Lufthansa Technik

Connection

The Lufthansa Technik Group Magazine

4.2013 July/August

Efficient maintenance

Lean works

Regional Aircraft Services

E-Jet component support

Regional Sales

Strong in the Middle East

Lufthansa Technik Philippines

The A380 overhaul expert

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Best MRO provider in Europe

Two awards for Lufthansa Technik // At this year's Aircraft Technology Engineering & Maintenance Awards ceremony, Lufthansa Technik scored a double success, winning the much sought-after awards in two out of twelve categories: "Best Airframe MRO Provider – EUROPE" and "Best Engine MRO". The awards were determined on the basis of an internet vote by industry experts, who in turn were not allowed to vote for their own company. Compared with many other industry awards, the Aircraft Technology Engineering & Maintenance Awards are highly prestigious, as the prizewinners are determined not by an interest-based jury but by thousands of experts from the industry. Lufthansa Technik invited selected customer representatives to attend the awards ceremony as guests. //

At the Awards Gala Dinner hosted by media company UBM Aviation and held to coincide with the Airline Purchasing & Maintenance Expo Europe trade show in London, Paul Conway, Sales Director UK and Ireland (left), accepted the two awards on Lufthansa Technik's behalf from the hands of Phil Callow, CEO of UBM Aviation.

nice® HD for Challenger 350

Bombardier // Lufthansa Technik's Innovation business unit has been selected by Bombardier Aerospace to supply cabin management and in-flight entertainment (CMS/IFE) systems on its new Challenger 350 aircraft program. This latest announce comes after Bombardier's selection of the nice® HD system on the Learjet 70, 75 and 85 aircraft programs. So far Lufthansa Technik has delivered more than 300 ship-sets of the first generation nice® and its successor, nice® HD, to Bombardier Aerospace. //

Lufthansa takes delivery of milestone Jumbo

50th Boeing 747-8 // Boeing celebrated the 50th delivery of a 747-8. Lufthansa, the launch customer of the passenger version, took delivery of the milestone aircraft almost one year after the first revenue flight of the 747-8 Intercontinental. It is the airline's seventh 747-8 and its 82nd 747 overall. "Lufthansa is very proud to have the next Boeing 747-8 entering our fleet – almost exactly one year after the launch flight from Frankfurt to Washington, DC," said Nico Buchholz, Executive Vice President Fleet Management, Deutsche Lufthansa. "After one year of operation and now seven aircraft in the fleet, the aircraft has proven and delivered the excellent economical and ecological performance. We are very happy with the reliable operation of the 747-8." //

Presidential visit to Hamburg

Federal President of Germany // On the occasion of his first visit to Hamburg, Federal President Joachim Gauck (3rd from right) was welcomed on the facility of Lufthansa Technik by the President of the Hamburg City Parliament, Carola Veit (far left). At Lufthansa Technik Gauck spoke to Chairman of the Executive Board August Wilhelm Henningsen (2nd from left) and visited the Jumbo hangar. Inside an Airbus A330 the Head of state evidently enjoyed having the overhaul work explained to him and he also sat down at the aircraft controls. Gauck then headed off for his next engagement – opening the International Garden Show at midday in the presence of 1,500 guests. //

Best VIP cabin outfitter

Airbus award // For the second year in succession Lufthansa Technik was named by Airbus Corporate Jets as the "Best VIP cabin outfitter" for the work done in its completion centers in Hamburg/Germany and at BizJet International in Tulsa, Oklahoma, in the United States. The award recognizes the best of the Airbus Approved Outfitting Centers in 2012. Dr. Hans Schmitz, Senior Vice President VIP & Executive Jet Solutions at Lufthansa Technik (photo below: left), accepted the award at the EBACE 2013 in Geneva, saying: "I would like to thank all Lufthansa Technik employees within our VIP business for their permanent engagement and discipline. We are extremely proud that we have been able to keep our high level of performance and quality in our VIP business which has led to this re-acknowledgement by Airbus Corporate Jets." //

737NG support for Pegasus Airlines

Base maintenance // Pegasus Airlines, the leading low-cost airline in Turkey, and Lufthansa Technik have signed a base maintenance contract for three C-checks for the carriers Boeing 737NG aircraft at Lufthansa Technik Sofia. Sertac Haybat, General Manager and Member of The Board of Pegasus Airlines, stated: "We have been very satisfied with the base maintenance work Lufthansa Technik delivered to us. It is therefore not surprising that we would trust Lufthansa Technik to deliver the same quality and level of service at a very competitive price once again." //

200th heavy maintenance for United

Ameco Beijing // Lufthansa Technik's Chinese affiliate Ameco Beijing recently redelivered the 200th heavy maintenance check for United Airlines, representing a new milestone for the mutual cooperation. The cooperation began in 2005 with the selection of Ameco Beijing as MRO provider for United's Boeing 777 fleet. It went through the first contractual period when Ameco Beijing performed 53 Boeing 777 heavy maintenance checks for United. In March 2010, the overhaul services had been expanded further with heavy maintenance and "International Premium Travel Experience" (IPTE) cabin modification program on United's Boeing 777 fleet as well as heavy maintenance on Boeing 747 fleet. Since June 2012, Ameco Beijing has been entrusted with United's Boeing 747 line maintenance which has been more than 100 times by now. //

Cooperation with Liebherr Aerospace

Exchange of know-how // Liebherr-Aerospace & Transportation SAS, Toulouse (France), and Lufthansa Technik have recently entered into a long-term cooperation. The agreement stipulates the bilateral exchange of know-how and process and repair documentation of a wide range of components for air management systems, flight control and actuation systems as well as landing gears developed and manufactured by Liebherr-Aerospace. The cooperation strengthens the companies' relationship and offers promising prospects for the development of customer service solutions. Liebherr-Aerospace & Transportation SAS is one of ten divisional control companies within the Liebherr Group and coordinates all activities in the aerospace and transportation systems sectors. //

Pillar in the overhaul network

Lufthansa Technik Malta 10th anniversary // With a workforce of 600 and well over 500 checks and aircraft modifications under its belt, Lufthansa Technik Malta has developed into an important pillar in the overhaul network of Lufthansa Technik in the ten years since it started in 2003. "We are proud of the way the company has developed over the years, but we are still developing," said Stephan Drewes, CEO of the subsidiary of Lufthansa Technik, on the occasion of the celebrations to mark the tenth anniversary of aircraft overhaul operations at Malta International Airport. Since a new hangar complex was opened in 2009, the joint venture between Lufthansa Technik and Air Malta has also been offering support services for long-range aircraft. As well as working on up to three narrowbody aircraft, up to two widebodies in the Airbus A330/A340 family can be handled at the same time. //

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Customer Newsletter // The 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. Please follow this link to sign up for Connection Flash: www.lufthansa-technik.com/customer-newsletter //

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Training for a booming region

The demand for **technical training in Asia** is high. With its three dedicated teams, a broad training portfolio and several facilities in the region Lufthansa Technical Training has the right solutions at hand.

The aviation industry in Asia is booming, resulting in high demand for well trained, skilled labor. As the Lufthansa Technik Group's training specialist, Lufthansa Technical Training has local facilities in Manila, the Philippines, in Singapore and Taiwan, from which it offers a wide range of training services. To meet the growing demand, the company is also stepping up its cooperation with universities.

Among the training services offered by Lufthansa Technical Training in Manila and Singapore are type training for all the popular Airbus and Boeing aircraft, basic training, Human Factors courses and training sessions on the subject of aviation legislation. "Basic training and A320 type training for younger staff are especially popular as a lot of aircraft of this type are on order in Asia," says Jochen Harms, General Manager of the Training Centre Philippines. The training establishment in Manila, Lufthansa Technical Training Philippines, is approved by the Civil Aviation Authority of the Philippines (CAAP). In cooperation with the two biggest aeronautical training establishments in the Philippines, Jocson College and Feati University, around 1,500 students are

Please continue on page 6

Lufthansa Technical Training offers a vast array of services for the Asian market, ranging from basic type training to consulting services.

currently being trained for Category A maintenance work on a five-year program. Most of the practical on-the-job training is carried out at Lufthansa Technik Philippines. To cope with the exacting market in Asia, a new IT landscape has been installed at Lufthansa Technical Training Philippines and preparatory work aimed at obtaining EASA Part-147 approval is under way. "In Malaysia alone the aviation industry will need 16,000 staff over the coming years," says Jochen Harms, illustrating the huge demand. The company has therefore made contact with 200 universities in Asia with a view to establishing possible cooperation. Looking ahead to the future, he says: "The universities are very interested, and there are a lot of offers and requests for cooperation."

In Singapore too Lufthansa Technical Training is also certified by the local authority – the Civil Aviation Authority of Singapore (CAAS) – and is thus able to invite students from outside Singapore onto courses with a duration of more than 30 days, for which student visas are obtained. Classrooms, workshops and instructors trained to Lufthansa Technical Training standards are available at cooperation partner Temasek Polytechnic.

