Backgrounder

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The Boeing 747-8 Intercontinental and 747-8 Freighter: Designed for Environmental Performance

On the new 747-8 family Boeing is leveraging the technologies from the 787 Dreamliner to further its commitment to creating environmentally preferred commercial jetliners.

Lower Fuel Use

Three key features – new engines, more efficient structure and advanced aerodynamics – contribute to a 15 percent improvement (on a per-seat basis) in fuel use for the 747-8 compared to the 747-400.

The new GEnx-2B67 engines incorporate the latest technologies – such as a composite fan case and blades and a revolutionary turbine – to create double-digit efficiency gains over the engines it replaces. The ultra-efficient structure of the 747-8 provides the lowest operating empty weight per seat of any large airplane. Lastly, the new-design wing incorporates the latest aerodynamic airfoils, raked tips and a simplified lightweight flap design, further improving the overall fuel efficiency of the 747-8. These features translate into lower takeoff weights, less engine thrust and less fuel burned on every flight compared with the A380.

Reduced Emissions

Carbon dioxide (CO_2) is produced as a result of fuel consumption. This means that with reduced fuel use comes an equivalent reduction in carbon dioxide emissions. Another key emission standard for commercial jetliners is nitrogen oxides (NO_x). Specific regulations have already been set for future airplanes based on the thrust ratings of an airplane's engines.

The 747-8 is being designed to ensure that it will perform significantly better than required by today's standard, and it will be better than the future, more-stringent regulations being incorporated by the Committee on Aviation Environmental Protection (CAEP). This will be achieved through a key design element affecting NO_x emissions, which is the twin-annular, premixing swirler (TAPS) combustor on the GEnx engine.

Quieter Takeoffs and Landings

By designing with noise reduction in mind, Boeing was able to reduce the 747-8 noise footprint around an airport by 30 percent compared to today's 747-400 as well as satisfy QC2 noise requirements for both takeoffs and landings.

These achievements result from the application of the latest wing and propulsion system technology. The GEnx engines on the 747-8, combined with dual chevrons and integrated nacelle liners that were tested on the Boeing Quiet Technology Demonstrator II program, allow the newest 747 to operate more quietly on takeoff and landing as well as during normal flight. The redesigned flap system reduces airframe noise, making the airplane even quieter when landing. Combined, these features make the 747-8 family a good neighbor in quieter communities around the world.

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