

wheel wells.

Cut retract pushrod clearance holes through both sides of the wheel wells so that the pushrods have a straight route to the retract mechanism.

Install pushrods and verify that the retracts work properly with no interference or binding.

Joining The Wing Panels:

Place the two wing panels together on a flat surface and block up one wingtip 2 3/4". Sand the root end of the wing panels until they fit together properly at that angle.

With protective plastic under the center section, hold the leading and trailing edges together with pins and lock the wings

together by dripping thin CA into the center joint. Fill any minor gaps with thick CA.

Turn the wing over and cut a slot for the dihedral brace through the W-1 ribs immediately behind the spars.

Drill 5/16" holes for the wing dowels in the 1/8" plywood dihedral brace as shown on the template, then using epoxy, glue the dihedral brace to the back of the spars.

Put a mark on the front of the L.E. 1 3/4" from the center joint on each side. Drill 5/16" holes for the wing dowels on these marks. Now install the dowels with 1/2" protruding in front of the L.E. and the rear of the dowel passing through the dihedral brace.

Now turn the wing over and cut a 3/4" hole in the center of the top sheeting about 1" behind the spars for the servo wires to exit the wing. This hole should include a section of W-1 so that it provides access from one wing to the other.

Tie a string to the servo rails in one wing, pass the string through the servo wire holes in the W-6 through W-1 ribs and on out the other wing and tie it to the other servo rails. Leave plenty of slack and be sure you can reach the string through the servo holes in the servo bay sheeting, and through the 1/2" hole in the center sheeting. You will use this string to pull the servo wires through the wing after the wing is covered.

Install the 3/32" balsa bottom center sheeting. If you are using tricycle gear, you will need to cut a slot in the sheeting to clear the main gear block.

Looking down at the wing from the top, the leading and trailing edges at the center section should be sanded straight across to match the formers in the fuselage. The straight section of the L.E. is 5 1/4" wide and the straight portion of the T.E. is 4 1/2" wide.

Apply a 4" wide strip of 6 oz. (heavy duty) fiberglass cloth to the center joint, top and bottom, using resin, thinned epoxy or thin CA.

Glue the 1/16" plywood wing bolt plate on top of the fiberglass at the trailing edge on the bottom of the wing.

For Retractable Gear:

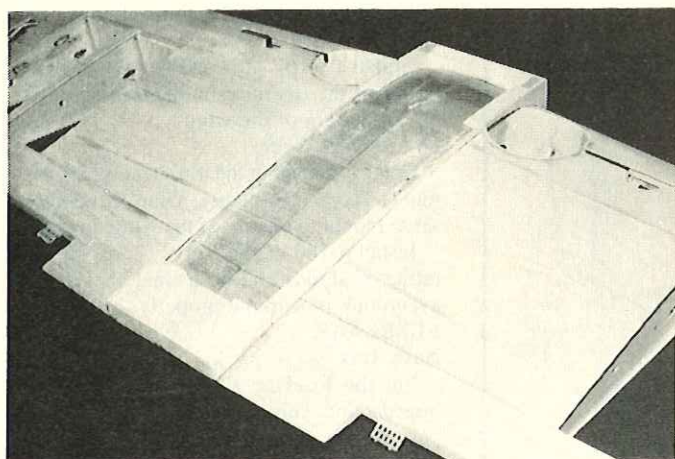
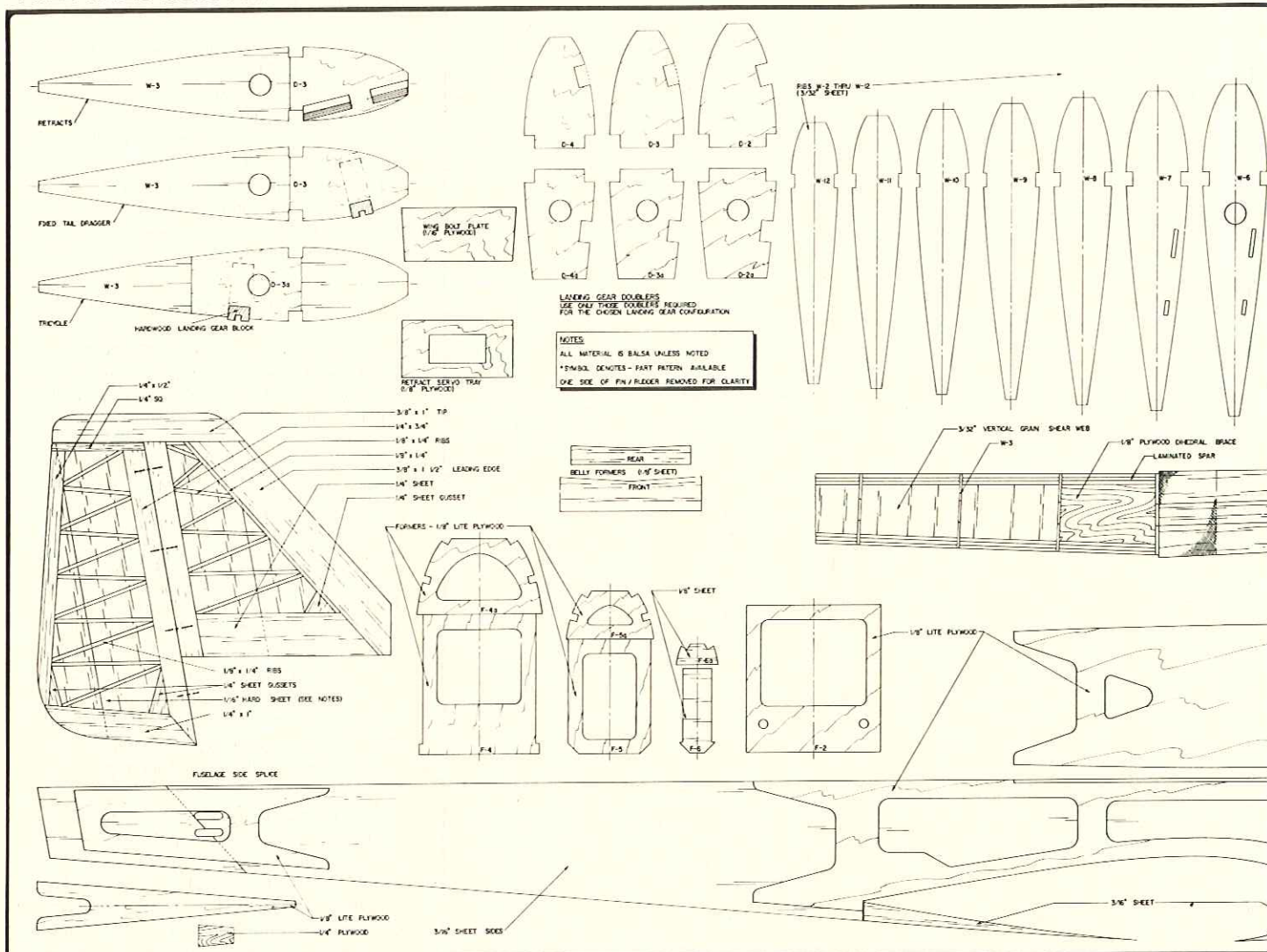
Cut an opening in the top sheeting for the retract servo (see plans). Glue the retract servo mount to the top of the wing dowels.

Install a 180 degree servo, hook up the retract pushrods and do a final check that everything is working properly.

FUSELAGE

Basic Box:

Pin the fuselage sideview plan on the board, and select the correct firewall position for your engine from the engine application table on the plans. If you are using an engine which is not listed on the chart, assemble the engine and engine mount, and check the total length against the plan and pick the combination of firewall and spinner which comes closest. Cut the fuselage sides and front doublers to the correct length for the selected firewall position. (Note that the firewall is installed with 2 degrees right thrust built in so the right side and right front doubler are 3/16" shorter than the left.)



The belly fairing is built up while the wing is mounted on the fuselage. Note the 4" heavy fiberglass reinforcement on the bottom of the wing.

