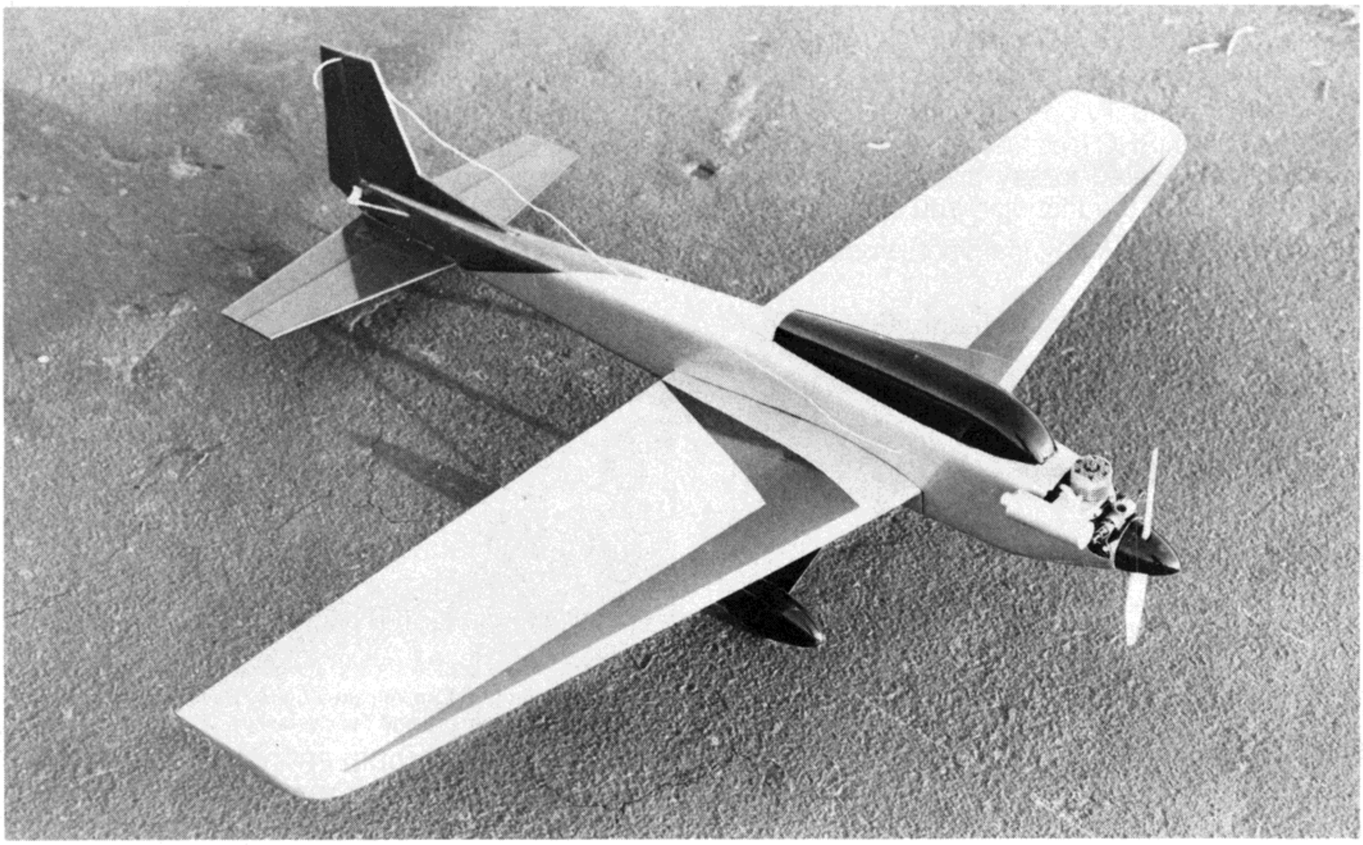
Faser

By Al Trapanese



PHOTOGRAPHY: AL TRAPANESE

Al Trapanese seems to have met his design criteria of something sleek but simple with a mid-wing and conventional gear in his .25 size *Faser.*

About 10 years ago I picked up a brand new Fox 25 at one of our club swap meets. At this time, I didn't have a particular project in mind for this size motor so I stuffed it in a drawer along with a variety of other motors that I didn't have an immediate use for.

