GMF AeroAsia

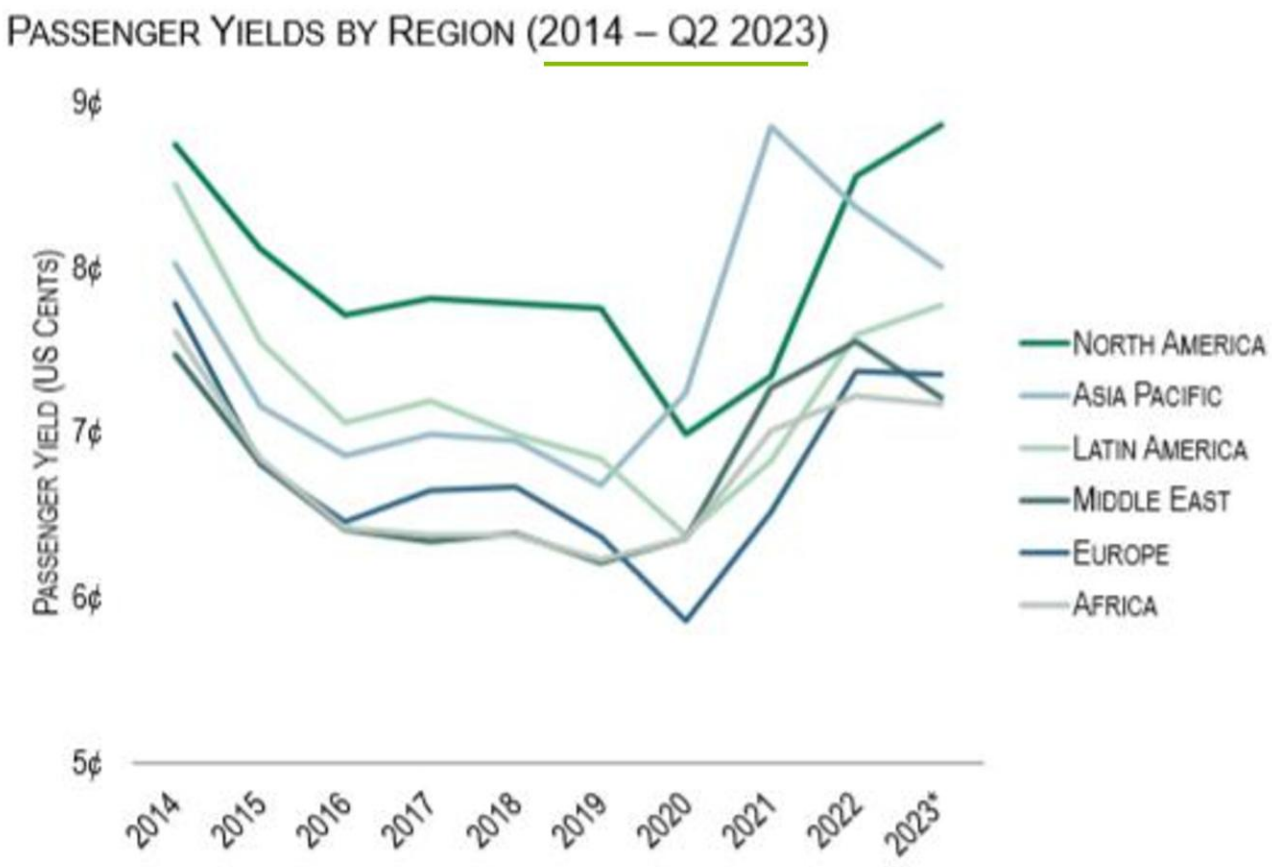
GARUDA INDONESIA GROUP

Driving growth in the

MRO Industry

MRO Summit Guangzhou

Aviation Industry Update



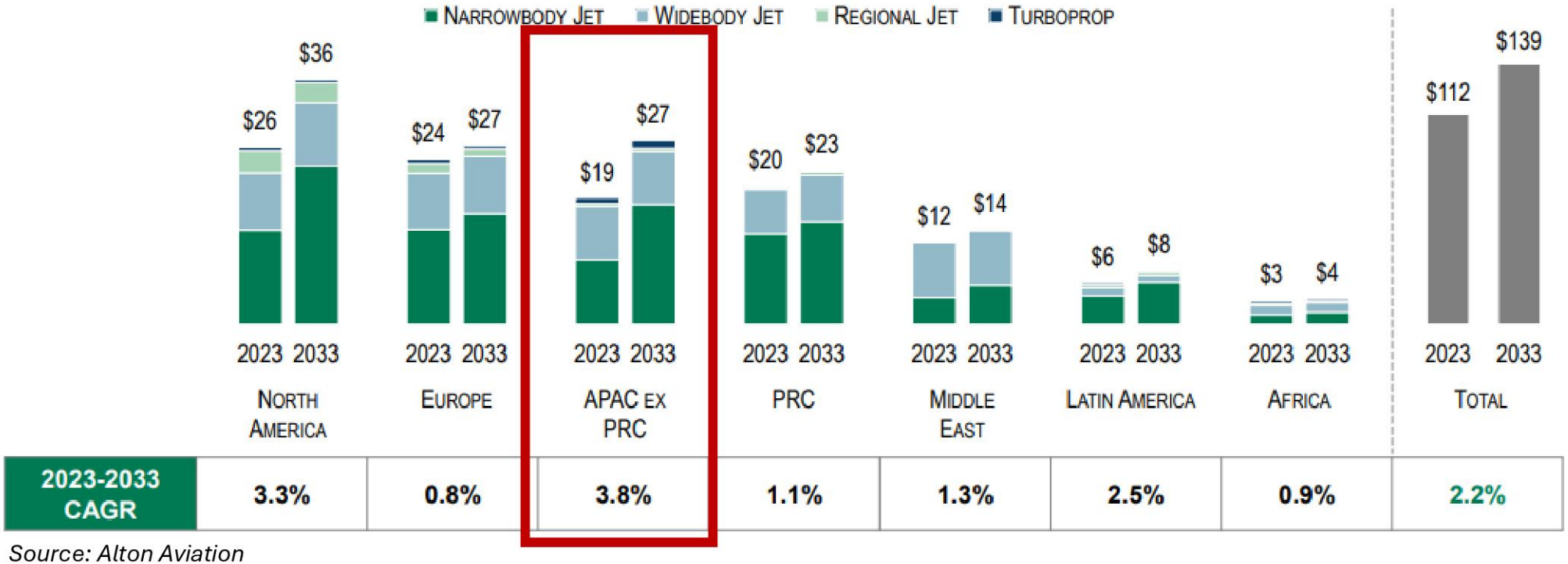
Note: [*] 2023 yield data as of 2Q 2023
Source: Alton; Cirium

Post-pandemic, yields are up due to **sustained air travel demand** following the **reopening of borders**, alongside limited supply as **aircraft are brought back into service.**

Aviation Industry Update

The MRO spend is forecasted to rise from $112 billion to $139 billion over the next decade, showing a CAGR of 2.2%. Among all regions, the Asia Pacific region is expected to experience the highest growth at 3.8% CAGR.

GLOBAL COMMERCIAL MRO DEMAND FORECAST BY REGION (US$ BILLIONS , CONSTANT 2023$)

