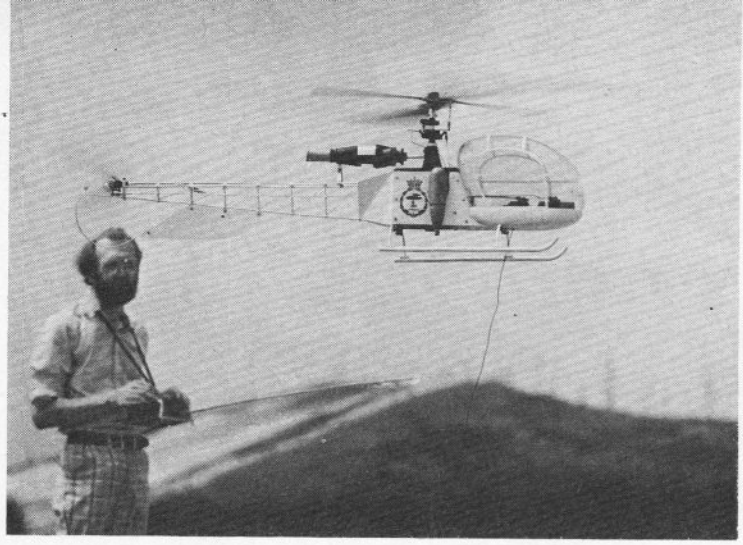
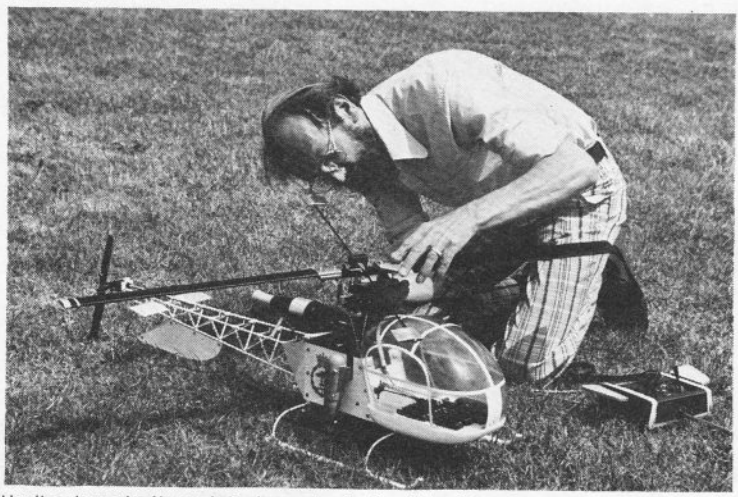


RM TEST REPORT

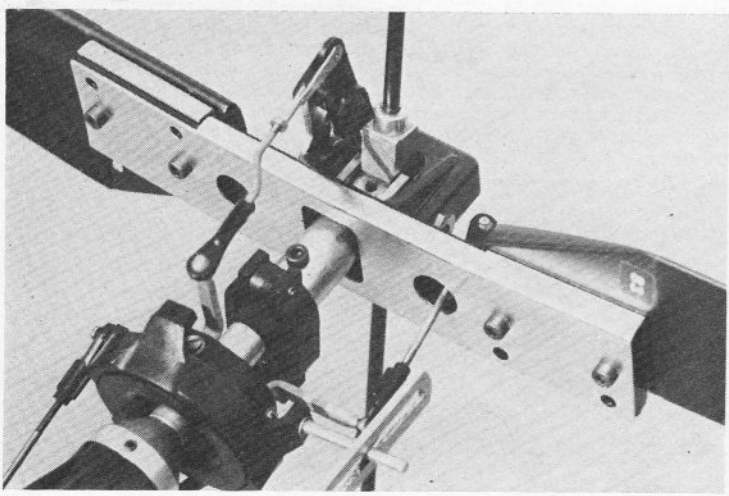
Part two of this report on the new KAVAN helicopter includes the designer's mods.

ALOUETTE 2

by TONY BRAY



Heading shows the *Alouette* being hovered on its first flight. *Below:* the main rotor head with the steel channel modification to stiffen the hub.



AS READERS will remember, the first flight trials of our *Alouette* were marred by a severe vibration of the tail boom. This was briefly reported in Part 1 of this report, published last September. The vibration was puzzling, as I had been most careful with the balancing and tracking of the main rotor blades, and had checked the balance of the plastic tail rotor blades. However, as we were all lined up for photographs to be taken, I had felt obliged to hover the model, and your Editor managed to get some shots. (The model looks O.K. in these, though I must confess I appear rather worried!)