Another country in which Lufthansa Technical Training is active in Asia is Taiwan. "With a population of about 23 million, Taiwan itself has its limits as a market region, but there are a lot of airlines and, thanks to the opening up of contact with China, air travel is also booming here," says Rainer Grünzfelder, General Manager of Lufthansa Technical Training Taiwan. Thus, for example, students come to Taiwan from Mongolia, China and Singapore.

> **"Our facilities are the very best in the region and are particularly well geared towards basic training.**
>
> *Rainer Grünzfelder*

"The biggest demand is for basic training," he adds. "And it is here that our strength lies: our facilities are the very best in the region and are particularly well geared towards basic training." When it comes to practical training, the China Aviation School near Hsinchu, Taiwan, boasts among other things ten training aircraft widely ranging in size, as well as 17 turbine engines and 20 piston engines. Trainers and simulations are available for every aircraft system, so that a large number of students can be trained at the same time.

In addition to its Taiwanese CAA Part-147 approval, the location also has the Mongolian MCAA Part-141 approval. Students are not only referred through the partner schools of the China University of Science and Technology, a cooperation partner with several partner universities all over Asia, but a lot come to Taiwan from different Asian countries for practical training and at the same time to gain some foreign experience.

Conversion to EASA system

One special service offered by Lufthansa Technical Training Taiwan is consultancy. For two years the training specialists have been assisting with the conversion of the Taiwanese aviation regulations from an FAA system to an EASA system. Here they perform all the local services as well as managing projects. The direct partner on the project is Evergreen Aviation Technol-

With air travel booming in Taiwan, it is one of the Asian markets where Lufthansa Technical Training is active.

ogy, the maintenance organization of the airline Eva Air. All license holders, of whom there are 1,800 in Taiwan, will need to upgrade their licenses as a result of the regulatory change. At the moment Lufthansa Technical Training Taiwan is the only training establishment that has the requisite approval for the relevant conversion training and conversion examination. This year more than 200 license holders have already converted their licenses.

Going "down under"

When it comes to training young staff for the Asian market, Lufthansa Technical Training is also looking beyond the Asian continent: for example, the training service provider has entered into a collaborative agreement with the Australian Kangan Institute. Thanks to this agreement, the Kangan Institute's Aviation Industry Training Centre (AITC) is able to offer its students an EASA Part-66 CAT B1 or B2 license – a qualification that is also popular among Asian students in Australia.

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Enhanced m/material online shop

m/material is the **manage/m® web application** managing all aspects of a customer's material contract with Lufthansa Technik. The new online shop offers customers a number of new features offering greater user-friendliness.

The m/material online shop provides instant access to Lufthansa Technik's material catalog, providing availability and price of consumables and expendables (C&E). With m/material being the manage/m® application to manage all aspects of a customer's material contract, the online shop manages different kinds of orders – from pool requests to purchase (covering line replaceable units as well as consumables and expendables), to loan and even 1:1 exchange.

Starting with an easy to use search function, customers can submit material orders and monitor them throughout the whole delivery process. Thanks to the quick order process, requesting material only takes a few simple clicks.

One novelty is the possibility of ordering different materials as a single order to be delivered to a single site through a combined ordering process. This can now be accomplished by simply uploading an Excel list – m/material then automatically creates the order. m/material can be customized for every customer. Both the contact person at Lufthansa Technik and the customer's contract data are stored in the system and therefore available instantly. The same is true for the contract conditions, as the contract framework of each customer is part of his profile. Customers can thus order any items, always keeping to their contractual framework conditions.

The m/material online shop's excellent usability is based on its intuitive, self-explaining structure. Working reliably and securely using all common browser types, it is a stand-alone web application for material order and monitoring with a global function. Project manager Georg Pelda states: "The first launching customers are already using the system, much to their satisfaction. Moreover, in the second half of the year we plan to enable other customers using systems such as TRAX or AMOS to use these new functions as well."

manage/**m**®

Technical Operations WebSuite

Focusing ressources and man power on a single C-check is one of the keys to success for Critical Chain Project Management.

The maintenance factory

Following the **reorganization of production processes to Critical Chain Project Management**, Lufthansa Technik Maintenance International in Frankfurt has finally established itself as a maintenance factory for events through to C-checks. Customers benefit from shorter layovers and a standardized transparent reporting.

We start fewer things at the same time, but allocate more capacity to individual tasks – and as a result we finish more quickly." Such is the simplified common denominator to which Dr.-Ing. Thomas Mützel reduces the principle that has dictated the way of working in Base Maintenance at Lufthansa Technik Maintenance International since last year. Today Thomas Mützel is Section Manager Airbus A330/A340, but in his previous capacity as Team Manager, Lean Production & Quality, at this Lufthansa Technik Group company that specializes in maintenance work for international customers, he was responsible for the methodical process transition.

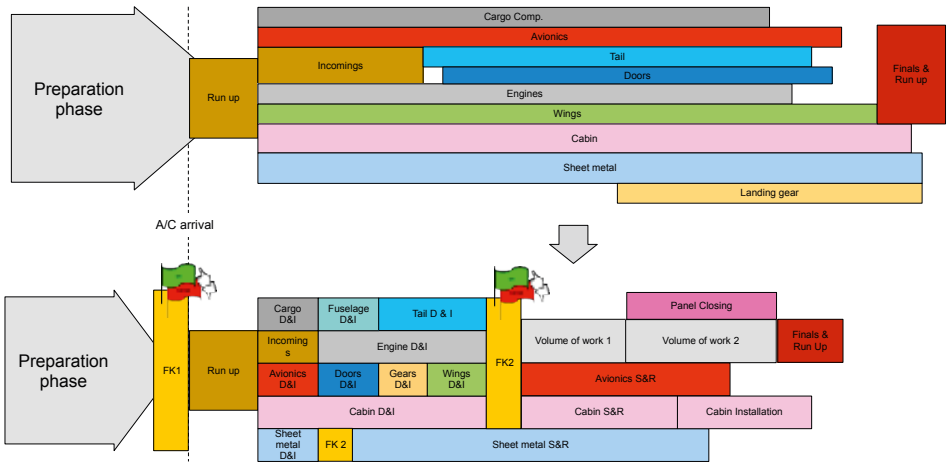
CCPM is the "magic formula" behind this approach, which is still relatively new in the MRO industry. The acronym stands for Critical Chain Project Management, a lean method of planning and managing projects that puts the main emphasis on the resources required to execute project tasks. This contrasts with more traditional methods which emphasize task order and rigid scheduling.

Last-minute, complex and difficult checks

For Lufthansa Technik Maintenance International the possibility of switching to CCPM appeared to be the way forward if the company was to respond better than it had up to now to the growing and increasingly differentiated requirements of the market. The company which was launched on the market five years ago has positioned itself within the Lufthansa Technik Group as a "maintenance factory" with the performance pledge of taking on complex and "difficult" checks even at very short notice.

But, as Thomas Mützel points out: "This approach significantly increases the variability of the tasks that ultimately have to be completed for a check. It's contrary to a classic series production, for example in automobile industry, where the process and work lists and the parts that will be needed are exactly known before production gets under way. Even when we know the airplane extremely well, we never know exactly what awaits us down the line on a check." The mix of C-checks and the shorter A-checks adds another dimension to the complexity of the work processes and also to personnel and material planning.

Please continue on page 10



Before (top) and after changing the maintenance processes to Critical Chain Project Management: Work packages are broken down into smaller units, each with a start and an end. The units are then integrated into the process chain on the basis of how many resources and how much time they require.

In the past these complex framework conditions had two primary consequences. Firstly, the uncertainty made it difficult to predict where bottlenecks could be expected in the production process and sometimes the predictions were wrong. This in turn led directly to multi-tasking and as a result to inefficient use of highly skilled staff. Before CCPM, firefighting was the order of the day. And secondly, experience showed that predictions of how long a given work package would take regularly proved to be little more than speculation, with corresponding implications for planning certainty.

The success of layover planning and its application on the basis of Critical Chain Process Management depends on a few important far-reaching rules being in place and consistently followed in practice. In the closed system of all the work associated with a layover in the hangar the critical issue is always the allocation of capacity between the various work packages. At Lufthansa Technik Maintenance International this process runs according to three rules.

Maintain low work in progress

Multi-tasking is the primary source of wasted capacity in a project environment. This challenge is countered by the first rule, which says that the number of projects running simultaneously – the work in progress (WIP) – must be minimized. Because maintenance work is almost always performed under time pressure, there is always a feeling that projects or subtasks of projects need to be started early on. In order to finish the tasks in time highly skilled employees have to alternate between tasks.