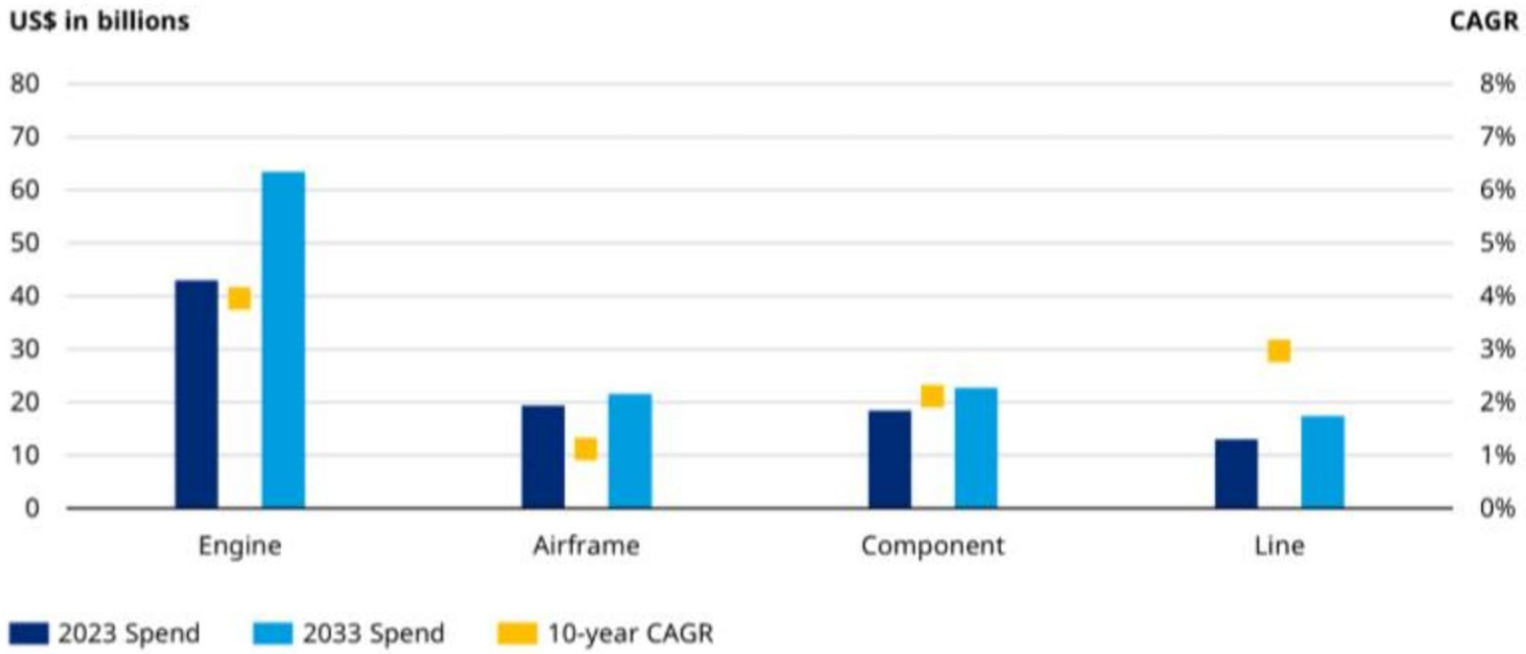


2023-2033 CAGR	3.3%	0.8%	3.8%	1.1%	1.3%	2.5%	0.9%	2.2%

Source: Alton Aviation

MRO Demand

by Segments

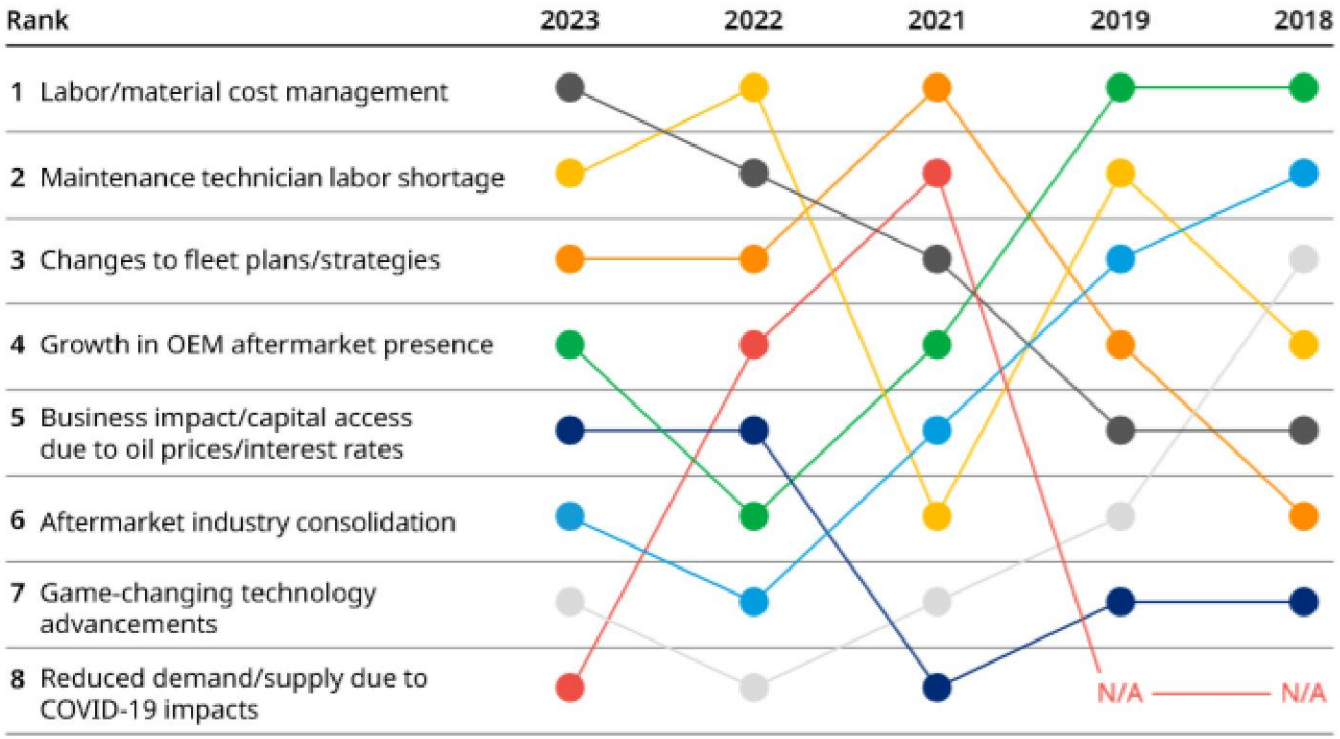


Note: Note: CAGR stands for compound annual growth rate
Source: Oliver Wyman analysis

Engine MRO has historically represented the biggest piece of the MRO market and remains so today.

In 2023, **engine MRO is set to surpass 2019 levels**, driving the rebound a year **earlier** than expected, due to the swift return of air travel demand and utilization.

Top Disruptors
for MRO Industry



Note: No ranking available for 2020
Source: Oliver Wyman 2023 MRO Survey

With the market returning to 2019 levels, the top disruptors for 2019 offer a useful comparison to 2023.

In 2019 and in the current year, labor availability received significant attention. The anticipation of a **technician shortage** predates this period, and the pandemic likely postponed and aggravated this issue. **Both labor supply and labor cost plays a crucial role in the overall maintenance cost.**

1 ***Labor/material cost management***

Overall market **labor rates popped up by 6.1% on average** last year. The MRO aftermarket will also see a shortage of mechanics, which is expected to **push up labor rates** in that sector

2 ***Maintenance technician labor shortage***

Currently **MROs are experiencing technician shortage and workforce challenges** (limited post-COVID pool of talent, etc.). MROs have to secure labor supply needs in the long term. Therefore, a **qualified workforce at a competitive price** is an advantage of Indonesian MROs compared to other Foreign MROs.

3 ***Changes to fleet plans/strategies***

Changes in fleet plans and strategies will lead to additional long-term disruptions in recovery. Despite comprising only 20 percent of the fleet, widebody aircraft accounted for **35 percent of retirements in 2020.** These shifts will profoundly impact the MRO industry.

