



AGIFORS

Airline Group of the International Federation of Operational Research Societies

Maintenance Operations 2020

How to restore and recover airline operations at minimal cost and with maximum efficiency as quickly as possible

Online Conference

01 – 05 June 2020

AGIFORS Operations and Maintenance Conference Schedule 2020

	Time Slot	01. Jun Monday (HOLIDAY)	02. Jun Tuesday	03. Jun Wednesday	04. Jun Thursday	05. Jun Friday	Time Slot
Technical presentations offered twice to cater for more time zones.	14:45 - 15:30 (CEST) 07:45 - 08:30 (CDT) 05:45 - 06:30 (PDT)		Prof. Dr. Christoph Brützel, International University Bad Honnef Impact of Outsourcing Flight Operations on Operations Control Management	Airline Updates Cathay Pacific, Patton Chan Oman Air, Ziad Abuawad	Anna Hess, FZI Research Center for Information Technology The Weight and Balance Optimization Journey	Airline Updates	14:45 - 15:30 (CEST) 07:45 - 08:30 (CDT) 05:45 - 06:30 (PDT)
	15:30 - 16:00 (CEST) 08:30 - 09:00 (CDT) 06:30 - 07:00 (PDT)	Conference Start 15:45 (CEST) 08:45 (CDT) 06:15 (PDT)	Valentin Weber & Mohamed Rbaia,, Amadeus Robust and Practical Tail Re-allocation	Airline Updates American Airlines, Tolou Esfandeh GoIndigo, Jason Herter	Jose Ramirez-Hernandez, American Airlines Maintenance Planning with Center of Excellence (CoE) Stations: A simulation Approach	Lufthansa Consulting M2P Consulting ELP Aviation Tata Consultancy Services Pricewaterhouse Coopers Advisory	15:30 - 16:00 (CEST) 08:30 - 09:00 (CDT) 06:30 - 07:00 (PDT)
	16:00 - 16:45 (CEST) 09:00 - 09:45 (CDT) 07:00 - 07:45 (PDT)	Keynote James Sarvis, Executive Vice President & Chief Operating Officer (COO), AeroMexico	Davide Bardelli, Lufthansa Systems and Tim Nickel, Lufthansa Aviation Training Operations control in (and beyond) a state of pandemic	Sebastian Heger, m2p Is the corona-crisis just a giant disruption or will it introduce a radical change? - The future of disruption management solutions	Gesine Varfis, APSYS Predictive Maintenance (PDM) is not an emerging technology		16:00 - 16:45 (CEST) 09:00 - 09:45 (CDT) 07:00 - 07:45 (PDT)
	16:45 - 17:00 (CEST) 09:45 - 10:00 (CDT) 07:45 - 08:00 (PDT)	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	16:45 - 17:00 (CEST) 09:45 - 10:00 (CDT) 07:45 - 08:00 (PDT)
