



GENERATIVE AI

Adoption within KLM E&M

Air France Industries KLM Engineering & Maintenance

2024

INTRODUCTION & AGENDA



Marc van Leeuwen

- E&M Big Data team
- Analytics Translator & AI Lead
- Marc-van.leeuwen3@klm.com

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- Intro AFI KLM E&M
- KLM E&M Big Data Program
- Adoption of Generative AI within KLM E&M

AFI KLM E&M

A RELIABLE PLAYER BACKED BY A GLOBAL NETWORK



AFI KLM E&M IN FIGURES

A MULTI-PRODUCT MRO WITH NOSE-TO-TAIL ADAPTIVE SOLUTIONS



3000+
SUPPORTED
AIRCRAFT



500+
ENGINE SHOP
VISITS



280
FTR
OVERHAULS



Prognos[®]



275+
C&D
CHECKS



20+
MAINTENANCE
FACILITIES



12.800
TOTAL
EMPLOYEES

200+
CUSTOMERS
WORLDWIDE

3
ENGINE TEST
CELLS

8
LOGISTICS
CENTERS

4.3b €
TOTAL
REVENUES
(in 2023)

40+
CABIN
PROGRAMS

10+
JV AND
SUBSIDIARIES

15+
BUSINESS
UNITS

PROGNOS[®] – PREDICTIVE MAINTENANCE SUITE

THOUSANDS OF AIRCRAFT TRUST PROGNOS[®]

Prognos[®] for AIRCRAFT



AIRCRAFT

- Avoiding delays and cancellations with alerts given weeks ahead. With aircraft sensor data PROGNOS[®] detects failures before it happens. Currently up to 400 aircraft monitored.

Prognos[®] for ENGINE



ENGINE

- Monitor the health of your engines in a customer environment. Receive PROGNOS[®] reports with alerts, degradation trends and predictive maintenance planning.

Prognos[®] for APU



APU

- Retain control over your APU assets with this system that uploads APU data to a central computer at each airport stopover. Based on Big Data, it allows PROGNOS[®] to predict maintenance.

Prognos[®] for INVENTORY



INVENTORY

- Optimize your stocks, supply chain, your MBK and IP design with this fully web-based solution. Using complex statistical analysis, Big Data and Machine Learning.

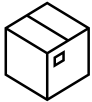
KLM E&M BIG DATA PROGRAM

PART OF KLM E&M ENGINEERING

Objective: Enhance decision-making within KLM E&M by integrating cutting-edge analytical techniques to develop data-driven solutions and insights



