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Embraer E190-E2

A family affair

Widerøe

Northern Lights

Lufthansa Technik's new wheels and brakes facility in Frankfurt can handle up to 32,000 wheels and 6,000 brakes per year, and was built largely to facilitate the continued growth of low-cost carriers.

Looking after the supply and maintenance of landing gear systems is a vital service that needs to be available everywhere, all the time, writes Mark Thomas.

What airlines and aircraft manufacturers have long required when it comes to landing gear systems – safety, reliability and performance – is increasingly becoming a longer list.

Today's requirements, among other things, now specify high dispatch reliability, flexibility, simplified and faster maintenance around the world, lower costs and lighter weights to help contribute towards the holy grail of lower fuel burn.

For what remains a system of such vital necessity on an aircraft – enabling it to manoeuvre to and from the runway, take off and land safely, as well as stop when needed – these hard working and robust pieces of engineering often get remarkably little attention apart from those that are specifically tasked with looking after them.

However, the increasingly complex design, manufacturing and maintenance of the landing gear structure – the extension/retraction and steering actuation, the main fitting, sliding tube, side stays and locking stays, wheel axle and drag braces, position and warning systems, the integration of wheels and brakes and the associated sensors and controls (including cockpit controls) – means the industry is not only having to raise its game but also position itself for the next wave of activity.

One company that is well aware of this is Liebherr-Aerospace. The Lindenberg-based aerospace manufacturer and servicing specialist supplied the landing gear system for the COMAC (Commercial Aircraft Corporation of China) short-to-medium-range C919 aircraft, now well into its flight test programme after first flying in May last year. For the development and production of this and earlier landing gear systems, Liebherr-Aerospace entered into a joint



Strong foundations

venture several years ago with AVIC (Aviation Industry Corporation of China) company Landing-gear Advanced Manufacturing Co. based in Changsha, Hunan Province.

The Liebherr LAMC Aviation's first co-production was delivering the main landing gear for the first ARJ21 regional jet built by COMAC.

The system for the C919 was developed, supplied and will be serviced by Liebherr-Aerospace Lindenberg. It includes the main landing gear and nose landing gear, extension and retraction system, nose wheel steering system as well as the position and warning system.

RELIABILITY

On the other side of the world, meanwhile, Liebherr has also been involved with the latest safe and scheduled arrival of a new aircraft type on the market, Embraer's E190-E2, now operating for Norway's Widerøe.

Liebherr-Aerospace Lindenberg was responsible for the new E-Jet's nose wheel steering control module as well as the advanced full fly-by-wire high lift system. It completed on schedule all tests and documentation in the build up to this key

launch for the Brazilian manufacturer. The company also offers international support solutions for its components and systems onboard the E2s and accompanies the aircraft throughout their entire life cycle.

Late last year it also signed a maintenance services agreement with Embraer covering ERJ135 and ERJ145 components, as well as the nose landing gear overhaul of ERJ135, ERJ145 and Legacy 600 aircraft. For Embraer Services and Support's Rodrigo Maeda, director, repair management, Liebherr's reliability is a key factor for its activities including nose landing gear maintenance. "They have a proven level of flexibility, performance and quality. This contract will make our services even more competitive for our operators in terms of service level and operational costs."

The support services will be performed by Liebherr-Aerospace's OEM and service centres in Lindenberg, Germany – its centre of excellence for landing gear.

WORLDWIDE NETWORK

Safran Landing Systems is now also reaping the benefits of a wide network of international service centres in Europe, Asia and the Americas, where it can call on a



large stock of ready-to-use replacement landing gear.

Long-haul, low-fare carrier AirAsia X of Malaysia has now chosen Safran's facility in Singapore to provide landing gear maintenance, repair and overhaul (MRO) services on its Airbus A330 fleet, starting this year. The deal will run initially until 2025 and

covers complete overhaul and repair services for the landing gear on 24 A330s.

The facility in Singapore is already commissioned to provide MRO services for the landing gear of AirAsia X's sister company AirAsia – specifically, its A320 fleet of 32 aircraft. The new deal means a total of 56 contracted aircraft from the airline group for the MRO provider. Jean-Paul Alary, Safran's CEO, said the latest deal was "recognition of our ability to deliver the highest and most competitive level of services, quality and performance."

