

well
named...



THE BLACK WIDOW

TWENTY-FIVE years ago, during the Autumn and Winter that followed the Battle of Britain, the Royal Air Force began to take an increasing toll of German night bombers sent to attack London and other cities. Newspapers explained that R.A.F. pilots were eating raw carrots by the dozen, and that the vitamins in these vegetables helped to give them exceptional vision in the dark. In fact, the key to Fighter Command's ability to find and track down the *Luftwaffe* aircraft at night was contained in the letters 'A.I'—standing for Airborne Interception radar carried by its night fighters.

Over in America, the U.S. Army Air Corps. (re-named U.S. Army Air Forces in mid-1941) knew the secret of Britain's successes against enemy raiders and asked for samples of our radar sets. Except for two prototype Curtiss PN-1 biplanes bought in 1921, it had never had any specialised night fighters; but its leaders realised that the time had come when such aircraft were essential for

survival in war. So, to fill the gap until a specially-designed night fighter could be designed and built, they fitted A.I. radar and extra guns to 164 Douglas A-20 bombers, which were redesignated P-70 Havocs.

Meanwhile, the Northrop company was given a contract to develop the completely new night fighter that was needed so urgently. The job was not easy, and the choice of Northrop to tackle it was rather surprising as they had never before had a fighter accepted for production. This lack of experience was hardly serious as the new aircraft, designated P-61, had to carry so much armament, fuel and equipment, and so many crew members, that it finished up larger and heavier than the P-70 Havoc, which had begun life as a bomber.

The first of two prototype XP-61s flew on May 21, 1942, only 16 months after Northrop received a U.S.A.A.C. contract to begin its design and construction. After a time, it was given the usual night fighter camouflage of black paint and

looked so sinister, with its armament blisters above and below the fuselage, that it became known as the 'Black Widow', after the venomous spider of that name.

Basically, the XP-61 Black Widow was an all-metal monoplane, with twin tail-booms, a retractable tricycle undercarriage and two 2,000 h.p. Pratt and Whitney R-2800-10 Double Wasp 18-cylinder radial engines. An unusual feature was that it had only tiny ailerons, at the tip of each wing, leaving most of the trailing-edge free for large flaps. These enabled it to land at only 80 m.p.h., in half the distance needed by other aircraft of its weight and high-speed performance.

To supplement the tiny ailerons, retractable spoilers were fitted in slots forward of the flaps on each wing. It was the first time that control surfaces of this kind had been used on operational aircraft and they proved so effective that the Black Widow could outmanoeuvre any other American fighter of its period. Top speed was 369 m.p.h. at 20,000 ft., service ceiling 33,100 ft. and combat range 700-800 miles.

A.I. radar developed by the Massachusetts Institute of Technology from current British sets, was mounted in the nose of the fuselage nacelle. Three aircrew were needed, with the radar operator behind the pilot in a raised cockpit and a gunner in a glazed cabin to the rear. Armament comprised four 20 mm. cannon, with 600 rounds of ammunition, in a bulged fairing under the fuselage and a remotely-controlled

dorsal turret containing four 0.50 in. machine guns, with 1,600 rounds. The turret was normally locked to fire forward, under the control of the pilot, but could be used also by the gunner as defensive armament, with a 360-degree field of fire.

Development

Flight testing went well, except that the dorsal turret created airflow problems over the tail unit, leading to 'buffeting'. Nothing could be done about this on the 13 pre-production YP-61s and the first 37 production P-61A Black Widows, as they were too far down the assembly line. To save time, the U.S.A.A.C. had ordered the YP-61s on March 1941, a first batch of 150 P-61As on September 1 of the same year and a further 410 on February 12, 1942—all before the first flight of the prototype.

From the 38th P-61A onward the turret was deleted and the crew reduced to two. Another change from aircraft No. 46 was the introduction of R-2800-65 engines, capable of giving up to 2,250 h.p. each in an emergency.

Altogether, 200 P-61As were built. Delivery to front-line squadrons began in 1944 and the first success in action was recorded by a crew from the 421st Night Fighter Squadron who trailed and shot down a Mitsubishi 'Dinah' twin-engined bomber over Japan Island, off the coast of New Guinea, on July 7.

In the same month, Northrop began delivery of 450 P-61Bs. These differed from the 'A' mainly in having underwing attachments for four 1,600-lb. bombs or 300-gallon drop fuel tanks. So equipped, they became intruder fighters, able to harass targets deep in enemy territory, as well as formidable night fighters. Furthermore, the tail buffeting problems had been overcome by this time; so the dorsal turret and third crew-member were reinstated on the last 250 P-61Bs.