	17:00 - 17:30 (CEST) 10:00 - 10:30 (CDT) 08:00 - 08:30 (PDT)	IBM Update	Panel Discussion: Why have there been no major new approaches to disruption management in the past 20 years? What can we do now?	FlightAware Update	SlickOR Update	Dassault Systems Amadeus Jeppesen	17:00 - 17:30 (CEST) 10:00 - 10:30 (CDT) 08:00 - 08:30 (PDT)
	17:30 - 18:00 (CEST) 10:30 - 11:00 (CDT) 08:30 - 09:00 (PDT)	Marc Brittain, Iowa State University A Deep Multi-Agent Reinforcement Learning Approach to Autonomous Separation Assurance	Michael Clarke, John Paul Clarke, Ira Gershkoff, Mike Irrgang, Anna Sauer, Gesine Varfis	Jack Troutt, Utah Valley University Perceptions of Fuel Conservation Programs at a U.S. Air Carrier	Darren Macer, Boeing Maintaining a Digital Twin for Aircraft During Operation	Sabre ZeroG Lufthansa Systems	17:30 - 18:00 (CEST) 10:30 - 11:00 (CDT) 08:30 - 09:00 (PDT)
	18:00 - 19:00 (CEST) 11:00 - 12:00 (CDT) 09:00 - 10:00 (PDT)	<i>Social Hour</i>	<i>Social Hour</i>	<i>Social Hour</i>	<i>Social Hour</i>	<i>Social Hour</i>	18:00 - 19:00 (CEST) 11:00 - 12:00 (CDT) 09:00 - 10:00 (PDT)
	19:00 - 19:30 (CEST) 12:00 - 12:30 (CDT) 10:00 - 10:30 (PDT)	Max Z. Li, Massachusetts Institute of Technology Conservative selective redistribution of airport delays	Martin Sedlacek, Lufthansa Consulting Airline Operational Excellence - what should be the priorities now?	Luis Delgado, University of Westminster Crew multi-criteria decision support tool estimating performance indicators and uncertainty (30)	Airline Panel What has COVID-19 done? How can software and service vendors & consultancies help to restore airline operations?	Inform IBS To70 Collin Aerospace	19:00 - 19:30 (CEST) 12:00 - 12:30 (CDT) 10:00 - 10:30 (PDT)
	19:30 - 20:00 (CEST) 12:30 - 13:00 (CDT) 10:30 - 11:00 (PDT)	Sujeevraja Sanjeevi, Sabre Airline Solutions Decomposition Techniques for Aircraft Recovery	Dr. Clemens Wolf, zeroG Increasing flight plan stability on the day of operations by using reinforcement learning	Sita Update	Tim Niznik (American Airlines) Jeff Meaney (Air Canada) Daan Debie (KLM) Jason Herter (GoIndigo) Bolivar Dominguez (Copa)	Maintenance Study Group Update Start:19.40 (CEST), 12:40 (CDT), 10:40 (PDT)	19:30 - 20:00 (CEST) 12:30 - 13:00 (CDT) 10:30 - 11:00 (PDT)
	20:00 - 20:15 (CEST) 13:00 - 13:15 (CDT) 11:00 - 11:15 (PDT)	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	Conference Closing	20:00 - 20:15 (CEST) 13:00 - 13:15 (CDT) 11:00 - 11:15 (PDT)