Other evidence of its international network came from the Middle East, where late last year it also signed a deal with Bahrain's Gulf Air to supply wheels and brakes for the carrier's incoming fleet of

Boeing 787-9s and Airbus A320neo aircraft. The kingdom's national flag carrier is a long-time partner of Safran and signed an agreement that will see the latter equip the airline's fleet of 10 B787-9 Dreamliners and 12 A320neos with its wheels and brakes as the aircraft are delivered during the course of this year.

Gulf Air's deputy CEO, Captain Waleed Abdulhameed Al Alawi, said the airline selected Safran Landing Systems "for their high dispatch reliability, simplified maintenance, as well as their weight advantage resulting in lower fuel burn. Safran Landing Systems is a reliable partner of Gulf Air and we are pleased with our choice towards a wheels and brakes technology of renowned quality to equip our new fleet."

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Safran's carbon brake technology was "an ideal choice with regard to the requirements of cost, efficiency and expected performance," he added.

Safran is also continuing work on its electric taxiing system, which would be built into an aircraft's main landing gear, after last year signing a Memorandum of Understanding with Thales for the development of a power supply unit for the system.

The taxiing system will enable an aircraft to taxi independently, based on using electric motors in the main landing gear, powered by electricity from the auxiliary power unit (APU) and not having to start up the main engines or use an airport tractor. In order to reduce aircraft weight, Safran chose an ATRU transformer (auto transformer rectifier unit) designed and developed by Thales.

LUFTHANSA RESPONDS TO LCC GROWTH

For Lufthansa Technik, the continuing rise of low-fare carriers has meant it has had to invest almost €60 million opening a new wheels and brakes workshop at Frankfurt East, Germany, to help it cope with increased demand. Built in just two years, the industrial facility has a gross floor area of 14,500sq metres.

Optimised processes, tailored logistics and the latest plant equipment will help the company deliver the cost-effective supply of wheels and brakes for flight operations not only for the Lufthansa Group but also for other European customers.

"And while business with low-cost carriers is already strong, this new site opens up opportunities for even further growth in this area," Lufthansa Technik stated. "Some 27,000 wheels and 5,000 brakes were repaired in the old workshop on the airport site in 2016 – way more than the original maximum capacity of the facility, which was designed originally for 15,000 wheels and 2,500 brakes annually. The new production now allows growth to 32,000 or 6,000 units per year."



Liebherr-Aerospace provides support solutions for its components and systems onboard Embraer's E2 jets and accompanies the aircraft throughout their entire life cycle.

Frank Zimmermann, head of project management of the wheels and brakes workshop, said considerable effort had been invested in the maintenance of aircraft wheels and brakes owing to their importance for the safety of flight operations. "Lufthansa Technik takes care of all the necessary work – from wheel or brake changes to small repairs or complete overhauls of a wheel or brake. Every wheel or brake passes through numerous stations until finally, after a thorough check, in accordance with internationally applicable aviation laws, it is approved in the final inspection."

TURNAROUND TIME

AAR Landing Gear Services, which can carry out activities ranging from minor repairs to complete overhauls from its own 12,000sq metre self-contained, full-service facility in

Miami, Florida, has also positioned itself for future growth.

Its existing joint venture, for example, with Malaysian MRO provider AIROD provides turnkey landing gear services to commercial customers throughout the Asia-Pacific region from its location near Kuala Lumpur's Subang Airport that it says brings high-quality, cost-effective services to this fast-growing aviation market.

Last year, of course, it made major inroads into the Asia-Pacific region after signing a significant agreement with India's IndiGo, the low-fare airline, to provide support for landing gear overhaul services. That contract included up to 49 full shipsets of Airbus A320 landing gear, as well as assemblies and subassemblies, for the next five years.

That also includes AAR's on-wing service via its 'Tiger Teams' that handle on-site situations worldwide and enable faster turnaround times, a key factor for low-fare and regional carriers.

It also just recently signed a wider long-term repair and overhaul agreement with Honeywell Aerospace, along with a parts supply agreement, that will see AAR provide repairs for over 1,800 Honeywell base part number and line replacement units (LRU) repair items at its New York and Amsterdam component repair shops.

To support these repairs, AAR will source more than 4,000 material supply piece part items from Honeywell, which will also provide repair and overhaul of LRUs to support AAR's growing flight-hour component support programmes for airline fleets worldwide. The agreement covers various platforms including pneumatics, hydraulics, and power generation for Boeing, Airbus and regional commercial fleet types.

"This is the latest step in AAR's focus on continuous improvement to drive more predictable maintenance while gaining the highest on-wing reliability for our airline customers," said Ken Hein, senior vice-president of operations at AAR. ■

