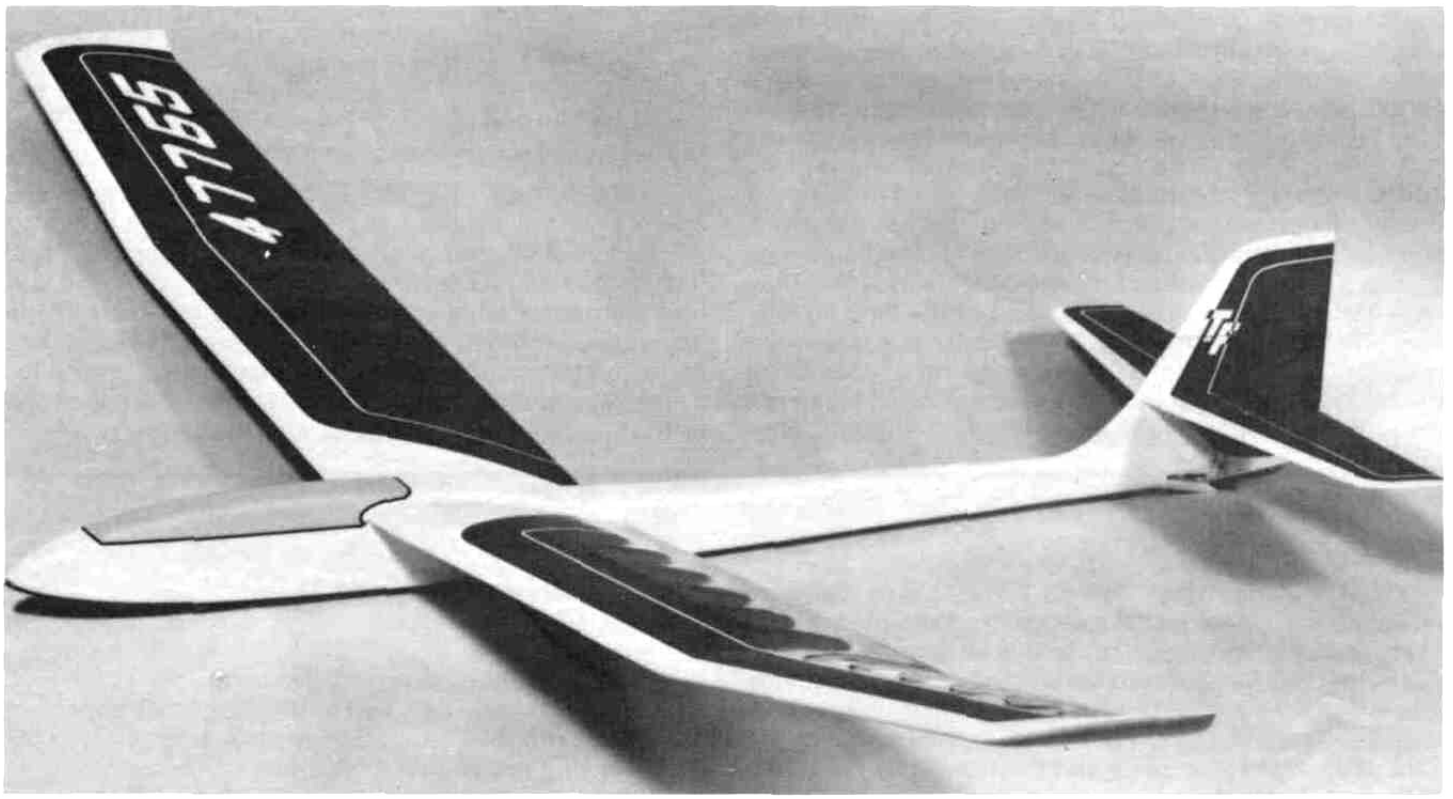
METRICK
RC-29 SAILPLANE INSTRUCTIONS



INTRODUCTION

There is no question, two-meter sailplanes have arrived in the mainstream of the modeling community and show every sign of remaining for a long time. The reasons why are many and varied but the fact that they are easier to build and still provide every bit the flyability of the larger Standard Class and Open Class sailplanes should not be overlooked. Until quite recently, the designs available, either in kit or plan form, have generally reflected the "floater" approach, with emphasis on very light construction yielding exceedingly low wing-loadings. Airfoils on these aircraft have usually been variations on the ever-present Clark-Y The models themselves have been typified by a kind of back-to-basics look as opposed to the considerable design work showing-up in the Standard and Open classes. While these "first generation"-type two-meter designs filled the initial need, competition has begun to disclose the drawbacks to lightly loaded and constructed models especially those using airfoils which do not provide penetration in anything less than no-wind conditions. It was inevitable that designers would begin to explore the sophistication of two-meter sailplanes and their resultant designs are now beginning to show-up on flying fields. These designs are now being referred to as "second generation." Your Top Flite METRICK two-meter sailplane definitely falls into this category.

The METRICK is the fulfillment of several important design criteria that we felt a second-generation two-meter sailplane should possess:

1. The ability to be flown in a wide variety of wind conditions and yet remain competitive by virtue of airfoil efficiency and relatively clean aerodynamics.
2. Airframe strength to survive and even take advantage of high-velocity 12-volt winch launches.
3. Expandability to allow the use of spoilers, releasable

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and captive towhook systems and room for reasonable ballasting as desired by the pilot.

4. The ability to accept and use today's radio equipment including the standard configuration 500 mah battery pack.
5. An overall appearance that is as pleasant to look at as it is efficient.

In our opinion, the METRICK not only has met these criteria but in actual practice has exceeded them. In contest situations the METRICK has been launched with a 12 volt winch into 15mph+ winds, penetrated forward from launch about 1/4 mile and completed the 10-minute task with a high 90's spot landing—all of this in a 31 ounce, unballasted condition! It is interesting to point out that in this particular contest, all other 2-meter designs, and many Standard class entries either folded their wings on tow or were blown so far back off of launch that they were forced to land well down-wind of the landing site. Since very few of us have anything to say about the weather conditions that a given contest is going to have, the METRICK *had to* handle the worst and still come out on top. What about light or no-wind conditions? Your METRICK will really come into its' own on these types of days! The design has a longer than usual tail-moment which dampens the usual low-speed porpoising tendencies associated with newer second generation two-meter sailplanes.Stalls, the nemesis of sail planes since they eat up much hard gained altitude, are very shallow with the METRICK. The glide in these light conditions is nothing short of incredible. The airfoil used on the METRICK allows you to cover so much sky with such a minimal loss of altitude you will no longer have many excuses for missing thermals! When the nose is trimmed slightly down the design will accelerate rapidly with a very flat glide rate, getting you from point A to B faster than you can believe at virtually the same altitude you started at.

The METRICK can be launched using any one of the commercially available hi-start systems as well as 6 or 12 volt winches. The design also slope soars beautifully and has an .049 engine set-up shown on the plans. You will find, no matter what configuration you set the airplane up with—engine or unpowered—your METRICK has hands-off performance, making it an excellent choice for a first R/C ship and an equally smart choice if competition is your goal.

PRE-CONSTRUCTION NOTES

The METRICK, like other Top Flite kits employs the use of die-cut wood to ease the task of construction, parts fit and identification. The dies used for this kit have been rigorously checked for absolute accuracy and should provide you with excellent fit. Die-cut parts should be carefully removed from their sheets by first lightly sanding the *back of* each sheet of parts and then carefully removing each part. Use a light garnet paper for the sanding and keep a sharp hobby knife with an X-acto #11 blade or equivalent handy for assistance in removing any parts that might not have been completely cut-through on the dies. Parts which oppose one another and must be precisely uniform—such as fuselage sides, ribs, etc...—should be carefully "matched" after their removal from the parts sheets. Matching is the process of holding the opposing pieces together with either pins, tape or spot gluing and lightly sanding the edges of the parts until they are identical. A sanding blockwith light garnet paper is most useful for this and other phases of construction.

Your building surface should be at least large enough to accommodate the wing panels. This surface should be as absolutely flat as possible and yet be able to accept pins easily. We have found that a product such as Celotex fiber board works quite well for this purpose. Another good surface can be found in most well-stocked hardware stores, this is a 2' x 4' fiber board ceiling tile—these are quite inexpensive and can be used for several airplanes before needing replacement.

As with most R/C kits that are constructed from wood, a selection of tools—most of which can be found in the average workshop—are a must to do the job correctly:

Hobby knife and sharp #11 blades
Single-edge razor blades
T-pins
Sanding blocks in assorted sizes
Sandpaper—220, 320, 400 and light garnet **paper**
Hand-held hobby saw, such as an X-acto
Power drill and assorted drill bits
Straight-edge, preferably metal, at least 24" long
90° triangle
Small power jig-saw such as the Moto-Saw
Tapes such as masking and cellophane.

