Corporate Sales

Global excellence

Lufthansa Technik’s three Vice Presidents Corporate Sales highlight the special strengths of the MRO provider.

Engine Services

Cyclean® goes digital

Using digital technology for engine washes.

Line Maintenance

Cooperation based on trust

Lufthansa Technik Brussels supports Ryanair.

Innovation and technology

Augmented reality at work

Pursuing the implementation on the shop floor.
Lufthansa Technik Connection 1.2020

Global excellence
Lufthansa Technik is committed to mastering the challenges of the markets together with its customers.

Corporate Sales
- Lufthansa Technik in the regions: 6
  Global excellence
- Interview with Gerald Steinhoff: 8
  “Encouraging intensive exchange”
- Interview with Robert Gaag: 10
  “Connecting the dots for our customers”
- Interview with Frank Berweger: 12
  “Trusted partner in a vigorous market”

Engine Services
- Engine wash: 14
  Cyclean® goes digital
- Mobile Engine Services: 26
  Engine boost for the Americas

Aircraft Services
- Support for Ryanair: 16
  Cooperation based on trust
- APU services for Japan Airlines: 23
  Stable and smooth operations
- AviaQuote: 24
  Evaluation service for layover tenders

Lufthansa Technik Group
- Lufthansa Technik Middle East: 19
  Growing beyond the Gulf region

Innovation and technology
- First use cases: 20
  Augmented reality reaches the shop floor

Events and exhibitions
- A350 Community workshop: 22
  Strengthened collaboration
- “Wings of the Future”: 27
  Positive market outlook

Categories
- News 3 – 5
- Events 27
- Products and services 28
- Contacts 30

Lufthansa Technik Connection is a complimentary information service for Lufthansa Technik’s family and friends. Published every two months. This and earlier issues can be downloaded from our website www.lufthansa-technik.com/connection

Publisher
Lufthansa Technik AG
Kai Raudzus · Corporate Marketing · HAM T/TM-M
Weg beim Jaeger 193 · 22335 Hamburg, Germany
Info line +49-40-5070-5553 · Fax +49-40-5070-8860
marketing@lht.dlh.de · www.lufthansa-technik.com
Laura Greimel · Database management

Editorial production
Editorial office: Flightlines, Hamburg
Design: Art Works!, Hamburg
Photos: Lufthansa Technik AG, Deutsche Lufthansa AG
Printing: Beisner Druck GmbH & Co. KG
First LEAP-1A customer

With the authority approval and a long-term exclusive contract with Swedish charter carrier Nova Airlines AB (Novair), Lufthansa Technik has reached two further significant milestones for its LEAP-1A engine services.

The Swedish charter carrier Novair has signed a long-term exclusive engine services contract with Lufthansa Technik for the CFM International LEAP-1A engines of the carrier’s two Airbus A321neo aircraft. Thereby, Novair has become the launching airline customer of Lufthansa Technik’s services for this new engine type. Covered by the new contract are different services, such as engineering, overhaul and testing, Mobile Engine Services offerings, engine parts repair and warranty handling.

“The Novair operations is all about maximum aircraft use for our business and minimum environmental effect for our legacy. Every decision and provider selection is scrutinized regarding these aspects. Lufthansa Technik’s long-proven record with Novair has made Lufthansa Technik an essential partner and a factor to our success,” said Anders Fred, CEO at Novair. “It is with a feeling of comfort, coming from a period of challenges with the LEAP-1A, that we sign this contract with Lufthansa Technik. We look forward to a cooperation that will include Lufthansa Technik’s non-compromising effort to learn and develop the service to a market-leading position in terms of support, quality and value for money spent.”

“The signing of the first LEAP-1A contract is a real milestone for Lufthansa Technik. I would like to thank Novair for the trust they placed in us and their willingness to extend our long-standing relationship by offering technical support for this new engine type,” said Dietmar Focke, Vice President Engine Services at Lufthansa Technik. “We are ramping up our capability and capacity to support our customers in the early phase of their operations and beyond. This agreement with Novair is another milestone to become one of the leading LEAP full service providers.”

Novair and Lufthansa Technik already started their cooperation in 2005 with the MRO company providing V2500 engine services. The new contract for LEAP-1A services underlines Lufthansa Technik’s ability to adapt flexibly to the individual requirements of fleets of all sizes, even when introducing the latest engine technologies. Under its CBSA (CFM Branded Service Agreement) license, Lufthansa Technik is able to offer the widest range of services to its customers. The agreement includes extended licenses – for sophisticated repairs, too – and much better access to technological data and information regarding the LEAP engine.

Lufthansa Technik received the aviation authority’s approval for this engine type by the German Federal Aviation Office (LBA) in mid-November 2019. After an extensive audit without findings, Lufthansa Technik is now in the position to provide comprehensive technical support for the LEAP-1A and is ready for the induction of the first LEAP-1A engines at its Hamburg facility.

Marc Wilken
Senior Director Product Sales and Engine Lease
Phone +49-40-5070-64013
marc.wilken@lht.dlh.de
Completion of first A350 head-of-state cabin

VIP & Special Mission Aircraft Services // Work on the world’s first ever head-of-state cabin conversion of an Airbus A350 aircraft will begin this year in Hamburg. It will be equipped with a special transitional cabin for the transportation of delegations so that the German Federal Government’s Special Air Mission Wing, the user of the aircraft, can have the first aircraft available as soon as possible. The aircraft is expected in Hamburg in April 2020.

The transitional cabin will be tailored precisely to the customer’s specific requirements, featuring an office area and spacious conference area, adjoined by a multifunctional lounge area. The rest of the cabin area will be available to the accompanying delegations. It will be equipped with modern, comfortable seats, a generous number of washrooms and a kitchen designed to cater for up to 150 people. “The German Air Force was our very first external customer. We have been equipping its aircraft, including government aircraft, for decades, thus forming a comprehensive partnership,” said Wieland Timm, Senior Director Sales, VIP & Special Mission Aircraft at Lufthansa Technik. “With our wide-ranging expertise for the Airbus A350, we are well prepared to meet the high expectations of the new government aircraft.” //

Cooperation on human-centric lighting

Cabin equipment // Joining SCHOTT, jetlite and Etihad Engineering, Lufthansa Technik will commence a cooperation to further explore and promote a new human-centric lighting technology and bring it to the market. The collaboration aims at combining SCHOTT’s expertise in cabin lighting systems, jetlite’s holistic and scientifically-proven solution for jet lag reduction, and Etihad Engineering’s and Lufthansa Technik’s expertise for aircraft systems integration, design certification and innovation capabilities. The result is an effective system for automated cabin lighting scenarios that will positively affect air travelers’ well-being on multi-timezone flights by reducing jet lag and headaches as well as through enabling higher concentration and energy levels.

The new lighting-pilot technology permanently calculates and executes the optimum illumination sequence for any flight route and phase or any desired lighting choreography, without the need for cabin crews to intervene. Etihad Engineering and Lufthansa Technik bring decades of experience with aircraft and systems integration, certification, and validation into the partnership, contributing to development capabilities in design and parts manufacturing. //

E-Jet landing gear services for Royal Jordanian

Hawker Pacific // Royal Jordanian Airlines has recently entrusted Hawker Pacific Aerospace, a subsidiary of Lufthansa Technik, with landing gear services for the airline’s regional aircraft fleet of Embraer E-Jets. The three-year contract encompasses landing gear overhauls for one Embraer 195 and two Embraer 175s. In addition, Hawker Pacific will support Royal Jordanian with landing gear spares on a loan and exchange basis. The first overhaul in Hawker Pacific’s Sun Valley facility was scheduled for November 2019.

Lufthansa Technik already has a decades-long business relationship with Royal Jordanian. The support, in addition to the new contract, encompasses both landing gear services as well as a Total Component Support (TCS*) for the airline’s Airbus A320 fleet.