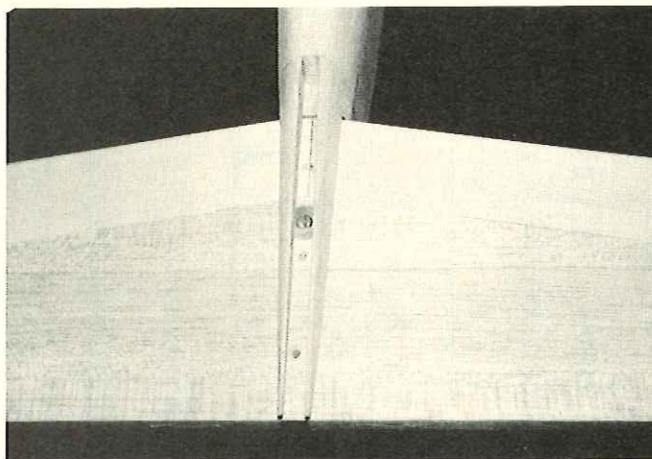
Cut the firewall to fit in the position selected, then bevel the top and bottom edges as shown on the plan. Mark the "front and top" of the firewall for future reference.

Draw a line on the front of the firewall 1/16" above the vertical center.

Determine the correct left offset and make another line that far to the right of the

horizontal center of the firewall. The center of the engine mount must be at the point where these two lines cross.

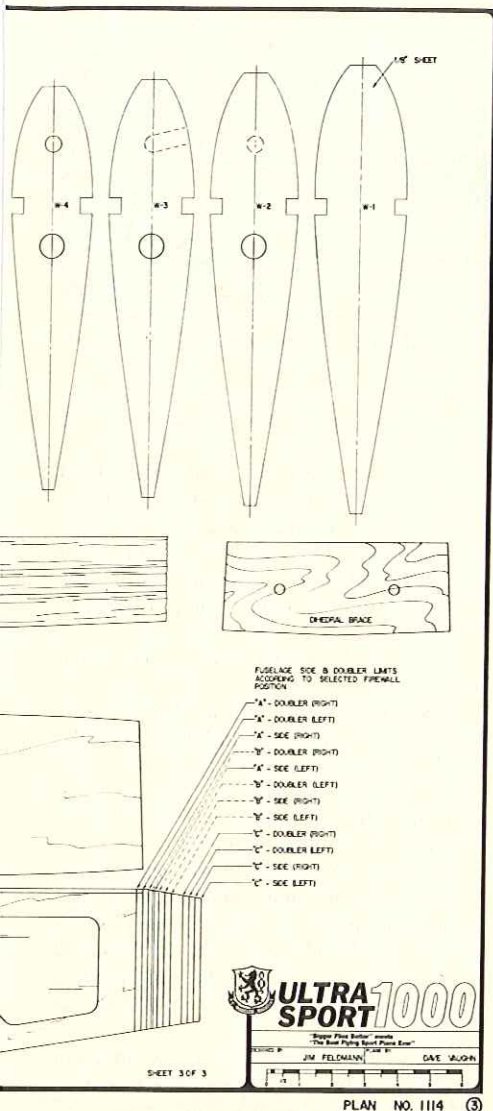
I strongly recommend an isolated (soft) engine mount for improved airframe and radio life. Carefully center the mount over the lines on the firewall and drill the required holes. Then temporarily install the



After the horizontal stab is mounted in the usual way, a large sheet metal screw is installed through the fender washer and into the stab anchor in the fuselage.

mount.

If you are using tricycle gear, turn the firewall over and draw a line along the horizontal center. The gear strut will go on this line. Drill holes to mount the nose gear brackets. The bottom bracket is located 1/16" above the bottom of the firewall and the top bracket should be just below the top



Remember to drill them out for the 3/16\" wire strut.

Assemble the left fuselage side and the left rear fuselage side over the plan. Then install the front and rear doublers. Note that the front doubler ends 3/8\" behind the front of the fuse side, and the rear doubler ends 1/8\" below the top of the fuse side and 1/4\" from the rear edge.

Now assemble the right fuselage side but be sure to turn it over before gluing on the doublers.

Drill pushrod exit holes through the fuselage sides as shown on the plans. Glue the tail wedge to one of the sides.

Glue the 3/8\" triangle servo mount supports in place. Note that the flat side of the triangle faces down.

Install the 3/8\" triangle along the bottom edges of the fuselage sides from the rear of F-4 to the front of the tail wedge. Then pin the sides together back to back and sand all of the edges to match.

Draw a line on the bottom of the stab base 1/8\" from each side. This line is a guide to show the position of the rear doublers.