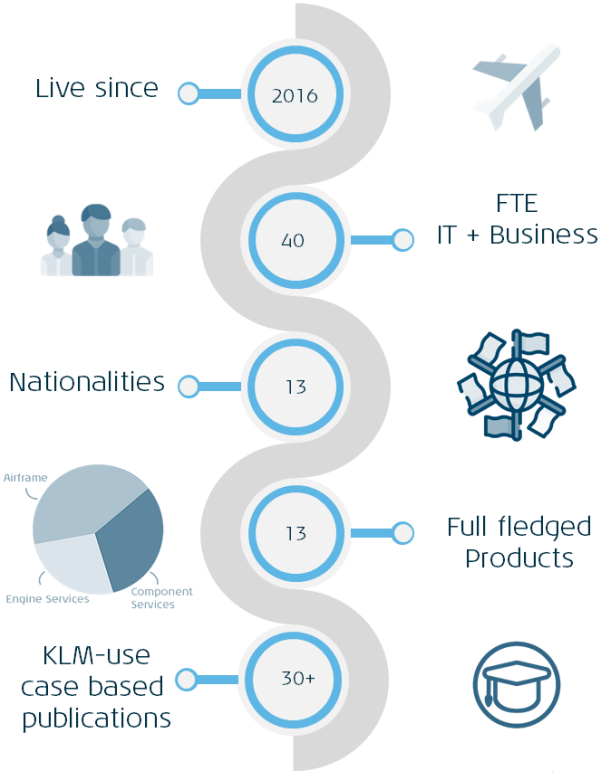
Predictive Maintenance



Supply Chain Optimization

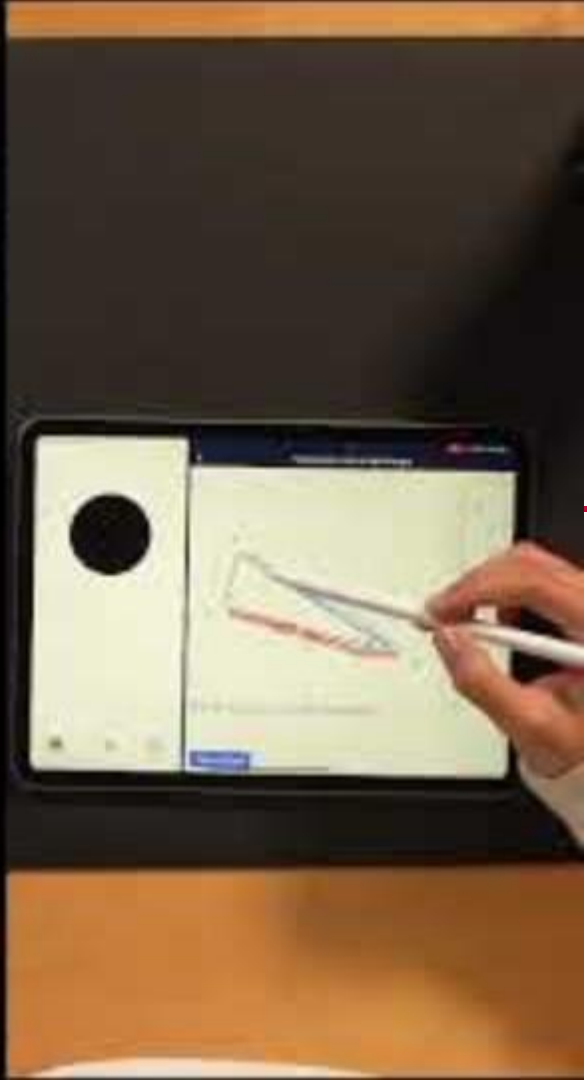


Maintenance Planning Optimization



Hello GPT-4o





The image shows the tail fin of a KLM Boeing 787-10 aircraft against a blue sky with light clouds. The KLM logo, featuring a crown above the letters 'KLM', is prominently displayed on the white tail fin. The aircraft's fuselage is blue and white, with 'BOEING 787-10' written on it.

KLM

"At some point in the near future, GenAI solutions will fundamentally disrupt the airline maintenance industry, and sitting on the sidelines won't be an option. Players that engage now to develop a clear strategic vision with investment in value-focused experimentation will be better positioned to realize the value of GenAI"

McKinsey (2024)



ChatGPT

AIRFRANCEKLM
GROUP

TALIA



Microsoft 365
Copilot



Generative AI Cheat Sheet

For Aviation Industry

Text	Image	Video	Audio
ChatGPT	DALL-E	runway	MURFAI
AIRFRANCEKLM GROUP TALIA	Midjourney	HeyGen	SOUNDRAW



AI Terms Defined

- Generative AI (GenAI)**
AI that creates images, text, video, etc.
- Prompts**
Instructions provided to generative AI
- Prompt Engineering**
The skill of crafting prompts to guide AI
- AI Hallucination**
Generated content that is false but is presented as a fact

Define Generative AI (e.g., ChatGPT) Role

- Act as a X
- Aviation Expert
 - Customer Service Expert
 - Excel Guru
 - Content Strategist
 - Legal Expert
 - Management Consultant

Reverse-Engineer Content

- Rewrite this content for X
- MS Teams
 - E-mail
 - PowerPoint
 - Blog Post
 - Newsletter

Writing styles

- Write in X style
- Formal
 - Inspirational
 - Persuasive
 - Descriptive
 - Humorous
 - Friendly

Edit content

- Review the following content
- Proofread for grammar errors
 - Outline text in X bullet points
 - Summarize text into steps
 - Translate into another language

KLM Use Cases

- Write and review computer code
- Assist in developing training material
- Act as a personal assistant
- Improve customer service and experience

Super Prompt Process



KLM E&M GENERATIVE AI USE CASE DEVELOPMENT FUNNEL

Explore

Prepare

Prototype & Validate

Deploy & Scale

Activities

- Gather use cases from the business
- Categorize use cases
- Brainstorm on possible solutions
- Select prioritized use cases.

