

SMART USE OF TECHNOLOGY TO REDUCE MAINTENANCE COST

PREDICTIVE MAINTENANCE

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WHO ARE WE?

- > 328 A320 FAMILY AIRCRAFT. 3RD LARGEST A320 FLEET IN THE WORLD.
- > 154 AIRPORTS, 35 COUNTRIES, 981 ROUTES
- > 13000 PEOPLE
- > AIMING TO BECOME THE WORLDS MOST DATA DRIVEN AIRLINE
- > FIRST AIRLINE TO ANNOUNCE A CREDIBLE SUSTAINABILITY ROADMAP



WHAT IS PREDICTIVE MAINTENANCE?

Predictive Maintenance is the approach used to determine the condition of equipment and systems by analysing aircraft data to identify patterns and predict issues before they arise. It is used to establish the best time to intervene and perform the corrective action at an optimal time and environment.

PREDICTIVE MAINTENANCE TURNS **AN UNPLANNED** EVENT INTO A **PLANNED** EVENT.

LESS **UNSCHEDULED** MAINTENANCE =

- > **REDUCED NUMBER OF AOGS**
- > **REDUCED DELAYS**
- > **BETTER PASSENGER EXPERIENCE**
- > **LOWER COST**

WHY DID WE SELECT PDM?

By acting proactively, using aircraft sensor data on a scale never seen before, we can anticipate the effects on aircraft components and the operating characteristics during continued flight.

DIRECT MAINTENANCE COSTS (DMC)



- > Turning Unscheduled into Scheduled Maintenance
- > Positioning and stock of spares/Reducing reliance on AOG labour
- > Reduction of component repair costs/Reduced Inventory (E.G. Skin Air Valve HT previously)
- > Future review of MSG3 Philosophy possible due to PDM which may reduce maintenance requirements

DIRECT OPERATING COSTS (DOC)



- > Reduction of delays, diversions, cancellations and subsequent EU261 impact.
- > Reduction of aircraft operating under MEL and in conditions that may impact fuel burn or operations.
- > Optimised flight scheduling due to lower AOG risk
- > Asset utilisation – Improving Aircraft recovery time

SAFETY



- > Reduction of unanticipated technical events at times of greater risk (1st wave departures, circadian cycle)
- > Busy Integrated Control Centre which relies on expert decisions in a dynamic working environment
- > Specialist troubleshooting guidance built into the Predictive Maintenance tool, customizable for easyJet

OUR PREDICTIVE MAINTENANCE JOURNEY

2015

Study of three years worth of easyJet historic flight and MIS data by Airbus.

2016

80 aircraft take place in low data volume trials.

3 aircraft take place in high data volume trials.

2017

Expansion of basic services to the full fleet

2018

Long term partnership signed with Airbus

FOMAX retrofit programme started

Skywise Predictive Maintenance designed in collaboration with Airbus and Palantir.

2019

Massive data transmission commenced.

FOMAX ADC and easyJet MIS data ingested into Skywise

2020

FOMAX Retrofit Paused due to Covid.

