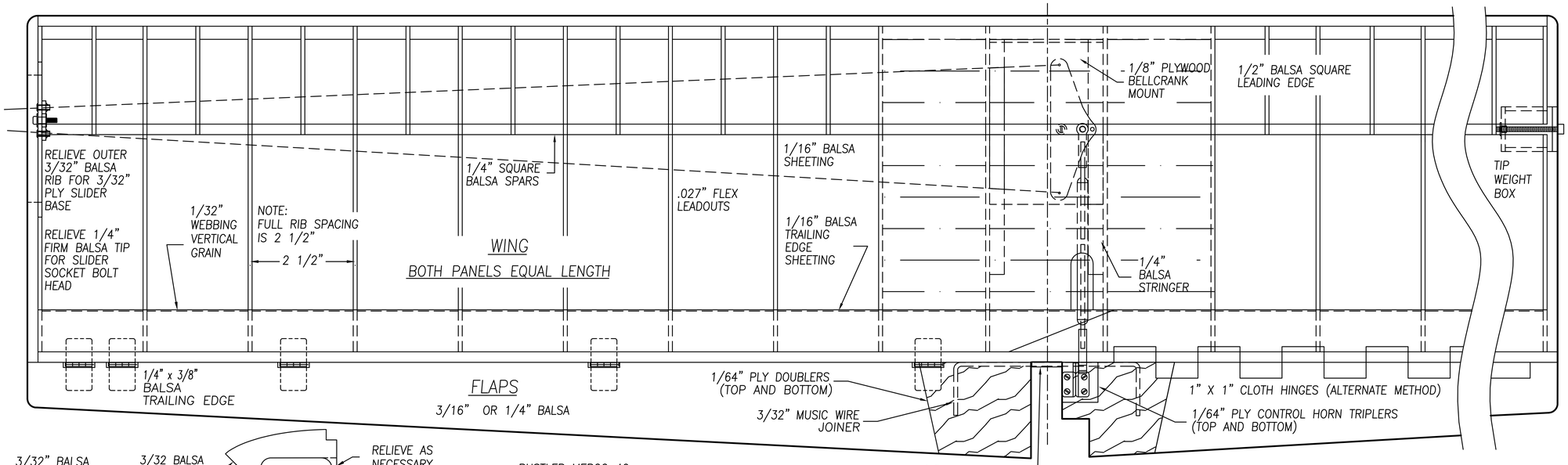
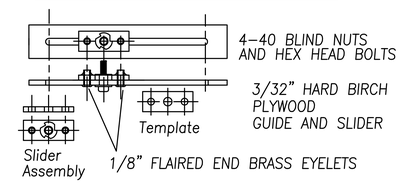
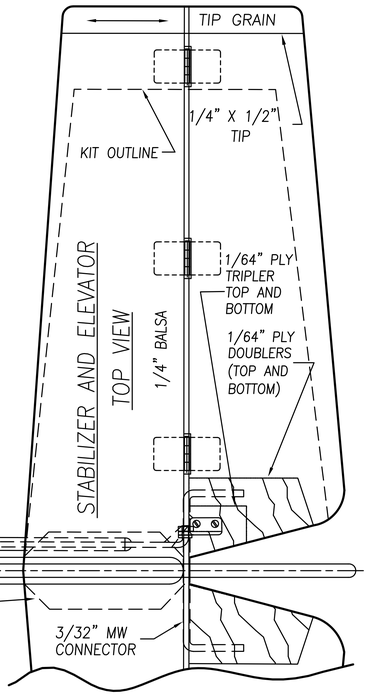
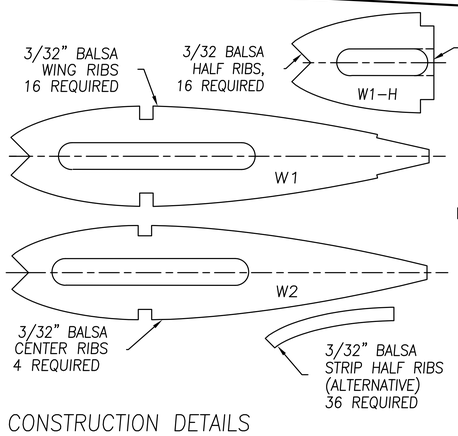
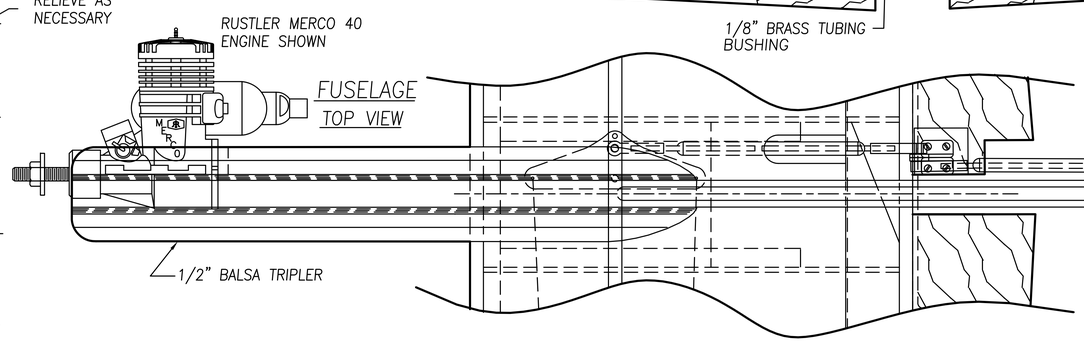


ADJUSTABLE LEADOUT DETAIL





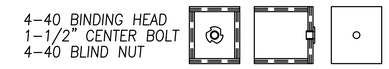




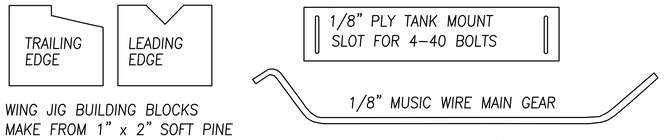
WARNING – DANGER!

DO NOT FLY NEAR POWER LINES! INSTANT DEATH CAN RESULT FROM CONTACT WITH, OR PROXIMITY TO ELECTRIC POWER LINES.

