

Ready for take off

Vice president of business development at TT Electronics, Dominic Cartwright, talks about the company's involvement in the increasing electrification of aircraft

Aircraft systems have traditionally been driven by a combination of hydraulic, pneumatic, mechanical and electrical technologies, however, recent advances in power electronics, including electro-hydrostatic actuators, high-density electric motors and new power generation and distribution systems, mean more-electric aircraft design is now a commercial reality. Its advantages: to reduce aircraft weight, minimise fuel consumption and cut emissions.

Flying lighter

TT Electronics is heavily involved in the move towards MEA, with experience dating back to the Airbus A380. This aircraft required a more-electric approach to minimise take-off weight, prompting the decision to use electrically powered electro-hydrostatic actuators.

According to Airbus, the combination of higher hydraulic pressures and a more-electric flight control architecture cut



aircraft mass by around 3,307 pounds.

Technology transfer

Utilising its industry-specific expertise, TT Electronics now offers a range of aircraft components that enable fuel pumping and fuel control, as well as electromagnetic components that control primary flight surfaces, including the ailerons, rudder and elevator. Experience from the A380 programme also prompted innovations such as electric thrust reverser actuation, and this knowledge has been transferred into the military sector.

The company's portfolio now comprises everything from cockpit and engine controls, through dynamic braking resistors for aircraft flight surface controls, to power modules and connectors for avionics and flight systems.

Tackling challenges

One of the challenges with more-electric aircraft design is heat-dissipation. TT Electronics continues to innovate here, adding heatsinks to assemblies and using special resins over larger surface areas.

Another development has been the use of composite materials. Although this has reduced aircraft weight, it also affects the airframe's electrical characteristics

More aerodynamic wing design means less space for components

as composites can't conduct electricity, eliminating the protective Faraday cage effect created when metal surrounds electrical components. TT Electronics worked to minimise these effects and protect components from nearby electric fields.

Size is a further challenge, since more aerodynamic wing design means less space for components. Here, TT Electronics reduced the footprint of the Rolls-Royce Trent XWB engine power control module on the Airbus A350 by 70 per cent.

On the horizon

In terms of electrical power actuation, there are still hurdles to overcome. Technology has enabled electric spoilers and put electric back-ups onto rudders and ailerons, but always using primary hydraulic actuation. One of the biggest challenges for the more-electric approach therefore surrounds landing gear systems. While equipment remains heavy, hydraulic power will be required.

The industry is working on a solution, but in the meantime, TT Electronics continues to explore future MEA developments.

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