Much has happened in the intervening years. My modeling interests have changed direction from small sport aircraft to 1/5th scale military aircraft, sporting liquid cooled motors, landing flights, flaps, retracts, etc. I have always found this type aircraft challenging and exciting when everything works as designed but terribly frustrating when everything doesn't work such as the gear not retracting, or worse, not extending due to a faulty control valve or the radiator popping a coolant hose and motor overheating, etc. Anyway, after 10 years of aggravation I decided to get back to the basics and find a home for my "brand new" 10 year old Fox!

I originally planned to purchase an off-the-shelf sport type aircraft but when a couple of fellow club members bought a garage full (literally!) of balsa from a now defunct kit manufacturer, I decided to purchase some of the balsa and scratch build my own design.

What I had in mind was something sleek but simple: midwing, conventional gear, set up for a side exhaust motor with or without a tuned pipe.

As with most of my aircraft, I first started with a pleasing wing design. The remainder of the aircraft was then designed to complement the wing. I have always been partial to swept back wings. Just looking at an aircraft with swept back wings makes it look as if it's going 100 MPH! The only difficulty with this type of wing is that its construction is non-trivial. In an effort not to violate my original intent of sleek but simple, I elected to utilize a symmetrical airfoil built in one piece, topside down. Because of the wing taper, chord dihedral is automatically established. Rib feet were incorporated to ensure proper alignment.

The empennage was designed using solid 3/16 medium grade balsa and for the sake of consistency, swept back. A built-up empennage would of course have been lighter but more difficult to construct. Hence, the reason for solid sheet.

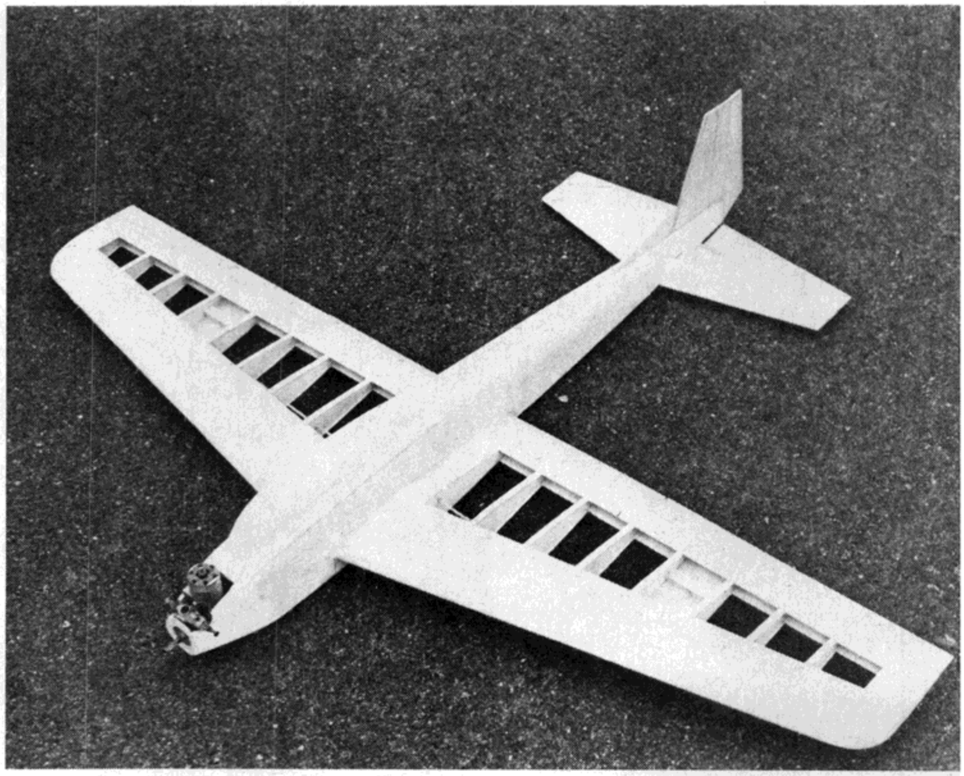
The fuselage required considerably more design work than the empennage! I had to ensure that all the moments were correct and that there was sufficient room for the "worst case" 25 schnuerle type motor, a four ounce tank, a 500 mA pack, an average size receiver, and four mini (not micro) servos. The first design didn't quite make it. Too tight! The second go-around looked good. I increased the height of the canopy section 1/2 inch over the original design and lengthened the tail one inch. I also moved the wing back 1/2 inch to ensure proper clearance for a four ounce tank. Presto! All my hardware now fit without using a shoe horn!

