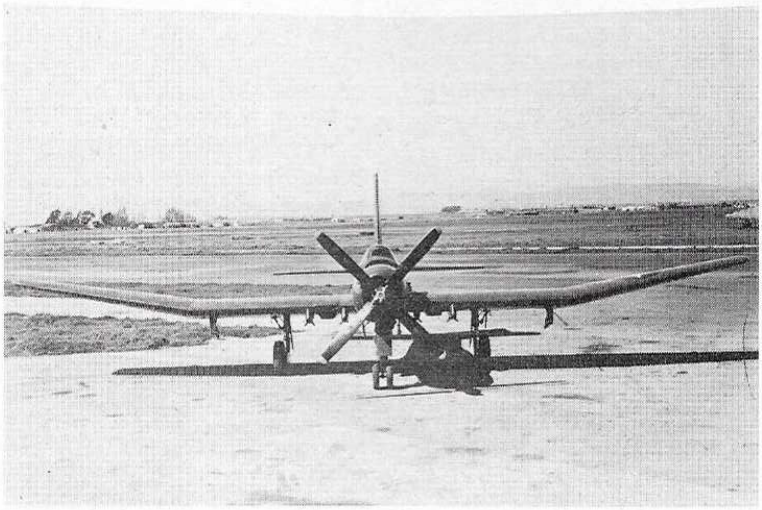
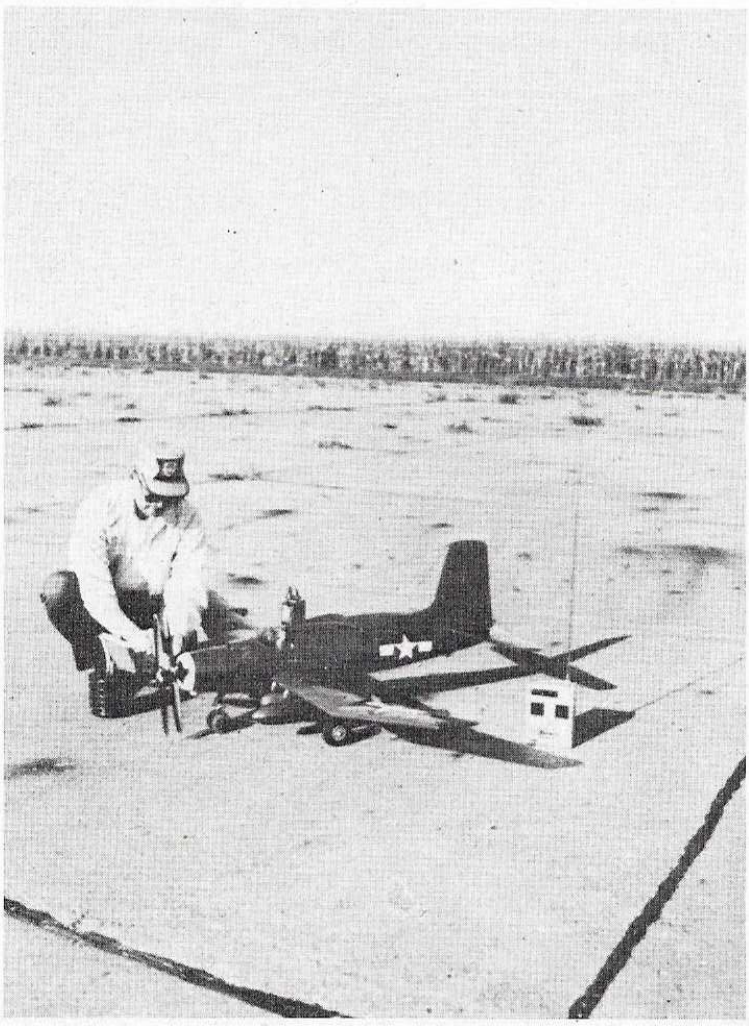
By CLAUDE McCULLOUGH

DOUGLAS XTB2D-1 SKYPIRATE

CLAUDE McCULLOUGH'S FABULOUS 84" SPAN SKYPIRATE IS ONE OF THE FINEST SCALE R/C DESIGNS EVER TO BE PRESENTED. AMONG ITS TROPHIES, A FIRST IN SCALE AT THE 1965 NATIONALS.





A lesson to be learned early when searching for good scale subjects is that the airplane which looks ideal in a picture or three view more often than not has defects hampering conversion into a practical model. When plans are drawn up for building you find cowlings expanded to sizes that blanket the flying prop, fuselages that turn out big enough to double as a dog house, or are so divided by wing position and cabin location it would take a shoe horn to get the equipment squeezed in and still leave room for cockpit detail. Spinners and wheels end up as odd sizes obtainable nowhere.

