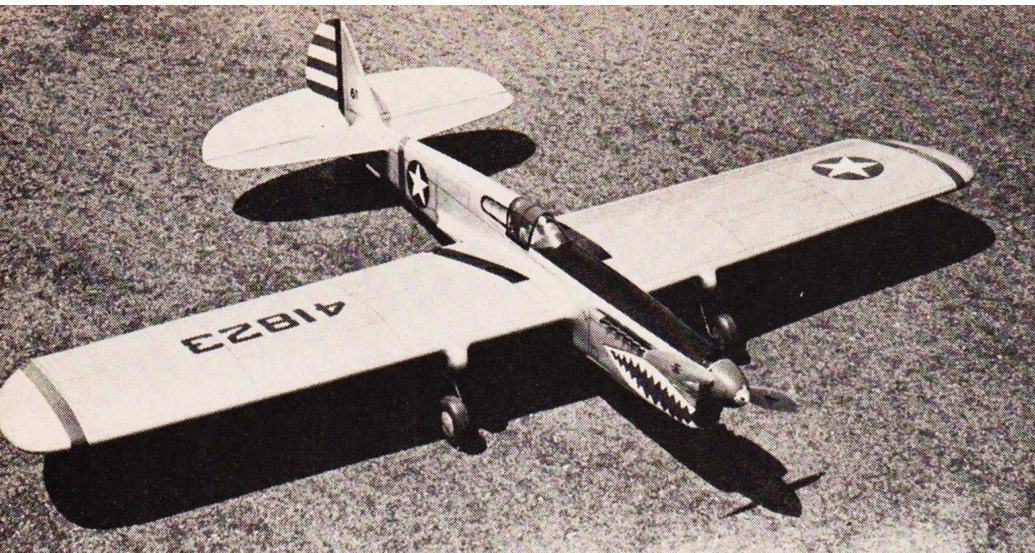




Bill's Stunt Controline P-40 is hardly a "Warhawk," but it's a competitive beast. For O.S. 35's, either foam cores or built-up wings.

by Bill Simons

Photos by Don McGovern

A Stunter with a "P-40" flavor!

Most articles of semi-scale Stunt ships start with a brief run-down of the prototype. Here I will not follow suit. When compared to a real P-40 Warhawk mine bears little resemblance. What I wanted was a military-type look-alike aircraft, easily recognizable by a Navy judge.

Here's the method I use in building a foam wing. I would suggest that you order a core and plank it yourself, the reason being personal choice of wood, and one can sand the core ridding it of ridges caused by the hot wire. Also let's not forget the tender loving care that goes along with your magnificent building methods.

I will briefly outline methods and products which are needed to construct these wings. Although different methods are used, these wings are easier in the long run. The only glues to be used should be white glues such as Elmers' white glue, Franklin glue and similar alphetic resins. These glues are made from dairy products and will not dissolve the foam.

I've tried two kinds of contact spray glues. First and best is 3M #8074 Upholstery Glue, the kind used for attaching interior door panels in automobiles. It's available at auto paint supply stores. The other to be recommended is called simply Scotch Grip.

Method as follows: sand core to your liking. Clean all residue with air pressure. Glue on leading and trailing edge caps and blend to airfoil. These can be held in place with masking tape approximately 1" apart until the glue sets. Do not use an excessive amount of glue because when dry the glue is much harder to sand than the balsa and foam, leaving a glue ridge that will be difficult to sand. In short, it will drive you bananas.

Again clean with air pressure stream. Spray "wing skins" and corresponding side of core getting a light, even coat of adhesive on both. As with the white glue, excessive amounts of adhesive will be harmful.

Let both sides set until they feel very sticky. At this point the core and skin are ready. Apply an even light coat of white glue on the leading edge cap and trailing edge cap. Turn skin so the sticky side is up.

Lay skin on flat surface. Carefully position core on skin. The grain of the wood should parallel the leading edge. Rock wing back and forth and the two parts should adhere immediately. Only one chance here, so if you blow it at this point you start all over.

After this is done, turn wing over and rub skins profusely to get a positive bond. Trim extra wood around edges leaving 1/4" overlap and again tape in place. Place core in saddles (part from which wing was cut) and position a piece of hard wood which completely covers the saddle. This will distribute the weight. Put approximately 50 lbs. on top of this mess, distributed as evenly as possible and let it set overnight. When done, repeat the process. (Take note—not one pin is needed during the construction of wing.) After this, finish in a conventional manner.

