Build F. Crosby's 41in. Darth Vader of the skies for interceptor performance on .20 motors and three-function gear

IRREGON STARTED LIFE as a small slope model, the configuration of which I would call a swept forward delta on which the wingtips were rigged at a positive angle of attack to that of the centre section. This model had a number of faults. High sensitivity of pitch, combined with the swept forward tips (one or other of which would dig in on landing) produced a model that was hard to fly and consequently had a short life.

One of the lads named it 'Darth Vader.'

Smooth, positive pitch control was achieved by the addition of a canard wing which I linked to the elevator. The centre section of the main wing was given anhedral, the tip panels were now dihedral and their leading edges swept backwards to keep the tips out of trouble when landing.

This new look Irregon was now much nearer the state of the art as found in the military world of full size aircraft. It flew well, smoothly, accurately and was very forgiving. The next step was to draw up and built a powered version. After a word with David Boddington, Irregon MkIII was drawn up, built during the Christmas holidays, powered by a PAW19 and to my great satisfaction, flew straight off the drawing board. The name Irregon was derived from irregular polygon – 'irregon.'

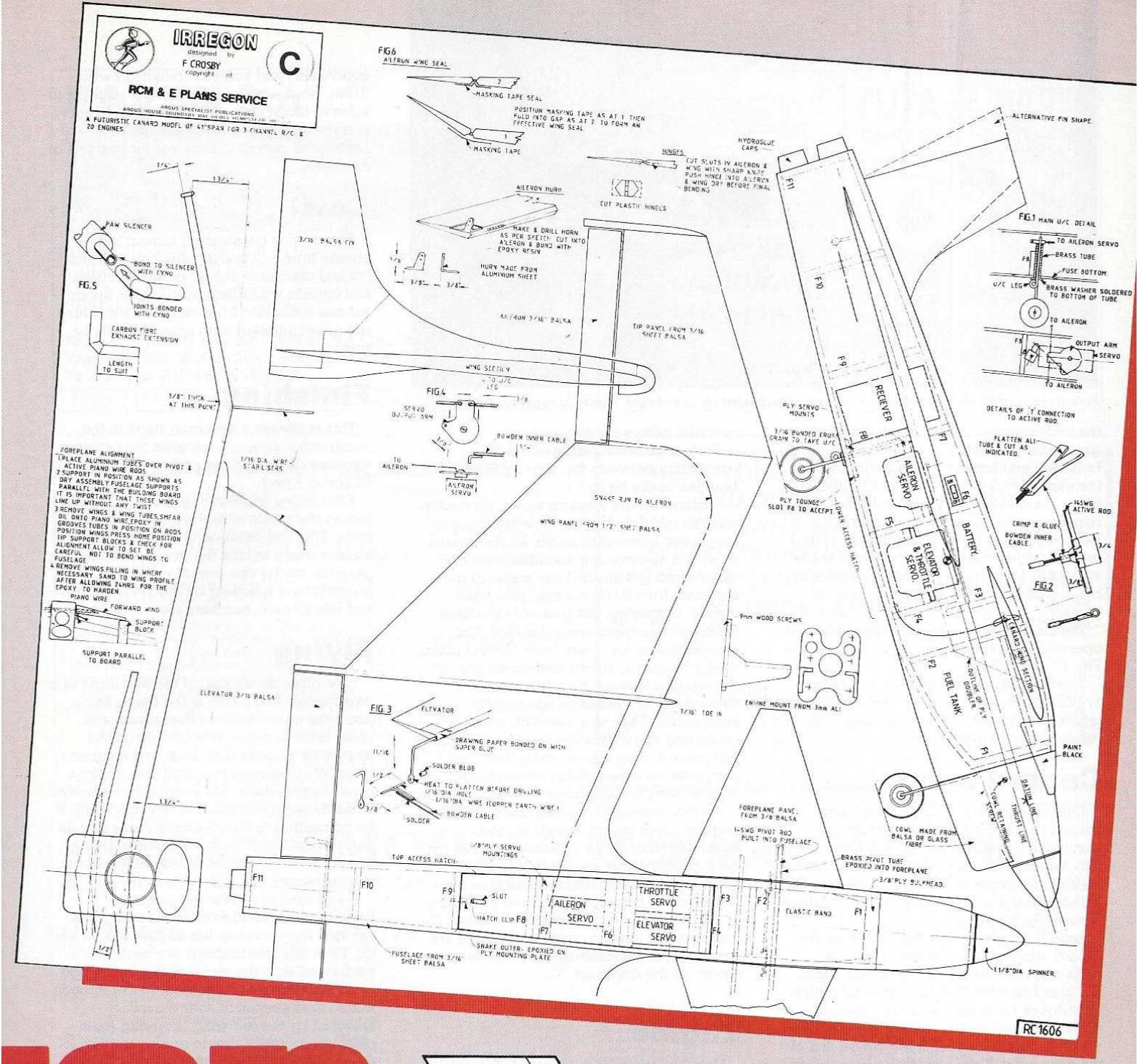
Here then follows a description of Irregon MkIII, a simulated fighter interceptor. Study the drawings to assimilate the shape; become friendly with it. I can assure you this will help later when you find yourself behind the box of tricks flying it. Disorientation may be a problem at first.