Then there's that old scale bogie tail area. Maybe with our present highly developed proportional it really is possible to fly *anything* in model form that flew full size, using scale tail area, no matter how small. Still, and here my old free-flight phobias crop out, it seems that a fair sized fin and stab are definite aids in having a flyable reproduction, particularly in critical low speed situations. Add landing gear positioning problems, too short or too long nose moments, etc. and you get the picture. There is no such thing as a perfect scale prototype and very few even close.

So you can understand my enthusiasm when I came across a 3-view of

the Douglas XTB2D-1 alias the Devastator II and Skypirate, the answer to an R/C scale modeler's prayer. Despite years of digging in old magazines and books I had never heard of this airplane until information was printed in the January 1961 (International edition) of the English magazine Flying Review. Subsequent research seems to confirm that this was the first time data had ever appeared in public print. For example it is not even mentioned in Jane's "All the World's Aircraft" of the period, an almost unheard of omission. My conclusion is that this "lost" airplane must be the rarest completed experimental by a major manufacturer in the World War II period.

It was an exceptionally large 70 foot span, 3 seat ship board torpedo bomber, powered by a 3,000 h.p. Pratt and Whitney XR-4360-8 engine. Intended for the big Midway class carriers, only two prototypes were built and flown during 1943-45 and the end of the war brought cancellation of the project.

Prior to discovering the XTB2D-1 I had sifted through the plans, photos and specs of hundreds of airplanes looking for possible scale subjects and submit that this is one of the best of the lot. It fits into AMA scale competition in more respects than any other I have ever investigated.

Check some of these advantages:

1. High aspect ratio wing with a thick section. An ideal setup which may be flown and maneuvered at high wing loadings without having a snap-roller on your hands.
2. Ample tail area. By not requiring any enlargement it will be possible to gain maximum points in scale fidelity judging.
3. Wide track tricycle gear. Although rule changes have been made making things easier for airplanes with narrow, ground-loopy 2 wheel gear, you still want to get the airplane up and down safely and with a little dignity.
4. Scale operations. Few airplanes offer so many scoring possibilities for point gains in the gadget department: Retracting gear, flaps, carrier arrester hook plus *four* stores pylons to carry bombs, rockets, smoke screen, land mines, drop tanks, etc.
5. Low frontal area. Try any other radial engine monoplane or even most any in-line engine type and you'll see the contrast.
6. Clean, relatively simple lines without fillets. Low wing layout for contest condition flying.
7. Last, but not least, that intangible something that makes military airplanes a little more attractive than civil craft.

About the only important debit that can be chalked up against the design is that the low frontal area brings with it the problem of too small a cowl to completely hide the engine. However, by inverting, the damage to appearance is negligible. With the head outside in the slipstream a valuable sub- advantage is gained in eliminating the overheating ever present with enclosed engines.

I considered for a long time trying a retracting gear on the Skypirate — the lure of 20 points is strong. Commercially available units work fine on the relatively short and light weight L. G. of the standard size multi but would be more than a little strained on a scale of this size and wing loading. A specially built layout might take the punishment, but would be heavy and difficult to build. It comes down to a gamble in either case and I have seen

as many points lost as gained playing this particular slot machine — a belly landing doesn't get many perfection points!

Another good argument can be developed in favor of a fixed gear. Note that in the AMA rules the gear is worth 25 points for scale fidelity and 25 points for workmanship. For retraction you are pretty much restricted to stark simplicity or run the chance of overloading the mechanisms. With a fixed super-detailed gear you can not only gain more fidelity and workmanship points under the landing gear category but also improve the overall general appearance and raise your score in that section also. It seems likely the retracting gear points can be pretty much retrieved in scale judging without any "Look, Ma — no wheels!" incidents.

The model is 1 3/16" equals one foot scale, giving an 84" span. Wing area is 864 sq. in. or 6 sq. ft. With a full load of dope and details aboard, this adds up to a 29 ounce wing loading at around 11 pounds. I'm sure it could be built lighter by a builder not so addicted to epoxy and fillercoat.

Most notable contest win of the model was first place at the 1965 Nationals R/C scale event. Later it took first in the RCM Design Contest. Most recent placing was 3rd at the Hastings, Nebraska meet last September. I had a lead in scale points and was all set to blitz my favorite adversaries, Maxey Hester and Bud Atkinson. But "engine-itis" helped to goof up my flights on Saturday and Sunday a Nebraska cyclone grounded scale flying.