TIP WEIGHT BOX DETAIL



WEIGHT BOX IS 3/32" LITE PLY
USES SIG RECTANGULAR 1/4 OZ LEAD WEIGHTS
TYPICAL TRIMMED TIP WEIGHT IS 3/4 TO 1 OZ

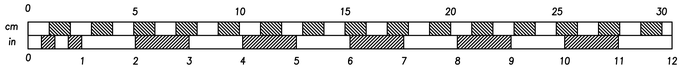


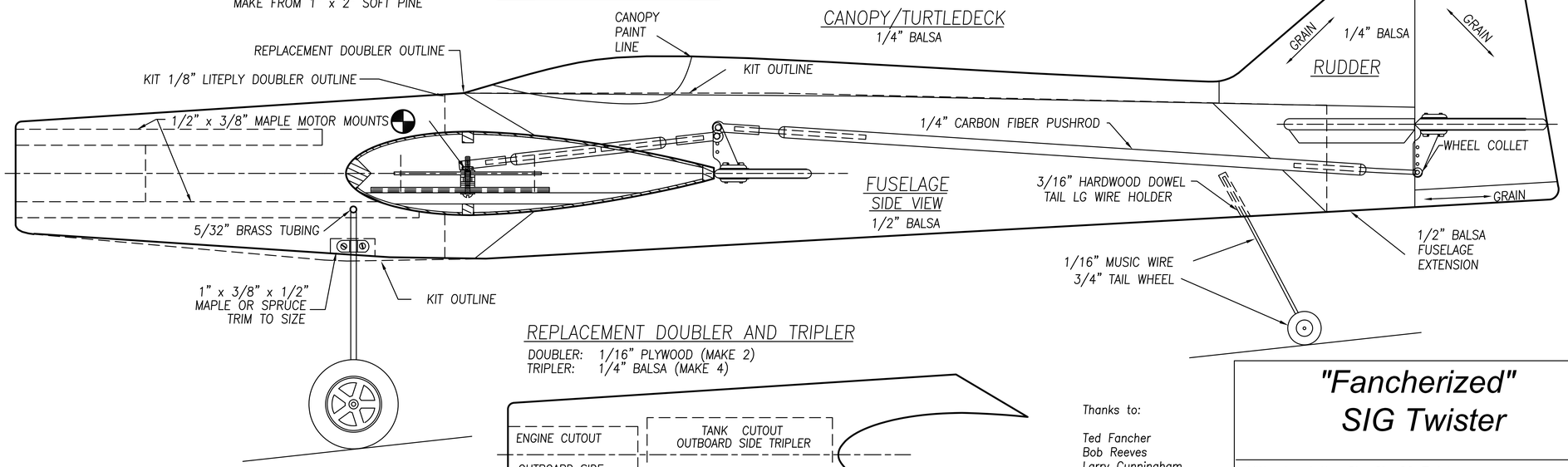
CONSTRUCTION DETAILS

- Outboard flap 1/8" wider at the tip than Inboard Flap
- Tip weight box is centered between 1/4" spars
- Wing Jig blocks made from 1" x 2" pine cut 1 1/2" long
- Half ribs made from 4–6 lbs 3/32" stock
  If 4–6 lbs stock is not available, use 1/16"
- Rudder, stab, and elevator uses 1/4" 4–6 lbs balsa
- Controls set up for 1 to 1 flap/elevator ratio
  If less flap movement is wanted, move clevis on the elevator up one hole.
- Use DUBRO 6121 or similar ball links at flap horn
- Landing gear set up for smooth surfaces. Move forward 3/16" for rougher fields
- Note grain detail for the rudder
- Adjustable leadouts available from RSM or Tom Morris
- Drill nose doublers and triplers prior to assembly
- Control empenage is on the outboard side of the fuselage
  It is shown in the inboard side in the fuselage side view for clarity

MODIFICATIONS FROM THE ORIGINAL KIT

- Elevator, stabilizer, rudder and wing tips replaced with 1/4" balsa (optional)
- Stabilizer and elevator enlarged (optional)
- Fuselage extended 2"
- 1/64" ply over joiner wire
- Adjustable leadouts (Available from RSM or Tom Morris)
- Tip weight box added (Available from RSM, or Tom Morris)
- 1/4" balsa nose triplers
- Arrowshaft/Carbon Fiber pushrods with clevises
- 3/32" 5 layer plywood fusesalge doublers
- Wing halfribs added
- Double control horns at flaps (optional)
- 4" bellcrank (Available from RSM or Tom Morris)





REPLACEMENT DOUBLER AND TRIPLER

DOUBLER: 1/16" PLYWOOD (MAKE 2)
TRIPLER: 1/4" BALSA (MAKE 4)

Thanks to:

Ted Fancher
Bob Reeves
Larry Cunningham
Leonard Neumann
Pat Johnston
Brett Buck
Mike Gretz
Geoff Goodworth
Ian Russell
Sig Manufacturing

"Fancherized" SIG Twister

Kitbash of the Sig CL-22 Twister
490 SQI For 25-40 Engines
35 – 41oz w/Rustler Merco 40

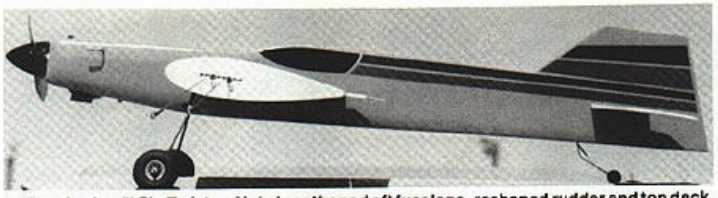
Drawn By: Bob Kruger
14 JUN 2002
bkruger@mindspring.com

Last Revision:
2 JUL 2005
#6.8.20

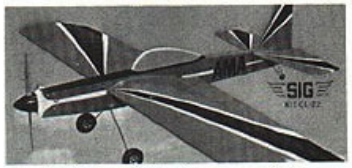
Control Line

Aerobatics

Ted Fancher



A "Fancherized" Sig Twister. Note lengthened aft fuselage, reshaped rudder and top deck. Mods add to more modern appearance, help define sides of square maneuvers.



The stock Sig Twister for comparison.

Ted's very simple adjustable lead-out guide was stolen from Bob Gieseke. Neat covering of flat wing tip obtained by covering it first before doing top and bottom surfaces.

HI, GROUP! Probably the most consistent complaint I receive on my monthly musings is that the material I cover is too "high-tech." While I don't feel that the CL Stunt column should be considered a beginner's forum, there is nonetheless a lot of merit to those complaints.

In response, I have undertaken a project which I at first thought would be a pain in the neck but which has proven to be both enjoyable and educational. I built me a Sig Twister!

Most of this and the next two columns will be a fairly detailed coverage of my experiences dealing with Stunt from the viewpoint of a beginner. Using only commercially available supplies and trying to limit a nearly uncontrollable urge to "make things better," I'm going to build, finish, and flight-trim a profile Stunter appropriate for anyone from a beginning pilot (not a rank novice) to an Intermediate or new Advanced flier.

