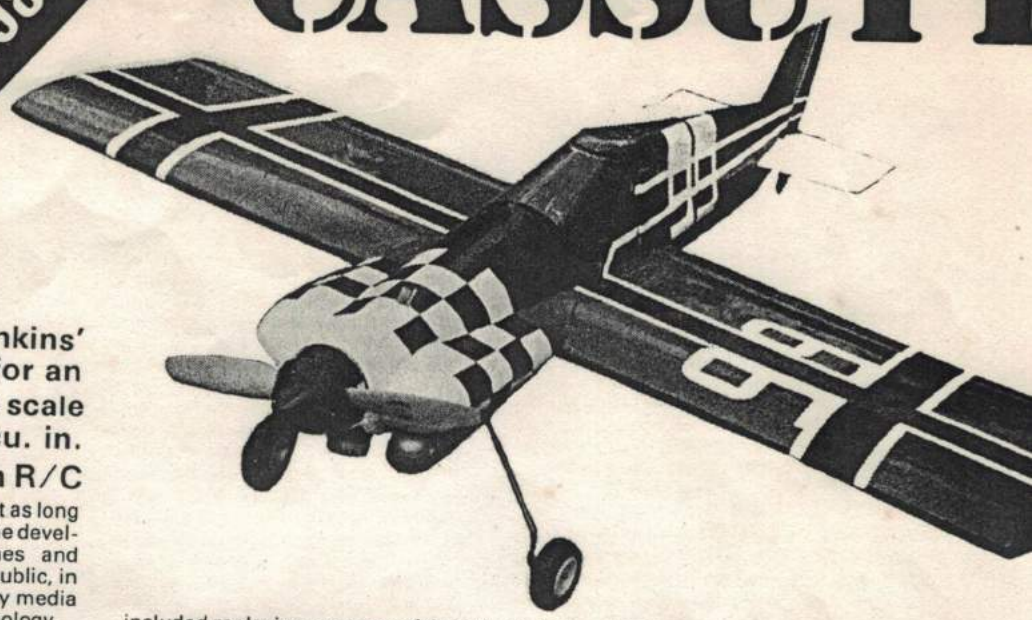
Your No. 1 pull-out PLAN FOR 1985

CASSUT



K. Jenkins' design for an attractive little scale model for 0.10cu. in. motors and 2-4 function R/C

AIR RACES have been around almost as long as the aeroplane, pushing forward the development of air frames and engines and exciting the interest of the general public, in short they created 'airmindedness by media exposure' to use present day terminology.

In 1930 Charles E. Thompson, a Cleveland manufacturer of engine parts, donated the now famous Thompson Trophy. This he felt would help stimulate aircraft engine development in the United States which he felt was lagging behind the Europeans. The race was to be held over a 30 mile triangular course to provide more spectator appeal and there was to be no handicapping. This led to the development of several well known specials such as Folkert's 'Jupiter SK3', Roscoe Turner's 'Pesco Special' and Granville's 'Gee Bee R1' (Plan packs 2771, 2745 and 2789). The racing was fast, exciting, dangerous and sometimes fatal. It always expensive. It always seemed to me that here were aircraft attached to engines. All racing was halted by WWII but in 1946 restarted.

This time there were no specials, there were instead ex 'warbirds'. Surplus fighters at first stripped of everything moveable with boost pressures raised to levels which would make the engine designers curl up. but the quest for speed at all cost was now on again and it was the turn of the airframe designers to turn pale. Cockpit hoods became blisters then the saw came out for the wings, can you imagine a 38ft. span 'King Cobra' flying with wings trimmed to a mere 25ft. span? The air frames were filled and stopped and given a mirror finish which was then waxed.

Power was the key so the next logical step was inevitable; can you imagine a *Rolls Royce* 'Griffon 57' complete with 13ft. 8in. contra rotating propeller being shovelled into a 'Mustang'? Well it was and it cost $350,000 to do it. Or even a 25 cylinder R4360 — 4 'Wasp Major' developing 4000hp screwed to the front of a 'Corsair'? well it was. Cook Cleland won the 1947 Thompson Trophy at over 396mph to win $19,000. The wheel had turned full circle, aircraft were being fixed to engines and the development costs were getting into the Military project level. Inevitably the number of racers dropped due to the sheer expense of these gas guzzling giants, a less expensive way of racing had to be found and so the AT6 'Texan' (Harvard) class was formed.

