ROLLS-ROYCE INTELLIGENTENGINE VISION MAKES RAPID PROGRESS

News / Events / Festivals, Manufacturer

Rolls-Royce today provided journalists at the Farnborough International Airshow with an update on its IntelligentEngine vision, highlighting three examples of recent progress and showing how rapidly Rolls-Royce's digital capabilities are developing.

The IntelligentEngine vision, launched at the Singapore Airshow in February, is based on a belief that the worlds of product and service have become so closely connected that they are now inseparable. This trend was first identified when Rolls-Royce introduced the market-defining TotalCare® service in the 1990s and, since then, advancements in digital capability have accelerated this change and further blurred the boundary between the two.

This coming together of product and service, supercharged by digital technology, offers Rolls-Royce a wealth of opportunities to improve the way it provides power to its customers with engines that are increasingly connected, contextually aware and comprehending.

Rolls-Royce outlined three examples of how their vision is coming to life:

Connected: Engines now 'talking back' to operational centres

Rolls-Royce is taking Engine Health Management (EHM) to a new level of connectivity. EHM is the

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term used to describe the transfer of data from an engine on an aircraft to an operational centre on the ground which can be used to record and monitor the performance of an engine, helping to ensure its availability.

While EHM has been a feature of Rolls-Royce jet engines for decades, Rolls-Royce's latest EHM system is capable of measuring thousands of parameters more than previous versions and it can monitor entirely new parts of the engine. And, uniquely, the engine can "talk back" – responding to requests from an operational centre to focus on one particular part or parameter, sending back hundreds of hours of information specifically tailored to that request.

Axel Voege, Rolls-Royce, Head of Digital Operations, Germany, said: "Our latest EHM systems can reach parts we haven't reached before and deliver much greater detail on request. We can now monitor

1

line replaceable units, such as Variable Stator Vane actuators and sensors – small parts but still crucial to making sure our engines are ready and available for flight – and predict when they need replacement rather than respond to their failure.

"And our talk back capability means that if, for example, an aircraft is on the ground and unable to start, we can get our engineering teams at our Rolls-Royce Availability Centres to ask for data relating specifically to starting issues – and the engine can respond to that by sending back data covering up to 200 hours of specific information. By getting that greater level of detail, instantly, our engineering teamscan work out a solution much more quickly."

The new system will go into service next year on Rolls-Royce's new Pearl 15 engine that will power the Bombardier Global 5500 and Global 6500 aircraft, making it our most IntelligentEngine yet. Rolls-Royce will build on this level of EHM for future engine designs across all its civil aerospace engines.

Contextually aware: Taming the volcano

Just as Rolls-Royce led the way with EHM to enable the success of its pioneering TotalCare service, so too it has pioneered research into atmospheric conditions and how they can affect engine performance.

Rory Clarkson, a Rolls-Royce Associate Fellow, received the UK Civil Aviation Authority's first ever flightsafety award earlier this year for his work on creating a new tool that helps aircraft operators plan flights more effectively when ash is in the air.

He examined the effects of ash on engine performance following the Eyjafjallajökull volcanic eruption in Iceland in 2010 which grounded flights across Europe, affected around ten million travellers and cost the global economy around £4.7bn. Rory, working with the UK Met Office and airline customers, synthesised the combined data into a working tool which identifies levels of engine tolerance to ash and by doing so allows customers to make better judgements about flight operations, reducing ash-related "no fly zones"with no compromise to safety.

Comprehending: Understanding the weather

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Now Rolls-Royce is taking its environmental learning forward with a better understanding of humidity and its relation to turbine gas temperatures (TGT) – creating new ways to better predict part life and servicing.

For Trent XWB engines, one way of predicting service requirements is by reading the TGT but this can be affected by humidity and make an engine appear to need maintenance earlier than is necessary. We have developed a new tool, using coding apps within the Microsoft Azure cloud platform, to rapidly

2

access accurate humidity data for every airport served by the Trent XWB and adjust for the effect on TGT readings.

This means we can plan the number of cycles our Trent XWB engines can fly on wing more accurately, increasing their availability to customers. We are already looking at ways to support other Trent fleets on a similar basis.

These three examples of the IntelligentEngine vision show the power and speed of digital development and highlight how Rolls-Royce will continue to pioneer the power that matters.

The IntelligentEngine vision sets out a future where an engine will be increasingly connected, contextually aware and comprehending, helping to deliver greater reliability and efficiency:

? Connected – with other engines, its support ecosystem, and with its customer, allowing for regular, two-way flow of information between many parties

? Contextually aware – of its operating context, constraints and the needs of the customer, allowing it to respond to the environment around it without human intervention

? Comprehending – learning from its own experiences and from its network of peers to adjust its behaviour and achieve best performance.

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