We'll not get into any "glue A to B" directions, for if you haven't built enough models to not need this type of instruction you shouldn't be trying a complex design anyway. Construction is mostly of Sig Contest Weight balsa with the exception of wing spars, fuselage stringers and longerons, which are medium grade.

The wing and tail are of usual multi-type construction. The one-piece landing gear mounting block (get someone in your group with woodworking tools to make it for you) is the main strength of the center section, so don't try substituting standard separate multi l. g. mounts — a snapped wing fluttering down is a great thrill for spectators but doesn't do much for the fuse. Plank the bottom of the wing first. Install Williams Bros. 90 degree bellcranks as control horns for the ailerons by epoxying one arm to a rib and the bottom planking. Run a pair of wires up the spars to power the navigation lights, terminating in the center section servo cavity. At the wing tip blocks leave loose ends inside the hollowed part, long enough to reach outside.

Provide blind nut mountings to retain the bomb pylons, since they must be removable to be able to take off the landing gear when desired. Incidentally, a simple method of pulling the bomb release toggle string is to fasten it to the flaps, directly behind the pylon. Running the flaps into "up" position (above neutral — in the prototype this movement was used as a dive brake so is not unscalelike), jerks the release. Different length strings will permit dropping the stores from pylon separately.

For accuracy, I like to build the ailerons and flaps as an integral part of the wing, rather than separately. After planking and sanding, saw them free using a blade removed from an X-Acto razor saw. It will be an aid in this process if during planking you either mark or slit the planking in the proper spots. Cut the open edges to an angle to allow the desired amount of movement. Close the open wing hole with 3/32" sheet and face the flaps and ailerons, also with 3/32".

Stab-elevator and fin-rudder are also made as units and sawn apart after planking. Use temporary bracing at the back of the tail ribs until the surfaces are partially planked.

The aerial is simulated with elastic cord, allowing the Skypirate to be turned over for starting the inverted engine.

The fuselage is ruggedly constructed around a 1/4" sq. "bridge girder." This madness has a method, as you have already discovered if you have tried to plank a flimsy compound curved structure — the strength is absolutely necessary to keep it aligned during building. The formers are not notched until after assembly on the framework. Pin the 1/8" x 1/4" stringers in place, one at a time and make the spots for notches by cutting on each side with a razor blade. Note that the front section (on the outside of the 1/4" frame) is solid soft block balsa directly behind the cowling to provide material for carving the cooling and exhaust exit ducting. The tail cone and the area immediately in front of the rear cockpit is also made from block, hollowed for lightness.

On the prototype aircraft, this humped section of the upper fuselage was to feature a power gun turret but available photos do not show it actually installed. It is believed that the idea was dropped when projected utilization of the aircraft was changed in midstream to something like the mission soon acquired by the XBT2D, prototype of the AD Skyraider. The turret opening in the first prototype Skypirate was covered over in rather crude slap-dash fashion by the junior apprentice of the sheet metal shop, but the second prototype (Serial No. 36934, distinguished by a white cowl ring) was done in neater, contoured fashion, as shown on the plan.

Most instructions for planking generally advise use of many small strips. I don't care for this method, not only because of its considerable tediousness, but equally because of the multiplicity of seams and extra weight of all the glue required. The S. P. fuselage was planked in 6 major pieces of 1/8" sheet — from top centerline to top longeron, then to the bottom longeron and last hunk to the bottom centerline, on each side. First requirement is the proper grain of wood that will easily bend into a curve, well soaked in water to be very pliable. By soaking I don't mean immersing the entire sheet. I wet the outside repeatedly with a cotton swab, it then assumes a fair amount of curl on its own.

Starting at the front and working to the rear, fasten down the planking to the stringers, using plenty of pins (it may take several hundred per piece),