Glue F-6 to the bottom of the stab base, glue the 1/4\" plywood stab anchor block in place as shown on the plans, then add 1/4\" triangle along both sides of the stab base with the flat side on the line and facing outward.

Pin the fuselage bottom view plan to the board and pin the assembled stab base over the plan. Mark the position of F-2 and F-3 on the light ply fuselage top, then pin the fuselage top down over the plan.

Glue F-2A to F-2 and drill the wing dowel holes as shown on the plans.

Pin F-4 and F-5 over the plans and glue F-2 and F-3 to the fuselage top, making sure each is perpendicular to the board and centered between the fuselage sides.

perpendicular to the board. Use epoxy here to fill any gaps and to give you time to get the alignment right.

After the epoxy has thoroughly set, begin putting the sides together. Pin the sides to the board every few inches and glue them to F-5 and F-4 as you get to them.

When you reach the fuselage top, slip the firewall between the sides at the front and use a couple of rubber bands to hold the sides together. Then hold the fuselage top and the sides firmly against the board as you glue the sides to the top and to F-3 and F-2.

Now glue the firewall in place (remember, the fuselage is upside down so the "top" mark on the firewall goes at the bottom).

Add 1/2\" balsa triangle behind all four sides of the firewall, allowing enough of the triangle to extend beyond the top and bottom of the firewall so that the triangle can be sanded to match the angle of the top and chin blocks.

If you are using tricycle gear, use a long 3/16\" bit to drill through the gear brackets and the balsa triangle and light ply fuselage top. You will need this hole later to line up the gear strut hole in the chin block.

Install the throttle cable casing and the nose gear pushrod outer tube (if used), and then fuelproof the tank compartment including the part of the chin block which will be exposed inside the tank area.

Sand the fuselage bottom flat from F-2 to the firewall. Fit your fuel tank (as low in the fuselage as possible) with plenty of foam padding, then glue on the chin block.

Glue in the servo rails and the two 1/4\" x 1/2\" balsa spreader bars as shown on the plans.

Now is the best time to install the elevator and rudder pushrod outer tubes. Glue the tubes to the fuselage sides at the exits and to

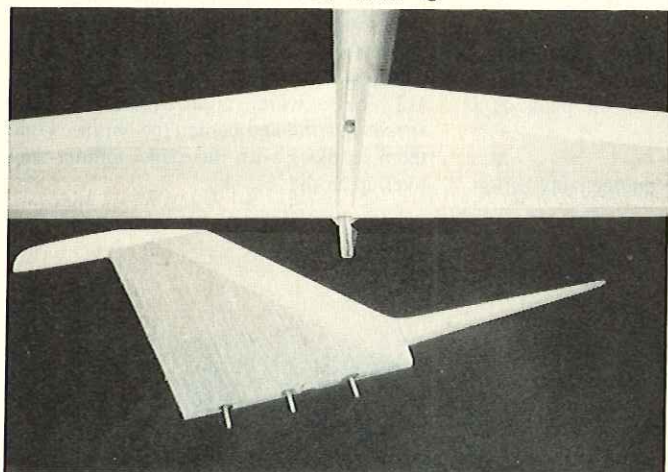


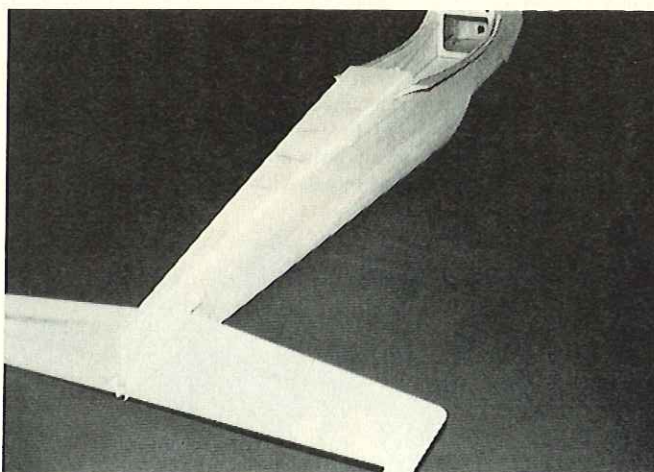
Photo showing the vertical fin is ready to install. Note the dowels already in place and the notch to clear the head of the screw in the stab.

engine mount bolt.