If I've had any luck at all with the Instamatic, several pictures should accompany the columns. These will help illustrate some of the techniques and features.

Let's get the hardware out of the way first. I chose the Sig Twister, kindly donated by Mike Pratt and Sig. I used both a Merco .35 engine from Tom Dixon and a box-stock OS .40FP, and I used a Taffinder four-ounce profile tank, modified for uniflo.

The hardware package included with the kit was used with the exception of the bellcrank, for which I substituted a Fancher Circular Crank to which I am partial. (There is *no* significant value in doing so at the beginner level, and I don't necessarily recommend it. I wasn't even going to mention it except that my fancy bellcrank caused some problems in the initial test flights, and I didn't want you to think it was the fault of the perfectly adequate Sig bellcrank. More on that later.)

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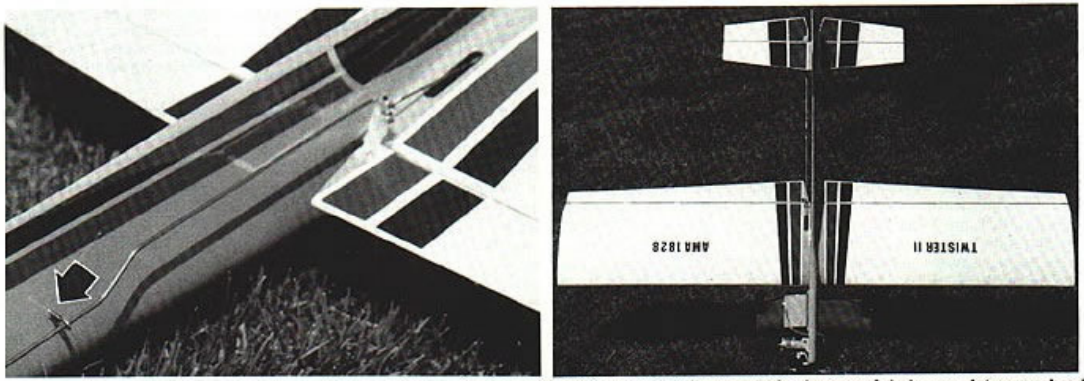
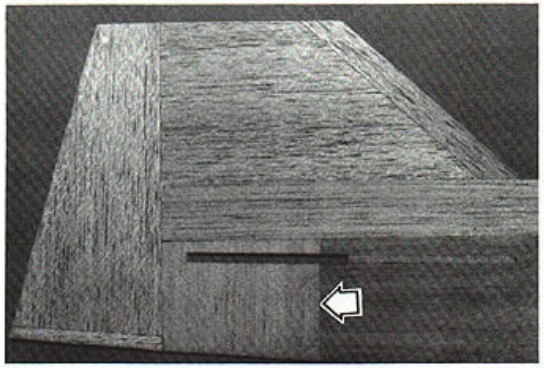
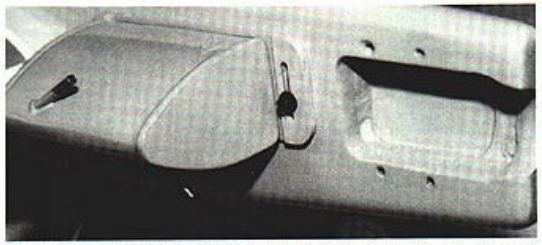


Z-bend in elevator pushrod (L) allows adjustment of pushrod length to trim elevator/flap neutrals. Arrow points to *mandatory* pushrod guide—it keeps pushrod from bending under airloads. Guide is made from half of a Perfect line clip wrapped with copper wire and epoxied in place. Simple, effective trim scheme (R) cut from MonoKote trim sheets with aid of thin cardboard templates to assure symmetry.





Uniflow-ized Taffinder profile tank mounts on plywood tray; bolt/slot scheme allows moving tank up/down to get proper engine runs. Look at thickness of fuselage evident in engine cutout area. A ¼-in. sheet balsa "tripler" has been glued to inboard side of nose to add rigidity and to strengthen wing-to-fuselage joint.

Fuselage lenghtened three inches by butt-glued balsa sheet (arrow). Note grain direction in restyled fin and rudder for strength.

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The covering for the wing and tail is Sig's new Supercote, and the fuselage was painted with Pactra Formula U polyurethane from a spray can. Trim colors are Top Flite MonoKote trim sheets—"sticky MonoKote." I used Du-Bro 2.25-in. wheels and wheel retainers, Du-Bro large pinned nylon hinges, and a Carl Goldberg two-inch spinner.

I also made liberal use of a new product called Fast Threads from Ohio Superstar. These terrific little gadgets are threaded brass inserts in all the popular threads (use 4 - 40s on this project). They do the same job as blind mounting nuts except they are inserted from the visible side. They can literally be inserted anywhere at any time.

Why choose the Twister? The range of kits appropriate for this project is narrow but of a uniformly high quality both in materials and performance. I narrowed the field down to the Top Flite Tutor and Sig's Banshee and Twister.

The Tutor is the more modern of the three in design, but I opted against it for a couple of reasons. The wing is smaller than I would prefer, and the leading-edge planking and the tapered planform make it a decidedly more complex building project. It's certainly within the range of most, but the chance of building a tapered wing crooked always exists, and that can wreak havoc with a Stunter.

Between the very similar Banshee and Twister, I chose the latter because of its simplicity—primarily the squared versus rounded wing tips, and its shorter nose (if you do build a Banshee, whack off 1½ in. to avoid a bunch of tail weight). And, frankly, I find it more appealing . . . and I'm the guy who has to look at it all the time!

Although Sig wraps all its kits in clear plastic so you can't check out the contents, I wouldn't be concerned about buying the kit sight unseen. Sig is famous for its balsa, and it isn't about to risk that reputation by putting lousy wood in the kits.

The only wood I found inappropriate was the 3/32 balsa flaps. They were much too soft. Flaps should be very resistant to twisting, especially if you plan to cover them with plastic material which won't stiffen them at all. I picked up a sheet of firm but light 3/16 for a buck or so, from which I made both the flaps and the redesigned rudder. (More on that rudder in a bit.)

This is a good time to mention that the Sig Lite-Ply used for fuselage doublers is too soft for mounting an engine directly. It will compress as the mounting bolts are tightened, resulting in an occasional loose engine. Either substitute regular ¼-in birch plywood or add 1/16-in aluminum or birch plywood pads on top of the kit doublers. I didn't, and I wished that I had.

