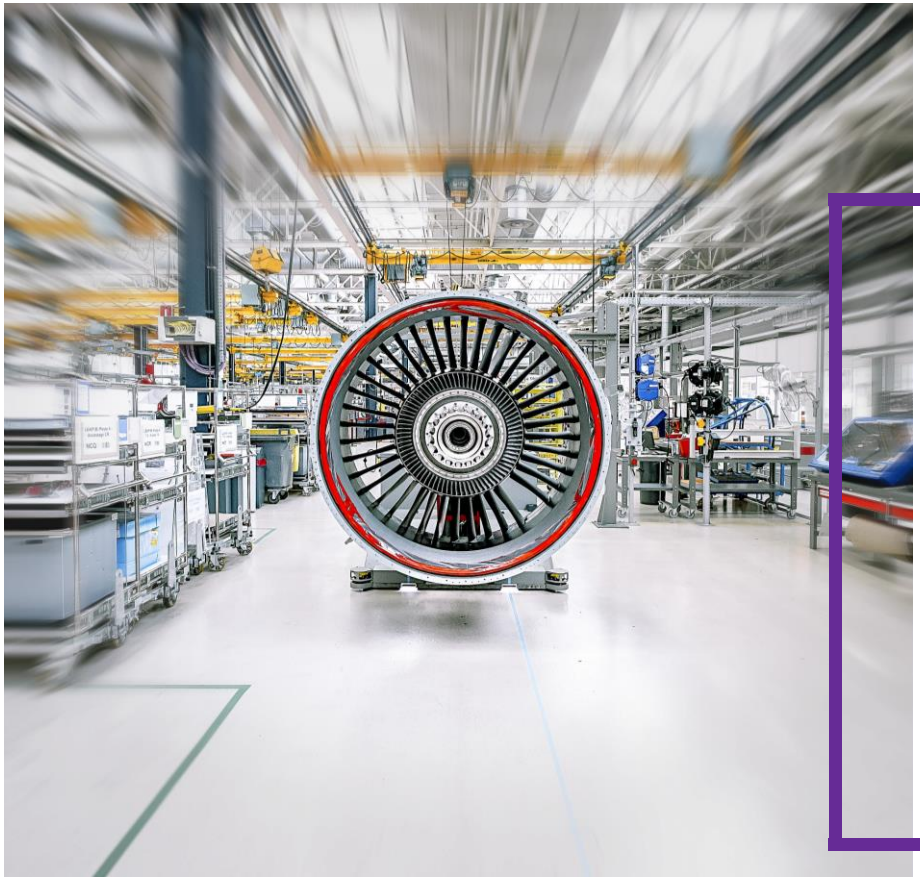
CFM56 / LEAP TRANSITION AND AFTERMARKET

Olivier ANDRIÈS, SAE CEO

François BASTIN, SAE Commercial Engines

François PLANAUD, SAE Services & MRO



1

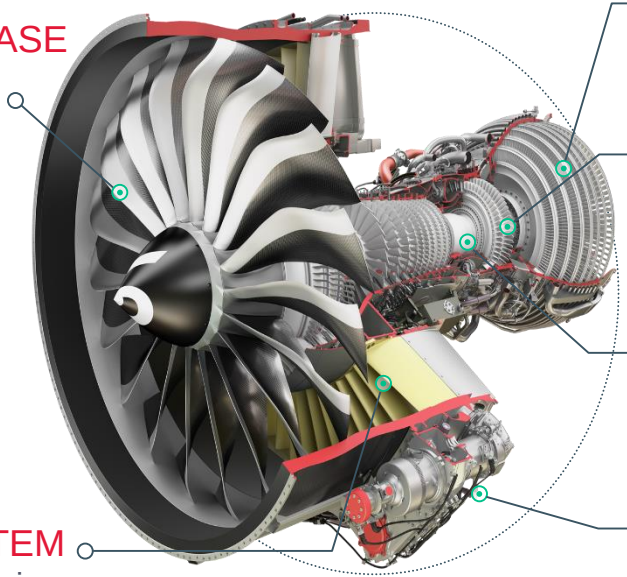
CFM56 / LEAP TRANSITION

François BASTIN,
SAE Commercial Engines

LEAP: Technology, Experience & Execution

CAPITAL MARKETS DAY/2018

COMPOSITE
FAN BLADES & CASE
Lightweight & durable



ADVANCED 3D AERO
Performance

ADVANCED COOLING
Lightweight & temperature resistant

LEAN COMBUSTOR
Low NOx, durable

FAN MOUNTED AGB
Reliability, Maintainability

DEBRIS REJECTION SYSTEM
Protection against erosion

▶ **It takes a suite of technologies to make a great engine**

LEAP
Reliability
Life cycle maint. cost
Same as CFM56

-15%
lower fuel consumption and reduction in CO_2 emissions

Noise & NOx
-50% vs CAEP6, margin to new regulations (Chap 14)