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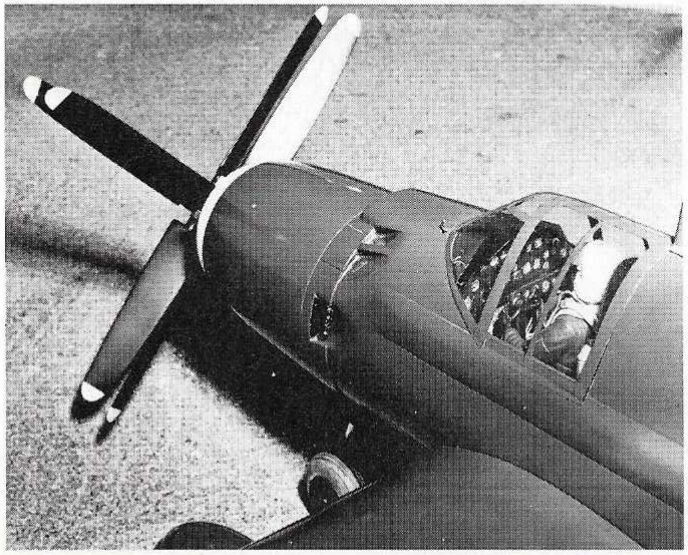
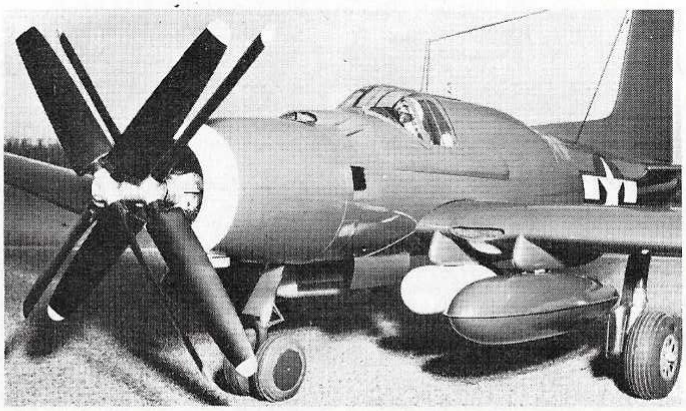


Cockpit instruments from Tatone. Hood, control wheel, etc. from Air-O-Sheet. Pilot is Aurora's Steve Canyon. Note pilot's seat offset to left side of cockpit. Scale prop carved from balsa with hubs from copper plumbing fittings. Front hub detail from Monogram Wright Cyclone plastic kit.

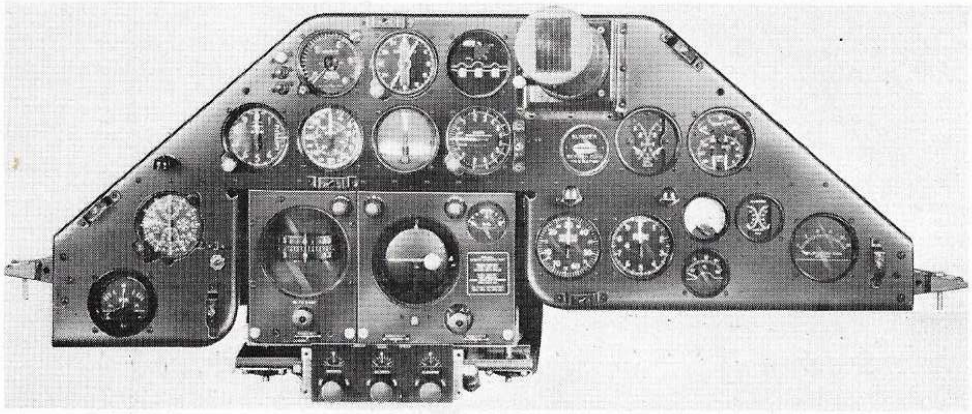


binding down with tape or bandages and in some places on the edge where possible, with clamps. As you work to the rear you will come to an area where it can no longer be forced down. At the former nearest to this bulge, remove a "relief" section — a high aspect ratio thin triangular silver whose bottom width seldom need be more than 3/32" and at the top diminishing to a razor blade cut. This may have to be repeated further along. Later filling and sanding will hide these seams. Note that the relief cut do not necessarily have to be made very far into the sheet to accomplish the purpose in most places.