I also replaced the ¼-in.-square balsa wing spars with spruce. If you intend to cover your Twister or Banshee (or similar unsheeted, open-framework wing) with silkspan and paint, then the balsa is adequate. If you expect to use plastic covering, however, you will find that it adds almost no rigidity to the wood framework. The spruce spars will stiffen things up a bit and also add that little bit extra which comes in handy if you should inadvertently land prematurely.

Modifications. Aha! You knew Fancher couldn't resist, didn't you? Besides which, you've probably noticed that my Twister looks a bit different from the one pictured on the box.

I've incorporated two kinds of changes: those which I think everyone should make to the basic kit, and those that would appeal to fliers who demand more up-to-date performance.

In the area of desirable modifications, the most striking change is the use of a "fastback"-styled aft fuselage and low-profile rudder rather than the stock bubble canopy and tall rudder. The canopy style is a matter of taste, but I feel the swept rudder profile is important for beginners or for any modeler who must fly off grass. The tall rudder is very vulnerable to damage in any kind of inverted incident or landing flip over. It not only will break off easily itself, but it can also apply leverage to break the entire fuselage. By lowering its profile and sweeping it back you nearly eliminate the problem and still have an

attractive airplane. I've landed mine upside down several times to date with zero damage.

Less noticeable but equally valuable is the addition of a ¼-in. balsa "tripler" on the inside of the nose applied over the Lite-Ply doubler. Profiles are notorious for being subject to engine vibration, and the wing/fuselage joint at the leading edge provides an almost guaranteed stress crack. The additional area in this high-stress joint pays big dividends. Balsa sheet up to ½-in. thick is actually preferable.

The plans do not show a fairlead on the flap-to-elevator pushrod. You need one! If you don't, air loads on the elevator when applying Up control (pushing on the pushrod) will most likely cause the pushrod to flex, resulting in a reduction or loss of control. A simple fairlead can be made from either a cotter pin or one half of a Perfect-style line connector epoxied into the fuselage halfway between the flaps and elevators.

Performance-improving modifications to the stock design include the following changes which have proven successful on my prototype.

First, the tail has been moved aft three inches! The Twister was designed some time ago when the prevailing school of thought was that short-coupled ships were the way to go for tight cornering. More recent thinking has shown that not only are short tails not better but that they may, in fact, be detrimental.

Simply stated, the longer tail is more powerful since it is further from the center of gravity (CG). Since it is more powerful it not only changes the attitude of the airplane more positively but also stabilizes it better in level flight. This results in a ship which maneuvers crisply when asked and which stops turning immediately when controls are neutralized, a concise description of the "perfect" Stunt corner.

An added benefit is that since the tail is more powerful, the CG can be located further forward without sacrificing cornering potential. This improves line tension, stability, and tracking in consecutive maneuvers. The CG on my prototype is a full one inch forward of that shown on the plans, and it flies very "brisk" corners. Try it, you'll like it!

I lengthened the tail by butt-joining a three-inch piece of sheet balsa using slow-setting CyA glue. The resulting joint is stronger than the wood. Fill the old stabilizer slot with scrap and cut out a new one.

The tank-mounting system is worthy of attention. As we discussed in June's column, Stunt engines run a little weirdly on profiles, and some means of adjusting the tank height is important.

My system consists of a cradle to which the tank is attached (using double-sticky servo-mounting tape). At the front and back of the cradle are vertical grooves about ⅛ in. by one inch through which short 4 - 40 bolts attach the tank/cradle to the fuselage, using the threaded inserts described earlier. By simply loosening the screws the tank can be raised or lowered, after which the screws should be retightened. This system is effective, simple to use, and sanitary in appearance.

While checking out the fuel system, notice that the Taffinder tank has been modified to a uniflow feed. This was done without opening the tank. The stock fill-tube was removed and the hole covered with tin. An ice pick was then used to poke a hole in the tank about ½ in. forward of the outside rear corner, and a ⅛-in. copper tube was soldered in place so that it just enters the tank, ending about ⅜ in. forward of the fuel pickup tube.

For those of you unfamiliar with the uniflow principle, a future column will deal with it at length. Suffice it to say at this point that a system as described will result in an engine run which is remarkably consistent from beginning to end, as opposed to a conventional "suction" system which characteristically runs progressively leaner as the tank empties. To function properly, the overflow tube must be sealed for flight, and the exterior end of the uniflow tube must be to the inside of the tank. (Note on my prototype that a tube is solidly epoxied through the fuselage with a flexible line connecting it to the uniflo tube on the tank proper.)

Notice the simple, adjustable lead-out guide. I used ½-in. balsa wing tips and inset a piece of basswood into which I had cut a two-inch-long groove wide enough for the lead-out cable to pass. Into this groove I drilled ⅛-in. holes every quarter inch in which the brass guides are inserted. To adjust, simply pull out the brass tube, move the lead-out to the desired location, and reinsert the tube. The tubes should either be a snug fit or be inserted with a small drop of model cement to secure them.

If you wish to install your lead-outs permanently, the location as shown on the plan is very close to correct when used with the more forward CG allowed by the longer tail. If you are building your Twister with the stock tail moment and plan on using the CG shown on the plans, I would suggest that you lengthen the forward lead-out holes on the ribs to allow the forward lead-out to be located just aft of the spar. The aft lead-out is just fine as shown.

In the olden days it was considered gospel to have the front lead-out on the CG. Experience (and science) has proven this ain't appropriate. Proper lead-out location must provide for the natural sweep of the lines caused by their drag.

Next month we'll talk about some construction techniques and how to make that profile look "spiffy."

Ted Fancher, 158 Flying Cloud Isle, Foster City, CA 94404.

Control Line

Aerobatics

Ted Fancher

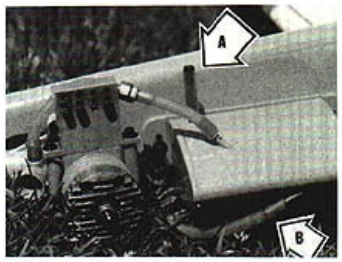
Final shaping of the Twister nose with 100-grit sandpaper. It was previously rough-formed with very coarse 40-grit sandpaper. Note nozzle of shop vacuum lashed nearby to suck up dust. It's a good idea to also wear a filter mask while doing a job like this.

LET'S get right back to the Sig Twister project we started last month.

One of the major reasons I selected the Twister was its ease of construction. The constant-chord wing (that means all the ribs are the same size) with square tips can be built directly on any firm, *flat* surface. You've heard it before—and if you ain't I guarantee that you will again—that the single most important part of a Stunt ship is a straight wing . . . and that's the truth!