Royal Jordanian’s President and CEO Stefan Pichler said: “We are glad to partner with Hawker Pacific being a leading landing gear repair and overhaul provider. We believe that their high-quality standards and timely services will support Royal Jordanian’s continued keenness to maintain our aircraft in their best performance. This agreement will further enhance our historical cooperation with Lufthansa Technik.” //
Cooperation on predictive maintenance

**Digital Fleet Solutions //** Honeywell and Lufthansa Technik are collaborating to deliver the best of Honeywell Forge and Lufthansa Technik maintenance analytics on AVIATAR. It will help airline operators increase the availability of their aircraft and reduce costs associated with operations, flight delays and cancellations. The collaboration will create a comprehensive data analytics solution for airlines – from the data pipe, to a platform that digitizes maintenance data, to realized benefits based on analytics and predictive tools.

“Combining the power of Honeywell Forge with the capability of AVIATAR provides a new option for airlines looking for a total aircraft digital maintenance solution,” said Jim Currier, President, Europe, Middle East, Africa and India Sales at Honeywell Aerospace. “Honeywell and Lufthansa Technik bring decades of experience with aircraft maintenance to this digital experience. This results in opportunities for airlines to reduce minimum equipment list failures by up to 35 percent while reducing flight cancellations or delays due to maintenance.” With the inclusion of the Honeywell Forge on the AVIATAR platform, customers can broaden their aircraft component coverage and depth, thus enabling customers to make faster and better operational decisions. //

Stay up to date!

**Customer newsletter //** Lufthansa Technik’s online customer newsletter Connection Flash supplements our popular bi-monthly Lufthansa Technik Group Magazine Connection with first-hand news on innovative technologies and developments, new services and offers, and future events. //

**MoU with All Nippon Airways**

**Boeing 777-9 //** All Nippon Airways has signed a comprehensive Memorandum of Understanding (MoU) with Lufthansa Technik regarding a technical collaboration project for the Boeing 777-9. The Japanese carrier is one of the launching customers for the 777-9 while Lufthansa Technik is currently preparing its MRO readiness for the arrival of the first Lufthansa aircraft of this type planned at the beginning of 2021. The collaboration shall contribute to the success of both companies and help to enable the best-in-class dispatch reliability for ANA and for Lufthansa Technik’s future customer fleet from day one of entry into service of the 777-9. The two partners have already identified different engineering and maintenance areas in which they want to collaborate or have even started to do so. In the entry-into-service phase of the aircraft the two companies want to share insights and best practices in engineering services and intend to collaborate in aircraft production inspection. They will also cooperate in the fields of material planning and sharing, line maintenance services, AOG support and the digital platform AVIATAR. //
The Lufthansa Technik Vice Presidents Corporate Sales and Senior Directors Corporate Sales, representing the global sales team.
Lufthansa Technik is committed to mastering the challenges of vibrant and diverse markets together with its customers. The continuously growing teams and production footprints in the regions ensure that customers around the globe can continue to rely on Lufthansa Technik as the trusted partner for the reliability and availability of their aircraft.

See the interviews with Gerald Steinhoff (page 8), Robert Gaag (page 10) and Frank Berweger (page 12).
How would you characterize the development of the civil aviation market in your region?

Gerald Steinhoff: Asia Pacific is a very vibrant market – this has been the general thrust for a few years now. It is a market that continues to grow rapidly and where a lot is happening. We can only realize our growth in the region at the desired pace by being active in certain key markets.

Where do these key markets lie for Lufthansa Technik?

One of them is certainly China with its incredible aircraft growth rate. The development there is mainly influenced by four large airlines and drives all of Asia Pacific forward. China Southern for example will very soon have more than 1,000 aircraft in its fleet, more have been ordered and the carrier is growing at phenomenal speed. The Chinese carriers are also increasing the frequencies beyond their country borders and into the Asian market. We are increasingly focusing on emerging niche markets, where the industry is disrupted by more and more – partially evolving – low-cost airlines. We also need to be careful to not only focus on growth, but to also take into account the airlines’ economic situation and the local political developments.

In which way do political developments influence the airline industry?

We see a number of political tension fields in the area – Hong Kong is one of them, of course – which affect our industry, too. They influence growth, shift capacities and push airlines into crisis. The collapse of Jet Airways, for example, has also raised our concern, and we need to be aware earlier and react faster to such developments and effects.

How can Lufthansa Technik maintain the balance between growth and risk?

First, I am very pleased that we have such a strong and secure standing in quite a few countries and regions. In North East Asia especially, where we have a strong customer base of economically stable airlines. For example, we provide every single Airbus A320 operated in Japan with components. We also have a strong standing in Korea and Taiwan. On the other hand, we need to assess the risks with new contracts even more thoroughly and make conscious decisions. To this end, we are involving our financial experts more closely. We have transferred these functions directly to our team in Asia Pacific. Of course, this approach does not make our competitive situation any easier. It is therefore all the more important that we engage in dialogue with our customers.

How is this implemented and how is this noticeable to your customers?

We have literally become more diverse and multicultural. We encourage the intensive exchange with our customers – with sales representatives who are located in the respective countries and who facilitate the cultural and linguistic exchange. For example, we have two
Indian employees locally and a new employee in Vietnam, people who have the cultural understanding and can balance out a lot. We are simply there where our customer is and where he needs us. We promote career paths for local employees in Asia Pacific and worldwide. I think this is what makes our team so special – and I enjoy this cooperation very much.

You were clearly successful with this approach in the past year. Looking back, what were your particular highlights?

We were able to further strengthen our market position last year. One of the larger contracts was the component supply for Asiana’s Airbus A320neo fleet. All in all, we are very successful with new aircraft types. Japan Airlines has entrusted us with the component supply and APU support of their Airbus A350 fleet (see page 23). We are market leader for the A350 component supply in Asia Pacific – and will soon be for the Boeing 787 also. On the other hand, we were unfortunately not able to extend a few engine contracts with content customers due to missing materials and tools, caused by supply bottlenecks with OEMs. There are a few rays of hope in this respect, but we are now additionally focusing on new types such as the LEAP and the GEnx as well as our Mobile Engine Services when it comes to engine services.

Are the airlines in the region also interested in other digital products and services?

Airlines are very aware of the topics digitalization, predictive maintenance and data ownership. We held two large conferences on digital topics in Shanghai and Singapore last year that were met with great interest. There, we had lively discussions with airline representatives about the digital future. With our stance that data belongs to the airlines and not to the OEMs, we differentiate our digital AVIATAR platform from other products. This is received very positively. We were able to win Philippine Airlines as the first Asian customer to partner with us for full AVIATAR implementation. In addition, we agreed with many Asian airlines on what is known as quick boarding for AVIATAR, where they are connected to the system by relatively simple means and can try out the services free of charge. I am sure we can very soon interest many airlines in our product.

How is the base maintenance business developing in the region?

Lufthansa Technik Philippines has expanded its hangar and is now able to offer increased capacity. We are thus well positioned for widebody aircraft and our facility there is heavily in demand. At the same time, we continue to see a large requirement in the heavy airframe maintenance of narrowbody aircraft and we are currently developing an opportunity to invest and build up capabilities in the area. A trend is also becoming visible for aircraft modifications. As mobile communication is ubiquitous in Asia Pacific, in-flight connectivity is an important service feature for airlines. Together with antenna manufacturer Honeywell and a local provider, we are able to offer an excellent solution with our product Lconnect. Last year, we have already closed two contracts with local providers in Indonesia and China, and more countries will follow.
Overall, how do you see the current market situation in the aviation industry?

Robert Gaag: What I sense increasingly is an unsettling anxiety among the airlines. That has partly to do with the fact that aircraft are grounded — and not just for a few weeks, but for months and possibly even years. But it is also that the technology of aircraft engines has been exhausted to such a degree that all the manufacturers are facing problems, both in meeting the needs of the new engines and in looking after the engines in legacy fleets. And all the MROs are suffering from this situation. Overall, as an industry — and basically that means Lufthansa Technik, too — we need to return to a stable state of operational excellence, and ultimately to a certain normality.

What are the reasons for that, and what solutions are available?

One cause surely lies in our dependency as MROs on the manufacturers when it comes to the supply of parts. It is well known that supply has stagnated not just from engine manufacturers, but also from landing gear OEMs, for example. Next, we are having problems — in Europe, too — finding qualified technicians. That affects us as Lufthansa Technik as much as it affects the rest of the industry. However, the problem is known, and we are working on it: We are investing a great deal in recruiting beyond just our home bases and expanding our own allotments of trainee positions, for example.