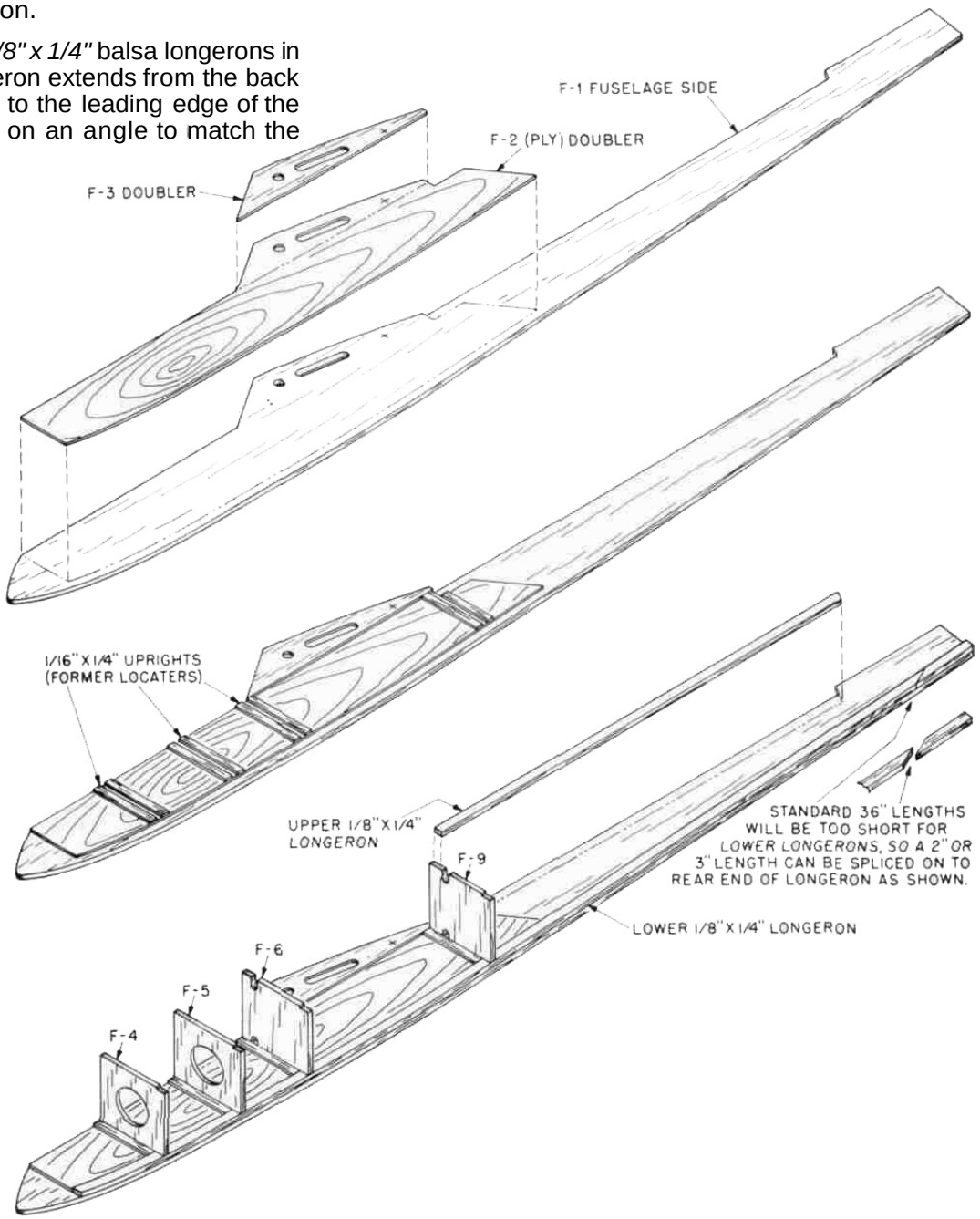
Our METRICK's were constructed using a variety of common hobby adhesives including 5-minute epoxy, Cyanoacrylates, aliphatic resin (such as Titebond) and 1-hour epoxy was used to secure the main wing wire tubes in the wing roots. Since all of us have our own construction techniques and favorite adhesives, stick with the ones that you are familiar with and prefer. However, in certain areas there will be callouts for certain types of adhesives and we urge you to try not to substitute since doing so could possibly cause problems structurally later on.

The last thing we should touch on before we begin actual construction is the sequence in which the METRICK is assembled. The sequence given to you in this booklet has been proven to be the most straight-forward and provides the finished components in the order that you will need them to progress to the next assembly phase. Try to stick with the building order presented here to avoid mistakes.

Spread the plans out on your work surface, cover them with a clear plastic material, such as the backing from a roll of Monokote or plastic food wrap and commence construction.

FUSELAGE ASSEMBLY

1. Remove die-cut fuselage parts; F-1, F-2 (ply) and F-3—do this carefully and, as mentioned earlier, use an X-acto knife to expedite this. Start construction, by gluing (we used contact cement) the F-2 fuselage doublers to the F-1 fuselage sides. Do this as accurately as possible, lining-up slots and holes for the wing mating points and making sure these doublers are flush with the top edges of the fuselage sides—MAKE A LEFT AND RIGHT FUSELAGE SIDE.
2. Glue the 1/16" balsa F-3 doublers in place onto the F-2's, again lining-up the slots and holes and making sure the top fuselage side edges—allow to dry.
3. Using the 1/8"x1/4"x36" balsa stock supplied, glue the bottom fuselage longerons in place, starting at the front of the F-2 doubler, pinning and gluing as you work aft. Note that you will need to add an additional 1-1/4" of this longeron stock at the rear to complete to full-length bottom longeron.
4. Cut and glue the top rear *1/8" x 1/4"* balsa longerons in place. Note that this longeron extends from the back of the F-9 former position to the leading edge of the fin location where it is cut on an angle to match the fin.
5. Using a sharp pencil and a straightedge, mark the locations of all fuselage formers; F-4, F-5, F-6, F-7, F-8 and F-9, including the location of the rear 1/8" x 1/4" fuselage uprights, behind former F-9—mark these locations on the right fuselage side. Holding the left fuselage side to the right, so that they are accurately matched, transfer the former locations to the left fuselage side.
6. Now accurately glue the 1/16" x 1/4" balsa "former locators" in place on each side of the former F-4, F-5, F-6 and F-9 locations. Use a scrap piece of 1/8" wood to simulate the thickness of these formers, ensuring an accurate slot and therefore a good fit.
7. Note the 1/8" x 1/4" balsa "nyrod spacer" at the rear of the fuselage, directly below the leading edge of the fin. Cut and glue one of these to each fuselage side.



8. You will now need to drill an angled hole in the left rear fuselage side for the red outer nyrod rudder pushrod. Note the location of this on the plans. We used a piece of sharpened brass tubing that was the same diameter of the outer plastic tubing, in order to get a good fit. Be sure to keep the location of this pushrod as low in the fuselage as possible to avoid any interference from the action of the stabilator bellcrank.

9. Pin, tape or lightly spot glue the two fuselage sides together, with their outer surfaces touching—align them to each other very carefully. Using the sanding block, sand their outer edges to match them identically. While the sides are still together, carefully match the main wing tube holes and the access slots—the main wing tube holes must line-up accurately.

10. Remove both W-1 ply wing root ribs and both F-11 fuselage root ribs carefully from their sheets. Remove the main wing tube holes from each of the ribs and the access slots from the F-11 ribs—use a hobby knife to assist you. Take one of the F-11 ribs and locate the indentation at the back, called out with an arrow. Drill a *1/8"* dia. hole in this rib, at 90° to its surface—this rib is now your "drill guide" for the rest of the ribs. Insert one of the main wing wire tubes into the hole in the "drill guide" rib, letting one end of it extend out from the rib about 1/16". Now drill the *1/8"* dia. hole needed in the remaining F-11 and W-1's, by placing the rib onto the wing wire tube, lining up the rib to be drilled with the "drill guide" rib and drilling the hole—repeat this process until all four ribs have accurately aligned and drilled holes. Use the same procedure on the now matched fuselage sides; insert one of the main wing wire tubes into the hole in the fuselage side, slide an F-11 rib onto the tube and down *flat* against the outside of the fuselage side, position as shown on the plans and drill the *1/8"* dia. hole. Repeat this process with the other fuselage side.

11. Remove ply tailskid F-12 from its sheet. Position F-12 in place on one of the fuselage sides, as shown on the plans. Mark its forward edge location on the longeron in pencil. With a single edge razor blade, remove approximately *1/32"* of the thickness of the longeron, forward to the pencil mark—this becomes half of the slot that F-12 will fit into. Do the same thing to the other fuselage side.

