
NAVY
015

CUTLA

From New Zealand—a spectacular 57in. span slope soaring replica of the Chance Vought fighter. Convert it to power if you can!

THE Chance Vought XF7U-1 first flew on September 29th, 1948. Nineteen of that model were produced and used for carrier evaluation work. It was reshaped extensively, more powerful motors were fitted, and it was accepted by the U.S. Navy under the name F7U-3 "Cutlass". The production version had a wing span of 38 ft., length of 41 ft. and a height of 11 ft. 6 in. With a weight of 20,000 lbs. normally loaded, it had a maximum speed of 750 m.p.h. and a climb rate of 6000 ft. per minute, and a ceiling of 50,000 ft.

Our model is the XF7U-1 which to my mind had the most elegant shape and scales down to a model of 57 in. span, a weight of 106 ozs!

Ever noticed how elusive that "perfect" soaring hill is? Despite living in a hilly area – Wellington, New Zealand – and regardless of the fact that we're surrounded by a steep coastline, a good spot had been difficult to find. The usual problems arose – too turbulent, no landing area, too close to the local airport, flying field nearby being used by power fliers, "a good hill, but who's going to cross a stream and then climb for 45 minutes" etc.

One site, Titahi Bay had been used a few years back but seemed to have gone out of favour. About 30 minutes drive from the city with high steep cliffs down to the sea and good grassy landing areas, it seemed ideal except for the prevailing on shore wind which at Titahi is frequently double the strength of the wind elsewhere. Obvious answer – a heavily loaded, clean ship for penetration. In a year of slope soaring, I had noticed how most of the models being used are the usual slab-sided, straight-winged designs. To me, there's not much excitement in seeing these time after time on the slope. I felt the urge to build something different! Modern jet lines are to be admired. It had to be rugged for those turbulent zone landings, would need to fit into the average car without difficulty and would need to be aerobatic.

The Cutlass came to mind. "Never!" said Terry Bannister (an aerodynamicist friend), and promptly delivered a plastic scale model, ideas and much enthusiasm. An outline was drawn up, wing section selected, control system planned and within the week, construction was under way.

The following points were considered important and were built into the design although in some cases at the expense of scale fidelity.

1. Wing span and chord were increased slightly in an effort to achieve a reasonable wing loading, say, 16 ozs. a sq. ft., maximum.

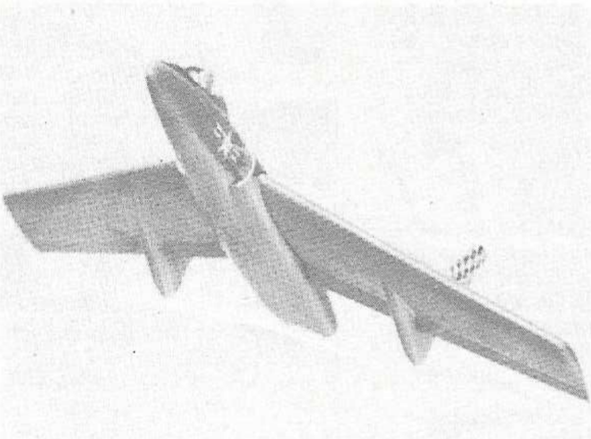
2. The width of the body and fins were reduced so that frontal area and thus drag would be kept to a minimum.

