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SUPersonic travel: the future of airAviation

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Air travel: THE American dream

What happened to the Golden Age of Travel? Back in the 50’s, 60’s, and 70’s, air travel was such a glorious experience, and only those who could afford the luxury of cruising over 30,000 feet in the air witnessed it first-hand. In this day and age, most feel indifferent about flying, and for some, it is a miserable experience. Airlines fit hundreds of passengers into an already cramped space, looking to maximize profits and lower operating costs. Cleanliness and dwindling amenities contribute to the ever-so-unpleasant journeys we embark on using airplanes. As well as the uncomfortable atmosphere in airplanes, air travel is a time consuming process. On top of time in the air, aerodynamics of modern aircraft, albeit much better than early stages of jetliners, are still not as efficient as they could potentially be. The aerodynamics of modern commercial jets restrict them to speeds below Mach 1. Air travel is inefficient, and there needs to be a solution. I believe that the solution is in the past. We need to bring supersonic commercial travel back to the real world. Supersonic travel, although a topic of the past, is a campaign of the future. There are restrictions against supersonic flight, making it difficult for companies to develop aircraft that are capable of breaking the sound barrier and beyond, as they have to confide to the restrictions set by the FAA. However, the benefits of supersonic travel are immense. Imagine traveling transcontinental, or transatlantic, in three hours, half the time it currently takes with modern airliners. Supersonic travel would greatly benefit efficiency of airlines. Although there are no supersonic airplanes in operation currently, a startup in Denver, Boom Supersonic, is looking to change that, all while hoping to make the technology available and more affordable. The future of supersonic flight, while still questionable, has a significant chance of becoming the future of air travel.

Brief history of supersonic flight

Towards the end of the Golden Age of Travel, aviation took off in an interesting direction, as engineers at companies like Boeing, Lockheed Martin, and British Aircraft Corporation, began to research and develop aircraft worthy of travelling supersonically. Although supersonic travel is no longer available commercially, the idea is brilliant, and is by no means a lost cause. If it were to become a topic today, the prospect of once again being able to fly transatlantic in three hours will no doubt be very popular among frequent flyers on these routes, beat-up by consistently flying the long-haul flights. Jumbo jets, although they impress with their immense stature and capabilities, are just not what the future of flying entails. A plane that comes to many minds when the word supersonic comes up is Concorde. The Concorde, a plane capable supersonic flight, was the plane popular among the customers who regularly made the transatlantic trip, or could simply afford it. The Concorde, first undergoing planning in the early 1960’s, took off in 1976. “From London’s Heathrow Airport and Orly Airport outside Paris, the first Concorde’s with commercial passengers simultaneously take flight on January 21, 1976”[1]. Along with the Concorde, other companies, such as Boeing and Russia’s Tupolev have planned, and even created prototypes, albeit British Aircraft Corporation’s Concorde was the only long term supersonic commercial airplane.

Along with commercial purposes, supersonic jets for defense and military purpose are much more common, and the market is much more economical for these products. Military aircraft have been capable of travelling at speeds exceeding Mach 1 since the 50’s. One of the most popular supersonic military aircraft was the Lockheed SR-71, creatively nicknamed “Blackbird”. The U.S. Air Force was the only organization to operate the Blackbird. “The Blackbird accrued about 2,800 hours of flight time during 24 years of active service with the U.S. Air Force. On its last flight, March 6, 1990, Lt. Col. Ed Yielding and Lt. Col. Joseph Vida set a speed record by flying from Los Angeles to Washington, D.C., in 1 hour, 4 minutes, and 20 seconds” [2]. If supersonic travel was available for commercial purposes, the aviation industry would be much more efficient, and to say the least, very different than it is today. One supersonic airplane that travels at Mach 3 would be three times more efficient than three subsonic airliners. With this efficiency, airlines can be more profitable, as less maintenance is required because there are less operating aircraft in the airlines’ fleet. However, like most great ideas, there are issues that would need to be addressed, such as the environmental impacts and the economics behind supersonic commercial flight.

The sound barrier and beyond

Flying supersonically is as simple as it sounds: the aircraft flies faster than the speed of sound. However, everything
beside the logic is very complicated. The physics, math, and aerodynamics are mind-boggling. Furthermore, the process in reaching a finalized product that is test-worthy is a process that is years in the making. Supersonic aircraft are generally perceived to be a lot more streamlined, thus making them much more aerodynamic. Low drag is important when considering supersonic flying. Wings generally have a shorter span, and are often designed in a delta shape, flush with the fuselage of the aircraft. These details are the basic premises of any supersonic airplane that has flown successfully and over a large timeframe, such as the SR-71 or the Concorde.