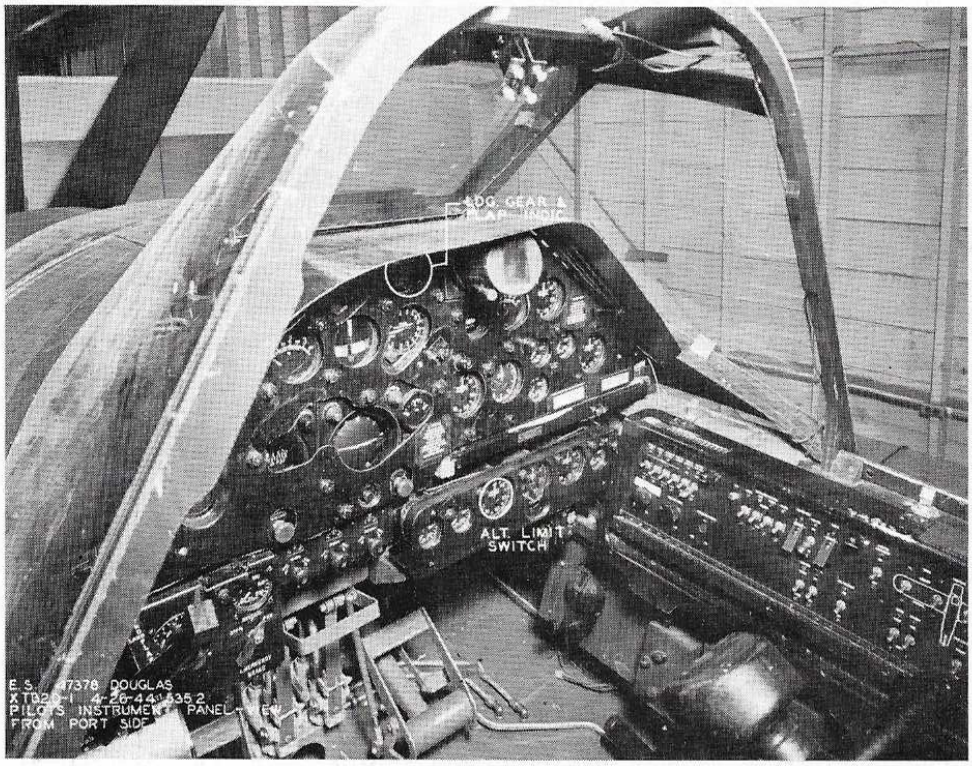
The rear cockpit glazing is flat sheet cellulose acetate but the front canopy requires a bit of molding. Don't let this scare you — it is a skill that every scaler should acquire. Since shaped lenses must be made for the wing tip navigation lights, let's start there as a good practice project before tackling the more exacting fuselage task. On the completed and sanded balsa wing tip, mark the outlines of the lens and saw this piece out. Mount it on a sturdy peg, wing outline edge up, and fasten it to a solid base. I clamp it in a small vise. Finish the mold with several coats of fiberglass resin, sanded and polished to a gloss. Be advised that every flaw will show on the final product — not so important on this small item, but something to keep in mind especially for the canopy. Don't use sanding sealer or fillercoat as a shortcut to a smooth mold finish — the heat will ruin it.

Cut some strips of celluloid, allowing some excess length for handling and set the mold up right next to the burner of the kitchen stove, preferably electric. Wearing gloves, pick up the ends of the strip with two pair of long nosed pliers and hold several inches over the red hot element. When the celluloid begins to smoke slightly, sag and assume a shimmering rainbow or "goldfish" surface sheen, quickly transfer to the mold and pull the strip down over it, stretching it in the process and tucking the pliers under the bottom edge (the mounting peg must be smaller than the base of the lens mold) so that the exact shape is impressed into the plastic. Hold until cool.

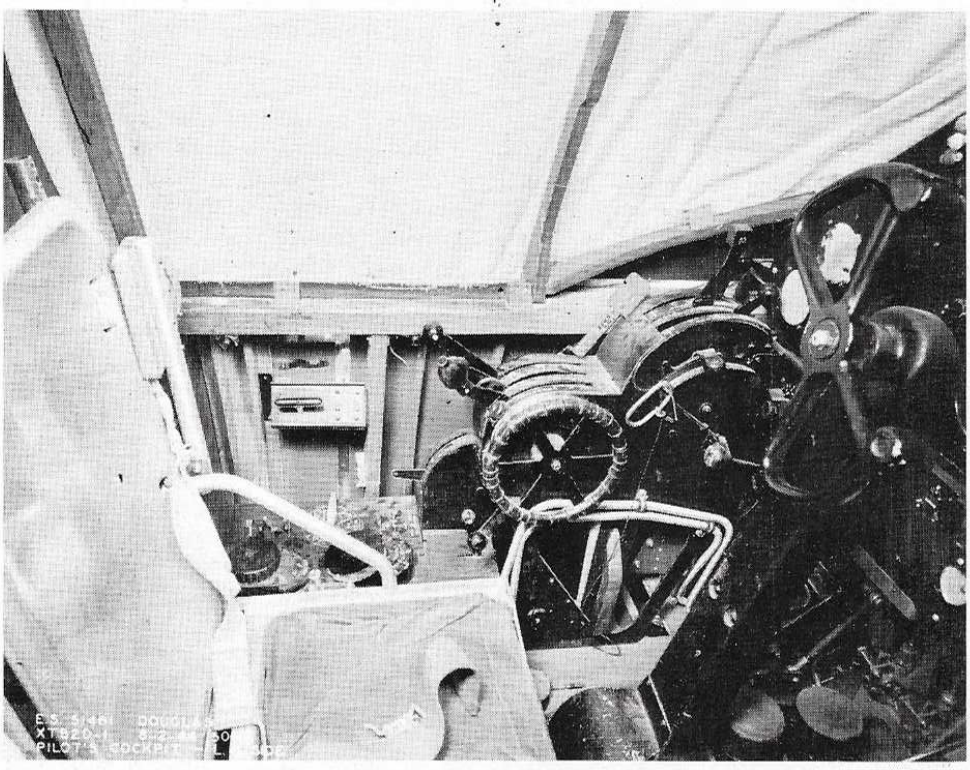
If this is your first attempt you will undoubtedly waste some material before you get a perfectly shaped and clear molding. You will soon recognize the effects of too hot, too cool, too much stretch, etc. Some strips that fail to work out because of being too cold can be re-heated and tried again. These small items take so little plastic that you can learn economically the technique necessary on the cockpit. Since the navigation light covers must fit