2021

Continued validation of PDM models

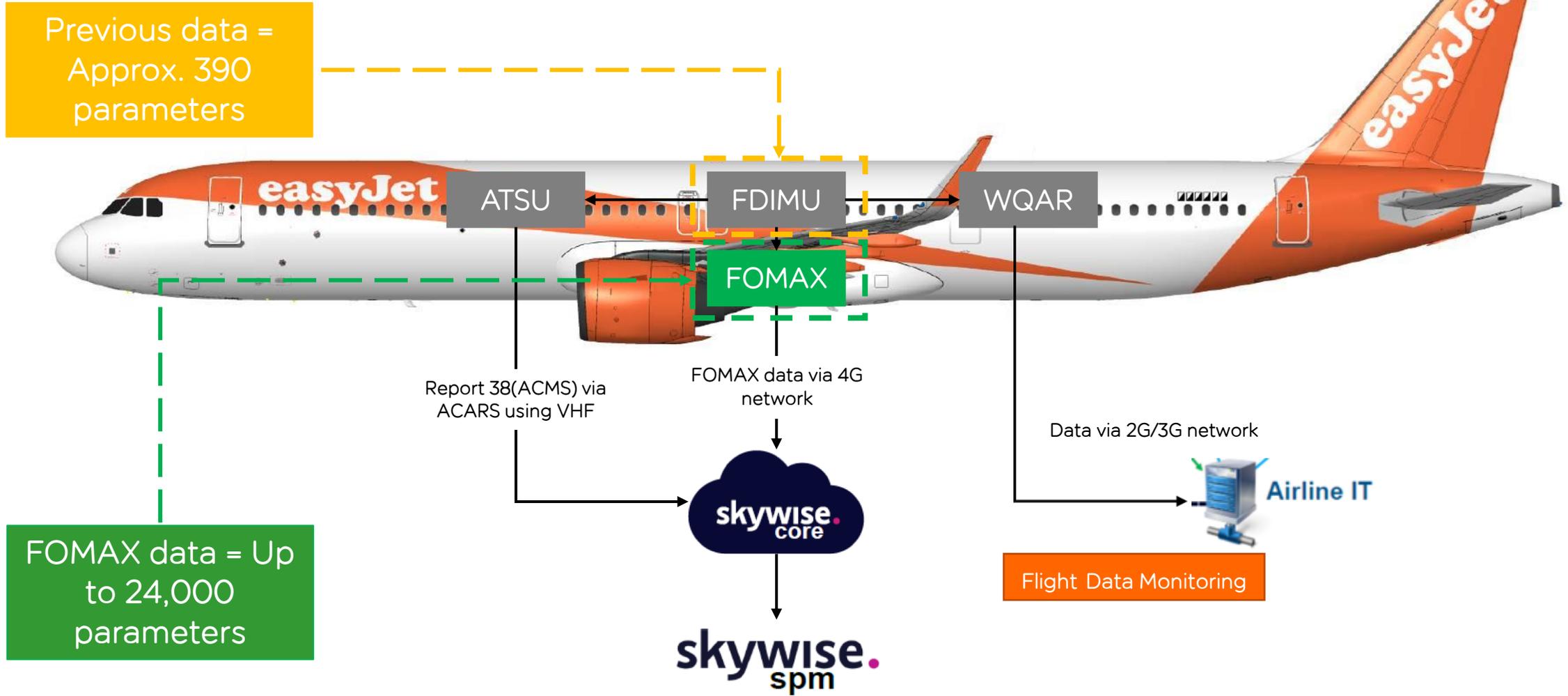
2022

FOMAX retrofit completed.

2023 >

Development & Validation of more predictive models.