LEAP: since CMD 2016

CAPITAL MARKETS DAY/2018

AIRBUS
A320neo

ON TIME

LEAP-1A
Entry into service
in August 2016

BOEING
737 MAX

ON TIME

LEAP-1B
Entry into service
in May 2017

COMAC
C919

ON TIME

LEAP-1C
First Flight
in May 2017

ON SPEC

All performance, noise and emissions reduction objectives met

73 LEAP customers
have accumulated more than

2.5 million
engine flight hours

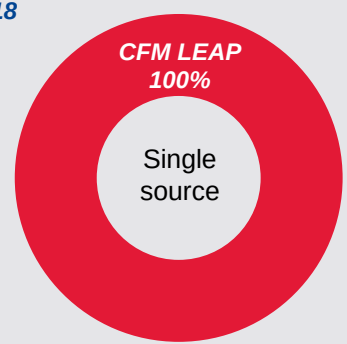
SAFRAN

LEAP: the customer's choice

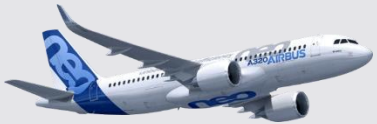
CAPITAL MARKETS DAY/2018

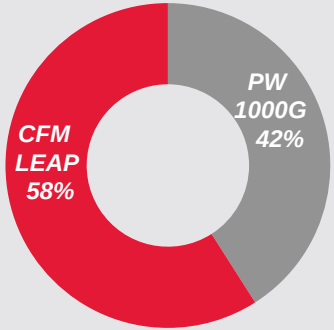
Market shares, as of October 31, 2018

737MAX

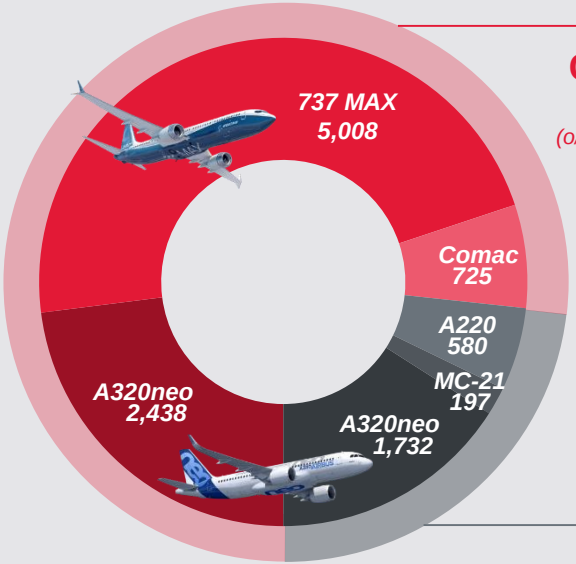


A320neo





Based on announced orders and selections



CFM LEAP
8,171 AC
(o/w ~7,500 AC to be delivered)
77%

PW1000G
2,509 AC
23%

Investor's choice: LEAP market share for A320neo lessors is 67%

SAFRAN

LEAP in service: supporting a fleet of more than 500 aircraft…

CAPITAL MARKETS DAY/2018

As of October 31, 2018

A320neo
288 aircraft

Jazeera. · China Southern Airlines · TAP · Alaska · Frontier Airlines · wow air · Iberia · Avianca · interjet · airmalta · easyJet · novair · SAS · SKY · azores airlines · Chongqing Airlines · vistara · Pegasus Airlines · Azul · Gulf Air · SriLankan Airlines · Air India · British Airways · 长龙航空 Loongair · 中國東方航空 China Eastern · Citilink · AirAsia · Royal Brunei Airlines · Lucky Air 祥鹏航空 · 首都航空 Capital Airlines

737 MAX
231 aircraft

WestJet · norwegian · Southwest · sunwing · Aerolíneas Argentinas · Ethiopian · TUI · Mauritania Airlines · AIRITALY · Air Canada · American Airlines · AeroMexico · LOT · United · GOL · Turkish Airlines · Oman Air · Lion air · Garuda Indonesia · flydubai · SilkAir · TUIfly · corendon · Travel Service · Xiamen Air · Shandong Airlines · Thai Lion Air · China Southern Airlines · 中國東方航空 China Eastern · SCAT Airlines · Air China · Shenzhen Airlines · Icelandair · 海南航空 Hainan Airlines

SAFRAN

…with unrivalled utilization

CAPITAL MARKETS DAY/2018

Already 99.9% dispatch reliability and still improving!

World Class Utilization, matching CFM56 standard

Cornerstone

- Engine designed for reliability

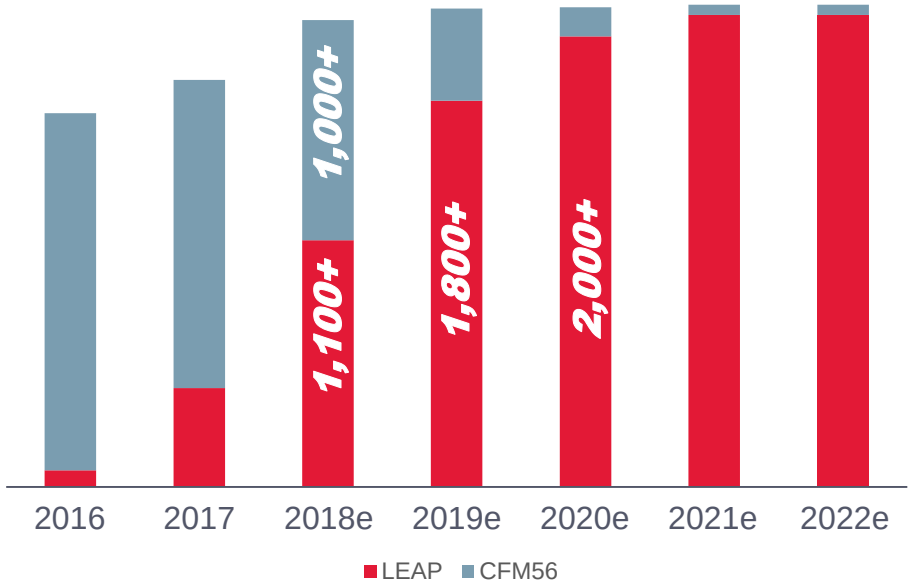
Levers

- Digital advanced monitoring
- 3 call centers, 250+ field engineers
- On site support force operating 24/7 from 15 locations over the world
- 7 MRO shops up and running

SAFRAN

Unprecedented ramp-up underway

CAPITAL MARKETS DAY/2018



In 2016, 77 LEAP deliveries, on top of 1,693 CFM56's

In 2017, 459 LEAP deliveries, on top of 1,444 CFM56's

In 2018 on track to beat 1,100 LEAP engines deliveries, on top of more than 1,000 CFM56's

▶ **LEAP weekly rate already hit CFM56 historical peak level**

SAFRAN

Leveraging our Production Management System

Extensive investment: added 3 new plants and pulled in a 3rd pulse line in 2018 alone