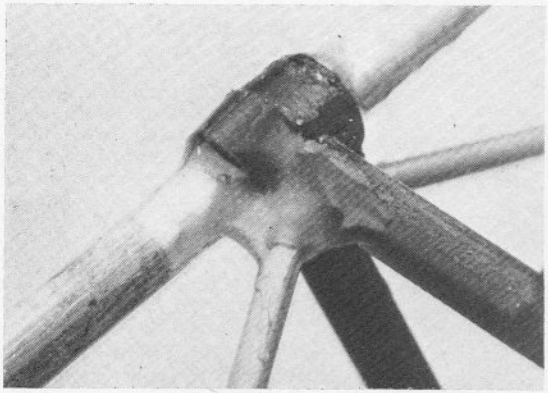
Source of vibration

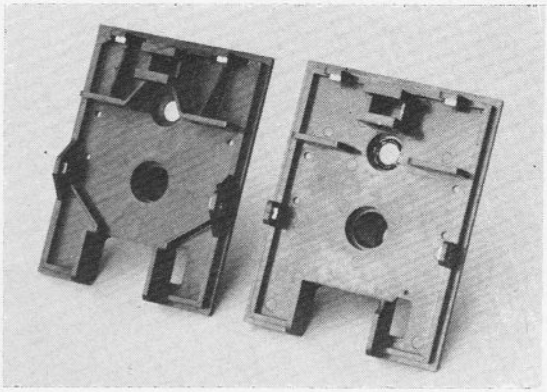
Careful inspection of the tail rotor soon revealed the cause of the vibration. The hub which carries the blade holders had not been drilled square for the rotor shaft. The blades, therefore, were at an angle to the shaft and did not track correctly. This, in itself, would have caused some roughness but not the severe vibration we had experienced. The second and more important effect was that, because the blades were connected to the pitch-change arm by equal length links and this arm was square to the shaft, one blade had considerably more pitch than the other. The resultant unbalanced thrust was causing the considerable vibration experienced.

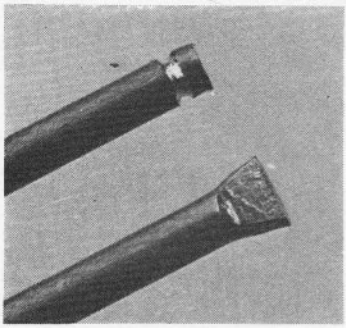
Back in Germany, Kavan had discovered that a small number of faulty hubs had been despatched, and had already sent replacements to his distributors. After changing this hub, the model was smooth and vibration-free.

Manufacturer's mods

After a very few flights, however, a number of design weaknesses became apparent. These were reported to the distributors who were advised by Kavan that modifications







Right: the type of modification that has been made—the new transmission base plate is heavily ribbed for extra rigidity. *Left:* one of the truss joints showing the Araldite fillets described.

were in hand and improved parts would be available. It was therefore decided to delay the Part-2 of this review until these parts were received.

The new modifications are now complete and have been incorporated in all kits distributed since November 1976, and all purchasers of early kits who have returned their registration cards should now have received a modification pack. The improvements include redesigned and strengthened main rotor hub, transmission baseplate and tail rotor gearbox; additional fixing plates for the landing gear and extra diagonal bracing for the tail boom. These improved parts overcome the weaknesses encountered in the original model. Naturally, these weaknesses must have caused disappointment to many purchasers of the early kits, but I do think that Kavan is to be congratulated on acknowledging the faults and speedily producing improved parts.

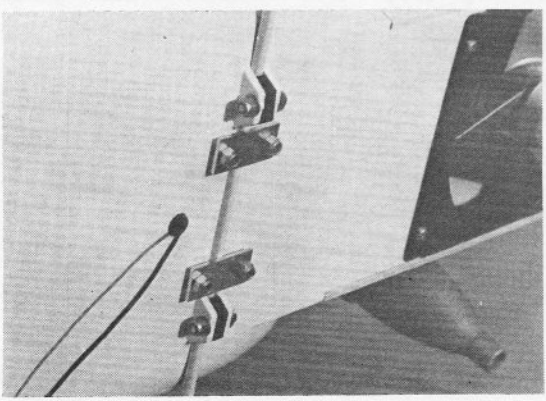
That tail boom

Because I had experienced difficulty in keeping the diagonal struts glued securely in the original tail boom, I decided—at the same time as fitting the new parts—to fit a new boom and try to improve the diagonals' fixing. Two simple methods were devised. A groove about .25mm deep may be filed or turned at each end of the 2mm rods—or the ends may be pinched in a vice to form a fish-tail. This will key the rods into the adhesive and improve the bond. The most successful adhesive for this purpose was found to be 24-hour Araldite.