THE DRAWBACKS

Aviation experts around the world are concerned about reinstating supersonic flight on a commercial basis. There are some concerns that restrict flying supersonically to only transoceanic routes and airspace where tests are conducted, such as deserts. This is because once aircraft make the transition from subsonic to supersonic, or breaks the sound barrier, it creates a sonic boom. This is from the shock waves created from the aircraft traveling through the air faster than the speed of sound. Concerns from the shock waves arose in the late 1960’s, with the focus being on civilians on the ground, as well as damage to structures, shattering of windows, and intolerable noise near large international airports. “Since March 1973, supersonic flight over land by civil aircraft has been prohibited by regulation in the United States” [3]. You can thank the FAA for this continued restriction in air travel. In 1973, supersonic flight was undergoing massive research, and bright and bold discoveries were being uncovered rapidly. When the ban was enforced, interestingly enough, the FAA defined no standard for what qualifies as “restricted”, meaning there is no official measurement for what kind of sonic booms are unacceptable. No company will spend millions of dollars producing a potential contestant for supersonic travel, only to figure out later that it is banned, despite an ignorant FAA ruling. However, one man is banking on the fact that supersonic travel is the future. That man is Sir Richard Branson, founder of the Virgin Group, a leader in entertainment, lifestyle, and most importantly, travel. Branson stated that “After we've done the space program, we will be producing supersonic planes, which will go far, far, faster than [the] Concorde” [4]. Branson has lofty goals for the future of supersonic travel. He also stated in an interview that “If we get it right, New York to Tokyo could be less than an hour” and that “You could be traveling at 19,000 miles per hour around orbit”[5]. Factually speaking, Branson has a point. The technology for such supersonic travel has been researched and has the potential to start being tested and developed. Branson also has ties to space ventures, where his company, Virgin Galactic, is looking to get off the ground with their supersonic space flights.

Aside from supersonic flight having restrictions from flying over United States territory, there are also the concerns with the economics of supersonic travel. Supersonic jets travel at speeds that put a lot of stress and pressure on the airframe. The systems are complicated, and supersonic airplanes are unable of having the passenger capacity as a Boeing 747, for example. For those who flew supersonically on Concorde, a hefty price tag was included. Those who did were “Paying $6,336 to fly one-way across the Atlantic on British Airways, or about $5,000 on Air France, quickly lost its appeal, even though catching the Concorde could shave several hours off of the usual flight time” [6]. Fares like these were present towards the end of the Concorde’s lifespan. Only the upper class were able to afford fares like these, and with the Concorde’s noisy and uncomfortable accommodation, some vouched for the twice-as-long subsonic flight, as it was more comfortable.

BOOM: THE FUTURE OF SUPERSONIC

Currently, there are no commercially operating supersonic aircraft, however, there are military-operated aircraft that are capable of surpassing the sound barrier. A handful of start-up companies have given reached into the world of supersonic flight and have attempted to develop a product worthy of serving the modern age. However, one company has stood out amongst the rest. Boom, a startup emerging from Colorado, may have proved worthiness in the category of supersonic flying. Boom’s call to action is daring, yet very attainable. “Ultimately, Boom wants to build commercial aircraft with room for 40 passengers and offer transatlantic roundtrips for roughly $5,000, about the price of ordinary business class. Boom’s plane would fly at 60,000 feet to take advantage of the thin atmosphere, a height that would allow passengers to see the curvature of the Earth” [7]. Boom’s breakthrough design looks similar to the designs of other supersonic jets in the past few decades. “Advanced aerodynamics, featuring a slender fuselage and a refined delta wing. Optimized through 1000+ simulated wind tunnel tests” [8]. The design of the aircraft is simple: and it’s been proven to work. The design differs from a traditional airliner in the sense of materials used and the design itself. Materials used on a supersonic aircraft tend to be lighter, allowing the aircraft to travel at faster speeds. The design of a traditional airliner has wings with engines attached for thrust. However, Boom’s design incorporates the engines towards the tail, allowing for a sleeker design and better aerodynamics, lessening drag and friction on the aircraft. Boom is no ordinary startup, and they have the endorsement of Sir Richard Branson and the Virgin Group, who have vowed to option 10 planes from Boom. That deal would be “roughly $2 billion if everything goes to plan” [7]. Boom isn’t doing anything new, they’re simply using existing technology and ideas and putting it together in their own way. If all goes to plan, a prototype will be developed by the end of 2017.
SUPERSONIC TRAVEL: A WORTHY INVESTMENT? OR ECONOMIC DISASTER?

I believe that supersonic commercial flight is the route modern aviation needs to take for the future. Seeing what Boom Supersonic is planning to do, supersonic travel will be open to the public within a decade. Aircraft developers need to stop perfecting their subsonic airplanes, and instead, invest in the research and development of a new generation of supersonic aircraft; ones that can efficiently replace the old aircraft and continue to change the world of aviation. With supersonic travel, a whole new world of possibilities opens up. A business person can leave New York City in the early morning, arrive in London for mid-afternoon meetings, leave late afternoon from London, and arrive back in New York City in the evening, just in time for a night out. The same goes for travelling from west coast cities. The possibilities are endless, and as long as we have engineers who are willing to dedicate the time in order to develop such innovations, such as those at Boom Supersonic, we will be flying supersonically once again.

SOURCES


ACKNOWLEDGEMENTS

In the process of writing this paper, I had peers help revise and edit, as well as mentor my writing. I’d like to thank Justin Long and Brian Robb for helping to generate ideas for writing, and I’d like to thank Marlo Garrison helping to convince me that I should write about something having to do with aeronautics. Finally, I would like to thank my parents, Jennifer and James Zerweck, for providing me experiences on airplanes that’ve sparked my interest in aviation and aeronautics.