

RB211-535 & PW2000 technical support providers

While the majority of the maintenance market for the RB211-535E4 & PW2000 is controlled by the OEMs, there are a large number of other providers that provide a variety of support services.

This survey summarises the major aftermarket and technical support providers for the Pratt and Whitney PW2000 and Rolls-Royce RB211-535E4 engines. It is grouped into six sections covering the categories of technical support offered by each provider.

- Line maintenance and in-service operational support.
- Engine management.
- Engine provisioning.
- Engine components.
- Shop-visit maintenance.
- Specialist repairs.

Companies that are listed in most of the six sections are 'one-stop-shop' service providers for one or both of these two engines. This means that they provide most, if not all, of the technical support services that a third-party customer would require. The tables show the range of services that the RB211-535E4 and PW2000 overhaul shops are capable of offering.

Rolls-Royce owns and operates two overhaul facilities that specifically deal with the RB211-535E4: one near its head offices in Derby, UK; and the other in Canada.

Pratt and Whitney (PW) owns and operates many facilities all over the world, but its main facility for the PW2000 is in Cheshire, US.

RB211-535E4 market

Much of the RB211-535E4 engine overhaul is done either at Rolls-Royce's own shops, or at those that are joint ventures between Rolls-Royce and airlines or independent maintenance providers.

The two Rolls-Royce-owned overhaul shops in the UK and US account for just over 25% of the market. They are second only to Texas Aero Engine Services (TAESL) which has over 27% of logged contracts, according to FlightGlobal's ACAS maintenance database. This equates to 418 individual shop visits. TAESL is a 50:50 joint venture between Rolls-Royce and American Airlines. This means that Rolls-Royce's partner shops

or joint ventures account for over 50% of engine contracts.

The next biggest overhaul facility in terms of market share is Iberia, which has nearly 17% of logged contracts, with airlines including British Airways and China Southern Airlines. After Iberia, the overhaul facilities with the next biggest market share are Ameco Beijing with over 5% and Lufthansa (nearly 2%). Ameco Beijing is a joint venture between Lufthansa and Air China, meaning that Lufthansa is connected to about 7% of the market.

Contracts that are completed by airlines in-house still account for more than 16% of maintenance, repair and overhaul (MRO) provision for the RB211-535E4. The remaining 6% of contracts are either unknown or up for tender.

The largest fleet of engines is operated by American Airlines, which has 248. These are overhauled by both TAESL and American's own in-house engineering team.

The next biggest number of engines is operated by Continental. They have more than 100 RB211-535E4-Bs, and these are overhauled by both Iberia and Rolls-Royce Aero Repair & Overhaul. Iberia is also responsible for Continental's 16 - 535E4-C engines.

TAESL is not the only MRO to be a joint venture between Rolls-Royce and airlines. Rolls-Royce has similar ventures with airlines all over the world, such as SAESL with Singapore Airlines and HAESL in Hong Kong. TAESL is,



The majority of RB211-535E4 shop visit activity is controlled by Rolls-Royce or engine shops where Rolls-Royce has a joint venture with an airline or independent maintenance provider. Iberia Maintenance & Ameco Beijing are the only independent engine shops for the RB211-535E4.

RB211-535E4 & PW2000 LINE MAINTENANCE & IN-SERVICE OPERATIONAL SUPPORT

	On-wing maintenance	Line maintenance	Hospital repair/ Quick turn repairs	On-wing support	AOG/field services	Borescope inspection
RB211-535E4						
Air Atlanta Aero Engrg	Y	Y	-	Y	-	Y
Air Concepts Repair	-	-	Y	-	Y	-
Ameco Beijing	-	-	Y	Y	Y	Y
ATC Lasham	Y	-	-	-	-	-
Condor Cargo Tech	Y	Y	Y	Y	Y	Y
El Al Tech	-	Y	-	-	Y	-
Far Eastern Air Trans	Y	Y	-	Y	-	Y
GAMECO	Y	Y	-	Y	Y	Y
HAECO	Y	Y	Y	Y	Y	Y
HAESL	Y	-	-	Y	-	Y
Iberia Maintenance	Y	Y	Y	Y	Y	Y
Icelandair Tech	Y	Y	Y	Y	Y	Y
Louro	Y	Y	Y	-	Y	-
Air Berlin Technik	Y	Y	Y	Y	Y	Y
Monarch Engineering	Y	Y	Y	Y	Y	Y
Shannon Aero	Y	Y	-	-	-	Y
TAESL	Y	-	Y	Y	Y	Y
PW2000						
Air Atlanta Aero Engrg	Y	Y	-	Y	-	Y
ATC Lasham	Y	-	-	-	-	-
Condor Cargo Tech	Y	Y	Y	Y	Y	Y
Delta TechOps	Y	Y	Y	Y	Y	Y
Far Eastern Air Trans	Y	Y	-	Y	-	Y
GAMECO	Y	Y	-	Y	Y	Y
HAECO	Y	Y	Y	Y	Y	Y
Louro	Y	Y	Y	-	Y	-
Air Berlin Technik	Y	Y	Y	Y	Y	Y
Monarch Engineering	Y	Y	Y	Y	Y	Y
MTU Maintenance Hannover	Y	-	Y	-	Y	Y
Northwest Airlines	Y	Y	Y	Y	Y	Y
Pratt & Whitney Cheshire	Y	Y	Y	Y	Y	Y
Shannon Aerospace	Y	Y	-	-	-	Y
United Services	Y	Y	Y	Y	Y	Y