The big challenge in Europe is still an intense competition and thus high cost pressure on the airline industry while fuel prices are rising. Consequently, airline customers are looking for solutions to reduce their maintenance costs and to increase efficiency. We have developed several solutions in the past years, one being our engineering consulting service Maintwise. Another example is our digital platform AVIATAR. We believe that digital solutions will really help tech ops managers to create even more intelligent maintenance operations and in the mid- to long-term even optimize their flight operations.

When we talk about digital solutions, what is Lufthansa Technik’s position with regard to the use of data?

There was a lot of discussion at the recent MRO Europe about Airbus’ attempt to charge MROs an additional royalty fee for Part 145-related maintenance work on Airbus aircraft for using the OEM’s technical data. Of
course, airlines were as alarmed as we MROs were. While the manufacturer has meanwhile withdrawn this controversial proposal, I personally believe that the idea itself is probably not yet off the table. Our standpoint is clear and unchanged: If an airline generates data in flight operations, that data belongs to the airline. They can make it available to whomever they choose. The data does not belong to the aircraft manufacturer. There are a few exceptions. As an example, if we want to install a VIP cabin and need the aircraft’s design and development data as a basis for this, then we have to buy it. That practice is not controversial and we have been doing it for years now.

**AVIATAR is an important cornerstone. What else plays a role on the path toward digitalization in the future?**

When we talk to airlines, we notice that they are fundamentally looking beyond just the MRO for holistic digital solutions for their flight operations. In fact, today there is a whole host of individual solutions in the aviation industry that already address every facet of operations – from aircraft allocation to crew and ground ops planning and all the way to maintenance. The AVIATAR with its predictors, aircraft/engine health monitoring, reliability applications and more of course addresses needs from the tech ops side. I personally dream of these standalone elements someday being connected in such a way that the systems talk and understand each other in both directions. By connecting these dots, in some cases supported by artificial intelligence, we will be able to generate a more stable and efficient system for flight and technical operations in one ops suite.

**How is Lufthansa Technik currently positioned in its home market?**

We are already the powerhouse in Europe and will seek to defend that market position. With two new joint ventures, XEOS and EME Aero, we are well positioned for some of the engines of the future. We are in the process of building an engine parts repair shop in Hungary. And of course we will expand our operation gradually where we see market opportunities. Important news for our base in Hamburg, we just concluded our first engine maintenance contract with Novair for the LEAP-1A engine (see page 3). In the long term, the LEAP-1A will ensure the work load for our engine shop and will eventually replace the existing legacy type operation.

**What’s happening in the Middle East? How is Lufthansa Technik positioned there?**

I see that the large airlines in the Middle East are increasingly trying to optimize their operations. In part, they want to serve smaller markets in a more targeted fashion with mid-sized aircraft such as the A350 or 787. As an enhancement we are seeing some quite active regional and low-cost carriers who want to tap their own regional markets with narrowbody fleets, sometimes in cooperation with the big airlines. For us, it is extremely important to be present locally with some production capacity. We are close to our customers and get a very good sense of where we can complement their operation with our core competencies in the regions. With our subsidiary Lufthansa Technik Middle East at the new Dubai South Airport (DWC), we have done exactly that. Since the beginning of operation in 2017 we have doubled our revenues each year and thus increased our local footprint in the Gulf region significantly (see page 19).

**A similar development can also be seen in Africa right now.**

That’s true. Our activities for Comair and our other customers in South Africa show how we are building up our local business with partners. At the moment we primarily take on line maintenance and integrated fleet management such as CAMO services. By the end of 2020, Lufthansa Technik will be servicing the entire Comair fleet and will have set up various line maintenance stations in the country with up to 120 local employees. There is substantial interest in our services from other airlines, too. Naturally we can’t look after the entire African continent from only our new foothold in the south. So we are looking very closely at where we can participate locally with our MRO expertise.

**What else will occupy the industry in 2020?**

One very exciting question is how the industry will react when the 737 MAX is approved to fly again. At the end of 2019, more than 700 aircraft were grounded – at the airlines and in production, too. Boeing will find a solution in 2020 with the FAA for re-approval, and then, within a relatively short period of time, operations of a large fleet of new aircraft which initially need much less maintenance will replace older aircraft. That will definitely affect the entire MRO industry.
How would you describe the state of the world’s largest aviation market right now?

Frank Berweger: I think our customers would agree with me when I say that the market is a very lively place right now. Capacities are being taxed to their limits, both in terms of operations as well as in terms of maintenance and shop utilization. A high level of stress is being placed on the entire system. But generally speaking, the airline industry in the Americas is doing well; margins in North America remain healthy. In Latin America, the political situation has left its mark on the market. Some interesting strategy changes involving our two largest customers in the region, LATAM and Avianca, have taken place. Major North American carriers now have a big say in them as a result of their investments. These investments will indeed provide stability. But they are also a sign of continued consolidation on the continent – in all areas, both the airline side of the business and the MRO industry, resulting in continued concentration of market power.

How has Lufthansa Technik tackled these challenges?

When you take a close look at 2019, you see that the year was a very difficult one in terms of tight resources. Our capacities were heavily utilized, and turnaround times are a challenging issue – not only for the industry as a whole, but also for us. We haven’t reached all of our service goals yet. But we are working on it and are concentrating on supporting the success of our customers. Our main focus is to be empathetic and responsive to their needs and continue to work on developing a trusting relationship – basically, the factors that I consider to define customer centricity. This work remains our highest priority.

How did Lufthansa Technik perform in the region last year?

In spite of the challenges, 2019 was a very successful year once again in the Americas. Over the past five years, we have grown at three times the speed of the MRO market in the Americas as a whole, and our market share has doubled. We were able to reach many important long-term agreements. These include airframe maintenance for 767s as well as Airbus A320 component and material supply for two major carriers; A320 base maintenance for Allegiant in Puerto Rico; an extension of landing gear services contracts with a large U.S. cargo carrier and V2500 engine services with a major engine lessor. Worth mentioning for me is also a long-term MRO agreement with GE Aviation for Boeing 777X component services and a recent agreement with Honeywell to bring a new level of predictive health management expertise to airlines. Looking ahead, our component supply agreement with Air Canada will be revived once the 737 MAX is back in the air.

What role is digitalization playing in the American market?

One more major customer airline has just decided to join our AVIATAR digital platform. This represents another breakthrough for AVIATAR. We have spent a lot of time on explaining the value proposition of such a digital MRO platform. It is a long-term investment and...
airlines are starting to see the first tangible returns. Data ownership is a major issue for the aviation industry in America, too. And we fully respect that and ensure the airlines have 100 percent control of their data.

What are Lufthansa Technik’s biggest strengths in the American market?
Our Mobile Engine Services are a real success story (see page 26). We have significantly expanded the capabilities and capacities of our repair stations – sometimes also referred to in the market as “engine hospitals” – in Tulsa and Montreal. We have invested considerably, have moved into our own, larger facility in Montreal and have introduced the CFM56-5B engine type in Tulsa. We are serving a real market need with our offering, and the product is in high demand. In component services, we are continuing to expand our local capabilities in our shop in Tulsa. Lufthansa Technik Component Services has become the 33rd design department of Lufthansa Technik’s EASA 21/J Design Organization and the first one in the Americas. What’s more, it is now certified by the FAA, the EASA and the CAAC. I think this is an important signal in the market. Furthermore, all five bays are operating at full utilization levels at our heavy maintenance location for A320 narrowbody aircraft in Puerto Rico. We are already considering expanding the facility and the local workforce.

