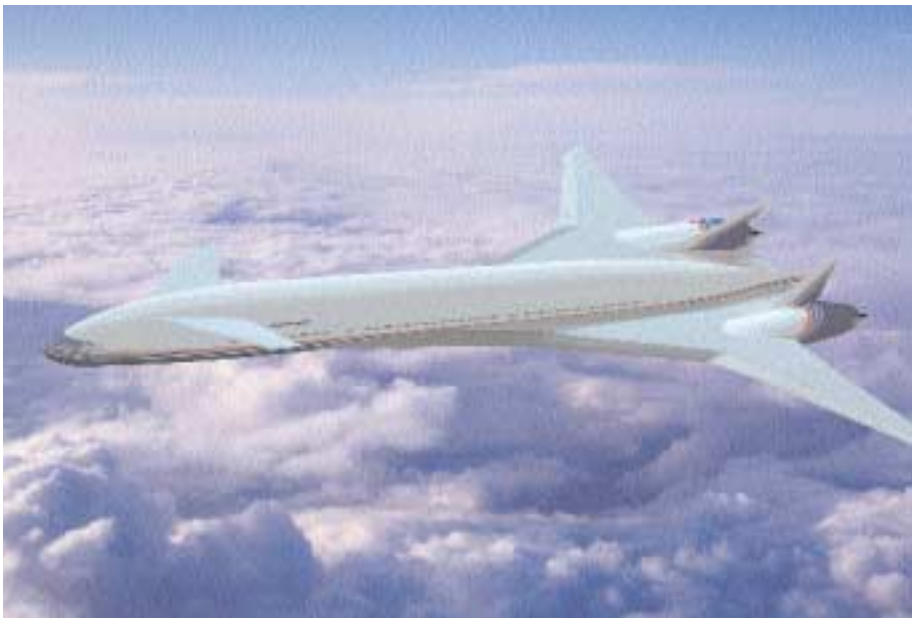
Boeing plays its trump card

The Sonic Cruiser has the potential to cause some of the largest changes to the industry since the introduction of jets. Its major advantages are increased ASM productivity and ability to segment traffic into premium and non-premium groups.



The Sonic Cruiser's key advantages are faster speed and higher ASM productivity, which dilutes time-dependent costs. One undecided aspect is list price. Depending on the level chosen, the Sonic Cruiser will have total costs per ASM either similar or lower than a conventional aircraft of the same size.

Has Boeing trumped Airbus with the Sonic Cruiser? Boeing certainly managed to cause consternation after insisting it saw no need to develop an aircraft larger than the 747. Disbelief was almost the reaction when Airbus launched the A380 while Boeing remained virtually silent.

All through the A380's development and launch order stages, Boeing stuck to its argument that the long-haul market will fragment in parallel with continued traffic growth. The 747-X was therefore sufficient to meet a limited demand for large aircraft, while 777-200-sized aircraft will be the highest in demand. Airbus argues growth will stimulate demand for the A380, since trunk routes will continue to dominate. Orders placed for the A380 seemed to provide a growing list of reasons that would prove Boeing had got it wrong. Has Boeing made a career error and allowed Airbus to walk away with the future market for long-range aircraft?

Past experience has seen Boeing produce a number of paper aircraft every time Airbus has been preparing to launch a new project, every one of which has been a success. Following an Airbus launch Boeing's paper projects quietly went away. This includes the 7-7 and 7J7, both proposed as alternatives to the A320. A super-stretched 767 was perhaps intended to divert attention from the A330/340. The 747-500X and -600X and double-decker 747-style aircraft have all been proposed, and then subsequently dropped. Many in the industry perhaps thought the 747-X was another phantom. Had Boeing again miscalculated, letting Airbus get away with another winner?

But Boeing has since revealed details of an aircraft that could result in the same transformation provided by the 707 and DC-8 when they made turboprops obsolete almost overnight. The introduction of the jet engine made more than twice the number of seats and nearly twice the speed possible, transforming air transportation economics.

Boeing's Sonic Cruiser project has multiple economic advantages over conventional aircraft that could seriously damage the A380's, and many other conventional aircraft's, market potential. Has Boeing then waited for the right time to play its trump card; the Sonic Cruiser?

The Sonic Cruiser's key advantage is speed, and consequently seat-mile productivity. The Sonic Cruiser will have a cruise speed of Mach 0.95-0.98; about Mach 0.10 faster than conventional jets and also just under the supersonic barrier. Breaking Mach 1.0 would prevent widespread use. Perhaps from Boeing's point of view, the Sonic Cruiser's biggest attraction is that it requires little in ground-breaking engine or aerodynamic technology. Entry into service is tentatively planned for 2007.

In addition to faster speed, the Sonic Cruiser's wing design provides it with larger fuel volume than a conventional aircraft of a similar size. A 9,000nm range will be almost standard.

"While we are not sure about the size of the first aircraft, it will be somewhere between 100 and 300 seats. Although it will burn 20-25% more fuel than conventional aircraft of the same size, the Sonic Cruiser will have the same trip cash operating and available seat-mile (ASM) costs," explains Mike Bair, vice president business strategy and marketing Boeing Commercial Aircraft. While two similar-sized aircraft will obviously generate the same number of ASMs on the same route, the Sonic Cruiser will be able to generate these ASMs in a shorter period. The consequences of this are that it will operate more sectors and so generate more ASMs per year. This will then dilute many time-dependent costs, the most important being finance and depreciation charges. "We do not know how total trip and ASM costs will compare, because we have not yet set a price," says Bair.

The costs of higher fuel burn will be offset in many respects by faster speed, which will have far-ranging implications. Either directly or indirectly, higher speed and ASM productivity per flight hour dilute and reduce unit ASM costs for flight crew, flight attendant, maintenance, navigation, airport, finance and depreciation charges.

