THE Kavan Alouette R/C helicopter has been 'in the works' for a fair time. Indeed, announcement of the prototype at the Nuremburg Toy Fair some time back heralded the trend to the smaller type of model 'copter. Handy sized, having a main rotor diameter of 42 ins. and a fuselage length of 40 ins., it is designed to use motors of .40 cu. ins. capacity and four function control systems operating cyclic pitch, tail rotor and throttle controls. An interesting control feature is the interconnecting of throttle and tail rotor servo arms with a mixer arm which adjusts the tail rotor pitch to compensate for torque variation due to power changes.

Following the trend to advanced prefabrication, the kit is basically a series of pre-assembled modules which have to be bolted together. The tail boom for example

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By

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is supplied partly factory assembled, being made up of aluminium tube longerons and plastic cross members, leaving only wire diagonals to be fitted. In the finished model, the bulk of mechanical parts are contained within an enclosed centre section of the fuselage. The motor is cooled by air drawn over it from a vent at the top of the centre section using a three bladed cast alloy fan which is bolted to the engine drive-shaft. Engine power is transmitted to the rotors via a toothed belt and strong clutch assembly which features a large cork lined surface. Metal gears connect the clutch shaft to the tail rotor drive shaft and the nylon 5 to 1 reduction gear of the main rotor.

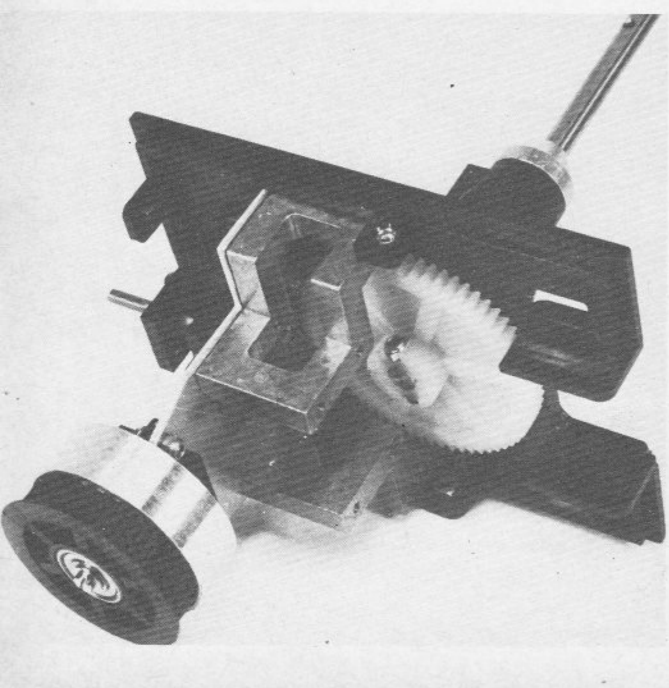
Construction starts by cutting out the cabin inner floor and fuselage side pieces from marked plywood sheet. Apart from the main rotor blades, these are the only wooden components in the kit, the cabin floor doubling as a servo tray and marked to show the correct servo positions. It is important that servos are positioned as shown if the interconnecting mixer arm of the motor and tail rotor servos is used.