This multi-tasking applies not only to support processes, engineering and material support but also to managers, who are overloaded by too many simultaneous tasks. “Instead of running two tasks, each at 80 percent capacity, we prefer to invest 110 percent in one task. The effect is a lot greater,” says Thomas Mützel. The classic approach to planning a project entails a series of milestones. As a matter of principle project managers determine whether the project is where it needs to be in terms of the next milestone. At the same time experience suggests that a plan comprising a series of milestones is based on estimates. The result is that the intervals between milestones are calculated so as to incorporate a safety margin and hence are overly generous. This classic path does not allow for any early warning system. If a major problem only becomes obvious at a milestone, the plan falls apart as the next task is waiting after that milestone. Furthermore classic planning procedures are based on local efficiencies such as productivity.

CCPM follows a different path. Work packages are broken down into smaller units, each with a start and an end. These units are integrated into the process chain on the basis of how many resources and how much time they require.

Effective buffer control

Based on the knowledge that in the past the time necessary to accomplish a given task was planned too conservatively, the scheduled times have now been cut significantly. This “time saving” is then put into a transparent buffer. On the one hand the buffer is available when unexpected problems arise – they can now be worked through in a hassle-free fashion – and on the other hand it makes it possible to deal more effectively with situations where the work is finished ahead of time. This also has the effect of reducing work in progress significantly Finally the change in prioritization logic from worker productivity (everyone has to perform on 100 percent) to a lead time focus (do less in a faster way) leads to a drastic reduce in WIP.

But even with these rules there is one overriding principle, as Thomas Mützel points out: “We don’t start at all until we

The hangar of Lufthansa Technik Maintenance International in Frankfurt.

The unusual approach generates directly measureable results in regards to punctuality.

have gathered together all the documentation and the materials required to complete the activity." At the start of the project plan there is therefore an item known as "Full Kit 1".

This coordinated start is followed by a depanel and inspection phase, in which the entire aircraft is opened up and the components and systems are inspected and, where necessary, dismantled. All the routine items are carried out during this phase. By contrast, pre-CCPM, they would already start by working through the findings and non-routine work. Once the inspection phase is over, the second part of the project plan covering all the rest of the check is drawn up. This is based precisely on the actual findings and reliably contains the actual work that still has to be carried out.

> **That approach significantly increases the variability of the tasks that ultimately have to be completed for a check.**
>
> *Thomas Mützel*

Shop load specific management

For the purposes of check management according to CCPM Lufthansa Technik Maintenance International uses the Concerto planning and execution software from Realization. But, according to Mützel, as well as suitable software it is equally important "that we ensure on a daily basis that we maintain a project status with as low as possible a workload (low work in progress)." To make this concept work it is very important that event managers are constantly on site, find time to talk to the staff, continually analyze which tasks are necessary and constantly revise their view of the progress of the project. One major challenge here is to avoid falling into the "old habits" and, for example, when one job is done immediately start – in uncoordinated fashion – work that does not fit into the new system. "We grew up in an industry in which firefighting was the order of the day due to multi-tasking," says Thomas Mützel. "Trusting that at the end of the day things would go quicker if you were to start fewer things at the same time, was an unusual challenge."

The first check based on Critical Chain Project Management was carried out in the autumn of 2011. Since then, the hangar in Frankfurt has often presented an unusual sight. Although one aircraft is a hive of activity, it may be that a second aircraft is apparently standing neglected in the hangar. Whereas in the past, given the task mix described above of A-checks through to complex C-checks involving up to 4,000 man hours, the workforce would be working on all fronts simultaneously, today a C-check is put on hold and the resources are put into a short-notice A-check. As soon as this check is finished, everyone goes back to the C-check. What's more, C-checks are no longer carried out in parallel, but one at a time (see figure on page 10).

This unusual approach in the hangar may take some time for customers to get used to, but ultimately they are convinced by the directly measurable results of this approach: C-check layovers have been cut by between 15 and 20 percent. Punctuality, which in any case is high for C-checks, is also virtually 100 percent for A-checks. "In the final analysis we now always finish either on time or a little bit earlier," says Mützel. It goes without saying that Lufthansa Technik Maintenance International is gaining in efficiency and competitiveness as a result.

Transparent reporting

With this process model it is especially important to have good communications with the customer. Standardized reporting is now in place, with customers now being notified in a highly transparent manner of the progress of the check, how much of the buffer time has been used up, the current status of the aircraft and of individual assemblies. Furthermore there is a clear focus on which problems have to be solved by the MRO provider or in cooperation with the customer.

In this way, thanks to CCPM, Lufthansa Technik Maintenance International is well equipped for the future and for stronger demand. "The more work there is in the pipeline, the more effective become the advantages of this system," says Thomas Mützel.

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Critical Chain Project Management

// Critical Chain Project Management (CCPM) is a lean method of planning and managing projects that puts the main emphasis on the resources required to execute project tasks. This contrasts with more traditional methods which emphasize task order and rigid scheduling. //

The A380 overhaul expert

After **Lufthansa Technik Philippines** has completed its first C-checks on an A380, the Asian center of excellence for A380 overhaul services in the Lufthansa Technik Group is gearing up to increase its capability further.

During the second quarter of 2011, Lufthansa Technik Philippines broke ground to start construction of its third widebody hangar able to accommodate the Airbus A380. A year of comprehensive preparatory work followed, comprising personnel trainings in Frankfurt and in Manila, obtaining certifications and completing facility requirements, among others. Then the 8,500-square meter hangar construction with tool room, storage and office facilities was ready to serve the largest passenger airliner ever built. As experts in base maintenance for Airbus type aircraft, Lufthansa Technik Philippines had been entrusted by Qantas Airways to carry out cabin modification works for its entire A380 fleet. Since the start of this campaign in 2012, six A380s of the Australian airline have already been modified. A major wing rib modification was performed in parallel with most events. When the company added the A380 capability, the goal was set towards achieving an expanded suite of services. Lufthansa Technik Philippines' technical personnel are now certified to perform C-checks on the aircraft. This service has already been performed in conjunction with the cabin reconfiguration and wing rib repair tasks for the two A380s that followed within the first quarter of this year.

"Qantas Airways is one of our most valuable customers. We first served the airline's A330 fleet with C-checks starting in 2006. The long-standing history with the

“Ready and geared up”

Marek Wernicke, Senior Vice President for Base Maintenance at Lufthansa Technik Philippines, talks about the role of his company in Asian aviation.

Qantas group and our growing expertise for Airbus aircraft made us a trusted partner Qantas can rely on,” shares Sebastian Radeke, Senior Sales Executive and Business Development at Lufthansa Technik Philippines.

Performing the C-checks together with other tasks as one package offers A380 customers substantial savings. Lufthansa Technik Philippines can carry out a major modification on the wings as well as to the aircraft’s cabin in parallel to a C-check. This not only results in lower costs, the integrated work also has minimal effect on turnaround times: All layovers which included C-check, cabin and wing rib modifications were performed on time. Qantas Airways has sent four more A380s to Lufthansa Technik Philippines for cabin reconfiguration. The campaign was completed in July 2013.

Preparing the future

As Lufthansa Technik’s center of excellence for Airbus base maintenance in Asia, Lufthansa Technik Philippines is gearing up for further expansion of its A380 capability. The Manila-based facility is presently in the process of completing all necessary training, equipment, certifications and further requirements to be able to provide bigger checks in order to offer a total service solution for its A380 customers. “We look forward to further sharing our growing expertise with Qantas and other A380 operators in the future,” says Radeke.

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Connection: What is your philosophy and how does it translate into operations?
Marek Wernicke: Our goal is to be the number one MRO provider in Asia, and we also want to be regarded as a one-stop shop. This means that we should be capable of offering comprehensive solutions that meet our customers’ needs today and in the future. Our philosophy is focused on the customer and we constantly drive ourselves to create and deliver value at every point of contact. At the end of the day, it’s all about releasing the aircraft on time and providing a pleasant experience for the customer.

Lufthansa Technik Phillipines has put a stronger focus on its base maintenance business. What benefits can customers expect from this change?
Our focus is driven by the fact that we see high growth potential in base maintenance and we want to grow. A particular area is the increasing fleet of Airbus aircraft in use and lined up for delivery in Asia. Lufthansa Technik Philippines specializes in the maintenance of Airbus aircraft and we want to participate in the growth.

We not only have the space to grow, we will also be open to discuss building new facilities. Our restructuring efforts are geared towards improved productivity and customer focus. We also certainly want to reduce turnaround times while keeping our standards high.

With the industry preparing itself for new generation aircraft, what is Lufthansa Technik Philippines doing to secure its position?
We welcome these new generation aircraft. As part of the Lufthansa Technik Group, Lufthansa Technik Philippines can grow together with other facilities in the global network and develop new products for these new generation aircraft. It is important that we grow our business side-by-side with the life cycle of these aircraft. Of course, training our employees will be a crucial part of our formula. They must have the skills to address the future maintenance needs of these new aircraft. The bottom line is that Lufthansa Technik Philippines is ready and geared up to familiarize with the new fleet of aircraft and to prepare for their needs in the future.