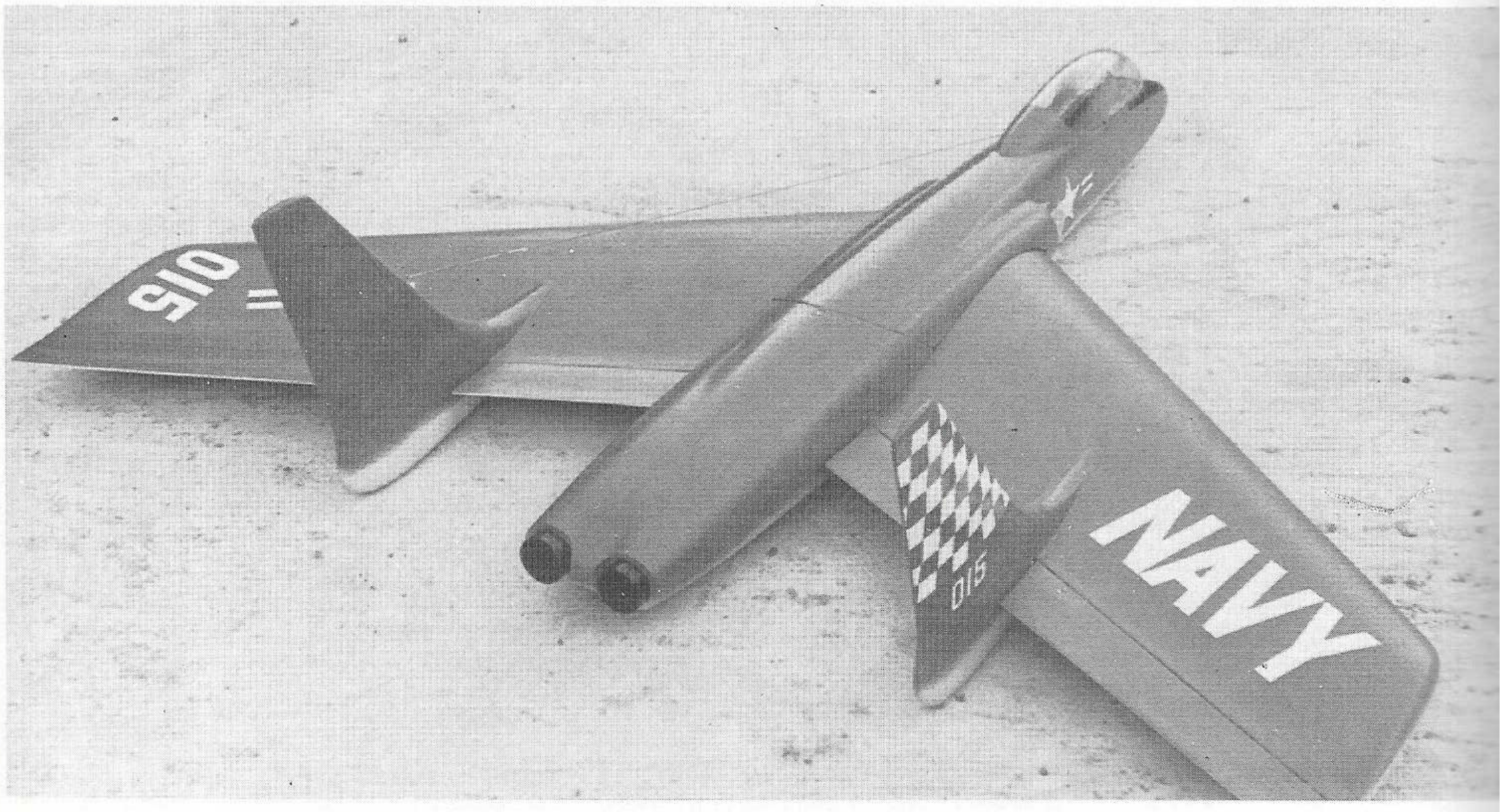
3. The nose was shortened and rounded off – the plastic model's probe had been broken off anyway. The moral was obvious.

4. The wing section became semi-symmetrical, approximately 16% thick with a gently reflexed trailing edge in an effort to achieve flowing lines and once again lower drag.

5. The fins were designed to snap off in a "rough and tumble" landing. These have not been put to the test yet, landings proving very easy with a slow, nose high approach despite turbulence, high winds etc.

6. The cockpit and pilot were enlarged slightly – this being a personal "thing". I like to see that the machine is inhabited from a