Talent War

Across the country

Several MROs across Europe, the Middle East, and East Asia are actively sourcing skilled personnel from Southeast Asia.

The Rising Costs Of MRO's Workforce Problem

Lindsay Bjerregaard November 11, 2022

One option some companies have looked to is luring talent from abroad. Lapinskas says FL Technics has "more than enough technicians" at its facility in Indonesia, but trying to fill positions in Europe is a much bigger problem and **it is being forced to look for labor in countries** such as India and Pakistan. Until AAR can entirely fill its workforce pipeline locally, Sartain says it is "looking everywhere we can," but that "immigration is a tough nut to crack," politically and otherwise.

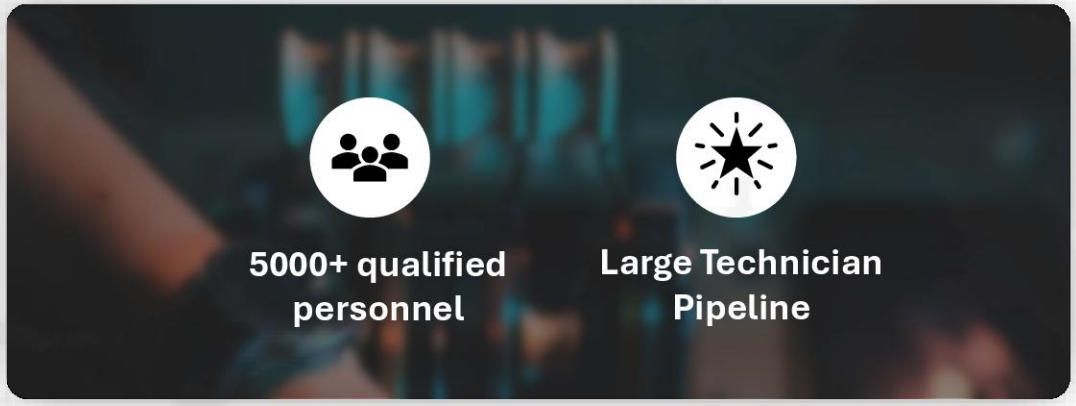
Source: Aviation Week

Indonesia

Currently, **Indonesia is entering a period of demographic bonus**, where the number of productive age groups is greater than the number of non-productive age groups. Based on the Statistic Indonesia (BPS) estimation, Indonesia will get the impact of the demographic bonus in 2020 – 2035.

Indonesia presents **abundant workforce availability alongside one of the most competitive and stable labor cost in the region**.

GMF AeroAsia



GMF has a significant number of skilled manpower to support the operation of Aircraft Maintenance activities **(5,000+ qualified personnel)**

Partnered with technical schools and colleges as a source to provide skilled manpower:

- Politeknik Negeri Malang
- Politeknik Negeri Sriwijaya
- Politeknik Negeri Medan
- Universitas Dirgantara Marsekal Suryadarma
- Institut Teknologi Diregantara (ITDA) Jogja

GMFs Wide-Body Hangar is currently at full capacity. In order to absorb the potential market demand, GMF has **already developed plans to expand its capacity in the area.**

GMF Product Portfolio

Commercial Aircraft MRO

Proven Commercial Aircraft MRO provider for more than 70 years of experience which fully equipped with large and complete 970,000sqm facility and handled by high-skilled man-powers.

Defense MRO

GMF become MRO which support Indonesian Airforce and military fleet maintenance. Our Defense Services provides customized aircraft and non-aircraft solutions based on defense needs and characteristics. Our precise and adaptive approach will bring absolute certainty towards your cost-effective defense-system reliability.