AGIFORS Operations and Maintenance Conference Schedule 2020

	Time Slot	01. Jun Monday (HOLIDAY)	02. Jun Tuesday	03. Jun Wednesday	04. Jun Thursday	05. Jun Friday	Time Slot
	16:45 - 17:00 (CEST) 09:45 - 10:00 (CDT) 07:45 - 08:00 (PDT)	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	16:45 - 17:00 (CEST) 09:45 - 10:00 (CDT) 07:45 - 08:00 (PDT)
	17:00 - 17:30 (CEST) 10:00 - 10:30 (CDT) 08:00 - 08:30 (PDT)	IBM Update	Panel Discussion: Why have there been no major new approaches to disruption management in the past 20 years? What can we do now?	FlightAware Update	SlickOR Update	Dassault Systems Amadeus Jeppesen Sabre ZeroG Lufthansa Systems	17:00 - 17:30 (CEST) 10:00 - 10:30 (CDT) 08:00 - 08:30 (PDT)
	17:30 - 18:00 (CEST) 10:30 - 11:00 (CDT) 08:30 - 09:00 (PDT)	Marc Brittain, Iowa State University A Deep Multi-Agent Reinforcement Learning Approach to Autonomous Separation Assurance	Michael Clarke, John Paul Clarke, Ira Gershkoff, Mike Irrgang, Anna Sauer, Gesine Varfis	Jack Troutt, Utah Valley University Perceptions of Fuel Conservation Programs at a U.S. Air Carrier	Darren Macer, Boeing Maintaining a Digital Twin for Aircraft During Operation		17:30 - 18:00 (CEST) 10:30 - 11:00 (CDT) 08:30 - 09:00 (PDT)
	18:00 - 19:00 (CEST) 11:00 - 12:00 (CDT) 09:00 - 10:00 (PDT)	<i>Social Hour</i>	<i>Social Hour</i>	<i>Social Hour</i>	<i>Social Hour</i>	<i>Social Hour</i>	18:00 - 19:00 (CEST) 11:00 - 12:00 (CDT) 09:00 - 10:00 (PDT)
	19:00 - 19:30 (CEST) 12:00 - 12:30 (CDT) 10:00 - 10:30 (PDT)	Max Z. Li, Massachusetts Institute of Technology Conservative selective redistribution of airport delays	Martin Sedlacek, Lufthansa Consulting Airline Operational Excellence - what should be the priorities now?	Luis Delgado, University of Westminster Crew multi-criteria decision support tool estimating performance indicators and uncertainty (30)	Airline Panel What has COVID-19 done? How can software and service vendors & consultancies help to restore airline operations? Tim Niznik (American Airlines) Jeff Meaney (Air Canada) Daan Debie (KLM) Jason Herter (GoIndigo) Bolivar Dominguez (Copa)	Inform IBS To70 Collin Aerospace	19:00 - 19:30 (CEST) 12:00 - 12:30 (CDT) 10:00 - 10:30 (PDT)
	19:30 - 20:00 (CEST) 12:30 - 13:00 (CDT) 10:30 - 11:00 (PDT)	Sujeevraja Sanjeevi, Sabre Airline Solutions Decomposition Techniques for Aircraft Recovery	Dr. Clemens Wolf, zeroG Increasing flight plan stability on the day of operations by using reinforcement learning	Sita Update			Maintenance Study Group Update Start:19.40 (CEST), 12:40 (CDT), 10:40 (PDT)
	20:00 - 20:15 (CEST) 13:00 - 13:15 (CDT) 11:00 - 11:15 (PDT)	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	Conference Closing	20:00 - 20:15 (CEST) 13:00 - 13:15 (CDT) 11:00 - 11:15 (PDT)
	20:15 - 21:00 (CEST) 13:15 - 14:00 (CDT) 11:15 - 12:00 (PDT)	Maarten Tielrooij, to70 Decision Support based on Runway Use and Capacity Predictions for Airlines and ANSPs	Xianfei Jin, Sabre Airline Solutions Recent advancements in effective disruption management	Lukas Glomb, University Erlangen-Nürnberg A rolling horizon approach for multi-time-period tail-assignment problems	Soufiane Bouarfa, ADPoly Automated aircraft visual inspection		20:15 - 21:00 (CEST) 13:15 - 14:00 (CDT) 11:15 - 12:00 (PDT)
Technical presentations offered twice to cater for more time zones.	21:00 - 21:30 (CEST) 14:00 - 14:30 (CDT) 12:00 - 12:30 (PDT)	Prof. Dr. Christoph Brützel, International University Bad Honnef Impact of Outsourcing Flight Operations on Operations Control Management	Airline Updates Cathay Pacific, Patton Chan Oman Air, Ziad Abuawad	Airline Updates	Jose Ramirez-Hernandez, American Airlines Maintenance Planning with Center of Excellence (CoE) Stations: A simulation Approach		21:00 - 21:30 (CEST) 14:00 - 14:30 (CDT) 12:00 - 12:30 (PDT)
	21:30 - 22:00 (CEST) 14:30 - 15:00 (CDT) 12:30 - 13:00 (PDT)	Valentin Weber & Mohamed Rbaia,, Amadeus Robust and Practical Tail Re-allocation	Airline Updates American Airlines, Tolou Esfandeh GoIndigo, Jason Herter	Airline Updates	Anna Hess, FZI Research Center for Information Technology The Weight and Balance Optimization Journey		21:30 - 22:00 (CEST) 14:30 - 15:00 (CDT) 12:30 - 13:00 (PDT)

Soufiane Bouarfa, ADPoly

Automated aircraft visual inspection

Deep learning combined with autonomous drones are increasingly seen as an enabler of automated aircraft inspection which can support engineers detect and classify a wide range of defects. This can help increase the accuracy of damage detection, reduce maintenance costs and AOG time, and help prevent inspection accidents. This talk will share the results of a recent use case that applies convolutional neural networks to detect aircraft dents. Furthermore, the talk will propose different test scenarios and connect them with standards that the drone-based system should satisfy in order to improve its reliability.

