight. A little right rudder is always easy to cope with. Set the aileron to give about 15 degrees of travel in each direction for a starter. This can be increased later to give a faster roll rate if desired.

The original model "Volksplane" has about 2 degrees of right thrust and 2 degrees of downthrust built in. The downthrust was achieved by filing the lugs of

the Tatone aluminum mount. The Tatone mounts usually have a small amount of downthrust built into the casting, but remember, you will be inverting the model and this will result in upthrust. Beware!!

Side thrust was obtained by scuffing the back of the shiny aluminum mount with sandpaper. A dam was built around the back of the mount using masking tape, with one side slightly higher to give side thrust. The mount was then clamped in a vise with the back face of the mount having a 2 degree slope. The back plate of the mount was then filled with a "puddle" of Hobbyoxy Formula II. Be certain you tilt the mount in the proper direction to obtain right thrust when the engine is inverted. I wasn't careful and can attest that the epoxy will really adhere to the aluminum mount!

Assuming that the radio system has been carefully checked out, there is nothing left to do but fly the little beast. You're in for some real scale fun, with few of the scale demands. Good luck and enjoy the meets.

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