HOW WE COLLECT AIRCRAFT DATA

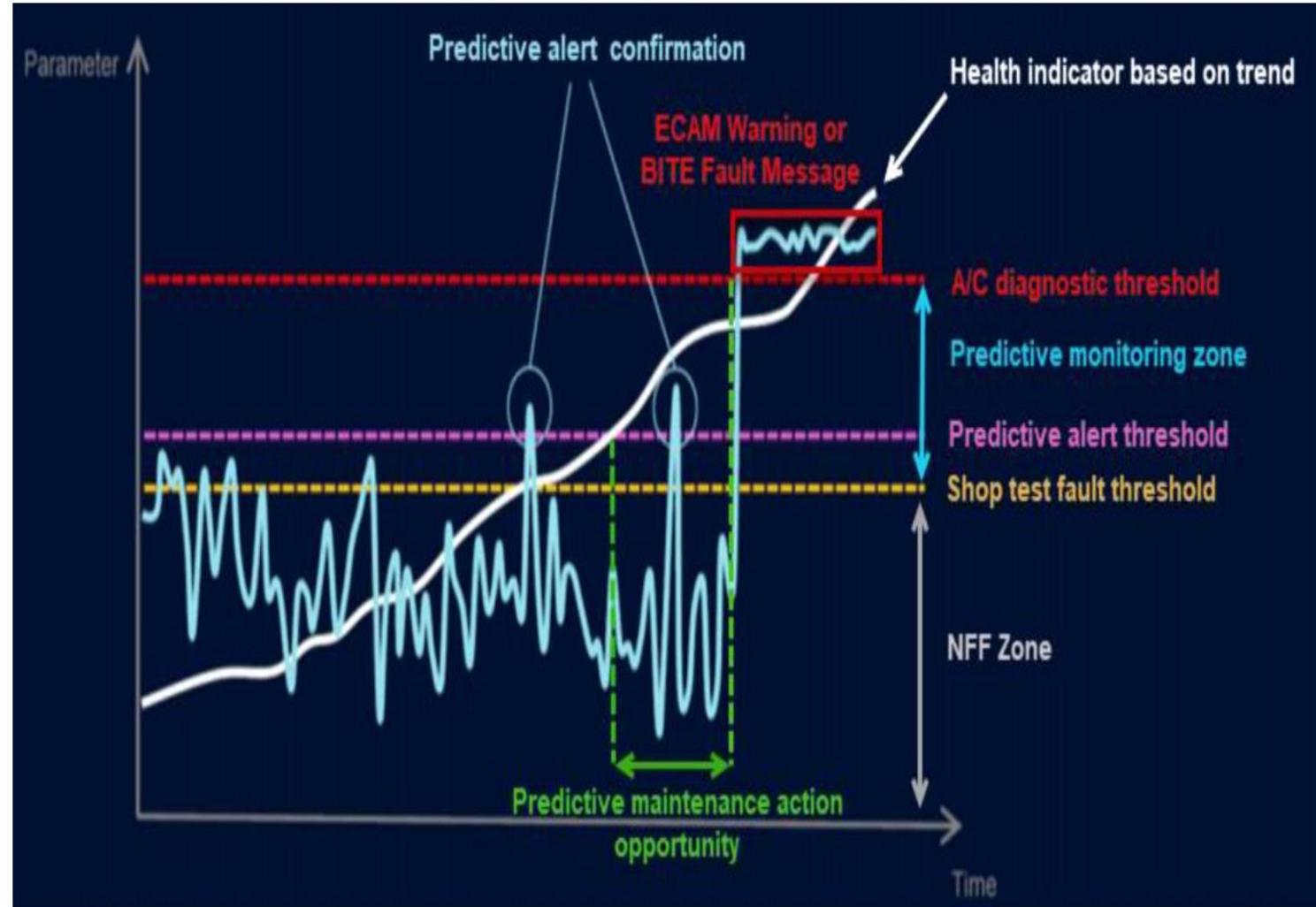


HOW IS THE DATA USED?

Validated algorithms are produced utilising historic aircraft data and component repair details. Data sent from the aircraft is processed against these validated algorithms to identify when a component or system is deviating from its correct pattern of behaviour.

Any deviation from the model is identified and trends will trigger alerts ahead of the aircraft diagnostic threshold.

To reduce the chance of NFF removals, the predictive alert threshold is always above the shop test fault threshold.