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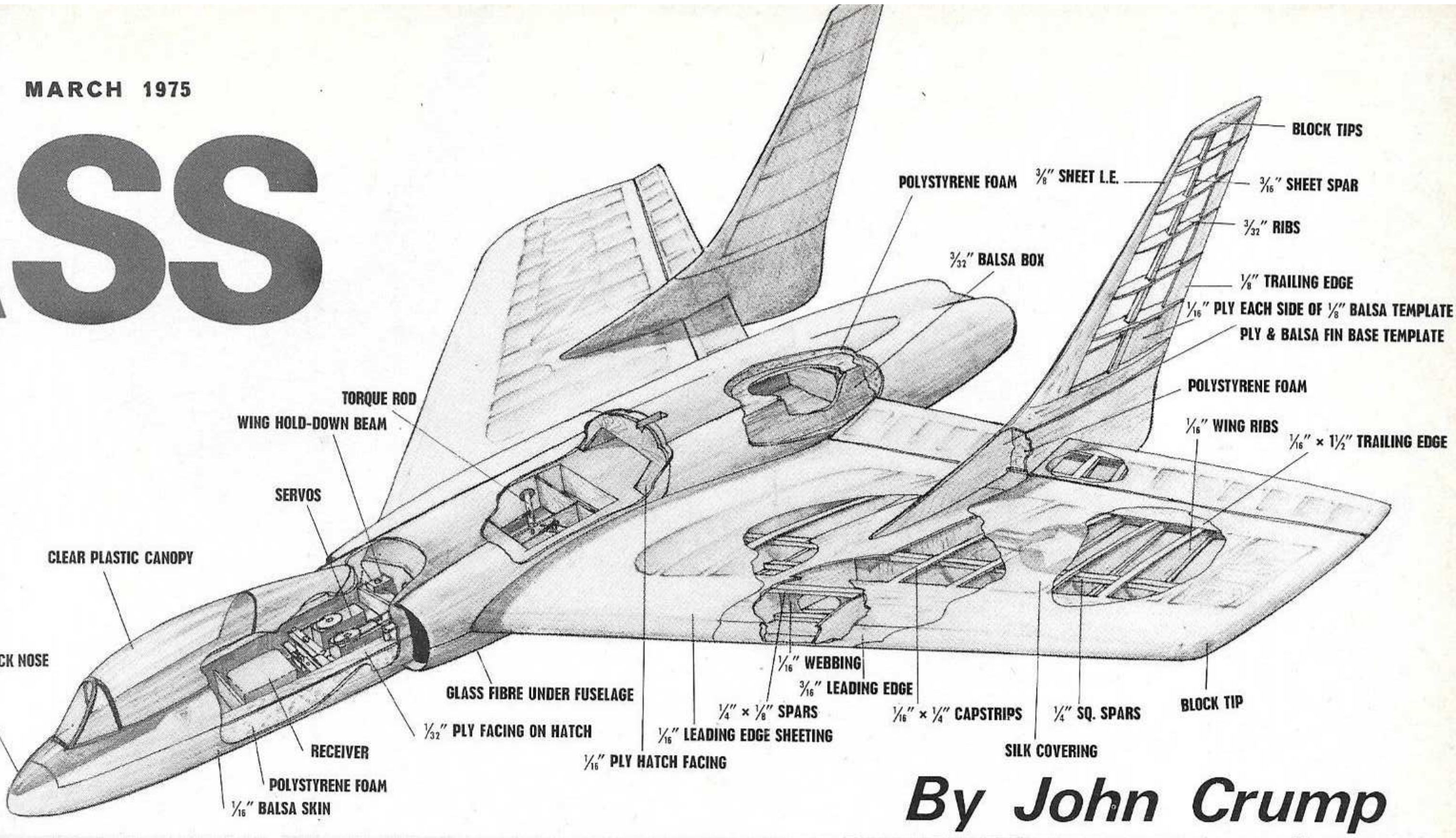
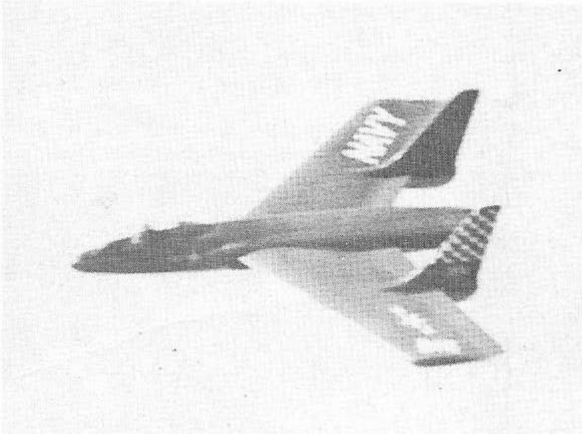
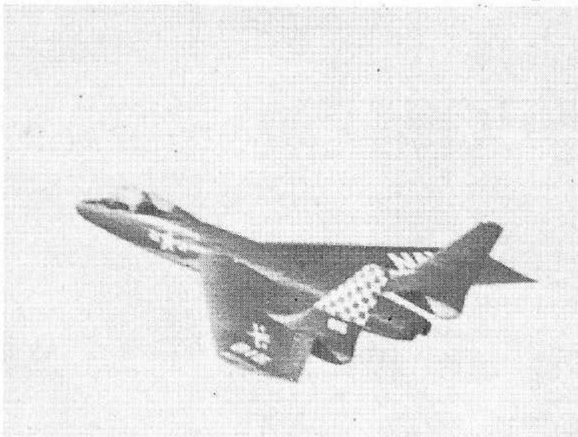