Cover your firm, flat surface with a sheet of that soft composition material that comes in 4-ft. by 8-ft. sheets from a lumber or hardware store. It is firm, about ½-in. thick, and accepts pins easily. (*The generic term for this is "insulation board." RMcM*) Most dealers will cut it to a more convenient size for you if you ask them. Build your wing directly on the plans as described in the kit's full-size plans. (Cover the plans with Saran wrap first to prevent them from becoming part of your wing.)

One of my techniques may be of help to you. Whenever possible I use masking tape rather than straight pins to hold pieces in place. For instance, when installing the leading edge, hold it in place with strips of tape going from the lower spar, around the leading edge, and back to the upper spar. Do this every couple of bays *between* the ribs. This will position the leading edge firmly, won't split the ribs as will pins, and will leave access to each rib joint for glue application.



Note Twister's uniflow tank details: arrow A points to sealed tube on overflow vent; arrow B points to uniflow vent line. You can fine-tune engine runs by changing the exhaust back-pressure. Using an SST Products muffler makes the task easy, since 4-40 screws can be plugged into one or more of the outlet holes to vary the back-pressure. It's a subtle refinement for experienced fliers.

I glue everything possible with cyanoacrylate (CyA) and follow up with a coat of aliphatic resin-type glue (i.e., Tite-Bond, etc.) applied with a small, cheap brush.

If you intend to use RC nylon-type hinges rather than the cloth ones shown in the plans, be sure to glue scrap balsa between the trailing edge sheeting to accept them. These types of hinges, such as Du-Bro or Klett, are much preferable to the cloth hinges. They operate much more freely, seldom break, and are somewhat easier to install.

In addition, if you plan on finishing the model with an iron-on type of covering, this type of

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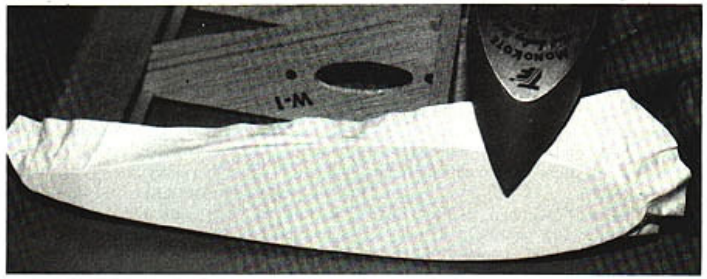
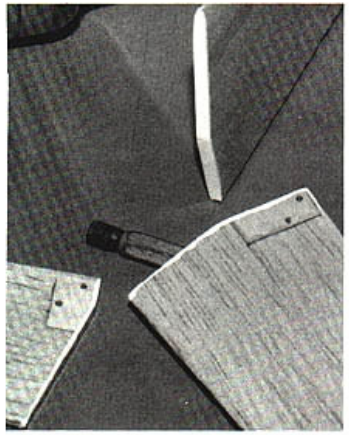


Here's how to do a neat job of covering large, flat surfaces with iron-on film. Cut a piece of film oversize and cover the flat area first, then coax it over the edge of the piece. Iron down a strip on the edges, which you later trim to about 1/8-in. wide.



Flat, inboard edges of elevators and flaps were covered first, too. Note that Ted installed 1/8-in. basswood inserts to accept the nylon control horns. A bare balsa surface is compressed and weakened when the horn-mounting screws are tightened down.

A modeler's best friend is—masking tape (L)! If you're sanding a piece to match structure which is already finished to size, you can protect the finished wood with the tape. Although you may sand through it, you can always put on a fresh strip. It will pay you to exercise some care when slotting thin wood surfaces for the installation of nylon hinges. Ted makes things extra simple with his Dremel drill press (Center) and drills a very fine guide-hole at each end of the potential hinge slot. This ensures that the slotting tool (R) will follow the pilot holes straight into the wood—it keeps you from digging a crooked slot and coming out the side of the balsa sheet. Surface is still unshaped.

CI Aerobatics/Fancher

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hinge is almost mandatory since they can be installed (and in fact should be) *after* the model is covered. Let's make that perfectly clear. *The surfaces to be hinged should be slotted to accept the hinges prior to covering.* Apply the covering next and seal right over the hinge slots. The slots are then reopened with a sharp razor knife, and only then should the hinges be installed.

When installing the bellcrank two things are very important. First, be sure that the installation is perfectly sound. The platform must be rigidly supported and properly glued, using either epoxy or aliphatic-resin glue.

The bellcrank bolt should be firmly tightened and the nut installed with epoxy to prevent loosening. Do not solder washers on the nylon-type bellcranks as pushrod retainers. The heat may melt the nylon and disrupt smooth control action. I use ½-in. Du-Bro wheel collars with the setscrews firmly tightened and epoxied in place.

Second, be sure that the flap end of the pushrod is directly in line with, and one inch above, the flap hinge line with the bellcrank in neutral. This will allow proper alignment with the flap horn and thus ensure that the whole control system will be in neutral simultaneously.

When shaping the sheet balsa flaps and tail surfaces, use the rounded cross section as shown on the plans. *Don't try to taper them, as they are too thin and will be unacceptably weakened.*

Now is the time to cut the slots for your hinges. Don't attempt to get a narrow gap between the hinged surfaces. If you do, what usually happens is that the controls end up rubbing, depriving you of both freedom and range of control movement. Just leave the natural gap which results from the rounded, pinned section of the hinge.

Shaping a profile fuselage is a pain in the neck. The plywood doublers don't take well to carving or planing, and sanding them to shape seems an imposing task. Try it this way.

Assemble the balsa profile fuselage, hardwood engine mounts, plywood doublers, and the inboard, ¼-in. (or thicker) balsa "tripler" we discussed last month. Blend the square rear edge of the ply doubler into the balsa fuse using a piece of scrap ⅛-in. balsa already sanded to triangular section.

Now comes the tough part: shaping the front end. Believe it or not, we're going to sand that sucker to shape!

First, clamp the fuse to your work bench so that the nose sticks out into midair. Use either a large C-clamp with some scrap hardwood to protect the balsa fuse, or pile on all your old *Model Aviation* mags. To protect against snapping the fuse in half as we shape it, place a piece of scrap hardwood under the fuse to support the nose. A piece of one-by-two about three feet long is good.

Now, using a 2 x 12-in. strip of coarse, 40-grit sandpaper, attack each side of the nose as though you were buffing a pair of shoes. As you use your buffing motion, move fore and aft so that you are removing material uniformly. You'll be surprised at how fast you can shape the front end, plywood and all.

Now that the hard part is done, carve the aft fuse to a pleasant shape using a razor plane and sandpaper. Don't overly taper it toward the tail, as doing so will weaken this area and allow the tail to flex in flight. Prior to final shaping of this area, I permanently attach the rudder so that it has a good solid joint and the fuselage can be faired smoothly into it.