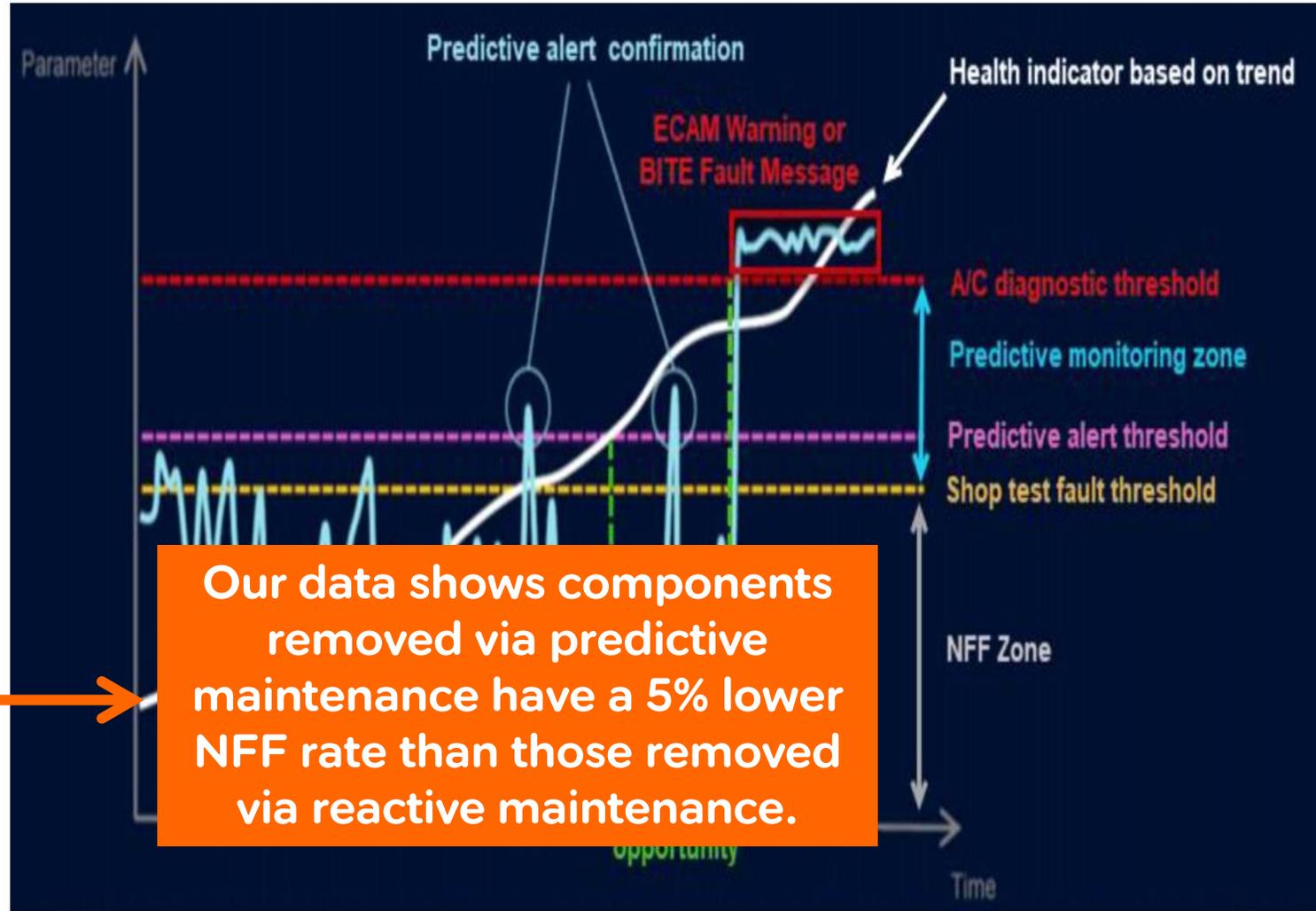


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PREDICTIVE MAINTENANCE IN ACTION

THIS IS A REAL EXAMPLE OF A FAULT IDENTIFIED BY PREDICTIVE MAINTENANCE. THIS ALL HAPPENED BEFORE ANY FAULTS DISPLAYED ON THE AIRCRAFT.

THE AIRCRAFT, G-EZAJ WAS FOUND TO HAVE A FAULTY ENGINE FUEL LP TWIN MOTOR ACTUATOR.

IF THIS WAS LEFT TO FAIL ON WING, OUR DATA SHOWS THAT 78% OF THESE COMPONENT FAILURES RESULT IN AIRCRAFT OUT OF SERVICE TIME OF OVER 3 HOURS.

PREDICTIVE MAINTENANCE IN ACTION



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PREDICTIVE MAINTENANCE IN NUMBERS

AUGUST 2022



PREDICTIVE MODELS

LIVE - **13**
IN CALIBRATION - **51**
IN DEVELOPMENT - **36**



PREDICTIVE INTERVENTIONS
TO DATE –
1964



PREDICTIVE MAINTENANCE
SUCCESS RATE –
94%



CANCELLATIONS AVOIDED
THIS MONTH –
35



MINOR DELAYS AVOIDED
THIS MONTH –
12



100% A/C MONITORED
IN PREDICTIVE
MAINTENANCE



FOMAX TRANSMITTING
AIRCRAFT –
290

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AUGUST 2022



PREDICTIVE MODELS

LIVE - 13
IN CALIBRE
IN DEVELOPMENT



PREDICTIVE INTERVENTIONS
TO DATE –



PREDICTIVE MAINTENANCE
SUCCESS RATE –

Since its introduction, our data shows that predictive maintenance has saved us hundreds of cancellations, hundreds of major delays and many more minor delays.