Temporarily install the engine in the mount and determine where the throttle cable and fuel line holes will be. Then remove the engine and mount and drill the holes.

Now is the time to permanently install the nose gear brackets if you're building a trike.

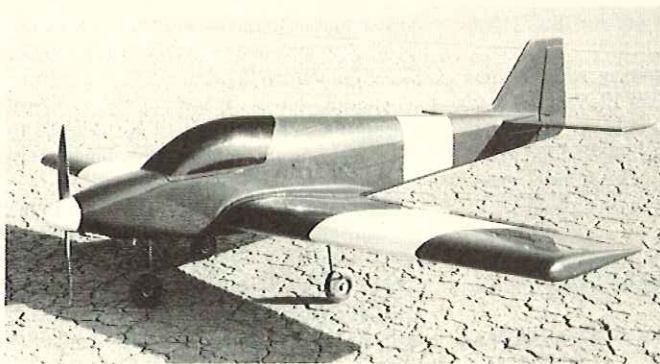
Sand the tail wedge and the bottom triangle stock as required so that the fuselage sides fit together properly with the stab base in-between. When satisfied with the fit, glue the fuselage sides together and to the stab base and F-6. Do this over the plans and be sure that the stab base stays flat on the board and that both sides are



1/2\" balsa triangle is added under both sides of the stabilizer. The stresses on large airplanes are high, but this one doesn't need bracing wires. Also note the plywood wing fairings.

the center support at F-5. Don't install the forward pushrod support yet.

Assemble the wing mount by gluing 3/8\" triangle along the three outer edges of one side of the 3/8\" plywood mount and 1/4\" triangle along the same edges of the other side. Sand the edges to provide a good fit between the sides and against F-4. When



This is prototype #1 with tricycle gear, an O.S. 1.20 Surpass II, and an ugly, but functional, hi-visibility trim scheme.

satisfied, use epoxy to glue the assembled mount into the fuselage (1/4" triangle facing you).

Now sand the bottom of the fuselage flat from F-4 to the rear end and sheet it with 1/8" balsa applied with the grain running across the fuselage.

Remove the fuselage from the board and sand the top flat. If you're using tricycle gear, drill through the fuselage top, nose gear brackets, and the chin block with a long 3/16" bit. Insert the nose gear strut and carve out enough of the chin block so that the axle is 5" from the surface of the block.

Draw a line along the horizontal center of the rear edge of the chin block. Carve and sand the block down to this line in a smooth curve from just behind the firewall (see side view on plans).

Fitting The Wing:

Trial fit the wing in the wing saddle. You may have to enlarge the holes in F-2 in one direction or another, and you will probably have to sand the wing saddle a bit to allow the wing to seat properly. **Important!** Make sure the center of the L.E. and the center of the T.E. on both sides of the fuselage are exactly the same distance from the top of the fuselage sides.

Mark the location of the wing bolt holes on the wing bolt plate. Carefully center the wing by measuring from each wingtip to the rear of the fuselage. Hold the wing in position and drill the wing bolt holes through the wing and the wing mount with a

13/64 (#7) bit.

Thread the holes in the wing mount with a 1/4-20 tap, and drill out the holes in the wing with a 1/4" bit. Then tighten the bolts and recheck the wing alignment.

Belly Fairing:

Glue the front and rear belly fairing formers to the leading and trailing edges, using scrap 1/16" plywood as a temporary spacer to separate these formers from the fuselage formers.

Glue the front and rear belly fairing sides in position and then sand them to flow smoothly into the angles of the bottom sheeting and the chin block. (See plan side view.)

Cut two 1/2" balsa filler blocks about 1 1/2" x 2" and make a 1/2" hole through each one to clear the wing bolt. Glue these blocks on top of the wing bolt plate, in front of the rear belly formers.