12. Lay the right fuselage side on your work surface in front of you with the inside facing you. Take one of the servos that you plan to use and position it between the F-5 and F-6 former locations. Note the position of the output arm. With a pencil, mark this location on the 1/16" x 1/4" upright former locator in front of F-6. Remove former F-6 and F-9 from their sheets and position them in place on the fuselage side. Mark the location of the output arm on F-6 and mark the location of the red outer pushrod housing, shown **on** the plans, on F-9. Sand or file a 3/16" slot on each side of these two formers so that the red outer pushrod can fit with the formers in place.

13. Remove formers F-4, F-5, F-10 (ply), F-7 and F-8 from their sheets. (Note that formers F-5, F-6 and F-9 are the same width—stack them to be sure and use a sanding block if needed to get them that way.) Glue formers F-5, F-6 and F-9 in place on the right fuselage side. Apply glue to the opposite edges of these formers and position the left fuselage side on them. Tape and/or pin this structure so that it is absolutely square and allow to dry completely.

14. With medium sandpaper, completely "rough-up" both outer red pushrod tubes. Install the stabilator pushrod on the right fuselage side by sliding it, from the rear, through the slot in F-9 and then F-6, so that about *Vs"* of it is exposed in front of F-6—see plans. Slot the rear *1/8"* x *1/4"* upright, behind F-9, just below the top rear longeron to accept this tube and press it in place above the rear spacer, just below the fin. Cut off the excess tubing exactly where shown on the plans and use 5-minute epoxy to glue this tube in place along the fuselage side and at F-6 and F-9. Using the same method, install the rudder pushrod tube along the *left* fuselage side. Note that this tube gently bends downward once past F-9 so that it arrives at the rear of the fuselage, laying along the top of the bottom fuselage longeron and exits through the slot we drilled earlier. Once the glue has set, use a sharp single edge razor blade to trim off the excess tubing on the outside rear of the left fuselage side. Use a sanding block to sand this exit smooth with the fuselage.

15. Glue ply former F-10 in place, directly above F-6. Note that this former protrudes above the fuselage top by a little more than *1/8".*

16. Glue the 1/8" x 1/4" balsa cross brace in place at the bottom of the fuselage, below F-7. This brace is the gluing "shelf" for the 1/16" ply floor, forward to the nose and the 1/16" cross-grain balsa floor, aft to the tail.

17. Temporarily install—do not epoxy yet—the 1/4" I.D. main wing wire tube and the 3/32" I.D. rear fuselage incidence tube in the appropriate holes on the fuselage sides. Install and glue in place former F-8—this former sits immediately in front of the rear 3/32" I.D. fuselage incidence tube. Now cut, fit and glue a length of 1/8"x1/4" balsa directly beneath this tube and against the rear bottom of F-8. Temporarily install the channeled maple "U" block in place over the main wing wire tube, open end facing up. Install and glue in place former F-7 so that it fits flush to the rear of the "U" block as shown on the plans. Remove the "U" block and both of the fuselage wing tubes.

18. Install former F-4, holding the two fuselage sides together at the nose with tape. Check to be sure that the structure is still "square".

19. Glue the hardwood noseblock in place. Note that this block fits between the two balsa fuselage sides, immediately in front of the F-2 ply fuselage doublers. Tape the block and the fuselage sides firmly in position and allow to dry completely.

20. Glue the shaped balsa forward "canopy fairing" piece in place, on top of the fuselage directly behind the noseblock. Use the sanding block to bring it flush with the fuselage sides.

21. Using a piece of the 30", *1/16"* balsa sheet supplied, carefully cut and fit the canopy/hatch base. Use your sanding block to bevel each end of this base to fit accurately to the forward canopy fairing block and the angled former F-10 at the rear. The base should be sanded flush with the outside surfaces of the fuselage sides. Remove the base and with a soft pencil, mark the locations of formers F-4 and F-5 on the outside top of each fuselage side. Lightly tack-glue the base back in place as it will only be removed after final fuselage sanding.

22. Bevel the bottom edges of canopy formers C-2 and C-5 to match the required angles at the forward (C-2) canopy fairing and the rear (C-5) angled former F-10. Glue these two formers in place to the canopy base also lightly tack-gluing them to their mating surfaces.

23. Glue the two remaining canopy formers, C-3 and C-2 in place on the base, using the pencil marks you made earlier on the fuselage sides for location. Note that these two formers are inset *1/8"* from the edge of the base on each side.

24. Using a flat work surface, glue and pin the *1/4"* triangular balsa stock provided to the inside top edge of canopy sides C-1—be sure to make a *right* and *left* side! When dry, carefully fit the canopy sides in place, trim as needed to get a good fit and glue and pin them in place. When dry, sheet the top of the canopy with cross-grain *1/8"* balsa from the back face of C-2 to the forward face of C-5. Pin and allow to dry completely. Use your sanding block to sand the canopy/fuselage sides flush and smooth.

25. Re-install the *1/4"* I.D. main wing tube and the rear 3/32" rear incidence tube, centering them so that equal lengths protrude from each fuselage side (about 3/32"). Apply epoxy (we used 1-hour type for this) to each end of the maple "U" block and fill it about halfway with epoxy also smearing some on the back face where it will contact F-7—slide this block in place over the tube. Make sure the tube is "buried" in glue. Now apply epoxy to the incidence tube/F-8 joint liberally, again, bury it—let these assemblies dry.

26. You must now decide whether to go with the fixed towhook provided or with a radio-actuated captive towhook system such as the FOURMOST RACING PRODUCTS towhook shown on the plans as an option. If you are opting for this captive set-up, the installation shown on the plans works very nicely and is quite simple. In fact, when we used this system, we slotted the ply floor, installed the mounting rails and secured the FOURMOST towhook in place on them and *then* installed the ply floor to the fuselage.

    If you are installing the stock towhook, position and hold the 1/16" x 2" x 16" ply forward floor in place and mark fuselage outline in pencil. Trim-off the excess with a hobby saw. Glue the ply floor in place, from the center of the cross brace beneath F-7 forward and on to the nose block—tape and allow to dry. Epoxy a length of 1/16" x *1/2"* ply—provided in an 8" length—to the inside center of the ply floor, between the cross brace and the back of F-6, this is the towhook plate doubler. Determine the location of F-6 and mark its rear edge location across the bottom of the fuselage in light pencil. Then draw a light centerline of the fuselage on the bottom from the F-6 line back. Measure back 1-1/2" and drill a 3/32" dia. hole through the ply floor and the ply doubler. Epoxy the 2-56 blind mounting nut provided into this hole from the inside of the fuselage—use glue liberally around the nut's base, without getting any into the threads.

27. Using *1/8"* balsa sheet, cross grain, sheet the top of the fuselage from the rear edge of F-7 forward to the angled back face of F-10 and from the forward face of F-8 to the rear edge of F-9. "Cap" the top of the two fuselage sides between the two edges of the sheeting with *1/8" x 1/4"* balsa aligning the outer edges with the fuselage sides. The resulting rectangular opening in the fuselage top is for the access hatch.

28. As shown on the plans, the access hatch is a simple frame made from *1/8"* x 1/4" balsa, on edge. We used scraps of bond paper front, back and on each side for spacing while making this frame. As shown, install two pieces of *1/8"* x *1/4"* balsa as shelves on the back face of F-7 and the front face of F-8 to seat this hatch. Sheet the hatch with *1/8"* balsa, cross grain, lightly sand the edges flush with the frame and lightly tack glue the hatch in place for final sanding.

29. Glue the fuselage sides together at the rear, from the leading edge fin position, back to the ends of the fuselage sides at the bottom—keep glue out of the slot you have cut in the rear longerons for F-12. Check the fuselage carefully for equal bending and that the top and bottom are aligned. Secure as necessary and allow to dry.

30. Cut, fit and glue 1/4" balsa turtle deck in place—note bevel for fin fit. Turn the fuselage over and install bottom 1/16" balsa cross grain sheeting from ply floor back to point shown. Use a straight edge and a knife to cut a 1/16" wide by 2" long slot in a piece of *1/16"* balsa sheet. This allows F-12 to slip in place. Glue this remaining bottom sheet in place. Once everything is dry, use a sanding block and medium grade paper to sand the fuselage sides, top and bottom smooth. Pay particular attention to the side-view contour at the top of the fuselage where the *1/8"* sheet meets the *1/4"* turtle deck. Sand the side and top view shapes into the nose block but do not round any edges yet.