My suggestion would be to use Sig Lite Coat Clear. It is a low shrink dope. Other brands, I've noticed, allow the seams to buckle, leaving an unsightly ridge caused by the shrinking features of the dope. This is useful when covering an open structure, but not desirable on a foam wing.

Sig Dope is a high-quality finish, so if you are using something else don't be afraid to give it a try. (Proof being Bob Lampoigne's 2nd place in the Testors Best Finish category at the Nats, using Sig Dope.)

These foam wings are easily obtainable at C/L Specialties, 3 Rodger Court, Woodcliff Lake, New Jersey, Bob Hunt, President. Bob himself is a Stunt flier, so he knows what one would want. He has many popular wings available and also will custom cut wings for you.

As far as weight goes—the lightest one to date around here is Gene Schaeffer's ship called "The Stunt Machine." Gene's ship weighed 46 ozs. and flew quite well at that weight. The "P-40" weight 48-1/2 ozs. and had a larger wing, but a comparable wing loading and also flew well.

If you live in a higher elevation area of the country, maximum weight should run 44 ozs. This weight will prove difficult to attain, so a built-up version is shown on the plans.

The original version did not have an asymmetrical planform, one wing longer

than the other. A mistake! This feature should be built into every stunt ship, bar none.

The idea of equal panels sounded good to me during the building stage but proved to be a mistake. The only way to correct this was to add another full ounce of wing tip weight. The tip had 3/4 of an ounce to start with and finally ended up with 1-3/4 ozs. Extra weight we need like stress cracks, so the plans incorporate unequal panels. I feel that this is a rule we should always follow and 1" seems to be the correct amount. Also I feel that some sort of an adjustable tip weight method would be a good idea and I plan to use this on my next ship. To have a more versatile design should prove advantageous.

Adjustable leadouts are also a worthwhile feature, as well as a removable tank. At Glenview N.A.S. one of my tank vents broke. It was cause for little concern to me because of the removable tank. I would hate to think of what I would have to do to my ship had I not had this feature.

The "P-40" was set up for an O.S. Max 35-S. I had previously been using something else and was quite happy with it. Had it not been for the changes in FAI requiring a muffler I would not have happened on this little jewel of a motor.

The Max people make a muffler especially for their motors. It fits like a glove and works well. Some power loss is experienced, but this can be minimized by experimenting with props sizes and makes. The muffler comes with two removable rings which will further lower the noise level, but as expected, the more efficient the muffler, the greater the power loss. Removing one or both rings enables one to fit the power range of the Max to the airplane. Again, another example of versatility.

When coupled with a Uniflow tank system, which has been around as long as the Ford, this will give a smooth run from start to finish. Addition of the muffler will make the Max run even smoother, it seems. The backpressure helps a bit. Also, not incidentally, it helps calm the nerves of your local neighbors.

Also consider the noseweight factor. Very few of today's ships balance when

they should. Most are tail heavy. Here's a dandy way to trim your ship: the muffler weighs 1.5 ounces and can be altered to weigh 1 oz. The weight of the Max 35S is 6.5 ounces, which is right on par with most other .35 engines, so this will not cause any difficulties. The O.S. runs better when vibration is held to a minimum, as do all motors. Always use a balanced prop! Also, make sure that the wheels don't vibrate.

Construction

Assuming that we have in our possession the lightest balsa available, we shall start with the wing. If you decide to use a foam wing, then this part of the instructions won't apply. The following is intended for a built-up wing.

First, obtain two lengths of 3/8" OD aluminum or steel rods approximately 54" long. These rods are intended to assure the building of a straight, true wing. They are the simplest method to form a jig that I know. The main bulk of construction can be accomplished using this jig. All plank-ing capstripping, etc. can be done with the rods inserted.

Let's start. Make templates from plans of root rib and tip rib. 1/16" plywood or 1/16" aluminum should suffice. Stack 14 pieces of 1/16" between templates and then bolt fast. Carve and sand to shape, then repeat the process. Take note that the in-board wing is 2" longer as per plans. This is accomplished by omitting two ribs from the outboard panel. Slide all ribs on rods. Block up both ends of rods so that you have a "floating" assembly. Mark rib positions on the leading and trailing edges and spars. Find the positions from plans. Pin ribs in place and glue. Add hinge blocks as noted. Proceed to add leading and trailing edge planking and center sheeting.

Take note that the method of installing the bellcrank differs from most. This method which I call a "floating bellcrank" is stronger and far superior to the usual method, so do yourself a favor and use it!

