

Lightning

With the final stages of the Second World War came the first jet fighters; the British Gloster Meteor and the German Messerschmitt 262. Subsequent development was rapid; German research during the Second World War had established that a swept wing gave aerodynamic advantages at higher speeds.

The United States, the Soviet Union and the United Kingdom all produced operational swept-wing combat aircraft in the immediate post war years.

As Cold War tensions increased military planners became focused on nuclear warfare; at this time nuclear weapons could be delivered only by aircraft, and consequently the bomber was seen as a priority. Fighters were necessary only as a means of destroying bombers before they were able to reach their targets.

Experimental Requirement 103 was issued late in 1947. This called for an aircraft capable of Mach 1.5 . one and a half times the speed of sound - at thirty six thousand feet. It would also need to be able to explore the transonic speed range. And it should have the potential to be developed into a fighter. Orders were placed with both English Electric and Fairey Aviation for two flying prototypes from each company.

English Electric had already produced the successful jet-powered Canberra bomber. Their Chief Designer was W.E.W. Paddy Petter, a man who had already had four successful designs with Westland and English Electric.

Petter wanted the aircraft to be a small, cheap and lightweight fighter. He also wanted to personally oversee its production. This saw him at odds with high level management. With the design far from complete and tension high he left English Electric for Folland Aircraft. He was replaced by his assistant, Frederick Page.

Building upon Petter's ideas Page developed the design into a slab-sided fuselage with a large air intake in the nose. Buried behind the small cockpit were two Armstrong-Siddeley Sapphire engines whilst the wings had a revolutionary leading edge sweep of sixty degrees.

For the development of this project English Electric had invested significantly in research tools. One of these was the first transonic wind tunnel in Britain and this supplied them with all the information they needed to prove that the high sweep on the wings would work through the entire speed range.

The wings, particularly the large sweep on the leading edge, drew much concern from the Royal Aircraft Establishment regardless of the wind tunnel results. Ignoring English Electric's claims that the design would give acceptable low speed performance the Ministry commissioned Short Brothers to build an aircraft that could be used to investigate the low speed performance of highly swept wings. Although its contribution to aerodynamic research cannot be underestimated the Short SB.5 only proved what English Electric had been saying all along. There would be no problem with such a swept wing at low speeds.

The Air Ministry was very impressed with Page's design when they saw it in 1949. Consequently specification F23/49 was written, developing the aircraft into an interceptor aircraft for the RAF.

The first of the new aircraft, known as the P.1a, was completed in May 1954 and moved from English Electric's Strand Road Works, first to their own aerodrome at Warton and then to the main research establishment for secret aircraft at Boscombe Down.

The test pilot for the project was Wing Commander Roland Beamont. A veteran of the Battle of Britain, he had been working as English Electric's Chief Test Pilot since 1947, mainly with the Canberra. His association with the Lightning would last from the very first flight of the type until his death in 2001.

The aeroplane's first flight took place on 4th August 1954, during which Beamont reached a speed of Mach 0.85 at 15,000 feet. The only issue Beamont found with the aircraft was its fierce rate of roll, a persistent problem which interrupted these stages of the Lightning's development

On the third flight Beamont climbed to 30,000 feet and accelerated to an indicated speed of Mach 0.98. On later investigation it was discovered that the aircraft had actually exceeded Mach 1 and that if the throttles hadn't been reduced when they

were the dial would have jumped to Mach 1.2. Knowing this, Beamont took the aircraft up the following day and achieved Mach 1.8. Following aerodynamic redesign and an increase in power output the aircraft was exceeding Mach 1.2, and this before afterburners were fitted to the engines.

By July 1955 the second P.1a, WG763, started its flying career. It was this latter aircraft that would perform trials with Aden cannons and ventral tanks. Throughout the later 1950s these two supersonic aircraft, the first British aircraft capable of level supersonic flight, continued trials and development work. A redesign of the type had started in 1954 removing the faults with the P.1a to make it into an effective interceptor. It would also have a longer range, a higher top speed in level flight and be able to carry two missiles.

A redesigned fuselage allowed the installation of two afterburning Avon engines, doubling the power output. With the new engines came a circular air intake, with a central cone that both held a radar assembly and provided a suitable airflow for the engines over the entire speed range.

The completely redesigned aircraft was given the designation P.1b and before it had even flown the Air Ministry had ordered fifty. Twenty were to be used as development aircraft and the other thirty were to enter Squadron Service as the Lightning F.1.

In 1957 when the first P.1b achieved a height of 30,000 feet and a speed of Mach 1.2 on its maiden flight it was far in advance of any other aircraft in existence. Britain had a supersonic jet powered interceptor.

Having been developed into an operational fighter the Lightning became the only aircraft of its type to survive the cancellation of manned fighter projects following the 1957 Defence White Paper.

By having the P.1bs available for development work the entry of the Lightning into service was much quicker than it could have been. During trials the aircraft achieved Mach 2.0 with no difficulty.

With Soviet aircraft entering UK air space the Lightning was needed for interception, especially as it could reach 30,000ft within three minutes of the brakes being released.

The Lightning wasn't without its problems though. Endurance . the amount of time the aircraft could fly on a single mission . was short and high speeds could only be maintained for a short time. Following unsuccessful experiments with rocket units the problem was solved through in-flight refuelling. A refuelling probe and other modifications led to the F1a. This and its successor, the F2, were little changed from the basic design, the F2 being fitted with more advanced instruments and a variable reheat system.

The 44 F2s of 1961 supplemented the 24 F1as and the 19 F1bs bringing the RAF's Lightning force up to 87 interceptors. Further development led to the F3 variant, with Avon 301R engines and over-wing fuel tanks.

The F6 was the ultimate version of the Lightning, fitted with ventral and over-wing fuel tanks for longer range, a refuelling probe and a modified wing profile.

Two training versions where an instructor sat alongside the trainee were also produced, the latter version having provision for weapons. By the end of the 1960s nine RAF Squadrons were equipped with varying marks of Lightning for interception duties.

Although no Lightnings ever fired their weapons in anger they were regularly airborne on quick response interception duties. Even in the 1980s when the type was 25 years old they were still intercepting the Soviet Bears that regularly probed UK airspace; additionally in the 1980s 11 Squadron was to intercept French Mirages, USAF F-15s and F-5s and Royal Navy Sea Harriers as they strayed into restricted airspace.

The Lightning was finally withdrawn from service in 1988, 11 Squadron being the last unit to fly the type. A final airshow with nine Lightnings flying in a Diamond nine formation and going transonic at low level saw the type out of RAF service as the Cold War started to come to an end. Their interception role had been passed over to Phantoms and Tornados.

Today the Lightning is one of the most iconic British aircraft of the jet age. It was the only fully British-built aircraft capable of Mach.2; one pilot described flying the aircraft as like being saddled to a rocket

Both P1as were later preserved by the RAF Museum; the first at the RAF Museum, Cosford, whilst WG763 was put on display at the Museum of Science and Industry in Manchester. A P1b was also suspended in a vertical attitude in the National Cold War Exhibition at Cosford and an F6 joined the collections at the RAF Museum London site.