FIN AND BELLCRANK ASSEMBLY

1. Remove all required FIN parts from the die-cut sheets; FIN #'s 1, 2 and 3 (two of each) and FIN #'s 4 and 5. Also carefully remove the BELLCRANK (3/32" ply) using an X-acto knife as needed. Sand all edges **of** the bellcrank and the surface until it is completely smooth. Note on the plans that the bottom edge **of** F-1 butts to the top edge of F-2 and the top edge of F-3 butts to the bottom edge of F-2; lightly sand these edges to create a flat, gapless fit. Remove the oblong die-cut from FIN-2's.

2. With a 1/8"dia. drill bit, **drill-out** the two required holes at the top of the bellcrank for the *1/8"* O.D. brass drive tubes to be inserted—drill these holes at right angles to the bellcrank. With a 1/16" dia. drill bit, drill-out the two holes at the bottom of the bellcrank that will be used for connection to the elevator servo. Lightly sand-off any burrs.

3. Insert the forward *1/8"* O.D. x *1/4"* "pivot tube" and the rear *1/8"* O.D. x 1/4" "drive tube" into the holes at the top of the bellcrank, center them so that an equal amount of tubing is showing on each side of the bellcrank. Making sure that these tubes are roughly at right angles to the bellcrank, place a small amount of Cyanoacrylate to the tube/ply joints to hold them in place.

4. Assemble the 1/8" thick fin "core" directly over the plans using the *1/8" x 1/2"* balsa stock provided for the leading edge and FIN #4 and 5. Glue a length of 1/16" x 1/4" balsa stock on top of the leading edge, flush with the front edge of it.

5. On a flat work surface, make-up two fin "cover assemblies" by edge gluing FIN *#'s* 1, 2 and 3 together. Holding these two assemblies together so that they match as closely as possible, lightly sand the leading and trailing edges with a sanding block to get them as straight as possible and matched to one-another.

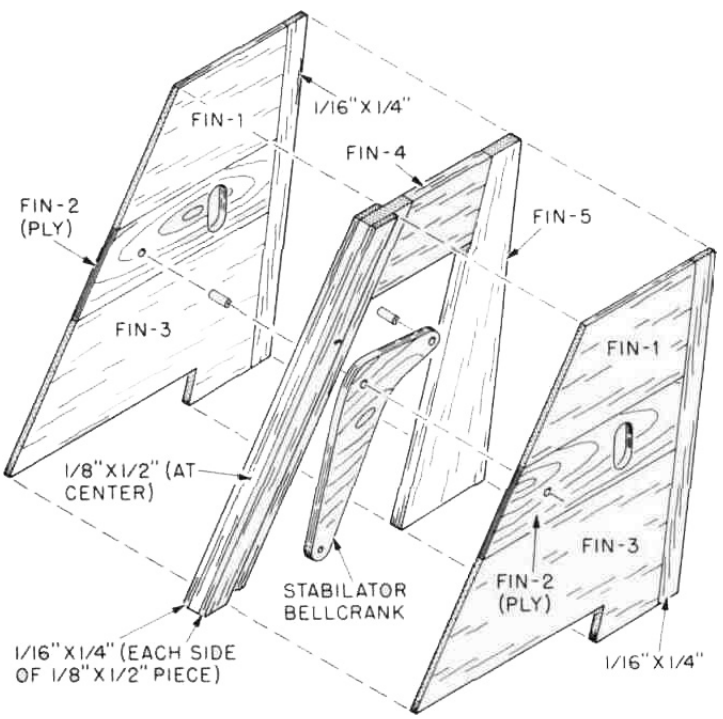
6. Set one of the fin cover assemblies aside and glue the other one directly to the fin core assembly, the leading edge against the 1/16" x 1/4" strip that was glued in place earlier. Make sure this assembly is flat by pinning it to the work surface. Glue another length of *1/16"x1/4"* balsa to the trailing edge of the exposed FIN 5 core and up against the cover assembly—allow **to** dry.

7. Remove the fin assembly from the worksurface and turn it over. Glue another 1/16" x 1/4" balsa strip to the leading edge of the core as was done on the other side. Fit in place, pin but *do* not glue, the remaining fin cover assembly. Cut and fit the remaining 1/16" x 1/4" balsa trailing edge strip that fits immediately behind the fin cover—glue this in place and pin. Remember, at this point the unglued fin cover is in place but removeable.

8. Slip a scrap piece of *1/8"* balsa inside the fin, from the bottom, directly under the small indention on the FIN-2 ply part (there is an arrow pointing to this). Using a 1/8" dia. drill bit, drill a hole all the way through the fin—*NOTE*, while a drill press is most useful here it is not necessarily needed if reasonable care is taken to drill this hole at as close to right angles as possible.

9. Remove the unglued fin cover assembly and the scrap 1/8" balsa. Install the bellcrank into the fin by pressing the forward "pivot" tube into the *1/8"* dia. hole you just drilled. You will note that the rear "drive" tube is now free to move up and down in the oblong hole. With the fin and bellcrank flat on the work surface, you can now glue the remaining fin cover assembly in place with the "pivot" tube pressed through the hole in FIN-2—allow this assembly to dry.

10. Using the sanding block, sand the sides of the completed fin as smooth as possible. Carefully cut-out the 1/4" FIN-6 fairing. Lay the fin assembly over the plans in the exact position shown and glue FIN-6 in place on the leading edge of the fin. Set this assembly aside for final sanding.

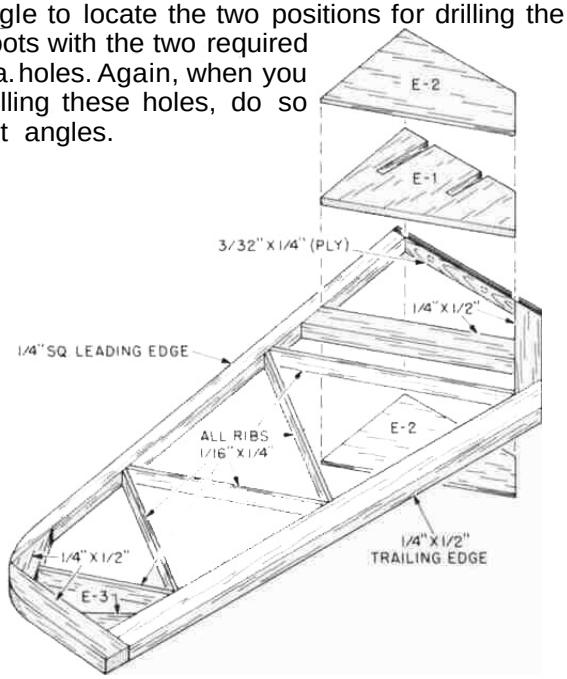


RUDDER

1. Carefully cut-out rudder parts R-1, R-3, R-4 and R-5 from the printed *1/4"* balsa sheet provided. **Remove** plywood die-cut part R-2 from its sheet.
2. Position the completed fin and bellcrank assembly **in** place on the plans and pin. Start rudder construction by first cutting and pinning the *1/4"x* 1/2" tailpost piece in place about 1/32" away from the trailing edge of the fin as shown. Next, fit R-1 in place with the bottom of it about 1/32" away from the top of the fin—if necessary, trim R-1 to fit as shown. Once satisfied with the fit, glue R-1 in place. Remove the fin from the plans and build the rest of the rudder as shown, pin and allow to dry.
3. Using a single edge razor blade, relieve 1/16" of the bottom tailpost area to accept ply part R-2 on the *left* side only. R-2 should be fitted to rest flush with the top surface of the rudder assembly. Once satisfied, glue R-2 in place.
4. Sand the outside of the rudder to the shape shown on the plans, followed by using the sanding block and light sandpaper to sand each side smooth. As shown in the drawing, bevel the leading edge of the tailpost, where it will be hinged to the rudder, to facilitate free left and right movement. Set the rudder aside for final airfoiling.

STABILATOR ASSEMBLY

1. Carefully remove die-cut parts E-1 (1/8" balsa), E-2 (1/16"' balsa) and cut-out parts E-3 from 1/4" balsa sheet which is printed. Note that the outside shapes of all of the E-1's and E-2's should be identical—carefully and accurately stack these parts together, pin and with a sanding block, "match" all of their edges. This procedure should produce a precise fit.
2. The stabilator halves will be built directly over the plans and both halves will be built at the same time. Start construction by accurately pinning E-2 in place followed by cutting, gluing and pinning the *1/4"* sq. leading edge in place. Complete the stab outline by cutting and gluing in place the remaining pieces of 1/4" x *1/2"* balsa stock shown. Glue the 1/4" E-3 rear gussets in place and cut the forward gussets from the 1/4" x 1/2" balsa provided and glue in place. Next, cut and glue the 1/16"' x 1/4" diagonal "ribs" in place.
3. Now glue the slotted 1/8" balsa E-1 in place directly on top of the bottom E-2. Pin in place and allow to dry.
4. From the 3/32" x *1/4"* ply strip provided, cut *two* 3-3/32" lengths. These will be used for the stab "cap roots." As shown on the plans, use a sharp pencil, a **ruler** and a triangle to locate the two positions for drilling the stab roots with the two required 1/8" dia. holes. Again, when you are drilling these holes, do so at right angles.