How important is innovation in our business?
Innovation is something that I take seriously. We innovate to become more flexible, agile, cost-effective and more productive. We started the year 2013 with the launch of a project to identify opportunities to become more efficient and apply Lean production methods and processes.
Another part of innovation deals with “putting ourselves in the shoes of our customers” and finding ways to save them money. This is evident for example when we repair parts and components of our customers’ aircraft instead of replacing them with new parts. Innovation is also seen in the way we manage our projects with the latest tools and methods. We want every working relationship with every customer to be mutually positive and we ensure this by having additional ways to communicate with each other.

What is in store for Lufthansa Technik Phillipines in 2013 and in the years to come?
We are optimistic about the future. From our meetings with customers, we are now seeing a developing demand until 2014. The year 2013 is going to be all about restructuring and improvements. At the end of this year, we will also be in a better position to discuss possibilities of increasing capacities in our facility, which of course will be in parallel with confirmed demand and growth. And, as mentioned previously, we will invest in new technologies and training to upskill our people for the new generation aircraft and for them to be at par with the world’s best aviation professionals.

“Safest possible operations under cost-effective conditions”

Representatives of Lufthansa Technik are actively involved in amending existing rules and creating new rules. **Dr. Hans-Jürgen Loss**, Vice President Quality Management, and **Werner Luehmann**, Manager Regulatory Compliance & Authorities Liaison, spoke to Connection about the significance of this work and some recent results.

For an MRO provider it goes without question that aviation regulations have to be observed. But Lufthansa Technik does not stop at that. The latest development is the creation of EASA Part-M, Subpart J, which is expected in early 2014, will allow the almost total transfer of airworthiness responsibility to a Continuing Airworthiness Management Organization (CAMO).

Connection: Why is Lufthansa Technik involved in drawing up aviation law?
Dr. Hans-Jürgen Loss: Lufthansa Technik is keen to be involved in our own interests and in the interests of our customers. It is important for someone with practical experience in the application of aviation law to execute influence. As the counterpart to the authorities, we add the finishing touch in many subject areas. We scrutinize the rules and ask: are they logical, linear, possible to adhere to, do they really make things safer, is the intended function really accomplished in an effective manner? Authorities appreciate input based on practical experience in maintenance or operations – we are able to offer that vital information. After all, the intention of implementing a rule for enhanced safety is one thing, shaping it for easy and compelling implementation is another part of it.

What areas are you particularly involved in?
Dr. Loss: We look ahead at trends in the industry and at other stakeholders, so we are involved in a number of subjects. Our primary objective is always the safest possible flying operations under cost-effective conditions. Here, every element in the chain, from operations to the proportion contributed by the maintenance providers, plays a part.

How would you characterize your relationship with the authorities?
Dr. Loss: Having dealt with them in a respectful manner for many years, we have developed a relationship of trust with the authorities that constitutes an excellent basis for working together. This applies above all to the European EASA, to the FAA and goes on with several other national authorities. This relationship of constructive collaboration has often enabled us to influence things in a way that promoted our interests.

Dr. Hans-Jürgen Loss was Vice President Quality Management until the end of June 2013, taking over as Executive Director Operations at Ameco Beijing in China at the beginning of July.

Werner Luehmann, Manager Regulatory Compliance & Authorities Liaison

Werner Luehmann: One example of a development that we initiated is the discussion regarding Continuing Airworthiness Management Organizations (CAMO), as in Subpart J. Today there is one Subpart G, which says that a commercial operator has to have its own technical operations management in the form of a CAMO. “Active control and direct involvement” is required for the operator. For small operators and especially for start-ups, but also for airlines integrating a new fleet into their pool, this is difficult or expensive to accomplish. Subpart J will provide an additional option to leave this responsibility with an experienced CAMO, like Lufthansa Technik.
Dr. Loss: In Europe it was a highly controversial subject that was discussed for years. Lufthansa Technik got involved in this subject early. We provided detailed comments, held discussions with EASA and the national authorities, and at the end EASA acknowledged us for having supported this issue.

What was the outcome of these efforts?
Luehmann: Subpart J is expected to be implemented shortly. This will then mean that, as an alternative to the present procedure, airlines will also be able to contract a CAMO to assume airworthiness responsibility. So in the near future Lufthansa Technik will be able to take the responsibility and carry out airworthiness management tasks. At the same time this will mean that the contractual partner can reduce its headcount.

When will Lufthansa Technik offer this service?
Dr. Loss: If the legal procedures will work as announced we expect to offer this “Contracting of CAMO” service from the next year. The airline will then still have a post holder maintenance having the competence to contract out the CAMO work package after a risk assessment. The operator just has to be qualified to contract the service and be able to accept it. The present requirement for “active control and direct involvement” will be dropped.
Luehmann: This means of course that we will be offering the customer an even more comprehensive product. We will now be able to offer the entire package of every conceivable organizational approval, meaning design, maintenance and CAMO. This has obvious attractions for the customer.

Are there any other current examples of how you have had a constructive influence?
Luehmann: We are also working on a lot of other matters, for example, material certificates. This is a major problem across the industry. For example, we have been able to eliminate a few problems with the new release of the EASA Form 1. Thus, copies of certificates will now be accepted as well as originals. There was a lot of discussion over this issue – in the past copies were not acceptable. In the context of electronic data transmission this is of course a huge advantage.
Dr. Loss: In some cases we have also requested to refrain from unnecessary rulemaking. For example, EASA wanted to introduce a “multiple release”. Different companies involved in one layover would

Please continue on page 16

have to release their own maintenance work, while at the same time there had to be a “primary” maintenance organization that assumed overall responsibility. This was an infringement of the separation between performing maintenance and the responsibility for continuing airworthiness. Together with other partners we prevented this rule from being adopted.

What is your assessment of the legislative process in Europe?
Dr. Loss: The process by which aviation law is made in Europe is actually exemplary. Rulemaking is often preceded by standards, for example, as issued by the ICAO. One example is the Safety Management System (SMS). We at Lufthansa Technik did not want to wait for a specific regulation in Europe. We analyzed the ICAO standard to identify what added value it contained for us. We introduced those elements and now we are tackling the subject of safety hazards and risk assessment in a more structured way than before. As a result, Lufthansa Technik has in place a risk management system that complies with the ICAO requirements.
Luehmann: In this context the fact that we work well with our customers and not only with Lufthansa German Airlines, our closest counterpart and partner, naturally also plays an important role. An MRO provider makes an SMS not for itself, but for its customers, for the operators. Here we advanced a major step towards structured safety concepts at reasonable cost.

What role do industry organizations play in your work?
Dr. Loss: In many subject areas the only way to progress is through these organizations, the authorities will not talk to individual industry partners without the involvement of the industry trade organizations. Within those organizations we develop a common position with other industry partners and take jointly influence. At the national level the organization that we work with is the German Aerospace Industries Association (BDLI), at the European level it is the Association of European Airlines (AEA). Internationally we also work with the Aeronautical Repair Station Association (ARSA), based in the US. I can say that it is not least down to our efforts that today ARSA acts as an international organization.

All this involvement must cost quite a bit. How do you justify the expense?
Dr. Loss: Aviation law is often viewed as cement, but at the end of the day it is also in a state of flux. We are working on making this foundation ever safer.

Summary: Rulemaking support

// Lufthansa Technik is directly involved in creating new rules and amending existing ones. Due to its strong practical experience the MRO provider is an important counterpart to the legislating bodies. Often, finishing touches are put to a new regulation in order to ensure that it is achieving its intended function, i.e making aviation safer. In some instances, unnecessary rulemaking can be refrained from. //

At first sight, adhesive foils may seem an unusual alternative to painting, but in practice this has evolved into an attractive product offered by Lufthansa Technik. The specialists in surface design offer a variety of services for the application of foils to aircraft, ranging from the simple production of adhesive foils to the complete solution. This starts with design consultancy, covers application of the foils at the customer’s site and ends only when the foils are removed without a trace at the end of a campaign.

But before the foiling process can get under way, usually Lufthansa Technik is asked to provide support with the design.

Foiling is the fast and flexible alternative to painting, whether a small warning sign must be replaced or the entire aircraft is “repainted” in a night shift.

Foiling is flexible and fast

In many cases the use of **adhesive foils** is actually a better choice than painting due to the flexibility and design variety of the foils and the speed with which they can be applied. Lufthansa Technik's graphics shop covers the full range of services from the creation of customized foils to support for classic painting methods with paint stencils.

