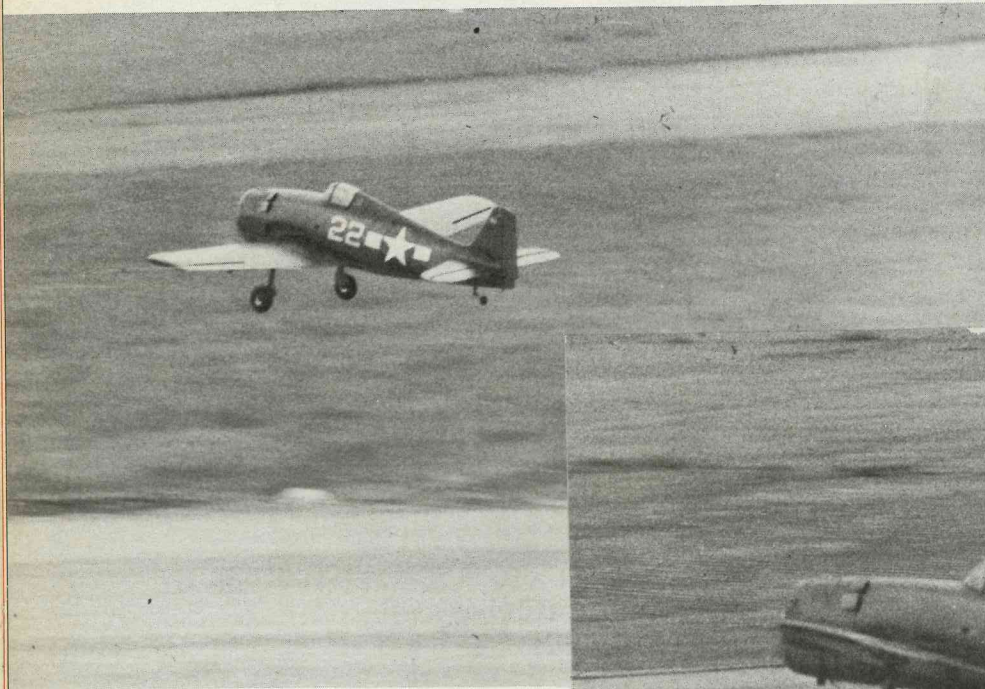




Grumman Hellcat

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!



Three photos on the bottom of this page and the next show the Hellcat on a takeoff run, rotating and up and away for a good flight.

- Ignition off, wheel chocks in place, fuel on . . . four priming turns of the prop at full throttle . . . ignition on, throttle at 1/4 position, *contact* . . . The Webra bursts into life—the bottom of the cowl is cloudy with exhaust fumes, and the engine settles down to the typical Webra purr. . .

The Hellcat shimmers in the morning sun in its medium and midnight non-specular paint, white stars gleaming on the sides of the fuselage. The fabric-covered tail control surfaces drum at the rhythm of the prop

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 others.

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.



Author and the Hellcat, not all that big but handles the .60 size engines with ease.

I build scale models to re-live the stirring 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.

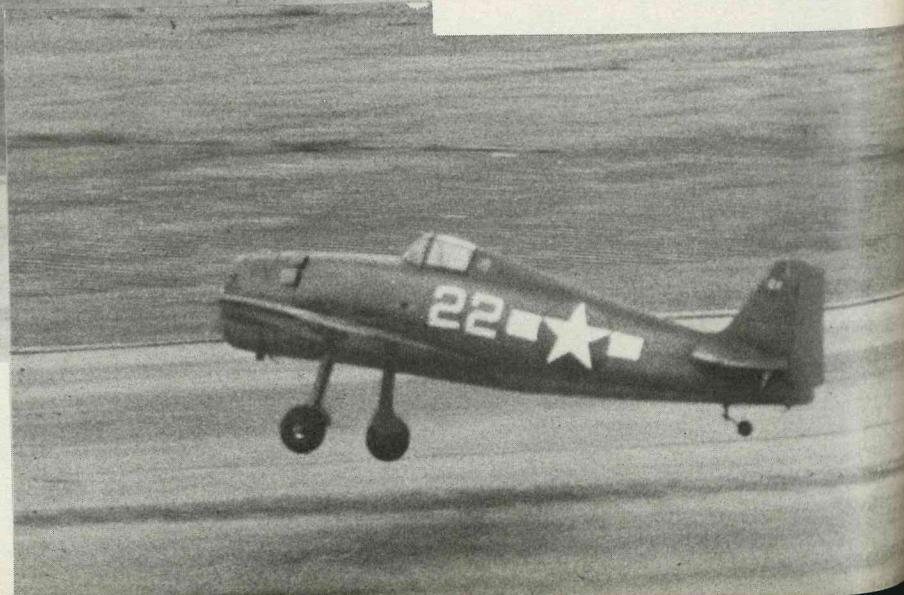
As a veteran who was building scale models 30 years ago (without radio to con-