Black Widows first reached units in Europe in August 1944, and by the end of that year equipped all night fighter squadrons of the U.S.A.A.F. Although



Production version of the 'Reporter' with engine supercharger intakes and underwing pylons for long-range fuel tanks. Our conversion (overleaf) was based on the modified, unsupercharged P-61A

they were far superior to the makeshift types they replaced, the opposition also had improved. To increase performance, Northrop switched production to a new model, the P-61C with turbosupercharged R-2800-73 engines, giving 2,800 h.p. each. The 'C' had a top speed of no less than 430 m.p.h. and ceiling of 41,000 ft.; but only 41 had been built by the end of the war, when further production was cancelled.

In addition to the three production versions of the Black Widow, there were two experimental marks. The two XP-61Ds were converted from 'As' and had R-2800-77 engines with new turbosuperchargers. Two XP-61Es, completed early in 1945, were converted 'Bs' with R-2800-65 engines. They were intended as prototypes for a long-range day fighter version of the Black Widow and had a smaller, more streamlined fuselage, without radar and top turret and with a crew of two seated under a one-piece blister canopy. Four 0.50 in. machine guns in the nose supplemented the under-fuselage cannon.

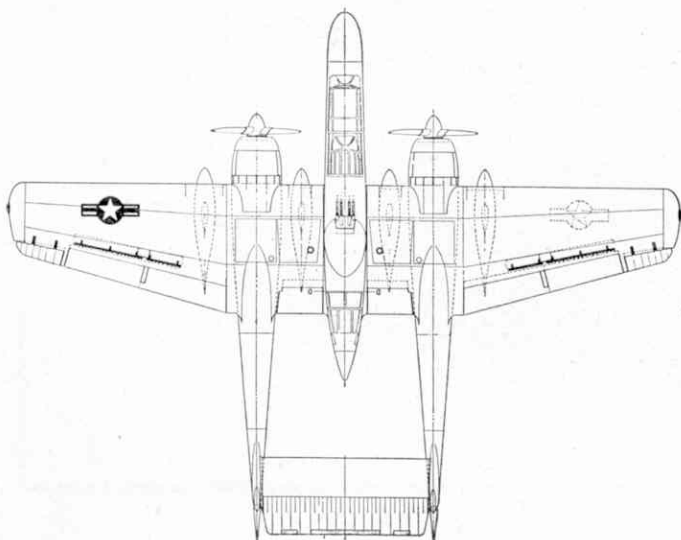
Main task of the 'E' was to be the protection of U.S. Bomber forces in the Pacific, during long-distance raids on Japanese targets. By the time it was

built, the Allies had battled their way so close to Japan that there was no need for such a fighter. So one of the XP-61Es and a P-61A were converted into prototypes of a photo-reconnaissance aircraft known as the F-15 Reporter.

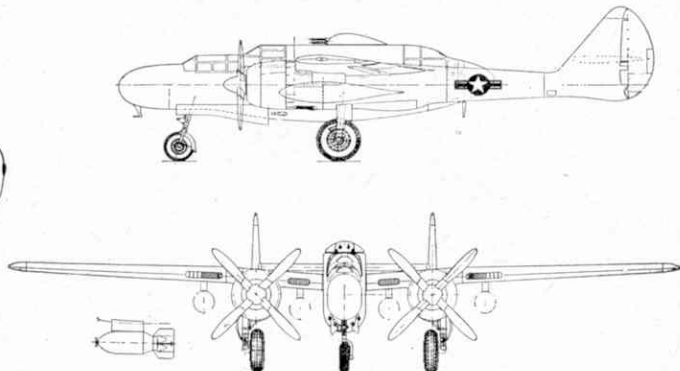
The Reporter carried six cameras, had a top speed of over 440 m.p.h. and could fly more than 4,000 miles when fitted with underwing tanks. To make life easier for the pilot on such long flights, his seat could be tilted back to a reclining position, like the passenger seats in an airliner, enabling him to rest while the autopilot was in control. Unfortunately, by the time the Reporter entered service, the jet aircraft had already made piston-engined reconnaissance aircraft obsolescent and only 36 F-15As were built. They remained in service from 1946 until 1952, being redesignated RF-61C during the last four years of their active life. **John W. R. Taylor**

Data (P-61B):

Span 66 ft. Length 49 ft. 7 in. Height 14 ft. 8 in. Wing area 664 sq. ft. Weight empty 22,000 lb.; loaded 29,700-38,000 lb. Max. speed 366 m.p.h. at 20,000 ft. Climb to 20,000 ft. in 12 min. Service ceiling 33,100 ft. Max ferrying range 3,000 miles.