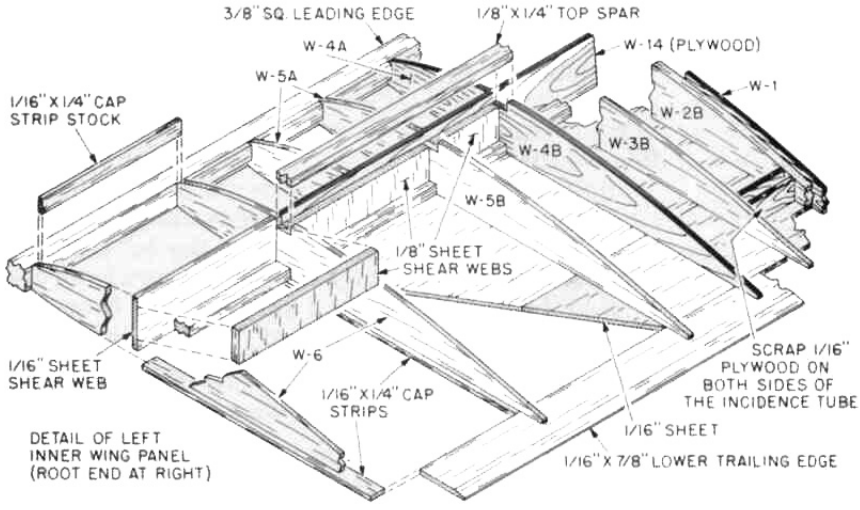
5. Remove the stab halves from the plan and place one half over the other so that they match as closely as possible—pin together in this position and using the sanding block, match their outlines including the radiusing of the leading edge tips as shown on the plans. *Carefully* sand the root sections flat. Unpin the two stab halves. Glue the 3-3/32" ply root caps to the stab roots, carefully matching the 1/8" dia. holes with the tube slots in E-1—allow to dry before proceeding to Step 6.
6. From the hardware package, remove; one (1) 3/32" dia. x 2-5/8" wire; two (2) 3/32" I.D. x 1 3/16" brass tubes; one (1) 3/32" x 2" wire; two (2) 3/32" I.D. x 7/8" brass tubes.

   You will need to use a slower drying epoxy, such as 15-minute to have the proper amount of time to do the job right. You are now going to epoxy the forward 13/16" long stab pivot tubes and the rear 7/8" long stab drive tubes in place through the holes drilled in the 3/32" ply stab roots and into the slots in E-1. *Be very careful to not get any adhesive in the tubes themselves.* As soon as both forward tubes are in place, fill the remaining area of the slots with epoxy and level it with your finger. Repeat this process with the rear tubes. Note that these tubes are flush with the 3/32" ply stab roots. Insert the forward and rear wires into one stab half and slip the other stab onto the wire ends and lay this whole assembly directly over the stabilator plan and pin accurately in place with the *1/4"* gap in the center, as shown. Now glue the remaining E-2's in place directly over the E-1's and tubes—pin and allow to dry completely.
7. Remove the stabs from the plan and trial-fit them to the fin and bellcrank assembly. The fit we are looking for is firm bordering on tight—not free or loose. The firm fit retains the stab halves in place to the fin. On one of our prototypes we made the components so accurately that the fit was too free and we cured this by smearing a thin film of 5-minute epoxy on the wires and lightly sanding them until all fits were firm.
8. Using a sanding block and light sandpaper, sand the top and bottom of the stabs until they are quite smooth and set them aside for final airfoil sanding.

WING ASSEMBLY

Before starting this assembly sequence, you must make the decision whether or not to build the spoiler option. While the plans are sufficient in explaining the addition of this option you should modify four (4) W-6 wing ribs by relieving them to accept the 1/4" x 1" trailing edge stock, which will be the spoilers. You will also note that the *top* 1/16" sheeting requirements are somewhat different and is called out with —-·— lines. Installation of the flexible plastic dial chord housing tubes must be done before the top, rear root section sheeting is installed. The spoiler option shown on the plans has been used quite successfully on our prototypes and really makes the METRICK quite "deadly" in the spot landing phase of your flights. Note that the first phase of the wing construction is the building of the two inboard wing sections, followed by building and fitting the two outboard wing sections.

1. Start by removing all necessary die-cut parts from their sheets—do this carefully, using an X-acto knife as required. We have made a practice of stacking all of the ribs together, in the order that they are used and lightly sanding them to uniform shape with the sanding block. Also be sure that the top and bottom spar notches line-up, again using the X-acto knife if needed. Next, prepare the 1/16" bottom leading edge sheeting by cutting it exactly to size shown on plan—note that unlike the top sheeting, the bottom sheet extends from the rear of the bottom spar, forward to the front of the 3/8" sq. leading edge. Use your metal straight edge and knife to make the front and rear edges straight and parallel. Pin the bottom leading edge sheeting in place directly over the plans.
2. Cut, fit and pin the 1/16" bottom trailing edge sheet in place over the plans. Use a pencil and a ruler to now mark the locations of all the wing ribs—remember that the bottom spar will cover up any marks that are too close to the rear edge of the bottom leading edge sheet, so make these marks further forward. Now cut, carefully fit and glue the inboard bottom center sheeting in place—again, use your straight edge to achieve straight, gapless butt-joints.
3. Cut, fit and glue in place all of the bottom 1/16"x1/4"cap strips.
4. Cut, fit and glue the bottom *1/8"* x 1/4" spruce spar in place, lining it carefully up with the rear edge of the bottom leading edge sheeting. Before pinning it in place, use your straight edge to be sure it is straight and accurately placed.
5. Use one of your W-6 "full chord" ribs as a spacer and locate and glue the 3/8" sq. leading edge in place on the bottom forward leading edge sheet. Be sure to glue and pin the leading edge in place straight and properly spaced.
6. When the leading edges have dried, remove all of the pins from it and any you have in place back to the spar. As shown on the plans, the bottom leading edge sheeting, at the front has to be raised off of the building surface by about 1/16" to conform to the bottom forward shape of the wing ribs. As shown, we did this by inserting some 1/16" sheet in place, deep enough to achieve the proper curvature.
7. Glue W-7A and W-7B ribs in place at the outboard end—note the 1/16" gap between these two ribs at the spar to allow the installation of W-17 later on. Use a triangle to be sure these ribs are at right angles to the work surface. Moving inboard, glue all five W-6's in place, again make sure they are at right angles with a triangle.
8. Trial-fit ply brace W-14 in place—note the "to root" arrow and the slight angle at that end. This means that this part has to be oriented with the angled end toward the fuselage. This part must fit onto the bottom sheeting, against the forward face of the bottom spar and terminate at the inboard edge of W-2A, as shown. Glue W-14 in place making sure the top edge of it will still accept the top spar to be inserted later.
9. Glue the remaining forward partial ribs in place; W-5A, W-4A, W-3A. Glue rear partial ribs W-5B and W-4B (ply) in place.



10. Rear ply brace, W-15 is glued in place next. Like W-14, this part has a "to root" arrow and an angle also and must be oriented correctly. The installation of this part is meant to create a "box" for the *1/4"* I.D. brass wing tubes. When gluing W-15 in place, use one **of** these tubes as a "spacer" to ensure a good fit.
11. Glue rear partial rib W-3B in place.
12. *Vs"* balsa root ribs W-2A and W-2B are now glued in place. Note that these ribs are slightly angled at the top to match the two angles of W-14 and W-15 at the **root.**
13. As shown on the plans, cut, fit and glue in place on the rear face of the 3/8" sq. leading edge, the 1/16" x *1/4"* balsa "sheeting shelves", between each rib—see cross-section.

14. With the *1/8"* balsa sheet provided, fit, cut and glue the *vertical* grained "spar webs" in place between each rib from W-4B out to W-7B. Note that these webs are fitted flush with the forward edge of the spars and are cut to fit between the top and bottom spars. Do this step carefully to ensure good, positive fits.

15. Now cut, fit and glue the forward 1/16" balsa webs in place between each rib from the inboard W-6 out to the inboard position shown for dihedral brace W-17. Note that the grain of these webs runs horizontal or parallel with the span and that they are full depth from the top of the bottom sheeting to the top of each rib and full against the forward face of each of the 1/8" balsa spar webs.