By John Crump





reasonable distance, also, the orange crash helmet shows up well and provides a good reference point. Despite these changes the model looks (to my jaundiced eye anyway), "spot-on" in the air and performs well up to expectation.

First though, to build it!

Fuselage

The construction system used is similar to that used in several radio control glider kits on the market. A simple 3/32 balsa box forms the "skeleton" around which the styrofoam "flesh" is contact cemented. Use medium balsa for the box and 1 lb. per cu. ft. styrofoam with as little contact cement between the two as possible. (Unnecessary weight must be watched throughout the construction). After gluing the slabs of foam in position, carve to the approximate shape with whatever tool you prefer. I use a "snap-off" type wallpapering blade which, when new, is extremely sharp. Note that the balsa box has a keel running along both top and bottom. This gives a line to which you can carve.

Having completed the carving and sanding, contact cement medium to soft 1/16 in. sheet balsa over the complete form. This is a fairly quick and very rewarding job. Apart from small fillets, the whole fuselage can be covered with about 8 to 10 pieces. Once sheeted, add nose blocks, intake supports, jet tubes, etc., and sand smooth. The hatch, wing slot and launch holes, can now be cut out.

Incidentally, these launch holes are a must. The original was built and test glided with two large pieces of 180 wet and dry sandpaper glued to each side of the fuselage to provide a grip. However, if your hand is like mine, you cannot pick up a basketball, for example, without using two hands. The same applies to a smooth 7 in. wide Cutlass fuselage. I should think the model would be impossible to hold in a buffeting 30 knot wind without these holes.

The amount of incidence on the wing slot is not critical as long as one remembers that the wing must fly at a positive incidence angle and the fuselage should at the same time fly level. I prefer a nose down attitude, (it avoids a waffling, stalled appearance) and therefore set up my machine with 4 degrees positive on the wing, although 3 degrees would look more "normal".

The styrofoam will be exposed around the hatch and wing when these are cut away. Face the areas forward of the wing with ply to avoid damage to the edges and to increase strength but try to avoid weight in the nose area. Hold down pegs, servo mounts, cockpit detail, a plastic canopy, etc., can now be added.

As mentioned on the plans, the original's canopy was moulded from 40 thou. thick Butyl acetate. I have pulled others in the past, "Cirrus" types with minimal double curvature but this one proved a struggle. Five attempts later, I decided to ignore the magazine articles and their advice and do it my way.

The mould was carved from a piece of Totara (a New Zealand native timber of a similar texture and density to cedar, perhaps a little harder and able to be smoothly finished). This mould was not treated in any way but was simply sanded smooth with 600 grade paper and then mounted on a pedestal. The original timber was from an old outhouse and therefore bone dry. This was placed in an electric oven at 350 degrees with an oversize sheet of acetate balanced on top of it. As the heat took effect, the acetate draped itself nicely to the mould. As smoke began to appear, the whole mess was taken from the oven (hurriedly) and both my wife and I pulled on all four sides. (Heat insulating gloves are most necessary.) This method produced a clear canopy that required about two minutes cutting with "Silvo" to produce the finished article.