PREDICTIVE
MAINTENANCE



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WHAT'S NEXT FOR EASYJET?

ENHANCE PREDICTIVE MAINTENANCE MODELS

- > Move 51 models in calibration and 36 models in development in to live.
- > Develop more models based on new capabilities, greater understanding of data and operational need
- > Continuous improvement of existing models

We've had 1964 interventions with only 13 live models. Imagine what this could look like with 100 live models!

OEM AND COMPONENT REPAIR

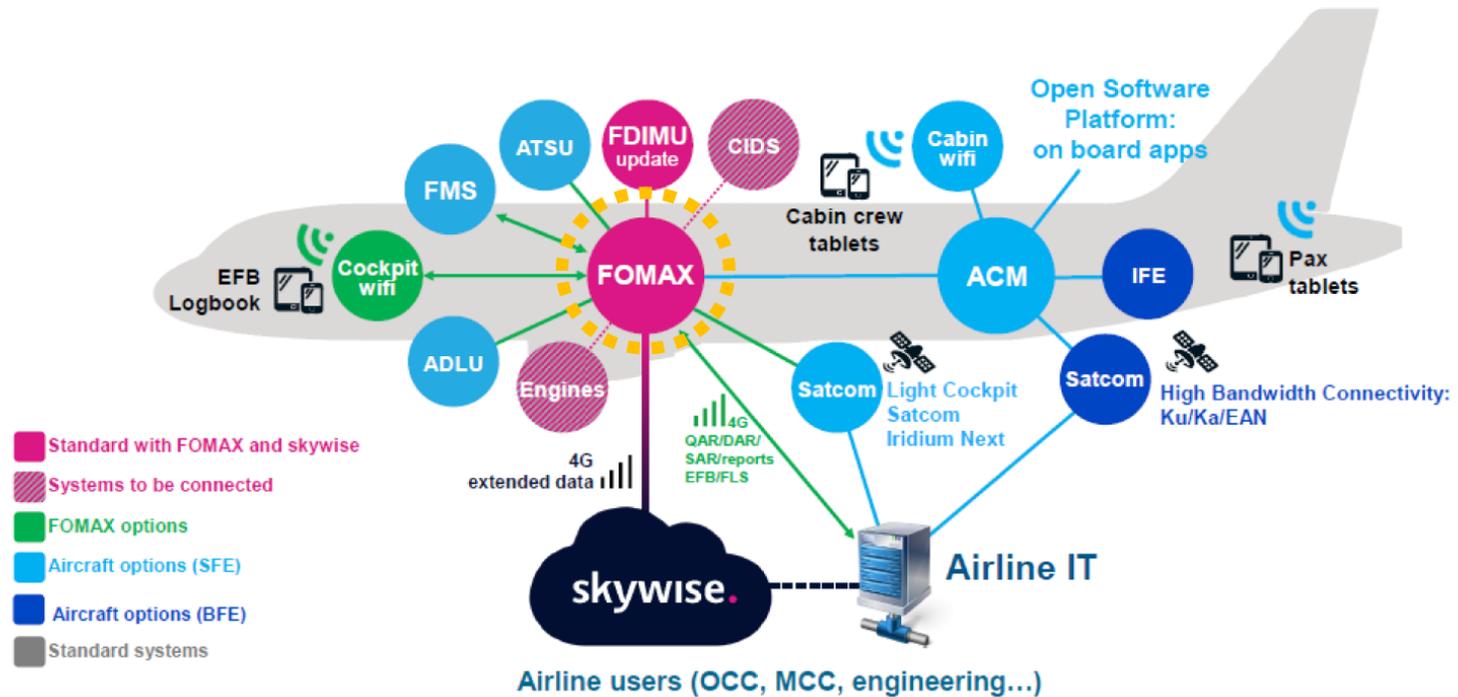
- > Engage further with OEM's and component repair agents to ensure shop testing reflects real-world aircraft effect
- > Rogue unit tracking
- > NFF analysis
- > Improvement of shop testing

IMPROVE IN-HOUSE DATA HANDLING FOR EFFICIENCY

- > Build on the experience of Predictive Maintenance for cross-departmental projects
- > Utilising easyJet's ATA experts to monitor the health of their systems and provide recommendations for further predictive capabilities

WHAT'S NEXT FOR EASYJET?