How is Lufthansa Technik positioned in terms of personnel in the region?
The way that customers personally experience Lufthansa Technik has been made our highest priority. We are striving to carry out this priority both as an organization and through quantitative and qualitative enhancement of our local team. Last year, we have invested considerably in expanding the local workforce of Lufthansa Technik. We hired several hundred people, trained them and imparted them with our culture of customer centricity. We also plan to simplify our interface to customers because sometimes we are still perceived as being too complex. In this regard, we have transferred more customer relevant functions in our organization from Germany to America. Our sales team in the region can now expertly consult airlines and lessors on the entire MRO product portfolio of Lufthansa Technik, locally. We have also added local purchasing, parts trading and human resources colleagues and have strengthened our customer service units once again. For our customers, these additions will mean improved and more direct service from contact partners in their time zone. Last not least, we are placing more and more staff members directly into the operation of our customers – for example at American Airlines, FedEx, LATAM, JetBlue and Spirit. They work “in plant”, that is, they are located at the customers’ facilities where they create a very strong connection.

What can your customers expect from Lufthansa Technik in America during 2020?
Three years ago Lufthansa Technik visibly underscored its commitment as MRO partner with a highly successful food truck tour. Beyond excellent MRO services, we will again find a special way to express the appreciation for our customers in 2020 – in line with Lufthansa Technik’s slogan “Excellence in Motion”. Although we are already increasingly being perceived as a local company, we will not pause and continue working on becoming the trusted partner to our customers in this vigorous market.
Cyclean® engine wash goes digital

Engine washes are becoming increasingly important, especially for the latest generation of engines. Lufthansa Technik is going on the offensive with the use of digital technology, new equipment and new locations in Cyclean®, the proprietary engine wash product from its Mobile Engine Services range.

After a decade, Lufthansa Technik is introducing a new generation of Cyclean® wash equipment. In the future, customers will benefit from the addition of digital applications that automate the washing process. Starting with the decision to initiate a wash, these planning and monitoring tasks will be carried out by a proprietary computer program. The program tracks an engine’s individual washing interval and determines the right time for a wash by linking the aircraft, flight schedule and globally operated Cyclean® stations with one another. The result of this: The aircraft automatically registers at a station, the local provider accepts the request, the aircraft is added to the schedule and the wash is carried out.

Automated process chain

Florian Prinz, one of the responsible managers on the Cyclean® team, says: “By linking the engines with the flight schedule and our service stations, we are able to automate the entire process chain.” Moreover, digitalization also creates transparency. As the wash data is tracked and saved centrally, Cyclean® customers can check when their engines were washed and whether the required parameters were met as the new system displays the engine’s current wash status.

The new-generation wash equipment also profits from the infusion of digital technology. With the new machines being connected to the internet, Lufthansa Technik specialists have remote access enabling them to perform troubleshooting or maintenance tasks at any location worldwide. This feature allows to maximize the reliability of the equipment, to minimize downtimes and to provide spares much quicker in case of any defect.

Leading performance

By introducing a new generation of devices featuring digital technology, Lufthansa Technik is cementing the position of Cyclean® at the forefront of aircraft engine cleaning technology. More than 9,000 engines are currently under contract and more than 110,000 washes have been carried out successfully. The system is available for all engine types currently used in commercial aviation and new types can be integrated within just eight weeks.

A Cyclean® wash is either carried out as part of the Aircraft Maintenance Manual (AMM) or in accordance with a procedure developed and approved by Lufthansa Technik as a Part 21 organization. The procedure also encompasses an ongoing evaluation of the processes as well as their continuous improvement. This philosophy applies not only to Cyclean® but to Lufthansa Technik as a whole: continuous improvement as the basis for maximum performance and optimum
efficiency for the customer. The fact that the number of Cyclean® customers has been growing steadily is testament to the product’s outstanding quality. That is why Lufthansa Technik is continuing to expand its engine wash service around the globe. For example, the station in Melbourne, Australia, was recently joined by another station in Brisbane. Coverage in Europe is already very good thanks to the presence of Lufthansa Technik’s line maintenance stations and the ability to make mobile equipment available practically anywhere within 48 hours of a request.

Available on all continents

North America has also grown strongly, with additional stations added at New York’s JFK airport as well as in Fort Lauderdale and Orlando in Florida in 2019 alone. Cyclean® is also well represented in South America and Asia Pacific. Furthermore, following the initial launch in Johannesburg in the summer of 2019, expansion in Africa is being driven forward as well. Feliks Wandt, who co-heads the Cyclean® team, explains: “We are working continuously on expanding the network. As a rule, we are practically always able to set up a service location anywhere in the world within about three months of receiving a customer request.”

Cyclean® stands for efficiency

Modern aircraft engines are designed for maximum fuel economy and minimum noise emission, meaning even minor contaminations of the compressor can have an impact on the overall system. OEMs therefore recommend to reduce the intervals between washes. Assuming average capacity utilization of a narrowbody aircraft, this translates into four to five washes per year compared to one or two in the past. The result is a rise in demand. This trend is also supported by other figures: While improving the EGT margin (exhaust gas temperature) by 16 degrees previously qualified as a very good result, today’s results often exceed 20 degrees and can reach up to 25 degrees in individual cases. Even a thin layer of dirt on the compressor can thus have a major impact. Cyclean® washes feature the outstanding combination of excellent washing performance and operational flexibility. Time savings of up to 80 percent are achieved. The system can be assembled very quickly, as for most engine types there is no need to open the cowling or disconnect any tubing. Washes can therefore be easily integrated into an airline’s flight operations. It is even possible to perform washes at the gate during a turnaround.
Cooperation based on trust

**Ryanair** has once more extended its contract with Lufthansa Technik Brussels for line maintenance services at Brussels Airport and at Brussels South Charleroi Airport – a clear sign of confidence in the services performed for this low-cost carrier.
For more than a decade, Ryanair has relied on Lufthansa Technik Brussels for line maintenance services at Brussels South Charleroi Airport (CRL). Other locations in Belgium and France have been added during this time. The recent contract extension is a sign of confidence based not least on the high technical reliability the MRO company has delivered over the last years. It is also proof of the ability of Lufthansa Technik to be cost-effective for the growing number of airlines operating on an extremely low-cost basis. The low-fare airline Ryanair operates a single-type fleet of currently about 450 Boeing 737-800 aircraft. It offers flights to destinations throughout Europe. The carrier is headquartered in Dublin, Ireland, and has multiple maintenance bases on the continent.

### Night shifts in Brussels

The partnership of the two companies dates back to 2009, when Lufthansa Technik Brussels took over line maintenance services for Ryanair at Brussels South Charleroi Airport from another provider. At that time, the carrier had seven aircraft based there; today the number has increased to 15. Since the aircraft fly with transit times of only 25 minutes during the day, nearly all maintenance work has to be carried out during the night. This includes daily and weekly checks – called ramp checks one, two, three and four by Ryanair –, the repairs of defects as well as numerous wheels and brakes replacements. In order to guarantee smooth operations, Ryanair provides all rotables and consumables & expendables. Lufthansa Technik has a team of 20 technicians based at CRL who spend the majority of their time working on aircraft from Ryanair. Other customers at this location are Air Corsica, Wizz Air and Enter Air. In February 2014, Ryanair decided to add operations at Brussels Airport (BRU) while maintaining its base at CRL. Ryanair openly confirmed its trust in Lufthansa Technik Brussels and signed a contract for technical line maintenance support at this new location – in spite of the fact that at Brussels Airport the competition among line maintenance operators is very high.

Rudi Preud’homme, Sales Executive at Lufthansa Technik Brussels, says: “The dispatch reliability of the fleet supported by us at CRL was above 99.5 percent in average. This certainly helped in convincing Ryanair to put the work at the new location in our hands.” As a result, the work volume performed for Ryanair increased considerably. The customer’s confidence in the services was underlined in the past by contract extensions for the CRL station.

### Cooperation in France

In July 2018, Ryanair and Lufthansa Technik Brussels signed a cooperation contract for Beauvais-Tillé Airport (BVA) in France. Although Ryanair has no night stopovers at this station, the carrier wanted to make sure it received adequate services whenever one of its aircraft had a technical problem during the day at this location.

