

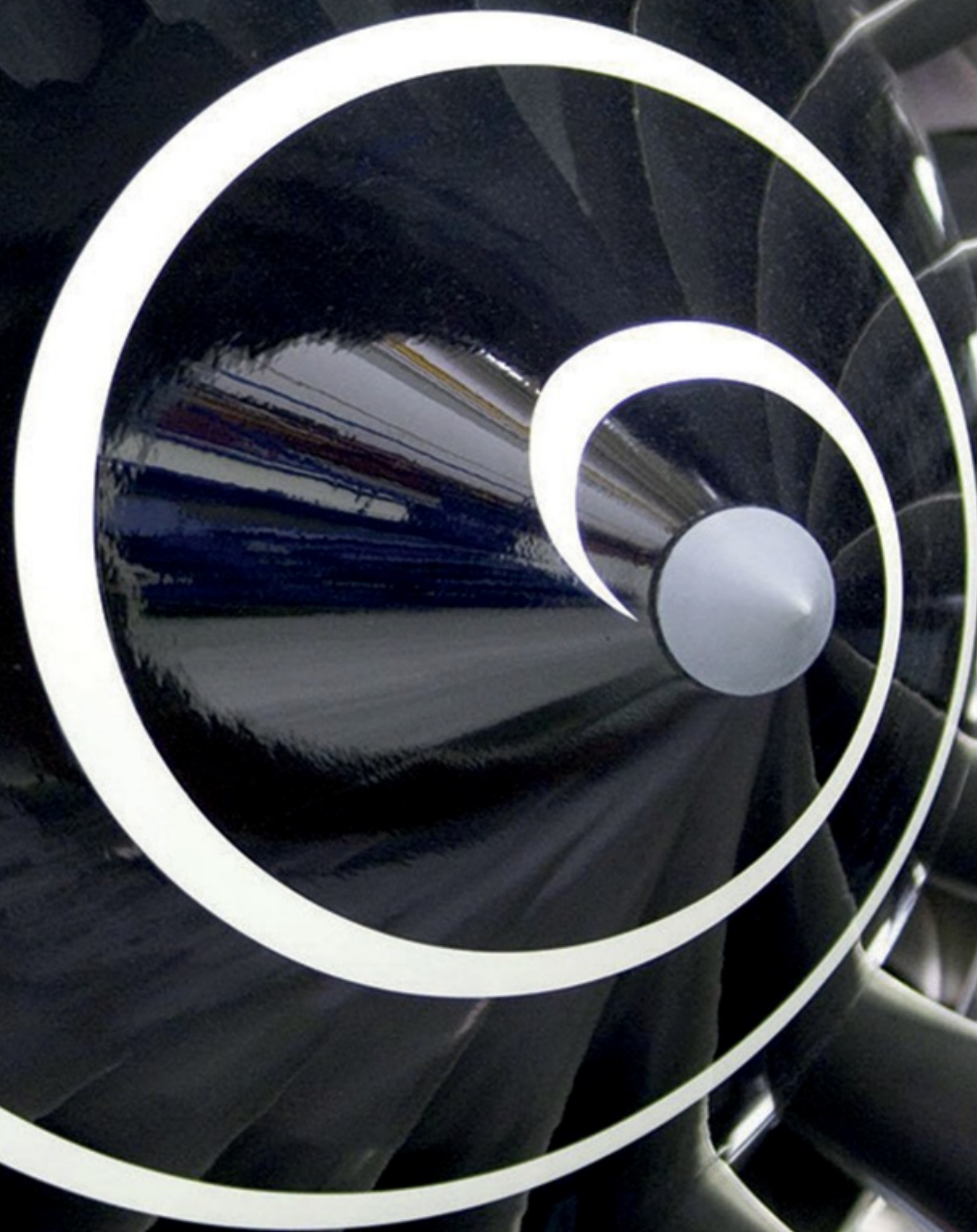
 **Airline Economics**

AERO ENGINE YEARBOOK

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A fresh Norwegian spirit

The CFM56 engine is expected to generate high volumes of MRO demand in the next five years and authorised independent repair station, Aero Norway, is focused on total precision to deliver exceptional industry recognised EGT margins. Investment strategies have been put in place to foster fast-paced growth and prepare the business to meet pent-up demand for its CFM56-3, CFM56-5B and 7B engines repair and maintenance services.



In a buoyant CFM56 engine market, operators and MROs are struggling to induct engines because there are so many of this highly successful engine type in operation. The -5 and -7 have performed particularly strongly on-wing leading to delayed shop visits. Some engines listed for a first shop visit in 2015 and 2016 will only be going in for repair in 2018 and 2019. This situation led to an unexpected shortage of work in 2015 and 2016, however from 2018 through to 2020 operators may struggle to get their engines into the shop. Aero Norway originally forecast a 60% to 40% split in 2018 between the -3 compared

to the -5 and -7. However, demand is so great for the latter two that it predicts a 50-50 split is now more likely.

SUSTAINING WORKSCOPE FLEXIBILITY OF

Aero Norway is benefiting from these current market forces and the business is streamlining processes and building skilled resources to ensure it can sustain its flexibility and commitment to fast turn-around times. Aero Norway is focused on delivering the best service and industry-recognised EGT margins. So to best serve its customers – MROs, independent engine owners and leasing companies – Aero Norway has

recently taken steps to underpin the business in three fundamental ways: financial support to deliver working capital; sourcing of repair partners that can complement the flexibility of workscope that they, as an independent organisation, strive to offer; and the development of highly trained apprentices to ensure continuity of the Company's engineering skill sets for the next 20 years and more.