In this area the foil shop has already accumulated extensive experience. There are no limits on the design and color scheme that can be used. The finished design is then printed with UV resistant ink on foil sheets with a width of up to 1.23 meters and applied to the aircraft. Larger designs are achieved through the juxtaposition of multiple sheets. There is nothing magical about the speed: depending on the size of the design, it is even possible to "repaint" an aircraft in a single night shift, without any need for a longer layover.

But the significance of the paintwork on an aircraft goes beyond the visual effect. It plays a very much underestimated role in ensuring smooth flying operations, as technical markings also fall within the scope of this area. Once a mandatory information on a placard is no longer legible the aircraft may have to be grounded to remedy the defect, causing an expensive AOG. It is therefore no wonder that Lufthansa Technik uses only the highest quality basic materials tested for longevity as suitable for technical markings in its aircraft foils. This means that the finished foils delivered to the customer come with a "Form 1", signifying that they are fully approved for aircraft use.

As well as direct foiling, the graphics shop also supports its customers with the creation of paint stencils for use with classic paint technology. The specialists can also prepare technical drawings that will serve as templates for painting operations. To cover these requirements the foil shop has three state-of-the-art printers and a laser cutting machine. This ultra-modern equipment and the experienced team make Lufthansa Technik's graphics shop the first choice when it comes to speed and flexibility.

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Lufthansa Technik uses only the highest quality materials for adhesive foils.

Gearing up for the Middle East

Expanding the **local presence** of the Lufthansa Technik Group, Lufthansa Technik Middle East (LTMES) was established two years ago. Now LTMES is rapidly increasing its local capability, with composite repair services, comprehensive component services and a local Cyclean® Engine Wash capability being established.

Lufthansa Technik is gearing up for an increased demand in the Middle East. Two years after the establishment of Lufthansa Technik Middle East, Ziad al Hazmi, General Manager Gulf, is confident that Lufthansa Technik's concrete offerings are able to satisfy the regional demand. At the beginning of March, for example, the reverser shop commenced a Trent 700 thrust reverser repair for a major Middle East carrier. Thus regional aircraft operators now have direct local access to Lufthansa Technik's renowned experts in composites und bonded structures for all common nacelle types. In addition to shop capabilities for smaller repairs, composite spare parts (Airframe Related Components, ARC®) pools are being established for both the CFM56-5B and the GE90. Other composite or nacelle parts will be added in accordance to regional customer demands.

Component sale, exchange & loan

Lufthansa Technik maintaines a large component pool for a wide spectrum of aircraft types with local stocks at airports all over the globe. Now these services are available from the Dubai Airport free zone for regional customers. In addition to the contractual services Lufthansa Technik offers material and component loan, exchange and outright sale on a case-by-case basis. The dedicated warehouse is established with the corresponding manager available. Logistics and the necessary customs processes have been established, enabling aircraft operators in the Middle East to profit from quality component maintenance on their doorstep – with communication lines being kept short and response times quick.

The Single Component Maintenance (SCM) business of Lufthansa Technik services hundreds of customers worldwide. The key to SCM success is the quick and individual quotation and fulfillment of outstanding customer services. With the individual order handling customers always remain independent and flexible.

In addition to short turnaround times and higher reliability Lufthansa Technik's component services offer, a 24/7 AOG service guarantees that problems are solved right now. 365 days a year, 24 hours a day a team of 50 staff organized in three shifts ensure that every customer is supplied with the materials required in an emergency as quickly as possible so that expensive down time can be minimized.

Cyclean® for efficiency

Washing a jet engine on a customized cycle leads to a cleaner and therefore more efficient compressor. To achieve the minimum downtime necessary to perform the washing process as an integral part of aircraft operations, Lufthansa Technik developed completely new equipment which makes engine washing a quick and easy process. Meanwhile the revolutionary engine washing technology, Cyclean®, has proven its worth in thousands of successful washes.

A dual nozzle arrangement sprays water heated to 70 °C (160 °F) with up to 100 bar (1,450 psi) directly into the core engine. Contrary to conventional washing methods, a fine and evenly distributed water mist follows the gas path. This ensures efficient cleaning of the compressor and at the same time minimizes the amount of residual water remaining within the engine. The advanced equipment ensures easy preparation, short washing times and washing results second to none. The Cyclean® washing service will be set up in Dubai ready for operation by the end of this year, allowing local and international customers to make use of the product regionally.

In cooperation with Lufthansa Technik Group companies from around the world LTMES will shortly be able to allocate qualified mechanics and technicians to regional customers for long period assignments. This will allow customers and operators to make use of Lufthansa Technik's experience and know how without long training periods and associated costs.

Local contacts

Complementing the capability buildup in Dubai, line maintenance services will now be available locally. Operations will be expanded further with an increased local customer service team to support customers with various after sales services and account management. Furthermore, sales representatives for commercial and VIP customers are now present locally, as well as on-site representatives from Lufthansa Technical Training, Lufthansa Technik Logistik Services and Lufthansa Technik Airframe Related Components (ARC®). With this strong buildup of the local presence in Dubai, customers are ensured the best possible service locally, from the leading independent MRO provider.

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Harry Haber is at home both on site and in the shop.

As always only a phone call away of helping his customers.

Kerosene in the blood

"I have blood group Jet A-1", says Harry Haber, **"Father" of Lufthansa Technik's mobile Airline Support Teams (AST®)**, talking about himself. Aircraft are his passion and especially innovative repair solutions for engine problems.

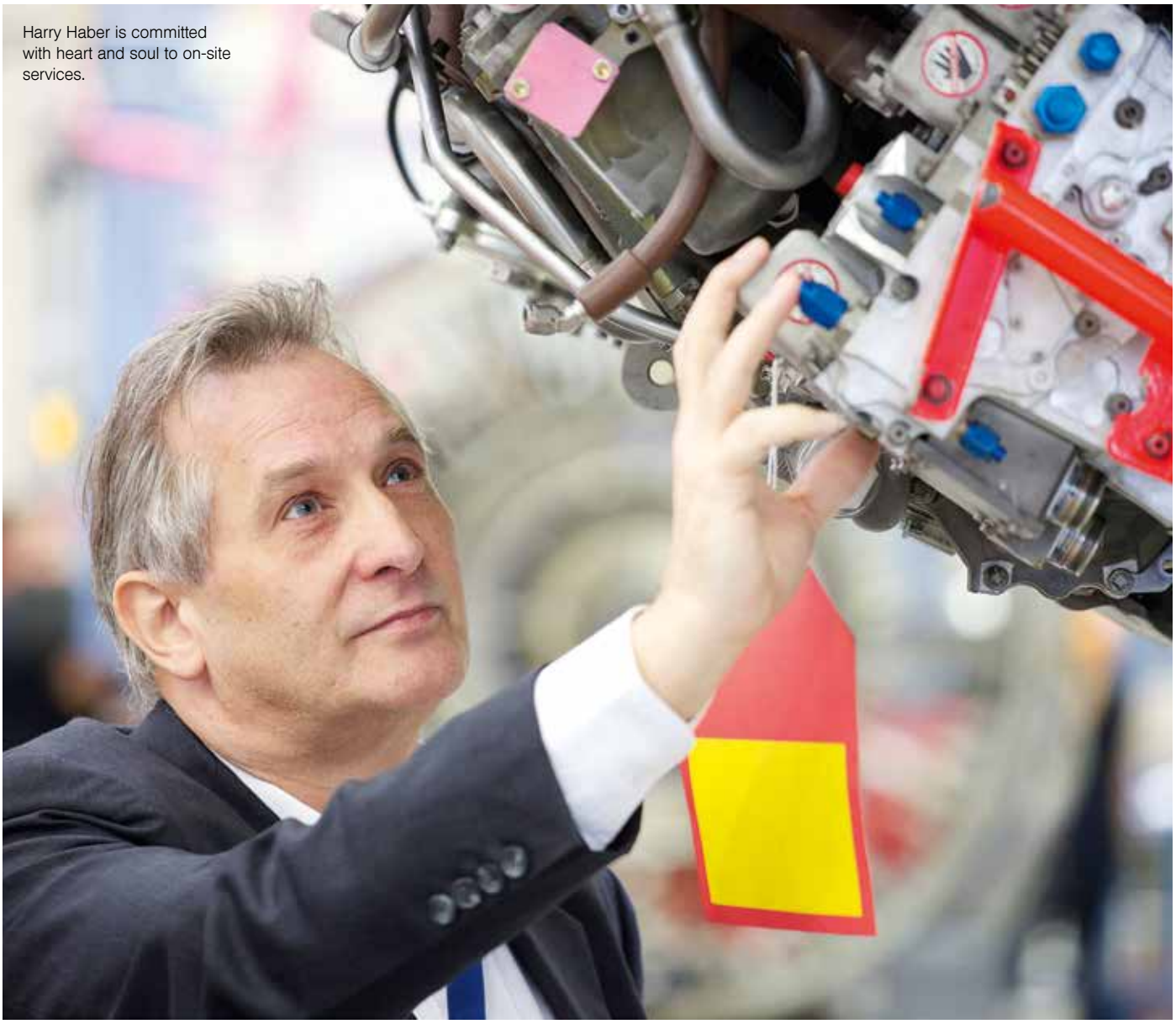
When Harry Haber talks about his work, the enthusiasm in his voice is unmistakable. "You have to be committed heart and soul to your work in order for your job to be fun. And who else can say that they virtually created their own job?" he laughs. Lufthansa Technik's "Flying Doctors", the mobile teams that travel out on special missions to perform on-site engine repairs – a success model that has since been adopted for other areas of the aircraft as well – originated in the 1990s based on an idea that Harry Haber had.

