



INCREASING EFFICIENCY & REDUCING COST WITHIN THE AIRCRAFT MAINTENANCE PROCESS USING NEW TECHNOLOGY AND INNOVATIVE SOLUTIONS

TUESDAY 5 SEPTEMBER 2017

08:15 **Registration and Refreshments**

09:00 **WELCOME & OPENING REMARKS**

Speaker: *Daniel Olufisan, Managing Director & Principal Airworthiness Consultant, Wing Engineering Ltd and Chairman Airworthiness & Maintenance Specialist Group*

09:05 **KEYNOTE PRESENTATION**

Speaker: *Michael Adams, Vice President MRO Services, Etihad Airways Engineering*

09:30 **1) HOW THE USDoD IS REDUCING NO FAULT FOUND IN LINE & BASE MAINTENANCE**

The impact of No Fault Found (NFF) has plagued aviation for decades and this presentation examines a new approach being applied by the US Department of Defence (USDoD). The presentation will detail the use of NFF reduction tools including data analysis, training and Intermittent Fault Detection (IFD). How and why the USDoD has prioritised the roll-out of IFD testing will be covered, including the formation of a joint-Services working group to deal with the issue and the introduction of the MIL-PRF-32516 performance specification for IFD test equipment. Finally, by reviewing IFD case studies on fixed wing, rotary wing and armoured vehicle platforms, the presentation evaluates the USDoD's subsequent IFD implementation approach to using Depot and portable MIL-PRF-32516-compliant IFD test equipment.

Speaker: *Giles Huby, Managing Director, Copernicus Technology Ltd*

10:00 **2) IMPLICATION OF DIGITAL AVIATION FOR AIRLINES AND MRO**

The latest generation of aircraft integrates new IoT devices and enhanced information capability which can provide information at great speed and volume. Some of the information is already part of the flight data being generated and captured for flight operations. Some data relates to the health of the aircraft, systems and sub-systems that traditionally is for reliability engineering; and of great interest to fleet engineering and MROs. The massive e-enablement of aircraft subsystems heralds the age of Digital Aviation. Issues could be reported in real-time to airline operations and MRO stations to plan solutions and solve issues as soon as the aircraft lands. Effective exploitation of this information requires the necessary information communication and processing equipment, as well as the human skills to take advantage of the information. This paper reports on a case study with a UK airline/MRO business to prepare for the introduction of a new e-enabled fleet.

Speaker: *Dr Ip-Shing Fan, Senior Lecturer in Enterprise Systems, Daniel Villanueva Péon, Researcher and Yandy Ma, Researcher, Cranfield University*

10:30 **3) APPLICATION OF LEAN PRINCIPLES & SOFTWARE SOLUTIONS FOR MAINTENANCE RECORDS IN CONTINUING AIRWORTHINESS MANAGEMENT ORGANISATIONS**

This presentation discusses how the processes of Continuing Airworthiness Management Organisations (CAMO) can be made more efficient by applying Lean principles and digital solutions, to obtain costs savings and improved compliance standards. Lean management is the process of eliminating waste by maximising value through balancing workloads and cutting out inefficient processes. Though Lean was initially applied to manufacturing production lines, an opportunity exists to apply the principles of Lean in CAMO. One such aspect of CAMO is the processing of maintenance records which is an essential part of safety and compliance; there are many

INCREASING EFFICIENCY & REDUCING COST WITHIN THE AIRCRAFT MAINTENANCE PROCESS USING NEW TECHNOLOGY AND INNOVATIVE SOLUTIONS

TUESDAY 5 SEPTEMBER 2017

benefits to be achieved by applying Lean principles in different work procedures. Further value can be extracted by applying additional software solutions that will lay a strong foundation for machine learning and predictive analytics — taking aircraft maintenance from a reactive model towards a proactive model.

