



Eaton products and technologies help power successful first flight of Rolls-Royce Trent XWB engine for the Airbus A350

Location:

Derby, England

Segment:

Commercial

Problem:

Design lightweight and innovative systems to support the Trent XWB engine's requirements for weight reduction and increased efficiency.

Solution:

Reduce component weight, replace expensive, complex tubing and ducting with more modular products and supply improved oil-debris monitoring system.

Results:

A reliable, lightweight and technically advanced engine build-up solution for the Trent XWB engine.

Background

The Rolls-Royce Trent XWB engine is on track to power the next generation of commercial aircraft with world-leading reliability and fuel efficiency, as well as the lowest carbon emissions of any wide-body engine. The Trent XWB engine is being developed for Airbus' new A350 XWB jetliner.

Eaton designed lightweight and innovative low-pressure fuel and pneumatic systems for the Trent XWB engine and also played an extensive role in supplying equipment for engine build-up sub-systems, which encompass a broad portfolio of customized components and parts.

Eaton was responsible for the design, development, manufacture and certification of: the low-pressure fuel system; starter air system; thermal ant-icing system; engine bleed air system, including sense and muscle lines; variable frequency generator system; power door opening system; fire-extinguisher system (Firex) and pylon drains.

The Trent XWB engine also features a dual-stage pump manufactured by Eaton that brings a long track record of quality, reliability and best-in-class performance, as well as an improved oil-debris monitoring system offering advancements in prognostic and diagnostic testing capabilities.

Challenges

While Eaton has enjoyed a long-standing relationship with Rolls-Royce, its work on the Trent XWB engine represented the largest project undertaken for the engine manufacturer. One reason is Eaton's extensive role in supplying equipment for the engine build-up sub-systems, which encompassed a broad portfolio of components and parts built from the ground up for the Trent XWB engine.

Eaton's previous engine build-up (EBU) design experience on Rolls-Royce engines served as a strong foundation for the project. However, to support the Trent XWB engine's requirements for increased efficiency, Eaton engineers were further challenged to meet rigorous new standards for material selection.



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Solution

In early stages of engine development, Eaton's engineering and program management team worked as part of an integrated team with Rolls-Royce engineers in Derby, United Kingdom, and suppliers. In addition to reducing component weight, Eaton engineers designed simplified and more modular products for easier, faster installation and removal.

Eaton also is supplying an improved oil-debris monitoring system for the Trent XWB engine offering advancements in prognostic and diagnostic testing capabilities. Quantitative debris monitoring, or QDM, is a proven, mature technology that has produced significant gains for engine monitoring and aircraft maintenance while improving safety and lowering operating costs. For the Trent XWB's engine oil-debris monitoring system, Eaton made application-specific design changes to optimize condition-based maintenance and prognostic health management.

The schedule was considered extremely aggressive, with first units due within 12 months.

Results

Eaton's in-depth understanding of both equipment and conveyance system installations provided the foundation to develop a reliable, lightweight and technically advanced engine build-up solution for the Trent XWB engine. Eaton's industry-leading capability in engine build-up design and manufacture also provided Rolls-Royce with a single, integrated source of supply.



Trent XWB engine on an A380 test aircraft, with expected entry into service in 2014.

The Aerospace Group's onsite engineering team completed its first hardware delivery for the Trent XWB engine within months, meeting an aggressive milestone on schedule to support the first run of development engine.

From program launch of a new design through development, procurement, assembly and acceptance test, a new development standard pump was delivered to Rolls-Royce for system rig testing in 14 months. Eaton delivered the production pump configuration on schedule to Rolls-Royce months later to support the flying test bed engine, followed by the successful completion of pump qualification and certification activities.

In February 2012, Airbus successfully conducted the first flight of the Rolls-Royce Trent XWB engine for the A350, with expected entry into service in 2014.

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