Although my previous use of iron-on coverings had been limited to Top Flite's MonoKote, I chose to try Sig's new Supercoat material. I was very pleased with its performance. It is activated at a much lower temperature and is somewhat

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easier to apply. Its best characteristic is its ability to be applied to sheet surfaces—such as our stab, elevators, and flaps—without those irritating, trapped-air bubbles. Merely tack it every inch or so around the perimeter and then shrink it down flat. Finally, completely seal the entire perimeter.

Here's a hint for neatly covering areas such as the flat wing tips or the innermost flat edges of surfaces like the flaps and elevators. Cover them first, and separately from the larger flat areas. Trim the excess to within ⅛ in., or so, and iron around the edges. Now apply the covering to the major surfaces, slightly overlapping the already covered area. Trim closely again and seal around the corners. Done properly, the seams will nearly disappear, and the joint will be completely sealed with no unsightly excess covering hanging around.

I always cover the wing and tail before installation. Neatly mark the eventual fuselage location on them and apply the Supercoat up to within ⅛ in. or so of that line.

Once the wing and tail are covered, install them in the unfinished fuselage. Be extremely careful that they are installed square to the fuselage and to each other. Remember, in Stunt straight is great, and crooked is the pits. Use either epoxy or aliphatic resin for the very important wing/fuselage joint. It must be extremely strong and not brittle. If there are any gaps in the joint—especially at the leading edge—fill them with scrap balsa to ensure a sealed joint.

Fillets! When the glue joint is dry, mask off the wing and tail so that only about ⅛ in. of covering is exposed next to the fuselage. Cut the tip off a Sig glue gun and open up the hole to ⅛ in. Mix up enough Sig Epoxolite to do the top and bottom of one wing or the entire tail at once. Don't try to do more than that at one time, as the material may start to harden before you are done modeling it to shape!

Using the modified glue gun, carefully apply a uniform ⅛- to ¾-in. bead of Epoxolite. You'll need to experiment a little to learn how much is needed, but be forewarned! It will take less material than you think.

Keeping your finger wet with plain tap water, lightly mold the fillet to approximate shape. Use the tip of a round-bladed prop—again kept wet—to achieve a final, uniform shape. I use a Top Flite 7 x 3.

Carefully remove any excess Epoxolite, then lightly feather the edges of the fillet with a wet finger, and allow it to cure completely. The fillet thus applied should overlap the plastic covering on the wing and tail and will seal those joints securely in addition to further strengthening the wing/fuse joint.

After the Epoxolite cures, you will notice an oily feel to its surface. Remove this with either Sig Airplane Cleaner or dope thinner. Failure to do so may cause the paint finish to bubble over the fillets.

Pactra's Formula U can be applied over almost any filler material, so use your favorite. I covered the fuse with light silkspan applied dampened over two full-strength coats of Sig dope. I then applied a couple of coats of Sig Balsa Fillercoat. Sand the filler carefully between coats until a smooth surface is achieved. Seal the filler with a 50/50 clear-dope/thinner mix. After the dope dries completely, shoot one *very light* and a couple of medium coats of Formula U color of your choice, and stand back and watch it shine for a day or so.

All of the trim on my ship is made from MonoKote Trim Sheets. To ensure identical shapes on both sides of the model, first cut the design pattern from thin cardboard, such as department store gift boxes, and then use those patterns to cut the trim sheets. Make certain that you make right- and left-side designs!

The secret to applying these sticky critters exactly where you want them and without any trapped air bubbles is in your lady's cleaning cupboards: spray window-cleaner! I use Glass Plus or Windex.

Spray a liberal amount completely over the area where you intend to locate the trim. Remove the backing and locate the trim approximately where you want it. The spray will prevent it from sticking until you have positioned it exactly as desired. Hold it in position with one hand, take a paper towel and, working from the middle, squeegee the spray solution out from under the trim until all the bubbles are removed. Once the solution is all out, the trim is permanently affixed . . . right where you want it.

Now you can spend an afternoon finishing up the detail items. Glue in the hinges with epoxy. Mount the control horns securely so that the holes for the pushrod are directly over the hinge line. This will ensure equal up and down movement.

Bend the pushrod to shape and install it. I formed mine with a slight "Z" bend as seen in the photos. This allows the pushrod to be effectively lengthened or shortened, which is sometimes helpful in flight trimming. Don't forget to install the pushrod fairlead and the Du-Bro retainers. Use the pushrod holes shown on the plans to provide one-to-one control ratio on the flaps and elevators.

Mount the engine. In the photos you may see the Midwest thrust wedges used to provide 3° engine offset. These items are also available from Parma Company in the RC Car department. They come in sets of 1°, 2°, and 3°.

Mount the tank and connect the tubes as required. If you choose to use the uniflow system discussed last month, hook it up as you see in the pictures: i.e., the uniflow pipe connected to the fuse-mounted filler tube, and the overflow tube capped with a piece of sealed tubing. The cap will be removed to fill the tank and then replaced.

Final weight of your modified Twister can be anywhere from 35 to 40 oz. Mine came out at 38, and it balanced between three-quarters and one inch forward of the spot shown on the plan CG using the Merco .40 with a spinner and muffler or the OS .40 with only the stock muffler. Even if you choose not to use the longer tail, this more-forward CG will provide a more sedate first flight with more positive line tension.

Very little wing tip ballast is necessary on a profile, since the weight of the engine, tank, and controls is all outboard of the centerline. I forgot that and had to cut into my wing tip to remove some of my ballast. If I were you, I would start out with none and only add it if flight tests show it to be necessary. If you pick the model up by the crankshaft and the tail, the outboard wing should drop softly to the ground. Betcha it does.

See you at the field.

Ted Fancher, 158 Flying Cloud Isle, Foster City, CA 94404.

current design thinking. My latest ship, under construction as I write this (or will be, once I get away from the word processor), will be smaller, lighter, and purposely less streamlined. By so doing I hope to recapture that nimbleness and ease of flight in a more attractive, full-bodied planform. I'll let you know if it works!

New subject. A couple months back I reported on an attempt by Doc Passen to establish a new event he has dubbed Nostalgia Stunt. I felt at the time (and still do) that this could be an idea whose time is ripe. Many of us still retain a soft spot in our hearts for those great ships of the late Fifties and early Sixties and would just love a reason to build one again. (I just found some pix of my then-future wife Shareen and myself with my first Ares circa 1960. If I get real gutty I might try to get one published.)

