

ROYAL AIRCRAFT FACTORY FE4

MULTI-ROLE COMBAT AIRCRAFT

by Paul R. Hare

THE FE4 HAS THE DUBIOUS DISTINCTION of taking longer, from conception to completion, and of being listed as 'in progress' more often in official documents, than any contemporary design, before finally materialising early in 1916.

Its creators, the Royal Aircraft Factory, first began to think about a long range, twin engine, aeroplane as early as August 1912 when the following brief description appeared in a list of 'Aeroplanes under Consideration' prepared for the War Office by the Factory Superintendent, Mervyn O'Gorman: *2 engines-15hrs - 2 x 75 Chenu - Fly with load, either engine.*

Building such a machine, which was also described as: *Aeroplane fitted with two independent engines either capable of supporting the machine in the air* was included in the 1912/13 programme² and two of the six-cylinder water-cooled 75hp Chenu engines, together with a quantity of spares, were purchased by the Royal Aircraft Factory during the 1912/13 financial year in readiness for inclusion in the projected aeroplane. The designation FE4 (Fighting Experimental No.4) was assigned to the project almost from the start.

What design work, if any, was carried out at this stage is unclear as no drawings or details exist from that time and yet, on 14 November 1913, development of the FE4 was recorded as being *in progress* in a list of Experimental Aeroplanes prepared by O'Gorman for the Director General of Military Aeronautics³.

In January 1914 an official order, No. 485⁴, was issued to cover construction and Stanley J. Waters was placed in charge of the design, whilst in May 1914 the type's role was further defined⁵ as being: *A large aeroplane- with the object of carrying a substantial weight of wireless, bombs, signalling devices.* And, once again, it was described as being *in progress*.

Wind tunnel tests of 1:16th scale models were employed, early in 1914, to establish the best shape for the fuselage and other components⁶ and the earliest drawing, A7016, shows an outline sketch of the proposed machine from which the design steadily evolved, and grew larger.

It soon became apparent that the two 75hp Chenu engines originally planned for the project would never provide enough power, and initially it was decided to substitute the 200hp water-cooled V12 RAF3, which was then being developed by the Factory, and drawings including this power plant were prepared. Thus powered, a maximum speed of about 100mph was expected, with the climb to 6000 feet taking around 15 minutes. It was still expected that the machine would be able to maintain altitude on one engine.

However, it was then realised that the design of the RAF3 would require further development before manufacture, for which orders placed with both Armstrong-Whitworth & Co, and Napier & Sons could begin, and drawings of the FE4 were updated to include the RAF5 engine (a pusher version of the 140hp V12 RAF4a) which was then being developed. This engine, being air-cooled, in the pusher role a small propeller-like fan was fitted to a forward extension of the drive shaft in order to increase air flow over the engine, and most especially into the scoop positioned above the cylinder heads which, together with a series of baffles, distributed cooling air around the cylinders.

Henry Folland appears to have become involved in the project on 29 July 1915 when he prepared the load calculations for the mountings to support this engine, the first of over fifty pages of sketches and calculations he was to carry out for this project⁷.

By now the FE4 was seen as fulfilling three separate roles: Ground attack for which it was to be armed with some kind of cannon, most probably the 37mm COW gun which had previously been tested fitted to the FE3; as a short-range bomber with a load of 1200lb and an endurance of three hours; and as a long-range bomber. Its endurance in the latter role was the subject of some debate, with O'Gorman first offering seven hours, or fifteen with a much-reduced bomb load and Trenchard insisting on eight hours, stating that seven was too few and fifteen far too many.⁸

The un-covered fuselage, showing the method of attaching the engines.

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