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Supersonic passenger flights with no sonic boom felt on the ground? Boom Supersonic thinks so after recent test flight.

Richard Craver - Feb 10, 2025

Boom Supersonic achieved its goal on Jan. 28 of breaking the sound barrier with the XB-1 prototype of its Overture aircraft. The company plans to manufacture the Overture at its $500 million "superfactory" at Piedmont Triad International Airport in Greensboro.

Boom Supersonic, provided

Achieving supersonic flight over land may be within the reach of Boom Supersonic's Overture aircraft, a potentially historic development that could revolutionize the commercial passenger airline industry.

A flight across the United States — beginning potentially as early as 2029 — could be at least 90 minutes quicker than current top flight speeds under that Boom is calling "Boomless Cruise' mode.

Meanwhile, trans-Atlantic and the first-ever trans-Pacific flights would not be tied down to just coastal airports as Overture aircraft could fly up to 30% faster than the speed of sound without a sonic boom being heard or felt on the ground.

For example, a Boom Overture flight from Atlanta to Paris or Dallas to Honolulu would go Mach 0.94 until reaching the ocean, at which time it could accelerate to Mach 1.7, or 70% faster than the speed of sound.

Supersonic flight has been banned over land by federal aviation law because of the disruptive nature of the unleashed sonic boom on the environment below.

Boom's XB-1 prototype is the first civilian jet made in America to break the sound barrier.

On Jan. 28, the aircraft broke the sound barrier on three separate runs at Mojave Space and Air Port in California without the sonic boom being heard or registered on the ground.

On Monday, XB-1 achieved supersonic flight on three shorter runs, again without any sonic boom being heard or registered. The aircraft achieved a record Mach 1.14 sustainable speed with spurts as high as Mach 1.18.

Mach 1 is equal to the speed of sound. Each one-tenth beyond Mach 1 represents a 10% increase beyond the speed of sound, so Mach 1.1 is 10% faster, Mach 1.2 is 20% faster and Mach 1.3 is 30% faster, and so on.

It is the last of 13 scheduled test flights for XB-1, including the final 12 by chief test pilot in Tristan "Geppetto" Brandenburg.

The Denver-based manufacturer used Monday's second round to demonstrate its theory that flying over land at supersonic speeds is valid, sustainable and scalable to an Overture airliner projected to hold between 65 and 80 passengers.

Boom said it will now focus its full efforts on scaling XB-1 learnings and technology to build the Overture supersonic airliner.

The second round of tests also was geared toward capturing images of how the XB-1 maneuvered through the shock waves encountered during supersonic flight.

Boom reached a key milestone June 17 with the completion of its $500 million "superfactory" at Piedmont Triad International Airport in Greensboro.

The PTI facility has 150,000 square feet for the production floor, 24,000 square feet for the office space and 5,000 square feet for the receiving area. The company has pledged to create at least 1,781 jobs at full production by 2029-30.

Why no sonic boom?

Boom said Overture could operate at up to Mach 1.3 without an audible boom.

However, until the Federal Aviation Administration changes its supersonic flight regulations, Overture would fly at Mach 0.94 over land — still 20% faster than typical commercial airliners.

Boom founder and chief executive Blake Scholl explained during Monday's flight why there's the absence of being sonic boom heard or felt on the ground.

Scholl said the technological breakthrough wasn't as much as the design of XB-1, and soon to be Overture, but rather determining "the altitude and the speed relative to the current atmospheric conditions."

“Sound waves bend toward colder temperatures in the upper atmosphere, so they make a U-shape as they come off the aircraft,” Scholl said. “If you fly at too low of an altitude or are going too high of a speed, those waves will hit the ground, and that’s when you hear a sonic boom.”

Scholl said that under the appropriate flight conditions, typically an altitude of 35,000 to 36,000 feet, the sound waves flow to a “cutoff altitude” before curling upward “so that no one ever hears it.”

During Monday’s supersonic runs, the cutoff altitude was about 7,000 feet. The cutoff altitude will vary based on atmospheric conditions.

The Overture airline is projected to fly at an altitude of up to 60,000 feet.

“That’s a big deal because that is what’s going to allow to legalize supersonic flight over land in the U.S. and the rest of the world,” Scholl said.