The latest milestone in the partnership of both parties is the renewed extension of the contract for the stations CRL and BRU in Belgium, signed in 2019. Christy Duffy, Regional Maintenance Manager of Ryanair, commented: “Over the last ten years I have worked closely with the engineers and senior management of Lufthansa Technik Brussels. Their continuous commitment and dedication has made a significant contribution to Ryanair’s success and...
I am sure this will continue in the coming years as our partnership goes from strength to strength.” Johan Delbauf, Duty Operations Manager CRL at Lufthansa Technik Brussels, adds: “It is sometimes very challenging for us to perform all the required maintenance tasks on the apron of CRL, as there is no maintenance hangar. Working in all weather conditions, including snow, rain, frost, fog, sun and heat, is very familiar to us. On top of that, 95 percent of the work takes place overnight with artificial lighting. In spite of these challenging conditions, we appreciate very much the fact that Ryanair is extending its cooperation with us for at least another five years. In one way or another, all my co-workers feel very much like being part of this success story.”

**32 line maintenance customers**

Lufthansa Technik Brussels is the maintenance center of the Group in Europe’s capital city. In addition to the line maintenance services provided for Ryanair at Brussels South, Brussels and Beauvais-Tillé, 32 customers rely on line maintenance services by the MRO company at Brussels Airport. The majority of non-Brussels based aircraft flying to and from this destination are handled by Lufthansa Technik technicians. The Brussels facility also performs engine services to, among others, the five biggest aircraft engine leasing companies. These services include engine storage, inventory checks, boroscope inspections, end-of-lease checks and logistical coordination. On average, about 50 engines are “housekept” by Lufthansa Technik Brussels.

At Brussels Airport, the company occupies a line maintenance office and a hangar that can accommodate up to three narrow-body aircraft simultaneously or one widebody aircraft. Next to AOG assistance, this also allows for hangar maintenance projects to be carried out. So it is no wonder that Ryanair is extending its cooperation with us for at least another five years. In one way or another, all my co-workers feel very much like being part of this success story.”
Growing beyond the Gulf region

**Lufthansa Technik Middle East** has further increased its footprint for maintenance, repair and overhaul services in the Gulf region and is set to continue on its recent growth path.

**Acquisition of local talents**

The number of people employed by Lufthansa Technik Middle East recently surpassed the mark of 100 and is set to grow even further in the course of this year. During the recent expansion, special emphasis was put on the acquisition of local talents, which was moreover fostered by intense cooperation with Middle Eastern universities such as the Emirates Aviation University in Dubai and the American University of Sharjah.

Since the inauguration of the new facility in 2017, the company’s customer base has seen continuous growth and now stretches even beyond the Gulf region with the company also providing regular services to several African and East-Asian airlines. Moreover, the company was recently able to further strengthen its local customer base in the Middle East by providing ad-hoc maintenance services within its repair portfolio for Gulf Air, the national carrier of the Kingdom of Bahrain.

Gulf Air’s Chief Technical Officer Jamal Hashim commented: “Gulf Air is committed to achieving technical excellence in aircraft maintenance. Lufthansa Technik Middle East’s vast experience and high quality technical expertise in the areas of maintenance is the primary reason we selected the company as Gulf Air’s ad-hoc repair service provider for such critical items like radomes. Secondly, their close proximity to Bahrain has the added benefit that our parts will no longer have to leave the region for maintenance, thereby improving efficiency, decreasing turnaround time, reducing logistic charges and ultimately lowering Gulf Air’s operational costs while maintaining the highest quality of safety standards.”

“During the establishment and further expansion of Lufthansa Technik Middle East is progressing well. Our new facility inaugurated two years ago has significantly strengthened our footprint in the region,” said Ziad Al Hazmi, Chief Executive Officer of Lufthansa Technik Middle East. “With ongoing investments in our local product and capabilities portfolio as well as in the local people, we are looking forward to even further expand our contribution to this important region.”

**Broadened product portfolio**

The company’s local product portfolio has recently been broadened with additional Airframe Related Components (ARC®) and flight control repair capabilities and an extended spare parts pool for engine nacelles of the Boeing 787. Moreover, the company offers ARC® support, AOG support and engine wash services as well as a local material support desk. The material pool in Dubai now covers parts and components for the Boeing 787, 777 and the Airbus A320 and A350 families.

---

Lufthansa Technik Group | 19

---

**Photo:** Dubai Air Show 2019
Augmented reality reaches the shop floor

Augmented reality (AR) is seen as a trending technology that can increase both productivity and safety. Lufthansa Technik has explored the **potential of AR during a range of different programs.** First use cases have been identified and the implementation on the shop floor is pursued.

The rapid development of digital information technology has created the opportunity to expand the real world by superimposing computer-generated information onto it. Using AR smart glasses or mobile devices such as tablet computers, the digital information, e.g., a 3D engine model, can be projected onto physical objects. This offers great potential for the aviation industry, opening the way to improve work procedures and to increase safety and reliability. For these reasons, Lufthansa Technik has explored and promoted AR during a number of different projects.

Lukas Bechheim is one of the engineers at Lufthansa Technik who has delved into AR. He outlines the requirements for a professional usage and integration of this new technology, stating that: “Given the huge investments required for augmented reality, the planned use must pay off. The costs and benefits must be kept in an appropriate balance.” One particular difficulty proved to be the search for suitable application cases of AR on the engine maintenance shop floor due to unavailability of necessary information. As Bechheim explains: “To use augmented reality, you need to have 3D models of the engine components that you want to project. However, you frequently do not have the raw data. This means that you have to create these models yourself.”

The work required to build digital engine models can vary considerably, ranging from the need to produce a graphic rendering of a component’s function to...
the precise measurement of, for example, engine blades down to the very last micrometer. The latter is a requirement, e.g., if the model is supposed to adequately render the airflow properties of a compressor. The effort and the costs associated with this work are substantial, even if the 3D models do not have to be an accurate, complete copy of the original components.

Assembly support

The development work at Lufthansa Technik has now reached a level that enables the company to take the next step and to use AR on the shop floor. One example is the currently tested AR application, which displays the entire assembly of a CFM56-5B low-pressure turbine drive shaft. This assembly job requires extensive tooling and the critical assembly point is normally not visible for the engineers as it happens inside the low-pressure turbine. First tests showed that thanks to the AR application, the quality and dependability of the assembly work can be greatly improved. Although the matching of the reality and the 3D model geometry may not be perfect yet – it will take another technological step before the new tool and the reality are really on equal terms –, the technology is already playing a noticeable role in this complex assembly work.

To give another example, AR is also further tested to help engineers during the process of installing a cylindrical flange connection in an engine. For this job, a large number of screws must be installed and torqued in a precisely defined sequence. The AR application for this process allows an engineer to view the exact order of the tasks in this screw-tightening job. The positive test results for this application demonstrate, as in the previous example, that AR promises to help improve current maintenance processes.

Training aid

Furthermore, AR is also already being extensively used by Lufthansa Technical Training. The training organization has succeeded in using the technology to partially shift instruction about an aircraft’s engines to the classroom. The development work was based on virtual reality (VR) hubs, boxes measuring 3 x 3 meters, that are used by Lufthansa Aviation Training in Frankfurt and Munich. This technology served as the basis for a prototype that enables students to work on an engine in a VR environment. The rendering can be seen both as a projection on a spherical panorama and with the help of an AR headset.

Panagiotis Poligenis, Head of Strategy & Innovation at the Lufthansa Technik subsidiary, says: “One of the problems that we always have when we train cabin personnel is access to the aircraft or its engines. We recently developed a virtual aircraft and photographed it in such a way that you can view it on a tablet or with a VR headset.” The system is primarily used for the Airbus A220. This has made it possible to shift some of the practical training to the classroom. The teacher can walk through the virtual aircraft with the trainee and explain things, including simple maintenance tasks.
For the fifth time since 2016, Lufthansa Technik hosted the A350 Community workshop, this time in Singapore. The event has become the leading forum to discuss topics relating to technical operations of the A350 in a network of MROs, OEMs and operators.

Panagiotis Poligenis adds: “Thanks to this technology, we can shorten the practical instruction we offer on the equipment itself. Training on a specific aircraft used to take ten days. With the help of the spherical panorama, we have been able to transfer five days of it to the classroom. This is a big improvement for us because we do not have to go to the airport. We also do not always have an aircraft on hand.”