Industrial Solutions

Brings the expertise of maintaining Aviation Powerplant along with the high-standards of Aviation, GMF starts to provide services for Industrial Gas Turbine Engine powerplant and generator

GMF AeroAsia
GARUDA INDONESIA GROUP

Airframe Maintenance

Experience
Our World's Biggest Hangar

Hangar 4

15 Narrow Body
1 Painting

66,940 sq-m

Hangar 1

Features a purpose-built docking platform for heavy maintenance of wide body aircrafts

2 Line
Wide Body

22,000 sq-m

Hangar 2

Dedicated to minor maintenance inspections up to "A" checks

3 Line Wide Body
6 Line Narrow Body

23,000 sq-m

Hangar 3

Equipped with a purpose built docking platform for heavy maintenance of Airbus A330 Series

3 Line
Wide Body

23,000 sq-m

GMF AeroAsia
GARUDA INDONESIA GROUP

Existing Customers

more than

190

customers

5

continents

70

countries

cebu pacific · Alitalia · Oman Air · Vietjet Air · Eastar Jet · IndiGo · Air Atlanta Icelandic · Garuda Indonesia · Citilink · AirAsia · Fiji Airways

WAMOS AIR · Virgin Australia · Qantas · Air France · KLM · Korean Air · Vietnam Airlines · Lion Air · DHL · Nauru Airlines

Supported by our world class partner:

Boeing · Airbus · Thales · GE · B/E Aerospace · Goodrich · Rockwell Collins · Honeywell · Safran · CFM · Air France Industries KLM Engineering & Maintenance

Part Repair Capabilities


CFM56-3


CFM56-5B


CFM56-7B

Approx.

40%

In-House **Engine** Part Repair Capability

We perform overhaul part repair in our shop

Other than that, we send these parts to outside vendor for overhaul repair:

- HPC Blade
- HPC Vane
- Combustion Chamber
- HPT nozzle, blade, shroud
- LPT blade, nozzle
- Honeycomb seal*

**Under development*


GTCP331-350


GTCP131-9A/B


GTCP85

Approx.

75%

In-House **APU** Part Repair Capability

We perform overhaul part repair in our shop

Other than that, we send these parts to outside vendor for overhaul repair:

- All LLPs
- And another proprietary repair parts

Engine Gantry System

First in Asia, second in the World
after Engine Gantry of Safran Villarosche

New system in 2020 built by Excent Group, France

Engine Gantry System is a system support for Engine Assembly and Disassembly with suspended method (hanging) on Engine Carrier to guarantee the alignment purpose while assembly and disassembly.

This Gantry mechanisms with single jackscrew for vertical movement with very precision and transfer motor with double guide rail for horizontal movement.

Precision and Better Alignment
Minimize the risk of mis-align between each modules, because only have one foothold instead of multiple. Tolerance until 0.01 cm.

Ergonomic and Aesthetic Design
Single jackscrew consume less space compared to multiple jackscrew.