Conventional gear was a must; less drag plus it looked better. Wheel pants helped dress up the model so I added them. Almost any commercially available glass or plastic wheel pants could be used. Many methods are available to attach the pants to the gear. I chose the simplest approach I could think of, by gluing a piece of 1/16 inch ply to the inside of the pants, drilling two holes through the pants and gear and bolting the pants on using 4-40 hardware. Crude maybe, but effective!

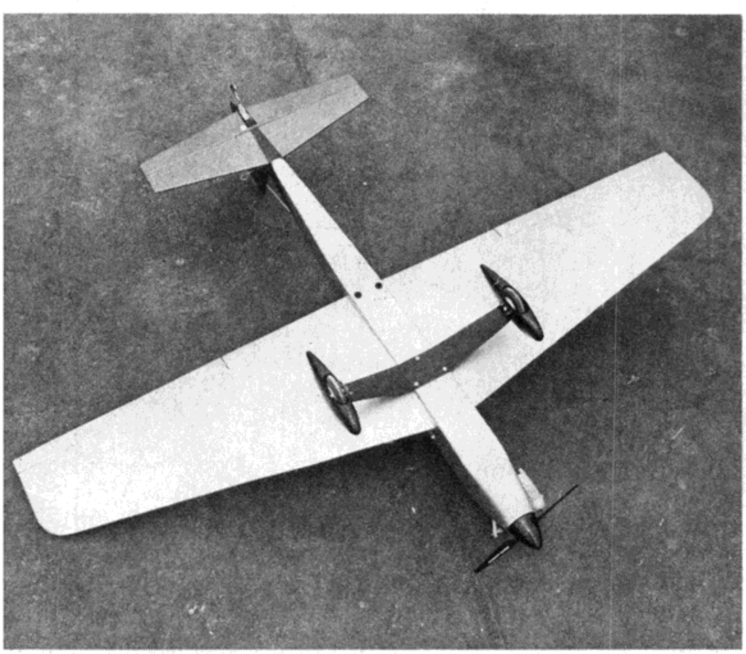
The part I hate the most, the wing, was constructed first with the help of two fellow modelers, Craig Brooks and Kevin Robertson. Many other modelers use the same ap-

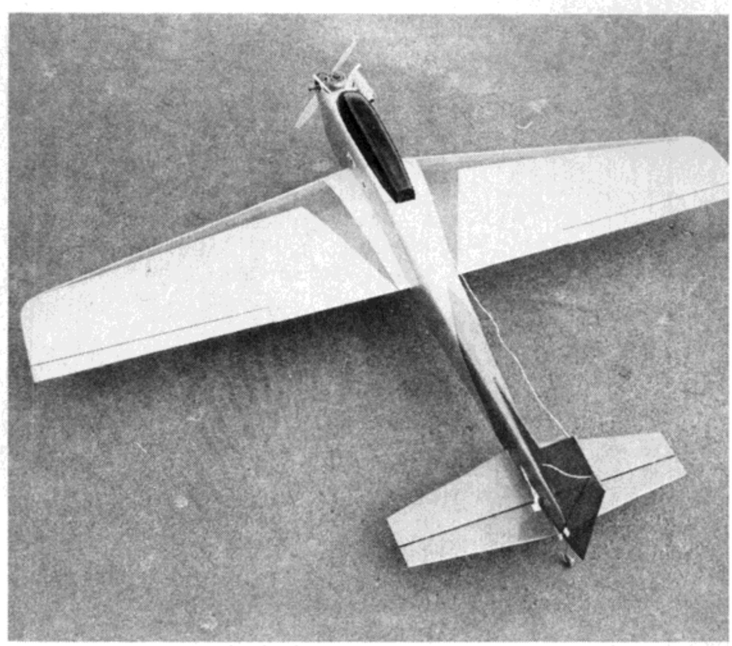
Bogged down in a sophisticated project? The author gets back back to basics with this spirited .25 size fun machine.