When mounted in this manner the plywood is held fast, not only by 1/16" sheet center planking but it is also butted against the 1/16" plywood fuselage doublers. Remove the rods from assembly. Add tips and carve and sand to shape.

Most flaps on today's ships are made from 1/4" sheet, 3" at the root and 1" at the tip. Mine are not. I prefer 5/16" in thickness. Why? It seems that 1/4" flaps tend to warp easier than 5/16". The 1/16" difference aids in reducing flap warps. Reducing the area and taper of flaps produces two results; a higher aspect ratio wing and the plane tends to fly a snappier turn due to the fact that it flies more off the elevators than the flaps. This, when added to an increased area of stab and elevator area, produces this effect.

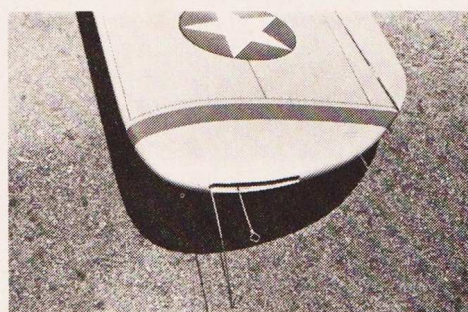
Stabilizer and elevator are self-explanatory, so I won't go into detail here. Keep this assembly light, 1-3/4 to 2 ozs. for complete assembly. The ratio of tail weight to nose weight is 4 to 1, meaning that if the tail is 1/4 of an ounce too heavy it will take one full ounce of nose weight to overcome this. If it's over 2 ozs. don't use it. Try again!

This leaves us with the task of building something to tie the wing and stab together. Let's call it a fuselage. Sounds like a good name!

Start with the sides. Blank them from



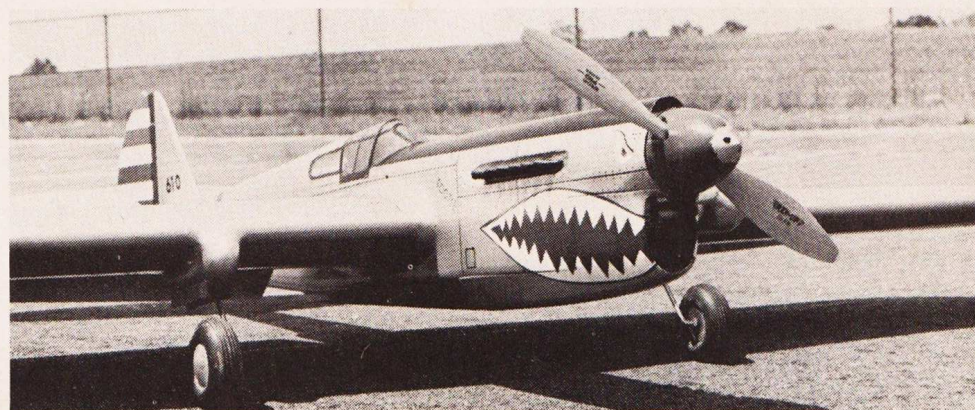
Lean lines tend to simplify construction, less bending of balsa. Absence of tensions in the lumber helps keep things true. Strive for warp-free surfaces, a shaving of weight, a reliable powerplant, fuel feed. As for that fence, it's nice to have around to keep young kids clear.



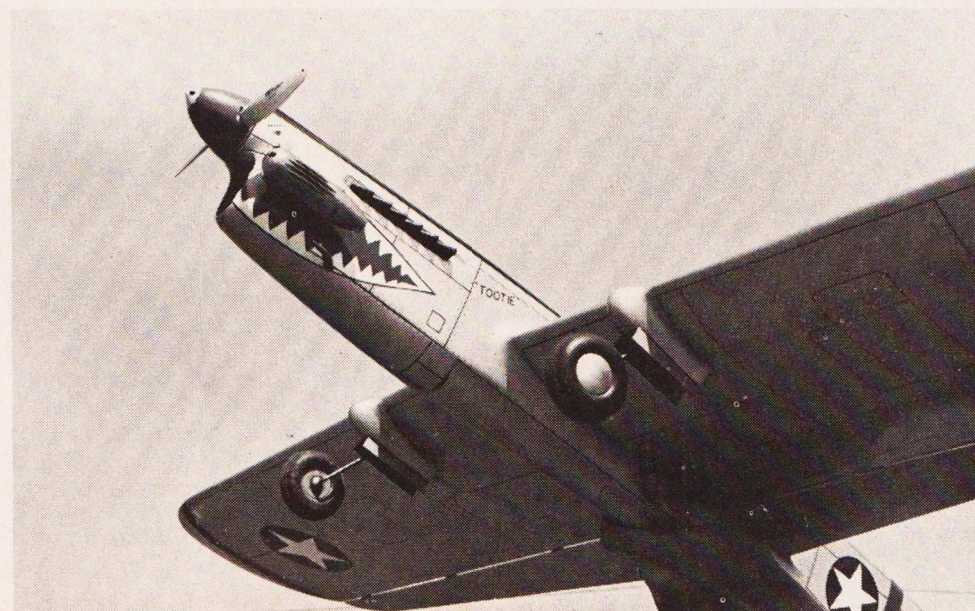
Leadout position alters flight performance. If mis-positioned, it detracts from the capability of the ship. An adjustable leadout line guide!

