

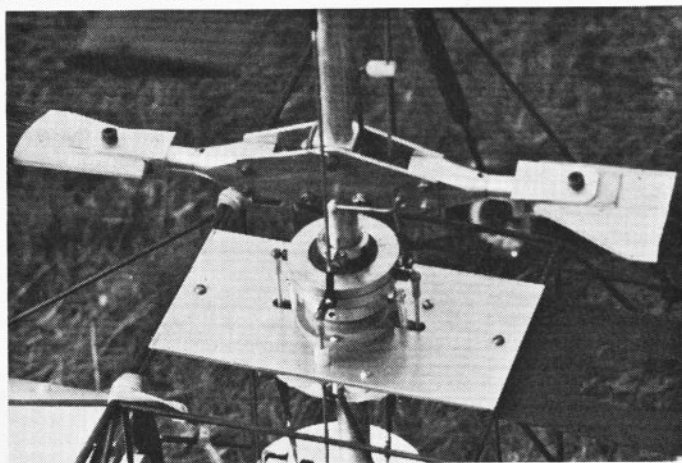
# A MAN.. ROY STURMAN & HIS MODEL



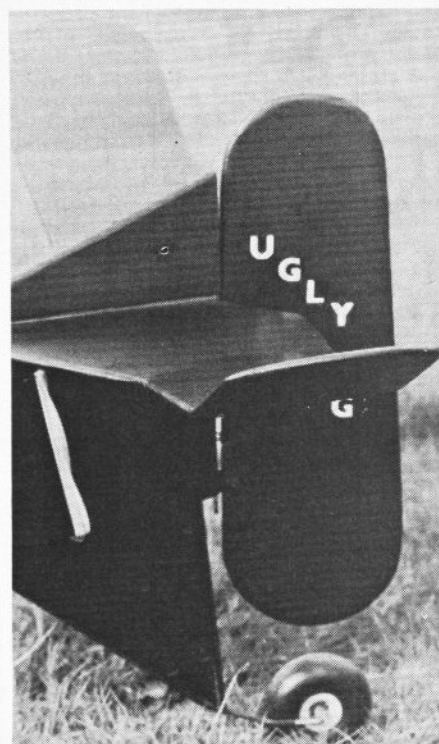
ROY STURMAN is one of the breed of aeromodellers who is never satisfied to follow the flock, but is definitely, even defiantly, an individual in his pursuits. For many years now his chief preoccupation has been with rotary wing aircraft and the first time I encountered Roy was as a result of a visit to our local flying field, complete with his own design helicopter. Bear in mind that these were the days when the R/C helicopters were in their infancy and the sight of one actually flying was a major point of discussion between enthusiasts. Roy, in his

design — it is sad that manufacturing problems have delayed the marketing of this design, as it has been eagerly awaited by many modellers. Development of the Autogyro had taken many years of gradual progress, commencing with experiments using only engine throttle control and working up to a full four-function control system for engine, rudder and rotor head.

Innovations, apart from the obvious ones of sorting out the stability problems, included an engine driven rotor spin-up (to



*Heading: Roy Sturman with his Wallis Autogyro model. Left: rotor head details of the Breguet helicopter described by Roy Sturman. Right and Below: tailplane and engine installation close-up of the Breguet.*



quiet, competent way, proceeded to demonstrate the helicopter, proving beyond doubt, that here was a modeller capable of original thought and the ability to put it into practice.

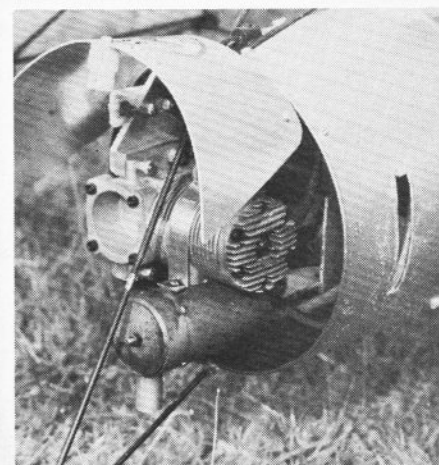
Some years later a telephone call from Roy informed me of a new interest that he had been researching and developing — single rotor autogyros. Would I be interested in taking a look at his latest creation? Naturally, because I knew that Roy would be unwilling to demonstrate any of his creations until they had been well tested and flight proven.