RB211-535E4 & PW2000 ENGINE MANAGEMENT

	Maintenance management & check planning	ADs/SBs management	Documentation management	Health/condition monitoring
RB211-535E4				
Ameco Beijing	Y	Y	Y	Y
ATC Lasham	Y	Y	Y	-
Condor Technik	Y	Y	Y	Y
Far Eastern Air Transport	Y	Y	Y	Y
GAMECO	Y	Y	Y	Y
HAESL	-	-	Y	-
Iberia Maintenance	Y	Y	Y	Y
Icelandair Tech Services	Y	Y	Y	Y
Air Berlin Technik	Y	Y	Y	Y
Monarch Engineering	Y	Y	Y	Y
TAESL	-	Y	Y	-
PW2000				
ATC Lasham	Y	Y	Y	-
Condor Technik	Y	Y	Y	Y
Delta TechOps	Y	Y	Y	Y
Far Eastern Air Transport	Y	Y	Y	Y
GAMECO	Y	Y	Y	Y
Air Berlin Technik	Y	Y	Y	Y
Monarch Engineering	Y	Y	Y	Y
MTU Maintenance Hannover	Y	Y	Y	Y
Northwest Airlines	Y	Y	Y	Y
Pratt & Whitney Cheshire	Y	Y	Y	Y
United Services	Y	Y	Y	Y

however, the only airline collaboration that maintains RB211-535E4 engines.

Rolls-Royce has also undertaken joint ventures with other maintenance facilities, in effect forming a third organisation. For example, it has formed HAESL with Hong Kong Engineering Company (HAECO), which means that more engine types and capabilities can be offered in the Asia Pacific region.

PW2000 market

Like the maintenance for the RB211-535E4, many of the contracts available on PW2000 engines are completed at Pratt and Whitney's own facilities or those of its joint ventures. Generally Pratt and Whitney does not take part in joint ventures to the extent that Rolls-Royce does.

There are many PW maintenance facilities worldwide, such as those in Norway and East Hartford, US, many of which may occasionally undertake work on the PW2000. But most of the engine overhaul is done in one place, Pratt and Whitney's Cheshire Engine Centre in the US, which is its main location for PW2000 maintenance. When all Pratt and Whitney's facilities are added together, they account for more than 62% of the logged contracts, according to ACAS.

The second most active facility is Delta's Delta TechOps with very nearly 19% of the market share (292 engines). United Airlines' United Services accounts for more than 12.5%.

The fourth position is held by MTU's maintenance facility at Hannover, Germany, which logged nearly 5%.

SNECMA, Eagle Services Asia and SR Technics are other facilities that used to perform PW2000 maintenance, but have now ceased activity with this engine.

The largest number of engines, other than those belonging to the US Air Force (which are overhauled by Pratt and Whitney), are those with Delta (274 engines). These engines are maintained in-house by Delta TechOps. The largest contract, which is not dealt with in-house, is that with Northwest Airlines. It sub-contracts the maintenance for 110 PW2037s and 32 PW2040s to Pratt and Whitney.

Major providers

The vast majority of PW2000s and RB211-535s are powering Boeing 757s. This aircraft design is over 20 years old, so the major MRO providers are not changing much or even growing. In fact, the number of maintenance facilities are being reduced as demand changes.

Quite a few 757s are now having their usage changed and becoming freighter aircraft. The failure of airlines,

such as ATA and Eos, means that more passenger aircraft are becoming available for conversion to freighter. When an engine shop no longer has a contract with a major airline to carry out maintenance for its engines, the shop could drop its capabilities for the engine altogether. This is the case with SR Technics, which carried out maintenance for XL Airways, but due to a lack of specialist tools did not do any overhaul. The engine is no longer part of their official maintenance capabilities.

