



MISORA

NEXT ► Aerospace Cluster

This cluster shall contribute to the development of safety, innovation and environmental compatibility of aerospace transportation technology.

"Development of a Supersonic Airplane that Exceeds Concorde"

Professor Shigeru Obayashi, Head of the Aerospace Cluster



Encounter with the Supersonic Biplane

The Institute of Fluid Science, Tohoku University is designated as the 21st century COE "Center of Excellence for International Research on Fluid Dynamics." The "Summer School of Aerospace Fluid Science" is held once a year, inviting aerospace engineers from all over Japan. The idea of the supersonic biplane was introduced for the first time in 2004 by Dr. Kazuhiro Kusunose (a former engineer of Boeing, invited professor at Tohoku University at that time, current chief research officer of the Aviation Equipment Research Institute of the Ministry of Defense).

When an airplane flies supersonically, the high-speed airplane compresses air and generates strong shock waves. The shock waves travel to the ground as noise (sonic boom), and strong air resistance (wave-making resistance) affects to the airplane. An enormous amount of energy is necessary to overcome such resistance, and therefore a large quantity of fuel is necessary for supersonic flight.

Dr. Kusunose suggested that the shock waves could be drastically cut by adopting biplane airfoils. If biplane airfoils are used, the interference between two airfoils cancels the shock waves. The shock waves remain only between two airfoils, and a very small portion travels outside. As a result, the shock waves spread in the air can be cut by up to 85%. The supersonic biplane is a great technological innovation in the aviation industry in terms of the elimination of shock waves.

The supersonic biplane we are developing has been named "MISORA," an acronym for "Mitigated SONic-boom Research Airplane." Its operating speed is Mach 1.7, and it can fly with approximately 100 passengers between New York and Tokyo in 6 hours. It is my dream as an aeronautical engineer to put "MISORA" in practical use as a post-Concorde next-generation supersonic airplane.

Challenging advanced technology leads to industrial and commercial success. If we do not constantly challenge advanced technology, there will be no commercial success. I think that one reason for Japan's great success in the automobile industry is that Japanese manufacturers have been constantly challenging advanced technology in areas such as the improvement of fuel-efficiency, exhaust gas control and the electric car.

I have always wished to challenge the aviation industry with Japanese homegrown technology.

Mitsubishi Heavy Industries, Ltd. is currently developing the MRJ (Mitsubishi Regional Jet) for approximately 70-90 passengers. The Institute of Fluid Science, Tohoku University is cooperating in the aerodynamic designing of the MRJ. Moreover, it is reported that Honda, a major auto manufacturer, has entered the business jet field (for very light jets), and that orders for over 100 jets have been placed since it commenced accepting orders in 2006. If such major companies with high manufacturing technology as Honda and Toyota seriously enter the aviation field, it will not be a dream anymore to take on the Boeing and Airbus.