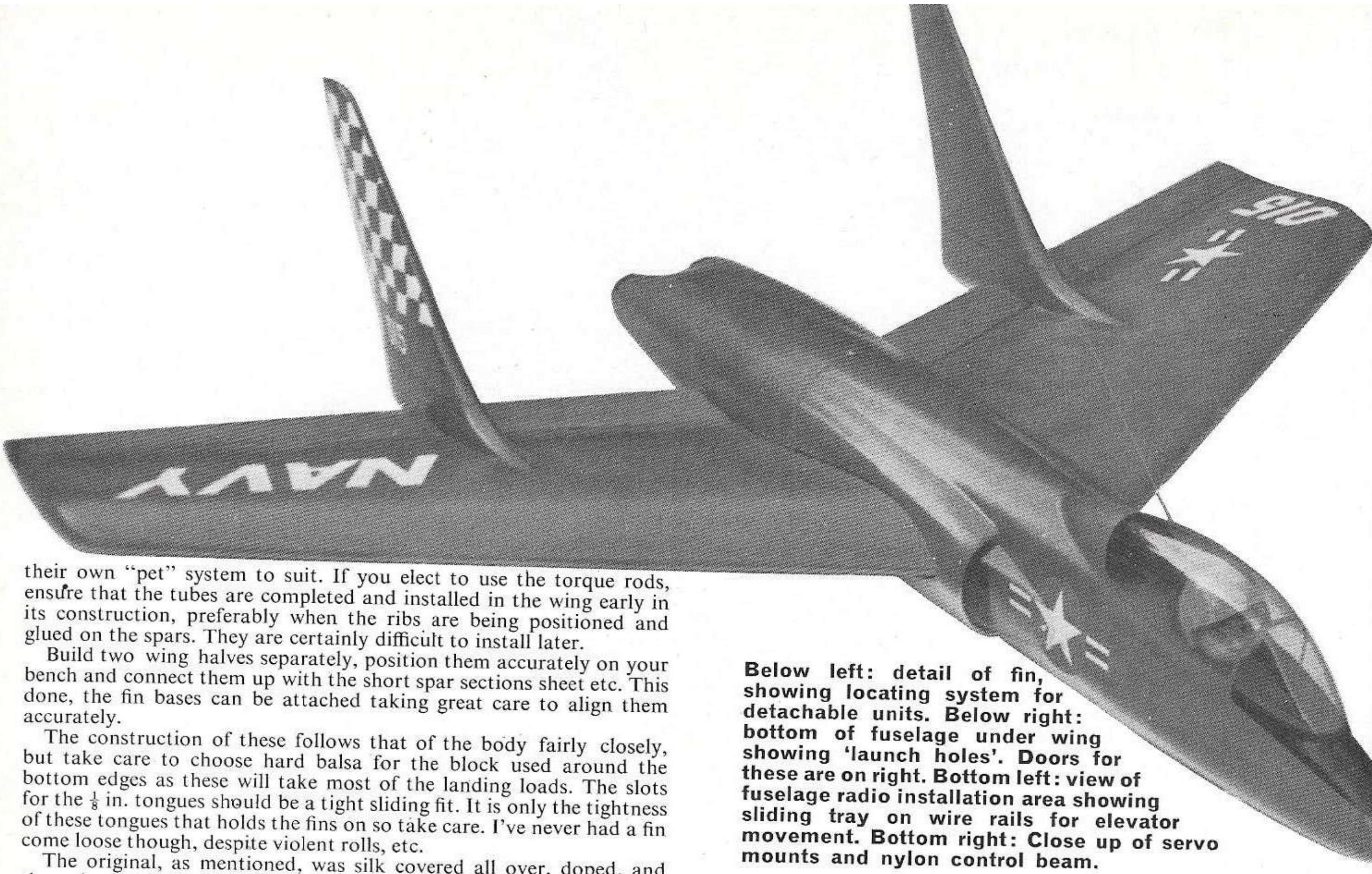
A light layer of fibreglass under the forward fuselage was necessary on the original, small stones, etc., proved nasty, but this will depend on your flying site.

The whole fuselage can then be finished to painting stage.

Wing

The wing is fairly straightforward and could no doubt be done more easily in foam, although weight could become a problem. The original was built to plan and proved very rigid and quite light. This was silked (to achieve a "scalish" satin finish) but the structure is quite adequate for solarfilm fans.

