HCI International 2024
29 June - 4 July 2024
Washington Hilton Hotel, Washington DC, USA

Call for Participation

Implementation of Artificial Intelligence in Aviation. A Human-Centric Approach for Practitioners and Organizations

30 June 2024, at: 13:30 - 17:30

Organizer(s): Dr. Dimitrios Ziakkas
Purdue University, USA
dziakkas@purdue.edu

Dr. Anastasios Plioutsias
Coventry University, UK
tassos.plioutsias@coventry.ac.uk

Aim of the workshop

The implementation of artificial intelligence in the aviation workshop aims to prioritize the well-being of practitioners while providing significant benefits to the organizations involved. The aviation industry can achieve greater efficiency, safety, and overall operational excellence by utilizing AI technologies and setting new standards for maintenance practices in the ever-changing aviation landscape.

1. Enhanced Maintenance Efficiency:
Artificial intelligence (AI) can significantly enhance the maintenance processes in aviation workshops. AI can streamline the workflow by automating routine tasks, predicting maintenance requirements, and detecting faults. Machine learning algorithms can analyze large volumes of data collected from aircraft sensors and past maintenance records to predict potential issues before they lead to critical failures. This proactive approach helps reduce downtime and operational costs and improves the overall efficiency of maintenance operations.

2. Safety Improvement:
Safety is paramount in the aviation industry, and artificial intelligence (AI) is vital in improving safety measures. AI-powered systems can monitor and analyze aircraft systems continuously in real time, providing early warnings for potential safety hazards. This proactive monitoring helps prevent accidents and ensures that aircraft are in optimal condition for each flight, ultimately increasing the safety of both passengers and crew.

3. Optimized Resource Allocation:
Artificial Intelligence (AI) can analyze historical data and predict future maintenance needs, helping organizations optimize their resource allocation. This allows them to prioritize maintenance tasks based on actual needs rather than scheduled routines, resulting in more efficient resource allocation and cost savings. Additionally, it helps improve the utilization of human resources.

4. Human-Centric Assistance:
AI technology in the aviation workshop is not meant to replace human roles but to supplement and enhance human capabilities. AI systems can provide technicians with real-time information, step-by-step guidance for complex tasks, and troubleshooting assistance. This approach places humans at the center and allows them to focus on critical and complicated aspects of maintenance while AI automates repetitive and data-intensive tasks.

5. Training and Skill Enhancement:
AI technologies have numerous applications in the aviation industry, especially in training personnel responsible for maintenance. These technologies can create realistic simulations and scenarios that allow practitioners to improve their skills in a controlled and safe environment. Doing so makes them better equipped to handle diverse and challenging situations during actual maintenance operations.

6. Data-Driven Decision Making:
The use of AI allows organizations to make data-driven decisions by analyzing large amounts of data. This approach helps organizations gain valuable insights into operations, maintenance trends, and overall performance. Organizations can optimize their strategies and continually improve their maintenance practices by making informed decisions.

Expected workshop outcome

Introduction to the Implementation of Artificial Intelligence in Aviation Ecosystem Following a Human -Centric Approach. Future directions of AI in aviation training and operations, including autonomous systems – Advanced Air Mobility (AAM), intelligent airports, and personalized passenger experience.

The aviation industry can significantly benefit from implementing Artificial Intelligence (AI) in workshops, focusing on human-centric approaches. This is expected to bring about a range of positive outcomes for both practitioners and organizations involved in aviation, including improved efficiency, safety, and overall operational excellence. These outcomes are expected to encompass various aspects of the workshop, contributing to the betterment of the industry.

AI algorithms can significantly improve maintenance efficiency in two ways. Firstly, AI can predict and optimize maintenance schedules through predictive maintenance optimization, thereby reducing downtime. Secondly, AI can automate repetitive and time-consuming tasks, allowing technicians to focus on more complex and critical aspects of aircraft maintenance."

Improved safety measures can be achieved with the help of AI systems. These systems can provide real-time monitoring of aircraft systems, which helps in issuing early warnings and preventive measures to ensure the safety of passengers and crew. Furthermore, proactive fault detection and analysis by AI can contribute to accident prevention and the mitigation of potential safety hazards.