Well, Mike and Jo Ann Keville, 6618 Dashwood St., Lakewood, CA 90713, and their new club, the Knights of the Round Circle, have taken the challenge. They are planning to hold the Vintage Stunt Championship (VSC) sometime in February of 1989. They are wisely planning to have a big PR campaign well in advance of the planned date to inform as many interested parties as possible in time for them to get something whipped together. (Except for Werwage and Aldrich, of course. I bet they still have the original Ares and Nobler in a state of suspended animation just awaiting such an opportunity.)

They are planning either a one- or two-day affair, depending on interest. A nice banquet would be part of a two-day affair. The location will be at Whittier Narrows in east Los Angeles, only a short drive from Disneyland and many other tinsel town attractions. It could be a great family affair. Even the competition would tend to be low-keyed compared to the "Top Gun" atmosphere of the Nats or FAI team trials.

They plan on three events. First, Olde Tyme Stunt, using the Garden State Circle Burners' rules available from John Miske, 415 Clifton Blvd., Clifton, NJ 07013. Stunt designs kitted or published prior to December 31, 1952 are eligible for this event.

Second, the Nostalgia event itself, using rules from 1957 and open to designs from 1953 through 1963. At this point, I haven't a listing of designs considered eligible, but I expect one is forthcoming. If you've got a favorite, be sure to document its heritage, in case there's a question. Mike and Jo Ann have assured me that FUN is the keyword for this event, and they intend to be flexible about eligibility. Just don't expect to fly your Super Blaster .60 Foam-Filled Pencil Bomber!

Finally, they're planning a Free-Style event. In their words "run what you brung . . . your time in the spotlight!" BYOHS (Bring your own Hot Stuff).

Additional awards are planned for Concours, Most Outrageous Paint/Decorating, Oldest and Youngest Contestant, and . . . Best Costume. That's right, they're encouraging one and all to come dressed straight out of the Fifties! Grease your hair, roll a pack of Luckies in your sleeve, and drive up in your '57 Chevy. (Come to think of it, that's how Whitely always shows up. Maybe all the rest of us will have to fight it out for second place.)

A fascinating possibility of the Nostalgia event is the chance that some of Stunt's legends will find the idea irresistible and show up in person. So, especially you legends in the Los Angeles area—Dick Williams, Jerry McMillan, Wild Bill Netzeband, Bob Palmer, Tom Warden, Bart Klapinsky (Bart Klapinsky! A legend?)—dust off those old T-Birds, Half-Fasts, Skylarks, and Tempests, limber up the old Foxes, Johnsons, and McCoys, and come out and teach us youngsters how it's supposed to be done. (Fancher! A youngster?)

Mike and Jo Ann are working hard to make this idea blossom. If the idea appeals to you, drop them a line to get on their mailing list for updates and rules.

Control Line

Aerobatics

Ted Fancher
158 Flying Cloud Isle
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HI, GANG. You'll recall that a few months back I did a series of columns discussing my modification of the Sig Twister. I've received several positive letters from fliers indicating their desire to see more of that type of article. This is evidence that the majority of my readers are neither rank beginners nor top-five Nats fliers. Rather, they are competent pilots who are looking for information and projects with which they can improve their existing skills and enhance their competitive standing amongst their peers. To do this they are in search of good-flying, attractive aircraft—ones which don't require a year to build (and/or repair), yet provide better performance than the available commercial kits.

Among the best ways to do that is to modify one of the existing kits to improve its performance. My Twister project was one attempt to do just that. The modified Twister is a significantly better flier than the stock one and required very little ad-libbing to the basic kit.

Jim Armour has now gone one step beyond the Twister. Jim is a perennial top-10 finisher at the Nats and won the Concours d'Elegance at the 1984 Reno Nats. Check out the accompanying pictures of his highly modified Top Flite Tutor. While Jim's modifications closely follow those of the Twister—primarily increased wing area and a longer tail moment arm—there are some additional subtle and noteworthy changes. Let's let Jim tell us all about his gorgeous fun ship.

"Although reluctant to build a 'kit ship' after all these years of scratch-building, I felt compelled to build the Tutor. The kit was a gift from a friend in thanks for teaching him the pattern.

"Because I didn't feel the stock kit would give me the performance I demand, I checked out the plans closely to determine what modifications

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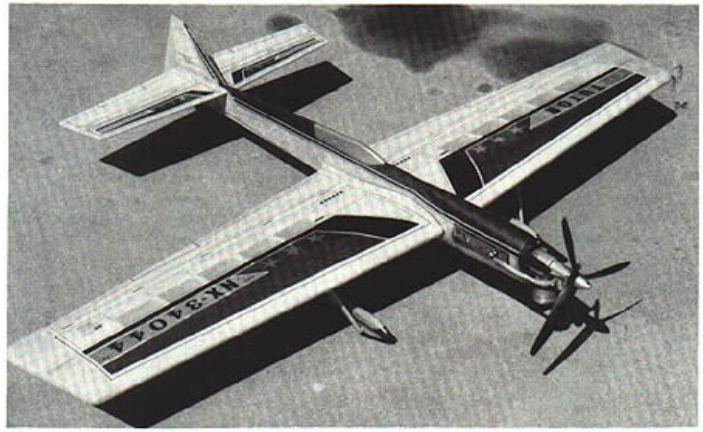
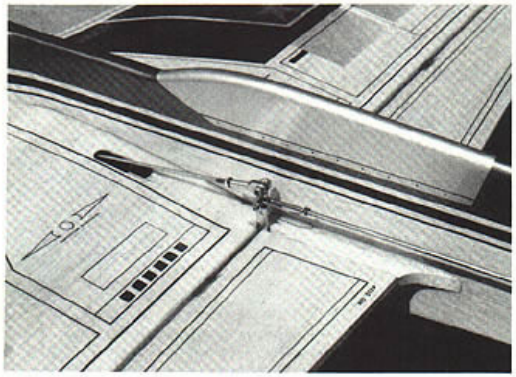
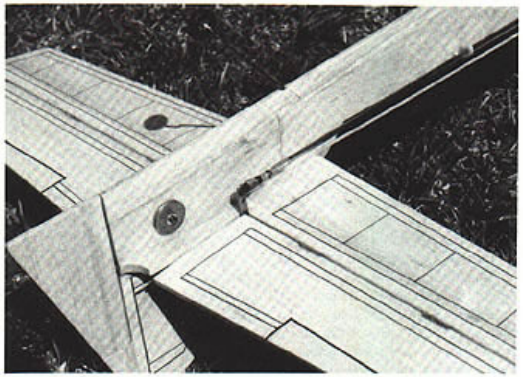
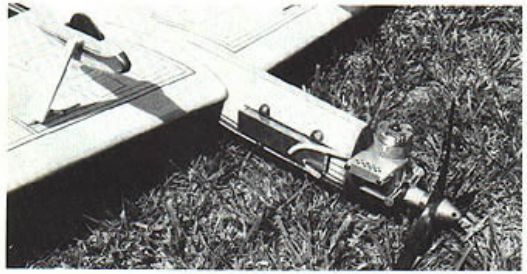
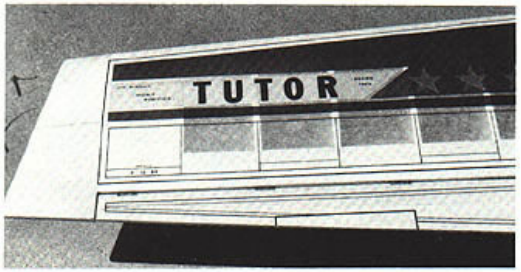






