Maintenance of Tomorrow
The AHM path from Airbus’ Perspective

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We have to find the right balance!

Our Mission

Safe, reliable and efficient operation at minimum cost!

Aircraft Availability

Maintenance Cost

No compromise on safety!

The best scheduled maintenance task is the one which does not exist!
Significant potential of savings in planned maintenance

maintenance Unavailability*

Unplanned: 19%
Planned: 81%

*following IATA Aircraft operational availability document

Example of Planned maintenance details

A330

Planned maintenance accounts for 81% of the “unavailability” for a long range aircraft
Significant potential of savings in planned maintenance

Maintenance Unavailability*

- 67% Planned
- 33% Unplanned

*following IATA Aircraft operational availability document

Example of Planned maintenance details

- 31% 12Y
- 15% 6Y
- 12% 2C
- 8% 1C
- 2% A

Less time in Hangar

Planned maintenance accounts for 67% of the “unavailability” for a narrow body aircraft
The classic scheduled maintenance task

Bye Bye Dirty Fingerprint

About 90% of systems scheduled maintenance tasks result in no finding!
The classic scheduled maintenance task

Let’s kill the waste

There must be a **better way** to assess systems performance.

90% of aircraft ground time for systems scheduled maintenance does not change the condition of the aircraft!
From Hard Time to Condition Based Maintenance

Hard Times are over!

History is telling us that there is a future, even on maintenance concepts.
System functional failure with a scheduled maintenance task

For about 63% of system functional failure no scheduled maintenance task has been selected.

MSG3 – Failure Effect Categories

FEC 5: evident/safety; FEC 6: evident/operational; FEC 7: evident/economical; FEC 8: hidden/safety; FEC 9: hidden/non-safety
The key factors to enhance aircraft availability by using Aircraft Health Monitoring are

Technology & Big Data
A4A MPIG AHM Working Group results

- An MSG3 update, described in a CIP (Candidate Issue Paper), has been developed by the MPIG AHM WG and presented to the MPIG (Maintenance Program Industry Group) in September 2017.

- The proposed solution is introducing a Level 3 analyses sheet to the existing MSG3 systems analysis methodology, which can be used optional by the TCH to identify an AHM (Aircraft Health Monitoring) capability as an alternative to a classic MRBR task.

- CIP has been successfully presented at the IMRBPB (International Maintenance Review Board Policy Board) meeting in April 2018 and published as IP180 “Aircraft Health Monitoring (AHM) integration in MSG-3”.

MSG3 is ready for AHM

Issue Paper 180

MSG3 methodology has been updated to allow AHM as an alternative to the classic scheduled maintenance task.

IATA EMG Request

MPIG WH Launch

CIP Development

CIP Presentation to MPIG

CIP Validation by IMRBPB

September 2016

December 2016


September 2017

April 2018
Aircraft Health monitoring vs scheduled maintenance

The Principle

Aircraft Health monitoring

Reduce unscheduled and scheduled maintenance
Aircraft Heath Monitoring it’s more than a ECAM message!

AHM is the Sensing, Acquisition, Transfer, Analysis and Action/s taken (SATAA) with data generated from specific Aircraft systems measuring condition, reduced resistance to failure or function degradation. This unified process intends to optimize the timely scheduling of required maintenance prior to operational impact.

Watching from ground

We have to predict and not to react!
Fuel Tank Inerting System Description

- Aim of Fuel Tank Inerting System is to provide and maintain a Nitrogen Enriched Air (NEA) in the fuel tanks to minimize the risk of fuel tank explosion.

- $O_2$ concentration sensors are located downstream of each ASM. They are available in Aircraft Condition Monitoring System.

- Uplink technology allows to capture these values at each flight from the ground.

- Scheduled maintenance task to replace the module at a fixed interval regardless of the condition.

Dispatch Message is triggered if $O_2$ concentration $\geq 9\%$
Fuel Tank Inerting System Description

Let's take an example

We don’t enhance the reliability of the item, but we react when it is required.

- Each flight, O₂ concentration is captured and sent via ACARS on ground for monitoring.

- O₂ concentration to be monitored by e.g. OPS center or engineering department.

- As soon as a O₂ concentration of more than 6% is detected, an alert is triggered and an advice is sent to e.g. MCC.

- Advice to schedule the replacement of the ASM within a certain timeframe.

ENOUGH LEAD TIME TO SCHEDULE FAILURE CORRECTION!
AHM as an alternative means of compliance

The operator can choose between the classic task and the AHM alternative.
Airbus is going to offer AHM as an alternative means to scheduled maintenance.

Let’s use the technology of today, we don’t have to wait for a new aircraft type.

Big data enable us to apply AHM as an alternative to existing tasks.

We have to validate and to demonstrate the capability of AHM.

Let’s start now to get prepared for the future, there is a journey ahead of us.
Thank You!