proach. I guess the philosophy is to get the worst part done quickly to make it as painless as possible. Initially, I drew the outline of the ribs on templates with the help of a french curve. The ribs are cut using the templates as a guide and the ribs with the feet were pinned over the top view of the plans. The rest of the assembly is conventional so I'm not going to go into any great detail. The top spar is added using one of the superglues, then the leading and trailing edges. The leading and trailing edges are then carved to shape, the remainder of the ribs added, and the structure is sheeted and capstriped. Note that the leading and trailing edge sheeting is glued over the respective leading and trailing edges. When completely dry, the panel is flipped over and the bottom spar, sheeting and capstrips added. It is important in this procedure to ensure that the panel does not warp by constantly checking it everytime something is added. The other panel is built similarly. The wing tip blocks, trailing edge extensions (from trailing edge stock), and aileron bellcrank hardware is installed at this time. The wing tips and leading edges are carved to shape and the entire structure sanded. Dihedral angles are sanded on the center ribs of each panel and, finally, the panels are joined together topside down as previously mentioned. Two 3/16 dowels are added to the leading edge as part of the wing hold-down hardware and braced inside using 1/16 ply. Hardware is added to the trailing edge section and drilled to receive two 10-32 nylor



In keeping with the simplicity factor, construction of the fuselage consists of slab sides with triangular supports and few bulkheads. Wings are simple as well, using feet on ribs for alignment.





Conventional gear was chosen as a drag reduction factor (**above left**). Wheel pants were attached using a 1/16 ply plate and some 4-40 hardware. The lines remind one of a sleek pattern ship (**above right**). In keeping with that theme, the wing's airfoil is symmetrical.

bolts to complete the wing hold-down hardware. The center section is then sheeted and wrapped with medium weight glass cloth and glued in place using polyester resin. The ailerons are simply trailing edge stock with the proper angles sanded on their leading edges to allow for up and down movement. The belly pan is added after the fuselage is constructed.

At this point I needed a break from thinking, so I constructed the empennage. The outline is traced on a slab of 3/16 planking and cut using a jigsaw. The components are sanded as per drawing, hinge slots cut, accommodations made for the elevator horn/dowel coupler, and assembly temporarily put aside.

The last remaining assembly was the fuselage. I tried to keep it simple by reverting to slab sides, straight lines and as few bulkheads as possible. I think I succeeded. The 1/8 medium grade sides are cut to shape and soft triangular stock added for support. With one side laying flat, bulkheads 1, 2, and 3 are glued in place assuring that they were square with the side. When dry, the second side is added making sure everything is straight and even. The assembly is then turned over on its bottom, and pinned to the workbench. The rear section of the fuse was drawn together, at the same time bulkhead 4 was added. Here again, ensure that each of the fuse sides bend evenly and are square with the fuse bottom.

Next, the bottom planking is added, the rudder and elevator control rods are then installed. Holes are drilled in the firewall for the engine mount and 4-40 blind nuts added. Next the throttle cable is installed. Finally, the tank rails and tank are installed. In actuality the above procedure can be performed in any order except for the tank installation; it must be last. The planking under the tank is held in place using C.G. hatch fasteners.

The belly pan is made and tack glued to the fuse. The objective of tack gluing is to facilitate the shaping of the pan and fuse and also guarantee that everything fits correctly.