“Overture will give passengers that power of time savings, unlocking all kind of possibilities,” such as flying from New York to San Francisco in four hours, or essentially one hour with the East Coast-to-West Coast time change.

In a question-and-answer section about Monday’s test flights, Boom said FAA regulations currently prohibits all supersonic flight over land, regardless of whether a boom reaches the ground.

“Boom Supersonic supports revising this regulation to allow Boomless Cruise and to establish a certification pathway for future low-boom aircraft. Updating this regulation will support innovation, promote American leadership in aviation, and strengthen U.S. national security.”

“It’s important to note that the initial Overture is not designed as a low-boom aircraft, and we do not expect to certify it for unrestricted supersonic flight over land.”

‘Boomless cruise’

Boom is not waiting to tout the possibility of “Boomless Cruise ... that quiet supersonic travel is possible.”

School said the achievement of the XB-1 “confirms what we’ve long believed: supersonic travel can be affordable, sustainable and friendly to those onboard and on the ground.

“With this success, we’re bringing Boomless Cruise to Overture, unlocking faster travel on even more routes.”

Boomless Cruise would be supported by Overture’s advanced autopilot, which automatically selects the highest quiet speed under real-time conditions.

Currently, supersonic flight allows for flying from Miami to London in just under five hours and Los Angeles to Honolulu in three hours.

Having Overture's landing gear compatible with international airport runways and taxiways gives it the ability to take off and land on more than 600 routes around the world.

Overture has an order book of 130 orders and pre-orders from American Airlines, United Airlines, and Japan Airlines, representing the first five years of production.

The possibility over supersonic flight over land could serve to skyrocket demand.

"Boon's breakthrough in noise reduction will, no doubt, disrupt the civil aviation industry in very positive way," said John H. Boyd, founder and principal with global site-selection firm The Boyd Co. of Boca Raton, Fla.

Boom being able to provide quite supersonic flight over land "may end up sending shock waves to the global aerospace and travel industries," Boyd said.

"The major issue with the Concorde and why the market has been without supersonic travel for over 20 years was the thundering noise that limited its routes — and, more importantly, its profits — and prevented it from serving many large and profitable metropolitan travel markets."

Boyd said Overture being able to take off and land from many major global business and tourist destinations "is the engineering breakthrough that distinguishes Boom — even more than its impressive speed."

Boyd said the potential Boom sound development "has implications in the field of industrial acoustics far beyond just the aerospace and civil aviation fields."

"Some of what Boom engineers have achieved have applications in numerous other industrial settings that require noise control, noise measurement, compliance with regulators, vibration management, acoustic design, as well as worker health and safety concerns."

Next steps locally

Scholl said the next step is to shortly complete the primary designs for Overture and the Symphony engine in March. The next primary goal is testing the engine thrust by the end of the year.

The Overture timeline at PTI remains:

- 2025: Equipment assembly.
- 2026: First Overture rollout.
- 2027: First test flight.
- 2029: Federal Aviation Administration certification.
- 2029: First passenger flights.

The initial Boom projection is producing up to 33 Overture aircraft annually at a projected price tag of $200 million apiece. The goal is producing 66 Overture aircraft annually at full production.

In partnership with tooling supplier Advanced Integration Technology, Boom has begun procuring and installing tooling, initially with an advanced test cell unit that will be used to develop manufacturing processes, optimize the flow of the assembly line, and prepare staff for Overture production.

Even though construction of the super factory was completed on June 17, and equipment began being installed in October, the local Boom workforce remains small.

The manufacturer has not provided a current workforce total. The average annual wage is projected at $68,792.

Scholl said Boom's first major wave of hiring will commence closer to when production equipment has become operational. He recommended perspective applicants keep an eye on the job postings at https://boomsupersonic.com/careers.

Scholl said during the ribbon-cutting ceremony that the manufacturer plans to eventually double annual production that would require another plant that could add another 600 jobs.

Boyd said Boom's breakthrough in noise reduction "just might create a new target industry for the Triad's economic development professionals — one centered around the intellectual capital and engineering talent in the field of industrial acoustics that made Boom's breakthrough possible.