- Gather all required information.
- Review legal, privacy and security requirements of use case during Cockpit session.

- Prioritize and select use cases based on potential value, type of solution and user group.
- Review the business case of the GenAI use case: does it meet the expected benefits?

- Deploy prototype to production environment.
- Make end-product available to other parties within the airline.

Ideas and products

E&M Training -
Compliance Check

Safety & Quality -
Track Changes

ES Engineering -
SharePoint
Prompter

Engineering – ORP
Co-Pilot

CS Repair Shop –
Voice to Admin

Airframe – DD
Description
Enhancement

MRO Lab – Intern
Onboarding

Engineering –
TRAK

Engineering – ATA
Predictor

Finance –
FinanceGPT

VOICE_{to} ADMIN

Prototype for E&M Hydraulics Shop

VOICE_{to} ADMIN

Prototype for E&M Hydraulics Shop

 Shop
Productivity

 Data
Quality

 Job
Satisfaction



legamat

KLM

Translate, structure, improve

Record in Dutch, English, French

Your notes

Dutch [v] Record notes [m]

De seal cartridge is geïnspecteerd. De carbon face seal is kapot, er zijn stukjes uitgebroken. De front cover schroeven zaten los in de stator housing en die moeten vervangen worden. De input shaft is goed.

SAP input

Process comments [c] Confirm answers [v]

Confirmed Removal Reason
- Provide a reason for the removal.

Inspected Seal Cartridge
- The carbon face seal is damaged with pieces broken off.

Inspected Stator Housing Assembly
- The front cover screws were found loose and need replacement.

Inspected Rotor Assembly
- The input shaft is in good condition.

Please provide the removal reason.
Provide Removal Reason [v]
Confirm primary reason

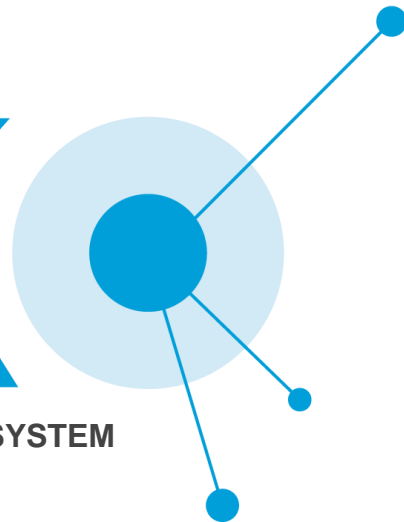
Can this be expressed as 'Carbon seal chipped' or clarified further?
[x] Remove note!
Carbon seal and mating ring need lapping
Other, please specify!
Carbon seal chipped [h]
Keep original note!

This note does not correspond to any provided examples. Can it be clarified or is it not relevant to the inspection findings?

Annotation System for missing/unclear content

TRAKO

TRANSPARENT RELIABLE ACCESSIBLE KNOWLEDGE SYSTEM



Select airplane type

Select damage type

Select aircraft zone

Found dent on outboard control surface



LOADING...

