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ANALYSIS: CFM56 overhaulers see light at end of tunnel

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Maintenance companies are confident of a recovery in CFM International CFM56 overhaul shop visits after airlines sharply reduced engine MRO activities amid the pandemic.

However, service providers diverge in their views on what long-term impact the crisis and predicted airline fleet cuts may have on the sector.

When CFM began the transition to the Leap generation in 2016, CFM56 maintenance providers forecast that aftermarket activities for the ubiquitous narrowbody engine would grow until around the mid-2020s.

Production rates for CFM56-7B-powered Boeing 737NGs and Airbus A320ceo-family jets, on which the CFM56-5B is an option, had reached high levels and had created a large fleet of young aircraft that were going to need support for years to come. Some MRO providers increased CFM56 overhaul capacity after Leap serial production had begun.

"We all thought there was a big wave coming, but actually the engine performed fantastic on wing," MTU senior vice-president of MRO programmes Martin Friis-Petersen tells Cirium. Shop visits for the latest CFM56-5B/7B variants tended to be driven by life-limited parts (LLPs) reaching their ceiling rather than a need to restore engine performance, he says. "Especially first-run engines have flown almost to LLP limit."

Air France Industries KLM Engineering & Maintenance senior vice-president of engines product Michael Grootenboer takes a similar view. "We had a big wave of shops visits that were rolling ahead of us for some years and that we never quite reached because the engine kept performing beyond expectations," he says. "The question now of course is what happens to that wave?"

DEFERRED OVERHAULS

Since the onset of the coronavirus, airlines have avoided engine overhauls in a bid to preserve cash. Operators have deployed, as much as possible, fuel-efficient new-generation aircraft powered by Leap or Pratt & Whitney PW1000G-series engines. The new-generation equipment tend to be covered by warranties and long-term service agreements with OEMs.

Aircraft powered by previous-generation engines have been deployed too. But if issues arise, operators have taken equipment from parked aircraft – either entire powerplants or individual modules – to resolve them through replacement rather than repair or even full-scale performance restoration overhaul. The CFM56-family's modular design has lent itself to such tactics as aircraft have been idle on the ground amid the crisis.

As a result, maintenance providers have seen an increase in hospital or quick-turn shop visits during which engines undergo module changes or limited, targeted repairs to address issues that prevent operation. Airlines, on the other hand, have used "green-time" remaining service life on entire engines or individual modules, be it from their own fleets or on leased equipment.

Friis-Petersen notes that "asset-centric" MRO strategies had been pursued before the crisis, especially to manage residual value of mature engines before their retirement. But the shift toward quick-turn shop visits has led to a sharp fall in regular overhaul events, which are among the most lucrative MRO activities.

MTU says it came away from 2020 with "a black eye" as the number of shop visits at its facilities declined "only 18%". Across the MRO sector, the German subassembly manufacturer and MRO provider estimates that the number of shop visits fell 45% last year.

Reduction in demand was softened by warranty support the company provides under its partnership with Pratt & Whitney on the PW1000G programme. In 2019, MTU had generated nearly 60% of its total €4.63 billion (\$5.52 billion) turnover through maintenance activities.

It predicts 15-25% maintenance revenue growth this year. "We are quite optimistic," says Friis-Petersen. The company expects the MRO sector to recover earlier than the wider airline market because the number of remaining serviceable engines will limit, at some point, the practice of deferring overhauls.

MTU is even adding a CFM56-7B overhaul line to its facility near Berlin. The site has so far concentrated on smaller aero engines and industrial gas turbines, and is set to start servicing the 737NG powerplant from the middle of this year. MTU says the additional CFM56-7B overhaul line increases network flexibility and responsiveness – something the company sees as "extremely important" in the current environment.

DIVERGING GROWTH PATHS

Engine Lease Finance estimates that the number of shop visits for CFM56-5B/7Bs and International Aero Engines V2500s – an option on the A320ceo-family – declined 54% in 2020.

"The supply and demand equation completely turned around," the engine lessor's vice-president marketing Justin Phelan tells Cirium. "Now we see a different [overhaul] growth trajectory in future."

After the annual number of CFM56-7B shop visits approached 1,500 prior to the crisis, ELFC predicts 600-700 events this year, and around 500 for the -5B, representing a "modest" increase over last year. Shop-visit demand in both 2022 and 2023 is set to grow faster, in the mid-20%-range for the latest versions, Phelan says. "Older -5Bs and -7Bs will probably not be overhauled in the medium term [and] will most probably go to part-out... A lot of them are aligned with aircraft that have been taken out of service and have been parked."