The first benefit of faster speed comes from the effect it will have on route scheduling, with knock-on benefits of increased annual ASM productivity. Bair gives the example of one return flight per day between Los Angeles and Tokyo with a 747-400. This round trip, including turnaround time, takes about 26 hours. This prevents one aircraft from being able to provide the daily service. Instead several aircraft have to be used to maintain the same daily departure times. The Sonic Cruiser will be able to complete the same trip in about 21 hours. Thus one aircraft will be able to complete the schedule.

Other examples of increased aircraft productivity are the ability to raise frequencies. Many routes between Europe and the Asia Pacific have problems raising daily frequencies above two flights because of the constraints imposed by flight times, time zone differences and airport curfews. The Sonic Cruiser will be able to reduce block times by one hour per 3,000nm. London-Hong Kong, for example, would thus take about two and a half hours less, making it easier to schedule more frequencies. The aircraft

The Sonic Cruiser's biggest impact will be on premium traffic. It is possible it will allow true segmentation of traffic, with first and business class passengers using the aircraft, while economy passengers could be delegated to slower conventional types.

would also be able to complete more sectors in a 24-hour period.

Bair expects maintenance costs to be little changed from aircraft of a similar size. If maintenance costs per flight hour are similar, then maintenance costs per ASM will be diluted. This is one cost reduction that will offset higher fuel burn.

"One major cost category which gains is flight crew. Currently flights longer than eight hours use supernumerary crew members. This requires an additional captain or first officer, as well as there having to be space used to install crew rest bunks. With faster speed more flights normally completed in eight hours or more will be finished in six with the Sonic Cruiser. They will therefore no longer need supernumerary crew," explains Bair. As well as smaller crew complements, the same crew cost will be amortised over more ASMs per year, so providing another offset against higher fuel burn.

The longer range capability makes it possible to fly every conceivable city-pair non-stop. "The ability to fly London-Sydney means transition cities, such as Singapore, will be by-passed. This could be a catalyst to fragmentation of the long-haul market we are anticipating. The effect would be to draw traffic away from trunk routes currently flown by the largest aircraft types," continues Bair. Boeing's market forecast predicts that routes like Amsterdam-Taipei will become economically viable with a daily flight using a 777-200 after continued traffic growth. Once an airline can achieve profitable load factors with an aircraft of this size the route will be opened, which may not occur for another 10 years. Opening this route will draw traffic from trunk sectors, in this case Amsterdam-Hong Kong and London-Taipei, which will diminish the need to add capacity on them with aircraft larger than a 747. A Sonic Cruiser similarly sized to the 767-400 will make routes like Amsterdam-Taipei viable earlier, since it will be easier to achieve profitable load factors with a type smaller than a 777-200. The Sonic Cruiser could thus make many long-haul routes with low traffic volumes viable earlier than would be possible with conventional aircraft.

In addition to direct cost benefits, the Sonic Cruiser will also have low noise emissions, further boosting ability to increase ASM generation. "There is a high probability the Sonic Cruiser will not be subject to curfews at airports like London Heathrow, which will allow flexibility in scheduling," says Bair.

"Perhaps one of the most interesting economic implications is on revenues and passenger demand. The ability to cut long-haul flight times by 1-3 hours means it will be possible to segment traffic in the same way hotel chains are priced to particular income brackets," explains Bair. "Since the number of aircraft delivered initially will be small, airlines will use them on their highest yield routes first. The Sonic Cruiser's advantage is that it does not need premium revenue to make it work, since it has similar trip and ASM costs to a conventional aircraft. It will, however, be able to command a premium because of the speed advantage. Because of this it is difficult to anticipate what portion of the cabin airlines will configure as economy class, which is why we do not know yet what size the first aircraft will be".

The final element of cost consideration is finance and depreciation charges. This is the largest cost category for conventional aircraft, and is sensitive to flight time and annual ASM productivity. High purchase price and consequent finance charges can eliminate the benefits of lower fuel burn, maintenance and flight crew charges of modern types. The Sonic Cruiser's resulting total cost per ASM therefore depends on the price at which Boeing is prepared to sell the aircraft. Since cash operating ASM costs are expected to be similar to a conventional aircraft, the Sonic Cruiser will need to have lower finance and depreciation charges to have an overall lower unit ASM cost. Its higher speed will allow this if the aircraft is sold at a price similar to a conventional aircraft. If the Sonic Cruiser is sold at a premium, unit ASM costs will be close to conventional aircraft. This will leave the ability to charge premium fares as the Sonic Cruiser's only advantage.

CFM56-5A correction

The February/March 2001 issue of *Aircraft Commerce* had some misleading comments quoted by Lufthansa Technik concerning the airworthiness directive (AD) affecting the CFM56-5A's forward rotating airseal. These comments were made in the third column on page 28 of the article.

The corrected comments are as follows:

The AD reduces the life of the forward air seal from 15,000 engine flight cycles (EFC) to 11,000EFC for the -5A1, if the engine had not already accumulated 4,000EFC. For the -5A3 it reduced the life of the part from 13,000EFC to 7,700EFC if the engine had not already reached 3,000EFC. For the -5A5 life had to stay at its initial certification life of 9,100EFC without further life escalation.

If the -5A1 and -5A3 had already reached more than 4,000EFC/3,000EFC when the AD was issued then another 7,000EFC/4,700EFC could be accumulated up to the original limits of 15,300EFC/13,000EFC.

Some engines were therefore able to achieve longer first on-wing runs, and there was a lot of variation in on-wing runs for -5A engines. Many of Lufthansa's engines had reached more than 4,000EFC when the AD was issued, and so got first on-wing runs of about 15,000 engine flight hours.