More than 70% of 757s are flown by North American operators. This figure is helped by the fact that United, Delta and Continental have such large 757 fleets. This also means that these three airlines need large maintenance facilities to cope with their requirements.

The majority of Pratt and Whitney's PW2000 maintenance is carried out at its Cheshire facility in North America. This is partly because Pratt and Whitney is an American original equipment manufacturer (OEM), but also because over 85% of all PW2000-equipped 757s are operated in North America. Only 16% of the PW2000-equipped 757s operate in Europe, and few in the rest of the world.

The major provider of PW2000 overhaul facilities in Europe is MTU Maintenance in Hannover, Germany. America's main PW2000 providers (other than Pratt and Whitney) are Delta's Delta TechOps and United's United Services. Many other maintenance providers around the world offer line and/or specialist maintenance services.

Rolls-Royce, on the other hand, has two main locations (one near its head office in the UK, and one in Canada) and many joint ventures with airlines and MRO facilities all over the world. This reflects the RR-equipped 757's geographical scattering. Of the 757s with RB211-535E4 engines, 60% are in the Americas, while another 25% are in Europe. The 25% equates to 142 aircraft. This is nearly six-and-a-half times more than the number of PW2000-powered 757s in Europe, which is 22.

The remaining 15% of RR-powered 757s are operating out of Africa, China and, to a lesser extent, the Middle East and Asia Pacific.

There are more overhaul facilities around the world for the RB211-535E4, but many are partners of, or joint ventures with, Rolls-Royce. The major providers in Europe are Iberia and Rolls-Royce. In the Americas, there are Rolls-Royce and TAESL, while Ameco Beijing and HAESL are the main overhaul facilities in the Asia Pacific.

Due to the age of the RB211-535E4 and PW2000, the number and size of the maintenance facilities for these two engines are not as great as those for the

RB211-535E4 & PW2000 ENGINE PROVISIONING

	Short-term leasing	Medium- & long-term leasing	Engine pooling	Sale & leasebacks
RB211-535E4				
AAR Engine Sales & Leasing	Y	Y	Y	Y
Ameco Beijing	Y	Y	Y	Y
Engine Lease Finance	Y	Y	-	Y
GAMECO	Y	Y	-	-
GA Telesis	Y	Y	-	Y
Iberia Maintenance	Y	Y	Y	Y
Icelandair Tech Services	Y	Y	-	Y
Monarch Engineering	Y	Y	-	Y
Willis Lease Finance	Y	Y	Y	Y
PW2000				
AAR Engine Sales & Leasing	Y	Y	Y	Y
Delta TechOps	Y	Y	Y	Y
Engine Lease Finance	Y	Y	-	Y
GAMECO	Y	Y	-	Y
GA Telesis	Y	Y	-	Y
MTU Maintenance Hannover	Y	Y	-	Y
Northwest Airlines	Y	-	-	-
Pratt & Whitney Cheshire	Y	Y	Y	Y
United Services	Y	Y	Y	Y
Willis Lease Finance	Y	Y	Y	Y

RB211-535E4 & PW2000 ENGINE COMPONENTS

	QEC repair	QEC build-up & engine dressing	LRU repair	LRU pooling & logistics
RB211-535E4				
Accel Aviation Accessories	-	-	Y	-
Ameco Beijing	Y	Y	Y	-
Far Eastern Air Transport	-	Y	-	-
GAMECO	-	Y	Y	Y
HAECO	-	Y	-	-
Iberia Maintenance	Y	Y	Y	Y
Icelandair Tech Services	-	-	-	Y
Air Berlin Technik	-	Y	-	-
Monarch Engineering	Y	Y	Y	Y
TAESL	-	Y	-	-
PW2000				
Able Engineering & Component Services	Y	-	-	-
ATC Lasham	Y	Y	-	-
Delta TechOps	Y	Y	Y	Y
Far Eastern Air Transport	-	Y	-	-
GAMECO	-	Y	Y	Y
HAECO	-	Y	-	-
Air Berlin Technik	-	Y	-	-
Monarch Engineering	Y	Y	Y	-
MTU Maintenance Hannover	Y	Y	-	Y
Northwest Airlines	Y	Y	-	Y
United Services	Y	Y	Y	Y

CFM56-7B or the V2500. Where there are maintenance capabilities, however, these will be supported with years of practical experience of that engine model. In addition to regular engine overhaul, additional work had been produced by the various modifications and upgrades to

the engines. Some of these processes were merged into planned maintenance and some were not taken up. Most, if not all, major work will therefore have been completed by now, other than that necessitated by Airworthiness Directives (ADs), as and when they are issued.