Soufiane is Assistant Professor at Abu Dhabi Polytechnic (ADPoly) in the UAE. He obtained a PhD on Airline Disruption Management from TU Delft in the Netherlands, and both a Bachelor and Master of Science in Aerospace Engineering from the same university. Prior to joining ADPoly, Soufiane was a postdoctoral researcher at TU Delft, and a consultant at Accenture & Deloitte.



Jose Ramirez-Hernandez, American Airlines

Maintenance Planning with Center of Excellence (CoE) Stations: A simulation Approach

Line Maintenance (LM) tasks performed on an aircraft vary in complexity, parts/tool requirements, and frequency for accomplishment. Simple and frequent tasks are easily learned by all Aviation Maintenance Technicians and present no assignment problem. However, a complex task that uses a tool/part with limited availability, and/or has low frequency can pose a problem - in industrial engineering terms, it is a learning curve problem. One way to offset this learning curve is to limit the tasks to a small set of stations that can become experts at it. These stations we designate as Centers of Excellence (CoE) for their particular subset of tasks. To support our decision process, we built a simulation tool to estimate the minimum access required by CoE stations to complete specific workload requirements. As a result, our approach provides the proper number and choice of CoE stations based on planned flying schedule, leading to a more efficient LM footprint.

Jose Ramirez-Hernandez has been with American Airlines 9 years working for the Operations Research & Advanced Analytics group and providing support to the different business units within the Tech Ops organization. He has a BS and MS in Electrical Engineering (EE) from the University of Costa Rica, and Ph.D. in EE from the University of Cincinnati.



Gesine Varfis

Predictive Maintenance (PDM) is not an emerging technology – a survey based position paper on where the industry stands and its relevance for the time after the crisis

On-Board Diagnostic Systems (OBD) have been generating fault messages about safety-critical systems such as engines, thrust reversers and APU for over a decade. The new dynamic around PDM is related to the use of smarter and more sensors, easier access to leverage cloud computing and enhanced techniques for data analytics like machine learning or artificial intelligence.

The PDM 'frontier' was moved daily before the crisis. Analytics and data platforms are provided by numerous OEMs, airlines, MROs, data analytics and IT services providers. All working on a fully analytics driven industry with zero AOG embedded into condition based maintenance. This position paper is based on a survey where we wanted to find out if PDM is going to be the or just one of many drivers shaping tomorrow's industrial revolution for aircraft maintenance #MRO 4.0, as well as how far airlines are in converting predictors into operational planning.

At APSYS Gesine is responsible for Airline and MRO Marketing. Together with her colleagues Gesine is ramping up a maintenance innovation program futureMRO ways. Gesine worked as CIO and COO advisor for Aeroflot. Prior to Aeroflot Gesine was Management Consultant for Lufthansa Consulting with a focus on MCC, Operations Control and Hub Control Center projects.



Darren Macer

Maintaining a Digital Twin for Aircraft during Operation

Once an aircraft is delivered and enters operational service, its digital twin must be maintained to mirror anything that its physical components experiences—we call this operational aspect of the digital twin the Operational Digital Twin. With the additional operational data, the physical entity is replicated digitally. This enables a comparison of its state to its peers, the determination of its current condition, an understanding whether it is operating as designed/expected, and predictions regarding its future condition. This operational understanding will, in turn, provide the information on which support and services can be based, and provide essential information back into design and production.

Boeing has been creating Operational Digital Twins across fleets and applying their capabilities along the whole life-cycle of the aircraft. This presentation will provide an overview of these capabilities, and how they enable predictive maintenance, health management, operational understanding and condition-based maintenance. We will also provide a characterization of Operational Digital Twin capabilities into five main areas: Data, Configuration, Data Science/Modelling, Future Simulation and Planning, and Processing capabilities.

Darren Macer is a Technical Fellow at Boeing Global Services leading a technology development team in creating analytics and engineering solutions for predictive maintenance and aircraft health management. They leverage operational data to identify, predict, and respond to operational issues.