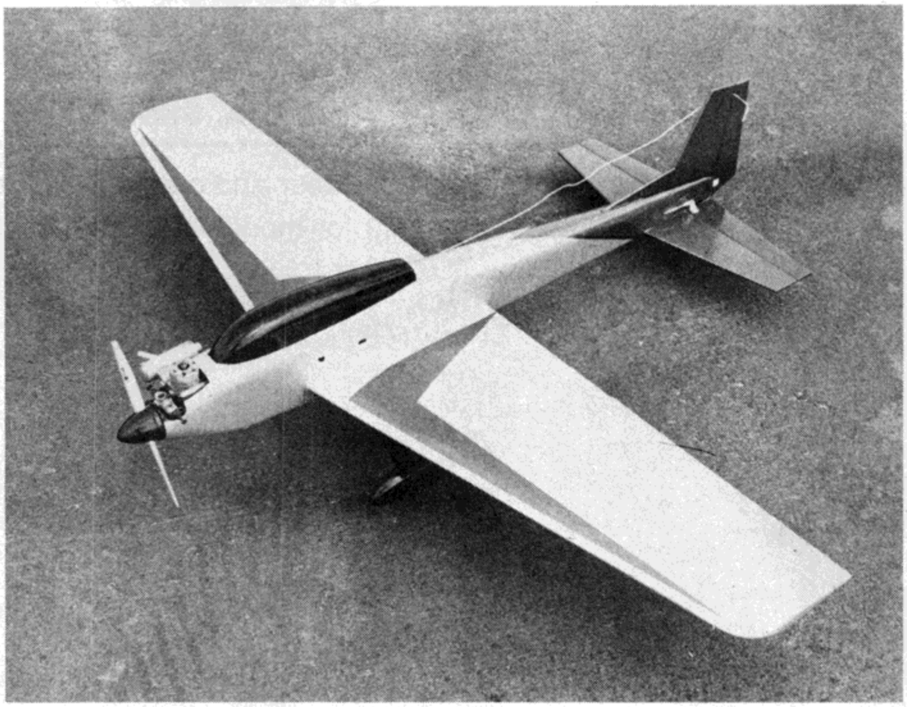
The top planking and nose section is added and everything rounded in accordance with the drawing. The canopy structure is made from balsa as shown in the drawing. The tail wheel bracket must be trimmed to fit in the space provided.

The final assembly consists of gluing in the servo rails, installing the radio, pushrods, etc., permanently gluing the belly pan to the wing, and finish sanding the entire structure. I chose gold and green Solarfilm for my covering material. No particular reason, just happened to have some on hand.

Over the years, I have found it best to cover as many parts as possible before gluing them to the main structure. It's so much easier and, for me, results in a neater job.

The plane was slightly nose heavy so 1/2 ounce of lead was added to the tail section. The all-up weight came out to be 3 1/4 pounds resulting in a fairly respectable wing loading of 19 ounces/square foot.

The plane was test flown at our club field. The field has a 250 by 50 foot paved runway which is recommended over grass when your aircraft has wheel pants and relatively small wheels as the Faser does. I'm always a bit nervous when I test fly one of my own designs. You're never 100% certain that everything was designed correctly, incidences and moments correct, etc. Therefore, I did what most cowards do - gave it to someone else to test fly! Actually it's not a bad idea to have a more experienced pilot test fly any aircraft just from a safety standpoint.



Fast but predictable performance. Stalls are not vicious since the nose only pitches gently down. Inverted flight requires some down elevator. On landing, the glide path is steady with a gradual sink rate.

My nervousness melted away when my test pilot, Craig, lined the plane up on the runway, applied throttle and accelerated down the runway. The plane was up on its mains in 75 feet and airborne in 100!

The plane performed very well and was very fast. I can picture what it would be like with a hot schnuerle 25 and tuned pipe! Too much for me to handle! Inverted flight requires some down elevator to keep the nose up. Slow speed stalls cause the nose to gently pitch down, with no tendency to fall off at either wing.

On landing, the glide path was predictable although the first landing was a bit bouncy. Pure nervousness on the part of its test pilot.

Presently, I am thinking of expanding this model to accommodate a hot 40 and really bore holes in the sky!