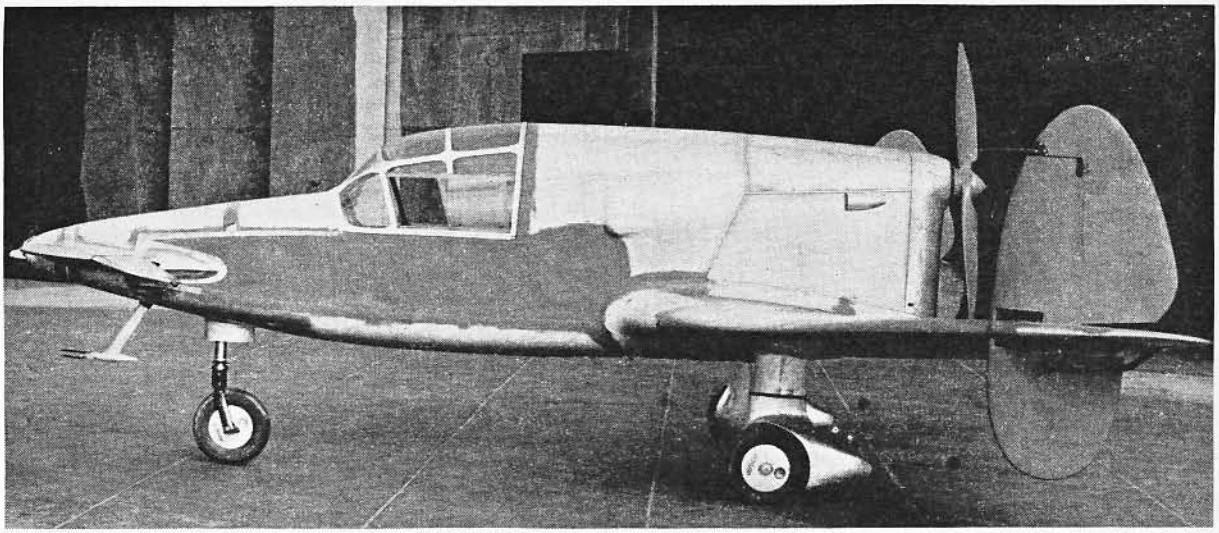


John W. R. Taylor's Plane of the month ★★★★

The de HAVILLAND T.K.5

AS an exercise in aircraft design and construction, the students of the de Havilland Technical School produced in 1934 a small two-seat biplane powered by a 120 h.p. Gipsy Major engine. The Dutch student responsible for the drawings referred to the aircraft as the "Tekniese Kollege No. 1," and this was shortened eventually to T.K.1 as its official designation.

Encouraged by the success of the T.K.1 (G-ACTK), the students became more ambitious and switched to a low-wing monoplane layout in the T.K.2 (G-ADNO) of 1935, which was still capable of setting up a 100 km. closed circuit class record 12 years later. Its successor, the bright red T.K.4 (G-AETK), spanned only 19 ft. 8 in. and was the smallest aircraft that could be built around a Gipsy Major engine. It embodied what were then all the latest ideas on high-speed design, such as a retractable undercarriage, slots, flaps and variable-pitch airscrew, and flew at more than 230 m.p.h. on 140 h.p.

For what was to prove the last of the series, the T.K.5, the students decided to have a shot at producing a practical single-seat canard. They had not progressed far when World War 2 started, but the Government encouraged de Havilland to continue training apprentices and the unorthodox T.K.5 was an ideal project on which to test their capabilities. So work on it continued and it was ready for flight testing by the summer of 1940.

It was hardly to be expected that all would go well from the start, and the first major snag was that the engine cooling proved completely inadequate on the ground. Worse followed, for when Geoffrey de Havilland tried to fly it, the T.K.5 refused to unstick. Even at 70 m.p.h. the nose-wheel remained on the ground and it was only a small consolation when the pilot remarked that a nice bump on the runway at speed might have induced an airborne state!

Undeterred, even after the Luftwaffe had bombed the Technical School, destroying almost all T.K.5 drawings and records, the students set to work on modifications to overcome the aircraft's reluctance to take off.

In its projected revised form, as the T.K.5 Mk. 2, it would have had a 50 per cent. larger fore-plane, to increase lift at the nose, and a ground angle of 2½ deg. to give the fore-plane increased incidence on the ground without the penalty of high incidence in flight. It was also planned to move the main undercarriage legs forward 9½ in. to bring them under the C.G. This, too, would have increased the effectiveness of the fore-plane, but would have produced an interesting problem in stability on the ground until the pilot climbed aboard.

Another problem introduced by the increased ground angle, when combined with the wing sweepback, was that it gave the bottom of the wing-tip stabilisers a ground clearance of only 2 in. at take-off. This was clearly insufficient, so the stabilisers were redesigned. Wind tunnel tests then indicated that the modification might affect directional stability; but before anything could be done to remedy this the war reached a stage which precluded further work on aircraft that had no operational value and the T.K.5 was scrapped.

For 20 years there have been arguments as to whether the modifications would have turned the T.K.5 into a safe, efficient aeroplane. We may soon have the answer, for a letter which the writer received recently from canard-modeller *par excellence* J. D. McHard contained the neck-sticking-out remark that "I'm looking forward to being able to prove that the T.K.5 *would* have flown if only they had persevered." We wish him luck!