16. Use a small sanding block and light sandpaper to bevel the bottom trailing edge sheeting as shown on the plans.

17. Cut, fit and glue the top 1/16" x 7/8" trailing edge in place. Pin and allow to dry completely.

18. Unpin and remove the two wing panels from the work surface. Prop-up the outboard end of each panel 1-1/8", with the inboard end flush with the edge of your workbench. Using the sanding block, carefully sand the inboard face of wing panel so that it is smooth and straight. This should be done accurately to provide a flat gluing surface for ply cap ribs W-1. Repin wing sections flat to the worksurface.

19. Glue W-1 directly to wing panel roots, carefully lining-up the large wing tube hole in W-1 with the space between W-14 and W-15. Be sure W-1 is also flat against the worksurface—allow to dry.

20. Trial-fit one of the 1/4" I.D. brass wing tubes through the large hole in W-1 and into the box between W-14 and W-15. As shown on the plans, the tube must fit against W-4B (ply) and contact the bottom spar. This fit imparts the correct dihedral angle when the panels are aligned to the fuselage. Once satisfied, remove the tube. Cap-off one end of the tube to keep epoxy from entering it when it is permanently put in place. We simply placed one end of the tube over a piece of bond paper, applied Cyanoacrylate adhesive around the joint and sanded off the excess paper, leaving a bond paper" cap".

21. Measure, cut and fit—but do not glue—the top 1/8" x 1/4" spruce spar. Set these aside for immediate installation after the main wing tubes have been installed.

22. Mix a batch of 1-hour type epoxy and be sure to mix enough since we are now going to fill the wing tube box with epoxy and tubing. Pour epoxy directly into the wing tube box to the level of the bottom of the hole in W-1. Insert the *1/4"* I.D. wing tube into the hole and in place as described in Step 20 above. Pour epoxy over the tube to a level at the bottom of the wing rib spar notches. Make sure the wing tube is in and will stay in the proper position and glue the top spruce wing spar in place. Pin as needed and allow to dry completely.

23. Cut, fit and glue the top 1/16" balsa leading edge sheeting in place—note that this sheeting, unlike the bottom, extends from the back surface of the leading edge to halfway across the top wing spar, leaving about *1/8"* of the top of the spar exposed. Pin and allow to dry.

24. From the *3/32" x 1/4"* ply strip stock provided, make and epoxy in place the wing eyehook screw bases, which are epoxied to the back side of W-2B—refer to plans for location.

25. Carefully and accurately cut and fit the two required pieces of 1/16" balsa sheet needed for the inboard top center section. Glue in place the forward piece of this sheeting, leaving the remaining piece for installation after the rear wing incidence tubes are installed. Cut, fit and glue in place all of the top 1/16" x *1/4"* cap strips.

26. Remove the panels from the worksurface. Press in place, through the rear *1/8"* dia. holes drilled earlier, the 3/32" I.D. x 1-3/16" brass incidence tubes. Press the F-11 fuselage ply wing ribs in place over the protruding ends of the fuselage wing tubes. Slip the forward 1/4" dia. wing rod and the rear 3/32" dia. incidence wire in place through the fuselage and slip the wings in place. Line-up the trailing edge tip of the W-1 root ribs with the F-11 fuselage ribs and tape or pin accurately in place. Make four 1/16" ply wing incidence tube "formers", as shown on the plan, using ply leftover from the die-cut sheets. Epoxy one on each side of the wing incidence tubes as shown, fill with epoxy and allow to cure. When dry, finish sheeting the top rear center section of each panel.

27. Remove the F-11 fuselage ribs and accurately tack-glue them to the W-1 root ribs—these will be removed after final sanding of the wings and be installed on to the fuselage during the FINALASSEMBLY stage of these instructions.

28. The outboard wing panels are now built directly over the plans, using the same techniques described earlier in this section. Note that in the outboard wing panels the vertical *1/8"* balsa shear webs are only installed between W-7B and W-8. Note that the 1/16" horizontal-grained full-depth webs are only fitted between the outboard end of ply dihedral brace W-17 and rib W-8 and between W-8 and W-9. When the panels are complete, lightly taper the trailing-edge facing ends of triangular gussets G-1 and G-2 and glue them in place as shown. When the outboard panels are complete remove them from the worksurface, prop-up the tips at W-13 1-1/4" and use a sanding block to bevel the inboard surface of the panels to achieve the proper polyhedral angles shown on the plan. Take your time here and do a careful job—each completed wing panel must carry the same polyhedral angles.

29. The two 13/16" x 1" x 6" balsa wingtip blocks are first rough-cut to shape, using the plans for templates and then glued in place. Use a hobby knife to first bring the tips down to rough shape and then use a sanding block and sandpaper to finish the job. Note

the "typical wingtip cross sections" shown on the plan.

30. The outboard panels are now joined to the inboard panels by first epoxying W-17 in place in the inboard panel and then epoxying the two panels together, proping-up the tips, at W-13, 1-1/4" as shown. Allow to dry completely.

31. The wing panels should now be carefully and completely sanded to final shape. Note the progression shown on the plans for bringing the leading edge down to final shape and the template provided for checking the leading edge entry. Also note that as the inboard sections are sanded, the tack-glued F-11 ribs will assume the exact shape of the W-1 wing root ribs.

FINAL ASSEMBLY

1. Use your sanding block and medium-to-light sandpaper to airfoil the fin, rudder and stab halves to shape—note cross sections on plans.

2. Thread at least 1/4" of the 1" threaded stud provided into one end of the inner yellow pushrod and then thread a clevis in place on the stud. Since we don't want this clevis to have any possibility of unscrewing itself from the stud, add a drop or two of Cyanoacrylate to the threads. Install the wing rods and wings to the fuselage. Attach the clevis which is now connected to the pushrod, to the exposed 1/16" dia. hole in the bottom of the fin and insert the opposite end of the yellow inner pushrod into the end of the red outer pushrod tube at the top rear of the fuselage. Apply a slow drying glue to the bottom of the fin, where it rests against the lower longerons and to the sides of the fin, where it "nests" between the fuselage sides and carefully slip the fin in place into the rear of the fuselage. Now mount the stab halves to the fin and view the assembled aircraft from the front. Make sure the fin is 90° to the fuselage and that the stab halves are flat and alinged at right angles to the fin—take your time to ensure everything is properly aligned. Use pins, tape, etc... to hold the fin in the proper position and allow to dry completely.

3. With the wings in place on the fuselage, lightly pencil the outline of the root F-11 ply ribs onto the portion extending forward onto the canopy sides. Then mark the top and bottom location of the front face of angled former F-10. Remove the wings and remove the previously tack glued F-11 ribs from the right and left wing roots. With a saw, using the top and bottom location marks you just made, cut off the front of the F-11 ribs. Glue the two small forward pieces of these ribs in place on each side of the canopy hatch, using the outline you drew for placement. Glue the two rear parts of F-11 in place over the wing tubes and to the fuselage sides. Use a sanding block to bring any protruding ends of the wing tubes flush with the F-11 ribs.

4. Glue ply tailskid F-12 into the slot at the bottom rear of the fuselage. The completed fuselage is now sanded to final shape—refer to the plans for typical radiusing.

5. Carefully remove the previously tack glued canopy/hatch and the access hatch from the fuselage. Using the 1/16" x 1/2" ply strip provided, cut a length to fit accurately between the two inside fuselage sides at the forward base of the canopy/hatch. Epoxy this to the bottom of the canopy base so that approximately 1/16" of its forward edge will fit beneath the front balsa canopy fairing. This becomes the forward canopy "hold-down". Since the canopy is held in position at the rear when the wings are in place, all that is needed is a simple hook made from a straight pin, one for the bottom rear of the canopy base and one for the floor of the fuselage, and a rubber band.

6. Locate the positions for the two wing-joining eye-hooks, drill small diameter guide holes into the W-1 ribs and screw the hooks in place. A pair of pliers are used to slightly open these hooks so that #62 rubber bands or a spring, if you wish, can be used to join the panels to the fuselage.

COVERING

Earlier in the introduction, we spoke of design criteria and in the #1 statement "airfoil efficiency" and "clean aerodynamics" were mentioned. The METRICK was designed to be a clean, relatively fast two-meter sailplane and while the basic shapes have been provided, what the airplane is covered with is certainly an issue. Airframe cleanliness and full flight potential is realized by using Monokote for this airplane. You will need two rolls of Monokote for the METRICK, leaving some left over.

Cover each of the separate components; wings, stab halves, rudder, canopy/hatch, access hatch and fuselage, also cover the spoilers separately if you have built this option. Follow the instructions provided with each roll of Monokote. Remember, to keep it simple, light and beautiful, keep it Monokote!

