Britain's fastest aircraft? The Bristol 188

During the 1950s the jet engine offered all sorts of possibilities. Supersonic flight was becoming routine for military aircraft. For instance the Hawker Hunter was able to achieve such speeds in a shallow dive. The development of the English Electric Lightning doubled the speeds achieved regularly to beyond Mach.2 ï two times the speed of sound.

But supersonic speeds caused potential problems for aircraft designers and operators. The speed of sound had been broken in 1948 but nobody really understood the effect that travelling faster than sound had on the structure of aircraft.

In order to find out, a special high speed experimental aircraft would be required. Specification ER.134D called for an aircraft capable of maintaining Mach 2.75 for long periods of time. This was so the effect of kinetic heating could be understood. The speeds requested would make the aircraft the fastest in the world after the North American X-15 Space Plane.

As a large amount of heat was expected to build up on the aircraft, a new material had to be used: The aircraft would need to be built from steel, as opposed to the normal aluminium. Since there was also interest in high-speed propulsion, the aircraftôs engines had to be easy to remove and change.

The specification was finished and distributed in 1954. Several companies tendered including English Electric, who proposed a variation of the Lightning, codenamed the P.6.

The contract was awarded to the Bristol Aeroplane Company who were to build six of the aircraft with a third static test aircraft. It was designated Bristol type 188.

Originally the specification covered six aircraft with three being used for armament research. Though this idea, and three of the aircraft, were cancelled before Bristol was selected for the project.

Work started in 1954 under the direction of Archibald Russell, who was later knighted for his work on Concorde. The design was an incredibly long and thin cylinder with a pointed nose; the profile was only slightly broken by the cockpit, the diameter of the fuselage was dictated by the size of the ejector seat. Each wing was broken by an engine bay that was not much smaller than the fuselage in diameter whilst a large fin supported the tail plane on the back.

Suitable steel was difficult to find. Eventually Bristol settled on F.V.520 hardened stainless steel, which could withstand 500 degrees Celsius. As steel is not an easy material to work with the aircraft had to be built using new techniques, for example: the ópuddle weldingôof the panels where fusion was done by an arc that was surrounded by inert argon gas.

These difficulties clearly increased the length of the project development. Further delays were caused by the design changes in the engine.

Originally Rolls-Royce Avon R.A.24R engines were to be fitted. These engines were designed for the Avro 730 reconnaissance aircraft. However when that aircraft was cancelled in 1957, the engine was also cancelled.

Another aircraft cancelled at the time was the Saunders-Roe SR.177 rocket interceptor. Several de Havilland PS.50 ó Gyron Juniorô engines and afterburners had already been built for this aircraft.

These engines were re-assigned to the Bristol 188, solving that problem. But since this was an entirely new airframe with newly designed engines there were inevitably teething troubles.

The first complete aircraft was delivered to the Royal Aircraft Establishment in May 1960 for static tests. A year later, in April 1961, the first aircraft, XF923 was rolled out for engine tests.

These test showed problems with the intake and the afterburner. After a year of work to solve these the Bristol 188 first flew in April 1962, eight years after it was ordered. This was simply a transfer flight from Bristolôs Filton works to the Royal Aircraft Establishmentôs Boscombe Down.

The project had suffered severe delays. Finding the right material, developing Puddle Welding for the panels, redesigning the central wings because of problems found during aerodynamic tests on models and the saga with the engines had all conspired against the project. By the time it flew the Mach 2 Lightning was already entering Squadron service with the RAF.

A year later in 1962 the second aircraft XF926 flew. Although easily passing the sound barrier neither aircraft ever achieved their design speed, the highest speed achieved was Mach 1.88 at 36,000ft.

As mentioned fitting new engines to a new aircraft isn't a good idea. Fuel consumption was much higher than expected allowing only two minutes at high speed. The Gyron Juniors also developed surging problems at supersonic speeds. When this occurred the aircraft became almost impossible to control.

To solve these problems required new engines and a complete redesign of the aircraft's engine bays and intakes. Naturally this work would be expensive and by the early sixties the need for high speed research had become less of a priority.

XF923 was stored in November 1963 and supplied many parts to keep XF926 flying until January 1964. Both were struck off charge and taken to Shoeburyness to serve as gunnery targets. XF926 was saved this fate though and now resides in Test Flight at the RAF Museum, Cosford.

The Bristol 188 was a failure. It was an aircraft that never achieved its target and was dogged by problems throughout its design, construction and testing. Partially this was caused by external pressures such as the request to use the de Havilland Gyron Junior engines intended for another aircraft which were the 188's main source of problems.

It's interesting to speculate what the 188 could have done had it been a success. At the time it would have been the fastest aircraft in the world that could take off and land (the North American X-15 was launched from a bomber) giving Britain a valuable research tool for high speed testing.

Such a tool would likely have joined the ranks of small development aircraft operated by the Royal Aircraft Establishment for the development of Concorde. Unfortunately this was never to be.

The final point of note is that the 188 was Bristol's last aircraft. The British aircraft industry was undergoing great changes throughout the late fifties and early sixties, with the amalgamation of small companies and the cancellation of military projects as the perceived threat seemed to indicate that missile defence would better serve the Nation. Anything built afterwards would be known as a British Aircraft Corporation aircraft.

