Rolls-Royce is transferring all its RB211-535E4 maintenance activity exclusively to StandardAero. The maintenance provider has a end-of-life licence up to 2040.

StandardAero is life support provider for the RB211-535

StandardAero has built on its 50-year relationship of supporting Rolls-Royce engines, and has been designated as the 'life of type' maintenance service provider (MSP) for the RB211-535E4.

RB211-535E4 shop visits (SV) will be performed at StandardAero's facility in San Antonio, Texas. The facility is located at the former Kelly Air Force Base, with full shop capacity expected to be reached by 2023. This will be supported by component repairs conducted by StandardAero Component Services (SACS) located in Cincinnati, Ohio.

The San Antonio facility includes four test cells, three of which are capable of supporting engines rated up to 50,000lbs thrust, and one for engines rated up to 90,000lbs.

The licence is for end-of-life support for the RB211-535E4. The licence is through to the engine's expected out of service date (OSD) of about 2040. Under the agreement with Rolls-Royce, go-forward support for the RB211-535E4 is being transitioned from its Derby location to StandardAero's facility in San Antonio. "We began inducting customer engines earlier this year, and have a well-defined ramp-up schedule, reaching a steady level of 60 inductions annually by 2023," says Gus Katramados, commercial services program director, at StandardAero. "From January 2021, all of Rolls-Royce's RB211-535E4 programme load will be undertaken exclusively by StandardAero."

The sector is currently served by a number of third-party providers. Ameco Beijing will continue to serve the Asia Pacific market. Iberia Maintenance, an independent provider of repair services with facilities at Madrid Airport, is expected to exit the RB211 market within the next two years, although it could still remain as an unauthorised shop. The former joint venture between Rolls-Royce and Texas Aero Engine Services Limited (TAESL), was dissolved in early 2016.

StandardAero's licence incorporates all workscopes, including heavy overhauls and high-tech repairs, to Level 4. "For engines enrolled in the Rolls-Royce TotalCare® programme, pricing is defined by Rolls-Royce. StandardAero will be conforming to established workscopes as already defined by Rolls-Royce," explains Katramados. "For engines not enrolled in Rolls-Royce TotalCare, StandardAero will set prices for workscopes, in consultation with Rolls-Royce." Customers will have the choice of time and material (T&M), fixed price, and not-to-exceed (NTE) pricing structures and flexibility on SV definition.

StandardAero will perform all engine disassembly, assembly and 'book' detailed part repairs. Rolls-Royce will retain the 'source controlled' repairs. The RB211-535 programme's current LRU suppliers will retain responsibility for LRU repair work.

There are four levels of SV workscope for the RB211-535.

Level 1 is a serviceability SV. It is usually an external visual inspection on a single module. Examples include a borescope inspection or a bench test.

Level 2 is a visual check and partial repair. This is called up when specific damage occurs to a module, for example, to the combustion chamber, HPT blades, or a compressor blade.

Both Level 1 and 2 are classified as light workscopes, and do not involve disassembly and reassembly of the engine or restoration of engine performance.

Level 3 encompasses work on all engine modules. This necessitates disassembly and reassembly. Each module, in turn, is disassembled to repair or replace parts that have suffered from thermal deterioration. Level 3 is also used to restore engine performance, or 'zero-life' the module.

Level 4 is a full overhaul. The engine is disassembled to its individual modules and the modules to piece parts. This facilitates life limited parts replacement.

Parts support for the engine is provisioned by Rolls-Royce and

The RB211-535 is expected to remain in service for another 20 years. Because of the engine's popularity, StandardAero is acquiring eight used engines to provide USM.

StandardAero. "Rolls-Royce has a well-established roadmap for the continued availability of new parts for the RB211-535, which is expected to remain in service for another 20 years. StandardAero will utilise off-wing engine assets to ensure a reliable supply of used serviceable material (USM) for those operators which use this type of material," says Katramados.

StandardAero is looking to buy engines on the open market. It is close to finalising the purchase of eight engines as the initial investment for its USM programme.

RB211-535E4 series

There are four RB211-535 variants: the -535C, rated at 37,400lbs thrust; the -535E4, rated at 40,100lbs thrust; the -535E4B, rated at 43,100lbs thrust; and the -535E4C, rated at 44,800lbs thrust.

The RB211-535 has the three-shaft configuration utilised by all RB211 and Trent engines. The engine has a 74.1-inch diameter intake fan and a bypass ratio of 4.3:1. The core engine has 17 stages: a six-stage intermediate compressor; six-stage high pressure compressor; single-stage high pressure turbine; intermediate pressure turbine; and a three-stage low pressure turbine.

The -535C was the last RB211 variant to use fan blades with a mid-span shroud that connects all blades to form a ring. The -535C has 33 fan blades.

The -535E4 introduced the use of wide chord, shroudless fan blades. The -535E4, -535E4B and -535E4C have 22 fan blades. The use of wide chord fan blades incurs less drag, leading to a lower specific fuel consumption (SFC) over the -535C. There are also annulus fillers between the fan blades. Fan blades and fillers are classed as LLPs in the RB211-535 series.

There are 477 active RB211-powered 757s in service. These form the potential market available to StandardAero.

The -535C-powered fleet is just six active aircraft. Five are -200SF converted freighters operated by DHL and one VIP-configured aircraft. These are due to retire over the next few years.

There are 265 active -535E4-equipped aircraft. Passenger-configured aircraft number 93, with the main fleets operated by Icelandair (17), Jet2.com (11) and TUI UK (12). Freighters account for 148 and are split by the converted -200SF (145), with the main fleets operated by DHL (9), FedEx (66), and SF Airlines (23); and the factory-built -200PF (3). The remainder comprise Combi (7) and VIP, special role, or experimental (17) aircraft.

There are 202 active aircraft with -535E4B engines . Passenger-configured aircraft number 141, split by the -200 (106) and -300 (35). The main fleets are operated by Airwork (NZ) (9), American Airlines (30), Condor (15), Icelandair (10), Jetran (15) and United Airlines (58). Freighters account for 60, with UPS operating 40 factory-built -200PFs and the remaining 20 converted -200SFs operated by Airwork (NZ) (1), Aviastar-TU (2), Cargojet Airways (4), DHL (7) and SF Airlines (6). There is a single VIP-configured aircraft.

There are just four active 757-300s with -535E4C engines, operated by United Airlines.

The Asia Pacific fleet is the least likely to be supported by StandardAero. It comprises 53 aircraft operated by a variety of airlines that include SF Airlines Xiamen Airlines. Six are passenger-configured and 47 are freighters. AC