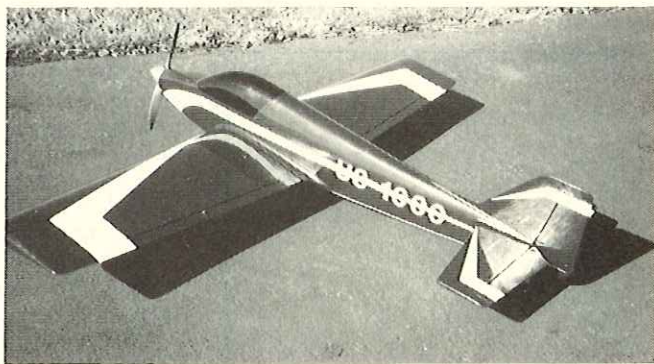
Add 1/4" balsa triangle along the bottom edge of the belly fairing sides to provide extra material for rounding the corners.

Sand the blocks and triangle flush with the sides and formers, and then sheet the bottom of the fairing with hard 1/8" balsa, grain running across the fairing.

Now round the corners of the bottom of the fuselage, the belly fairing, and the chin block (forward to the firewall). Use the drawing of F-2 and F-4 on the plans as a guide.

Cowl:

Determine from the engine application



The second prototype with retracts, a Super Tigre 2500, and a lot more eye appeal.

table which spinner size you need. Use the spinner backplate to draw the outside circle of the spinner ring.

Glue four small pieces of 3/32" hard balsa scrap to the back of the spinner backplate, equally spaced around the circumference, then use the balsa pieces to glue the backplate to the spinner ring. Be sure the backplate and ring are properly aligned.

Temporarily install the engine and engine mount.

Shorten the chin block until the spinner ring just touches the chin block when the backplate is tightened against the engine. In this position the spinner ring should overlap the chin block by 3/8" to 1/2". Glue the spinner ring to the chin block.

Sand the top front of the fuselage to the correct angle and fit the front top block. The rear of the block should be in the position shown on the plans and the front should overlap the spinner ring by the same amount that the chin block did. Glue the front top block in place.

Fit the 1/2" balsa left cowl side so that it protrudes 1/16" beyond the fuselage side at the rear and overlaps the spinner ring 5/16" at the front. Glue the left cowl side in place.

Remove your engine and engine mount. Make front and rear right cowl sides from 1/2" balsa which approximately fill the spaces in front and behind the engine. Glue them in place with the same spinner ring overlap as the left side.



Don Anderson, inspiration and mentor (and he likes the airplane).



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BILL OF MATERIALS

Balsa Sheet & Strip

- 7 — 1/16 x 3 x 30 — tail sheeting wheel well sides
- 5 — 3/32 x 3/8 x 36 — cap strips
- 6 — 3/32 x 2 x 36 — TE sheeting, LE front sheeting
- 19 — 3/32 x 3 x 36 — Ribs, LE and center sheeting, turtle deck sheeting, spar webs
- 2 — 1/8 x 1/4 x 30 — fin and rudder ribs
- 3 — 1/8 x 3/8 x 36 — stab and elevator ribs
- 3 — 1/8 x 3 x 36 — W-1 ribs, bottom sheeting, belly fairing, F-6
- 4 — 3/16 x 3 x 48 — fuselage sides
- 4 — 1/4 x 1/4 x 36 — (hard balsa) turtledeck stringers, cockpit sides
- 1 — 1/4 x 1/2 x 30 — rudder TE, spreader bars
- 1 — 1/4 x 3/4 x 24 — rudder LE, fin TE
- 1 — 1/4 x 3 x 36 — rudder bottom, fin bottom, tail wedge, TE jig
- 2 — 3/8 x 3/8 x 36 — wing TE
- 1 — 3/8 x 1/2 x 30 — elevator TE
- 2 — 3/8 x 3/4 x 30 — elevator LE, stab TE
- 1 — 3/8 x 2 x 30 — stab center, fin LE and tip, dorsal fin
- 2 — 1/2 x 1 1/4 x 36 — wing LE
- 1 — 1/2 x 3 x 36 — stab LE and tips, cowl sides
- 1 — 5/8 x 3 x 36 — turtledeck top block
- 2 — 3/4 x 3 x 30 — chin block, front top block, stab filler blocks
- 2 — 1/4 x 2 x 12 — wingtips

Shaped Balsa

- 1 — 1/4 x 1/4 x 36 — triangle stock reinforcement
- 2 — 3/8 x 3/8 x 36 — triangle stock reinforcement
- 2 — 1/2 x 1/2 x 36 — triangle stock reinforcement
- 4 — 1/4 x 1 1/2 x 36 — aileron stock, ailerons, center and tip TE's