AFI KLM E&M has a positive outlook for the CFM56 lines at its engine overhaul shops in Paris and Amsterdam. AFI's shop at Paris Orly supports CFM56-5Bs alongside legacy -5As and -5Cs – used on older A320ceo-family jets and A340-200/300s, respectively – while KLM E&M services CFM56-7Bs at its Schiphol site.

Grootenboer says the MRO provider is "very comfortable" with its service portfolio across the two facilities. "We are confident [that our] capacity will be filled in rapid order once the market picks up," he adds.

Scandinavian CFM56 overhaul specialist Aero Norway, meanwhile, this month terminated a company-wide 20% salary cut and four-day working week for shop floor staff that had been introduced in October to avoid redundancies. A review of the measures had originally been planned for April. But chief executive Glenford Marston tells Cirium that a five-day working week was reinstated early because of increased customer demand.

The uptick still covers mainly engine repairs with limited scope rather than full-scale performance-restoration shop visits. While he expresses doubt about a recovery this year, Marston predicts a shop-visit surge during the second half of 2022. "People make enquiries" about facility slots, he says.

Phelan notes that some industry players previously predicted increased overhaul activity from the end of 2021, arising from a projected lack of available green-time engines, but says ELFC expects shop visit deferrals to "probably carry on for a bit more" because travel demand has remained low in most areas amid continued government restrictions. ELFC foresees a gradual increase in shop visits, rather than a sudden surge, he adds.

Lufthansa Technik vice-president engine services Dietmar Focke takes a more cautious view. He is confident that CFM56-5B and -7B overhauls will return on a "relatively large scale" because of an extensive installed 737 and A320-family fleet and industry-wide expectations that short- and medium-haul flights will recover before intercontinental services. CFM56-5A and -5C shop visits, meanwhile, will likely peter out earlier than previously expected, he reckons.

TIPPING POINT

There is a tipping point at which overhaul of existing engines can no longer be deferred. Focke believes it will not be reached before late 2022 or early 2023. This will create a wave of pent-up overhaul demand rather than a gradual increase in shop visits, he says. "There will be a peak that will take some time – depending on how many flights will be operated then – until the wave has subsided."

Focke does sound a warning that overall engine MRO volume will be reduced, as international airlines, including LHT's parent, have outlined fleet reduction plans for a post-Covid environment. Noting the difficulty of predicting future fleet size and aircraft retirements, he says: "Every forecast that we produced over the past 12 months was replaced by another one three months later, and they never became better." But he is certain that "we will not see the same [overhaul volumes] in a parallel shift on a timeline – numbers will be smaller".

As a result, LHT had reduced its engine overhaul capacity 15% by February and intends to make further "small" cuts, Focke says. The company has agreed with the German government to implement a short-time work scheme until March 2022.

LHT predicts that overall MRO activity will not reach pre-crisis levels until late 2023 or early 2024 "at the earliest", chief executive Johannes Bussmann said on 8 March. The MRO group, which employed around 22,700 staff across its international network in December, swung to a €383 million adjusted operating loss in 2020 from a €463 million profit in 2019. Revenue losses were especially felt in engine and component services, where shop capacity utilisation temporarily fell "well over half" in 2020, LHT says.

Aero Norway's Marston is also sceptical about the market returning to pre-crisis levels in the short term. He argues that large overhaul shops are proportionally more severely affected by the dry spell. "The bigger shops will see the value of being small [and] resize," he says. "If they benchmark 2019 as the target to get back to, I don't think [carrying] that amount of people and equipment for another three or four years is actually viable."

AFI KLM E&M's Grootenboer acknowledges that overhaul activity will depend on air travel recovery. But he is more bullish. "If it is at the same pace as in China, then we will need all the [shop] slots in the world to return all those aircraft to flying condition. If it is a bit slower, then it is still a challenge."

Asked whether he sees a need to consolidate capacity across AFI KLM E&M's two engine shops, he replies: "Not at all. Where we see the market going post-crisis, we need all the capacity... We are very confident our shops will be more than needed."

In pure capacity terms – leaving economic pressures on individual MRO providers aside – Grootenboer does not even see compelling reasons for fundamental change across the entire CFM56 overhaul market. "There could be consolidation. But I don't expect that the capacity in the market will be dramatically lower... on the CFM56," he says.

