

## SUPERSONIC AIRCRAFT

I.U.Sychova– group IN-02

E.I.Zolotova – EL Adviser

In aviation, a supersonic aircraft is one that is designed to exceed the speed of sound in at least some of its normal flight configurations.

The great majority of supersonic aircraft today are military or experimental aircraft. Most of them, including many military fighter aircraft, are designed to exceed the speed of sound only in certain exceptional flight regimes; a handful of aircraft, such as the SR-71 Blackbird military reconnaissance aircraft and the Concorde supersonic civilian transport, are designed to cruise continuously at speeds above the speed of sound.

Supersonic flight brings with it substantial technical challenges, as the aerodynamics of supersonic flight are dramatically different from those of subsonic flight (i.e., flight at speeds slower than that of sound). These challenges have largely been met. However, political, environmental, and economic obstacles of greater magnitude continue to severely limit the actual deployment of supersonic aircraft, particularly in the civilian world. Additionally, the need and demand for supersonic flight have often been insufficient to justify development or deployment of supersonic aircraft, particularly in the domain of civilian transport.

The aforementioned SR-71 and Concorde aircraft are no longer flying today although Concorde was highly profitable in service, but because of the low market among operators (due to sonic booms, relatively high fuel consumption and poor range) in turn making it unprofitable for manufacturers to produce these kinds of aircraft.

Supersonic aircraft usually use low bypass turbofans as they give good efficiency below the speed of sound as well as above, or if extended supercruise is needed turbojet engines are desirable as they give less nacelle drag at supersonic speeds.

A supersonic transport (SST) is a civil aircraft designed to transport passengers at speeds greater than the speed of sound. The only SST to see regular international service was Concorde, and the only other design built in quantity was the Tupolev Tu-144. The last passenger flight of the Tu-144 was in June 1978, and Concorde's last flight was on November 26, 2003. Following the permanent cessation of flying by all Concorde, there are no SSTs in commercial service.

A supersonic business jet (SSBJ) would be a small business jet, intended to travel at speeds above Mach 1.0.

Typically intended to transport about ten passengers, SSBJs are about the same size as traditional subsonic business jets. Larger commercial supersonic transports such as the Aérospatiale / British Aerospace Concorde and Tupolev Tu-144 'Charger' had relatively high costs, and high noise, low range and some environmental concerns (although these problems were less evident in Concorde than the Tu-144). Many fighter aircraft and some bombers today are capable of supersonic speeds.