

Farnborough's green scene

Boeing's display on environmental innovation and technology turns heads at air show



energy
Biofuels

BY KATHRINE BECK

Boeing's technology exhibit was a star attraction at this year's Farnborough International Airshow in the United Kingdom, capturing the interest of customers, suppliers, media, government officials and competitors.

"It created a real buzz," said Commercial Airplanes Managing Director of Environmental Strategy Billy Glover. "We had several people asking about it and wanting to visit."

The exhibit combined stunning colors and graphics, sound, working demonstrations and interactive touch screens to showcase the innovative technologies Boeing is pursuing to help reduce aviation's impact on the environment. To complement the display, Boeing subject matter experts were on hand to explain the technology and answer questions.

Here's a look at some of the concepts presented in the display.

Biofuels: You wouldn't think a 75-gallon (284-liter) tank showing algae at various stages of growth would be called a "star attraction" at a major air show. Yet that's how a July 17 *New York Times* article referred to the tank, which was part of Boeing's display. The tank showed Boeing's efforts on discovering ways to make biofuel out of the oily aquatic plants.

The exhibit featured other sources of sustainable jet biofuel, including babassu, a Brazilian tree; halophytes, grasses that grow in saline habitats; switchgrass, a hardy grass that grows in deserts; and jatropha, a globally distributed tropical plant. None of them are used for food, contribute to deforestation or create competition for arable land.

"We see a real possibility to create sustainable biofuels that we can drop into our current aircraft without modification," said Glover.

Continuous innovation: Another display featured models of in-production Boeing commercial airplanes behind a glass timeline wall. Visitors got to walk through Boeing history while learning that since the beginning of the jet age 50 years ago, large commercial jets' fuel burn and carbon dioxide emissions have declined by 70 percent.

Silla Maizey, head of Corporate Responsibility for British Airways, said the exhibit showed the "incredible work being done by Boeing—with and for the industry—in a truly engaging and informative way."

Airspace efficiency: The air traffic system display told a complex story with striking amber-colored glass forms, interactive touch-screen displays and audio of air traffic radio chatter. The message: Increasing air traffic efficiency in all phases of flight, including takeoff and landing, and eliminating airplanes stuck in holding patterns, significantly saves fuel and lowers emissions. Multiple screens contrasted advanced or "tailored" arrivals with conventional, less-fuel-efficient ones.



Fuel cell and energy harvesting: The renewable energy display featured working models of devices for harnessing energy from an airplane in flight to produce power for onboard use. Potential environmental benefits include reducing bulky wiring and other items that add weight and increase fuel consumption.

Visitors could watch as thermoelectric energy, which can be generated by the temperature difference between the exterior and interior of an airplane, was used to darken a cabin window, eliminating the need for window shades.

Electrodynamic energy was represented by a button that, when pressed, generates a pulse of electricity that can send radio signals.

A video also showcased the successful first flight of the Boeing-backed Fuel Cell Demonstrator aircraft earlier this year in Spain (see Page 44 of the May 2008 *Boeing Frontiers*). A fuel cell is an electrochemical device that converts hydrogen into electricity. Water and heat are its only exhaust. The actual Fuel Cell Demonstrator airplane was on static display on the airfield, where visitors could ask questions of Boeing experts José-Enrique Román and Nieves Lapeña of the Boeing Research and Technology Center in Madrid.

Another portion of the display featured a 0.4-inch-square (1-centimeter-square) solar cell and an accompanying 197-inch-square (500-centimeter-square) concentrating mirror that multiplies the solar cell's power. The solar technology comes from Boeing subsidiary Spectrolab, which holds the world record for the most efficient solar cell and is adapting its on-orbit products for terrestrial power generation (see Page 30 of the November 2007 *Boeing Frontiers*).

"A lot of people were surprised to learn that Boeing makes the world's best solar cells and that we were bringing our space technology back down to Earth," said mechanical engineer Brad Mitchell, Associate Technical Fellow at the Commercial Airplanes Systems Concept Center.

Noise reduction: A working model of the back half of a 777 engine dominated the noise reduction display. Visitors could feel air coming out of microjets, which reduce engine noise by modifying the interface of airstreams from and around the engine, and learned about variable-area fan and chevron core nozzle technologies.

Shape memory alloys (SMA), which include metallic materials that change shape when heated, then return to their original shape when cooled, can be used in engines to reduce noise. An interactive model demonstrated an SMA wire coiling and moving a weight when heated, and SMA elements integrated into a fan nozzle, allowing it to open and close as needed.

Touch-screen maps showed noise footprints of different Boeing jetliners at specific airports. Older models were much noisier; technological breakthroughs have reduced noise-footprint areas by about 90 percent compared with first-generation commercial jet airplanes.

"The power of the exhibit was that it was interactive and allowed people to experience technology and talk to the experts," said Laura Henderson, Commercial Airplanes Brand and Market Positioning. "It made it all real."

The team, led by Commercial Airplanes Marketing, is looking at ways to repackage and repurpose the exhibit materials for use in other venues and regions. ■

kathrine.k.beck@boeing.com

PHOTOS:

Attendees marveled at the environment and technology display at this year's Farnborough International Airshow. Among the themes the exhibit touched were biofuels and energy.

BIOFUELS AND ENERGY GRAPHICS: PAUL HAVERLY
PHOTOS: BRAD MITCHELL/BOEING