

# F6F-3 "Hellcat"

A Stand-Off Scale version of the Grumman fighter.

by Don Williams



Photos by the Author

The Mitsubishi *Zero-Sen* had a decided advantage over our carrier based fighters until late summer of 1943 when the Grumman "Hellcat" appeared. This situation changed almost overnight when the "Hellcat" became the mainstay of the Navy in 1944. Out of 6,477 enemy planes claimed, 4,947 were credited to this aircraft.

The "Hellcat" was tailor-made for the Navy as a direct result of conferences with combat-experienced pilots to fight a specific enemy on its own terms. Its closest competitor was the F4U "Corsair" credited with 2,140 enemy aircraft.

Wingspan of the "Hellcat" was 42 feet, 10 inches and its length was 33 feet 6½ inches.

By the standards of the day, the "Hellcat" was not a small fighter as compared to the "Wildcat" and "Buffalo." It had speed and rate of climb that had been lacking in the F4F and a full range of flight characteristics completely void of any unusual tendencies. It was a pilot's airplane and its potential was made full use of. In short, the "Hellcat" was a very good fighter aircraft. It did its job against overwhelming odds and came out on top, and that's what counts.

I had wanted to build a model of the "Hellcat" for a long time. I don't know why I never did, I just didn't. Several months ago a friend of mine expressed his desire to build one and it kindled the flame. Nothing more was said until recently while I was visiting his home and we talked about it at some length which only made the prospects brighter. How large? What type construction? Many questions to answer, but mainly it had to fly well.

I had finished and flown a Stand-Off Scale "FW-190" from a set of plans I had

purchased and I liked the size, so I decided the "Hellcat" would be of about the same area. I admired the construction technique of the "FW-190" too, as it was simple, fairly fast, and strong. Everything started to form into a picture in my mind, so I got out the drawing paper.

With the construction technique borrowed from the genius model aircraft designer, Nick Zirolì, the lines on the paper began to take shape. After three evenings of drawing, material was selected and construction began. It was also decided at this time that a .60 c.i.d. engine would be used. A .51 to .56 would fly the aircraft, but I feel if you model a fighter it should fly like one—fast!

## Construction

Start by cutting out the fuselage sides and doublers. Glue the doublers to the sides and while this is drying, slice out all the fuselage bulkheads, wing ribs, stabilizer and rudder.

Glue the ¼" sq. along the bottom of the fuselage sides aft of the wing saddle to the tail and the ⅛"x¼" along the top.

Lay out the wing plan on a good flat board. The wing will have to be built in three sections. Start with the center-section. Cut the top and bottom center-section wing spars to length and epoxy them to the wing joiner. Saw the outer panel top and bottom spars to length and pin the bottom spar to the plan. Prop the ribs up with a length of ¼" sq. balsa so they will lay flat and glue them to the bottom spar. Follow this with the top spar and ¼" sq. leading edge, and the ⅜" sq. top rear spar. While this is drying go back to the fuselage. Join the fuselage at F-5 and the tail. You will need to dampen the outside of the fuselage

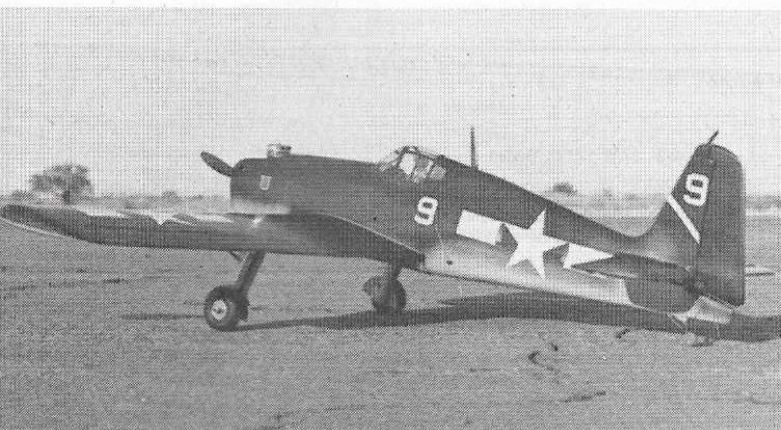
so it will follow the contour of the bulkheads easier. If you don't, the result could be a break in one or both of the sides. When the sides have been joined, hold with masking tape or rubber bands. Add formers F-6, 7, 8, 9 using masking tape or rubber bands to hold in place.

Go back to the wing and remove the outer panel from the board. Lay up the center-section the same as you did the outer panel and let dry. The wing joiner will determine the dihedral in the outer panel when they are attached. Be very careful here because you can get a twist that is not wanted. Join the center panel and the outer panel, propping up the center panel for the dihedral and keeping this outer panel flat on the table using the ¼" sq. again for alignment under the ribs. While this is drying build the other outer wing panel.

Add the remaining bulkheads to the fuselage. Dampen the sides again and hold in place with masking tape or rubber bands as before. Be sure you use epoxy on the firewall. Cement the cockpit floor to the rear of F-4 and to the top of F-5. Cement F-4a and F-5a in place and let dry. Remove all rubber bands and/or masking tape from the fuselage and add the ½" sheet balsa bottom to the rear of the fuselage. You should have all the holes drilled in the firewall for the throttle linkage, fuel lines, and motor mount. The blind nuts are epoxied in by now so you can also glue the 1" chin block in place. When this is dry, add the upper ⅛" sheet fuselage sides and start the ⅛"x ⅜" planking on top. When planking with the ⅛"x ⅜" strips it would be wise to cut your own strips so they will be of the same consistency. Start one strip on each side and work it this way until it is finished. This will prevent any warps.



There's no flight insurance better than a thundering .60 inside cowl-  
ing. At left and right: All "Hellcat" at any angle. Actively flown in WW-II. Beneath:  
As if a modeler designed it. Enough area for carrier landings.



Glue the 4" wide trailing edge sheet in place on the final outer wing panel. When dry, join to the center panel as before, again being careful not to get a twist in it that will be very hard to take out later. While this is drying, glue the stabilizer and vertical fin in place. Cut the soft balsa upper fuselage block to shape and slot the back side to accept the leading edge of the vertical fin. Set the block in place and mark it around the fuselage at the front. Trim, sand, and glue it in place. It is much easier to trim this block to shape and very nearly finish sanding it in your hand than it is to do it while attached to the fuselage. Now is the time to glue it in place and make the final sanding with the rest of the fuselage.

Add the side cowl blocks and go back to the wing. Add aileron bellcranks and  $\frac{1}{16}$ " dia. pushrod wire. Glue the landing gear blocks in with epoxy and sheet the rest of the wing with  $\frac{3}{32}$ " sheet. Since you already have the trailing edge top sheet on, the next sheet should be placed on the leading edge, also a 4" wide sheet, then fill in the middle. Sheet the bottom in the same manner but before doing so, mark the aileron cut-out.

Cut the aileron out and glue the  $\frac{1}{8}$ " sheet to the wing in the aileron opening. Trim and sand the leading edge of the aileron and glue the  $\frac{1}{8}$ " ply horn plate in place and the  $\frac{1}{8}$ " sheet balsa leading edge. Sand to shape and add the 1" by  $\frac{1}{2}$ " wing tip blocks. Carve and sand to final contour with the rest of the wing.

Drill and tap (1/4/20) the wing hold-down blocks in the fuselage. Run a 1/4/20 screw in them from the inside out. Screw them in just enough to make an impression on the wing when it is in place. Put the wing in place and press it down on the

screws. The impression left on the wing is where you will drill the bolt holes in the wing. Drill them  $\frac{1}{4}$ " dia. and file them slightly over-size with a rat-tail file. When this is done, bolt the wing to the fuselage. Glue F-3, F-4b, and F-5b to the bottom of the wing using a thin card as a spacer between F-3 and F-5b and the fuselage. Take the bolts out and add the leading edge balsa filler and the plywood screw seat plate behind F-3. Add the plywood plate in front of F-5b. Take the wing off the fuselage and plank the bottom formers with  $\frac{1}{8}$ "x $\frac{3}{8}$ " strips. Trim and sand the planking fore and aft and place the wing back on the fuselage. Do not bolt it on as it is not necessary unless you just can't hold it in place. If that be the case you had better do some checking before going any further because something is amiss. Mark the rear bottom fuselage block to the contour of the fuselage bottom on the wing. Do the same with the rear of the chin block. Remove the wing and carve and sand the fuselage to shape.

Using a long piece of  $\frac{1}{8}$ " dia. wire, drill a hole for the tailwheel strut. Drill from the top and hold the wire bit right next to, and in line with the trailing edge of the vertical fin. Glue a piece of inner Nyrod in the hole, flush with top and bottom. Bend the bottom portion of the strut to shape. Push it through the Nyrod and bend the top 90 degrees.

Glue the  $\frac{1}{8}$ " filler sheet to the bottom of the rudder and when dry, taper the top into the rudder.

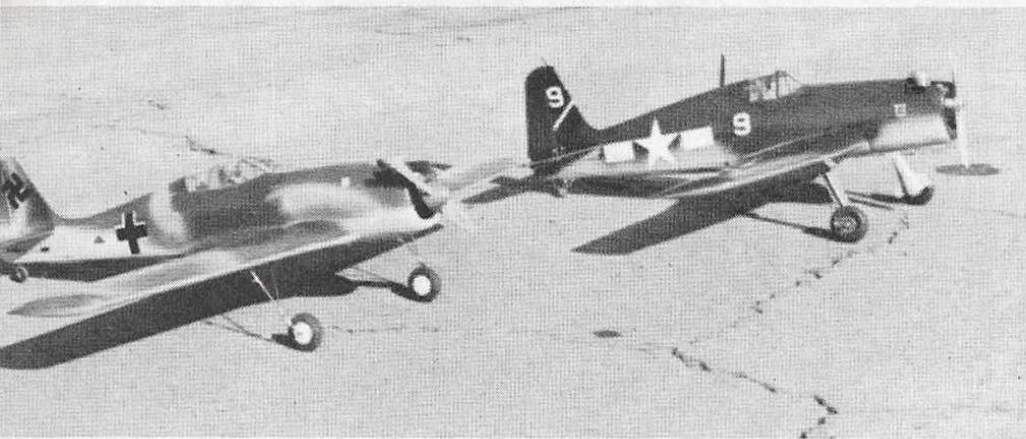
I know it has been said before, but here it goes again. Dap spackling compound makes a wonderful filling material. I have been using it for a couple of years now, and it works great. Fill any cracks in the fuselage and wing and sand smooth. If neces-

sary, fill again and sand. Be careful because this stuff sands very quickly. The false cowl flaps are also built up with Dap. Draw a line  $\frac{15}{16}$ " in front of the wing opening. Go all the way around the fuselage with it. This is the rear edge of the cowl flaps. Using masking tape, wrap the fuselage behind the line you drew. About three or four layers should be enough to give you a noticeable raised edge. Apply Dap in front of the tape, let dry and sand. If you find that after you have sanded that you need more — put it on tapering it to the front of the cowl as you do so. Let it dry once more, sand and remove the tape. You are now ready to scribe the flaps in. They are  $\frac{15}{16}$ " wide and  $1\frac{1}{8}$ " long, five on top and four on the bottom. Lay them out with a pencil and very carefully scribe in the flap sections. That's all there is to it. That wasn't hard, was it? You should now be ready to cover the model.

The original was covered with Silkspan. Medium on the fuselage, light on the tail and heavy on the wings. To prepare for the covering only a couple of coats of clear dope is required, lightly sanding between each coat. The Silkspan is applied wet and doped on, starting on the bottom of all surfaces including the fuselage. This keeps all your laps down so as to be hard to see. Not that they will be seen anyway, because when you're through the craft will be glass smooth.

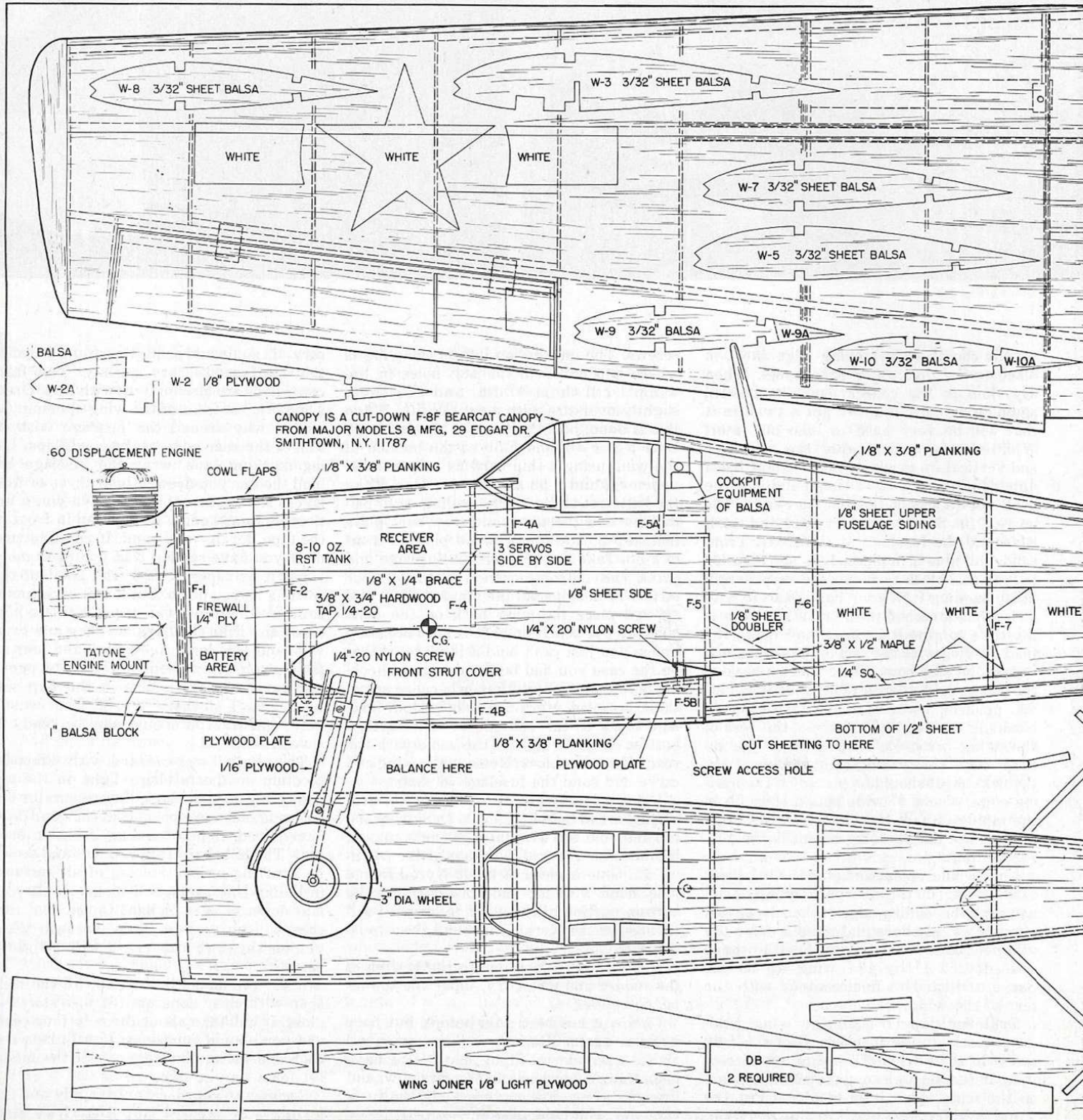
After the model is covered, fill the Silkspan with clear dope until it just starts to gloss. It will take about three to four coats and you should sand very lightly between each one. After the last coat let the model set for a day or two.

Godown to your local auto supply and get a couple of cans of Hot Rod Gray auto



Rarely did they park together. Time bends all things. A "Focke Wulf 190" and Don's "Hellcat."

primer in the spray cans. They will cost you about 68¢ each. Spray a coat of this over the entire model and let dry overnight. Using 320, wet or dry (sandpaper should be used wet), sand, being careful not to cut through the paper covering. High spots will show up as light spots in the primer. When you see a light spot coming, don't sand any further. Do the entire design this way and when you're finished, wash it down with clean water and dry with a tac rag. Some of the water used in sanding and washing will have soaked into the outer crust of the primer, so let it set a little while, then spray on another coat of primer. If you did your job well to begin with, this should be enough. Sand lightly with 600 wet or dry, used wet. When you're done



you should have a very smooth, glass-like surface on which to apply the color.

For the last few years I have been looking for a fast way to apply a finish to these demons of the sky and at last I have found it. It is unique in the fact that you can apply multi-colors in a matter of half an hour. What I'm about to describe you won't believe unless you try it, but it works beautifully.

There are hundreds of colors to choose from in the spray cans of enamel paint at the local paint store for about 75¢ a can. For the "Hellcat," three cans are required, dark blue, light blue, and dawn grey. You'll need a fourth can of white if you paint on the insignia, lettering and numbers as I did. You could substitute MonoKote trim

sheets and do as well, but the cost will be more.

Dust on a very light coat of dawn grey to the underside of all surfaces, wings, stabilizer and fuselage. By the time you've done that the first part you sprayed will be tacky enough to spray again. This time make the color solid and you're done with that part of it. Next, spray the light blue on the fuselage sides, letting it overspray onto the grey a little. This gives a fading effect—one color into another. Now wait about 10 min. and spray the dark blue on top of the wings, stab, and fuselage. Let it overspray on the fuselage a little once more onto the light blue. That's enough for one day, so let it rest overnight and apply the insignia. You now need a can of clear

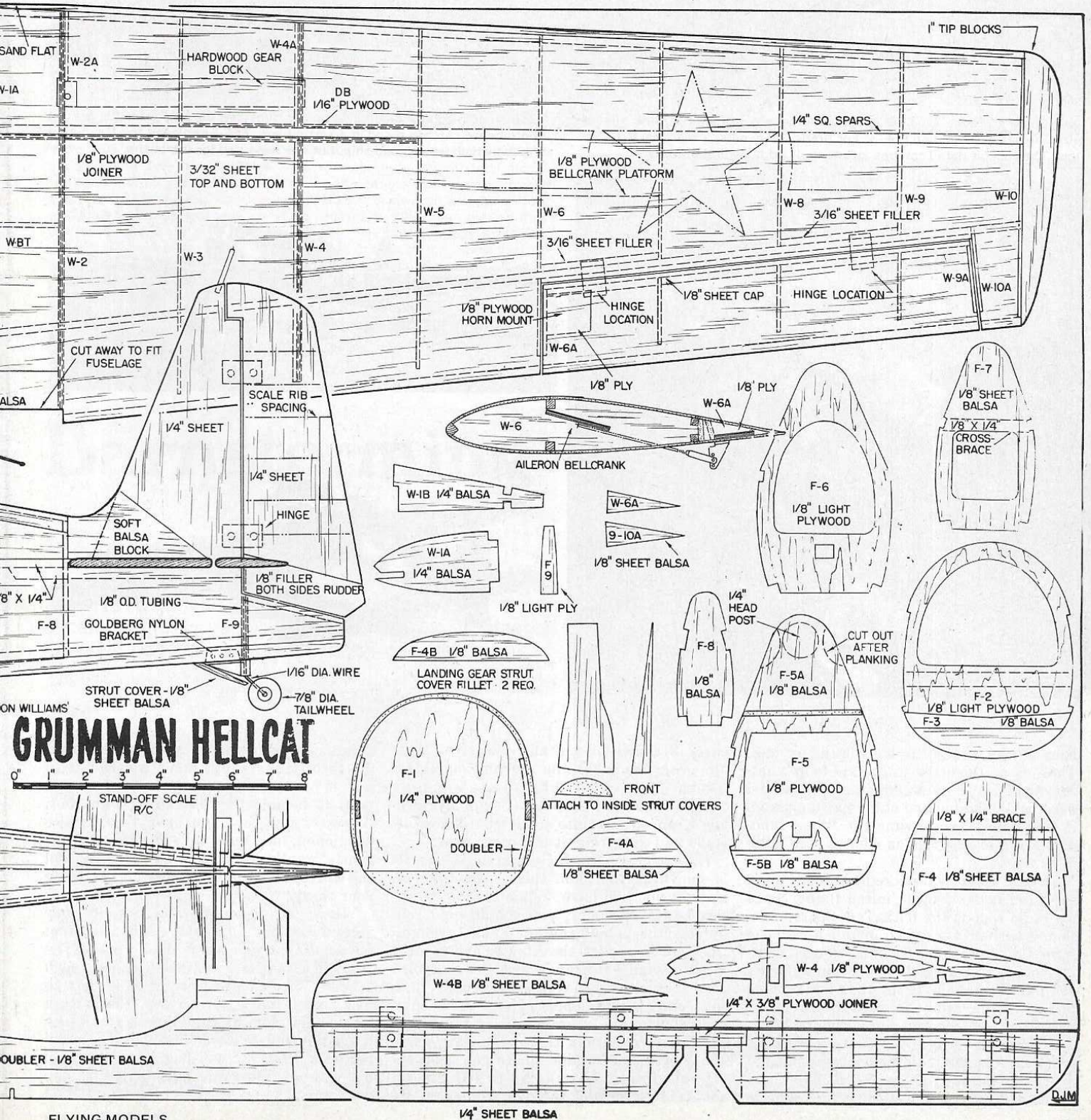
epoxy. Depending on the date of your model as to whether or not it was a glossy or matte finish. My "Hellcat" is of the early F6F-3 and has a non-spectacular finish, so I used clear Hobby epoxy flat over the color.

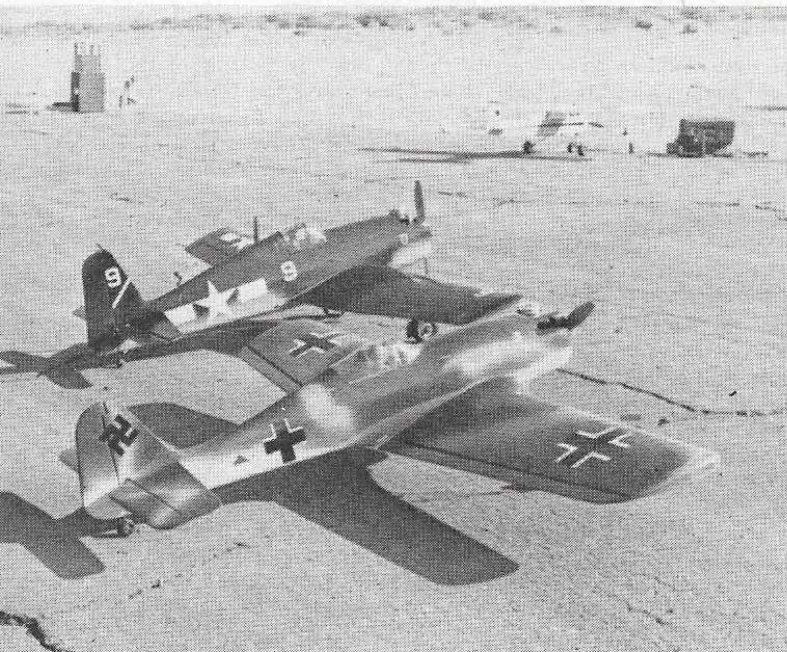
This finish will not crack, chip or mar. It is fast and lasting and it is cheap. The cost is about \$6.00, not including the clear dope. If you can beat that, I'd sure like to know about it.