Eike Nowiszewski, Head of Training Development at Lufthansa Technical Training, explains: “We can now provide trainees with more time that they can intensively use to study the material. Once the trainees see the spherical panorama on their tablets, they can start to teach themselves. With this change, we are moving away from a scattershot approach to an individual learning program. Under these conditions, the amount of knowledge acquired is much greater than it is when trainers teach information based on their own personal and subject-matter biases.”

Obviously, it makes sense to use VR in those areas where the technology can deliver real progress in terms of safety, productivity and cost efficiency. With these newly acquired technological skills, Lufthansa Technik is in a position to help various company departments to introduce this modern technology.

For the fifth time since 2016, Lufthansa Technik hosted the A350 Community workshop, this time in Singapore. The event has become the leading forum to discuss topics relating to technical operations of the A350 in a network of MROs, OEMs and operators.
Cost optimization and stable operations: Japan Airlines expects major advantages from the newest agreement with Lufthansa Technik. The two partners have signed a contract on APU maintenance services for the carrier’s Airbus A350 fleet. Under the terms of the long-term agreement, Lufthansa Technik will provide maintenance, repair and overhaul services and spare support for the APU HGT1700 series of the Japanese national carrier. Currently, Japan Airlines holds 31 firm orders and 25 options for the A350.

Further cost optimization

Kojiro Yamashita, Vice President of Procurement at Japan Airlines, said: “The Airbus A350 fleet is a key fleet for Japan Airlines. We believe this agreement will bring us even more stable and smooth operations and the highest performance for our customers. Furthermore, it provides us additional advantage of maintenance cost optimization and further development of engineering ability, while at the same time enhancing the long-term partnership with Lufthansa Technik.”

The cooperation between Japan Airlines and Lufthansa Technik includes a variety of MRO services. Among others, Lufthansa Technik has been providing Total Component Support (TCS®) services for Japan Airlines’ Boeing 787 fleet since 2011 and for its Airbus A350 fleet since June 2019.

Gerald Steinhoff, Vice President Corporate Sales Asia Pacific at Lufthansa Technik, commented: “I would like to thank Japan Airlines for their repeated trust placed in us and for their willingness to further expand our excellent relationship by this new contract. We will do our utmost to provide them with the technical readiness that will enable our customer to run its operations smoothly.” Lufthansa Technik has vast experience in APU overhauls and value-adding engineering services. The company is the official warranty station and partner of original equipment manufacturer Honeywell for maintenance, repair and overhaul of the HGT1700 APU. Due to its in-house repair capability, the company offers significant cost reduction compared to conventional parts replacements.

The contract also further strengthens Lufthansa Technik’s position as the leading MRO services provider for the A350 in Europe and Asia Pacific. More than 100 aircraft of this type from different customers already receive comprehensive technical support for components, auxiliary power units, composites components, engines and other aircraft parts.

Ralf Schulze
Senior Sales Manager Japan
Phone +49-40-5070-64706
ralf.schulze@lht.dlh.de

Japan Airlines has entrusted the APU maintenance for its Airbus A350 fleet to Lufthansa Technik, once more intensifying the long-lasting partnership between the carrier and the leading MRO services provider for the A350 in Europe and Asia Pacific.

Stable and smooth operations
Evaluation service for layover tenders

With **AviaQuote**, Lufthansa Technik’s Base Maintenance division introduced a new service for the optimal evaluation of the work and requirements of an aircraft layover.

**Service for MRO companies**

One of the first customers for this new service was the Montreal, Canada-based MRO company Avianor Inc., which specializes in the cabin integration of aircraft. Avianor was expecting aircraft from its customer FlairAirlines for comprehensive heavy maintenance checks with removal of all passenger seats and lavatories. The company asked Lufthansa Technik Sofia for support with the evaluation of the layovers. The AviaQuote team provided the customer with estimates for the work packages and man hours as well as the expected material costs.

With this precise planning, the customer could then enter the tender with much better prerequisites, making the whole process leaner. Furthermore, the example shows that AviaQuote is particularly expedient when the work has to be done at short notice. “Lufthansa Technik was very helpful in providing the quotations for two A330 events in a timely manner, from which we were very happy to benefit. Avianor continues to profit from this service,” comments Tania Tzirtziganis, an engineer with Avianor Inc.

There are several advantages to using AviaQuote. The staff of the respective MRO company can concentrate on its core tasks and is not involved in extensive evaluation work. At the same time, the precise evaluation of the work packages enables better utilization of the layover slots and the MRO provider is more aware of what to expect during the layover.

**Precise evaluation of layovers**

For Lufthansa Technik’s Base Maintenance division, the service is another important step towards closer cooperation with other third-party MROs. “AviaQuote supports our vision that Lufthansa Technik participates in more and more maintenance activities worldwide in order to increase growth and profitability,” explains Ivan Damyanov. AviaQuote has already been used more than 20 times. “Every layover for every aircraft tail sign is a new project, and every project is a new and welcome challenge for us,” he emphasizes. If requested, the team can also provide additional planning, consulting and engineering services and take over communication with manufacturers to prepare layovers at the customers’ facilities.

AviaQuote is now increasingly being offered on the market. At the same time, the team at Lufthansa Technik Sofia is already working on an even better customer experience. An order fulfillment platform is planned to simplify and accelerate procurement processes. It will allow customers to easily place their orders and choose from standard or premium services as well as from ad hoc or subscription support to best meet their business needs.

---

Ivan Damyanov
AviaQuote Supervisor
Lufthansa Technik Sofia
Phone +359-2-4601-167
ivan.damyanov@lht-sofia.com
AviaQuote supports our vision that Lufthansa Technik participates in more and more maintenance activities worldwide in order to increase growth and profitability.

Ivan Damyanov

The AviaQuote team provides the customer with estimates for the work packages and man hours as well as the expected material costs.
Expanding capacities and increasing capabilities for CFM56 engines, Lufthansa Technik has significantly strengthened the footprint of its Mobile Engine Services portfolio for customers in the Americas.

Lufthansa Technik has created a sought-after offer which is tailored to the needs of the American market with its Mobile Engine Services offerings. Since the beginning of the year, surgical repairs for the CFM56-5B, which is a very common engine type in the Americas, have been available at the repair station in Tulsa. This is part of a continuous and ongoing capability expansion, adding to the existing capabilities for the V2500 engine at this location.

Engine repairs in Tulsa are currently conducted in seven bays. “In 2020, we will boost our capacity to the extent that we can significantly increase our services towards customers with the CFM56,” says Volker Magunna, President and CEO of BizJet International, Lufthansa Technik’s subsidiary in Tulsa. Furthermore, the V2500 test cell, that is already in operation in Tulsa, will be adapted to the requirements of the CFM56-5B until the end of the first quarter of 2020. “On-wing and on-site services have always been a valuable strength of Lufthansa Technik,” says Sebastian Torhorst, Head of Product Sales Engine Services – Americas. “This is why the introduction of those services that are operated through a team located in Tulsa are a great benefit for the region.” A dedicated crew of specialists will fly to any location around the world on short notice with all the required tooling, equipment and material. They will rectify the damage using surgical procedures such as HPT (high-pressure turbine) blade replacement in the shortest timeframe possible, thereby avoiding additional findings and workscope creep, engine transportation and costly downtimes.

Repair station in Montreal

The capability extension in Tulsa is complemented by the capacities of Lufthansa Technik’s repair station in Montreal, which is already one of the backbones of the global Mobile Engine Services network. Following the inauguration of a dedicated facility in Montreal in the summer of 2019, the Canadian repair station has tripled its capacity, today offering in-station services for the CFM56-5A, -B and -7B as well as on-site and on-wing services. Customers benefit from some of the most experienced CFM56 mechanics in the engine MRO business today.