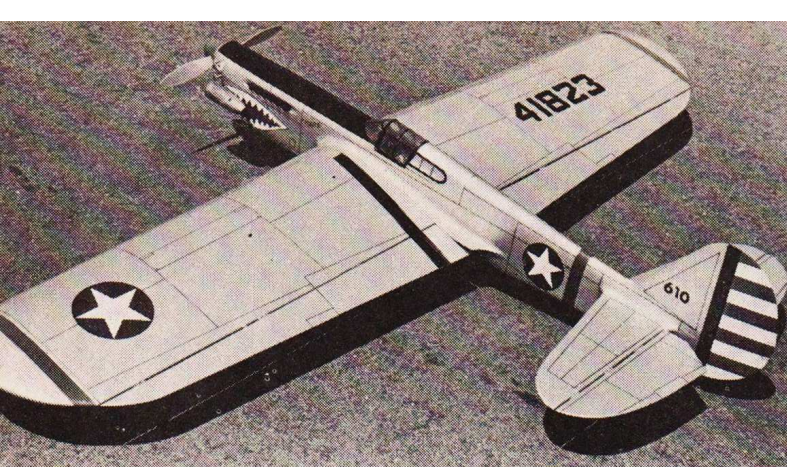


Keep the weight down for the moment you aim the nose up. Excessive weight puts you at a severe disadvantage in mastering the pattern.

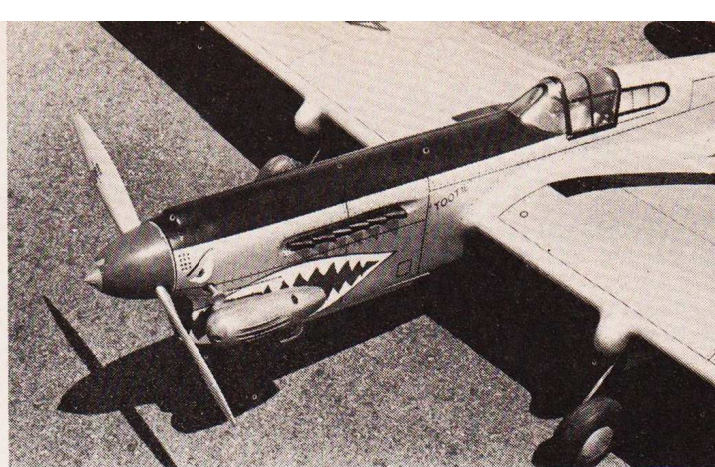


Any closer and it would be glued to the ground. Stunt ships get an assist from the "ground effect," a cushion of air building up between pavement and wing on landings. It helps the flare-out. Cowl does not bite. Prop does! Below: The gear visible here, typically "Warhawk" trimmings.





The flaps run almost full span, ample area, stab and elevator of generous size. Bill's original sports a superb finish, has had lots of flying time.



The character of the fighting Warhawk carries into the Semi-Scale Stunter, balance, moments, proportions engineered for this event.

1/8" sheet; make sure the tops are straight and true. These will determine your thrust lines of wing stab and motor. This area is extremely critical. A few degrees off either way and whammo—instant bomb! So, be careful. If you have ever had a ship that turns easy one way and hard the other, you can bet it's caused by incidence somewhere in this area. Measure, measure, measure.

The fuselage is fairly conventional, so I won't waste too many words here.

If you've cut out all of these parts correctly and I've drawn the plans right, this whole mess should add up to be a "P-40."