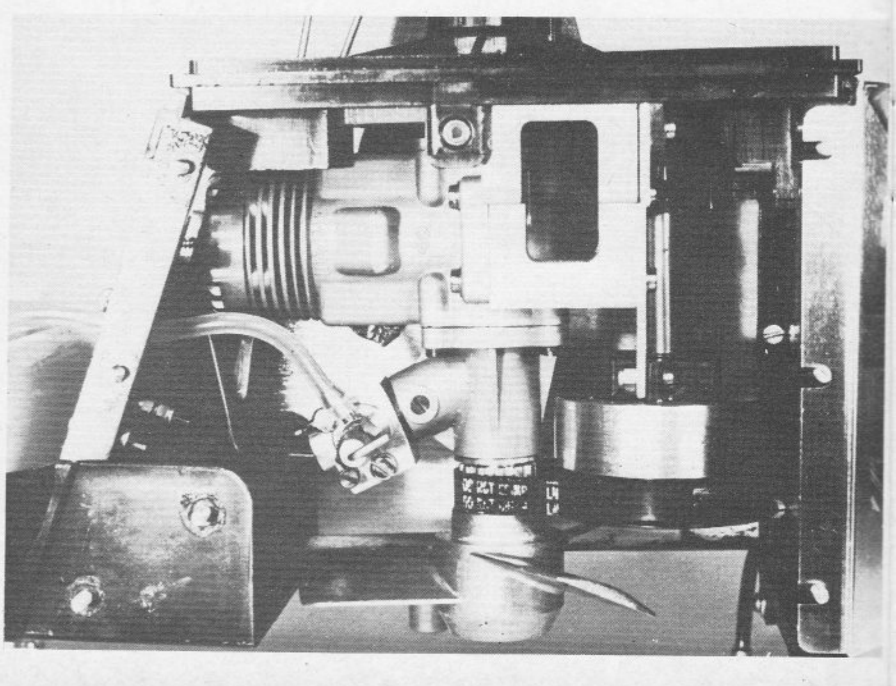
The plywood centre fuselage sides which form the side covers for the power/drive mechanism should be an exact pair and I advise checking this point as, in the review sample, the two components did not exactly match. Holes have to be drilled in the plywood sides and I advise clamping the two sides together and stack drilling to obtain an accurately matched pair.

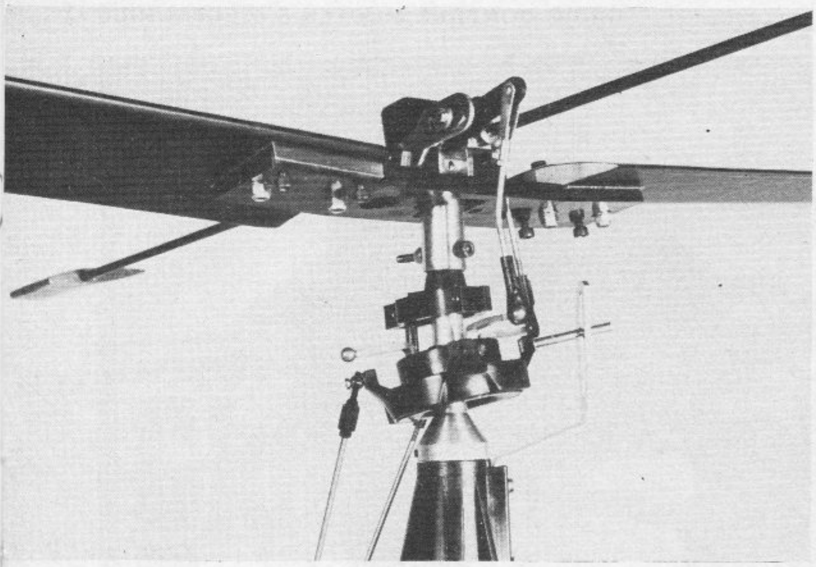
The all important question concerning these ply side panels is one of access to the internals and I found it very awkward to remove the plywood side panels when the model had been completed and the mechanics were in place, as the preferred method of assembly made the nuts and bolts which hold the side panels to the plastic front and rear panels difficult to reach and grip. I overcame this by permanently locking the retainer bolts of the left panel securely into the lugs of the plastic front and rear panels with 'Zap', so that the nuts now screw on to the outside of the plywood side panel. This re-arrangement makes the access panel quite easy to remove, and then allows easy access to the bolts on the right hand panel. It was not the manufacturer's intention that these panels should be taken off, and the design allows for the removal of the fuselage top complete with mechanics attached, but this also requires disconnection of all controls and I am in favour of my own 'easier' method of visually checking the security of the 'works' before flight.