The fuselage is a simple slab sided box structure which is built around the main wing; canard wing, snake runs, fuel tank, engine, control surfaces, radio cowl and finishing more or less in that order.

Main wing

Construct the centre panels from 1/2in. medium density balsa and 3/8in. medium for the tip panels. Commence by cutting the panels to profile and shaping to section before cutting to take the aileron snakes. The outers are tack glued with cyano into the pre-cut grooves, followed by gluing back the leading edge. I cut the snake grooves in the wings with a hacksaw blade.

Cranked-wing canards are seldom seen. Can you resist?



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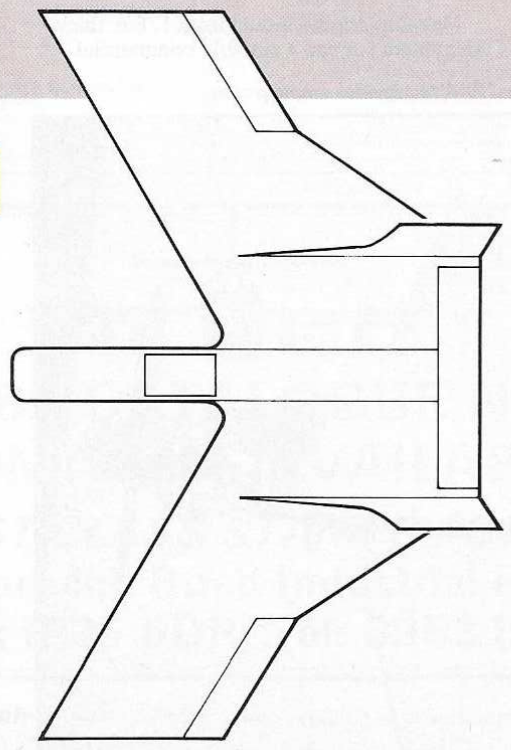
The centre panels can be fitted and glued together at the indicated angle of anhedral, remembering to cut out the openings to take the servo output arm and receiver. Prepare the dihedral tip panels which are cut, after sanding to give ailerons. Put the ailerons to one side until needed. Fit and glue the dihedral tip panels to the centre section, taking great care not to build in warps. Reinforce the wing joints with fibreglass.

Fuselage

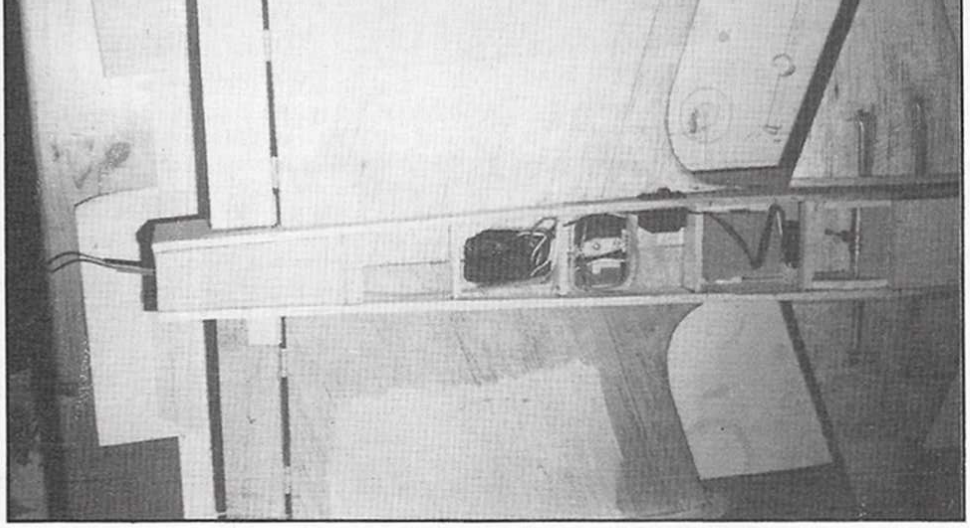
Commence by cutting the sides from 1/8in. balsa, these are fitted over the main wing, then remove to glue the ply doublers in position. Drill for the 14SWG pivot rod, and cut the curved slots. Cut out the