RB211-535E4 & PW2000 SHOP-VISIT MAINTENANCE

	Hot-section inspection	Module change	Module overhaul	Full overhaul	Mods & upgrades	Disassembly/build-up	On-site test cell	Specialist processes
RB211-535E4								
Ameco Beijing	Y	Y	Y	Y	Y	Y	Y	Y
Chromalloy	-	-	-	-	-	-	-	Y
GAMECO	Y	Y	-	-	Y	-	-	-
HAECO	-	-	-	-	-	-	-	Y
Iberia Maintenance	Y	Y	Y	Y	Y	Y	Y	Y
Lufthansa Technik Intercoat	-	-	-	-	-	-	-	Y
Monarch Engineering	Y	-	-	-	-	-	-	-
Praxair Surface Technologies	-	-	-	-	-	-	-	Y
Shannon Aerospace	Y	-	-	-	-	-	-	-
TAESL	Y	Y	Y	Y	Y	Y	Y	Y
PW2000								
Chromalloy	-	-	-	-	-	-	-	Y
Delta TechOps	Y	Y	Y	Y	Y	Y	Y	Y
Far Eastern Air Transport	-	Y	-	-	-	Y	Y	-
GAMECO	Y	Y	-	-	Y	-	-	-
Lufthansa Technik Intercoat	-	-	-	-	-	-	-	Y
Monarch Engineering	Y	-	-	-	-	-	-	-
MTU Maintenance Hannover	Y	-	Y	Y	-	Y	Y	Y
Northwest Airlines	-	-	-	-	-	-	-Y	-
Pratt & Whitney Cheshire	Y	Y	Y	Y	Y	Y	Y	Y
Praxair Surface Technologies	-	-	-	-	-	-	-	-Y
United Services	-	Y	Y	Y	-	-	Y	Y

RB211-535E4 & PW2000 SPECIALIST REPAIRS

	Fan blade repair	Vanes & stator repair	Compressor blade repair	Turbine blade repair	Combustor repair	Casing repair	Seals repair	On-site DER authority	PMA parts approved
RB211-535E4									
ATI UK	Y	Y	Y	-	-	-	-	-	-
Ameco Beijing	Y	Y	Y	-	-	Y	Y	-	-
Chromalloy	-	Y	-	Y	Y	Y	Y	Y	-
HAECO	Y	-	-	-	-	Y	-	-	-
Iberia Maintenance	-	Y	-	-	Y	Y	Y	-	-
Icelandair Tech Services	-	-	-	-	-	-	-	-	Y
Monarch Engineering	Y	Y	-	-	-	Y	Y	Y	-
PAS Technologies	Y	Y	Y	-	-	-	Y	-	-
PW2000									
Able Engineering & Component Services	-	-	-	-	-	-	-	-	Y
Chromalloy	-	Y	-	-	-	-	Y	Y	Y
Delta TechOps	Y	Y	Y	Y	Y	Y	Y	Y	Y
Monarch Engineering	Y	Y	-	-	-	Y	Y	Y	-
MTU Maintenance Hannover	-	Y	-	-	-	-	Y	Y	-
Pratt & Whitney Cheshire	-	Y	Y	Y	Y	Y	Y	Y	-
United Services	Y	Y	Y	Y	Y	Y	Y	Y	Y

Aftermarket perspectives

Development of the aviation industry in India and China means that 757s rather than 737s could be increasingly looked at as options on the longer, busier routes. An airline in the Russian Federation is being set up by a Russian travel company using 757s, emphasising the suitability of the aircraft, and either engine option, to the charter market.

The vast majority of the freighters are operated by American companies, but because they could be flying anywhere in

the world, engine maintenance facilities are required worldwide. The number of PW- and RR-powered 757s, used as freighters, has gone up in recent years and there are more conversions from passenger configuration being performed. FedEx is one of the cargo airlines that are converting a number of RB211-535E4-powered 757s.

One issue to consider is the preference freight carriers will have for engine types on converted 757 freighters. While the RB211-535E4 may have been the most popular with passenger operators, the

fact that RR controls the overhaul and repair market may see a preference for the PW2000 among freight operators. This is because there is some flexibility with the worksopes of engine shop visits for the PW2000, and this will suit carriers operating at low rates of utilisation. The RB211-535E4, however, has high shop-visit costs and just one level of shop-visit worksope. [AC](#)

To download 100s of articles like this, visit:
www.aircraft-commerce.com