

Overhauling the Aircraft Engine Services Industry

By: Gary Wong

Introduction

Mention the aviation industry in Malaysia and people would inadvertently focus their attention on our local airlines, Malaysian Airlines (MAS) and AirAsia. The success of our local commercial airlines and the burgeoning aerospace industry has raised our national profile to new heights.

The introduction of AirAsia as a “low fares, no frills” airline in 2001 paved the way for more affordable routine travel, in and around our region. Both MAS and AirAsia have an impressive fleet capacity of 111 aircraft for MAS and 26 for AirAsia (both airlines are looking to expand their fleet count in 2005/2006). The commercial aircraft engine MRO (maintenance, repair and overhaul) services in Malaysia is a huge undertaking.

GE Engine Services Malaysia (GEESM), a joint partnership between General Electric of USA and Malaysia Airlines, has one such facility at MAS Complex A near Subang Terminal Airport.

General Electric Engine Services Malaysia (GEESM)

Established in October 1997, GEESM offers full overhaul services for the CFM56-3, PW4056/4060 (94-inch) and PW 4168/4164 (100-inch) aircraft engines as well as normal overhaul for the CFM56-5C engine. Their clientele includes MAS, AirAsia, as well as international airlines from Japan, China, and New Zealand.

The partnership between GE and MAS brings with it vast years of



Mr. Tamilarasu Vellaiyan poses with two of their CFM56-3 engines currently undergoing overhaul service

experience in commercial overhauling, high-technology MRO, engine expertise (GE developed the CFM56 aircraft engines with Snecma Moteurs), hands-on fleet experience (MAS has largest CFM56 fleet in Asia and a modest fleet of PW4000 aircraft) and facility management.

The MAS overhaul facility (“shop floor”) was built in 1994 to accommodate MAS aircraft engine maintenance and service engineers. When GE entered into a joint partnership with MAS in 1997 to handle overall CFM56-3 and PW4000 commercial aircraft engine overhaul, the newly established GEESM naturally took over these very same premises.

Mr. Tamilarasu Vellaiyan, acting-Managing Director and Customer Service Manager of GEESM, states that the

overriding priority for the GEESM facility is that of quality and safety.

These factors, along with stringent customer processes, service efficiency and overall work atmosphere, fall under the umbrella of GE’s highly-valued Six Sigma quality approach.

When GE brought aboard the management team from its headquarters in Cincinnati during the initial establishment period of GEESM, they instilled regimented training in Six Sigma quality initiatives.

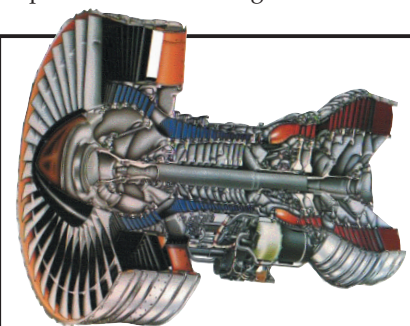
It’s All About the Employees

A large portion of GEESM’s employees have been recruited from the aviation industry, bringing along with them the experience in dealing with aviation

Pratt and Whitney 4000 Engine

The Pratt and Whitney 4000-class of aircraft engines is the successor to the highly reliable PW JT9D engine. It is a high-bypass turbofan engine capable of providing thrust range of between 52,000 and 99,040 pounds, depending on fan diameter (94, 100 and 112-inch diameter fans).

The PW4000 aircraft engines are built for Boeing models 747-400, 767-200/300, 777, Airbus models A300-600, A310-300 and A330 and the McDonnell-Douglas MD11. Malaysian Airlines has a fleet of 17 B747-400 utilising the PW4056 (94-inch fan model), 5 A330-200 and 11 A330-300, both aircrafts employing the PW4168 100-inch fan models.



The cross-section of a PW4000 turbofan engine

engine modules. GEESM has a total of 292 employees, of which 160 personnel work directly with the aircraft engines.