FOMAX OPENS UP A NUMBER OF OPPORTUNITIES FOR EASYJET TO EXPLORE THE FULLY CONNECTED AIRCRAFT



FOMAX has multiple optional features, allowing for the connection of satcom systems for inflight connectivity, transmission of aircraft data to EFBs and to ground for flight data monitoring. It can also be used as an interface with cabin entertainment systems or an ACARS over IP gateway.

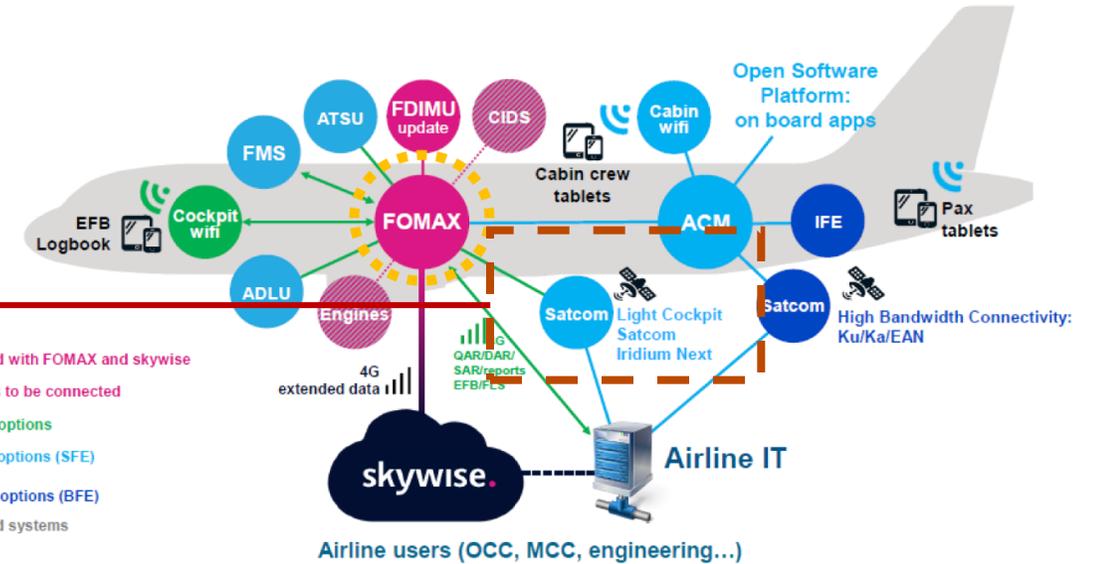
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easyJet first airline partner for Iris programme to further reduce aviation's carbon emissions

JUNE / 21 2022



We've partnered with ESA and Inmarsat to evaluate the Iris Light Cockpit Satcom system. The primary purpose of this is to evaluate the system for Air Traffic Management; however this system will be connected to FOMAX, allowing us to run trials of things such as ACARS over IP (opportunity for cost reduction, VHF expensive and bandwidth limited).

IN SUMMARY - WHAT'S THE PRIZE?

UNSCHEDULED MAINTENANCE = DISRUPTION = NEGATIVE PASSENGER EXPERIENCE AND COST

PREDICTIVE MAINTENANCE TURNS **UNSCHEDULED MAINTENANCE** IN TO **SCHEDULED MAINTENANCE**

PREDICTIVE MAINTENANCE =



Reduced AOGs,
Delays and
Cancellations



Spares and
inventory
optimisation



Fuel
savings/Reduction
in emissions



Reduced
operational
interruption



Improved safety



Improved
passenger
experience

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