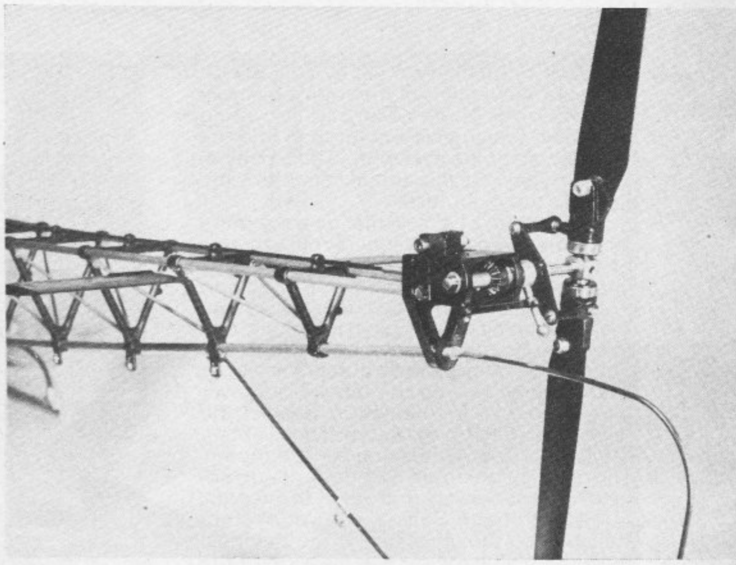
Having cut out, painted and fuel proofed the woodwork there remains the simple and straightforward job of bolting other components together. The instructions advise against using locking fluid on the nuts and bolts as this may damage the plastic, but to use a dab of paint instead. I have to confess to ignoring this advice and using locking fluid, but I was careful not to let it make contact with the plastic.

Below left: the transmission base plate with engine bearers, clutch, main rotor drive shaft and nylon reduction gear fitted. Below: centre fuselage section with left side-panel removed, showing motor installation, toothed belt drive to clutch and motor cooling fan.









The tail boom and rear fuselage plate must be joined together over the plan in order to obtain the correct angle of 'upsweep' of the boom. Too great an angle will result in bent tail boom longerons when these are clamped to the rear plate and will also cause 'binding' of the tail rotor drive shaft.

Although the Alouette is designed to suit a wide range of .40 size motors, I used the new Irvine .40 which makes this something of a double review. The new motor fitted neatly into position and, using the shims provided in the kit, I had no difficulty in aligning the belt drive pulley of the motor with the drive pulley of the clutch. A little juggling and elongating of fixing holes may be necessary if other makes of engine are used, but this should create no problems.

The main transmission, swash plate and main rotor head are quite easy to assemble. There have been modifications and improvements in this area since the first batch of kits were released, the transmission base plate has been modified to strengthen the tail transmission bearing block and the main rotor blade seats are now angled to give a rotor blade angle of incidence of approximately 4°, but provision is made for blade angle adjustment up to 7°. The pre-assembled ready drilled main rotor blades require only a light sanding before balancing and covering with the self-adhesive material supplied.

The rear rotor assembly is neat, features aerodynamically shaped plastic rotor blades and is quite easy to assemble and install. There is however a simple but important modification here which I knew nothing about until too late, but more of that anon.