Speaker: *Hadi Mohamed Shakir, Chief Technology Officer, GI Aerospace LLC*

11:00 **4) LEAN FOR AIRCRAFT MAINTENANCE: LEARNING BY DOING**

Lean implementation is not just about the application of the tools and techniques, which are widely available. This research demonstrates that successful Lean implementation requires numerous other factors to play a part including: strong leadership; creating and maintaining a sense of urgency; senior management buy in; a clear vision with goals; an iterative change process; real engagement from stakeholders. The research seeks to resolve an aeronautical maintenance problem, which has its primary focus on the turnaround time for the A-Check, by looking beyond the application of the Lean tools and techniques to understanding how and why some Lean Transformations are successful and others are not. The three themes which emerged from the literature research, creating the right conditions for Lean, learning by doing and growing a culture for change were used to create a preliminary model for Lean implementation in an aeronautical A-Check. The model was tested throughout the research and a final version was prepared taking the implementation and the findings into account.

Speaker: *Damian Murphy, Principal Trainer, Acclino & University of Limerick, Ireland*

11:30 **Networking Refreshment Break**

12:00 **5) THE HIDDEN BENEFITS OF AN AUTOMATED TOOL CONTROL SOLUTION**

Investment in Automated Tool Control Technology can enable unrealised potential to be fulfilled. This presentation reveals that creating a business case based upon staff efficiency and return of financial investment is only the starting point. There are subsequent benefits regarding staff engagement initiatives, Safety Management Systems, Lean hangar floor processes and the realization of undiscovered talent that are less obvious, but just as important to any maintenance organisation.

Speaker: *Graeme Robertson, Vice President Airframe Services, Etihad Airways*

12:30 **6) DATA MINING IN MRO PROCESS OPTIMISATION**

Data Mining seems promising to tackle the problem of unpredictability at SME enterprises in MRO. The Amsterdam University of Applied Sciences has initiated, in cooperation with Aviation industry, a 2 year applied research project. The research question is: How can SME MRO's use fragmented historical maintenance data to decrease maintenance costs and increase aircraft uptime? The research methodology is based on CRISP-DM. A detailed model was developed which shows which factors affect the maintenance costs and uptime. The data present within MRO SMEs are explored and prepared. This results in readable data sets that are then tested for their predictive value for key elements of the maintenance process. Case studies in different MRO markets segments were conducted successfully, e.g.: Optimal moment to change tires depending on cycles, weight and runway length and prediction of the probability of unplanned repairs and the duration of planned maintenance checks.



INCREASING EFFICIENCY & REDUCING COST WITHIN THE AIRCRAFT MAINTENANCE PROCESS USING NEW TECHNOLOGY AND INNOVATIVE SOLUTIONS

TUESDAY 5 SEPTEMBER 2017

Speaker: Maurice Pelt, Lecturer - Researcher, Amsterdam University of Applied Sciences

13:00 **Networking Lunch**

14:00 **7) HARMONISED MRO WORK TASK DEFINITION FOR AUTOMATED BID GENERATION**

This paper reports on a prototype mapping tool to automate the matching process in a case study with a UK MRO. Maintenance, Repair and Overhaul (MRO) service providers respond to bid requests from customers who manage their aircraft maintenance information in a wide variety of similar formats. While the source information is the aircraft manufacturer(OEM)'s Maintenance Manual, each airline has their own Approved Maintenance Programme and work tasks would be re-structured to reflect the airline's maintenance policy and customisation.

To compile a bid, the MRO has to accurately match the work tasks with the in- house database to ensure accurate time and cost estimates, and to identify any risks. At the moment, the matching process is labour intensive, takes considerable time and cost. This mapping tool can greatly reduce the time spent on matching tasks, significantly reducing the cost of bidding.