Waiting for my perusal was a genuine semi-scale Wallis Autogyro, based on the machine used in the James Bond film, that both looked right and flew right. Many of you will have seen this model displayed at model meetings and exhibitions, but not all will realise how great a break-through it represents.

Single rotor helicopters had been designed and flown previously, but none with the success and practicality of the Sturman

shorten the take-off run), automatic tether release (when the spin-up drive is disengaged) and limited rotation of fin and rudder (for improved access to the engine for starting). To combine all of these achievements into a scale type successful flying model, with good flight characteristics, indicates the degree of dedication that Roy has, and his refusal to accept second best.

Earlier this year, Roy asked me to witness, and photograph, the results of his latest 'brain-child', a twin rotor helicopter based on a pre-War French design featuring co-axial twin rotor blades. Again, as far as I know, this was the first time that a powered R/C version of this form of helicopter had been attempted and once again Roy was forced to start at a totally basic level. His following description makes light of the thought and work that goes into such a project before it reaches the state where it is demonstrated to the public. No wonder he titles his article 'Time Flies'.





Roy demonstrates the Breguet for the camera of David Boddington.



**Time Flies — The Development of a Co-Axial Rotor Helicopter**

October 1979, the evenings are dark and flying has come to a halt. The development of the Autogyro had been completed, thoughts turned to a project to tackle during the winter. It had been four years since I built and flew a helicopter; perhaps this should be the next thing to do. What did I want from a helicopter?

- (a) It must be a 'first'.
- (b) It must be very stable and easy to fly.
- (c) The rotor RPM should be as low as possible.
- (d) The engine RPM should not be too high, as this should help with the noise problems.

I decided to forget (a) until all the other problems had been sorted out. I knew how to make the rotor very stable, but there wasn't much I could do to improve the tail rotor, so why not do without it? This system could demand two counter-rotating rotors, which could also help (c) as two rotors at low RPM should provide plenty of lift and using a large engine should keep the engine RPM low.

A tandem rotor model "Chinook" style, had been done, that left two rotors side by side — i.e. FOCKE — 'Achselis' FW61V2 style, or a design with rotors intermeshing, i.e. FLETTNER F1 282V21 style or two rotors co-axial. The last appealed to me the most, and out came the Drawing Board! Firstly, I wanted a prototype that would be easy to work on and allow easy alteration to gear ratio. I considered the design in sections.

**Section 1:**

Two rotors, co-axial shafts, swash plates, two large bevel gears, with a small bevel gear in between them, and a large toothed pulley driving the small bevel gear.

**Section 3:**

Engine, cooling fan, clutch and first set of toothed belt reduction gears.