On-wing, on-site or at a station

With the Mobile Engine Services offerings, operators can take advantage of Lufthansa Technik’s more than 25 years of experience in providing repair solutions around the globe. Aiming to postpone or even avoid costly and long-running shop visits, services are provided either on-wing, on-site or at a dedicated repair station within the constantly growing Mobile Engine Services network. The services also include Lufthansa Technik’s Cyclean® engine wash system that is available at a continuously increasing number of airports throughout the Americas and other continents.
Positive market outlook

The 17th “Wings of the Future” forum took place in Moscow in the fall of 2019. About 700 high-ranking participants discussed trends and challenges of the aviation industry. Dr. Johannes Bussmann, CEO of Lufthansa Technik, delivered the keynote presentation.

During the largest conference of the aviation industry in Russia and the CIS, representatives of the region’s airline industry and international guests covered a broad range of topics, including airports, human resources and maintenance and overhaul.

Positive development

After a number of difficult years for aviation, the outlook for the industry in the region is starting to get brighter. Kate Markhvida, Senior Economist of the International Air Transport Association (IATA), presented a positive market outlook, with Russia remaining the driving force. Strong growth is also expected in Kazakhstan, resulting in a climb in the country rankings of air traffic volume within the CIS from its current 10th rank to 5th rank. Alexander Yurchik, Deputy Minister of Transport of the Russian Federation, expects air travel in Russia to grow by up to eleven percent in 2019. Dr. Johannes Bussmann projected the number of narrowbody aircraft in this market to double in the next ten years, from currently 787 to roughly 1,400 aircraft.

Digitalization

Meanwhile, the digital transformation has reached the Russian aviation in full force. Aeroflot and S7 Airlines are the pioneers here. Kirill Bogdanov, IT Deputy General Director of Aeroflot, announced that a new step towards predictive maintenance will be taken with the new Airbus A350 aircraft joining their fleet. Together with IBM, Aeroflot is working on a concept for a “digital twin” of their aircraft. During a visit at Lufthansa Technik, the Aeroflot delegation was particularly impressed at the company’s extensive use of a digital signature – so much that they are now implementing this in their own maintenance organization.

Capacity and manpower

The expected growth of air travel in the region means that adequate MRO capacities need to be available which are currently lacking. According to Anatoly Kharkovoy, Technical Director of I Fly Airlines, this is a particular problem for base maintenance of widebody aircraft. Another aspect: “Manpower shortage is a hot topic for the entire industry,” says Pavel Tereschenkov, Technical Director of Azur Air. Anton Grove from International Air Transport Association (IATA) even goes a step further in saying: “There is a chronic skills shortage emerging in our industry. We very urgently need to increase the attractiveness of our business.”

Positive market outlook
World of services

Total Support Services
Total Support Services customers enjoy cost-efficient and reliable flight operations while being able to focus on their core business.
- Total Operational Support (TOS®)
- Total Technical Support (TTS®)
- Total Base Maintenance Support (TBS®)
- Total Material Operations (TMO®)
- Total Component Support (TCS®)
- Total Engine Support (TES®)
- Total Landing Gear Support (TLS®)
- Aircraft Leasing & Trading Support (ALTS®)

Single Services
Single Services, letter checks, engine overhauls and repairs of single components form a unique range of products and services.
- Aircraft Services
- Component Services
- Engine Services
- Landing Gear Services
- VIP & Special Mission Aircraft Services

Special Services
Lufthansa Technik offers products reaching beyond standard manual MRO services.
- Composite Repairs (ARC®)
- Engine Parts & Accessories Repair (EPAR)
- Maintenance Management Services (MMS)
- Logistics and maintenance training
- AOG services
- Surface treatment

Original Equipment Innovation (OEI)
Lufthansa Technik has successfully established a line of cabin products.
- Cabin management and IFE systems
- Aircraft and cabin equipment
- Connectivity
- Patient transport solutions

Digital Services
Lufthansa Technik provides innovative digital platforms to support technical operations.
- AVIATAR
- AVIATION DataHub
- manage/m®

Design Organization
Across all of its services, Lufthansa Technik supplements its offers with the capabilities of an Approved Design Organization:
- Major changes (STCs) in the areas of structures, systems, cabin and avionics
- Major repairs
- Minor changes and minor repairs
- Flight conditions

Hotline 24/7 AOG desk
Please enter any desired search item into the capability finder – products, aircraft/engine types or part numbers – to find the result quickly. The search can also be refined by regions or Lufthansa Technik facilities.

Airbus

Airbus A220
Line Maintenance
Component Services
Engine Services: PW1500G
Completion

Airbus A300/A310
Line Maintenance
Base Maintenance
Component Services
Engine Services: PW4000-94, GE CF6-80C2
Completion

Airbus A318
Line Maintenance
Base Maintenance
Component Services
Engine Services: CFM56-5B
Completion

Airbus A319
Line Maintenance
Base Maintenance
Component Services
Engine Services: CFM56-5A, -5B; V2500-A5
Completion

Airbus A320/neo
Line/ Base Maintenance
Component Services
Engine Services: CFM56-5A, -5B; V2500-A5, LEAP-1A (in prep.), PW1100G
Completion

Airbus A321/neo
Line Maintenance
Base Maintenance
Component Services
Engine Services: CFM56-5A, -5B; V2500-A5
Completion

Airbus A330
Line Maintenance
Base Maintenance
Component Services
Engine Services: CF6-80, PW4000-100, Trent 700
Completion

Airbus A340
Line Maintenance
Base Maintenance
Component Services
Engine Services: CFM56-5C, Trent 500
Completion

Airbus A350
Line Maintenance,
Base Maintenance
Component Services,
Engine Services: Trent XWB
Completion

Airbus A380
Line Maintenance
Base Maintenance
Component Services
Engine Services: Trent 900
Completion
### Boeing

**Boeing 737 CL/NG**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CFM56-7B
- Completion

**Boeing 737 MAX**
- Component Services
- Further services in preparation
- Engine Services: LEAP-1B (in preparation)

**Boeing 747**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: RB211-524
- Completion

**Boeing 757**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: RB211-535
- Completion

**Boeing 767**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: PW4000-94, CF6-80C2
- Completion

**Boeing 777**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: GE90
- Completion

**Boeing 777X**
- In preparation

**Boeing 787**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: TRENT 1000
- Completion

**MD-11**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CF6-80C2, PW4000-94

### Regionals

**De Havilland Dash 8-400**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: PW100, PW150

**Bombardier CRJ**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CF34-3,-8

**Embraer ERJ/E-Jets**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CF34-8,-10

**Embraer 135/145, 170/175, 190/195**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CF34-8,-10

**Embraer Legacy, Lineage.**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CF34-8,-10

**Embraer Business jets**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CF34-3,-8

**Boeing Business Jet**
- Completion

**Airbus Corporate Jets**
- Completion

**AcJ**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CFM56-5A,-5B; V2500-A5
- Completion

**BBJ**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CFM56-7B
- Completion

**Bombardier Challenger, Learjet, Global Express**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CF34-3,-8

**Embraer Legacy, Lineage.**
- Line Maintenance
- Base Maintenance
- Component Services
- Engine Services: CF34-8,-10
Let’s talk about solutions

Senior Director Corporate Sales USA and Canada
Sahib Ajjam
p +1-305-677-5199
sahib.ajjam@lht.dlh.de

Senior Director Corporate Sales Europe
Georgios Ouzounidis
p +49-40-5070-5295
giorgos.ouzounidis@lht.dlh.de

Senior Director Corporate Sales Latin America and Caribbean
Robin Johansson
p +1-305-379-2604
robin.johansson@lht.dlh.de

Acting Senior Director Corporate Sales Middle East and Africa
Rolf Weihrauch
p +49-40-5070-3095
rolf.weihrauch@lht.dlh.de

Senior Director Corporate Sales Americas
Frank Berweger
p +1-305-379-1222
sales.americas@lht.dlh.de

Vice President Corporate Sales EMEA
Robert Gaag
p +49-40-5070-68406
sales.emea@lht.dlh.de

Vice President Corporate Sales Eastern Europe and CIS
Dmitri Zaitsev
p +49-40-5070-5404
dmitri.zaitsev@lht.dlh.de