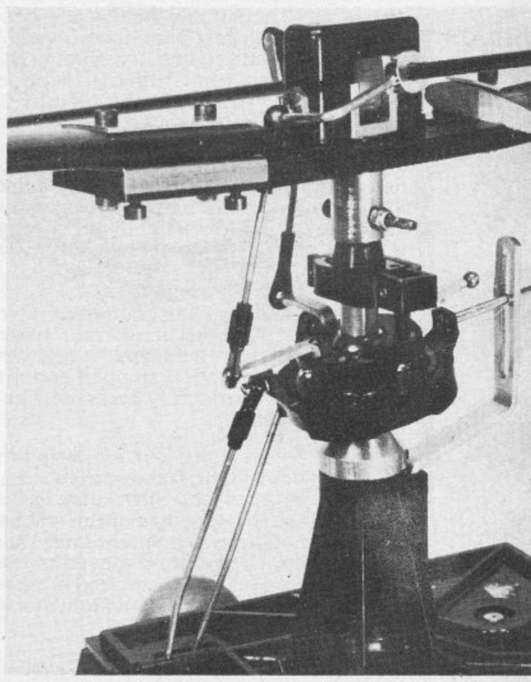
Assembly of the whole model is really so straightforward that any more time spent on the subject here would be a waste, apart from the following points which are not made clear in the instructions. The pre-assembled tail boom must be checked for accuracy and the triangular plastic cross pieces glued to the alloy longerons as these are factory assembled push-fit only – I ran a little 'Zap' into each joint. The correct setting of the rear rotor blade angle is neutral with the throttle *fully closed.*

The main rotor blades need careful balancing before fitting while the rotor head and stabiliser bar must also be carefully balanced when all parts are added and the head is in place on the model.

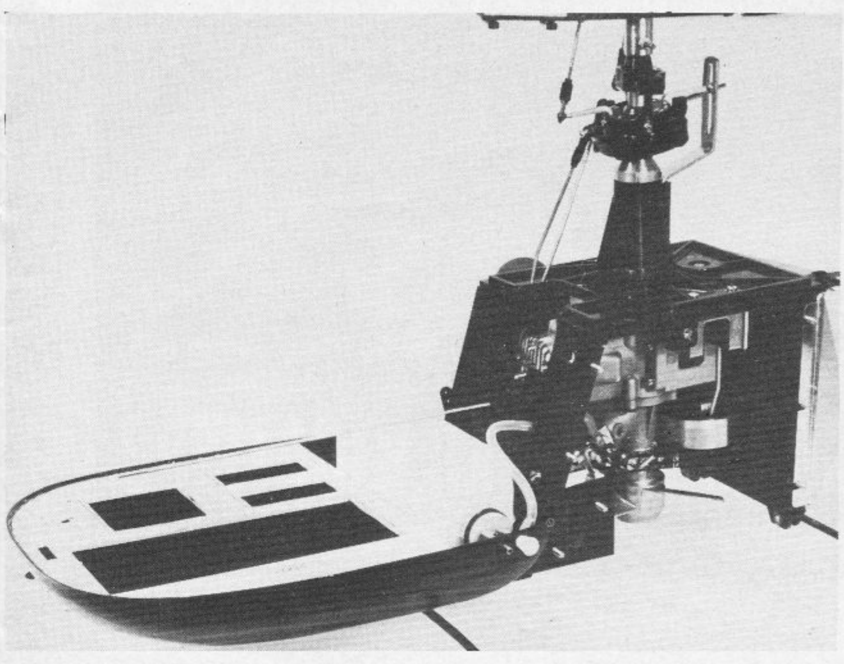
Joining the two halves of the canopy would be a messy job if carried out with the plastic glue provided because the double-channelled joining strip is a very tight fit. I found the most simple method was to assemble the two halves to the joining strip and when satisfied with the fit to run a little 'Zap' along the joins.

