

JAXA makes advances in development of high-speed commercial aircraft

May 11 2010, By Giko Sehata

Japan is making progress toward developing an advanced supersonic passenger aircraft that could, for example, make a day trip between Japan and Hawaii possible.

The Supersonic Transport Team of the Japan Aerospace Exploration Agency, or JAXA, is aiming to reduce the thundering roar of such aircraft, a challenge that weighed on the Concorde, a civilian [supersonic aircraft](#) jointly developed by Britain and France.

At a maximum speed of Mach 2, higher than 2,100 kph (about 1,305 mph), the Concorde traveled between Europe and the East Coast of the United States in less than four hours. As international travel became more common, demand for such supersonic civil transport was high.

However, fuel costs for the Concorde were more than three times higher than those for conventional jetliners. The Concorde also generated excessive noise although it flew at an altitude of 18 kilometers (11.18 miles).

The Concorde ceased commercial service in 2003.

The explosionlike noise of a sonic boom is caused by the shock waves created by the compression and expansion of air when a supersonic aircraft passes. The shock wave is thought to be generated in the nose and tail of the aircraft. On the ground, the loud noise can be heard on and off.

To put a supersonic aircraft into practical use once again, research institutions worldwide, including the U.S. National Aeronautics and Space Administration, have studied ways to reduce sonic booms. Among them, the JAXA team has drawn global attention with its research.

"Within 10 years, we aim to halve the noise that was generated by the Concorde and complete the development of an energy-efficient small hypersonic technology demonstrator that can accommodate 50 passengers," team leader Kenji Yoshida said.

To develop an advanced supersonic aircraft using made-in-Japan technologies, 16 people, with backgrounds ranging from business to academia, have examined how the Concorde's shock waves are generated. After learning that enormous amounts of sound energy are generated when shock waves created at different locations on the aircraft are combined, the researchers developed an experimental aircraft designed to prevent [shock waves](#) from coming together.

In 2005, the team conducted a test flight of the 12-meter experimental aircraft in Australia, where it was launched by a rocket and then flew at a speed of Mach 2. Based on test results and other data, the team is theoretically able to reduce sonic boom noise by 54 percent.

Despite achieving better experimental results in noise reduction than research in other countries, the JAXA project has left much to be desired in terms of improved fuel efficiency.

The JAXA team is gearing up to build a supersonic jet that could be put into commercial service. If a supersonic aircraft is developed, passengers could travel between Tokyo and London in about six hours and between Tokyo and Honolulu in about four hours, making round trips possible in one day.

"We want people in the West to say that Japanese technologies are essential to developing next-generation aircraft," Yoshida said.

Yoshida, who was a researcher at Kawasaki Heavy Industries, Ltd., joined the National Aerospace Laboratory of Japan, one of the three bodies merged to create [JAXA](#), in 1996 and began studying supersonic aircraft the following year. The budget allocated for his team's research last year was 100 million yen, only one-fortieth of the money NASA obtained (US\$1.081 million) for research in this field.

But Yoshida maintained his confidence, saying: "We've narrowed down the focus (of our research) to shock wave reduction. As we've already obtained a patent in the United States, it's possible for us to take a lead (in this field)."

In the meantime, the team has cultivated teamwork with casual monthly discussions of air transport over beer and delivered pizza.

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