There are several levels of mechanics at GEESM. At the top of the chain are the approval holders; mechanics trained on-the-job and certified for engine-work. There are three classes for approval holders; Class 1, Class 2 and Class 3. Apart from approval holders, most shop floor mechanics and engineers have to obtain training in areas of CFM, PW, machining, welding and related specialisation before being approved for shop floor activity.

Efficiency and Turnaround Time

The GEESM facility has a shop floor capacity of 30 engines at any time. A new gantry system upgrade work is projected to begin installation and commissioning, which will improve overall efficiency.

GE takes pride in their efficient processes, with an average turnaround time of 52 days for CFM56 engines and 90 days for PW4000 engines. This enables GEESM to handle an annual service of 105 CFM56 engines and 35 PW4000 aircraft engines.

Looking Ahead

Apart from the aforementioned gantry system, a large-scale RM 35 million expansion project is currently underway. The expansion provides the capability to overhaul the CFM56-5 and CFM56-7 aircraft engines by 2007/2008, in order to cater for an estimated influx of new Airbus A320s and Boeing 737-800's in the next 2 years (AirAsia inked a deal to bring in 60 Airbus A320 with 40 on option for the next 6 years²



Inspecting the Pratt and Whitney 4000 94-inch engine

while MAS is in the midst of deliberating either the A320 or Boeing 737-800 as a replacement for their 39 single-aisle Boeing 737-400s currently in service³).

This recent flurry of activity brings with it new challenges and opportunities. AirAsia is poised to acquire a 5% initial interest in GEESM with a further 14% equity when the Airbus A320s are in service⁴. The future and outlook of aircraft engine MRO in Malaysia, especially in the interest of our local airlines, looks to be heating up to a whole new level. ■

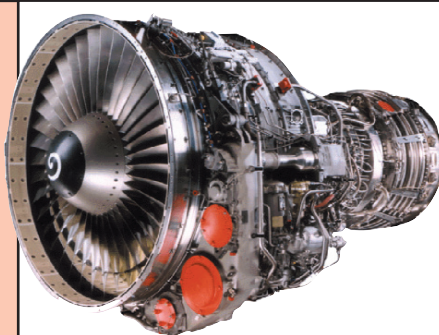
CFM56 Engine

The CFM56 engine family (developed by CFM International) and company has its moniker culled from the combination of its two parent company's commercial engines, namely, GE's CF6 engine and Snecma's M56. CFM International is a jointly-owned company by GE (USA) and Snecma Moteurs (France).

The CFM56-3 turbofan engine, part of the CFM56 family of engines, is tailored exclusively for the mid-range Boeing 737-300/400/500 aircraft models. The initial development of the engine started in March 1981, leading to its certification in January 1984, a mere 8 months after the service of its predecessor, the CFM56-2. The single-aisle, 100 to 200 seat-capable engine provides a thrust range of 18,500 to 23,500 pounds.

Due to the similar architecture and building block approach in developing the engine models across the CFM56 series of engines (the CFM56-3 engine shares 84 percent of parts and 60 percent of tooling with the CFM56-2, and also the core and low pressure turbine from the CFM56-2), many airlines have opted for aircraft outfitted with the CFM56 engines for its economic viability and long-term serviceability with low maintenance cost.

As it stands today, CFM56 engines powers more aircraft than any other engines in its thrust class, with the CFM56-3 engines forming about 30 percent of its total engines in service. Its successor, the commercial aviation class CFM56-7 (18,500 to 26,300 pounds of thrust) engine, which powers the next-generation Boeing 737 aircraft (737-600/700/800/900), is poised to take the lead in the near future. Apart from the apparent higher thrust, it also provides better efficiency and lower maintenance cost than the CFM56-3. AirAsia currently has a full complement fleet of 26 Boeing 737-300 aircrafts employing the CFM56-3 engines and Malaysia Airlines boasts 39 Boeing 737-400 employing the same.



The commercial-class CFM56-3 engine, the most popular engine in its thrust range

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An engineer works on the highly-precise co-ordinate measurement machine (CMM)