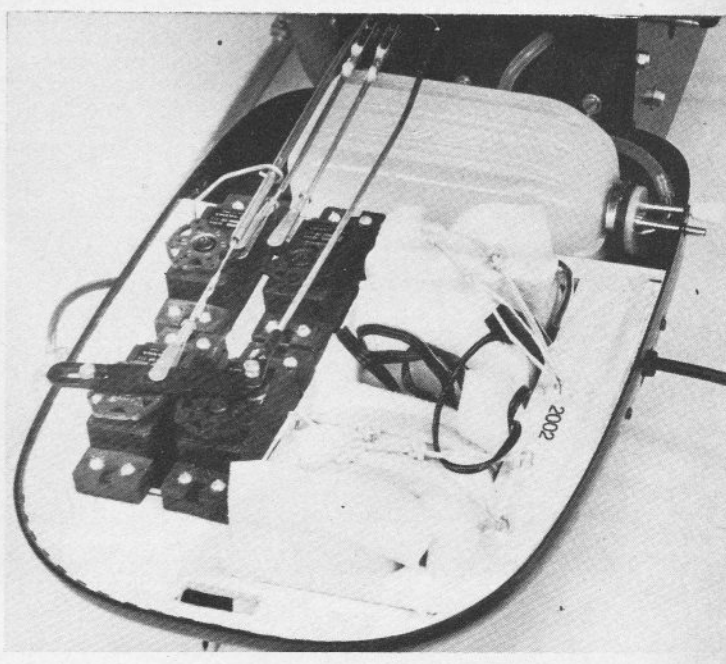
Finally, there is the modification to the tail rotor which I mentioned earlier. The plastic housing of the tail rotor assembly is tightly, and, apparently, firmly clamped into its seat. A lug prevents forward movement but

Above: tail rotor assembly, note rear rotor drive shaft passing through plastic bearings at top of boom. Above left: main rotor head and swashplate, note socket-head bolts for blade angle adjustment, positioned in front of blade fixing bolts. Below: 'other side' of main rotor head, showing fly-bar control from swashplate.



Below: general view of front left side of partly completed model. Below right: servos and radio gear fitted, note interconnecting arm of motor and tail rotor control servos and switch position (not recommended) above undercarriage leg at right of picture. Fuel tank is secured to cockpit base with double sided adhesive tape.





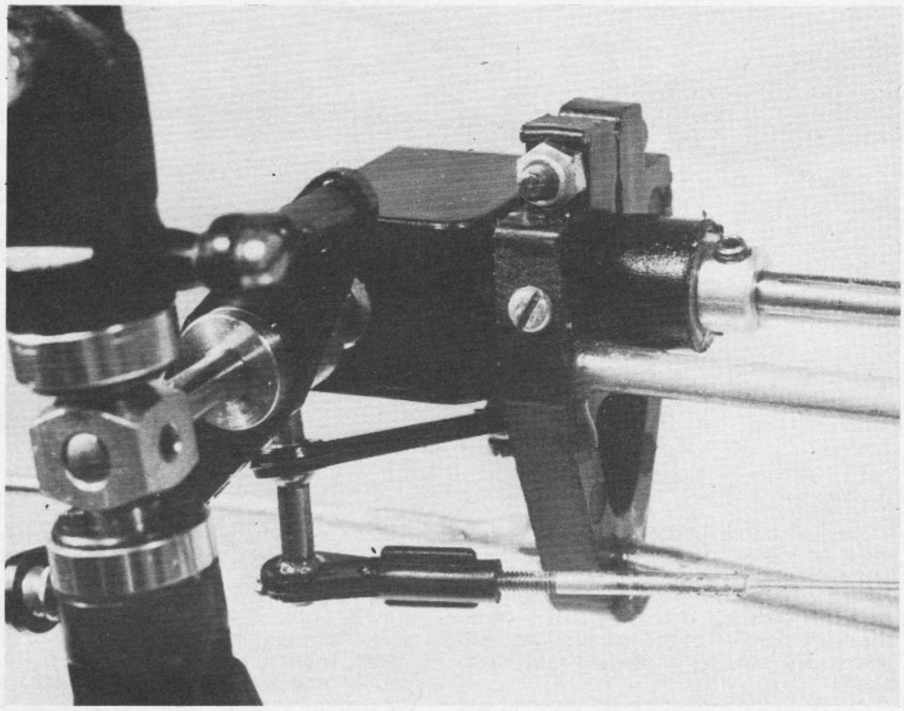
a necessary modification to avoid possible rearward movement of the rotor assembly in flight is to drill both sides of the clamp and insert self-tapping screws through into the plastic case of the assembly. The results of *not* carrying out this modification are detailed in the flight test.