"I believe we are the maddest people in the market as far as creative problem-solving is concerned," he says. "The more creatively and solution-oriented we work, the more attractive our services are to customers," says Haber

Aircraft have always interested Harry Haber, and after completing his apprenticeship as a toolmaker in 1970 he joined the maintenance team of Lufthansa Technik in Frankfurt as an aircraft mechanic. On graduating with a degree in Mechanical Engineering he started work in production planning in the engine shop in 1977. At that time the CF6-50 engines for the then ATLAS alliance were looked after from Frankfurt. The airline alliance between Lufthansa, Air France, Alitalia, Sabena and Iberia had been founded with the aim of lowering the amount they would have to spend on investment and ongoing technical support costs for their still small aircraft fleets.

> **"We bring the expertise and the tools out on site, exploit the layovers and as a result save our customers a lot of money.**
>
> *Harry Haber*

Recalling the close contact and exchange of ideas and information with the other airlines, Harry Haber says: "As a result, I was right in the middle of the action." At the beginning of the 1990s the engineer took his courage in his hands and put his idea, that the company should perform technical work on engines at the customer's site for a fixed price, to Wolfgang Mayrhuber, who later became the CEO of Lufthansa Technik. This would be the precursor from the technical and human resources point of view for providing certain engine repair services on a mobile basis. Haber succeeded in convincing his superiors, and the new Airline Support Teams (AST®) product was



Harry Haber is committed with heart and soul to on-site services.

born. “From the start it met with a good response, and the demand rose rapidly – even if at first we had to convince customers of the advantages of having a repair carried out in situ instead of coming into the shop.” The “initial spark” for the new service, as Harry Haber calls it, was a combustor repair for a South American airline which saved it a lot of money and time.

Summarizing the advantages of AST® missions, Harry Haber says: “We bring the expertise and the tools out on site, exploit the layovers and as a result save our customers a lot of money.” In his view giving sound advice is particularly important to enable Lufthansa Technik to offer customers appropriate solutions. “Depending on the results of the inspection and the engine parameters, either a repair in situ or a visit to the shop could be the better solution,” he says. Today Harry Haber and his team organize around 500 events per year – from borescope inspections to the exchange of entire subassemblies, which may require up to seven tons of tools to be taken to the site. On-wing services for engines is a big growth market. Harry Haber and his team are constantly developing new AST® products. “We monitor the places in engines where there are problems and then we develop mobile solutions that comply with the manual. To be top of the league is great, but to remain top of the league is quite something.”

Over the years Harry Haber has become very well known in the industry. He visits customers, presents new ideas at conferences and talks to the engine manufacturers about joint solution approaches with the aim of making airline operations even more efficient. “What I like most of all is when we can really help our customers. So I was really pleased by a comment one of our customers made. He said that as long as he had my phone number he could sleep soundly at night.”

Harry Haber

Joining the maintenance team of Lufthansa Technik in the 1970s, Harry Haber’s idea to perform technical work on engines at the customer’s site for a fixed price was the starting point for the success story of today’s Lufthansa Technik Airline Support Teams (AST®).

Component support for E-Jets

A component specialist in the Lufthansa Technik Group, **Spairliners** has expanded its product portfolio by after-sales component services for the Embraer E-Jet family of regional jets. Logistics are handled by Lufthansa Technik Logistik Services out of the regional aircraft components center in Munich.

Underlining the commitment to the newly established comprehensive E-Jet capability, Spairliners announced its new contract with the French regional airline HOP! at the Paris Air Show in mid-June. The agreement with HOP! includes the long-term support of 26 Embraer 170 and 190 aircraft. Two months earlier, Spairliners, known as the market leader for Airbus A380 Integrated Component Care, had added an equal spectrum for the E-Jet family of the Brazilian manufacturer Embraer to its portfolio. With the latest contract the company now has ten regional airlines under contract.

With its new E-Jet inventory and continual development within the project, Spairliners receives full support from two well respected MRO providers (Air France Industries KLM Engineering & Maintenance and Lufthansa Technik) and their comprehensive spare part stock. Lionel Guérin, HOP! Chairman and CEO explains: “HOP! is a very demanding customer regarding its suppliers, with a specific focus on their service level. We renewed our trust in Spairliners as they proved to be the right supplier for HOP! being able to meet all our requirements.” Spairliners enables its customers unlimited access to 1,100 part numbers (P/N) of the Embraer aircraft type including repairs invoiced per flight hour.

“The expansion of our portfolio by integrating E-Jet component services is the result of our continuous success with our A380 Integrated Component Care program. This success has enabled us to take on a new challenge and allows us to grow with the addition of Embraer airline customers,” Andre Schulte-Bisping, CFO at Spairliners, says. “The after-sales com-

ponent services for E-Jets is an integral part of our growth strategy," summarizes Olivier Mazzucchelli, CEO of Spairliners. "Our approved business model now brings out an advantageous solution for all E-Jet operating airlines and additionally, an alternative to the original equipment manufacturers (OEMs). We are expecting to have more than 200 E-Jet aircraft under contract in 2014, including E-Jets from our mother companies Air France KLM and Lufthansa."

Logistics supply center in Munich

Under the new arrangements Lufthansa Technik Logistik Services will supply the components for the E-Jets out of Munich. Lufthansa Technik Logistik Services has already been supplying Spairliners with A380 components since 2008. Explaining the decision, Olivier Mazzucchelli said: "In the past Lufthansa Technik Logistik Service was responsible for supplying the regional pool from Munich. On the basis of many years' experience and positive performance we have decided as part of the E-Jet integration to extend our collaboration beyond A380 provisioning and to contract out the distribution logistics to Lufthansa Technik Logistik Services."

Martin Kinzelt, Lufthansa Technik Logistik Services branch manager in Munich, said: "Choosing Munich was a deliberate decision on the part of the companies involved, the aim being to maintain the present short supply times achieved for local airlines and support global provisioning from the Munich hub. We accept the challenge, including under the new set-up, of maintaining our high level of performance and offering customers the best possible service."

Lufthansa Technik Logistik Service's range of services includes the handling and storage of pool materials for the E-Jets, incoming goods inspections in accordance with aviation law requirements and oversight of the repair cycle.

Material distribution logistics for Saab

Lufthansa Technik Logistik Services // In the frame of a long-term contract, Lufthansa Technik Logistik Services has begun distribution logistics for the defence and security company Saab and their 340 and 2000 aircraft types at the company's Munich site. Material supply for the rest of the world outside the Americas for both Saab aircraft types had historically been provided by the Lufthansa Technik Switzerland distribution center in Basel. After the discontinuation of operations in Basel at the beginning of the year, Saab Group made the decision in early April to award the supply contract to the aviation logistics specialist under the roof of Lufthansa Technik. "We are very pleased to announce the signing of this contract. We have won another large direct customer, but we have also created a foundation for further business in partnership with Saab," says Andreas Meisel, Managing Director of Lufthansa Technik Logistik Services. The services Lufthansa Technik Logistik Services will provide for Saab include acceptance and inspection of both incoserviceable materials and removed parts, material warehousing that complies with aviation law, and the provision of materials for shipment to customers and to Saab's workshops. More than 10,000 parts and components will be supplied every year. In addition, Lufthansa Technik Logistik Services will be providing material transports for Saab and also offering to take on transport for Saab's customers //

LYDIA MARTIN has joined the new Lufthansa Technik office in Los Angels as Sales Executive. Mrs. Martin's extensive background in the aviation industry dates back to 1995 when she began her career at Lufthansa German Airlines. Subsequently she worked for a number of carriers in international positions, including United Airlines, Zodiac, Virgin America Airlines and Hawaiian Airlines. In her new position in the LA office Lydia Martin will fill a dual role. On the one hand she will be responsible for commercial airlines. At the same time she will work on behalf of the Key Account Lessors and Banks.

HOLGER BECK is the new Director Finance & Key Account Management at Lufthansa Technik Maintenance International. Beck commenced his carreer at Lufthansa as avionics technician in 1989. He joined Lufthansa Technical Training in 1995. With a Senior Diploma in Airline Management (IATA) and a Master Degree in Technical Management (CCI), Beck subsequently filled a number of leading management functions within the company. Prior to his latest promotion, Holger Beck was Chief Commercial Officer at Lufthansa Technical Training.