After covering, your spoilers and access hatch are hinged using Monokote Trim sheets with the "wet" adhesive. Carefully slot the fin and rudder and epoxy these hinges in place ("flex" them a few times first to free them up) on first the rudder and then the fin—wipe off any excess glue with acetone. Locate and install the nylon rudder horn using the two #2 wood screws provided. Install the towhook and secure as shown on the plans.

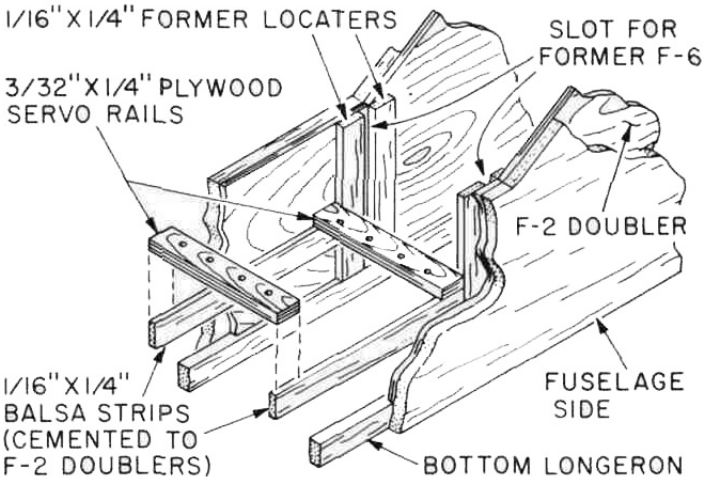
If your flying site isn't grass you may wish to protect the bottom of the fuselage from "gravel rash" by the addition of a rubber-type skid strip. A length of this material extending from in front of the towhook forward to the nose works quite well. This self-adhesive material can be found in most automotive supply stores. There are also commercially available skid strips sold in hobby shops, Airtronics is one of the manufacturer's who make it available.

RADIO INSTALLATION

The radio installation in your METRICK is very straightforward and therefore should not present a great many problems. As the plans show, the design is set-up for standard configuration 500 mah battery packs with room left over for any ballast required to arrive at the proper C.G. (Center of Gravity). As shown on the plans, the battery pack should be installed in the forward-most compartment of the fuselage, with the connector harness facing aft. Small, custom cut pieces of foam rubber are used to securely nest the pack in place—pack firmly, not tight, to avoid any shifting. Remember that this compartment will in all likelihood have to receive a small amount of ballast (lead) to achieve the C.G.

The compartment directly behind the battery pack is used for the receiver. In our METRICK's, we mounted the receiver in place on its' side, leaving quite a bit of room on the other side of this compartment which was used for the switch. If your antenna is not internally mounted, simply drill a 1/16th hole in the side or bottom of the fuselage, route the antenna through this hole and aft back to the rudder post area where you can secure it with a rubber band and a small hook made from a straight pin.

The servo compartment, as shown, is directly behind the receiver. This area is used to house the flight control-rudder and stab—servos. Note that the servos shown on the plan are reversed to one another for optimum servo output wheel clearance. In the case of radio systems that have a servo reversing feature, this presents no problem. If your radio does not have this feature, then you must *first* determine the direction that your servos go to achieve the proper surface directions upon radio command. The servos must then be mounted correctly into the fuselage. As noted earlier, the leftover piece of 3/32" x 1/4" ply strip that was used for the stabilator roots should be used for the two required servo mounting rails. These should be carefully cut to fit accurately between the inside fuselage sides and on top of the 1/16" x 1/4" balsa servo rail locators that were glued in place during fuselage construction. Locate and epoxy the *forward* rail in place first, as close to former F-5 as possible. Trial-fit one of your servos in place with the forward mounting lugs resting on the forward servo rail. Slip the rear servo rail in place with the rear mounting lugs of the servo resting on it. This will locate the position of the rear servo rail—mark its location in pencil on the inside of the fuselage, on each side, remove the servo and epoxy the remaining servo rail in place.



While the METRICK's radio compartment was specifically designed to accept most radio systems currently available, the servo output arms for some systems may require some trimming or modification in order to clear the fuselage sides during their movement cycle. Once you are satisfied that the servos move in the proper

directions for the desired control response and can sit side-by-side with the movement of the output arms not coming in contact with each other or the fuselage sides, the servos can be mounted in place using small *#2 x 1/2"* wood screws (not supplied). At this point, servo connection with the pushrods is the next stop. First, center the servos, using the trims on the transmitter. The servo output arms should fit approximately 90° to the fuselage sides to deliver equal movement. You will probably have to drill-out the holes in the servo output arms to about .076 dia. to accept the 3" threaded one-end studs provided for servo connection. With a razor blade, cut-off all but *1/2"* of the inner yellow nyrod pushrod that is protruding into the servo compartment. Thread at least V4" of the threaded end of the 3" threaded stud into the inner nyrod. We would suggest "nuetrilizing" the rudder and stabilator first, with tape. As shown on the plans, make a "Z"-bend at the servo-end of the stud and cut off the remainder of the stud. The "Z"-bend can now be pushed in place through the drilled-out hole in the servo output arm and the output arm screwed in place on the servo. Note that the servo plug wires are routed forward, through the hole in former F-5 to the receiver compartment.

With our METRICK's we chose not to mount the switch in the typically external manner, but rather left them loose in the receiver compartment, packed with foam rubber in the upright position. This requires that the canopy/hatch be lifted up, the switch activated before and after each flight. In practice, this proved to be perfectly acceptable and the fuselage side was spared the need for the cutting of holes for the switch—use the method that most agrees with you.

If you are planning on flying your METRICK with 2 channels, your radio installation is now complete and you can move on to the PRE-FLIGHT and FLYING sections of these instructions.

As mentioned earlier in the instructions, if you have planned to run a third spoiler channel you should now install this servo. The third, optional, servo installation shown on the plans for spoiler activation is the system we used in our prototypes and works quite well. You will need to fabricate two 3/32" x 1/4" x 1-5/8" ply servo rails (material not supplied) for mounting this servo beneath the access hatch, as shown. Use Dubro #181 "Ball-Links" (not supplied) on each side of the servo output arm for the loops in the ends of the spoiler chords to slip over. You can see that as the servo is actuated, by moving the "throttle" stick or lever on the transmitter, the arm rotates, thus pulling the individual spoiler chords, causing the spoilers to be pulled up. As the servo is returned to its' original setting, the rubber bands in the spoiler bays pull the spoilers back down flush with the wing's upper surface. It is most important that the tension relationships are the same for both spoilers and that they deploy at the same angles and that they return flush with the wing panels. Valuable wing efficiency can be lost with improperly seated and/or deployed spoilers. Note that the travel of a standard servo is sufficient to deploy to spoilers to about 50°-70° at full movement. This amount of travel is more than sufficent to achieve radical loss of lift. 90° movement of the spoilers in relationship to the surface of the wing is *not* needed. Once the servo is mounted in place to your satisfaction, route the plug harness wire forward, through former F-6 (you will have to cut a small, appropriate-sized hole), through the servo compartment and through former F-5 to the receiver.

Install the wing panels to the fuselage and secure with two #62 rubber bands between the two eyehooks, as if in preparation for flight. The two loose, unlooped ends of the spoiler chords should now be inside of the fuselage, roughly lined-up with the "Ball-links" on the servo output arm—the servo should be set at the "low spoiler setting", in other words spoilers *down.* At this point, we taped the spoilers down, flush with the wing, using making tape. Slip a short length (about 1/4") of 3/32" I.D. brass tubing (not supplied) over one end of the spoiler chord, wrap the chord around the "Ball-Link" and slip the end back through the tubing, creating a loop about 5/16" long. Pull on the chord until the slightest resistance is felt and crimp the tubing with a pair of pliers. We applied a small drop of instant glue to the tubing/chord joint to complete the connection. Repeat this process with the opposite chord, remove the tape holding the spoilers in place and test the action of the spoilers, using the transmitter. Remember that in order of priority, #1 is to have the spoilers sit flush with the upper surface of the wing when fully at rest.

Test the action of the entire radio installation to make sure that it is bind-free and that radio commands from the transmitter provide the correct surface movement. This cannot be stressed enough since backward servo installations are one of the number one reasons for initial crashes—check it and then check it again!

