

Development of A New Supersonic Aircraft

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Introduction

During part of the the 1950s and 1960s The US government had sponsored a Supersonic Commercial Aircraft Development Program. During the same time France and England were also sponsoring a Supersonic Commercial Aircraft Development Program. The US Congress canceled our program in 1965 because the French and English program was considerably ahead of the US program. The US was in early development and the French and English were almost ready to start flying the Concorde.

The US program was organized with a mach 3.4 speed target and a larger aircraft than the French English program. The US engine program was being conducted at both General Electric Aircraft Engine and Pratt and Whitney Aircraft Engine. The aircraft development was being conducted at both Boeing Aircraft and Lockheed Aircraft. Had the US program continued to completion it would have produced a much more efficient aircraft than the Concorde produced by Britain and France.

Advantages of Supersonic Aircraft Passenger Transport Over Subsonic

The major advantage of a modern supersonic commercial aircraft over the commercial subsonic aircraft is more passengers carried on overseas flights per day per aircraft. For example: A supersonic mach 3.4 aircraft is cruising at 2580 mph versus the subsonic aircraft cruising at 550 mph. A flight from New York to London is 3,250 miles long. The take off and climb is at 250 mph for 125 climb miles at 25 minutes plus 20 taxi minutes at New York with average 500 mph over 500 miles letdown to landing at London of 1 hour with 20 minutes taxi totals 2hours and 5 minutes subsonic. With 2,625 miles for supersonic flight at 2,580 mph the time is 1hr and 2 minutes. This makes the total flight, gate to gate at 3 hrs and 7 minutes.

With subsonic cruise speed at 550 mph and the same taxi, takeoff and climb and same glide in and land the subsonic flight time is 6 hours and 7 minutes.

If we assume 1 hour between flights at each end with the supersonic plane we get 5 flights per day and with the subsonic plane we get 3 flights per day. With 250 passengers for each plane that means 1250 people per day for the supersonic plane and 750 people per day with the subsonic. Longer distant flights across the ocean will increase the ratio of supersonic to subsonic flights and the passengers per day.

A flight from San Francisco to Shanghai is 6140 miles long. The take off and climb and taxi time at both ends is the same, 45 minutes. The supersonic flight is 6140 minus 250 climb miles and equals 5890 miles. At the supersonic speed of 2580 MPH that is 2hr. and 30 min. flight time. The total flight is 2 hr 30 min supersonic plus 2 hr. 30 min. taxi,

takeoff and climb times making the total flight time 5 hours. This would be slightly less than 1250 passengers per day

The subsonic flight time with 5890 miles at 550 mph equals 10 hr. and 45 min. with 2hr and 30 min. taxi and climb that makes the total 13 hr and 15 min. subsonic flight time. With one hour between flights that makes less than 2 flights per day. This would be slightly less than 500 passengers per day.

The commercial supersonic aircraft with the modern engineering technology and the experience with the military supersonic aircraft will be much more efficient for long distance flights than subsonic aircraft in terms of fuel usage per passenger mile and carbon dioxide produced per passenger mile. The total operating cost for the airlines should be less per passenger mile with the supersonic aircraft.

The Performance of the Concorde

The Concorde flew from January 1969 to November 2003. It had a unit cost of 23 million pounds. It had a maximum speed of mach 2.2. There were 20 built and 14 in service with the airlines on across the sea flights. The Concorde was a crowded cabin airplane and expensive to operate so passengers had to pay a high price for its flights. It was not nearly as efficient as new supersonic jets can be and it was not nearly as comfortable as new supersonic commercial jets can be

Mach 3 + Aircraft Experience in the Military

The SR-71 Black Bird has been a valuable experience in the supersonic aircraft technology. It made many examples of commercial flights for example New York to London in 1 hr. & 35 min. and London to Los Angeles in 3 hr. & 47 min. It is capable of flying at over 85,000 feet altitude.

The materials technology developed for the SR-71 is advanced beyond what was available for the development of the Concord. Other new military supersonic aircraft have been developed by both the US and Russia since the SR-71. New supersonic engines with supersonic fan capability have also been developed which will increase the efficiency of new supersonic transports well beyond the Concord. Advancement in materials technology going on today will provide exclusive capability to design the new plane to accommodate the structural heat and load produced by the higher than mach 3 speed. The new materials will also provide more efficient engines for the higher speed.

The Development Program Participants

General Electric and Pratt and Whitney jet engine producers are very capable of developing the efficient fan-jet engines required for a dependable supersonic transport. Boeing and Lockheed are also capable of developing the safe and efficient supersonic aircraft that can provide the fast and economical service for the airlines.

The Economic Plan for the Supersonic Commercial Transport Aircraft

The general average of the development of technical products is seven years. In terms of Experience we found it took an average of seven years to develop a new jet engine. It

took about seven years to develop the first atomic bomb. It took about seven years to develop the first atomic submarine. It should take about seven years to develop the new mach 3.4 supersonic transport aircraft.

Based on previous experience it should take about 12.4 billion dollars to develop the commercial mach 3.4 supersonic transport aircraft. The commercial sales and service for the transport would be expected to be about 1.2 trillion dollars over the 20 years of airline service.

The government should support the initial program and the engine and aircraft companies should take over their expense as the program moves ahead to a well defined commercial investment.

If this program were started now it would employ a few hundred people soon and gradually evolve to about five thousand in four years including people producing the materials, components and assembly and people in engineering and testing.

If the US does not get this program started soon another country or group of other countries will and take over the leadership in jet engine transports.