STEFAN SCHMUCK has taken over the position of Technical Director & Chief Operations Officer at Lufthansa Technik Airmotive Ireland. Schmuck can look back at 15 years of experience in aircraft MRO, having served in responsible management positions in Hamburg and Tulsa, OK, among others. Stefan Schmuck is a graduate of the Havard Business School, having acquired a Master Degree in Aerospace Engineering from the University of Munich before.

A CNC-controlled laser is used to extend the edges of a HPC blade.

State-of-the-art blade restoration

With a **laser-based repair method** developed in cooperation with specialist companies and institutions, the Engine Parts and Accessories Repair (EPAR) unit of Lufthansa Technik now offers a high-tech solution to a new problem: How to extend the lifetime of 3D high pressure compressor (HPC) blades of the CFM56.

During operations, high pressure compressor (HPC) blades suffer from chord loss due to erosion of the leading and trailing edges. With the beginning erosion already having a negative impact on performance, this effect finally leads to the scrapping of the affected blades when the chord length is eroded below the minimum serviceable limit. Scrap values of $40.000 and more per engine are common.

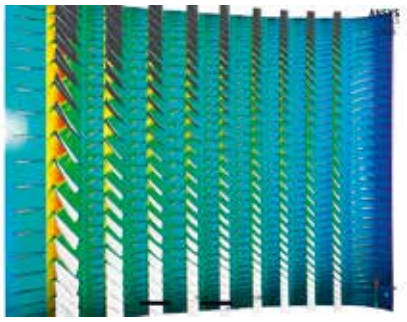
While chord restoration is a common repair for 2D HPC blades, not all new 3D HPC blades are repairable with ESM repairs. To slash down the scrap rates of these blades, Lufthansa Technik started developing a new chord restoration repair method. The project was supported by the Federal Ministry of Education and Research, with a number of external companies and institutions being involved in the process, such as the Helmholtz-Zentrum Geesthacht, Dreistegen from Monschau and ANSYS Germany based in Darmstadt.

Precise simulation

The new process is using adaptive CNC-controlled laser welding and subsequent milling of the repaired areas. At first, however, the maximum stresses in the material had to be predicted to evaluate the operational reliability of the repair. To achieve a reliable result, the engineering team performed a highly detailed CFD simulation of the complete high pressure compressor, coupled with a structural computation.

The nine-stage high pressure compressor achieves speeds of up to 15 000 rpm and exit temperatures of 650 °C. A flow calculation can only be realistic, if the influence of rotational speed, heat and pressure acting on the blades is considered. Due to these influences, the disk expands and the blade moves to a position on a larger radius. The blades themselves are also stretched and aligned radially. The deformation of the compressor cases must also be considered to allow for a calculation of the correct tip clearance and avoid contact between blades and case.

The basis for the stress calculation is the geometry of all piece-parts of the compressor which has been determined in a reverse-engineering approach by optical scanning. For each rotor stage, an FEA-model (Finite Element Analysis) of the blades was generated and stress-analyzed.



Visualization of a CFD (Computational Fluid Dynamics) simulation of the complete high pressure compressor section.

In this case pressure fluctuations are of high importance, as they can stimulate the blade in its natural frequencies and lead to fast propagating cracks. Calculations therefore had to prove that fatigue resistance and dampening of the material are sufficient. To ensure optimum performance of the repaired parts, transient Computational Fluid Dynamics (CFD) analyzes were used to evaluate the airflow of new and repaired compressor blades. The result of this process, which required tremendous computational power, was a blade map for each compressor stage showing the areas where the laser repair yields satisfactory results.

Laser-based repair

The final restoration of the blade geometry is accomplished by a fully automatic laser build-up-welding and finishing to obtain a geometry in “as-new” condition. The result of the entire effort is outstanding: Overall performance of a chord repaired compressor will – in combination with Lufthansa Technik’s Advanced Recontouring Process (ARP) – be competitive with all other parts on the market.

Furthermore, due to the small heat affected zone and the extremely narrow width of the laser weld, the impact of the repair on the part is minimized. This repair will therefore ensure the maximum number of repair cycles for the HPC blades. Available at the end of 2013, the new repair will restore HPC blades from stages 4 through 8 of the CFM56-5B/P and the CFM56-7B engines.

To further extend the life of an HPC blade, future developments of this repair are aimed at developing measures against erosion of the repaired blades. Hardfacing the affected areas with material that effectively reduces erosion is a technology currently under scrutiny. The ultimate goal is to develop measures which will be more efficient than existing ESM HPC erosion coatings.

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PW150 services for Sky Regional Airlines

Lufthansa Technik AERO Alzey // Montreal, Canada, based operator Sky Regional Airlines (SKY) signed an exclusive agreement with Lufthansa Technik AERO Alzey covering MRO services for SKY's fleet of PW150A powered aircraft. SKY started their operation in May 2011 with five Bombardier Q400 aircraft. The new contract also includes spare engine support. "Following signature of the Total Component Support (TCS®) agreement with Lufthansa Technik in March 2011 and the positive experience we have had with the Lufthansa Technik Group as a competent and reliable partner, we've decided to extend the relationship by entering into an engine service agreement with Lufthansa Technik's subsidiary Lufthansa Technik AERO Alzey for our fleet of PW150A powered aircraft. We have worked with Lufthansa Technik AERO Alzey since we've started operating the PW150 and we have found that Lufthansa Technik AERO Alzey is delivering the service we require at very competitive prices," said Pat Melen, Director of Maintenance. "We are very pleased to partner with Sky Regional and are looking forward to support Sky Regional's future growth," commented Martin Hach, COO of Lufthansa Technik AERO Alzey. "We believe this agreement is a direct reflection of our commitment to provide the most flexible and comprehensive services in the regional aircraft engine market." //

Excellence in combustor repair

Rolls-Royce award // Thanks to the fantastic work and consistent assurance of quality and processing times, the RR/IAE/CF34 line team from Lufthansa Technik's combustor shop in Hamburg has made a name for itself. In recognition of the performance of the colleagues contractual partner Rolls-Royce has conferred the designation of Center of Excellence with Silver status. Tradition-steeped Rolls-Royce sets demanding standards: to qualify for this designation, production system, on-time delivery, quality and many other criteria have to be consistently high over a long period. The shop was therefore closely scrutinized and evaluated before the award could be granted. Rolls-Royce Global Repair Services Business Development Leader Tony Garwood handed over the document in front of the assembled team and then offered his personal thanks to every single colleague.
Philip Mende, head of Engine Parts, acknowledged the honor with pride: "This is a great honor that singles out not just the special achievements of the entire team but also the personal commitment and passion for the product." //

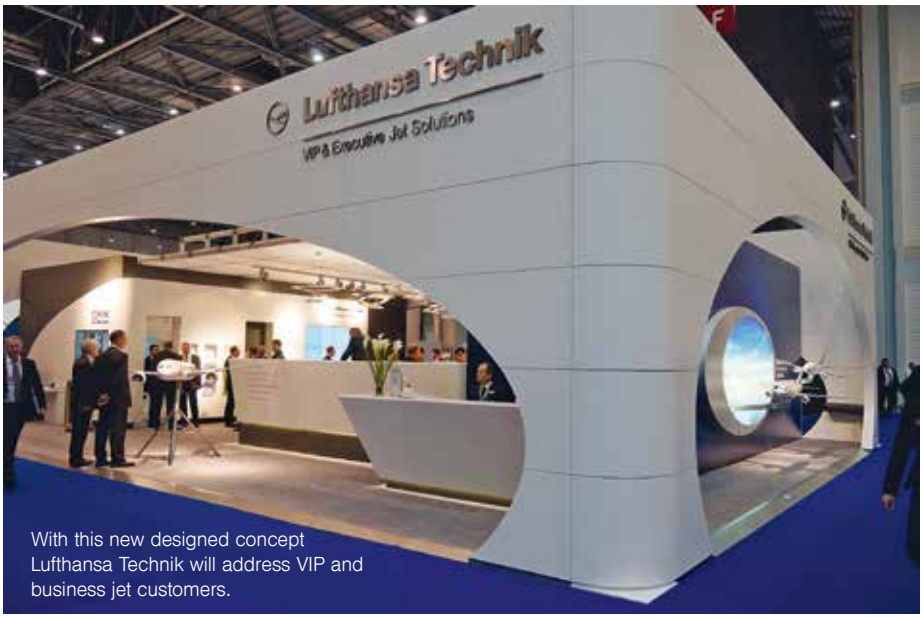
Excellence personified: The proud team with the award.