bulkheads including the 3/8in. ply engine bulkhead, which is rebated as drawing, ready for assembly. Position fuselage sides onto the wing but do not glue at this stage. Begin assembling the fuselage by gluing in the bulkheads in the following order: F1, F11, F2, F3, F4, F5, F6, F7, F9, F10 and two F8s from 3/16in. balsa or are glued in with the rear undercarriage. Accurately set up the wing fuselage and glue; when set, reinforce with fibreglass. The joints between the engine bulkhead, fuselage sides and the bottom can be reinforced in the same way. The inside of the tank bay can be fuel proofed. The top and bottom fuselage sheeting is best left in until later.

Undercarriage

Bend the undercarriage legs from 14SWG piano wire, to a length to suit the propeller. I used a 7 × 6 propeller, enabling me to keep



Foreplane rotates about front dowel; movement actuated via rear dowel. Plenty of room for R/C gear.

the undercarriage low. The front leg is grooved into the front of the engine bulkhead and bonded with araldite. When the engine mount is screwed or bolted in place the resulting leg is very strong. The rear leg is grooved and sandwiched between two 3/16in. balsa formers. (F8). I would suggest that the rear wheel is made steerable. I used 1 1/2in. diameter wheels but 2in. ones would be an advantage on grass.

Details of a steerable rear wheel which is operated from the aileron servo is shown in Fig. 1.

The ground stabilisers are made from 1/16in. piano wire, grooved and bonded into the underside of the wing to be reinforced with fibreglass.

Canard wing

Cut the units from 3/8 medium balsa, shape to section and groove to take the aluminium tubes. Fit the 14SWG pivot rod into the fuselage, remove to lubricate before aralditing into place. This will allow it to be withdrawn if it is necessary at a later date to remove the fuel tank.

Bond the pivot and active tubes into the canard wing panels allowing 1/4in. to project to take the 3/16in. root ribs which are glued on later. Support the wing panels on strips of balsa pinned to the fuselage sides and pack up the tips to give anhedral which is parallel to that at the centre unit of the main wing. Take care to avoid building in a warp. When set remove to fit and fix the root ribs before sanding to finish.

Refer to plan for details of the 'T' connection between the active rod and bowden snake inner.