ATA PREDICTOR FOR MAINTENANCE EVENTS







ATA PREDICTOR FOR MAINTENANCE EVENTS

Maintenance Event Description:

"after engine start eng eec mode r eicas msg found both eec switches left in alternate switches back to norm both engines started on stand without further issues"

Correct ATA Chapter should be

Main ATA: 73 - Engine Fuel

<input type="radio"/>		<input type="checkbox"/> 73-11-00 - FUEL DISTRIBUTION SYSTEM
<input type="radio"/>		<input type="checkbox"/> 73-20-00 - CONTROLLING
<input type="radio"/>		<input type="checkbox"/> 73-21-00 - FUEL CONTROL SYSTEM
<input type="radio"/>		<input checked="" type="checkbox"/> 73-22-00 - ENGINE CONTROL ELECTRICAL
<input type="radio"/>		<input type="checkbox"/> 73-30-00 - INDICATING
<input type="radio"/>		<input type="checkbox"/> 73-31-00 - FUEL FLOW INDICATING SYSTEM

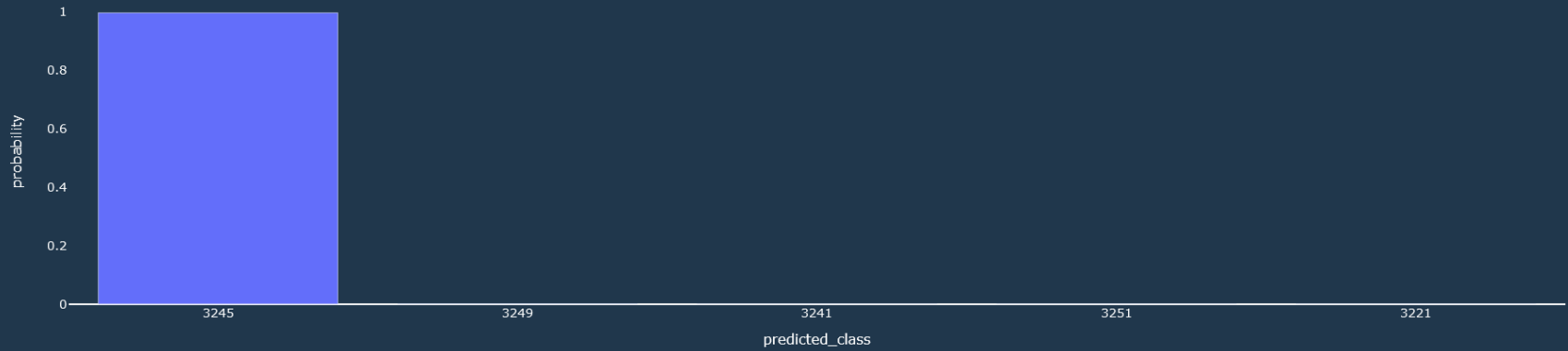
Model Evaluation

Inference

Feedback

wheel pos1 worn replaced wheel assy

Submit



TECH ENABLERS

TECH ENABLERS

AIRFRANCE KLM GROUP TALIA

Marc van Leeuwen | EN

+ New chat

Welcome to ChatGPT for Air France KLM

Start a new chat

Ask your question

vi.4.0

AIRFRANCE KLM GROUP



Copilot

Your everyday AI companion



Show data insights



Polish this presentation



Create an outline...



Summarize this

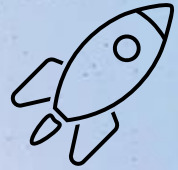




Collecting test
user feedback



Copilot



Decision to roll

Your everyday AI companion

THANK YOU FOR YOUR ATTENTION

Follow us



www.afiklmem.com

APPENDIX

AFI KLM E&M NETWORK

AEROTECHNIC INDUSTRIES (ATI)

Aerotechnic Industries (ATI)

Activity: A320 and 737NG airframe services.

Royal Air Maroc (RAM) / AFI KLM E&M 50/50 joint venture has a maintenance facility at Mohammed V International Airport, Casablanca, equipped with three medium-haul aircraft maintenance bays. Jointly managed and backed by the AFI KLM E&M sales force, the business unit bolsters the regional position of the Group and of RAM by offering leading-edge maintenance services for A320 family and Boeing 737NG aircraft.



AFI KLM E&M NETWORK

AIRFOILS ADVANCED SOLUTIONS

Airfoils Advanced Solutions

Activity: airfoils repair.