Our local country representatives

Americas

Chile
Carlos Sotomayor
p +56-2-2573-7770
carlos.sotomayor@lht.dlh.de

Belgium
Rudi Preud’homme
p +32-2-752-8690
rudi.preudhomme@lht.dlh.de

Italy
Emanuela Marabese
p +39-02-58571483
emanuela.marabese@lht.dlh.de

United Arab Emirates
Ziad Al Hazmi
p +971-4-4057-557
ziad.al-hazmi@lht.dlh.de

United Kingdom
Dan Hepworth
p +44-7812-091112
daniel.hepworth@lht.dlh.de

Australia
Lars Moeslein
p +61-475-943-334
lars.moeslein@lht.dlh.de

India
Reshma Singh
p +91-11-2568-7713
reshma.singh@lht-services-india.com
Affiliates and corporations

**Lufthansa Technik**

**AERO Alzey**  
Phone +49-6731-497-0  
sales@aero.com  
www.lfhr.aero

**Lufthansa Technik**  
**Brussels**  
Phone +32-2-752-8660  
sales.brussels@lht.dlh.de  
www.lufthansa-technik.com/brussels

**Lufthansa Technik**  
**Budapest**  
Phone +36-1-296-3000  
sales@lht.hu  
www.lufthansa-technik.com/budapest

**Lufthansa Technik Component Services**  
**Asia Pacific**  
Phone +65-3757-4450  
sales-apac@lht.dlh.de  
www.lufthansa-technik.com/lftsap

**Lufthansa Technik Interoct**  
Phone +49-4191-809-100  
sales@lht-intercoat.de  
www.lht-intercoat.de

**Lufthansa Technik Landing Gear Services UK**  
Phone +44-20-8589-1941  
sales@lht-lgser.uk.com  
www.lht-lgser.uk.com

**Lufthansa Technik Logistik Services**  
Phone +49-40-5070-5331  
sales@lht-ls.dlh.de  
www.lht-ls.dlh.de

**Lufthansa Technik Maintenance International**  
Phone +49-69-696-46929  
joerg.temerling@lht.dlh.de  
www.lufthansa-technik.com/lmi

**Lufthansa Technik Middle East**  
Phone +971-4-299-4443  
info.lm.aero  
www.lufthansa-technik.com/lht-middle-east

**Airfoil Services**  
Phone +603-6145-3612  
info@airfoil.com.my  
www.airfoil-services.com

**Avionic Design**  
Phone +49-40-88187-0  
info@avionic-design.de  
www.avionic-design.de

**Amecon Beijing**  
Phone +86-10-6456-1122  
ext 4100/4101  
sales@amecon.com.cn  
www.amecon.com.cn

**Bizjet International**  
Phone +1-918-832-7733  
sales@bizjet.com  
www.bizjet.com

**Heico Aerospace**  
Phone +1-954-961-9800  
sales@heico.com  
www.heico.com

**IDAIR**  
Phone +49-40-5070-69416  
sales@idair.aero  
www.idair.aero

**INAIRVATION**  
Phone +43-2644-21111  
contact@inairvation.aero  
www.inairvation.aero

**lumics**  
Phone +49-40-5070-61361  
info@lumics-consulting.de  
www.lumics-consulting.de

**N3 Engine**  
Overhaul Services  
Phone +49-3628-5811-0  
sales@n3eos.com  
www.n3eos.com

**Spairliners**  
Phone +49-40-5070-68499  
info@spairliners.com  
www.spairliners.com

**XEOS**  
Phone +48-717-165-868  
office@xeos.aero  
www.xeos.aero

**3D.aero**  
Phone +49-621-776-4604  
info@3d-aero.com  
www.3d-aero.com

**XEOS**  
Phone +49-621-776-4604  
info@3d-aero.com  
www.3d-aero.com

---

**Vice President Corporate Sales Asia Pacific**  
Gerald Steinhoff  
p +65-6733-5539  
sales.asia@lht.dlh.de

**Head of Sales VIP & Special Mission Aircraft**  
Wieland Timm  
p +49-40-5070-2548  
wieland.timm@lht.dlh.de

**Senior Director Corporate Sales Northeast Asia**  
Konstantin Stathopoulos  
p +852-3757-4491  
konstantin.stathopoulos@lht.dlh.de

**Senior Director Corporate Sales Southeast Asia and Indian subcontinent**  
Zang Thio  
p +65-6733-9081  
zang.thio@lht.dlh.de

**China**  
Steven Wang  
p +86-10-6465-1593  
steven.wang@lht.dlh.de

**Japan**  
Hidenori Sato  
p +81-50-3508-0668  
hidenori.sato@lht.dlh.de

**Malaysia**  
Lem Sze Keng  
p +601-2381-5352  
sze-keng.lem@lht.dlh.de

---

**Lufthansa Technik**  
**Milan**  
Phone +39-02-585714-24  
customersupport@lht-milan.com  
www.lht-milan.com

**Lufthansa Technik Philippines**  
Phone +63-2-855-9311  
sales@lht.com.ph  
www.lht-philippines.com

**Lufthansa Technik Puerto Rico**  
Phone +1-787-230-7700  
info@lht-puertorico.com  
www.lht-puertorico.com

**Lufthansa Technik Services India**  
Phone +91-22-935-37409  
sales@lht-services-india.com  
www.lufthansa-technik.com/india

**Lufthansa Technik Shannen**  
Phone +86-755-2777-5925  
sales@lht-shannen.com  
www.lufthansa-technik.com/lht-shannen

**Lufthansa Technik Sofia**  
Phone +359-2-4601-777  
sales@lht-sofia.com  
www.lht-sofia.com

**Lufthansa Technik Turbine Shannon**  
Phone +1-954-696-2751  
sales@ltt.ie  
www.lfts.ie

**Lufthansa Technik Vostok Services**  
Phone +7-495-363-0102  
ltv.customer.service.management@lht.dlh.de  
www.lufthansa-technik.com/vostok

**Lufthansa Technical Training**  
Phone +49-69-696-2751  
sales@lht.dlh.de  
www.lht.aero

**Lufthansa Bombardier Aviation Services**  
Phone +49-30-6875-4600  
sales@bas.de  
www.bas.de

**Lufthansa LESO**  
Phone +49-69-696-8222  
sales.leso@lht.de  
www.lufthansa-leso.com

**Airfoil Services**  
Phone +603-6145-3612  
info@airfoil.com.my  
www.airfoil-services.com

**Avionic Design**  
Phone +49-40-88187-0  
info@avionic-design.de  
www.avionic-design.de

**Amecon Beijing**  
Phone +86-10-6456-1122  
ext 4100/4101  
sales@amecon.com.cn  
www.amecon.com.cn

**Bizjet International**  
Phone +1-918-832-7733  
sales@bizjet.com  
www.bizjet.com

**Heico Aerospace**  
Phone +1-954-961-9800  
sales@heico.com  
www.heico.com

**IDAIR**  
Phone +49-40-5070-69416  
sales@idair.aero  
www.idair.aero

**INAIRVATION**  
Phone +43-2644-21111  
contact@inairvation.aero  
www.inairvation.aero

**lumics**  
Phone +49-40-5070-61361  
info@lumics-consulting.de  
www.lumics-consulting.de

**N3 Engine**  
Overhaul Services  
Phone +49-3628-5811-0  
sales@n3eos.com  
www.n3eos.com

**Spairliners**  
Phone +49-40-5070-68499  
info@spairliners.com  
www.spairliners.com

**XEOS**  
Phone +48-717-165-868  
office@xeos.aero  
www.xeos.aero

---

**3D.aero**  
Phone +49-621-776-4604  
info@3d-aero.com  
www.3d-aero.com

---

**3D.aero**  
Phone +49-621-776-4604  
info@3d-aero.com  
www.3d-aero.com
EXPERTISE IS DOING SMALL THINGS WITH GREAT PASSION.

Our expertise is based on enormous experience. At Lufthansa Technik, we conduct about 1,700 aircraft inspections a day, and stock thousands of components for more than 30 aircraft and 40 engine types. We also have the rare certification as a manufacturing and development company. But we don’t want to rest on our laurels. With relentless curiosity, we integrate the latest technologies that keep improving our customers’ performance.

ANNA EHMKE • TOOL MECHANIC

Excellence in Motion  Lufthansa Technik