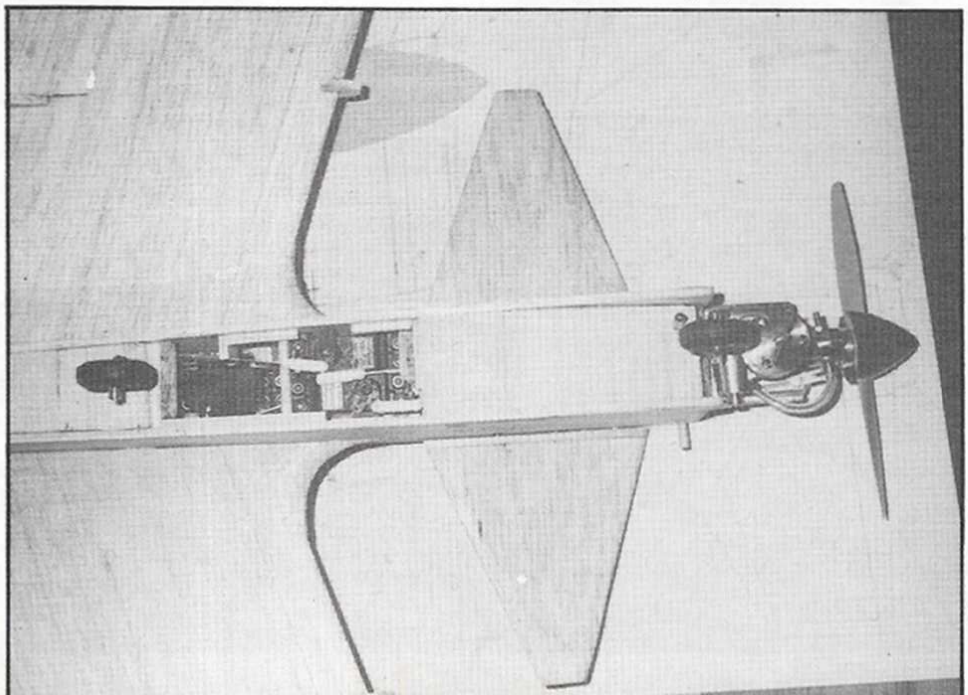
Position and fix elevator servo, rig canard wind as per drawing, cut bowden inner to length and connect to servo. As the canard wing and elevator are operated from the same servo you should now make up the elevators from 3/16in. balsa, attach the hinges, fit to wing, but glue only the flaps which go into the elevator for now. The elevator horns are made from 16SWG piano wire, (see plans, which also shows the "T" connection between bowden inner and elevator horns). Measure and cut the inner cable. Assemble elevator, connect to servo, and when satisfied that the elevator plus canard wing are correctly lined up complete the assembly by gluing hinge flaps to wing and solder retaining blobs.

Position aileron servo, drill servo horn and prepare cable inners; details on plan. Assemble from servo end, measure and cut inner cables finally connecting to aileron horns then adjust to retain tip section. Now is the time to complete the fitting and fixing of the top and bottom fuselage sheeting. The access doors to servo and battery bays are now fitted, to be retained with screws as shown on the drawings.

Engine

Make up engine mount from 1/8in. thick aluminium (or use a suitable commercial equivalent) and screw to bulkhead with 3/8in. No. 6 countersunk screws, packing to achieve thrust time. Bolt on engine, fit servo and snake, adjust throttle setting. now connect all servos to receiver for trial test of functions.

Underside view shows engine, tandem u/c and servos. PAW19 provides ample power.



Cowl

The cowl is constructed around the engine from 1/2 and 3/16in. balsa. When cut and sanded to shape, reinforce inside and outside with fibreglass. I made up an exhaust extension from carbon fibre fishing rod glued together with cyano, details on plan.

Finishing

This is always a welcome stage in the construction process, because we can now visualise the end of the project and what it's all about; flying.

After filling and sanding to a good finish, I sealed the whole model with one coat of resin. This was resanded to produce a surface ready to take the final finish. I simply gave the model one coat of red polyurethane followed by the yellow trim and black name, numbers etc.

Flying

How often do we put off the first flight of a new model? We arrive at the flying field, place the new model on the tarmac, and stand back because new models attract interested onlookers as a honeypot attracts bees. We then go through all the checks, mock engine starts, but eventually we arrive at the moment of truth. The new model must be committed to the air and we now feel as nervous as hell. Check the balance; this should be as shown on the drawings and is with an empty fuel tank.

If you have opted for the steerable undercarriage and have access to a good runway, then wind up the engine and let her go. Take offs and landings are best performed with the elevator rates switched to on. Full elevator movement of low speeds can so easily result in over elevation followed by the left wing dropping (anti clockwise rotation due to engine torque). Once airborne fly a number of circuits to become familiar with the model's handling and orientation before switching the elevator rates to normal function. When landing with power off the model will maintain lateral control when the stick is pulled well back.

To hand launch for the first flight, I would suggest you pick a day when there is a stiff breeze blowing. Elevator rates on, launch irregon straight and fast into wind, preferrably over long grass. It is always a good idea for this first flight to have someone else do the hand launching.

I used standard size radio gear in my Irregon, producing a model of 3lb 3oz all up weight, and would suggest that this is about the upper weight limit for a model of this size. Miniature radio gear therefore will enable the loading to be reduced with a subsequent improvement in glide angle and performance. I think you will find that Irregon will fly smoothly and accurately inverted or right way up, performs rolls, loops etc.; what more do you want! Remember she also flies the 'right' way around.