Spruce or Bass

- 4 — 1/8 x 1/2 x 36 — spars
- 4 — 1/8 x 1/2 x 48 — spar doublers, triplers, servo mounts

Birch ("Aircraft") Plywood

- 1 — 1/64 x 6 x 12 — wing fairing base
- 2 — 1/16 x 6 x 12 — LE doublers, rib and landing gear doublers, wing bolt plate
- 1 — 1/8 x 6 x 12 — dihedral brace, retract servo mount
- *1 — 1/4 x 6 x 12 — retract mounts

- 1 — 3/8 x 6 x 12 — firewall, stab spar, wing mount, stab anchor

Poplar ("Lite") Plywood

- 3 — 1/8 x 6 x 48 — fuselage doublers, formers, fuse top stab base

Other Wood

- 1 — 1/8 x 6 — birch dowel, fin reinforcement
- 1 — 5/16 x 12 — birch dowel, wing dowels
- *2 — 1/2 x 3/4 x 12 — grooved hardwood landing gear blocks (3/16 grooves)

Hardware/Accessories

- 1 — Great Planes #CANPY 051 canopy
- *1 — Great Planes #WBNT 128 tailwheel strut
- 5 — Du-Bro #493 — control horns
- *1 set — Du-Bro #156 — nosegear brackets
- *1 — Du-Bro #166 — steering arm
- 18 — Sonic Tronics #129 — one piece hinges
- 3 — Sullivan #511 — solid wire pushrods
- *1 — Sullivan #505 — nosewheel pushrod
- 1 — Sullivan #508 — throttle cable
- 2 — 6" threaded pushrods for ailerons
- *2 — 9" threaded pushrods for retracts
- *1 set — B&D mechanical main gear retracts
- 1 — 3/16 x 36 — music wire for main gear (fixed or retract)
- *1 — 3/16 x 36 — music wire for nosegear
- 1 sq. ft. — 6 oz. fiberglass cloth
- *1 set — landing gear straps, Goldberg #291
- 2 — 1/4-20 x 1 1/2 nylon bolts
- 1 — #10 x 1 1/4 sheet metal screw
- 1 — 3/4" fender washer

Note: For engine mount and spinner selection, see Engine Application Chart on plans.

Clevis, wheels and wheel collars, fuel tank, screws nuts, covering and finishing materials are left up to the builder.

*Optional depending on landing gear configuration selected (see plans)



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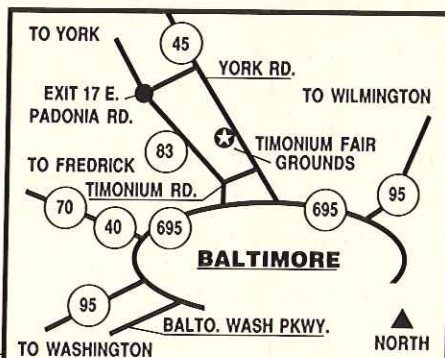
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Fit and glue 1/2" triangle along all four corners inside the cowl from the spinner ring to the firewall.

Now cut away just enough of the right cowl sides so that you can reinstall the engine mount and engine.

Remove the engine and carve and sand the cowl to shape. (Use the spinner ring and the drawing of the firewall on the plans as a guide to the correct shape.)

Turtledeck:

Prepare the turtledeck sheeting as follows: Use a 3" x 36" sheet of 3/32" medium balsa. Make a mark at the top edge 20" from the left end. Make another mark at the left end 2" from the top. Connect these marks with a line, then cut along the line. Now flip the cut off piece over and glue it to the remaining top edge of the sheet, so that the line you drew is carried on past the right end of the sheet. Finally, cut the right end off 33" from the left end. You should now have a 3/32" balsa sheet 33" long, 1" wide at one end and 4 1/2" wide at the other end.

Make a second sheet just like the first one, and sand both of them smooth.

Using the F-3A angle template, install F-3A in the location shown on the plans. Also install F-4A, F-5A and F-6A, making sure that each former is centered from side to side.

Install hard 1/4" square balsa stringers. Now install the sheeting. Glue the bottom of the sheet to the top of the fuselage side, wet the outside of the sheet and then glue it to the formers and top stringer. Now you can use thin CA to glue the sheeting to the lower stringers.