A "Torque rod" control system is shown in the drawings (I like its lack of slop and fine adjustment), but no doubt, builders will adapt



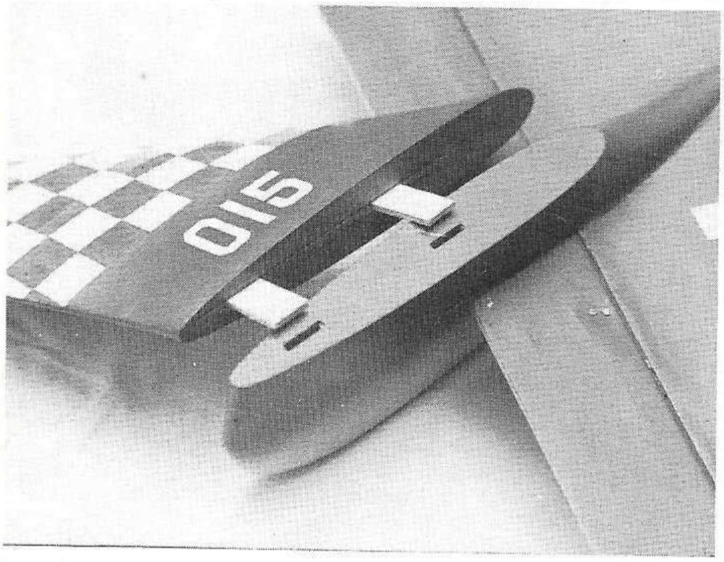
their own "pet" system to suit. If you elect to use the torque rods, ensure that the tubes are completed and installed in the wing early in its construction, preferably when the ribs are being positioned and glued on the spars. They are certainly difficult to install later.

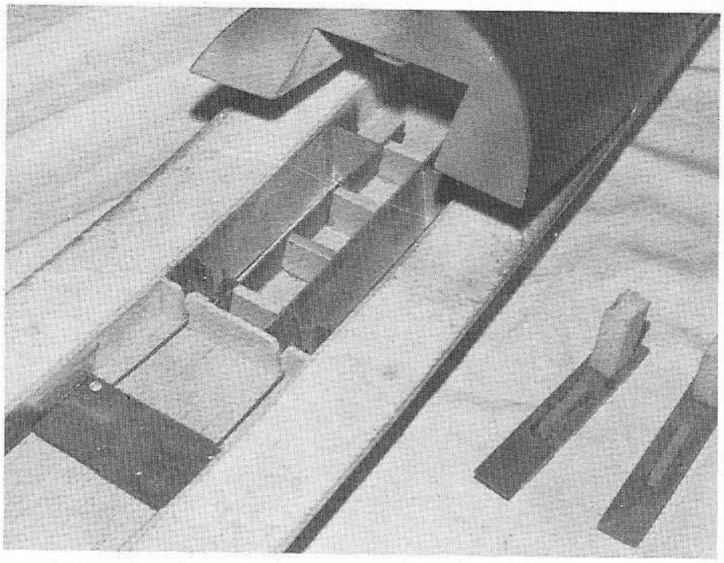
Build two wing halves separately, position them accurately on your bench and connect them up with the short spar sections sheet etc. This done, the fin bases can be attached taking great care to align them accurately.

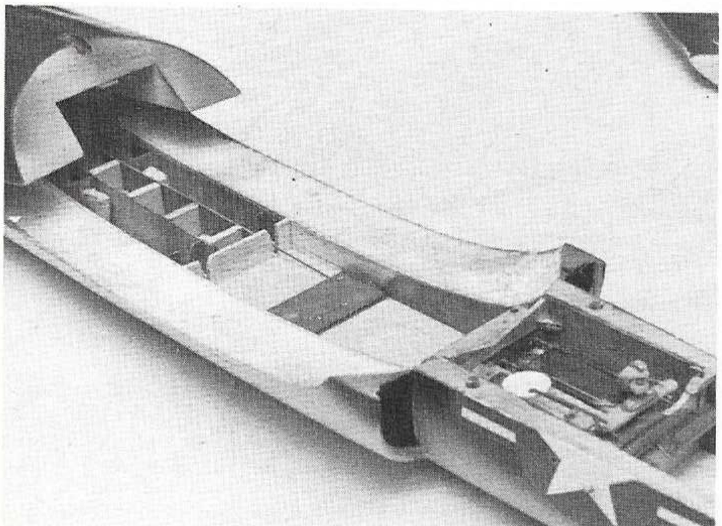
The construction of these follows that of the body fairly closely, but take care to choose hard balsa for the block used around the bottom edges as these will take most of the landing loads. The slots for the $\frac{1}{8}$ in. tongues should be a tight sliding fit. It is only the tightness of these tongues that holds the fins on so take care. I've never had a fin come loose though, despite violent rolls, etc.

