



SUPERSONIC AIRCRAFT: VIEWS OF THE AMERICAN AEROSPACE INDUSTRY



Since aircraft first took to the skies over 100 years ago, aviation has evolved from what was once a risky pursuit undertaken by hobbyists in experimental structures to the safest form of transportation in the world – carrying over 4 billion passengers per year. Despite this history of innovation and progress, there is one area of aviation that hasn’t changed since the dawn of the jet age: the speed at which we fly.

However, recent advances in supersonic technology– including the ability to travel faster than the speed of sound (Mach 1.0) without causing a loud sonic boom – will deliver a future of environmentally responsible supersonic flight, where people can fly to the far corners of the globe faster than ever before, creating new possibilities for how people travel and experience the world.

AMERICA’S SUPERSONIC REVIVAL

American manufacturers are aiming to build supersonic aircraft that will transport passengers as soon as the middle of the next decade. Aerion Supersonic has partnered with GE Aviation and Boeing to build the world’s first supersonic business jet. It will travel over land at up to Mach 1.2 without exposing communities to a sonic boom and reach speeds of Mach 1.4 over the ocean. Meanwhile, Boom Supersonic’s Overture airliner will travel at Mach 2.2 over the ocean, meaning you could travel from New York to London in just over three hours, or from Sydney to Los Angeles in less than seven.

Work is also taking place that could completely redefine the possibilities of supersonic travel. Lockheed Martin, in conjunction with NASA, is producing the X-59 Low-Boom Flight Demonstrator aircraft. The shape of this aircraft will enable it to travel at Mach 1.4 while creating only a gentle sonic thump – comparable to a car door closing. Flight tests of the X-59 are planned to begin in 2022. They will provide data on how these sonic thumps will impact communities and inform future designs of supersonic aircraft – designs that can eventually be scaled up for use on a commercial airliner.

ENVIRONMENTALLY RESPONSIBLE SUPERSONIC FLIGHT

AIA recognizes that for our vision of supersonic travel be realized, these aircraft need to be designed and operated in an environmentally responsible manner. Given concerns about noise, we believe the following two principles are particularly important:

- **Routine flights at supersonic speeds over land should be prohibited until acceptable levels of exposure have been established.** While technology now exists that allows aircraft to operate at supersonic speeds without causing an audible boom on the ground, we support current work to further understand how communities will react to such operations and inform appropriate limits. The industry has no intention of creating aircraft that cause loud sonic booms over populations, and it supports appropriate rules to prevent this from happening.
- **Manufacturers must ensure that supersonic aircraft incorporate the latest technology to minimize landing and take-off noise for those living around airports.** Supersonic aircraft have very different performance capabilities and characteristics than subsonic aircraft, which means the noise from them will also differ. Manufacturers are committed to ensuring that these aircraft are no louder on landing and take-off than aircraft currently operating around airports. As new technology becomes available, standards should be reviewed to drive down supersonic noise in the same way that has been done for subsonic aircraft.

We must also address other environmental impacts. The aviation industry will offset any increase in international CO₂ emissions from 2020 and have a goal to reduce them to 50% of 2005 levels by 2050. To meet this goal, manufacturers are committed to producing the most fuel-efficient supersonic aircraft possible. We are also working to make Sustainable Aviation Fuels (SAF), which can reduce carbon emissions by up to 80%, a viable source of fuel for operators. Two U.S. supersonic manufacturers have announced the ambition for their aircraft to be certified to fly on 100% SAF.

SUPPORTING A SUPERSONIC FUTURE

AIA advocates for a modern regulatory framework which protects communities and the environment without stifling new technologies. Current supersonic regulations are outdated however and date back to the 1970s. As a result of fears that then existed about the impacts of sonic booms on communities, supersonic flight is completely banned over the U.S. and many other countries – even if it wouldn't cause a sonic boom. There are also no currently applicable international standards for landing and take-off (LTO) noise as historical standards were only ever developed for Concorde-era aircraft. Due to the different characteristics of these aircraft, subsonic LTO standards do not apply and are not appropriate for supersonic aircraft.

The U.S. is leading efforts to address these issues and recent legislation requires the FAA to set appropriate LTO noise standards and periodically review whether the over land flight ban should be amended. However, the best way to address aviation's environmental impact is at the international level, through common rules that apply to all countries set by the International Civil Aviation Organization (ICAO).

The Committee on Aviation Environmental Protection (CAEP) is responsible for advising ICAO on aviation's environmental impacts and its work is essential for setting effective environmental standards that reflect the performance and operational characteristics of aircraft and the impact they have on the environment. Given the importance of data-driven international standards for aviation, AIA believes ICAO and CAEP must work toward timely standards for supersonic aircraft in conjunction with U.S. efforts.

CAEP is currently undertaking a study into potential impacts from supersonic aircraft, supported by data on aircraft design and other technical expertise provided by manufacturers. AIA looks forward to this study informing future discussions on the technical feasibility, economic reasonableness and environmental benefit of future standards. We are committed to supporting future technical work at ICAO to help fully realize the benefits of supersonic flight.