Sand the top of the sheeting, formers, and stringers to a level flat surface and glue on the 3/4" balsa rear top block.

Carve and sand the turtledeck to shape and blend it into the fuselage sides.

Install 1/4" square balsa cockpit sides and scrap balsa filler which may be required where the cockpit sides meet the front top block. Add a piece of balsa between the bottom edge of the front top block and the light ply fuselage top to seal off the cockpit from the tank compartment. Sand the cockpit sides to blend with the fuselage sides.

Glue the 1/2" balsa stab spacer block behind F-6A. The grain should run front to

back on this piece, not across the fuselage.

Cover the leading edge of the stab and fin with plastic wrap and pin them in place on the fuselage.

Prepare the 1" x 3/4" stab filler blocks by tapering them in two dimensions (see side view and bottom view plans).

Glue the filler blocks to the back of F-6A and the top of the stab spacer, but not to the stab or fin. Remove the stab and fin as soon as possible to avoid stray glue.

Sand the filler blocks to match the fuselage contours.

Wing Fairings:

Cover the center section of the wing with plastic wrap (do the top and both ends of the belly fairing), then mount the wing on the fuselage.

Press the 1/64" plywood fairing base against the surface of the wing and push it up against the fuselage side. Glue the base to the fuselage side with a bead of thick CA. Any gaps you find can be bridged with balsa scrap if the CA won't fill them. Note: The fairing base should extend 1/16" beyond the T.E.

Laminate a second layer of 1/64" plywood on top of the first, and do the other side of the fuselage the same way.

The 1/8" light ply wing fairing extension butts up against the rear of the wing fairing base, and is flush with the top of the base. Note that the extension is parallel with the top of the fuselage side, it does not continue the curve of the airfoil.

Now remove the wing and form the fairing with light spackle, rough shaped with a wet thumb. When the spackle has dried about 24 hours, sand off any high spots with a round sander and give the fairings a smooth coat of regular spackle or wall joint compound. Sand to final shape, then give all the spackle a coat of thin CA or UFO. This final coat is easy to sand smooth and gives the spackle a hard durable surface which covering sticks to very well.

Spackle fairings should also be used on the bottom of the wing and around the fin and stab. (Modelers often swear that this fuselage is fiberglass.)

Mounting The Tail:

Mount the wing to the fuselage, slip the stab into its slot and measure carefully to see that it is parallel with the wing when viewed

from the top and from the rear. When satisfied, glue the stab in place with epoxy, rechecking alignment until the epoxy sets. Note that the fender washer must be facing up.

Drill a 3/32" pilot hole through the fender washer, stab, stab base, and stab anchor, then install a #8 x 1 1/4" sheet metal screw.

Drill 1/8" holes straight into the bottom of the fin as shown on the plans, and glue in the 1/8" reinforcing dowels. Drill corresponding holes through the stab and stab base. Check the fit of the fin in its slot. You may have to "notch" the bottom of the fin to clear the head of the sheet metal screw. Make sure the fin is lined up straight with the centerline of the fuselage and 90 degrees to the stab. When satisfied, glue the fin in place with epoxy, rechecking alignment until the epoxy sets.

Add 1/2" balsa triangle reinforcement under the stab on both sides of the fuselage.

For Tail Draggers:

Cut a slot in the rear of the fuselage for the tailwheel bracket and drill a 3/32" hole in the rudder for the strut. Test fit the rudder and tailwheel assembly to be sure no binding or clearance problems remain.

FINAL ASSEMBLY:

Covering, finishing, final assembly, and balance are left up to the builder. I prefer low-temp iron-on to keep the weight down. Start with the recommended control travel and C.G. and be sure to balance the airplane side to side as well as front to back.

FLYING:

Like all of the Ultra-Sports, the 1000 is capable of precise high speed aerobatics, but retains very gentle low speed characteristics. It goes exactly where you point it with no surprises.

If you've been flying smaller airplanes you will find that the Ultra-Sport 1000 is a little bit slower to respond, although the response is smoother than in the smaller models.

If you've been flying giant scale airplanes you will find that the Ultra-Sport 1000 is much quicker to respond than the average big model.

In either case, after a couple of flights, you will find that the compromise is easier to fly and more fun than either extreme.

Happy Flying!