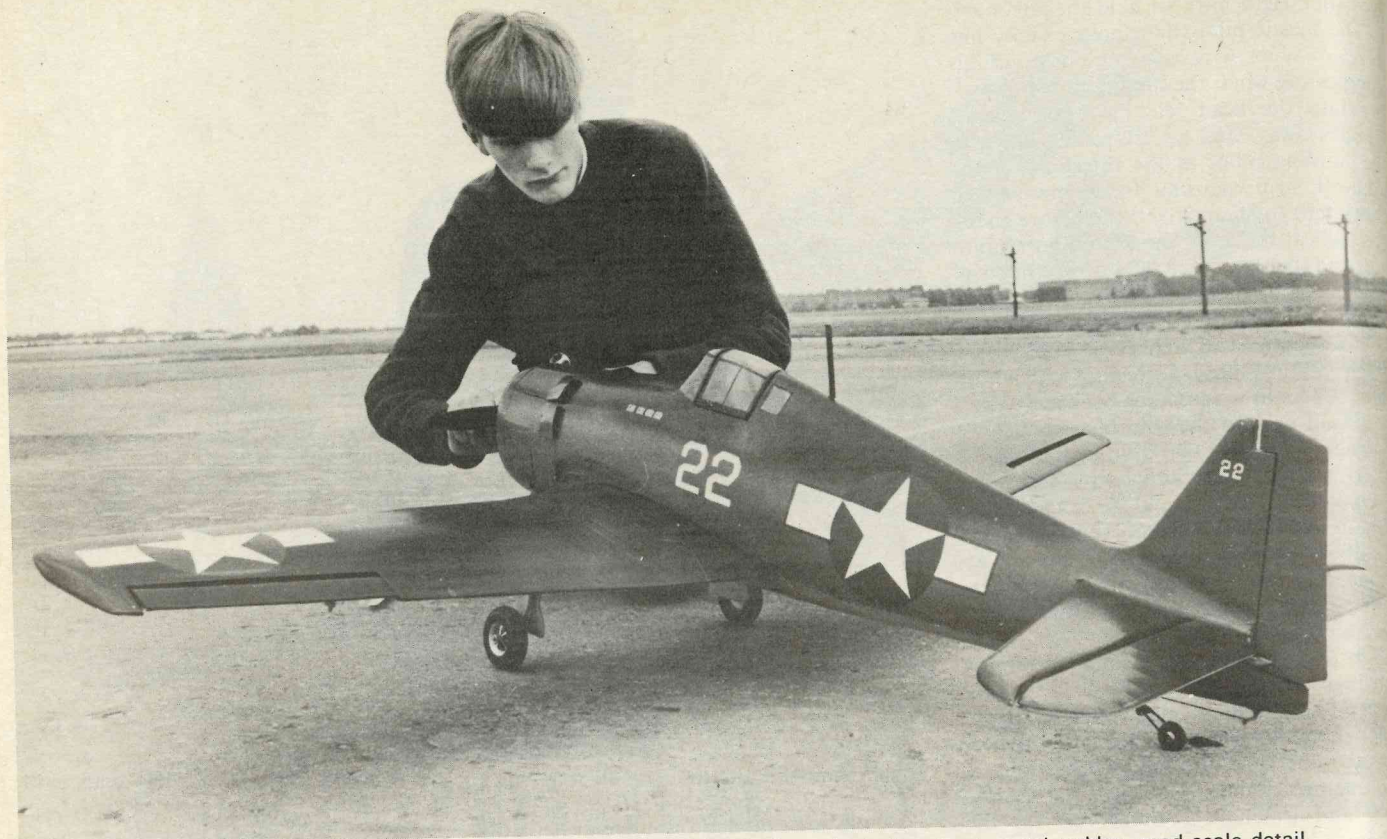
trol them), long before most of our present guys were born, I advise that you keep the weight down, particularly at the tail end, as all scale jobs end up tail-heavy. The Hellcat is flying without ballast, which outlines the care in choosing the right wood—light at the tail, firm at the stress points.

The Hellcat, you will see, is small, and powered by one of the outstanding 61'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 sure does.

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 day-dreaming.

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-

prisingly fast, being able to hold its own 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 out.

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.

When I re-built, I decided to have the pot level with the top of the cowl, as the Webra 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 would say. It is invisible at a few feet, so who cares? In the re-build, I added a few modifications to make for a better flyer, and 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 shows, it flies power on, power off without change of attitude directionally or longitudinally, which is one thing less to worry about.

The real point is that it does not want to exceed seven pounds dry, ready to fly; it must balance *exactly* where it says, it must

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.