Safran, CFM's joint shareholder with GE Aviation, is certain that the crisis will have a limited effect on its MRO prospects. "Our medium-term outlook for the aftermarket has not changed," said chief executive Olivier Andries during a 25 February financial results briefing. "We are still very confident that the traffic will come back and that the aftermarket will come back... to pre-crisis level."

The French aerospace group's civil aftermarket revenue declined 43% amid the pandemic in 2020. It predicts a short-haul, domestic traffic recovery by 2023-2024 and, more broadly, that it will benefit from an uptick in short- and medium-haul flights before long-haul services.

RETIREMENTS

According to Safran, 80% of CFM56-7B/5B-powered aircraft were in service at the end of 2020, while the number of retirements of such aircraft fell to around 60 during last year from 108 in 2019. "Much less than what we [had] expected," Andries says.

For MTU's Friis-Petersen, "the big question is: will there be a retirement wave?" Although airlines parked aircraft *en masse* during the early phase of the pandemic, the MTU executive says that there have so far been relatively few retirements, as operators and asset owners have not finalised fleet plans for a post-Covid environment. Instead operators have managed fleets in a "very dynamic... opportunity-driven" manner to remain flexible, he notes.

"I do expect that we do see more availability of assets going forward," Friis-Petersen says. But he adds that a lack of clarity about retirements over the next few years is "the biggest uncertainty" at this point.

LHT predicts that airlines will decide their future fleet footprint in 2021 – and the German provider predicts that the crisis and outlook of a reduced fleet in future will lead to consolidation in the MRO sector. "I do expect that one or the other engine MRO provider will not make it into the new world because in the end, there is still a relatively long dry period ahead of us. You have got to survive that first," says Focke.

But survival isn't everything – Focke argues that the crisis will likely affect the ability of some MRO providers to establish new-generation engine capabilities and thus secure market access beyond the widely supported CFM56. "That is an investment hurdle that an already weakened MRO will not be able to cross," he says.

Noting that LHT had started establishing Leap support at the group's Hamburg headquarters and had built up several PW1000G overhaul lines prior to the crisis, he adds: "We have to assume that the entire competition that we see today will probably not be there anymore in 1.5 to 2 years' time, and that lower demand for [CFM56]-5B and -7B overhauls... will also meet reduced capacity in the marketplace."

NEW OPPORTUNITIES

ELFC's Phelan warns that MRO providers must adapt and become more flexible as airline demand is set to remain centred on targeted quick-turn events rather than full-scale overhauls for some time yet.

"Shops will have to become more agile, and certainly speed will be of the essence getting engines in and out," he says. "It comes down to whether the MROs and overhaul shops can right-size themselves and strike off some fixed costs they may have, to be able to

make money out of smaller shop visits and quick-turns and selling less labour hours and less material [than in the past]. I think there are difficulties ahead.

"But we are over a lot of it, we are approaching the end game," he adds. "I do believe that when we go back to a more normal growth trajectory, we absolutely need all those shops and need the [existing] capacity."

Phelan expects that as the fleet of Leap and PW1000G-powered aircraft expands, OEM facilities and their partners will be busy with the support of these engines as the new-generation equipment tends not to immediately reach reliability levels achieved by established predecessors.

"That will create some opportunities for the existing players in the current-market technology," he says. "There is room for everybody. I just think MROs need to be smarter on how they get through this downtime."

AFI KLM E&M's Grootenboer believes the crisis will not cause a long-term shift in engine overhaul demand and that airlines will require conventional shop visits. When air travel picks up in a sustained manner, airlines will return to handling maintenance in a manner that is "optimal for a fleet", he expects. "Typically for a CFM56, these are more [of] performance restoration-type interventions and not only small [events]."

As to whether or not the future competitive MRO environment will look different to that before the pandemic, Focke predicts that Covid-19 will also create new opportunities for service providers – as previous crises have done. Pressure on established airlines – some of which have accumulated large amounts of debt by government bailouts or private financing to survive the pandemic, while others have left the market – has created room and favourable conditions for new players without legacy costs to enter the field, he suggests.

Especially as established airlines reduce operations, Focke argues, start-up airlines will be in a position to secure "extremely favourable conditions... in all respects", be it aircraft procurement, financing, recruitment, airport slots, ground services or maintenance. For the engine MRO market, this may mean that many CFM56 engines poised to be excluded from airline fleet plans will return to the market powering new operators.