Airfoils Advanced Solutions is jointly owned by Safran Aircraft Engines (51%) and AFI KLM E&M (49%). This joint venture, specialized in engine part repairs, contributes to the cost optimization of the engine shop visits thus the competitiveness of the two mother companies. Airfoils Advanced Solutions repairs high-pressure compressor blades and variable stator vanes, focusing on the CFM56 and the GE90 engine. Airfoils Advanced Solutions incorporates state-of-the-art equipment while implementing hi-tech metallurgical processes.



AFI KLM E&M NETWORK

AFI KLM E&M COMPONENTS CHINA

AFI KLM E&M Components China

Activity: component and component repair.

Based in Shanghai, AFI KLM E&M Components China is a wholly-owned subsidiary of AFI KLM E&M launched in 2013. AFI KLM E&M Components China is certified by the CAAC, the EASA Part 145 and the FAA 145.

Offering repair capabilities and logistics services for a wide range of avionics components mainly for the A320 and the 737, AFI KLM E&M Components China has also developed A350, 777 and 787 repair capabilities. AFI KLM E&M Components China also benefits from the expertise and resources of AFI KLM E&M's extensive global MRO network.



C O M P O N E N T S C H I N A

中 国 附 件 中 心

AFI KLM E&M NETWORK

AMES

BARFIELD

Activity: component and component repair.

Barfield is a 100% subsidiary of AFI KLM E&M based in Miami, Phoenix, Louisville & Atlanta. With its leading facilities, Barfield can satisfy the needs of customers operating commercial or regional fleets in North, Central & South America. From MRO Services to Distribution and Ground Support Test Equipment (GSTe), Barfield provides complete adaptive support for A320 family, 737, Bombardier, Dash 8, ATR 42 & 72 and Embraer 170 & 190 aircraft.

Since 2021, Barfield is introducing cutting-edge, competitive UAS, UAV and Drones to the Americas as well as a maintenance support adapted to these new technologies.



AFI KLM E&M NETWORK

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AFI KLM E&M NETWORK

Bonus Tech

Bonus Tech

Activity: disassembly, inspection, parts identification, parts trace tags, and full packaging solutions.

A Miami-based joint venture part of AFI KLM E&M's global MRO network and major player on the aircraft engine teardown market for Repair Stations, Parts distributors, Airlines and Investors. Bonus Tech provides services for a wide range of Engine brands (Pratt & Whitney, CFM International, General Electric, Rolls Royce, IAE).



AFI KLM E&M NETWORK

CRMA

CRMA

Activity: component and engine component *repair*.

Based in Elancourt Paris Region, CRMA is a “Center of Excellence” specialized in engine part repairs within Air France Industries KLM Engineering & Maintenance. As a one-stop shop, CRMA adjusts constantly its capacity and technology to the needs of the market. With the support of its Design & Innovation Department, CRMA industrializes new repairs and processes in order to optimize costs and TATs for its customers. It is the case for the GENx, the Trent XWB & Trent 1000, that CRMA adds into its wide range of capabilities, i.e CFM56 series, GE90, GP7000. Thus, CRMA reinforces its position in the MRO engine segment, and especially on the Very Big Engine (VBE).



AFI KLM E&M NETWORK

EPCOR

EPCOR

Activity: overhaul and repair of pneumatic components and APUs, including APS5000 for Boeing 787 aircraft.

EPCOR is a wholly owned subsidiary of Air France Industries KLM Engineering & Maintenance, part of the Air France-KLM Group, holding EASA, CAAC, CAAV and FAR 145 certification. Within the Group EPCOR provides MRO support for the APUs and pneumatic systems of a wide range of commercial aircraft. EPCOR maintains APUs on Boeing 737NG/MAX, 777 and 787, Airbus A220, A320neo/family, A330neo, A340 and Embraer 170/190 aircraft. EPCOR is a licensed and OEM warranty-approved Honeywell and Pratt & Whitney Canada (former HSPS) Auxiliary Power Unit (APU) repair centre. Besides the APU capability, EPCOR also maintains and overhauls air cycle machines on 737, 777, 787 and Emb170/190, 787 Cabin Air Compressor (CAC), environmental control systems, starters, leading-edge flap drive units and many other pneumatic and nitrogen components installed on large commercial aircraft.