PRE-FLIGHT

1. CENTER OF GRAVITY: Although the METRICK has a fairly wide C.G. range intital flights should be made with a balance point located directly at the wing spar location, or 2-5/8" back from the leading edge of the wing. This is the time to add any ballast required to achieve this balance point. Ballast should be lead sheet or lead shot and should be placed forward and/or beneath the battery pack. The ballast should be securely but not permanently installed in order to make changes for personal preference in glide later on. If you have built the engine powered option it may be necessary to switch the locations of the receiver and battery pack to achieve the correct C.G.
2. RADIO AND AIRFRAME INSPECTION: Once again, check the radio system to be sure that the surfaces move in the desired direction by radio command and that the action of the servos is bind-free. If you have installed a captive tow-hook system, test it's operation to be absolutely sure of release on command.

Inspect the airframe and it's various components. Check for warps in all of the surfaces. If any are found, now is the time to correct them. Initial flights with our METRICK's employed the use of about *1/4"* of wingtip wash-out (wash-out is the raising of the trailing edge wingtip). This was used to avoid any tip-stalling tendencies that might have shown up on our prototypes. Subsequently, our METRICK's have been flown with and without wash-out with equally good results—pick the set-up that works best for you. Once everything has been checked to your satisfaction, make sure the battery pack is charged and head for the flying site.

FLYING

Whether your METRICK has been set-up powered or unpowered, you will need to perform a series of hand-glides to develop a basic neutral trim. Assuming that the C.G. is right and that the radio is on and functioning, run into the wind until the airplane begins to feel "light" at which time throw it straight, slightly nose-down with the wings level. The airplane should glide straight forward at a very flat angle. Try to remember what commands you had to give the transmitter to achieve straight and level flight. Repeat these hand-glides until you are certain what is required. We used our transmitter trims to achieve the flat glide that we were looking for and *then* made the required adjustments on the servos, followed by returning the trims to neutral and repeating the process until the plane flew flat and straight with no stick movement on the transmitter necessary. This then is dead-neutral trim. As your flight time and familiarity with the METRICK build-up, you can experiment with moving the C.G. progressively aft—we caution you to do this in very small increments—until the point is reached that you can literally vary the cruise speed of the airplane with transmitter trim, without stalling. This is done by removing small amounts of lead ballast from the nose until you are satisfied.

Assuming that your METRICK is an unpowered sailplane, the next phase is a tow-launch. Although this method of launching a sailplane can be intimidating to the beginner, the METRICK's stability on tow is of great help. If you are using a "Hi-Start" system—surgical chord and monofilament line—pull the line back until you have about 20 lbs. of tension. Hook the tow-ring onto the towhook on the bottom of your model. With the transmitter on and of course the receiver, hold the airplane in your right hand, transmitter in your left, with the wings level and the nose at about 15° to 20° up. Launch the airplane briskly and *level.* The airplane should quickly assume about a 50° to 60° climb attitude and be moving in a straight line up and away from you. Any corrections to maintain the straight launch should be done with small movements of the transmitter stick—avoid quick, full-throw movements because at launch speeds the flight surfaces are very effective! As the airplane comes over the top of the Hi-Start, it will begin to slow down and the nose will be about level with the ground. At this point, apply some down-elevator to let the tow ring come free from the tow hook. The airplane should now be free from the tow ring and flying on it's own. If you followed the hand-gliding instructions, your METRICK will very likely be very close to trimmed for flat and level flight.

First try a series of both left and right turns to get the feel of the rudder, be sure to trim the rudder for straight flight on the transmitter, if necessary. Next, while at altitude, slowly feed in up elevator until you observe the airplace beginning to "mush", this is the beginning of a stall and knowing where it begins and how drastic it is can save your airplane later on. Continue to hold up elevator until the airplace fully stalls—it will literally stop flying. Observe carefully what it does at this point. Does it lose all airspeed, drop the nose and continue flying or does it fall-off on one wingtip or the other? If it falls off on a wingtip, some washout in the wingtips could help—not cure—this phenomenon. Practically speaking, it is best to know the stall characteristics of your particular airplane and to avoid those flight circumstances which will lead to them. While we are still at some altitude, try dropping the nose a little with a touch of down elevator to get some idea of the speed range that your METRICK provides. As the model's speed picks up, the airfoil becomes quite efficient and tends to resist the nose-down condition—the result is a very flat, fast glide rate that allows you to cover a lot of territory with a minimal loss of altitude.

Landings, especially some of the first ones, until you are used to the airplane, should be set-up in the normal fashion, except for the final up-wind leg which might have to be longer than you are used to since the METRICK, with the nose slightly down, as in a landing approach, tends to want to stay airborne. If you have equipped your plane with spoilers, the landing task becomes very easy with incremental amounts of spoiler

applied at the right times. If the METRICK is your first sailplane or your 21st, there are three rules that always apply in soaring:

1. Practice
2. Practice
3. Practice

We are going to assume that you are now fairly comfortable with the airplane and would like to attempt some thermal soaring. As the METRICK comes off of tow, we have made it a practice to penetrate out upwind in a fairly straight line, watching the airplane carefully for lift (or sink) information. If the airplane flies directly into a thermal, you will notice some decrease in forward speed and a flattening of the glide together with a flat elevator-type climb. When you see this, make a broad turn, searching for the "core" of the thermal, avoiding the outer edges. Once into the center of the lift, hold the rudder and elevator combination that provides the highest rate of ascent and at all costs, avoid stalling. You will find that the METRICK will outclimb most anything at the field in the same lift conditions—its rate of climb is awesome.

If you encounter a thermal during cruise that is either to the left or right of the airplane, you will know because the wing encountering the lift will kick up. When this happens, turn into the direction of the wing panel that went up—right wing up; turn right, left... same procedure except turn left. Again, search out the core of lift and enjoy.

If you have chosen to power your METRICK with the optional .049 engine set-up shown on the plans, all of the above applies to you except, of course, for the launching technique. Your engine should be started and the needle valve set to provide maximum RPM's. Making sure that your receiver and transmitter are on, the airplane should be hand-launched with the wings level and the nose slightly down, with a brisk throw—*do not* heave the model, it is not necessary and could cause a stall. Let the model climb-out and up at a shallow angle at first to build-up airspeed and allow the wings to become efficient. With a standard reed-valve engine and three minutes of fuel, you should have little trouble reaching 300 to 400 feet of altitude. When the engine quits you are flying a sailplane and the information mentioned earlier applies concerning thermal activity.

No matter how you have chosen to fly your METRICK we sincerely hope that it has been a rewarding project for you and thatthe hours spent on the building board will be nothing compared to the hours of soaring enjoyment to come.

Speaking of soaring enjoyment, TOP FLITE MODELS, INC. is very proud to be the first model aircraft company to provide you with information and a membership declarationfortheworld'slargestR/Csailplaneorganization, the LEAGUE OF SILENT FLIGHT. Your R/C soaring activities can take on a whole new meaning and importance by participating in the L.S.F.'s Soaring Accomplishments Program.

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LEAGUE OF SILENT FLIGHT

P.O. Box 39068
Chicago, Illinois 60639 USA

Hello...

You're in good company if you're curious about the LSF. Many are these days. The LSF is attracting the attention and interest of R/C sailplane enthusiasts throughout the world.

The League of Silent Flight is an association of and for the individual sportsman. It is not a club… it is a program … and participation neither conflicts with nor requires club membership. However, many clubs find that group participation in the LSF can excite new interest and bring new growth.

Membership can only be earned. Membership cannot be bought… there are no membership dues or fees. To become a member, an R/C sportsman must fulfill the requirements of Level I of the LSF Soaring Accomplishments Program: a 5 minute thermal flight; a 15 minute slope flight or a second 5 minute thermal flight; and five spot landings within 3 meters (9.84 feet) of a target point.

Advanced levels in the program are progressively more challenging. Level V, for example, requires a 2 hour thermal flight, an 8 hour slope flight, a 10 km (6.21 mile) goal and return flight, as well as considerable success in soaring competition.

Members (sportsmen who have achieved Level I or higher) are privileged to display the distinctive LSF insignia. The LSF emblem on a jacket or sailplane is a symbol of proven performance. It is displayed with pride… and recognized… anywhere in the world.

The LSF is a personal challenge, and serious sportsmen are invited to associate with the League. The first step? Declare your intent.

To: LSF Executive Board
PO Box 39068
Chicago, Illinois 60639

I, _____, (please print) will support the philosophies, concepts and criteria set forth in the Bylaws of the League of Silent Flight and give notice herewith of intention to attain Level I of the LSF Soaring Accomplishments Program, and by so doing, earn full recognition and privilege of membership.

(Signature)

Mailing Address: _____

AMA (or other FAI Affiliate) License or Membership No. _____

FCC (or other) Radio Operator's License No. _____

NOTE: ALL CORRESPONDENCE TO THE LSF MUST INCLUDE AT LEAST $1.00 IN STAMPS OR COIN FOR RETURN POSTAGE.