T.K.5 SPECIFICATION

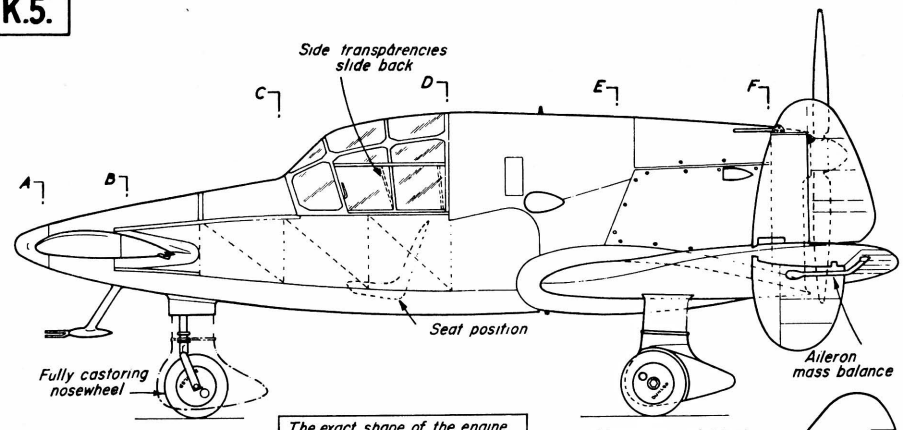
(Constructors Number 2266)

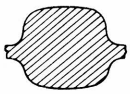
Length O/A	18 ft. 3 in.
Height	6 ft. 3 in.
Main wing	
Span	25 ft. 8½ in.
Aspect ratio	6.8
Area	97.4 sq. ft.
Section	NACA 23,012
Dihedral	4° 7′
Fore-plane	
Span	9 ft. 7.84 in. (Mk. II 13 ft. 4 in.)
Aspect ratio	4.7 (Mk. II 5)
Section	NACA 23,012
Area	19.82 sq. ft. (Mk. II 25.8 sq. ft.)
Dihedral	3° 12′
Wing loadings	
Total lifting surface	117.22 sq. ft.
All-up weight	1,366 lb.
Front wing loading	12.07 lb./sq. ft.
Rear wing loading	10.9 lb./sq. ft.
Overall loading	11.1 lb./sq ft.
Performance (estimated) with 140 h.p. Gipsy Major 1C high compression engine.	
Maximum speed	177.5 m.p.h
Cruising speed	157 m.p.h.
Landing speed	59 m.p.h.
Stalling speed	56.6 m.p.h.
Climbing speed at sea level	104 m.p.h.
Rate of climb at sea level	1,165 ft./min.
Service ceiling	22,100 ft.
Absolute ceiling	24,000 ft.

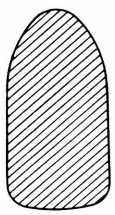
Nose wheel is fully castoring. Differential brakes for steering on the ground. Drag flaps were to be fitted to rudders to assist inner rudder during turning.

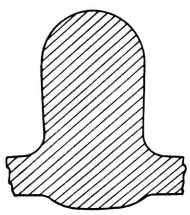
DE HAVILLAND T.K.5.

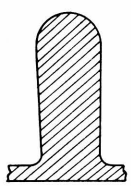
Drawn by. J.D. McHARD.











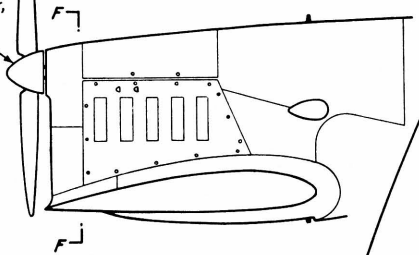
Dotted line shows outline of spat intended for, but not fitted to prototype

The exact shape of the engine cooling air outlets is not known They consisted of four rounded louvres located one beneath each cylinder, on the port cowling underside The four short exhaust pipes were also associated with these outlets

Mainwheels of Mk II were moved 9½" forward and the ground angle increased by 2·5°

Rudder mass balance

Spinner – intended for, but not fitted to prototype



Engine cooling air intake louvres

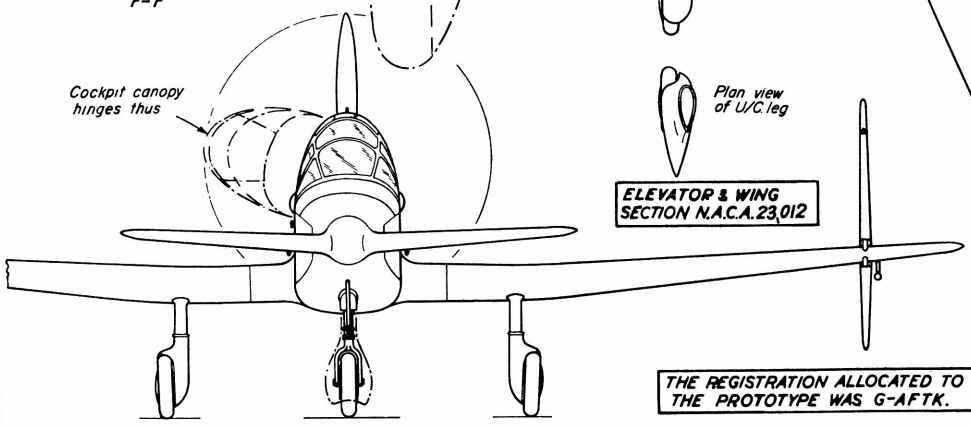
U/C leg position

Rear view of U/C. leg

Dotted outline shows Mk II elevator

Plan view of U/C. leg

Cockpit canopy hinges thus



ELEVATOR & WING SECTION N.A.C.A. 23012

THE REGISTRATION ALLOCATED TO THE PROTOTYPE WAS G-AFTK.

0 1 2 3 4

Feet