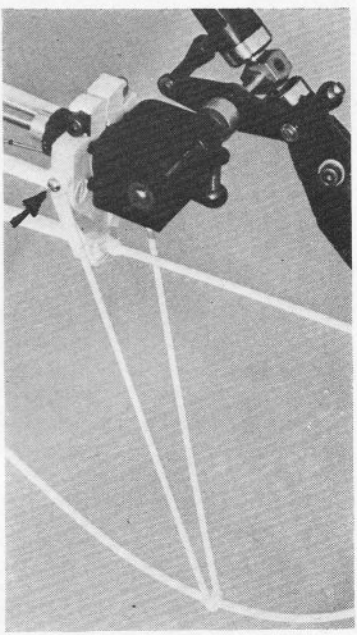
The diagonal braces to the side panels were assembled using a minimum amount of adhesive and the whole structure was warmed to about 45°C with a hot air gun (a film covering heat-shrink gun, or powerful hair dryer are suitable for this). The boom was then stood vertically and Araldite added to form bold fillets between the rods and the trusses, sufficient adhesive also being run between the trusses and the aluminium tubes to form small fillets. After the adhesive had set, the boom was reversed and the process repeated. The diagonal braces to the top panels were bonded in a similar way, with the boom propped up at 45° to allow good fillets to Araldite to form between the rods, trusses and tubes.

Setting up

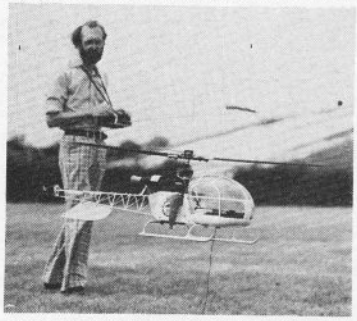
When setting up the *Alouette II* I liked it best with the c.g. just ahead of the main rotor shaft, so that the model had a slight nose-down atti-

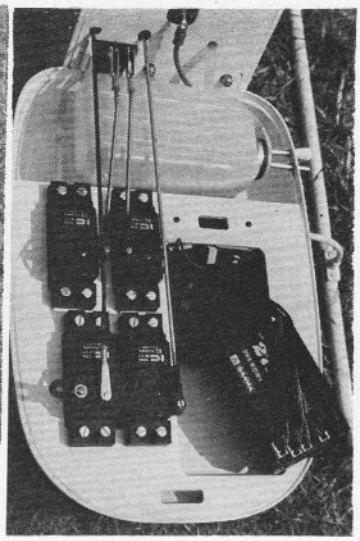


Above, left: alternative treatments to the ends of the diagonal bracing to improve adhesive bond. *Right:* additional bracing to tail-skid. The fixing screws (arrowed) should be long enough to enter the spigot on the gearbox. *Left:* underside, showing extra metal plates added as modification to ensure more secure landing gear fixing.

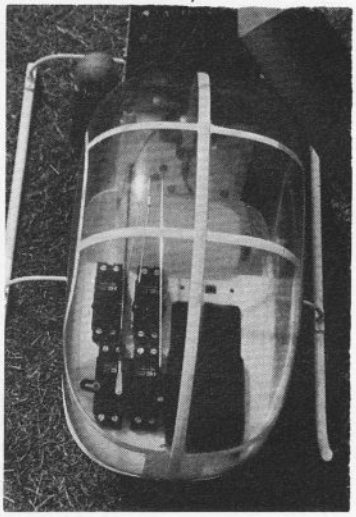


Above: Tony has a last check-up before lift-off—and, below, more hovering for the camera.





Neat installation is the keynote—though perhaps it could be covered with "furniture" later, if not a pilot. Note the metal pushrods, for the relatively short runs.



tude when suspended from the flybar. I started with the tail rotor at 0° pitch with the throttle closed, and the tail rotor servo neutral; and the main rotor at 4° pitch (*i.e.* the blades bolted down to the hub). I did not fit the jacking screws, and set the tracking of the blades by adjusting the length of the link from the swashplate to the mixing lever.

I started with the swashplate controls in the least sensitive position on the bell cranks—*i.e.* servos to the longest throw and the snap-link in the outside hole of the mixing lever. These settings, together with the stiffened rotor head, gave a nice degree of control, but to realise the full aerobatic potential of the model the throws will need to be increased, and maybe the larger and lighter paddles fitted.

Summary

The *Allouette II* has a most realistic, scale-like appearance, both on the ground and in the air. The open framework construction which achieves this effect, results in a structure which obviously is not as robust as more "functional" designs intended to withstand the inevitable mishaps of training. Therefore, although I would not recommended the model for the absolute beginner, it will prove a most rewarding machine for those who have passed beyond this stage. It is one of the few commercial designs with genuine aerobatic potential and hence the expert flier will be able to obtain an outstanding performance. As it is well below the permitted weight limit, I expect to see many *Allouette II's* flying very successfully in competition during the coming season.

Manufacturer: Franz Kavan.

Importer/Distributor: Irvine Engines, Unit 8, Alston Works, Alston Road, High Barnet, Herts.

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