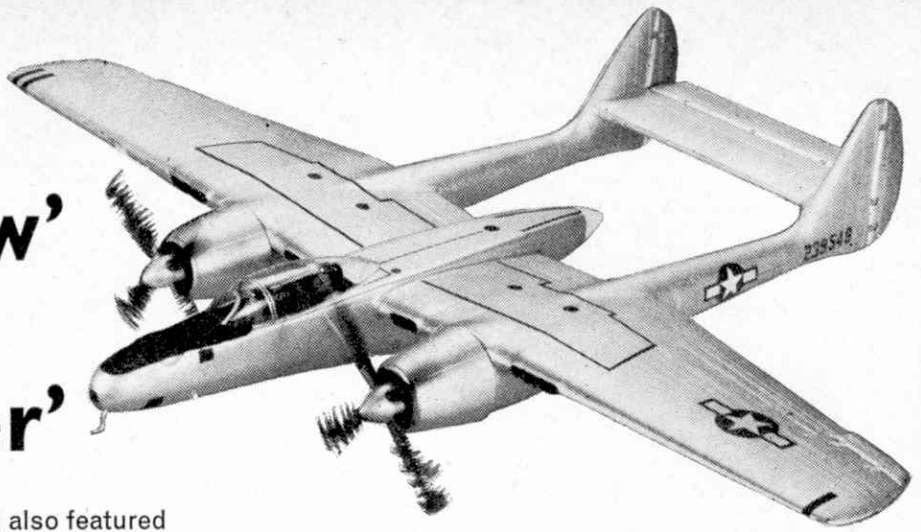


This drawing shows details of the four-gun top turret and positions of bombs and/or fuel drop tanks—make them for your model



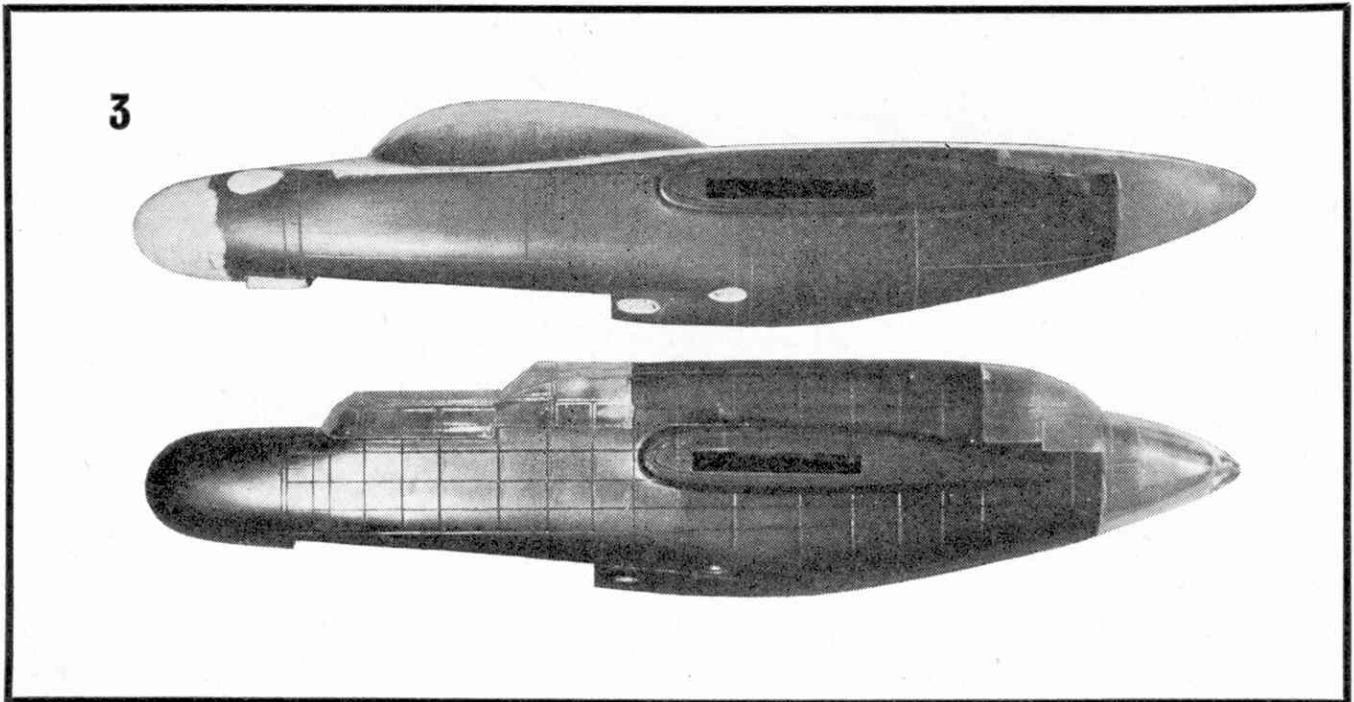
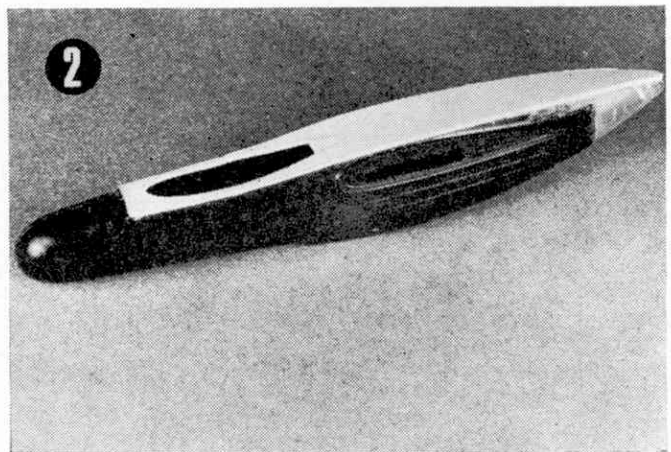
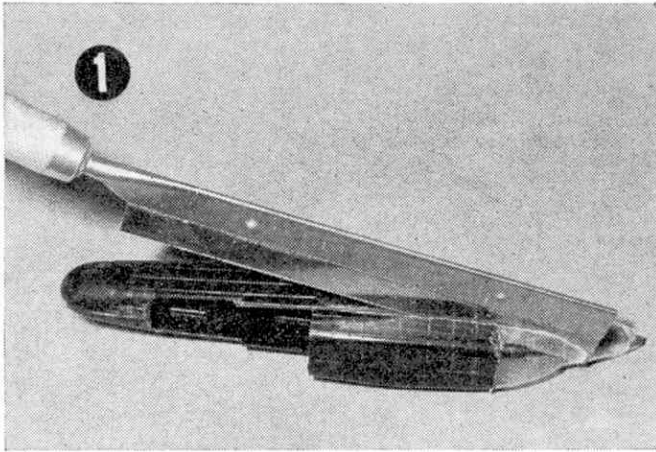
★ Turn the page for full details about how to convert the Frog 'Black Widow' kit into a 'Reporter'

The 'Black Widow' makes a Fine 'Reporter'



Subject of the latest FROG plastic kit, and also featured in John Taylor's article on page 16, The Northrop 'Black Widow' offers the 'plastic surgeon' lots of scope for his skill and ingenuity. On these two pages, Doug McHard shows how he converted the 'Black Widow' into a sleek photo-recce 'Reporter'.

Compare this photograph of the completed model with those on pages 16 and 17



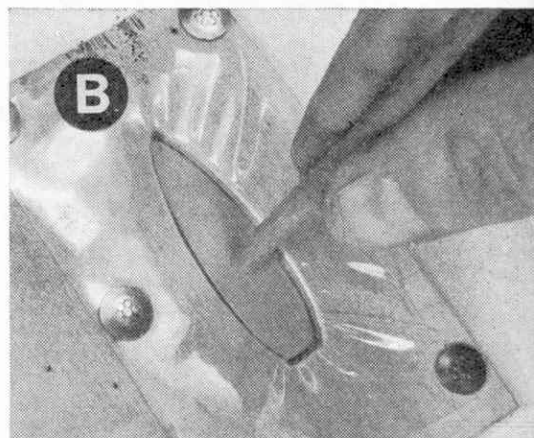
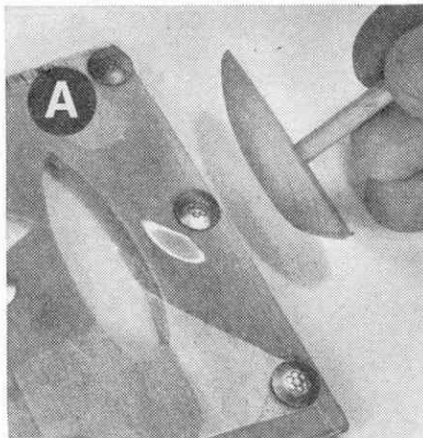
1 Cement the rear transparency in position and allow it to set *completely*. Then saw off the top of fuselage, using the horizontal line just above the wing root as a guide.

2 File the upper fuselage contour to a gentle curve, and cut a piece of 30 thou. Plastikard (polystyrene sheet) slightly oversize. Cut out the cockpit area and then cement in place.

3 This full size photograph of the modified fuselage shows the exact shape of the upper contour. 'Body Putty' is used to build up the nose. Add an extra $\frac{1}{2}$ in. to the original length—a thin layer at a time. The same material is used to fill in the gun ports in the lower fuselage, to shape the two top nose blisters, and to build up the flat-bottomed 'box' just ahead of the nosewheel bay. Sand off all panel ridges with No. 400 carborundum paper and replace them by the scored lines where shown.

4 After silver painting, indicate the positions of the camera windows using dark blue paint to which has been added a touch of silver. Notice that all camera windows are filed 'flat' before the base colour is applied.

5 Wing-walk areas are defined by a black outline applied with a ruling pen, charged with slightly thinned down paint. Follow the lines already engraved on the wing surface and use a straight-edge guide.



THE COCKPIT CANOPY

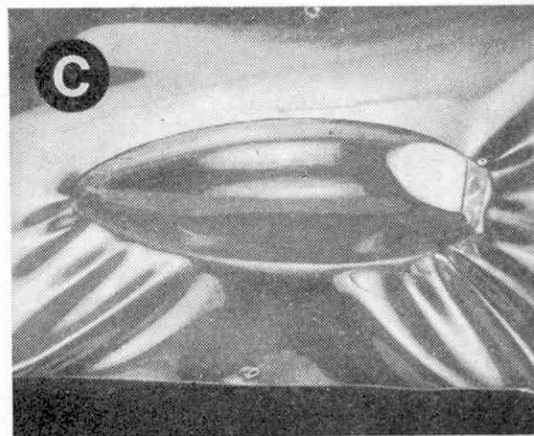
The shapely transparency does a lot to transform the somewhat angular Black Widow into a sleek Reporter. Its production is not at all difficult.

Carve a solid wooden canopy from some close grained wood such as Parana Pine or Lime. Make the wooden forme a little deeper than the finished transparency and slightly smaller in other dimensions to allow for the thickness of the clear sheet. The forme must be smoothed to a very fine finish. It should then be drilled and mounted on a $\frac{3}{8}$ in. dowel. Now cut a hole in a piece of $\frac{1}{4}$ in. thick plywood slightly larger all round than the plan view of the forme. Smooth the inside edges of the hole and round off the upper edges.

The canopy is moulded from clear acetate sheet. This material is a thermo plastic and becomes soft when heat is applied. It should be no less than 15 thou. thick, thinner sheets are difficult to mould. Cut a piece of acetate about 2 in. by 3 $\frac{1}{2}$ in. and, using drawing pins secure it to the plywood as shown in pic A.

Now hold the mounted acetate in front of an electric fire until it becomes quite soft and floppy. At this point the forme should be very quickly pressed into the hole which will draw the clear sheet over the forme to produce the canopy. (Pic B.)

The process is simple but it needs practice to achieve perfection. The acetate cools very quickly, so you must be very nippy to get the forme through the sheet before it cools and re-hardens. If it does cool before you can strike, it is easily re-softened by re-heating. **TOO THIN** a sheet of acetate will cool too rapidly to allow you to work comfortably. **TOO SMALL** a piece of acetate will not stretch



Pic C: Here's the finished transparency ready for trimming

sufficiently to produce a good moulding. **TOO MUCH** heat will cause the acetate to blister and bubble. **TOO LITTLE** heat will produce a milky appearance in the finished transparency.

Polystyrene sheet cannot be moulded in this way, and acetate cannot be stuck with polystyrene cement! So you must stick your finished cockpit cover to the body with a contact adhesive such as Evo-Stik. A neat way to do this is to leave the transparency with shallow 'skirts' each side, below the line of the cockpit edge. These can then be stuck to the inside edges of the cockpit opening.