Installation of the radio gear is quite straightforward with plenty of room for any modern four function control system. It is important, however, as mentioned earlier, to check that the servo positions marked on the tray suit the type of servo to be used and to ensure that the relative positions of the motor and rear rotor control servo arms are exactly as shown on the plan. The power pack should be positioned in front of the receiver, as far forward as possible to obtain the correct C of G position for the model. The switch position recommended, i.e. below the servo tray in front of the servos, did not suit the Sanwa control system switch and I thought I had found the ideal position for this below the left side of the tray with the slider protruding through the plastic cockpit base. Not so, however, as the exhaust goo is reflected upwards when the model is on the ground and a lot of it settled on my switch slide! The best position for the switch is obviously on top of the tray ahead of the servos with an operating rod through to the outside.

The day chosen for the flight test arrived with low cloud and drizzle, not exactly ideal conditions but our test pilot had arrived at the flying field and seemed impatient to get started and I couldn't think of a good enough excuse to postpone the event! The brand new Irvine .40 started surprisingly easily and after a few adjustments to the slow running the throttle was opened (using a rich mixture as the motor had only a few minutes running before installation) to just below take-off R.P.M. for pre-flight checks. The K & B glow plug incidentally seems to be the best for the job.

The main rotor blades were obviously incorrectly aligned and the model vibrated somewhat but after accurate rotor blade alignment had been achieved, a few minutes' work, the vibration stopped and the rotors turned very smoothly. I was quite impressed with the model's obvious stability coupled with a surprise control response. It looked good and I was mentally complimenting the builder when the Alouette began to rotate about its vertical axis and hit the ground with a terrific thud, bounding back into the air where the pilot regained at least sufficient control to put the thing back on the ground without damaging the rotors. Loss of control had been caused by the tail rotor hitting a stone just before lift-off, loosening the tail rotor assembly in its housing. Vibration then worked the assembly rearward out of the housing, thus re-setting the tail rotor blades to an angle beyond which the tail rotor servo could not compensate. Hence the previously suggested modification!

Despite heavy impact, damage was confined to the undercarriage assembly and fan shroud, but further flights were obviously not possible until the model had been given a thorough check over. Before leaving the testing site, however, we were able to watch an excellent demonstration of the Alouette's capabilities with two further examples which proved conclusively to us that the Alouette is a smooth and responsive machine as R/C helicopters go.



Above: the cause of our Alouette's heavy 'touch-and-go' has been put to rights in this picture, the tail rotor gear-box assembly is now held securely in position with self-tap screws which pass through the plastic clamp and into the plastic drive-shaft cover. The head of the near-side screw can be clearly seen below the pinch-bolt nut. This modification is now included, along with other modifications noted in this review, in the Alouette kit.

Summing up, the Alouette is quite easy to build which is just as well because the written English instructions are less than entirely satisfactory. Fortunately, however, the step-by-step pictorial sheet compensates. The model flies very well, is fast, and highly manoeuvrable, but is perhaps a model for those with previous R/C helicopter experience to enjoy.

And what of the new Irvine .40 R/C, likely to be on sale mid-February we understand? Ours worked remarkably well, right out of the box, with no tendency to overheat. Power seemed more than enough for the task in our model and in the other two examples witnessed, both Irvine powered also.

Below and below right: our Alouette lifts off for its maiden flight, fast camera shutter speed has 'stopped' the main rotor in the picture below. The 45° angle of the stablisers at rear of boom was unintentional, they were not securely fitted and moved to this angle as the model left the ground but had no apparent effect on excellent flight stability of the model.

British Distributor

Irvine Engines, Unit 8, Alston Works, Alston Road, High Barnet, Herts. Price £119.95 incl V.A.T.