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THE AIRCRAFT

The Spitfire, the British fighter aircraft, is one of the most sophisticated developments in the history of aviation. The iconic silhouette of the propeller plane with its characteristic elliptical wings is the epitome of perfectly functional design.

Spitfire pilots rhapsodise as they recount their experiences with the single-engine Royal Air Force (RAF) fighter aircraft. You don't just fly a Spitfire. It feels as if you are merging with the aircraft; as if you are wearing an exoskeleton. That's how instantly and sensitively the aircraft responds to the pilot's commands.

The unprecedented engineering voyage that led to the development of the Spitfire started with a call for bids from the British Air Ministry in 1931. The Ministry wanted to develop a state-of-the-art fighter aircraft with a flying speed of 400 kilometres per hour. Reginald J. Mitchell, Chief Engineer for British aircraft manufacturer Supermarine, took on this enormous challenge and built an aircraft referred to as "Type 224". He drew on his experiences in the construction of seaplanes, for which he was awarded the prestigious Schneider Trophy several times. With its open cockpit, gull wings and solid chassis, Mitchell's monoplane did not, however, meet the expectations of the British Air Ministry.

But the engineer would not be deterred by this setback and went on to develop an aircraft with a retractable chassis and a closed cockpit. He was determined to build a balanced and powerful plane. He wanted to use the enormous power of the Rolls-Royce Merlin engine but still make the aircraft easy to fly. The greatest challenge was making the aircraft, which had a 27 litre cubic capacity, 12 cylinders and around 1650 HP, manoeuvrable in the air. With the Merlin engine as its powerful beating heart, Mitchell and Canadian aerodynamics specialist Beverley Shenstone developed the "Type 300", which had the main features of the aircraft that would enter the history books as the Spitfire.

In 1936, the first prototypes were built. Even in the early test flights, pilots were impressed by the aeronautical capabilities of the "fire-breather". The aircraft was well ahead of its contemporaries in terms of power and flying characteristics. Yet Mitchell would never know the historical importance of his invention. After his death in 1937, his successor Joseph Smith continued with the aircraft's development at Vickers Supermarine. Up until production ended in 1948, over 20,300 prototypes were built in a range of continuously improved designs. As a result, more models of the Spitfire have been built to date than any other aircraft in the world.

The fact that the "Spit" is so popular among pilots is due to its extraordinary manoeuvrability. The secret to this is its elliptical wings, which increase the lift evenly from the outside in. This means that the flow of air can be used optimally in every position, including at high speed or in the event of abrupt changes of direction. With a combination of strong rigidity and minimal drag, this clever design also guarantees a very tight turning radius. The thin wing profile also makes the aircraft easy to manoeuvre at all times, including at high speed.

Many of the technical achievements that Mitchell and Shenstone integrated into their Spitfire design had already been developed. The Spitfire designers drew on existing concepts for the elliptical wings and the monocoque or shell construction of the fuselage. The real demonstration of Mitchell's engineering skills was his ability to integrate all of these approaches into a new type of aircraft with outstanding characteristics.

Shenstone later summarised Mitchell's engineering capabilities in a single sentence: "Mitchell was an extremely practical man". Shenstone had the following to say about the Spitfire's characteristic elliptical wings: "The ellipse was simply the shape which allowed us the thinnest possible wing with sufficient room inside to carry the necessary structure". The fact that this perfect and functional design would become an iconic silhouette was obvious to Shenstone, who also appreciated that the ellipse "looked nice".

SPECIFICATIONS FOR A SUPERMARINE SPITFIRE MARK IX

Length	9.46 m
Wingspan	11.22 m
Engine	Rolls-Royce Merlin 63 with 1650 HP
Maximum speed	656 km/h at 7600 metres altitude
Range	1500 km (with auxiliary tank in fuel-saving mode)
Crew	1 man
Maximum take-off weight	4309 kg

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