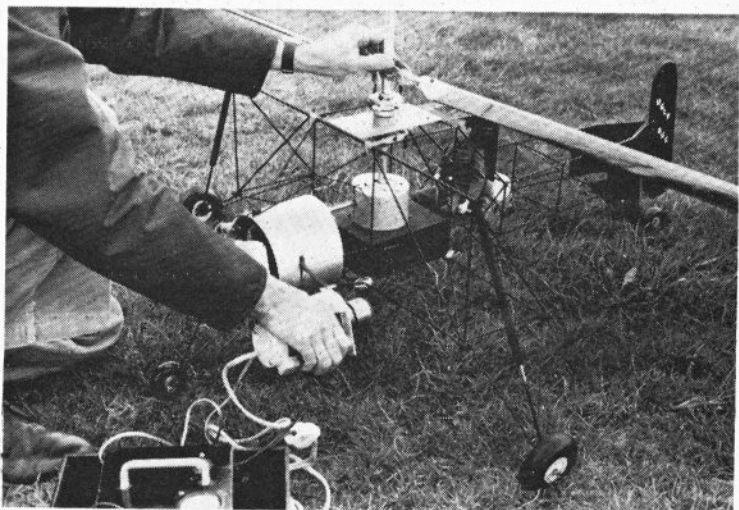
**Section 3:**

Radio gear, plus a helicopter type r/c. If the three parts were simply bolted together, it would be easy to carry out modifications to one section without altering the others. All looked right on paper, so into the workshop!

**20th March, 1980**

Where did the winter go, did we have Christmas, or was it cancelled that year? I tried 6 gear ratios, four different single rotor blades and four different rotor controls. By this time I was trying another on the flying field.

On slowly opening up the engine to about a quarter power, the helicopter gently lifted off the ground, with the engine and rotor RPM quite low, just what I wanted, but it would not



Both the ungainly appearance and size of the Breguet can be judged from this picture as Roy starts up for another successful flight.



An earlier, more conventional Roy Sturman model based on the Hughes 500 full-size, once again with Roy's own design and manufactured mechanics.

keep straight into the wind re-checked the rotors to make sure they were at equal incidence, but they were! A thought occurred, perhaps there was insufficient side area! Back to the workshop, where I cut a piece of 1/16 in ply one foot square and bolted it to the back end. Flight trials showed that she flew like a dream. My left thumb kept twitching to the left and right as I altered the engine control, but to no avail, there was no servo connected to that channel, as only three channels were being used, i.e. rotors forward and back, left and right, and engine.

I landed the model and returned to the workshop very happy. One hour later, the prototype was completely dismantled, and thoughts turned to which scale prototype to choose to house my proven mechanics.

Some of the USSR co-axial helicopters looked very nice, but if I had to make a fibreglass fuselage it would take all summer. The Wagner 'Sky Trac' 3 was different, but lacked a fin on the back. A check back into helicopter history revealed one that looks very different, the Breguet — from the Dorand Gyroplane Laboratoire in 1936. This was the first successful co-axial helicopter and held many records.

Back to the Drawing Board; about 1/7th scale proved large enough to hide the engine and gearing in the front section. The fuselage was to be of pianowire, butt-jointed and silver soldered.

The motor cowling needed a 6in cylinder, a 2 1/2-litre paint tin was just right, I tipped the paint away, reasoning that there would be

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little time for decorating anyway. The model specification finally ran as follows: Fuselage length 49in, width 6in, height to the top of rotor 26in, u/c width with working oleo legs 42in, 22 ball races, 26 ball links, and 14 quick links (ouch!) at least the last three items are re-useable.

Six weeks later (where had Easter gone? perhaps that was cancelled as well — I missed Sywell and vowed to get to Sandown) the helicopter was all complete and a funny looking thing too! Test flying was an anticlimax, just a couple of minor modifications and she was away. The model seemed tail heavy, however, perhaps the large tailplane, directly beneath the rotor tips, was being pushed down. Without the tailplane the results were just what I wanted; flying very stably with low noise level and low rotor and engine RPM. Landings were very smooth, with no bounce, I don't know whether the

two rotors or the sprung u/c are responsible, probably a little of each.

The time had arrived to show off my creation and I made the promised 'phone call to David Boddington. He promised not to laugh when I showed him the model, but when I unveiled it, I did see a smile come over his face! Out to the flying field for photos, seems funny not having to worry about a tail rotor.

Back home again, safe and sound, designed, built and flown in 6 weeks — not bad.

Summer is nearly here now, the evenings are getting lighter and I have put the Drawing Board away until next time; this is the time to get some flying in. "Just off to the flying field, Thelma. Sorry, dear, can't do any decorating, we haven't any paint!"

Where did the winter go . . .

