ROLLS-ROYCE EXPANDS ASIAN TRENT 1000 PARTS MANUFACTURING

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Rolls-Royce (R-R) has expanded its involvement in the Asia/Pacific aerospace industry with arrangements for producing Trent 1000 engine fan cases in Malaysia. The engine maker has signed a 25-year agreement covering manufacture, assembly, and supply of the assemblies with UMW M&E, the investment arm of Malaysian conglomerate UMW, and the latter's newly established UMW Aerospace subsidiary.

The deal is part of the UK company’s strategy to create a supply chain closer to customers in developing regions. Three years ago, Rolls-Royce opened a 65,000-sq-m (about 650,000 sq-ft) fan-blade manufacturing, assembly, and testing plant at Singapore's Seletar Aerospace Park, which, in the future, will receive Trent 1000 fan cases from neighboring Malaysia.

The agreement follows R-R's development of Southeast Asia as a supply hub and “demonstrates the positive impact the Seletar facility has on growth in aerospace capability in Malaysia and the rest of the region,” according to UMW. The conglomerate sees its expansion into aerospace as a significant step that will make it Malaysia's first Rolls-Royce Tier 1 supplier.

R-R aerospace president Tony Wood said establishing a competitive global supply chain is part of a transformation of the engine manufacturer's industrial base. “With its commitment to creating a successful aerospace industry, Malaysia was an ideal country in which to look for manufacturing partners.” As well moving R-R nearer to Southeast Asia, the deal will reduce labor costs and complement UK manufacturing capacity as production approaches unprecedented rates, said Wood.

With its first Seletar-assembled example unveiled earlier this year, R-R plans to accelerate Singapore production of the Trent 1000, which competes against the General Electric GEnx-1B to power Boeing 787s, and that of the Trent 900, its offering for the Airbus. The facility, which accommodates a full-size engine testbed, has an annual capacity for 250-to-300 units, which permits the principal UK plant in Derby, UK to concentrate on increasing output of Trent XWBs to more than 300 a year. The engine is the exclusive powerplant for the new Airbus A350.

Transfer of Trent 1000 fan case manufacturing to UMW Aerospace during the coming five years will allow R-R's UK factory at Ansty to concentrate on other engines. UMW said that the initial agreement will expire at the end of 2040, although there is an optional five-year extension.

The industrial move comes as the engine company products continue to evolve to meet requirements for more-reliable, quieter, and more-economical powerplants. Unveiling half-year results early in 2015, R-R chief executive Warren East said: “In the near term, we are managing a significant transition from mature engines to newer, more fuel-efficient ones, such as the Trent XWB, Trent 7000 [for the planned Airbus A330neo], and Trent 1000.”

The Trent 1000 propelled the first Boeing 787 “Dreamliner” flight in December 2009 and first commercial service in October 2011. It was the initial powerplant certified on both the 787-8 and -9, and was the first 787 engine to be cleared for 330-minute, extended-range, twin-engine operations (ETOPS). Now, R-R is keen to see its latest Trent 1000-TEN (for Thrust, Efficiency, and New-technology) variant power the first flight of the stretched, short-range 787-10.

This new engine introduces several features developed for the A350's more-powerful TrentXWB, including a “rising-line” compressor and three-stage bladed disc (“blisk”) at the front of the high-pressure compressor. R-R says that on flights of up to 3,000 miles the -TEN is expected to offer a specific fuel consumption advantage of some 3 percent, although this differential decays over longer sectors.

For flights of average 787 range, the basic 1000 delivers a fuel-burn advantage “well ahead” of the GEnx-1B at shorter ranges, according to R-R. An “additional 1 percent” is also said to accrue from superior performance retention through the life of the engine.

As testing has continued, one of the 1000-TEN prototypes (engine serial number 11003) has been put through its paces at the U.S. Air Force Materiel Command Aeropropulsion Systems Test Facility (ASTF) at the Arnold Engineering Development Complex (AEDC) at Arnold AFBin Tennessee. Altitude performance was “slightly better than pre-test predictions,” said R-R.

Tests for Trent 1000-TEN performance, operability, and icing certification were performed in the ASTF's C-2 engine cell. “The first program [tests] verified the expected improvements in thrust and fuel efficiency, operability (such as stall margins during fast accelerations and decelerations), [and] the start envelopes,” said Tom Schmidt, project manager at Aerospace Testing Alliance (ATA), which provides AEDC information management, maintenance, operations, and support services. “The C-2 icing system was then installed to run the prescribed icing condition and to demonstrate

the engine's anti-ice systems and engine ice-shedding characteristics."

Serial number 11003 is the third Trent 1000 to be tested at Arnold: during the first exercise in 2007, the engine was tested for performance, operability and starting. Last year, AEDCengineers tested a 1000 fitted with Pack C performance upgrades. Other R-R commercial engine testing there has involved Trent 900s and the BR725 powerplant for the GulfstreamG650.

Rolls-Royce has also been running Trent 1000 "maturity engines" to ensure behavior of units fitted with Pack B and Pack C performance-improvement measures and to stay ahead of operational in-service units. A recent, and new, customer is Ethiopian Airlines, which has selected the engine (and an associated long-term support package) to power six Boeing 787-8s. The decision is noteworthy since it represents a change of engine by the African carrier from the GEnx-1B it chose for 13 previous 787s.

Ethiopian Airlines chief executive Tewolde Gebremariam is confident that the R-R engines will "deliver outstanding lifetime fuel burn, performance, and reliability." According to Dominic Horwood, the manufacturer's chief customer officer for large civil engines, R-R has "real momentum in the marketplace," the Trent 1000 having been selected in more than 60 percent of applicable engine competitions in the past five years.

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