In the past I had been annoyed by stress cracks in various areas. I have found that by white gluing a small piece of regular gauze bandage in certain places (externally) these problems will be prevented. These areas being a leading edge and fuselage joint. The gussets between flap and fuselage, leading edge of stab and fuselage, gussets between fuselage and elevators. This gauze "patch" should be cut small enough to allow fillets to completely cov-

er them. Just prior to painting I put a thin coat of epoxy resin inside cowl, engine compartment and tank area. This is the only area on which I use epoxy.

The wing to fuselage joint is held in place by gauze and glue. The reason for this is because epoxy is much heavier than glue and gauze, but as far as strength is concerned—they are equal. I suggest using this method for all major joints such as stab to fuselage, wing to fuselage, etc.

Well, let's put some paint on this bird. First, two coats of clear go on the base wood. Sand with 400 dry. Additional coats are unnecessary and just add weight. Next, get hold of some Silkspan and cover the entire airplane. Do not cover fillets anywhere. Silkspan will pull away from the fillets causing bubbles that will drive you crazy. So, don't cover them!

I've found that three coats of clear thinned 50% will fill 00 Silkspan and will take two thorough sandings to rid the ship of the grain in the Silkspan. Note, I say Silkspan and not balsa. Because of the nature of balsa it is impossible to fill the grain. We just cover it up to hide the grain, not fill it.

The original "P-40" was painted so many different colors that I finally wound up using silver, one just can't go wrong using silver, I thought. But as old-lady-bad-luck would have it, it can go wrong. The "P-40" was painted with another brand of dope which I won't mention for obvious reasons. This dope was created to drive modelers mad. In my case it did. The finish was not up to par. In short, it was a mess, but with summer and the first contest rapidly approaching I said the heck with it, it was only on the bottom anyway.

I would like to mention that I was having problems with tanks and motor runs. The two go hand-in-hand. It seemed that I could not get a satisfactory run. Siphon system (one vent) on the O.S. causes the undesirable characteristic of leaning out toward the end of the pattern. Uni-Flow system is just the opposite. Also leaning out going upwind and richening going downwind on both. What to do. I don't know. Then one night while playing with my Tonka Truck it dawned on me. Most of today's venting systems rely on air velocity ram. This being so and realizing that a Stunt ship does not fly at a constant speed, the amount of pressure of air exerted in the tank is not always equal. Also as the fuel is used up, internal pressures decrease for air can be compressed more than fuel. To completely overcome this the simple solution is to pres-

surize the tank. I did this by drilling and tapping the O.S. muffler for a pressure fitting and then running a piece of black neoprene from same to the uniflow vent and Presto! absolutely the best running engine in Northvale, probably the only engine in Northvale anyway. Really, it does work.

When this was seen at a local meet, my arch nemesis, rivals and severest critics, (otherwise known as "flying buddies") said "What is that? Is that to keep out the dirt? Aren't you gonna disconnect the tubing before you fly?" Completely disregarding their puns and laughter I flew anyway noting that they were watching me like hawks. After landing and wiping off the top of my ship I was surrounded by half the population of Stunt flyers in Queens, N.Y., three in all. I could almost hear them mentally scratching drawings in their heads. In short, give it a try it really works well, the idea is borrowed from somewhere. Stolen, if you will.

If this article seems repetitious of many other such articles, it's mainly because this particular ship is not exactly radically different. Many folks I've met have stated that Stunt is in a rut. Change the rules, change this, change that. Why? Maybe Stunt is in a rut but I don't think making any changes in the pattern will alter this fact. The pattern as written is enough of a challenge. I really enjoy seeing a good pattern flown. I've been flying Stunt for 15 years and can remember only a handful of good patterns—the ones that would really give one goose pimples. None of the same were flown by yours truly unfortunately. When the great, really great patterns become the commonplace, then it's time to change.

I've either shown or listed products and procedures which will work well and with dependability and longevity. These are not difficult to duplicate, nor great departures from what would be considered the norm. It's my contention that when one finds a combination that works well one stays with it. But don't be narrow-minded either.

I realize the construction section of this is vague in many areas. The "P-40" is not a beginner's ship. If you want a step-by-step run-down, check into my previous "Shoestring" article in FM, September 1971. I hope these words have been entertaining, if not informative. Maybe in the future our planes will cross lines (figuratively speaking of course) and we can steal ideas from one another. Until then, may all your wood be light.

Below: Aside from those flaps, there is nothing depressed about this bird. A competitive ship.