Fully active dual sourcing, adding 3rd or 4th when necessary (forged parts, frames)

- Examples: turbine disks, turbine rear vane

Winning the First Time Yield battle:

- Through design updates & process improvements
- Examples (2016 to now): OGVs (20 to 93%), fan blade leading edge (70 to 97%)

SWAT teams to tackle emerging issues at suppliers

Route to Serial Mode

- Systematic risk analysis & abatement

Watch item

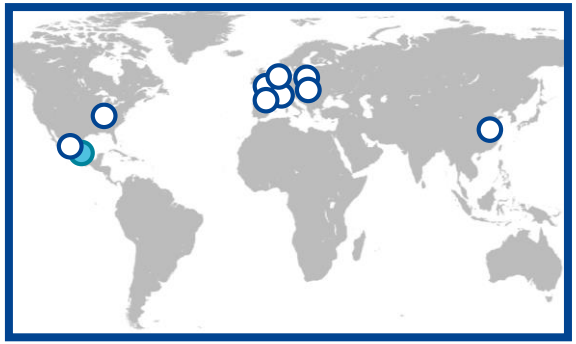
- Forgings and Castings

150 suppliers **14 countries**

SAFRAN

A steadily extending footprint

CAPITAL MARKETS DAY/2018



Safran plant development

Location	Size	Country	Specialisation	Status
Queretaro	6,000 m²	Mexico	Assembly	2019 ○
Queretaro	31,000 m²	Mexico	3D composites RTM and OGV	2018 ○
Rzeszow	5,000 m²	Poland	Compressor Blade machining	2018 ○
Rzeszow	9,300 m²	Poland	Turbine blade machining	2018 ○
Suzhou	19,000 m²	China	Machining and assembly	2018 ○
Villaroche	40,000 m²	France	Logistics for assembly and spares	2017 ○
Gennevilliers	1,500 m²	France	Precision forging	2016 ○
Le Creusot	4,000 m²	France	Turbine disk machining	2015 ○
Rochester	31,000 m²	USA	3D composites RTM	2014 ○
Commercy	27,000 m²	France	3D composites RTM	2014 ○

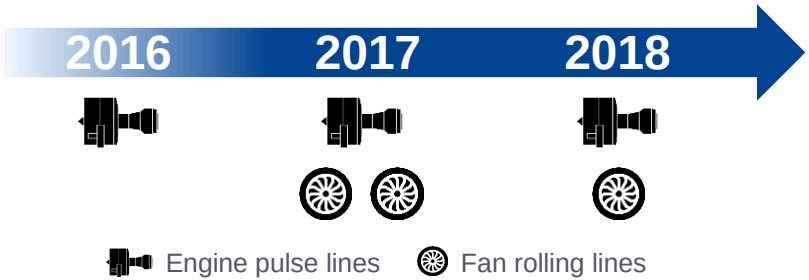
○ *In production*

▶ **Over 173,000 m² of extensions and new plants in Europe, Asia and the Americas since 2013**

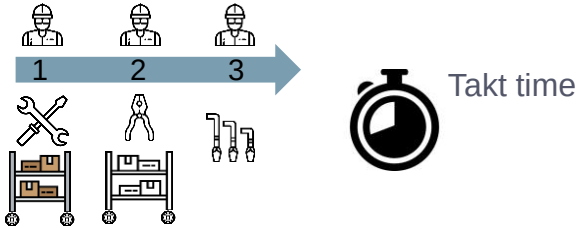
SAFRAN

Defining the state of the art of engine assembly

CAPITAL MARKETS DAY/2018



- Generalizing the **Pulse** line concept
- Combining it with relentless innovation

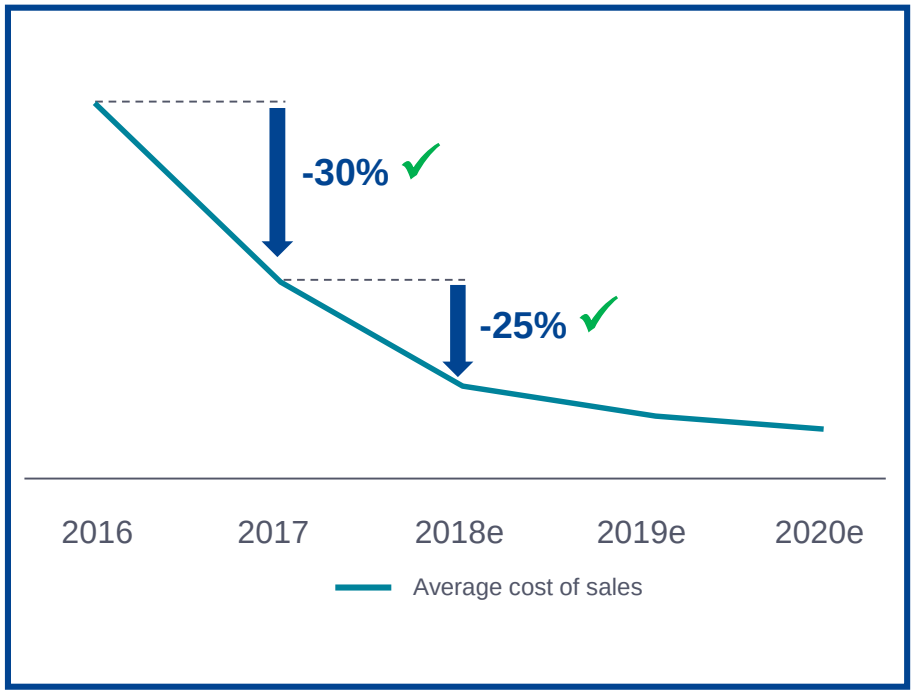


All effective today… and more coming!