Speaker: Dr Ip-Shing Fan, Senior Lecturer in Enterprise Systems, Daniel Villanueva Péon, Researcher and Yandy Ma, Researcher, Cranfield University

14:30 **8) THE NEXT GENERATION IN AIRCRAFT LOGISTICS INFORMATION SYSTEMS**

The next generation in aircraft logistics information systems is based on a holistic enterprise perspective from the outset of development. This approach considers the primary system (platform) and enabling system (sustainment) as a whole, forming a closed-loop information system geared toward continuous improvement. It determines the necessary interactions and capabilities between mission and sustainment operations to provide enabling features that provide higher operational value at lower sustainment costs. These features are tailorable to a platform and its associated operational concept and tempo. This paper provides an overview of the authors' concepts and implementation of next generation logistics information systems and identifies the latest technologies.

Speaker: Christopher Geiger, Chief Engineer and Vince Galluzzo, Fellow, Lockheed Martin

15:00 **9) ALIGNMENT OF THE SUPPLY CHAIN TO MEET THE AVIATION MRO CHALLENGES**

The role and importance of the supply chain in supporting aircraft maintenance activities is changing. Current solutions and operational set ups typically have been around for many years – performing a service. However, with the fast changing dynamics in aviation and aircraft maintenance placing increased financial and competitive pressure on organisations, the supply chain now has a key role in supporting these changes and delivering customer value. It is probable that today's supply chain solution will not be optimal for tomorrow's needs. But how do you go about redesigning a supply chain solution that is already in operation?... To be successful, what enablers are required to be in place?...What is the role of technology in the future supply chain design? This presentation will give an insight on how DHL approaches this strategic challenge with airline and MRO customers – building on what is already there today, but adopting a process to design new a solution that will support the future changed business needs.

Speaker: David Bruce, Vice President MRO, DHL Supply Chain



INCREASING EFFICIENCY & REDUCING COST WITHIN THE AIRCRAFT MAINTENANCE PROCESS USING NEW TECHNOLOGY AND INNOVATIVE SOLUTIONS

TUESDAY 5 SEPTEMBER 2017

15:30 **Networking Refreshment Break**

16:00 **10) A TASTE OF LUXURY AT 40,000FT....CABIN INNOVATIONS, UPGRADES AND THE EFFECT ON MROS**

Today's travelers are ever more discerning, and expectations of in-air experience are high:

- What are the latest trends in cabin technologies and cabin upgrades? Can an Airline and MRO satisfy these trends?

- What are the best practices in scheduling and completing cabin upgrade programs?

What are the Common pitfalls and how to avoid them ? What are the MRO implications for cabin modification program?

- How to share the cabin vision between OEM , Supplier, Airline, MRO and Regulations?

Speaker: *Bernhard Randerath, Vice President Design, Engineering and Innovation, Etihad Airways*

16:30 **11) CONCEPT DEVELOPMENT OF A COGNITIVE INTEGRATED VEHICLE HEALTH MANAGEMENT SYSTEM**

Integrated Vehicle Health Management (IVHM) is a demand in the context of the Fourth Industrial Revolution, and very demanding topic for future aircraft development. IVHM goes beyond the condition-based maintenance and does a predicted maintenance scheduling. Developing the IVHM will bring predicted scheduling modules to service and operation, and turns unexpected failures to expected maintenance and operational actions. Thus, prediction is a recognized development demand for making IVHM operational.

The author studied air-conditioning system failure prediction in an Airbus A320 of Aircondition system failure production, since is applying very high operating costs and delays. As a result, a successful forecast model for predicting failure was developed on basis of cognitive computing philosophy. The method has been upgraded to the whole concept of IVHM in operation. In this presentation, an automatic development environment concept is presented with architecture, technology and operational aspects. Considering IoT for aircraft operation, one other key point is the airworthiness, which is again approached cognitively.

Speaker: *Ali Baghchehsara, R&D Engineer, VDev Systems and Services*

17:00 **CLOSING REMARKS**

Speaker: *Daniel Olufisan, Managing Director & Principal Aiworthiness Consultant, Wing Engineering Ltd and Chairman Airworthiness & Maintenance Specialist Group*

SPONSORED BY:

