

# Grumman Hellcat

Looks as though it's ready for action on this straight and level flight path. Easy flight characteristics make it a fun and contest machine

BY ERIC FEARNLEY . . . famous World War II Naval Air Force fighter in all its pristine beauty for the fellow who likes to fly as well as build Typical scale construction methods make this a project for the average builder

> • Ignition off, wheel chocks in place, fuel on . . . four priming turns of the prop at down to the typical Webra purr. . .

as the throttle is opened in bursts, the control stick right back to hold the tail down.

The plastic pilot (that looks exactly like John Wayne) wipes an oil smear off his goggles and winds the canopy closed, growling into the head set "Let's go, fellers." Chocks away, and we are rolling down to the holding point at the threshold of the take-off strip, pausing for a moment to check left, right, and overhead before giving the Hellcat the gun. The Webra bursts into life, and the ship accelerates down the strip. Stick back to hold the steerable tail wheel on the ground until the air speed allows the tail to operate. Tail high, stick centered, we reach rotation speed, correcting with a little right rudder as we go. Stick back just a fraction, and up into the wild blue yonder we climb, reaching for that altitude that means safety before we are jumped by Zeros.

Operational height, and we can afford to ease down a little, remembering the pilot's handbook legend, "P.A.T."-power, attitude, and trim. Throttle down-stick central, a little trim to hold the nose on the horizon and we watch below.

The local farmer sees a flight of hungry starlings scud across the airfield. To us, they are Navy Nakajimas intent on a killing.

Rocking our wings to hold radio silence, we execute a climbing roll, and head down the enemy, getting a sight on the middle one, and leaving the outer two for the

The bird (sorry, Nakajima) does a sharp aileron turn, and we get a good burst in before we are forced to break contact. Stick back and we head upwards again, before the protective fighters jump us.

Fuel and ammo low, we head back for base. There below us is the strip, the English hedgerow in our eyes becoming a New Guinea jungle. We hit the landing circuit, checking the power, attitude and trim as we line up for a fast run-in. We are over the runway now, holding the nose straight on the horizon and watching the A.S.I. as the speed drops off. Coming to the stall, the Hellcat sinks the last few inches onto the hard runway, tires squealing as we contact. Stand on the brakes, and disperse off the runway for the others, run up the Webra, and switch off.



adventures the real planes experienced, rather than worry about the next competition and what the judges will think of my model or my flying.

I have only one set of gears, so I build for general Sport flying rather than Concours. This doesn't mean that I am satisfied with a low standard of accuracy; in fact, I try to keep as near to scale as I can, but I do build simple and light, as heavy scale models just don't fly for the simple reason that the heavier the model gets, the more work the wings and tail have to do, which in turn means the faster the thing has to fly to even keep in the air, which means the more work the engine has to do, which means the bigger the engine, the heavier the model will get and so on ad infinitum.

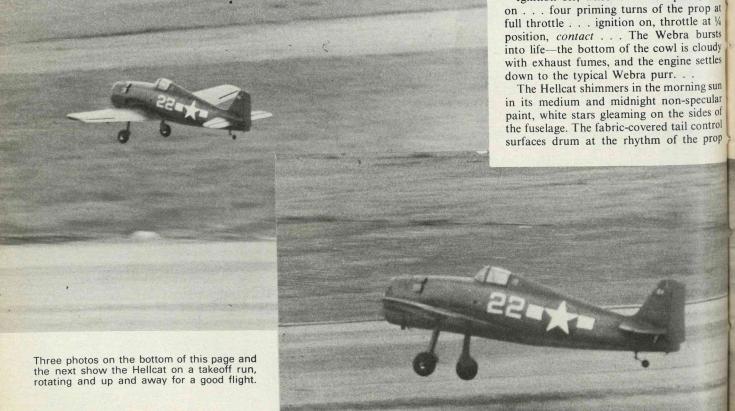
As a veteran who was building scale models 30 years ago (without radio to con-

I build scale models to re-live the stirring trol them), long before most of our present guys were born, I advise that you keep the weight down, particularly at the tail end, as all scale jobs end up tail-heavy. The Hellcat is flying without ballast, which outlines the care in choosing the right wood—light at the tail, firm at the stress points.

The Hellcat, you will see, is small, and powered by one of the outstanding 6I's, the Webra, which is not only powerful, but also thoroughly reliable, throttle-wise. The finished aircraft is small, light and fast, being very sensitive to control, making it safe but spectacular. It's no good building a scale Hellcat unless it flies like one, and this

Do not attempt this project unless you can handle a fairly hot F.A.I. Pattern ship—the Hellcat is probably a little easier to fly, as it is so well balanced. The fin look-

(Continued on next page)







Author's son readies the Hellcat for a flight, note the simulated rib on both the elevator and rudder, good scale detail.

### GRUMMAN HELLCAT . . . CONTINUED

ed so small I was tempted to fiddle with it, but thought "Grumman knows best" and stuck strictly to the outline—that is, to the outline I finally chose. In fact, I have four drawings of the Hellcat and a plastic kit. All are slightly different, some hopelessly so. I studied photos and drawings 'til my head ached, and finally chose the one that looked right. This was blown up photographically for accuracy, so it should be a fairly good likeness.

The result is a very well-balanced aircraft. The Friese-type ailerons are necessary due to the small area, but built to the plan they really bite, but very smoothly. The ailerons alone produce lateral roll only (as they should) and prolonged use of them means a side slip effect that few home-designed ships can manage. The elevators are also light and easy, needing only a touch of the stick, and the aircraft is most pleasant to fly, except for the speed, which does not allow daydreaming.

It's a funny thing to study the history of the fat Navy fighters. .

In the thirties, the Navy just would not buy liquid-cooled aircraft—it had to have a radial engine. As power went up, it became necessary to fatten up the bodies to streamline the ship, but this fatness never seemed to slow them down. The original 'fatty', the Grumman F2FI, and the Buffalo, the Russian Polikarpov I\*16 are examples of this theory.

The model looks like a barrel with gnat's wings attached in the air, but it is sur-

against a sleek model of equal weight and power. The large cowl has little effect on the flying, but of course in building small, it was possible to concentrate a big motor inside the cowl without having the pot sticking

My first Hellcat had an inverted engine (which the comp boys will follow) completely hidden. My test flight was a complete disaster. The brand new radio gear went mad, and I got a knife-edge on take off, inverted flight at 30 feet and a hairy circuit followed by a snap roll straight in. At the time I thought I had finally built myself a monster, but after my Skyraider came in I realized that the radio was out. The trouble was the battery pack spot welding.

level with the top of the cowl, as the Webra planked up in sections. Some areas can be wanted two flicks to start inverted instead of one when upright (I'm a lazy guy), and I wasn't bothered about what the judge forget the doublers which fit below the jig at would say. It is invisible at a few feet, so the wing position. If you get a few gaps who cares? In the re-build, I added a few between the pieces they can be filled with modifications to make for a better flyer, and scraps. the result is a smooth ship. I do advise the use of the downthrust-it helps the pilot fighting trims all the time. As the plan are scale spacing. shows, it flies power on, power off without change of attitude directionally or tion. Build flat and cut to get the dihedral longitudinally, which is one thing less to Cover wings with medium 3/32" sheet worry about.

exceed seven pounds dry, ready to fly; it right type of wood, or the wings may warp must balance exactly where it says, it must

prisingly fast, being able to hold its own have the surfaces (wings and tail) all true, the controls smooth and return centering accurate, and the rigged incidences as per plan. Follow this and you will fly the ship, otherwise it will fly you . .

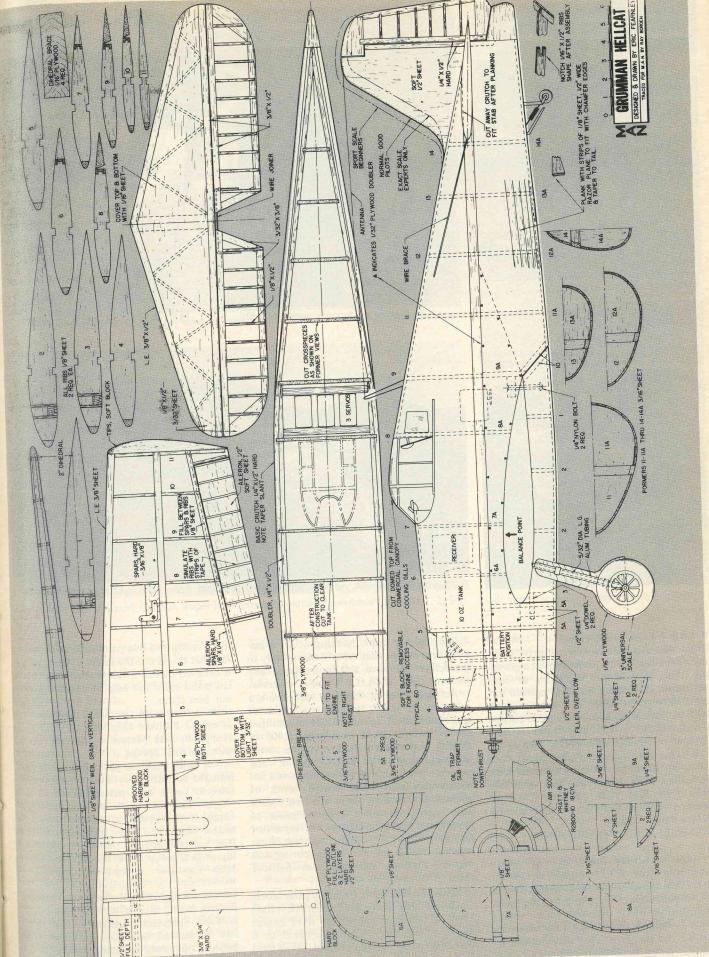
Now let's get the building board out. I am not going to give full instructions as this is an advanced project and if you are capable of flying it you will know how to build it. However, I will cover one or two points.

The fuse is built on a jig made of 1/4" x 1/2" wood. You will see that the rear twists in to meet the angled cross pieces. This is best done with a little steam if the wood is difficult. The engine plate is ply, built into the jig. Note the downthrust angle, and pack it up suitably.

The formers are added top and bottom, When I re-built, I decided to have the pot and the control tubes added. It is then covered in fairly large pieces; others will want 1/2" strips tapered rearwards. Don't

The tail is sheet covered (light grade) and the controls covered with paper. The ribs

The wings are cranked at the wheel posistraight grained wood. Make a nuisance of The real point is that it does not want to yourself at the model shop until you get the (Continued on page 70)



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#### **Grumman Hellcat**

(Continued from page 32)

tical crash so it's worth it.

go across the fuse inside the cowl. I had a tin plate Set the rudder trim over a little. Even if you in one but decided it was a silly risk with the radio lorget to take it off when airborne, it has little gear. The normal bottle goes in the fuse for the effect on the flight, anyway. And it is one thing upright version.

W.W. II fighter designed to out-manuever the you think you have enough speed on to rotate. best the Mitsubishi and Kawasaki could produce. Get plenty of speed on, more than you need, and with scale controls and a reasonable similarity in then give a slight touch of up elevator, no more power/weight ratio, it is not surprising that the than a quarter of an inch or so on a Kraft stick. If airplane behaves very much like the real one. I it takes off, everything is fine. If it doesn't kill the consider this is an important part of the scale motor and do some checking. Don't drag it off modeler's joy. To see light planes tearing about with a lot of stick or you will be fighting it all the like fighters is just as crazy as seeing a Helicat fly way. If it takes off without any up elevator, the ing like a Tiger Moth—and this ship is no Tiger CG is probably wrong and you are now com-Moth, as you will find.

pushed at them from the start: never, never close get some height, then you can study what's the throttle sharp, ease it down. This is true of the wrong, and think about landing it. Take your model. If you shut the motor off with a jerk, look lime, but don't let the speed drop. Speed is safety. out, as it does not like it. Second, don't overdo Assuming it has taken off as planned, fly it out, as it does not like it. Second, don't overthe around it has taken off as planned, tly it the up elevator at any speed, or you will think the around and get used to the characteristics. It's tail has dropped off. Do both these together, and sensitive on everything, but pleasantly so. It you can expect a total loss under 200 feet.

friendly with few vices.

learned to ground control the ship. Early ground looping was caused by the wheels being just once I got a touch of this when I tried my first about ½" too far forward. It runs fine, now.

The drill is to set everything at neutral as the the witten to half loop straight. In my panic, I put

plan shows. The thrust line should be where self you use zero thrust it will be that much harder to fly, needing re-trimming every time the powel



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changed. And the power is the prime control on scale model

Check the motor. It's no use trying to fly with a ck engine. It has to pull all the time, in any sition. The Webra is superb in this respect.

The airplane will tend to swing slightly to the and that won't do. Glass-tape the joints at the outer panels when finished. Mine survived a verdone properly. This is so slight that rudder is ost too much to check it, and too much If you use the inverted engine the tank has to rudder will give a ground loop, for sure.

ess to worry about. For first flight you can run the motor with a helper and release, when it FLYING. Having constructed a scale model of a will set its tail up in no time and run tail high until mitted, so feed in some down trim, if necessary Pilots training for either of the Terrible down elevator as well. Whatever you do, keep it Twins—Hellcat and Corsair—had one thing flying fast. Don't cut the motor. Fly out of it and ou can expect a total loss under 200 feet.

Fly it the way I tell you, and it is sweet and panic—it holds its height well, and looks far more dangerous than it really is. Turns are made with a My first time out proved far too windy, so I did steep bank, and a dose of elevator. The real ship some taxi runs. This was not wasted time as learned to ground control the ship. Early ground control the ship in the steep bank, and a dose of elevator. The real ship learned to ground control the ship. Early ground to the steep bank, and a dose of elevator. The real ship leaves to stalled it and it had to be rolled off at

spun down three revolutions before I realized what was happening. Luckily I was now used to the plane and I eased the throttle down and at the same time put on down elevator. She went into a vertical dive, but straight. I then eased on a small amount of elevator, and out she came, as smooth as you like.

The real test is with the landing. My first half dozen landings were made with about quarter throttle, flying it all the way in from a long straight approach, killing the motor only as the wheels touched, and giving the elevator very little to do, maintaining speed. The result was fine. However, as I am self-appointed test pilot to the project, I had to find out what would happen when we get careless. I dropped it in as I would the Skyraider, with motor on low idle, holding the nose up for a three pointer. It kited up, and as I applied too much elevator, rolled on its back at once and slid down the runway. Luckily it's a tough baby and there was no real damage, but I realized that there is only one way to land it, if you want to walk away from it.

I hope I haven't frightened you off with all this, but I get mad at the fairy tales one reads in writeups about scale flying. It's a tough racket, where experience is essential, and where a gentle touch and a seeing eve are better than over-confidence and a thick thumb on the stick. Most scale jobs crash because of overweight, failure to rig the flying surfaces properly, faulty CG, particularly if it is aft, balky engine, underpower, and overcontrol caused by nerves. Play it cool. Fly when you are in the mood. If you are nervous, get airborne with an old ship and really throw it around until you feel ready to tackle the new one.

The reward of seeing a scale Hellcat chasing round among the 'planks' that guys fly as airplanes is worth the trouble, and once you have settled the character of the ship it is a good friend. At least it will not be mistaken for an F.A.I. Pattern ship in the air! A Hellcat is a Hellcat, it just can't be anything else!

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eversal. I rolled inverted, and applied up

the stick right back, and the ship went mad. It

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