



JAL Flight Brings Aviation One Step Closer to Using Biofuel

Tokyo, January 30, 2009: Today, Japan Airlines (JAL) became the first airline to conduct a demonstration flight using a sustainable biofuel primarily refined from the energy crop, camelina. It was also the first demo flight using a combination of three sustainable biofuel feedstocks, as well as the first one using Pratt & Whitney engines. The results of the flight are expected to conclusively confirm the second-generation biofuel's operational performance capabilities and potential commercial viability.

The approximately one and half-hour demo flight using a JAL-owned Boeing 747-300 aircraft, carrying no passengers or payload, took off from Haneda Airport, Tokyo at 11:50am (JST). A blend of 50% biofuel and 50% traditional Jet-A jet (kerosene) fuel was tested in the No.3 engine (middle right), one of the aircraft's four Pratt & Whitney JT9D engines. No modifications to the aircraft or engine were required for biofuel, which is a 'drop-in' replacement for petroleum-based fuel.

The JAL cockpit crew onboard the aircraft checked the engine's performance during normal and non-normal flight operations, which included quick accelerations and decelerations, and engine shutdown and restart. A ground-based preflight test was conducted the day before the flight to ensure that the No. 3 engine functioned normally using the biofuel/ traditional Jet-A fuel blend. Captain Keiji Kobayashi who piloted the aircraft said, 'Everything went smoothly. There was no difference at all in the performance of the engine powered by the biofuel blend, and the other three engines containing regular jet fuel.'

Data recorded on the aircraft will now be analyzed to determine if equivalent engine performance was seen from the biofuel blend compared to typical Jet A fuel. The initial analysis of the data will take several weeks and will be conducted by team members from Boeing, Japan Airlines, and Pratt& Whitney.

The biofuel component tested was a mixture of three second-generation biofuel feedstocks: camelina (84%), jatropha (under 16%), and algae (under 1%). Second-generation feedstocks do not compete with natural food or water resources and do not contribute to deforestation practices. The primary benefit of using biofuels in a commercial jetliner is their ability to reduce greenhouse gases throughout their entire lifecycle, while also helping to improve the environmental performance of commercial aviation and the planes that are flying today.

JAL Group President and CEO, Haruka Nishimatsu applauded the flight saying, "Today is an extremely important day for Japan Airlines, for aviation, and for the environment. The demonstration flight brings us ever closer to finding a 'greener' alternative to traditional petroleum-based fuel. When biofuels are produced in sufficient amounts to make them commercially viable, we hope to be one of the first airlines in the world to start powering our aircraft using them."

Boeing Japan President, Nicole Piasecki said, "We are hopeful that within the next 3-5 years, commercial aircraft will

begin flying revenue passenger flights using sustainable next-generation biofuels. There are remaining hurdles to overcome, including gaining the support of regulators, airports, fuel distributors and others, as well as increasing the production of environmentally and socially responsible fuel sources. Our industry is already working to secure its fuel future supply by establishing firm sustainability criteria to ensure that the environmental impacts and carbon dioxide emissions from biofuels are significantly lower than fossil fuel-based kerosene fuels.”

The fuel for the JAL demo flight was successfully converted from plant-based crude oil to biofuel, then blended with typical jet fuel by Honeywell’s UOP, a refining technology developer, using proprietary hydro-processing technology. Subsequent laboratory testing by Boeing, UOP, and several independent laboratories verified the biofuel met the industry criteria for jet fuel performance.

Jennifer Holmgren, General Manager of UOP Renewable Energy and Chemicals said, “We have proven that we can produce renewable jet fuel from sustainable resources that is a drop in replacement eliminating the need for costly changes to the fuels infrastructure and transportation fleet. This technology can be utilized to begin making an impact on the aviation fuel supply in as little as three years.”

“Ground-based jet engine performance testing last year by Pratt & Whitney of similar fuels further established that the biofuel blend either meets or exceeds the performance criteria that is in place for commercial aviation jet fuel today”, added Greg Gernhardt, Asia Pacific Region Vice President, Pratt & Whitney Commercial Engines & Global Services.

Sustainable Oils, Inc., a U.S.-based provider of renewable, environmentally clean, and high-value camelina-based fuels sourced the camelina used in the JAL demo flight. Terasol Energy sourced and provided the jatropa oil, and the algae oil was provided by Sapphire Energy. Nikki Universal, a joint venture of UOP and JGC, supplied the biofuel used in the flight, which had been produced in the U.S by UOP.

Also known as gold-of-pleasure or false flax, camelina is good candidate for a sustainable biofuel source, given its high oil content and ability to grow in rotation with wheat and other cereal crops. The crop is mostly grown in more moderate climates such as the northern plains of the U.S and Canada, and originally hails from northern Europe and Central Asia. Test plots are also underway in Malaysia, South Korea, Ukraine and Latvia.

“There are currently a few thousand acres under management, with an expectation of hundreds of thousands of acres within three years. Within 5 years, projections are for between 100 million and 200 million gallons of camelina-based sustainable jet fuel,” said Tom Todaro, CEO of Sustainable Oils.

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