Test Cell

up to **100,000 POUNDS** thrust sufficient for **300 Engine Test / year**

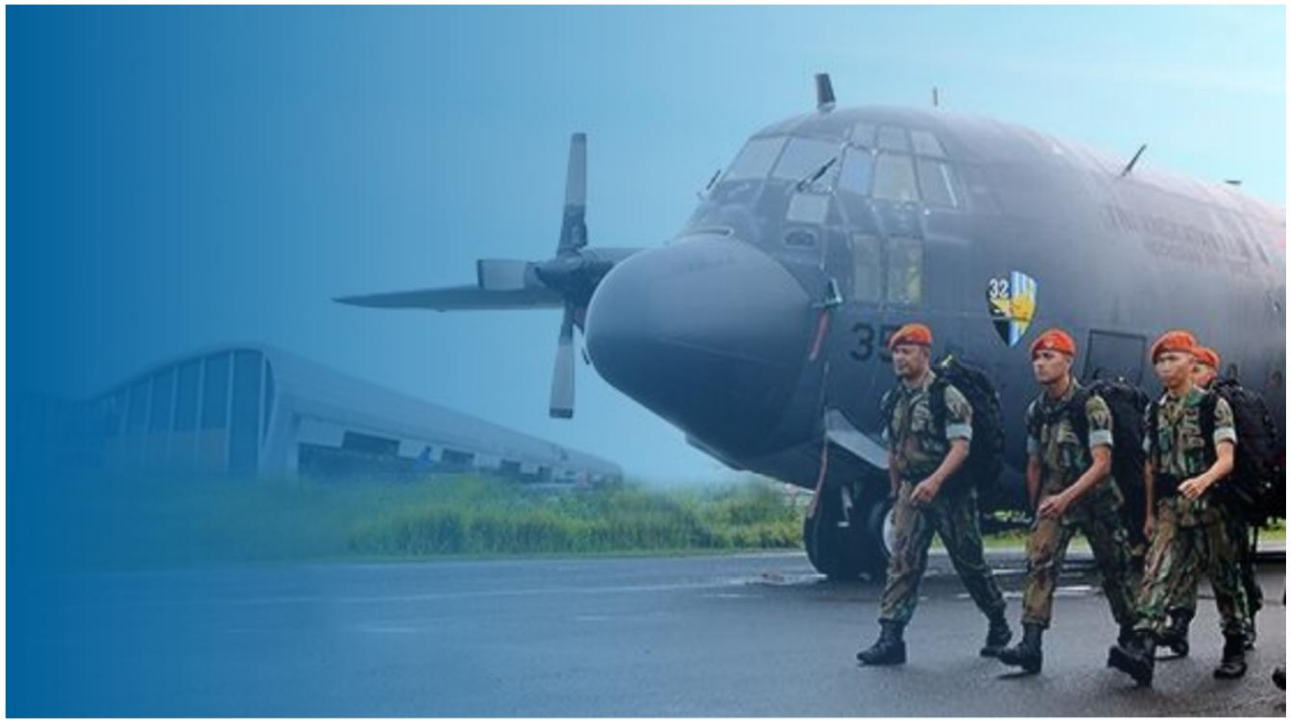
Built in 1987 by CCM Sulzer and operated in 1989

In 1996, Aero System Engineering (ASE) developed capability upgrade for Test Cell to perform CFM56-3 engine test.

In 2012, ASE appointed to develop new capability for CFM56-7B engine and CEL developed the GTCP131-9A/-9B APU in addition to the current GTCP85.

In 2018, GMF Test Cell already certified by Safran to perform CFM56-5B Engine test.

Defense MRO



GMF become MRO which support Indonesian Airforce and military fleet maintenance

Our Defense Services provides customized aircraft and non-aircraft solutions based on defense needs and characteristics. Our precise and adaptive approach will bring absolute certainty towards your cost-effective defense-system reliability.

GMF AeroAsia
GARUDA INDONESIA GROUP

Industrial Solution

Brings the expertise of maintaining Aviation Powerplant along with the high-standards of Aviation, GMF starts to provide services for Industrial Gas Turbine Engine powerplant and generator

GMF Industrial Solution providing maintenance and services for :

- Heavy Duty Industrial Gas Turbines and Aeroderivative Gas Turbines both in repairing parts and field services.
- Gas Turbine Component Repair and Refurbishment.
- Power Generation Services in the major of Generator & Motor Rewinding Base Repair and Overhaul.
- Gas Turbine, Generator and Motor Control and Protection Services.
- Performance Analyzing & Engineering Service of Electrical and Mechanical Rotating Equipment

Our Growing List of Customer

PERTAMINA EP · MEDCOENERGI · INDONESIA POWER · PLN · INDORAMA · KPC PT KALTIM PRIMA COAL · PUSRI PUPUK SRIWIDJAJA PALEMBANG

PT PERTA-SAMTAN GAS energizing the country · PJB · pgn · PUPUK KUJANG CIKAMPEK · PUPUK KALTIM · KRAKATAU STEEL · COMMUTER PT KAI COMMUTER JABODETABEK