Fact Sheet

Boeing Commercial Airplanes
P.O. Box 3707 MC 21-70
Seattle, Washington 98124-2207
www.boeing.com

Boeing ecoDemonstrator Program Technology Testing Highlights

2021: 737-9 to be delivered to Alaska Airlines — 21 projects

- Identifying the optimal strategy to use commercial airliners to measure greenhouse gas emissions will help the National Oceanic and Atmospheric Administration improve its climate modeling and long-term forecasting.
- Low-profile anti-collision light designed to fit mostly within the fuselage—topped with a low-profile cover—protects the light better, improves maintenance reliability and reduces drag to improve fuel efficiency.
- Cabin interior sidewalls made from recycled carbon composite fiber can reduce noise and waste going to landfills.

2020: 787-10 owned by Etihad Airways — nine projects

- The most comprehensive aeroacoustic research ever conducted on a commercial airliner in collaboration with NASA.
- Landing gear modified to be quieter by Safran Landing Systems.
- Operational efficiency project enables pilots, air traffic controllers and an airline's operations center to share digital information simultaneously to optimize routing and minimize holding at the arrival airport. This enhances safety by reducing workload and radio frequency congestion, minimizes flight time for airline efficiency and passenger satisfaction, and improves airspace usage to accommodate future growth.

- Portable ultraviolet wand disinfects high-touch and hard to clean surfaces (such as flight deck control panels) to enhance passenger and crew safety.

2019: 777-200 owned by Boeing — 53 projects

- Shape memory alloys developed in collaboration with NASA enable vortex generators to move based on the temperature. The small fins on the airplane's wings raise up during takeoff and landing to improve airflow, then retract during cruise when they're not needed to reduce drag, improve fuel efficiency and lower emissions.
- Electronic flight bag application uses next-generation communications to automatically reroute an airplane when weather conditions warrant.
- Operational efficiency project enables pilots, air traffic controllers and an airline's operations center to share digital information simultaneously to optimize routing and enhance safety by reducing workload and radio frequency congestion.
- Boeing's self-disinfecting lavatory uses ultraviolet light to disinfect all surfaces, killing 99.9% of germs in about three seconds after every use. The lavatory also includes a UV sanitizing system for the sink faucet and a moisture-absorbing floor made from recycled carbon composite material.
- Galleys equipped with sensors can help cabin crews locate catering items faster and enable airlines to better manage their inventory by using data analytics. This can significantly reduce waste — particularly on international flights where regulations require the disposal of any food remaining onboard after arrival.

2018: 777 Freighter owned by FedEx Express — 37 projects

- Surface Operations Collision Awareness System (SOCAS) uses optical and radar sensors on the airplane to detect obstacles (other aircraft, ground vehicles, buildings).

- FLYHT Aerospace Solutions' Automated Flight Information Reporting System (AFIRS) provides tracking, distress and data-streaming capabilities from flight data recorders; tested in collaboration with Embraer.
- Several flights use 100 percent sustainable aviation fuel — a first for a commercial airliner — to reduce carbon emissions and assess performance.
- Manufacturing byproducts reused as high-value materials for fittings replacing titanium alloy (Ti64) with over 75% recycled content.

2016: E170 owned by Embraer — six projects

- Ice-phobic paint improves safety and reduces drag.
- Wireless measurement of airflow over the surface of the wing (boundary layer).
- Wing slat cove fillers that reduce noise.
- Air data measurement system using light distancing and ranging (LiDAR).
- Sustainable aviation fuel sourced from Brazilian sugarcane.

2015: 757 owned by the aircraft finance division of Stifel — 20 projects

- Robust wing designs that enable natural laminar flow and improved aerodynamic efficiency:
    - Krueger shield to protect the leading edge of the wing from insects.
    - "Bug-phobic" coatings that can reduce drag from insect residue (in cooperation with NASA).
- Active flow control to improve airflow over the rudder to potentially improve its aerodynamic efficiency by more than 15% and allow for a smaller vertical tail design in the future (in cooperation with NASA).
- Utilized 5% blend of renewable diesel to support ongoing industry efforts to approve this sustainable fuel for commercial aviation.

- Dismantled and recycled the 757 using environmental best practices. About 90% of the airplane was reused or recycled (in cooperation with Stifel, the Aircraft Fleet Recycling Association and an airplane demolition company).

2014: 787-8 Dreamliner owned by Boeing — 35 projects

- Fuel efficiency and smaller noise footprint:
    - Aerodynamic and flight control improvements.
    - Advanced wing coatings to reduce ice accumulation.
    - Software applications and connectivity technologies that can improve flight planning, fuel-load optimization, in-flight routing and landing.
- Airborne Spacing for Terminal Arrival Routes (ASTAR) system helps achieve precise spacing between aircraft during approaches (in cooperation with NASA).
- Airplane connectivity enhancements:
    - Touch-screen displays on the flight deck.
    - Wireless sensors that can reduce wiring, reducing weight and saving fuel.
    - Outer wing access doors made from recycled 787 carbon fiber.
- Historic first flight using renewable diesel, a sustainable fuel widely available in ground transportation.

2012: Next-Generation 737-800 delivered to American Airlines — 14 projects

- Aerodynamic performance of the 737 MAX advanced technology winglet.
- Variable area fan nozzle to optimize engine efficiency.
- Active engine vibration control.
- Regenerative hydrogen fuel cell for aircraft electrical power.
- Flight path optimization for operational efficiency.
- Carpet made from recycled materials.
- Sustainable aviation fuel.

For more information, visit boeing.com/ecodemonstrator.

Contact:
Paul McElroy
The Boeing Company — Seattle
Sustainability / Strategy Communications
paul.mcelroy2@boeing.com / 425-283-7740

June 2021