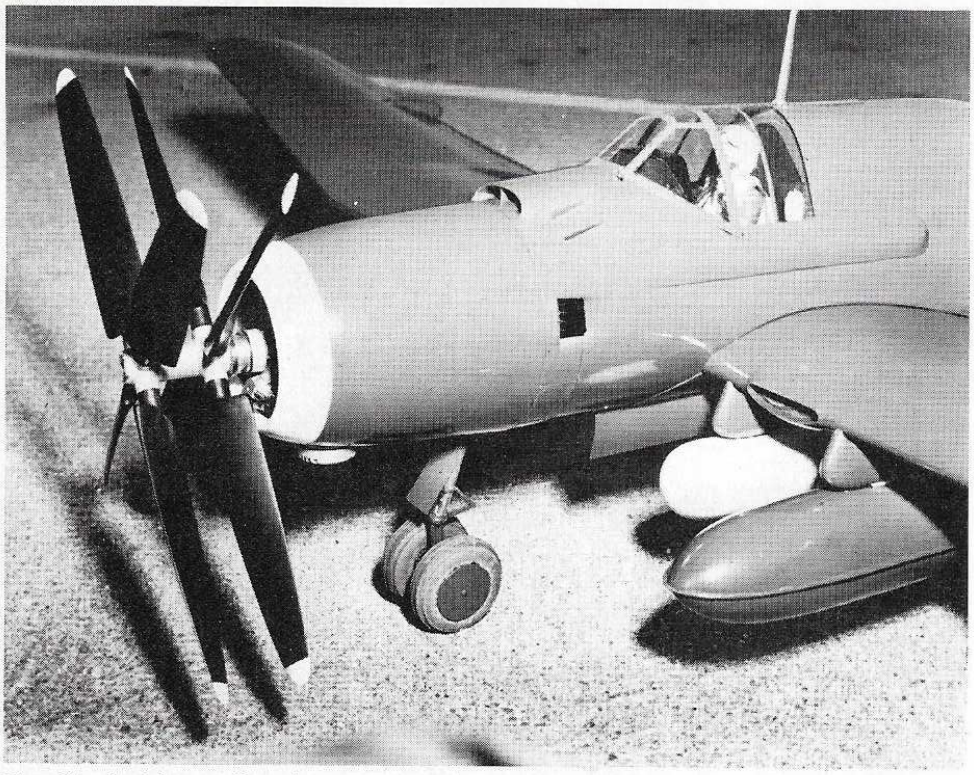
Pilot's instrument panel.



View of instrument panel from port side.



View of left side of pilot's cockpit.



The Skypirate's cowling is a custom spun job. Cowl flaps are simulated with heat formed pieces of Air-O-Sheet, although aluminum, or something similar could be used. Air-O-Sheet takes butyrate dope very well.

flush with the wing tip surface it will be necessary to trim them down slightly with a razor blade. Reach through the opening in the wing tip block with tweezers and pull out the wiring. Solder on a G.E. 222 3 volt bulb or equivalent and mount in the opening. Don't cement the plastic cover in place until after final paint job and cover the seam with a small strip of Scotch Plastic Tape. Dye the left light red and the right green with dial light coloring or put some aniline dye in clear dope.

The cockpit job could perhaps be made smaller by making the sliding portion from flat sheet and moulding just the front windshield but as long as you are about it it's nearly as easy to make it all in one piece. But first the pattern: Inset balsa blocks into the planked fuselage by tack cementing them in the cockpit opening. Cut and sand them to shape, flush with the fuselage contours. Remove and add a 3/16" extension all around the bottom — the finished canopy must be bigger than the hole it is covering, unlike the lens. Fiberglass and polish.