Jim Armour sent these photos of his new, modified Top Flite Tutor to emphasize its sleek lines and notable details. Power is an OS .40 FP equipped with a homemade muffler. The three-bladed prop has since been replaced by a two-blader. Fuel tank is pressurized from the muffler. Photo of flap control linkage (Above, L) shows use of ball link connector on flap pushrod, simple L-bend-with-wire-keeper on elevator pushrod. The bottom view of the tail (Above, R) shows the ballast weight mounted to a hardwood insert using a 4-40 bolt and washer; adjustable rudder (uses soft brass hinges); dreaded quick-link adjustable pushrod connector. Front end detail (Below, L) shows ¼-in. ply firewall for engine's Hayes radial, RC-type mount. Photo of modified wing tip (Below, R) reveals plain white silkspan covering with clear enamel finish and Sig color trim. Black panel lines were applied with a drafting pen filled with special India ink made for application on film or other slick surfaces. Jim is a true craftsman—and this is just his *fun* airplane! Other mods are mentioned in Ted's column.





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would make it a better performer.

"Because the 45-in.-span, 410-sq.-in. wing just wasn't large enough for me, I respaced the ribs to three inches apart. I replaced the ¼-in.-sq. trailing edge cap with ¼ x ½-in. balsa. In addition I added three-inch, jet-styled wing tips and enlarged ¼-in. flaps with a root chord of three inches and a tip chord of 1 1/16 in. These changes resulted in a 54-in. wingspan with a 10-in. mean chord, 540 sq. in. of area, and an aspect ratio of 5.4 to 1. The inboard wing is ½ in. longer to provide asymmetry. *(This refers to the common practice of having the inboard wing slightly longer than the outboard. This compensates for the higher airspeed, and thus greater lift, of the outboard wing. Ted)*

"All of the tail feathers were also redesigned for more span and area. Again, I used ¼-in. balsa instead of the 3/16-in. kit wood. The new tail has a span of 23 in. with a root chord of six inches and a tip chord of four inches. The hinge line is at 50% of the chord. The stab and elevator area is thus 115 sq. in., or 22% of the wing area.

"The fuse was not long enough to handle the longer moment arm between the flap and elevator hinge lines, so five inches of balsa was grafted at the rear. The enlarged tail was then relocated to achieve the desired 17-in. hinge-to-hinge spacing.

"The nose was 'whacked off' to allow the use of a radial-type RC engine mount instead of the stock profile, side mounting. This allowed the engine to be mounted in traditional inverted fashion, which makes for better engine runs. Thin (1/64 in.) plywood doublers were added, and then ¾-in. balsa triplers on each side. Thus, the fuselage is just over two inches thick at the nose. A ¼-in. plywood firewall provides the mounting surface for the RC engine mount.

"A ½-in.-deep strip of balsa was removed from the fuse, starting at the top of the canopy extending all the way to the rear of the lengthened aft body. A 3/16-in. subrudder was added to the bottom of the fuse to regain the lost side area. This resulted in a better-looking, more streamlined profile.

"The landing gear found a home in the wing, complete with Don's racing wheels and a set of wheel pants. This provides much improved ground handling on hard surfaces.

"After using five-minute epoxy for all the fillets, a bit of color was sprayed on for the trim, and Ditzler clear automotive enamel was used for the top coat, allowing the beauty of the wood grain to show through. *(Note: The colors are typically Armour—red, white, blue, and silver with black letters and highlights. Ted)*

"The more this thing started coming together, the more it resembled a certain 'Fanchermobile,' although it was not intended to be so. *(Aw, gee. Shucks. Ted)* Total weight came out to just 39 oz., including ¾ oz. of tail weight required to adjust the CG.

"While the balsa chips mounted, a new OS Max .40 FP arrived at my door. I ran a gallon of 10%-nitro, 25%-castor fuel through it on the bench in a sloppy-rich four-cycle and then bolted it into the ship. The cut-down Bolly 10 x 6.5 three-blader shown in the pictures proved to be too much prop for the FP. However, both the engine and the ship love a Zinger 10 x 6. With a properly set needle valve, the .40 runs perfectly and breaks only slightly in all the right places.

"Boy, does this ship perform! It will more than rival any full-bodied Stunt ship in all areas. On 61-ft. lines (center of fuse to center of handle), it pulls like a .46-size ship and stays tight at the top of the Hourglass.

"The only consideration for this project was 'just for fun.' Besides, it has been a number of years since I had built a .35-size ship. Well, Ted, it is so much 'fun to fly' that I take it to the field when I should be taking my .60 ship for serious practice!"

Thanks for sharing your ship with us, Jim. After checking out the pix and reading of your enthusiasm for the project, I wouldn't be surprised to see a few clones appear around the country.

I'd like to add a couple of thoughts to what Jim had to say. The "Fanchermobile" to which he refers is my old Imitation, to which I refer periodically in these ramblings. *(Full-size plans are available for it—No. 280, RMeM)* It's true that it bears a close resemblance to Jim's Tutor. This similarity is more than skin deep.

Like Jim's ship, the Imitation is more than a match in performance to any of its full-bodied brethren. This includes two Nats winners, the Intimidation (national champion in 1982) and the Citation V, the 1986 champion. In addition to flying just as well, it is also a much easier plane to fly and, not coincidentally, much more fun.

Why that is I'm not exactly sure. The fact that you've only got 25% as much work involved certainly takes a lot of the anxiety out of flying aggressively. However, that doesn't really tell the whole story. Because they are somewhat smaller (the Imitation is only 610 sq. in. compared to 660 and 680 for the Nats winners) and more draggy (by virtue of their profile configuration), they are more nimble without being squirrelly. They don't pull your arm off and don't require two strong men and a boy to yank out of level flight.

Items such as these have greatly influenced my