- 3 LEAP engine pulse lines, 3 fan module rolling lines
- Friendly engine cradles
  (4 axes, including +/- 110° engine axis rotation)
- Augmented reality
- Smart tooling
- In line image recognition control
- Collaborative automation (cobots)
- Zero-G handling

Cost reduction: right on track

CAPITAL MARKETS DAY/2018



Before 1st engine delivery, CMD16 learning curve was expressed in terms of Cost of Production

As serial production has started, Cost of Sales metrics becomes more relevant

The achievement to date is in line with the 2020 objective

LEAP Cost reduction: within our plants

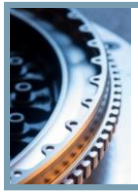
CAPITAL MARKETS DAY/2018

Levers	Examples
Design updates for cost	• 1B Turbine rear vane • Removal of EEC blowers • 1B Fan frame shroud **$90k / engine**
Process Optimization	• Closed door machining • Optimization of inspection times • Rework elimination
Leveraging our low cost footprint	• China: turbine shafts, disks & module assembly • Mexico: fan disks, blades, OGVs & module assembly

SAFRAN

Closed door machining: Le Creusot (France)

CAPITAL MARKETS DAY/2018



Traditional turbine disk machining

- Batch flow
- One machine for one operator
- Manual on line machine set up

Flexible assisted manufacturing system

- One piece flow
- 2 machines for one operator
- Centralized retooling
- Off line machine set up

Flexible automated manufacturing system

- 3 machines for one operator
- Automated loading
- Closed Door Machining
- Digital data collection

Labor efficiency:	**X2.5**
Machining time:	**-50%**

SAFRAN

LEAP Cost reduction: with our suppliers

CAPITAL MARKETS DAY/2018

Levers	Examples
Design to cost	• Cone torque metal coating removal, LPT shaft heat treatment optimization
Lean manufacturing, value chain analysis, process reengineering	• Turbine disk machining cycle time reduced from 120 to 43 days
Supply base footprint optimization including best cost country	• Extension of cost share in Morocco, Mexico, Portugal, Poland
Rolling negociations	• Contract renewal, market share or volume change, dual sourcing benchmarking

SAFRAN

CFM56 / LEAP Transition: the first steps of a success story

CAPITAL MARKETS DAY/2018

Looking back on 2.5 years and 2.5 million hours of operations, LEAP is already delivering on all its promises

- Performance (fuel, noise, emissions)
- Reliability
- Utilization

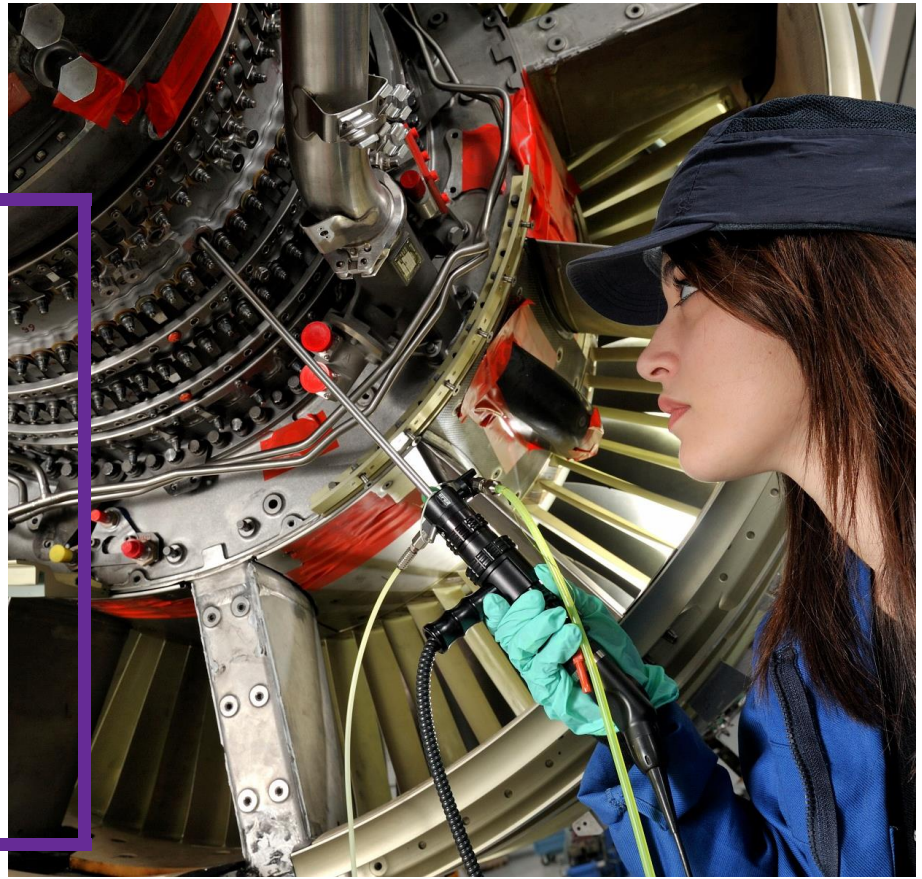
Historic ramp up is underway, supported by a strong production management system

Cost reduction is right on target

2

CFM56 / LEAP AFTERMARKET

François PLANAUD,
SAE Services and MRO



CFM56 / LEAP installed base growing

CAPITAL MARKETS DAY/2018

CFM56 / LEAP fleet in service to grow by 4.5% CAGR until 2025

- More than 38,000 CFM56 / LEAP engines will be in operation in 2025

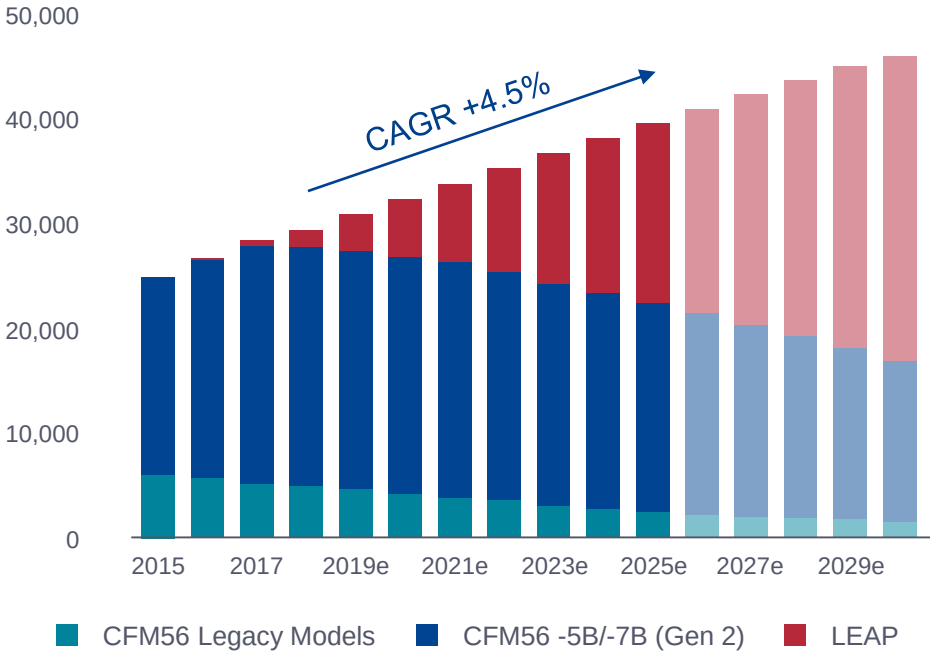
Strong CFM56 installed base over the horizon

- 28,000 CFM56 engines (all models) in operation today
- 22,000+ in 2025

▶ Sustained CFM fleet growth driven by LEAP deliveries

CFM Fleet in service

Source: CFM fleet data, agreed airframer LEAP rates



SAFRAN

CFM56 / LEAP different aftermarket dynamics

CAPITAL MARKETS DAY/2018

CFM56

- Aftermarket business essentially driven by spare parts sales
  - > Large choice of Maintenance, Repair and Overhaul (MRO) providers for Airlines
- Revenue drivers: shop visit volumes, workscopes (content), pricing

LEAP

- Increased customer demand for long term, rate per flight hour agreements
  - > Provides airlines for maintenance cost predictability
  - > 3rd party MRO network will develop over time
- Profitability drivers: engine reliability, fleet management & maintenance cost optimization, additional services

▶ Transitioning from spare parts model to long term contracts

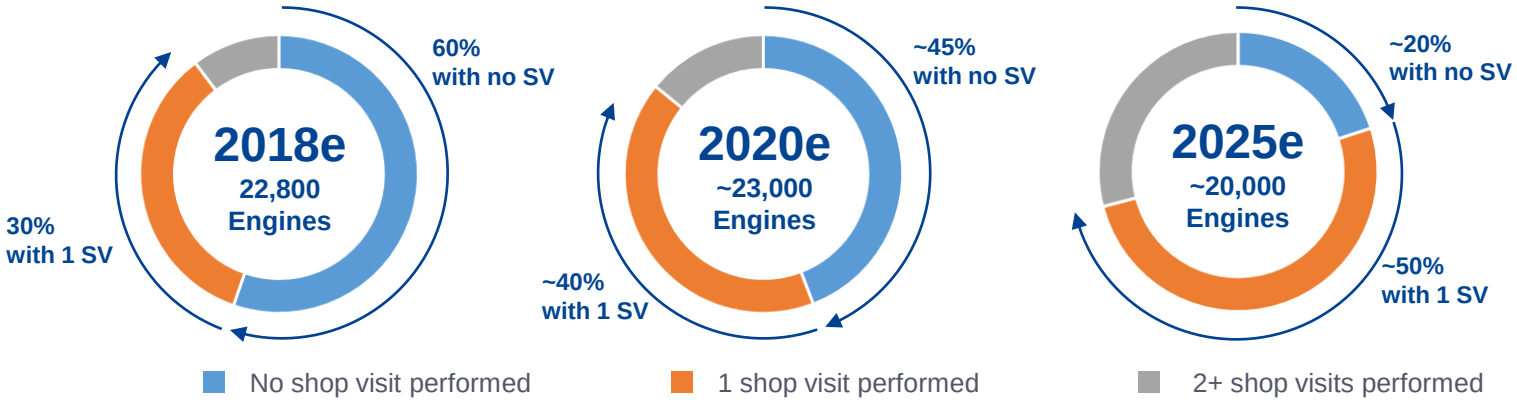
CFM56: -5B/-7B fleet is still a young fleet

CAPITAL MARKETS DAY/2018

As of **2018** **60% of CFM56 -5B/-7B in service have had 0 shop visit**

CFM56 -5B/-7B fleet split by number of shop visits performed

Source: CFM fleet data



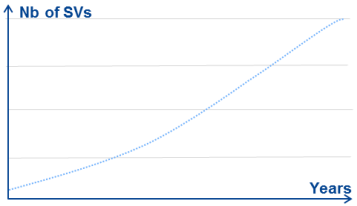
▶ **Large maintenance activity ahead for CFM56-5B/-7B fleet**

CFM56: Spare parts consumption model

CAPITAL MARKETS DAY/2018

Shop visit forecast

Long term trend



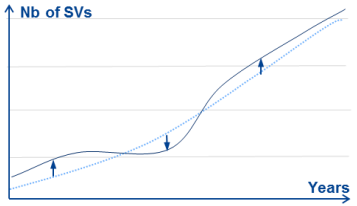
Fleet in service

- Engines in service
- Utilization, area of operation

Technical parameters

- Operating data (Flight leg, temperatures…)
- Hardware durability, Life Limited Parts, EGT…

Short term variations



Airlines strategy

- Fleet management
- Financial & operational situation

Spare parts usage at shop visit

Workscope

- Module exposure
- Rebuild standards, Life Limited Parts (LLP) replacement

Spare parts consumption

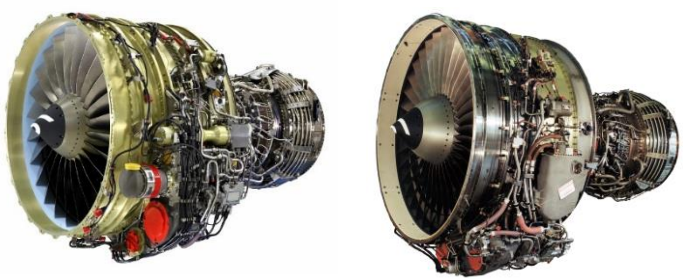
- Replacement rates
- Used parts availability and demand

▶ **Comprehensive spare parts forecast model**

SAFRAN

CFM56: -5B/-7B shop visit outlook

CAPITAL MARKETS DAY/2018

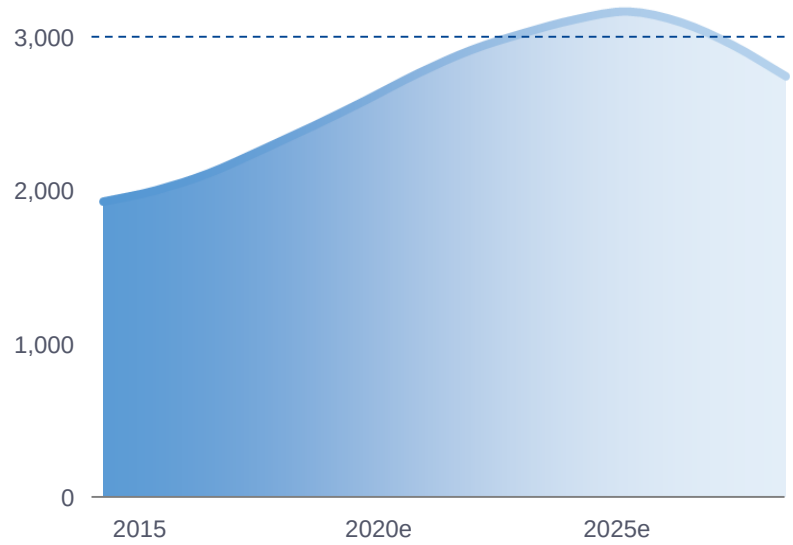


CFM56-5B/-7B shop visits to grow by ~5% CAGR until 2025

Peak over 3,000 shop visits per year expected around 2025

CFM56 -5B/-7B Worldwide shop visits

Source: CFM fleet data



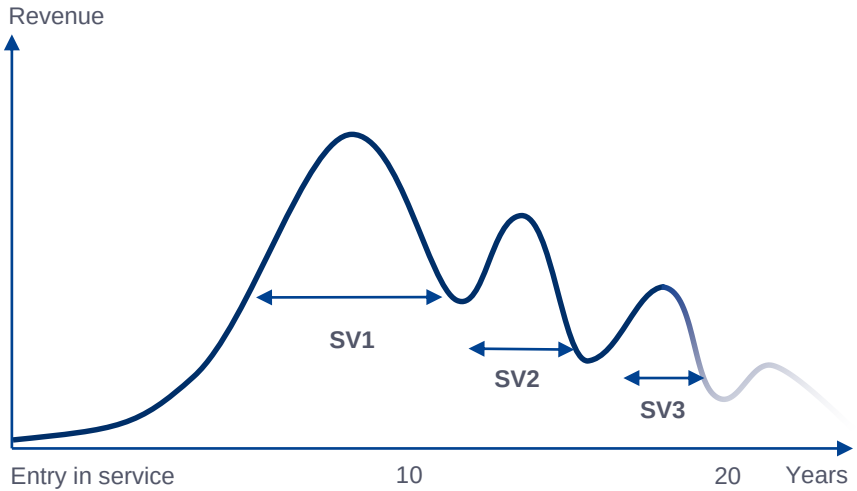
- **Higher peak level than in CMD16, due to additional CFM56 deliveries**

SAFRAN

CFM56: -5B/-7B shop visit rank distribution

CAPITAL MARKETS DAY/2018

Fleet-wide average timeline for spare parts revenue



Proportion of shop visits 1 & 2 within total of -5B/-7B SV/year

2018e	2025e
75%	>66%

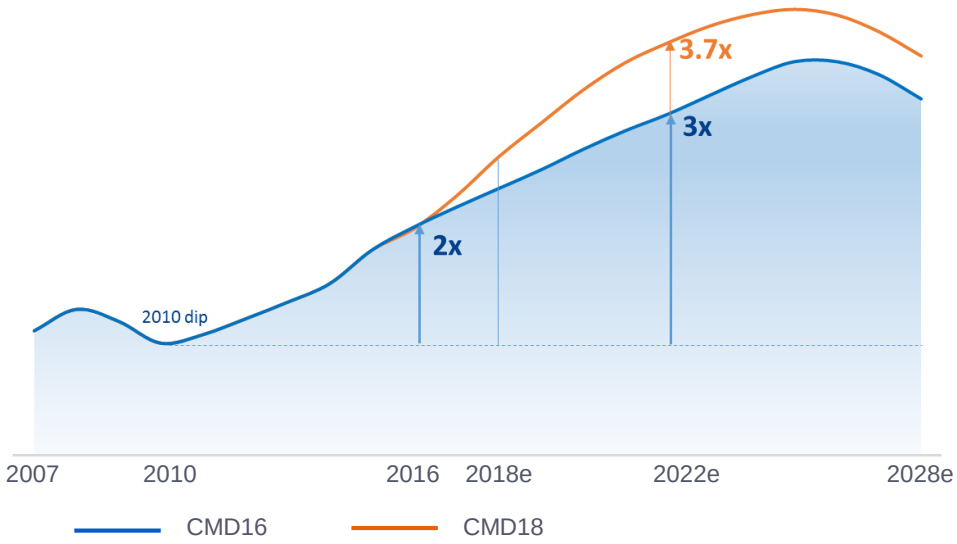
- Shop visits 1 & 2 are main revenue contributors
- Large proportion of shop visits 1 & 2

CFM56: Spare parts outlook

CAPITAL MARKETS DAY/2018

Expected CFM56 worldwide spare parts consumption profile ($)

Source: CFM fleet data



2017/2018 benefiting from tailwinds

- Positive global context:
  - > Traffic growth and high fleet utilization
  - > Airlines financial health
- Strong MRO activity & high-content workscopes

Higher perspective over the horizon

- Main contributor to civil aftermarket growth
- Year to year anticipated variations

Peaking in 2025

▶ **Stronger outlook for future CFM56 spare parts**

SAFRAN

LEAP: moving to Services with different type of offerings and contracts

CAPITAL MARKETS DAY/2018

Spare parts purchase Time & Material	Rate Per Flight Hour ESPH* / ESPO**
	
Spot Sales / Short term agreement	*Long Term agreement*
• Spare parts sales to MRO shops or operators • T&M overhaul agreements for an engine or a batch • Workscope control by operator	• Typically 8 to 12 years • Agreement covering a defined fleet • Additional services (Lease Engines, Engineering…) • MRO provider manages Time on Wing and maintenance cost
Cash at point of sale	**Cash per the hour (ESPH) or at shop visit (ESPO)**

▶ **Increasing scope of services to address customers needs**

**ESPH: Engine Service Per Hour **ESPO: Engine Service Per Overhaul*

SAFRAN

LEAP: Long term contracts performance management

CAPITAL MARKETS DAY/2018

Leveraging on our expertise

OEM expertise

- Wide range of services
- Engine design knowledge

Fleet management & maintenance optimization

- Shop visit schedule
- On wing/quick turns interventions

Operational performance

- Optimized workscoping
- State of the art MRO facilities

Bringing digital tools and analytics

Integrated Data Collection

- Larger quantity of Engine data
- Environment (Weather, routes, …)

Predictive maintenance

- Continuous Remote Monitoring & diagnostics (e.g. advanced vibration analytics…)
  - > Reduces physical interventions on engines
- Customized maintenance and inspections plans (e.g. Waterwash recommendations…)
- Dedicated teams developing advanced analytics

Enhanced fleet management

- Multi-parameters optimized engine removal plans

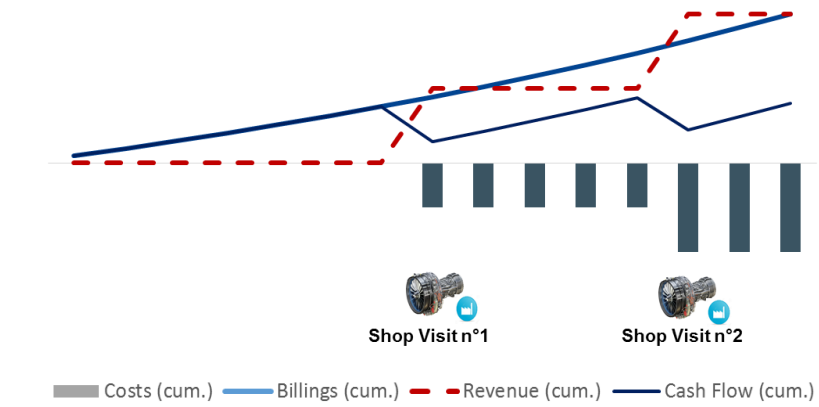
▶ **A wide suite of levers to manage performance**

SAFRAN

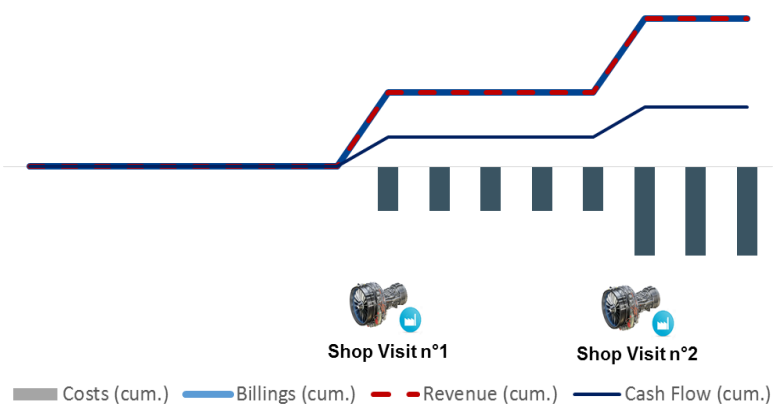
ESPH and ESPO illustrative cash profile

CAPITAL MARKETS DAY/2018

Engine Services Per Hour (ESPH)



Engine Services Per Overhaul (ESPO)



Revenue: IFRS15 Sales
Billings: Cash in
Cash Flow: Net Billings less Costs
Costs: Cash out

- **Similar revenue patterns in both cases**
- **Improved cash profile for ESPH vs ESPO**

LEAP: Rate Per Flight Hours agreements portfolio

CAPITAL MARKETS DAY/2018

To date, 28% of LEAP engine orders include a signed CFM Rate Per Flight Hour (RPFH) long term agreement

- Split between ESPH and ESPO: 25% ESPH /75% ESPO

Within 3/5 years, expected RPFH agreements to represent 60-70% of LEAP installed fleet as further discussions are on-going with a large panel of LEAP customers

- Anticipated split between ESPH/ESPO to be similar for future contracts

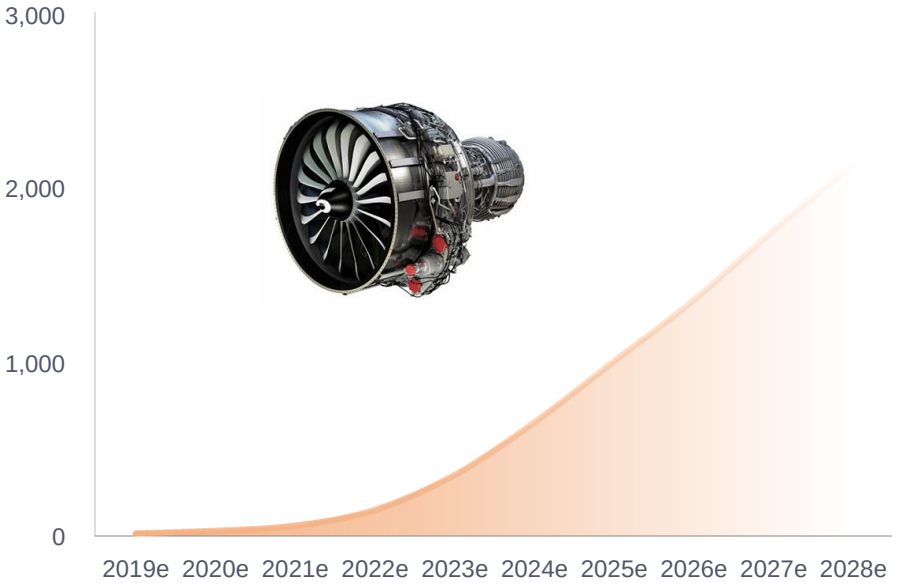
We assume later switch to T&M or spare parts model as fleet matures and worldwide overhaul demand increases (typically 8/10 years after EIS)

▶ **RPFH agreements trending to 60-70% of LEAP installed fleet**

LEAP: Shop visits & MRO footprint

CAPITAL MARKETS DAY/2018

Worldwide shop visits



LEAP worldwide shop visits

- Expect strong ramp-up of shop visits as a result of new engines deliveries profile
- ~1,000 shop visits in 2025

Maintenance activity for Safran

- Long term Services portfolio will translate into significantly higher industrial maintenance volumes (x3 vs CFM56)

Planned extension of current Safran maintenance network footprint

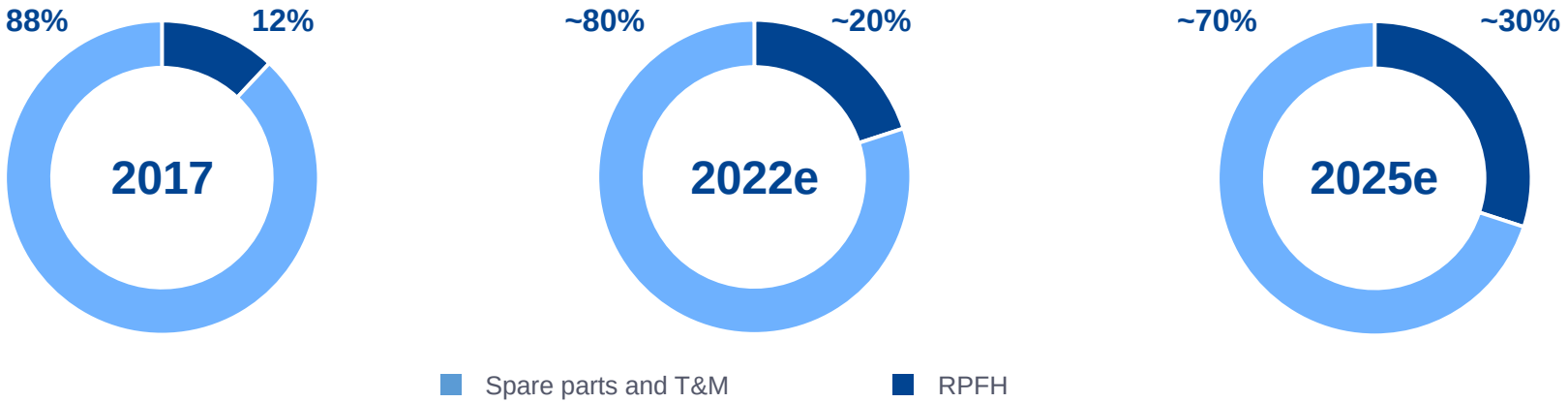
▶ **Preparing for LEAP MRO ramp-up**

SAFRAN

CFM56 and LEAP mix of aftermarket revenues

CAPITAL MARKETS DAY/2018

Distribution of CFM56+LEAP aftermarket revenues by nature



- Smooth and progressive ramp-up of RPFH contracts
- Spare parts and T&M will be the main revenue channel up to 2025+

SAFRAN

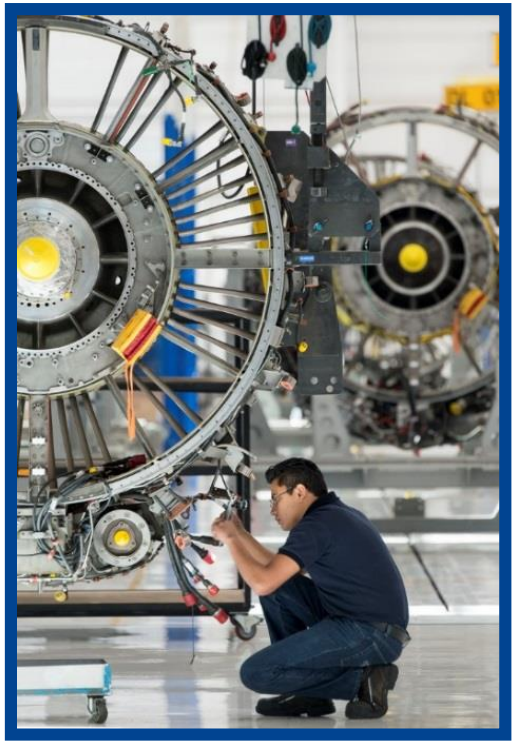
Civil Aftermarket key messages

CFM56

- CFM56 spare parts keep driving civil aftermarket growth until 2025

LEAP

- LEAP Services will progressively ramp up and provide the relay for growth



▶ **High single digit growth for total CFM56 & LEAP aftermarket revenues**