Cut your celluloid (.020 or .030) in a strip that will allow about 1/2" leeway all around and make handles of strip aluminum to bolt to the long edges and allow an extra inch on each of these sides. Same idea as the lenses, but the strip is too wide for pliers. With the mold set up on a stand as though it were in the fuselage at a 45 degree nose up angle, repeat the procedure used on the navigation light covers. Occasionally you will get whitish areas like dope blushes, due to incorrect temperatures and if not too bad, these can be removed with a Plexiglas scratch remover polish. Cockpit framing is done with strips of Scotch *Plastic* Tape (not Electricians, it's not oil proof.) Get black, which holds paint better than colored tape and dope it the same color as the rest of the airplane, after it is applied to the canopy. Don't stretch it anymore than necessary when applying or it will shrink back in the sun.

For the dual nose wheels I used Geoff Franklin's excellent ready made steerable unit, bulkhead mount type. (Address: 101, Jarrom St., Leicester, England.) The aluminum block into which the two landing gear legs are plugged and retained with set screws, was drilled out for 5/32" instead of 1/8" wire (I have been known to land less then lightly), with coil springs at the top of each leg, out of sight, just inside the cowling. If you haven't got any one in your club with a wire bending device (thanks, Maxey!) to make these for you, commercially made coils can be adapted or the 1/8" legs that come with the unit used. Since the paired wires were filled out to scale diameter with a brass tube cover, plugged in place with extra wire and filled with solder, they are a bit heavy — but you'll bend something else before you will the nose gear. Never worry about a little extra weight in the front of a scale model. Better something useful than a hunk of lead. Front wheels are 2¾" Graupner German made solid sponge.

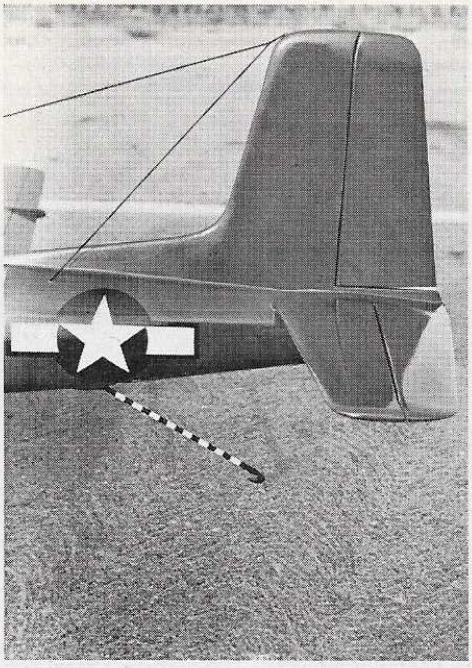
The main gear is a 3/16" wire torsion bar and to keep weight down this far back, polystyrene plastic tubing was used to flesh it out to scale diameter. To paint this tubing, sand off the gloss and use Hobbypoxy paint. Wheels are English Keilkraft 4" pneumatic, light but durable. (Wheels are available from Polk's or Geoff Franklin.) The wheel bushing will have to be drilled out to 3/16" and this must be done carefully on a lathe for there is not much leeway — but enough.

The cowling was commercially custom-spun from aluminum, a beautiful job, accomplished with the help of ace Omaha R/Cer, Dr. Bill Clark. If you want to make your own, I'd advise turning a wooden form on a lathe, finishing it with fiberglass, polished and waxed and making a plaster cast. One good trick is to leave a "peg" of several inches in diameter out of the front of the wooden pattern — there will be one there anyway, just don't take it off. Leave this sticking through the bottom of the plaster. When dry, a few whacks on this with a hammer will drive the form out of the mold. Coat with release agent and make a one piece fiberglass cowl in the usual manner with 7.5 ounce boat cloth.

A handy product for the scale fan is Len Purdy's Air-O-Sheet, the material used in the Lanier ready-builts. It is a soft, easily worked and heat moldable plastic. Many detail items on the model were made from 30 gauge Air-O-Sheet; the landing gear cover doors, wheel hub covers, instrument panel and cowl cooling flaps.

For this last item a strip of A.O.S. was wrapped in place around a can the same diameter as the back of the cowl and put in the oven at 350 degrees for 10 minutes. Individual cowl flaps were cut from this and epoxied in place. A little extra work, but so much more realistic looking than painted on versions. Air-O-Sheet can be painted with Aero Gloss or butyrate dope, but it is better to spray rather than brush and use thin coats. It can be sanded where necessary, as is required to match the cowl flaps exactly to the cowl, but has a smooth surface that needs no filling or preparation for painting ordinarily. A special liquid cement is available which welds pieces of the material together quickly and in this manner such exacting little dinkies as the "scissors" on the sliding part of the L.G. oleo strut were quickly made.