Optimizing resource utilization is essential to running a successful organization. With the help of AI, companies can allocate resources more efficiently by analyzing data. This includes

optimizing human resources, materials, and time. Additionally, prioritizing maintenance tasks based on actual needs can reduce operational costs and improve resource utilization.

Human-Centric Assistance and Collaboration refers to using AI to provide real-time information, step-by-step guidance, and troubleshooting assistance to technicians in their tasks. This promotes a collaborative work environment where humans and machines complement each other, enhancing overall productivity and efficiency.

Continuous training and skill enhancement are vital for professionals to stay updated with the latest industry practices. AI-driven simulations provide realistic training scenarios that allow practitioners to enhance their skills in a controlled and safe environment. Additionally, AI can tailor training programs to individual needs, ensuring practitioners receive targeted skill enhancements based on their performance and requirements. This adaptive learning approach helps professionals bridge knowledge gaps effectively and stay ahead in their respective fields.

Data-driven decision making is a process of making informed decisions based on data analysis. Artificial Intelligence (AI) can facilitate this process by providing valuable insights into maintenance trends, operational performance, and areas for improvement. Organizations can optimize their strategies based on data analysis, leading to continuous improvement in maintenance practices and overall operating efficiency.

Implementing AI in the aviation industry can increase operational excellence. AI-driven improvements can help achieve efficiency gains, which can raise the overall standard of maintenance practices. Adopting AI in workshops can also provide organizations with a competitive advantage. They can gain an edge over their competitors by staying at the forefront of technological advancements and operational efficiency."

In summary, incorporating AI in aviation workshops with a human-centric approach can lead to various significant benefits. These benefits include improved efficiency, enhanced safety measures, optimized resource utilization, collaborative working environments, continuous skill enhancement, data-driven decision-making, and an overall improvement in operational excellence. These advantages demonstrate the potential of AI to transform the aviation industry positively.

Workshop topics

Introduction to Artificial Intelligence in the Aviation ecosystem.
Human – Machine Interaction in Artificial Intelligence in Aviation and Transportation.
Ethical and Legal Challenges in Artificial Intelligence implementation in transportation.
Best Practices for the Implementation of Artificial Intelligence in transportation.

Workshop agenda

The following is a framework for the program of the workshop:

Time	***Program event***
13:30 – 14:00	Introduction to Artificial Intelligence in Aviation
14:00 – 14:30	Artificial Flight Training and Operations
14:30 – 15:00	Artificial Intelligence in Air Traffic Management

15:00 – 15:30	Artificial Intelligence in Maintenance, Technical Support and Repair Operations
15:30 – 16:00	**Break**
16:00 – 16:30	Human – Machine Interaction in Artificial Intelligence in Aviation and Transportation
16:30 – 17:00	Ethical & Legal Challenges/Best Practices
17:00 – 17:30	Conclusions

Guidelines to prospective authors

Submission for the Workshop

Prospective authors should submit their proposals in PDF format through the HCII Conference Management System (CMS).

Papers minimum 8 pages.

Submission for the Conference Proceedings

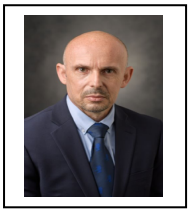
The contributions to be presented in the context of Workshops will not be automatically included in the Conference proceedings.

However, after consultation with the Workshop Organizer(s), authors of accepted workshop proposals that are registered for the conference are welcome to submit, through the HCII Conference Management System (CMS), an extended version of their workshop contribution to be considered, following further peer review, for presentation at the Conference and inclusion in the "Late Breaking Work" conference proceedings, either in the LNCS as a long paper (typically 12 pages, but no less than 10 and no more than 20 pages), or in the CCIS as a short paper (typically 6 pages, but no less than 4 and no more than 8). The submission deadline for the camera-ready papers (long or short) for the "Late Breaking Work" Volumes of the Proceedings is the 24th of May 2024.