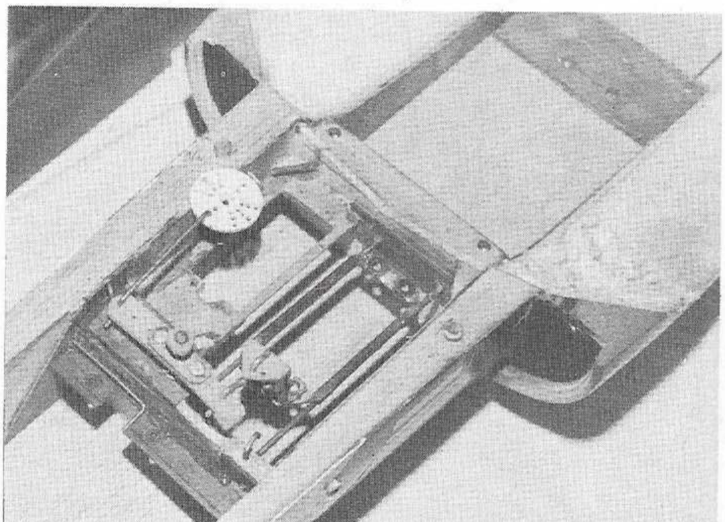
The original, as mentioned, was silk covered all over, doped, and then given a light coat of acrylic lacquer primer. After sanding, two coats of coloured lacquer were sprayed on, then trim was added.

Below left: detail of fin, showing locating system for detachable units. Below right: bottom of fuselage under wing showing 'launch holes'. Doors for these are on right. Bottom left: view of fuselage radio installation area showing sliding tray on wire rails for elevator movement. Bottom right: Close up of servo mounts and nylon control beam.









Trimming

The exciting bit. The model did not prove as critical as we expected, even at an all up weight of 6 lb. 10 oz. You'll realise why I said to keep the nose light – mine carries 10 oz. of lead in the tail pipes! The R/C equipment could be shifted back if you feel the urge – every bit will help.

Set up the C.G. to the forward position shown and the elevon movements to the plan. Ensure that the trailing edges are all in line at neutral as response to aileron is fairly quick.

Initial hand glides were done on a flat field but this gave us very little information due to lack of flying speed. Further attempts were made on a long grass slope of perhaps 10 to 15 degrees. This proved ideal, the model dropping to grass level, gaining speed and covering about 100 yards before being forced down short of trees and fences.

After the initial hand glides had been completed, clear plastic fairings were added in front of the air intakes. These were simply the back ends of two of the canopy failures, these proving a perfect fit and needing only one screw at the front to hold them secure. The reduction in drag was obvious and as a bonus, they are completely invisible in the air.

Flying

As you may now have realised, this ship soars on a wing loading of 22.3 oz. a sq. ft., high by New Zealand standards at least! If you can picture a white capped sea 200 ft. below, tears streaming from the eyes in the 35 knot "breeze" and a Cutlass moving up and out with ease, then you'll enjoy your first "flight" as much as I did. Control response is both prompt and smooth, the stability is first class and the appearance in the air is tremendous.

Low speed flight, as in the full-size, is nose high, very slow, but fully controlled; ideal for carrier type landings – with no fear of stalling a wing tip.

Speed in a long passing dive must be 70 knots or more and a long steep climb away in true jet style is a fine reward for the hours of building. Take note that the nose must be noticeably pushed down to allow the model to change from its low speed to its high speed, low drag position.

Rolls, loops, inverted, etc. are effortless despite the high wing loading, but, no doubt the performance must be still better if the weight is kept down 4 to 4½ lb. being a reasonable target with a better selection of balsa (stocks were very poor in Wellington when the original was built), and more care with contact cement, etc. So 10 oz. of lead in the tail could be that .45 to .60 cubic inch motor on your workshop shelf. With a drop off dolly for take-off (or retracts with a .60 engine minimum), it must make a mighty power model. Then again – forget it! This one's designed to beat the fuel crisis!