AFI KLM E&M NETWORK

IGO SOLUTIONS

iGO Solutions

Activity: A350, A330 and 737 full support.

iGO Solutions, joint venture dedicated to line and light maintenance operations. Based in Paris Orly, iGO Solutions provide support for Airbus A350 and A330 as well as Boeing 737 aircraft.



AFI KLM E&M NETWORK

KLM UK ENGINEERING

KLM UK Engineering

Activity: MRO services for narrow bodies, regional fleets and E-Jet.

KLM UK Engineering Limited is a leading regional aircraft and narrow body MRO, wholly owned by KLM and member of the AFI KLM E&M Network. Services include base maintenance, UK line maintenance, technical training and component repair centre for Boeing 737's, Fokker 70/100, BAe146/Avro RJ's and Embraer E170/190. KLM UK Engineering has been based at Norwich Airport for over 40 years and employs an experienced and skilled work force, delivering a superior service and high quality product at a competitive price.



AFI KLM E&M NETWORK

MAX MRO SERVICES PVT. LTD

MAX MRO Services Pvt. Ltd

Activity: component and engine component repair.

Located in a high growth aviation hub of India at Mumbai, Max MRO Services Pvt. Ltd. is a leader in the component MRO business for customers operating commercial aircraft fleets in India and the neighbouring regions. Max MRO Services Pvt. Ltd. is able to provide a wide range of adaptive component solutions for the A320ceo/neo, 737NG/MAX and ATR aircraft.

Max MRO Services Pvt. Ltd.



AFI KLM E&M NETWORK

SINGAPORE COMPONENT SOLUTIONS

Singapore Component Solutions

Activity: A320 family and ATR component support.

Singapore Component Solutions is a joint venture between Air France Industries KLM Engineering & Maintenance and Sabena technics. Ideally located in Singapore and approved by 10 authorities in Europe, the USA and the Asia-Pacific region, the company combines the skills and expertise of two leading aircraft maintenance specialists that already support customers in the region. Singapore Component solutions bring its comprehensive portfolio of customizable, mix & match reliable solutions for A320, A330, 737 & ATR aircraft operators.

SINGAPORE
COMPONENT SOLUTIONS

AFI KLM E&M NETWORK

SPAIRLINERS

Spairliners

Activity: A380 and Embraer E-Jet component support.

Spairliners GmbH was founded in 2005 as an equally split joint venture between Air France Industries KLM Engineering & Maintenance and Lufthansa Technik, with its headquarters located in Hamburg, Germany. The company offers flexible component services for the Embraer E-Jet Family, (E170/175 and E190/195 series) and the Airbus A380. Spairliners provides multiple services combined with engineering expertise. The services include component access, on-site stock lease, stand-alone repair, and asset optimization. As a market leader in integrated component care, Spairliners is a trusted and proven supplier to world-renowned airlines such as KLM Cityhopper, Air France HOP!, and Lufthansa CityLine. The company operates warehouses and logistic hubs in Paris, Frankfurt, Singapore, Miami, and Munich.



AFI KLM E&M NETWORK

XCELLE AMERICAS

XCELLE AMERICAS

Activity: nacelles repair and maintenance.

xCelle Americas is a joint venture between Air France Industries KLM Engineering & Maintenance and Triumph Group, dedicated to servicing new generation aircraft nacelles in the Americas. Solving logistics issues for parts and providing fully licensed repair, xCelle Americas is a unique maintenance, repair and overhaul (MRO) solutions provider, taking the expertise of an airline combined with the experience of a third-party MRO.

xCelle Americas provides complete adaptive support for 787, 737MAX, A320neo and A350 aircraft.