Workshop deadlines

Submission of workshop contributions	25 March 2024
Authors notified of decisions on acceptance	30 March 2024
Finalization of workshop organization and registration of participants	15 April 2024

Workshop Organizer(s)



Dimitrios Ziakkas is an Assistant Professor in the School of Aviation and Transportation Technology at Purdue University. As a pilot, instructor and examiner, he has a 11500 total flying hours experience with aircraft types such as McDonnell Douglas F-4E Phantom II, Lockheed C-130 H/B Hercules, Gulfstream G-V, Premier 1/A (RA-390), Airbus A-320, A-330, A-340, A-380. He

earned a B.S in Aviation Science in 1994 from Hellenic Air Force Academy, Athens Greece, and a B.S in Economics from National and Kapodistrian University of Athens, Athens (NKUA), Greece in 2003. Additionally, he earned an M.S in History and Philosophy of Science and Technology, (NKUA), Greece in 2006. He holds a Ph.D. at the Graduate Program in the History and Philosophy of Science and Technology, (NKUA), Greece (2014). Furthermore, he holds an M.S in Human Factors in Aviation from Coventry University, UK, (2016), an MBA from Birmingham University, UK (2019), and an MS in Human Resources Management and Development from Salford University, UK (2019).
His research is focused on the adoption of technology in the aviation operations area, flight safety and training, online flight training, single pilot operations and economical approach of the software and hardware localization in the formation of the aviation - military projects. He works on a project in the appropriation of aviation electronics and related technologies in single pilot operation - AI (VR-AR-MR-SATCE) simulation and formation of certification - training requirements of Advanced Air Mobility. Also. he is interested in the competition between Europe and the USA in the aviation industry in and after the cold war period worldwide.

https://polytechnic.purdue.edu/profile/dziakkas
https://www.linkedin.com/in/dimitrios-ziakkas-aa988317/

Anastasios Plioutsias is an Assistant Professor of Human Factors of the School of Future Transport Engineering, College of Engineering, Environment & Science, Coventry University, UK. He has over ten years of experience in Human Factors and Accident & Incident Investigations. He was a fighter pilot in Hellenic Air Force (HAF) for 27 years with flight experience in F-16BLK52+ and F-4E Phantoms (2500 flight hours in fighter). He is an experienced accident and incident investigator, and he had assigned to all levels of investigation boards when he was on duty in HAF. He is a member of RAeS, SaRS, ISASI, EAAP and the European Chapter of Human Factors and Ergonomics Society. He holds a PhD in Engineering and Ergonomics, National Technical University of Athens, a Project Management and Aviation Safety Investigations MSc from University of Thessaly, Business Administration & Management from the University of Applied Sciences of Thessaly, and Aeronautics and Aviation Science B.S from the Hellenic Air Force Academy. Anastasios' research is embedding in ergonomics & Human Factors into development and operations, enriching the science by embracing outward-facing collaborations.

https://pureportal.coventry.ac.uk/en/persons/tassos-plioutsias
https://www.linkedin.com/in/anastasios-plioutsias-73921028/

Useful links and References

Implementation Guide for Artificial Intelligence in Aviation: A Human-Centric Guide for Practitioners and Organizations, Ziakkas, D., Vink, L.-S., Pechlivanis, K., & Flores, A. (2023). IMPLEMENTATION GUIDE FOR ARTIFICIAL INTELLIGENCE IN AVIATION: A Human-Centric Guide for Practitioners and Organizations.

https://a.co/d/aokdBGA

Artificial intelligence applications in aviation accident classification: A preliminary exploratory study. Elsevier, Decision Analytics Journal Volume 9, December 2023, 100358, https://www.sciencedirect.com/science/article/pii/S2772662223001984

Registration regulation

Workshops will run as 'hybrid' events. Participants will have the option to attend either in-person or virtually. The total number of participants per workshop cannot be less than 8 or exceed 25.

Workshops are ‘closed’ events, i.e. only authors of accepted workshop proposals, registered for the specific workshop, will be able to attend.

Registration for workshops is complimentary for registered conference participants.