Then also as a logical progression it was decided that the key to cost lay in the engine so what was needed was a light cheap economical reliable engine around which a small racer could be built (this sounds familiar). So was born the Goodyear F1 racing class to use the flat four cylinder *Continental* engine. This was to have the minimum of allowable modifications which included replacing up to two of the pistons for balance and internal polishing. As this latter raised the output by 50% it must have been some metal polish!

The aircraft were small and nimble with well harmonised controls, what the races lacked in pure speed they gained in the excitement of close racing at low altitude. They were also affordable.

The 'Cassut' is but one of the more famous and successful of the breed. Its design philosophy is 'form follows function'. The low aspect ratio wings span 15ft. (yes both of them), while the tail plane spans are an even tinier 2ft. The long moment arm gives this aircraft the required manoeuvrability and indeed, with its light wing loading and powerful engine, it can aerobat with the best, and as the airframe is stressed to ±12g its a tough machine. It is a feasible 'home build' project and is popular as a sports aircraft and also a very much personalised design with wing thickness varying between 6% and 11% of the chord, and cockpit height given a 'pilot's' eye level plus 6in. Wings and tail outlines are rounded or square cut while ailerons are narrow full span or part span.

The real aircraft is a mixture of wood and metal. The wing has a laminated wooden span 'D' section L.E. and welded tube ailerons. The fuselage has a basic welded tube structure so too has the tail assembly. Metal panels are confined to the rear top deckings, cockpit and engine bay and have simple curves. The compound curves on engine cowlings side cheeks and wheel pants are usually from GRP mouldings.

The whole design has an air of 'Pezazz' which is continued in the names given, 'Booray', 'Idjits Midget' and 'Scarab' are but a few. The colour schemes are equally up front, have a look in December 1969 Aeromodeller or get plan pack 2905 for suitable inspiration. The red and yellow brigade will find the *Airmark* 'Cassut' a gift and this can even be flown sans spinner and wheel pants.

However, remember the brighter colour schemes do give more visibility which is important for this small model and the wheel pants help you tell which way up it is (also important).

The Model

The outline has been drawn as accurately as possible. The scale of approximately 1⅓ in foot was found to give a wing area of 200sq. in. which is in line with the American ½A racer class. The engine usually used is a Coxs TD051 which is a 'goer', so 0.06cu. in. 0.10cu. in. should be sufficient 2 chann control on elevator and aileron is ample bu 225mAH battery is a must.

The original was fitted with 3 channel R/ equipment, a *Fleet* micro pack, the comple airborne pack weighs less than a 500mA battery. If your gear won't fit, run out and g one of these it adds a new dimension to sma models (and its British).

With a total weight of 18oz. the prototyp was below the minimum 20oz. of the ½ class the top weight of which is 30oz.

Materials

Use light wood and don't beef it up. Ge good fits and use glue sparingly. Avoid grea blobs of PVA and epoxy. The airframe ha been simplified to add lightness don't revers the process. Cover in coloured iron-on filr also to avoid weight build up. Find ligh weight 1¾in. wheels, do not use those heav 'spongies' in the scrap box.

The whole thing can be built from thre sheets of 3 × 1/16in. (1.5mm) two sheets 3 ⅛in. and one sheet of ¼in. (6mm) (which *must* be soft). For stripwood you will nee two off 3/16in. square, one off ¼in. square an a shaped T.E. A visit to the scrap box shoul provide the rest. A 2oz. plastic fuel tank wa used but the neck of the tank was heated with the Solarfilm gun so that it could be shortened by approximately ⅜in. I like to make up a kit before I start including the accessories.

Wings

So you've seen bigger tailplanes! Yes the wings are tiny but every effort should be made to build them true. First laminate the leading edge from ½in. and ⅜in. strips from your ¼in. sheet. Mark on the rib positions then cut the slots for the ribs. Use two pieces of hacksaw blade held or bolted together through the end holes. This will give a nice push fit for the wing ribs (three pieces will do the same for the two centre ribs). Cut two ribs accurately then use these to draw the blanks which are cut slightly oversize. The pack of ribs are then pinned together with the two finished ribs on either end. Carve and sand carefully until they look as if you have one solid rib. Cut the spar slots with a razor saw (Junior Hacksaw) so that the spars are a push fit. The trailing edge is now cut from the ¼in. sheet and sanded to the required taper before slotting at the rib positions with the hacksaw blades. You should now have a 'build-in-the-

hand' wings kit which can be quickly and accurately assembled. The spars are then sheeted between ribs as shown. 1/16in. sheet is cut into 2in. and 1in. wide strips for L.E. sheetings and T.E. and attached using white glue pins and or masking tape. The 1/4in. cap strips were cut from the 1/16in. scrap and a pencil rolled along their length to induce some curvature. These are then added to make a rigid light structure. The torque rods were made up from piano wire and brass, the pushrods are brass tube flattened, drilled and soldered on. The pre-shaped T.E. stock which forms the strip aileron was cut to length then the front edge sanded (with a sanding block) to give the profile shown. These were attached with mylar strip but could be removed later for easier covering. With tips added which can be built up from scrap sheet or block the whole structure is well sanded using again the sanding block.