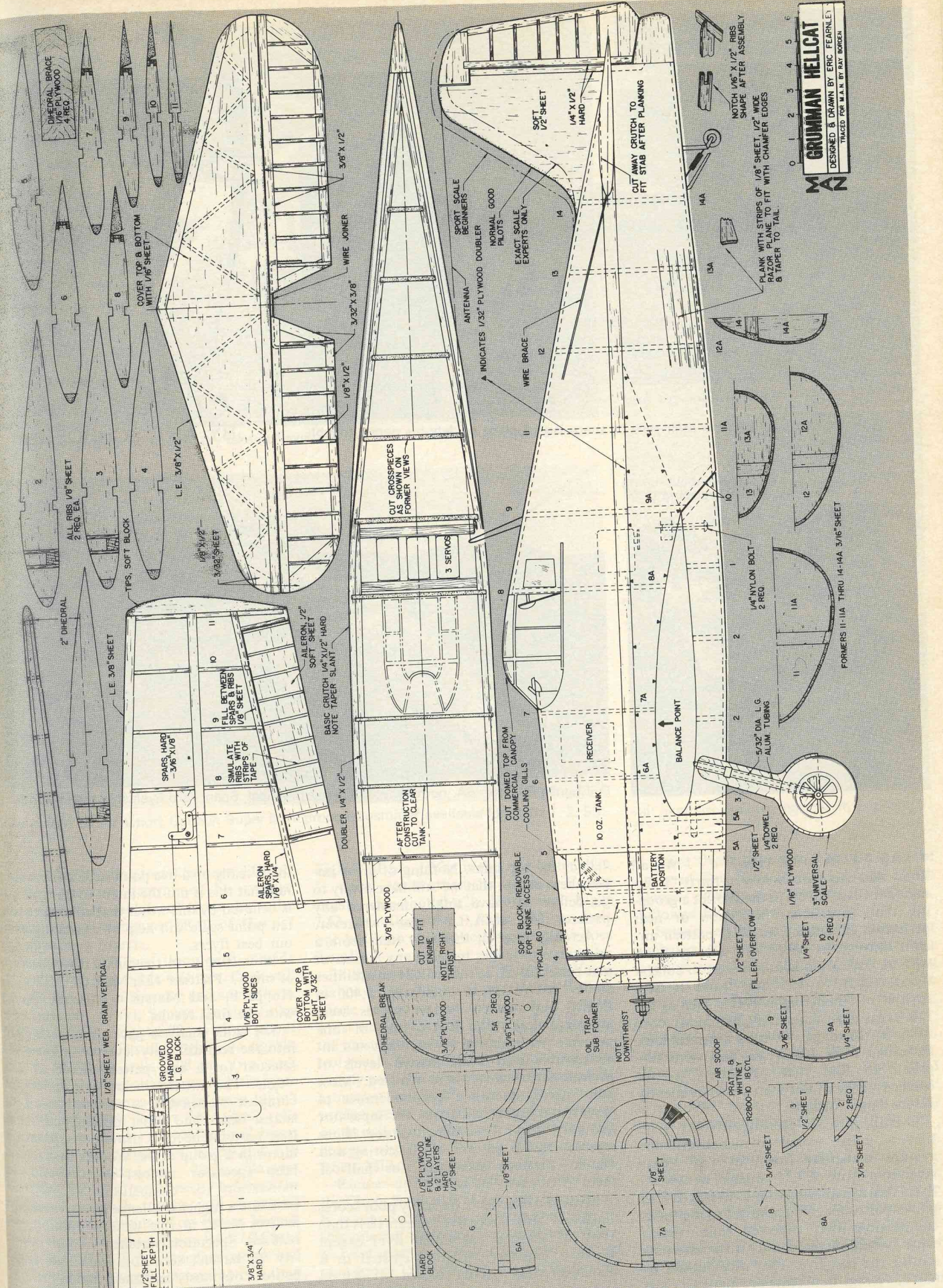
The fuse is built on a jig made of $\frac{1}{4}$ " x $\frac{1}{2}$ " wood. You will see that the rear twists in to meet the angled cross pieces. This is best done with a little steam if the wood is difficult. The engine plate is ply, built into the jig. Note the downthrust angle, and pack it up suitably.

The formers are added top and bottom, and the control tubes added. It is then planked up in sections. Some areas can be covered in fairly large pieces; others will want $\frac{1}{2}$ " strips tapered rearwards. Don't forget the doublers which fit below the jig at the wing position. If you get a few gaps between the pieces they can be filled with scraps.

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

The wings are cranked at the wheel position. Build flat and cut to get the dihedral. Cover wings with medium $\frac{3}{32}$ " sheet straight grained wood. Make a nuisance of yourself at the model shop until you get the right type of wood, or the wings may warp

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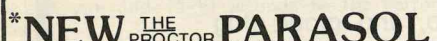
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My first time out proved far too windy, so I did some taxi runs. This was not wasted time as I learned to ground control the ship. Early ground looping was caused by the wheels being just about $\frac{1}{2}$ " too far forward. It runs fine, now.

The drill is to set everything at neutral as the plan shows. The thrust line should be where set. If you use zero thrust it will be that much harder to fly, needing re-trimming every time the power

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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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