### Time for Flying

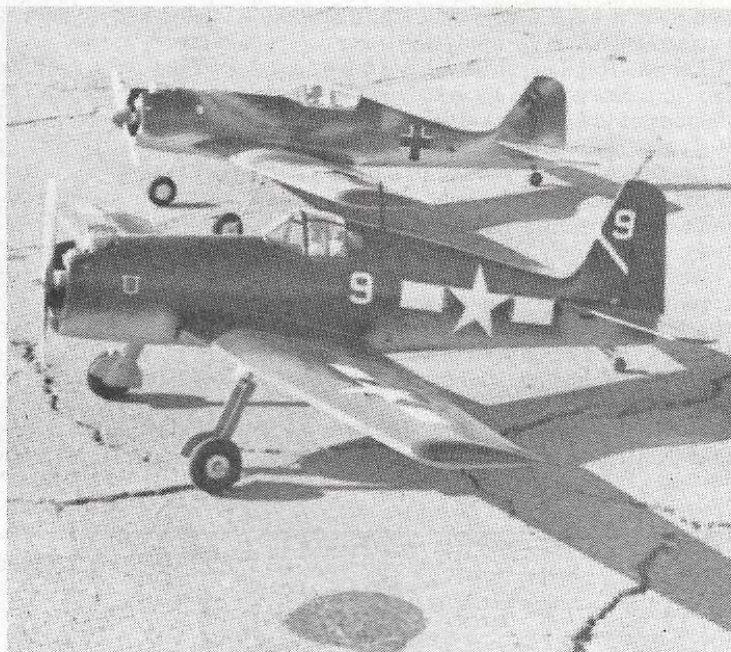
I'm not going to say this aircraft flew right off the old drawing board, but it almost did. It only required 1½ turns on right aileron to be in trim. That's an almost—maybe next time I'll make it.

With the wide-track landing gear it

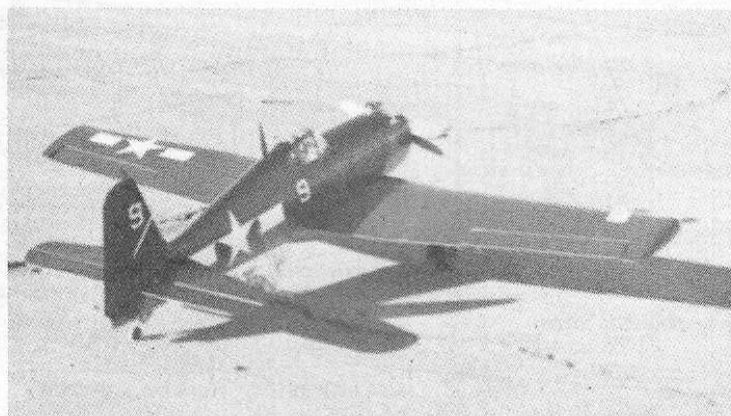
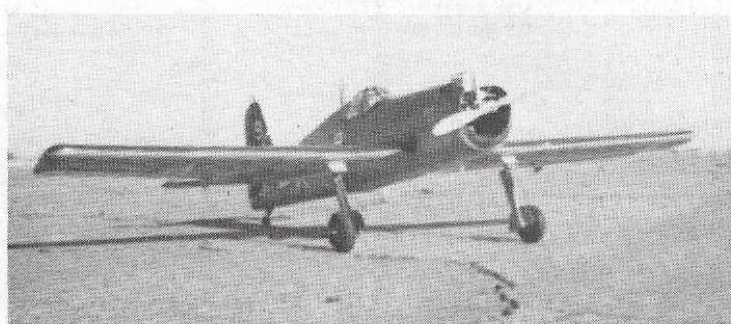
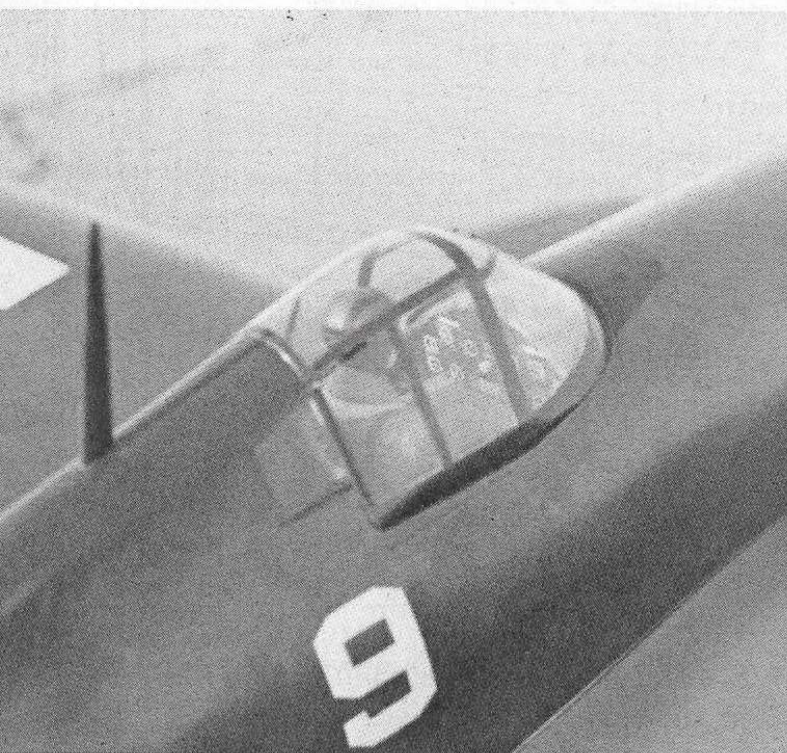




Nick Zirolì's "Focke Wulf 190" design appeared in FM, inspiring similar sized-design of Grumman F6F-3. For Stand-Off events, a practical R/C. Below: The cockpit detail catches attention. It adds feeling of realism.



Wide stance, good moments, a design that can be balanced. It's a flier! Photo below catches mood in a setting sun. F6F-3 replaced the Grumman Wildcat which was a good ship, but one designed for life in the '30's.



handles like a baby carriage on the ground. There is no tendency to ground loop whatsoever. I have even bounced one wheel hard, while taxiing and still no ground loop. It didn't even drag a wing tip. Wheel landings are a breeze too, as well as stall landings.

To give credit where credit is due, I must say I did not make the initial flight. Since my radio was on the fritz, Tom Sears, mentioned earlier, agreed to install a radio in it for the test flights. I think he was wanting to see this aircraft in the air as badly as I did. Since he took the time and trouble to install the radio he was awarded the first flight — which came off without a hitch.

Flying this design is a real pleasure. It is sensitive enough on the controls, but not overly so and it grooves well. It will do almost all of the AMA pattern well enough to

enter Stand-Off Scale and win. Not that I'm prejudiced, but the machine looks so good and flies so well it has to be a winner.

Slow flight is incredible. It will fly to a low airspeed for quite some time before it stalls and even then it is very gentle.

If you locate the C.G. exactly where it is shown on the plan, this is the type of aircraft you will have. While taxiing, since this is a taildragger, you should hold full up elevator to hold the tail on the ground. Once you are out on the runway and turned into the wind — stop and check the controls. Now, return the elevator to neutral and ease the throttle open slowly. The only controls you are interested in at this point are the throttle and the rudder. Be very gentle with the rudder unless you want to zig-zag down the runway to lift-off. In about 15 or 20 feet the tail will begin to

lift and you're on your way. Go ahead, open the throttle wide, but don't wait for it to lift off by itself. It will run as far as you want it to go with the tail straight out. Anyway, now that you have the throttle wide open, let's build up some speed. Now gently, gently, ease back on the stick and she will lift into the sky ready for you to do your thing.

When you decide to land, set up your normal landing approach. Upon reaching the final approach, chop the throttle. The ship will set up its own descent angle, which is beautiful. Just fly her right on in, flaring just before touch down. Hey, that was a nice landing for the first time around! Try it again, you'll do even better. Just remember, this "Hellcat" will help you all it can, but you must do your share or it will slap your wrist.