Fuselage

The ply formers are cut first, soft or 'packing' ply is strong enough and lighter than birch ply. The hole in F2 elongates to allow removal of the tank. The whole engine bearer assembly was constructed including the installation of the tanks and engine. The ply and balsa front spinner-ring was glued and screwed to the face of the bearers after checking with the spinner and propeller attached. Use captive nuts for the engine mountings because you can't get at them after planking. I faced the side of the bearers with 1/4in. balsa scrap shaped to the fuselage curve to assist the securing of the side sheets. Cut and glue the 1/4in. sq. and 3/16in. sq. to the fuselage side allowing the latter to form a ridge to locate the top deck sheeting. These were then glued to F2 and F4A checkings squareness. The wing which had been completed was added when these components had dried the seating being eased to give a good tight fit with squareness in top view and front view. With this assembly dry, the front and rear were glued up using *SLEC* clamp, pins and elastic bands. The undercarriage legs were bent up and the hardwood bock stepped to take the two wires snugly. This was then positioned together with the top blocks against F2 and allowed to dry before drilling for final location and fixing of the UC with saddles and screws on a metal plate.

The precut and sanded tail plane is added together with spars and top deck formers. The top deck 1/4in. sheet is traced and cut and attached followed by the 1/16in. sides. The front former F3 is added and the planking added. I did this in three pieces using so 3/32in. sheet dampened on the outside and pre-curved held in place with elastic bands while drying. The cockpit area was then painted matt black using drawing ink and the framing cut from scrap 1/8in. to form a rebate for the windshield. This came from the centre of a 'coke' bottle it was secured with clear contact cement which was used to attach the card framing which acts as a heat barrier when attaching the covering film. The bottom sheeting was attached grain fore and aft including the hatch which was cut after shaping. Take out the engine and sand it all to shape. The prototype had the fuselage sides sloping inwards but this proved to be a bit restrictive for the fittings of engine and R/C gear so that shape has been simplified, still some crafty sanding will give a good shape. Fuel proof the engine bay.

The cheek cowls are constructed onto the wings and finished fuselage. I used 'Blue foam' and ABS sheet cut in one piece both these proved susceptible to the sealing iron so block and plank. You can now refit the engine cutting where necessary for clearance. Cut the hatch, fitting dowels and ply tongue for fixing and install R/C equipment as shown.

I chose the 'Scarab' colour scheme and used 'Solarfilm' a sealing tool is essential for attaching trim. Beg, borrow or even buy some double glazing twin channel aluminium strip, with this you can tuck your fingers out of the way when cutting strips of Solarfilm with a very sharp (even new) blade in your modelling knife. The numbers and checkerboard are from 'Fablon' and the whole is given a coat of 'Tufcote' to complete.

Flying

Balance on the main spar I had to use a heavy tail wheel. Check movement is 1/4in. either way on elevator and that there is a 1/4in. movement on the up going aileron. The swept forward torque rods will give the required differential movement. Fit a 7 × 4in. prop to your OS 10 FSR. Mine was new, so was first run as per the instructions to ease the fits. A 5% nitro fuel was used and the slow throttle set up.

The shoulder wing layout allows a good grip so with everything checked I was able to give it one of my best hand launches, just like lobbing a dart at double top. The climb away was fast, even rapid, and the fly-by was even faster. The rolls were axial and faster to the left. The grey blue sky made orientation difficult for me but not the pilot it would seem from the loops, stunts and inverted flying, well it wasn't his! He wouldn't give me the transmitter and kept his elbows well out to prevent any sudden grab. Not knowing the engine run duration the motor cut and it was a dead stick landing, fast and straight back to the master. Very satisfying.

So there you are; a scale model without the 1000hr. instrument panel that works. It's fast, but not a racer and it's manoeuvrable without being twitchy. It will nearly fit the glove compartment never mind the boot of the car! It's cheap to make and run and exhilarating to fly. What more can you want. Have a good day.