The color scheme of the Skypirate belongs to a short period which many



Douglas XTB2D-1 arrester hook may be lowered. Droppable bomb is one of many scale operation features.

published articles and books on Navy color schemes ignore, usually stating that the matte finish graduated dark to light blue top with white bottom was replaced by overall gloss midnight blue. In fact, from May to Sept. 1944 at least some Navy aircraft (Hellcats, Corsairs, other experimentals such as the XF15C-1 and XBT2C) were painted overall gloss sea blue. These can be detected in black and white photos by the fact that the insignia surround can be clearly seen on an all gloss blue airplane — later they painted the whole airplane the color of the insignia border, and hence there was no longer any border.

The nearest thing to this color suitable for the model commercially available is Aero Gloss Curtiss Blue. Using this as a base and more references than can be detailed here, I mixed my own according to a scientific formula — a dash of gray, white, black, Corsair blue, etc. The idea is to give it a slightly darker, grayish cast. For a check in stirring up this brew, go down to your friendly neighborhood hobby dealer and borrow a piece out of the Monogram SBD Dauntless kit. (If he complains, tell him Bill Northrop sent you.) The color of the plastic is about what you are shooting for. Mix enough (say 5 pints or even 3 quarts) so you will have some left over for repairs; to duplicate it again will take a spectroscope.

A former habit I had of piling on dope, coat after coat, came to a screeching halt the time I found I had managed to add 1¼ lbs of finish to a wing. The finishing procedure used on the XTB2D was simple but effective, giving a much more scale-like surface than a super high gloss. The planked balsa was first brushed with one coat of Sig Superfill to close pores and grain and sanded down considerably. Next a coat of clear dope, lightly sanded. Then wet silk over everything, doped in place and followed by another coat of clear. Then two or three coats of heavily brushed on Aero Gloss Fillercoat (it can be sprayed, but wastes a lot), sanded extensively but with care not to get through to the silk. Last coat fine sanded and polished. This gives you a uniform surface for spraying on the color dope.

You can use commercial star and bar decals but I consider painted insignia more permanent. Patterns are on the plan and come back here while I tell you how easy it is to paint them without going to art school. First, spray the areas where the insignia will appear with white dope, feathering the edges of the patches so they will not show through. With the white Fillercoat background, two coats will be plenty. Lay a light cardboard pattern of the insignia in place and trace around it lightly with a soft pencil. Using an ordinary draftsman's ruling pen and compass (a flexible ruler will also be handy), with Corsair blue dope in them instead of ink, draw the outlines of the insignia. You must work quickly because the dope starts to dry in the pen immediately. I keep a cup of thinner close by, dip the pen in it and wipe clean on a rag before each refill. Sometimes the dope will not start flowing from the pen or compass easily. Mark on your finger instead of the hard surface of the airplane and transfer over to the work at once. To keep the compass point from punching a hole in the model when drawing the circular parts, scotch tape on a small square of celluloid and place the point on this.

With the blue thus sharply outlined it is a job no more difficult than a kid's coloring book to paint in the areas between the lines with a small camel's hair brush. Or for really perfect results, mask out, using the drawn line as a guide and spray paint, with an airbrush. This will require cutting a circular mask for the round parts.

Test flying was placed in the capable hands of Maxey Hester. The model flew, you should pardon the old cliche, right off the board, requiring only the most minor of adjustments. It is not a tricky model to fly, considering it's wing loading. Keep turns fairly shallow until you get the feel of the ship — the long wing span makes it a little slower to come out of a bank. Anyone capable of managing a low wing multi would have no trouble. It makes particularly smooth and scale like lift-offs from the runway and handles easily on landing. In fact, Maxey says I shouldn't get any points for landings because the model lands itself. Maybe I should get minus points then for the ones I manage to louse up a bit.

Since scale fidelity material on the XTB2D-1 is so hard to come by, I'll undertake to supply copies of the items I have collected at the cost of reproduction and mailing. Send a self addressed envelope to Claude McCullough, Rural Route 5, Ottumwa, Iowa 52501 for a list of available data and information on the spun aluminum cowling and ready made canopy. I'd also be glad to answer any questions you may have on the construction of the model. There's one I won't be able to provide an answer for and that's how come I had the wing wheel well covers on backward when the pictures were taken!

— The End —