Okay Airways expands engine contract

Lufthansa Technik AERO Alzey // Chinese operator Okay Airways (OKA) and Lufthansa Technik AERO Alzey have signed an exclusive MRO contract covering PW127J engines. Currently OKA is operating eight MA60 aircraft. The airline has started an ambitious expansion and Lufthansa Technik AERO Alzey has been selected as partner to accompany this development. "Referring to our excellent experience with Lufthansa Technik AERO Alzey in 2012, we are happy to extend this technical cooperation. Okay Airways has the chance to learn from Lufthansa Technik AERO Alzey and the Lufthansa Group. And we know as well that our PW127J engines are in best hands," said OKA CEO Liu Weining during his speech on the occasion of the signing ceremony in Alzey. "We are happy about OKA's commitment concerning their PW127J engines and it is with pleasure to accept the invitation to negotiate a further cooperation. We are honored to support OKA's long term growth as reliable MRO partner", answered Mark Johnson, CEO of Lufthansa Technik AERO Alzey, in his speech. //

Photo: Thomas von Sichart

Signing the contract (from left): Raimund Schnell, Vice President Marketing & Sales, Lufthansa Technik AERO Alzey, Mr. Liu Weining, Chief Executive Officer Okay Airways, and Mark Johnson, Chief Executive Officer of Lufthansa Technik AERO Alzey.



With this new designed concept Lufthansa Technik will address VIP and business jet customers.

New trade fair stand design

Lufthansa Technik has renewed the design of its trade fair stands. The two different designs for commercial and **VIP exhibits** are an evolution of the MRO provider's corporate presence.

Lufthansa Technik presents itself using different stand concepts, depending on the size, importance and target group of a trade fair. From 2013 two variants will be used: "VIP" for trade fairs targeted at the clientele of the private jet and executive aircraft market, and "Commercial" for all other trade fairs. The concepts are flexible and can be adapted to different stand sizes at little expense. Thus, "VIP" is suitable for areas from 70 to 220 square meters and "Commercial" for stands between 20 and 150 square meters.

Marketing Director Ulrich Leidorf explains the rationale behind the makeover: "The three trade fair concepts that we have had in use before were in need of an urgent overhaul as concepts such as the 'First Class' concept for VIP trade fairs had been in use since 2005. Optimizing their design and content the new designs are an evolution of Lufthansa Technik's corporate presence."

The first trade show appearance in Europe featuring the new full 220 square meter "VIP" stand was at the European Business Aviation Convention & Exhibition (EBACE) in Geneva in May. Further explaining the stand's features, marketing project manager Daniela Klinger said: "The entire exhibition stand is of the highest product and quality standard, reflecting the aspiration of a 'First Class' in the aircraft. Luxurious leather, fine wood and designer pieces by way of furnishings communicate our ambitions in the fitting out of VIP business jets to customers."

The new full-size VIP stand was used for the first time at this year's Ebace in Geneva.

Meet us at...

27 Aug. – 1 Sept. 2013 | Moscow

MAKS

At Russia's leading aerospace exhibition Lufthansa Technik will showcase its products and services dedicated to operators in Eastern Europe and the CIS.

24 – 26 Sept. 2013 | London

MRO Europe

For maintenance, repair and overhaul, as well as manufacturing, at MRO Europe the latest standards for productivity and aerospace technology are presented.

22 – 24 October 2013 | Las Vegas

NBAA

Lufthansa Technik will showcase news and highlights from its all-encompassing interior solutions and VIP aircraft services portfolio at NBAA 2013.

29 – 31 October 2013 | Singapore

MRO Asia

MRO Asia is the largest event in the region dedicated to the aircraft MRO market. Lufthansa Technik Group will be represented by Ameco Beijing as well as conference speakers.

17 – 21 November 2013 | Dubai

Dubai Airshow

The foremost aerospace event in the Middle East, Dubai Airshow once again attracts the world's top players in the aviation industry. Lufthansa Technik will underline its role as reliable partner for the region.

For more information:
www.lufthansa-technik.com/events

World of services

No matter if you are a regional start-up, a small or mid-sized carrier, a private or governmental operation, or a legacy airline: Our range of products and services can be tailored for commercial and private fleets of every mix, kind and age.

Total Support Services

Total Support Services are the first choice for any customer wanting to enjoy cost-efficient and reliable flight operations and focus on his core business at the same time.

- 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™)

Single Services

Single services and shop load events such as letter checks, engine overhauls or repairs of single components are at the core of a unique assembly of products and services.

- Aircraft Services
- Component Services
- Engine Services
- Landing Gear Services
- VIP & Executive Jet Solutions
- Logistics & Training

Special Services

The world's leading manufacturer-indepenent MRO provider offers a product portfolio reaching beyond traditional MRO services from the manual.

- Composite Repairs (ARC®)
- Engine Parts & Accessories Repair (EPAR)
- Maintenance Management Services (MMS)
- Aircraft Leasing & Trading Support (ALTS®)
- AOG Services
- Surface treatment

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Hotline 24/7 AOG desk

Cabin & IFE Products

Lufthansa Technik has successfully established a line of cabin products.

- Cabin Management & IFE Systems
- Aircraft & Cabin Equipment
- Connectivity
- Patient Transport Solutions

eServices

Lufthansa Technik's Technical Operations Websuite manage/m® allows operators to manage their technical operations via a web-based system.

For more information:
www.lufthansa-technik.com/services

Airbus

A300

Airbus A300

Line Maintenance
Base Maintenance
Component Services
Engine Services:
P&W JT9D, PW4000-94,
GE CF6-80C2

A310

Airbus A310

Line Maintenance
Base Maintenance
Component Services
Engine Services:
P&W JT9D, PW4000-94,
GE CF6-80C2

A318

Airbus A318

Line Maintenance
Base Maintenance
Component Services
Engine Services:
CFM56

A319

Airbus A319

Line Maintenance
Base Maintenance
Component Services
Engine Services:
CFM56-5, IAE V2500-A5

A320

Airbus A320

Line Maintenance
Base Maintenance
Component Services
Engine Services:
CFM56-5, IAE V2500-A5

A321

Airbus A321

Line Maintenance
Base Maintenance
Component Services
Engine Services:
CFM56-5, IAE V2500-A5

A330

Airbus A330

Line Maintenance
Base Maintenance
Component Services
Engine Services: P&W
PW4000-100, RR Trent 700

A340

Airbus A340

Line Maintenance
Base Maintenance
Component Services
Engine Services:
CFM56-5, RR Trent 500

A380

Airbus A380

Line Maintenance
Base Maintenance
Component Services
Engine Services: RR Trent 900

Boeing

737

Boeing 737

Line Maintenance
Base Maintenance
Component Services
Engine Services:
CFM56-3

737 NG

Boeing 737NG

Line Maintenance
Base Maintenance
Component Services
Engine Services:
CFM56-7B

747-8

Boeing 747

Line Maintenance
Base Maintenance
Component Services
Engine Services: P&W
JT-9D, P&W PW4000,
GE CF6-80C2

757

Boeing 757

Line Maintenance
Base Maintenance
Component Services
Engine Services:
RR RB211-535

767

Boeing 767

Line Maintenance
Base Maintenance
Component Services
Engine Services:
P&W PW4000-94,
GE CF6-80C2

777

Boeing 777

Line Maintenance
Base Maintenance
Component Services

787

Boeing 787

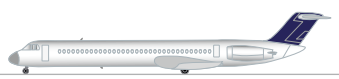
Line Maintenance
Component Services
Engine Services*
*schedule to be defined

MD-11

MD-11

Line Maintenance
Base Maintenance
Component Services
Engine Services:
GE CF6-80C2,
P&W PW4000-94

MD-80



MD-80

Line Maintenance
Base Maintenance
Component Services

Regionals

CRJ

Bombardier CRJ

Line Maintenance
Base Maintenance
Component Services
Engine Services: GE CF34

Q Series

Bombardier Q400

Line Maintenance
Base Maintenance
Component Services
Engine Services:
PW100, PW150

E-Jets

Embraer

ERJ-135/145,
E-Jets 170/175, 190/195,
Line Maintenance
Base Maintenance
Component Services
Engine Services: GE CF34

BAe-146 Avro RJ

BAe, Avro, Saab

Avro RJ, BAe 146
Saab 2000
Line Maintenance
Base Maintenance
Component Services

Business Jets

Airbus Corporate Jets

ACJ

Line Maintenance
Base Maintenance
Component Services
Engine Services:
CFM56, IAE V2500-A5

Boeing Business Jet

BBJ

Line Maintenance
Base Maintenance
Component Services
Engine Services:
CFM56-7B

Bombardier

Bombardier

Challenger, Learjet,
Global Express.
Line Maintenance
Component Services
Engine Services:
GE CF34

Embraer

Embraer

Legacy, Lineage.
Line Maintenance
Base Maintenance
Component Services
Engine Services: GE CF34

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Let's talk about solutions

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