

Airplane recycling techniques to wrap up ecoDemonstrator 757 testing

Tests include airplane-grade aluminum extraction for new airplane parts

July 23, 2015



Members of the ecoDemonstrator team gather at Boeing Field in Seattle to say goodbye to the ecoDemonstrator 757 earlier this month. After finishing its flight tests, the 757 flew to Moses Lake, Wash., as a test article for more efficient airplane recycling techniques. (Monica Wehri photo)



Autographs from members of the ecoDemonstrator team covered part of the ecoDemonstrator 757 before the airplane flew to Moses Lake, Wash., to be recycled. The recycling experiment culminates a four-month flight test of the airplane. (Monica Wehri photo)

When the ecoDemonstrator 757 completed flight testing in early July, it made one last flight: to Moses Lake, Wash., to serve as a test article for more efficient recycling techniques and to extract the most value from the materials and parts.

In addition to removing usable spare parts, Boeing, the recycling company and Stifel, the 757's owner, will test whether airplane-grade aluminum can be extracted and used for fabricating new airplane parts. While aluminum from decommissioned airplanes is commonly recycled for other uses, the most common techniques used today don't take the time to extract this valuable aluminum for reuse as aviation-grade alloys. The testing in Moses Lake will make an effort to recycle that material.

There also will be an effort to reuse the recycled carbon fiber from 787 production that was 3-D-printed into interior parts. The recycler will be using techniques endorsed by the Aircraft Fleet Recycling Association, where standards for airplane recycling are held and of which Boeing is a founding member, according to the ecoDemonstrator program.

“The ecoDemonstrator program has been very successful for Boeing,” said Mike Sinnett, Commercial Airplanes’ vice president of Product Development. “The ecoDemonstrator 757 has reinforced the fact that we can test advanced technology at a quicker pace and more efficiently. I’m pleased that the program will continue, and we will be looking for more advanced technology to test in the years ahead.”

The recycling experiment culminates a four-month flight-test of the airplane. During that time, Boeing tested a variable camber Krueger shield to prevent insect contamination on the left, or port, wing and, through Boeing Research & Technology, collaborated with NASA on active flow control of the vertical tail and bug-phobic coatings on the right wing’s leading edge. The airplane also flew across the U.S. with green diesel biofuel and tested an energy-harvesting technology to power electronic windows and interior parts made of recycled carbon fiber.

Boeing Test & Evaluation pilots and crews flew more than 200 flight-test hours, covered thousands of miles in more than 100 flights and tested 15 technologies. In addition to the flight-test period, Boeing and NASA worked closely for about 18 months to plan active flow control tests, starting with wind-tunnel testing in late 2013 and then designing and implementing the technology on the 757.

“The ecoDemonstrator 757 has been my life for about two years,” program manager Doug Christensen said. “While we accomplished a lot, it will be sad to see it disassembled for recycling. But I know that everything we’ve done has been to look at these unique technologies and evaluate them for future use.”

The airplane accomplished another milestone by flying for the first time with U.S.-produced green diesel, a biofuel made from vegetable oil, waste cooking oil and waste animal fat. Green diesel is commonly used in truck transportation and is on par with the price of conventional petroleum jet fuel. Boeing is working to get it certified for aviation use.

The ecoDemonstrator flew on a blend of 5 percent green diesel and 95 percent Jet A fuel to NASA’s Langley Research Center in Virginia.

“We’re happy the third flight-test program of the ecoDemonstrator was very successful and again provided lots of learning for our Boeing team,” said Jeanne Yu, director of Environmental Performance for Commercial Airplanes. “I’m looking forward to the next ecoDemonstrator, a collaboration with Embraer next year.”

Boeing and Embraer are planning to conduct ecoDemonstrator tests with an Embraer airplane in 2016, the company and the airline announced recently.

The ecoDemonstrator program began in 2011 and is led by Commercial Airplanes Product Development with support from Boeing Test & Evaluation and Boeing Research & Technology. The first airplane flew in 2012 and tested 14 technologies on a 737 testbed borrowed from American

Airlines. The next airplane was a Boeing-owned 787 that flew in 2014. The 757 is the third flight-test airplane.

By Bret Jensen