Aero Norway predict peak demand for the CFM56 will occur from 2018 through to 2021 at its Stavanger engine MRO facility and it anticipates it will soon be running to full capacity. The plan is to induct 92 engines this year,



comprised of 52 -3s and 40 -5s and -7s. By 2020, it foresees the engine shop running at full capacity of around 120 engine inductions.

BURGEONING GLOBAL OPERATOR AND LESSOR DEMAND

After the predicted peak period of CFM56 ends in 2021, Aero Norway plans to remain a CFMI repair specialist as this is where the organisation holds a depth of expertise and knowledge. After talking with CFMI, Aero Norway hopes that the rigorously sustained quality output of the repair shop will support their strategy to obtain a licence for the LEAP engine because eventually there will be a lot of

demand for this engine type. It will not be until the end of 2018 at the earliest that CFMI will grant any repair licences to independent MROs like Aero Norway. But with a relationship already spanning 25 years, the company is optimistic that burgeoning global operator and lessor demand for competitive and high quality MRO support will see them at the forefront of delivering this service. The costs involved with introducing the model, and evaluating the necessary tooling required, means that any potential introduction of the LEAP engine into the facility would be 2020 at the earliest.

Aero Norway aims to keep its

customer base as wide as possible and across all global regions. The primary focus has always been with smaller airlines operating no more than 40 aircraft because it can customise programmes and inductions according to their needs. The CFM56-5B is the engine choice of the global A320 family due to its high reliability and durability, and the CFM56-7B is exclusively powering the B737 NG – making it the most popular engine combination in commercial aviation.

The facility is multi-release FAA, EASA, TCCA, CAAC, GCAA and DGCA certified which qualifies its worldwide appeal to operators and lessors of CFM56



type engines. If there is a business opportunity it will secure the additional approvals it needs however the majority of operators and lessors find approvals from these regulators indicative of Aero Norway's credentials.

Based on Aero Norway's scheduled induction work-flow and the partnerships with global MROs, Aero Norway recently secured significant working capital with Sparebank 1 SR-Bank, the largest bank in Norway. This working capital facility is being provided as a combination of engine purchase financing, general overdraft and capital expenditure funding for new tooling for the workshop. It was important for Aero Norway that this funding should come from Norway.

There is a definite need to have leased spare engines available to customers, so some of this funding has been used to procure engines that can then be leased to operators while their other CFM56 engine undergoes a shop visit. Typically, turnaround times on the CFM56 can be between 55 to 60 days, and smaller operators in particular cannot afford to stop flying. Other large MROs have taken this approach and Aero Norway has found distinct benefits for both the MRO and the operator/customer. It enables Aero Norway to offer a more complete package. The company is also investing to make the facility paperless and bring in additional machinery to improve productivity.

Utilising the most modern, up to date equipment and technology, ensures that all maintenance and repairs carried out in the Stavanger workshop, on-wing, or undertaken off-site by specialist repair

vendors, are implemented with precision to the highest possible standard. Through the creation of support agreements with outstanding specialists around the world, Aero Norway is focused on enhanced operational efficiency with the ability to maximise the fast slot induction and quick turn-around that its global customers demand.

A COMMITMENT TO KNOWLEDGE SHARING

The final lynchpin of Aero Norway's on-going change programme relates to human capital. The leadership team has been strengthened with chief executive officer, Glenford Marston, now supported by chief business officer Rune Veenstra, and Neil Russell as new chief operating officer. These highly-experienced industry veterans will pilot the organisation's growth strategy.

Aero Norway is also expanding its apprentice scheme working with the Norwegian Government and seven more ambitious young people will be joining the current team of ten apprentices who enrolled in 2017. This further reinforces Aero Norway's commitment to knowledge sharing and deepening the expertise and certification of its internal resource pool.

PROLONGING THE LOW-COST USEFUL LIFE OF LEASED ENGINES' GREEN TIME

By 2024 and the oldest CFM56-7Bs will be over 26 years old and at the same time it is predicted that over one hundred A320neo and 737NG aircraft will be retiring per year, releasing some 300 engines to the market annually. Due to the reliability of these engines there

will be plenty of remaining life so they will either be re-deployed or parted out. This will reduce maintenance costs and further prolong the low-cost useful life of leased engines' green time.

AERO NORWAY AS

With a strong and growing international reputation, Aero Norway builds long-term partnerships with flagship airlines and low-cost carriers, aircraft leasing companies and OEMs.

Aero Norway AS is an authorised CFM repair station based in Stavanger Airport, Sola, Norway. The modern facility was designed specifically to provide MRO services for CFM56® engine variants and is fully equipped with all the necessary equipment to provide high quality maintenance services with industry recognised EGT margins for CFM56-3, CFM56-5B and CFM56-7B engines. Aero Norway offers a full range of engine MRO services: engine maintenance, repair and overhaul; engine test cell runs; full restoration; back shop parts repair; engine investigation; special customer requests; and non-destructive testing & diagnostics. Aero Norway is multi-release FAA, EASA, TCCA, CAAC, GCAA and DGCA certified. Visit www.aeronorway.no

Serviced engine types: CFM56-3, CFM56-5B and CFM56-7B