

AI and the Future of Aviation

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What is Artificial Intelligence?

Algorithms to make machines that imitate humans
(learning, reasoning, and making decisions)

Big data refers to the storage and processing of massive
amounts of data. AI is the consequence of Big data Analysis



Types of Artificial Intelligence

Based on the likeness to the human mind (Hintze, 2016)

- Reative Machines
- Limited Memory
- Theory of Mind
- Self-aware



Types of Artificial Intelligence

- Artificial Narrow Intelligence (Weak AI)
- Artificial General Intelligence (Strong AI)
- Artificial Super Intelligence

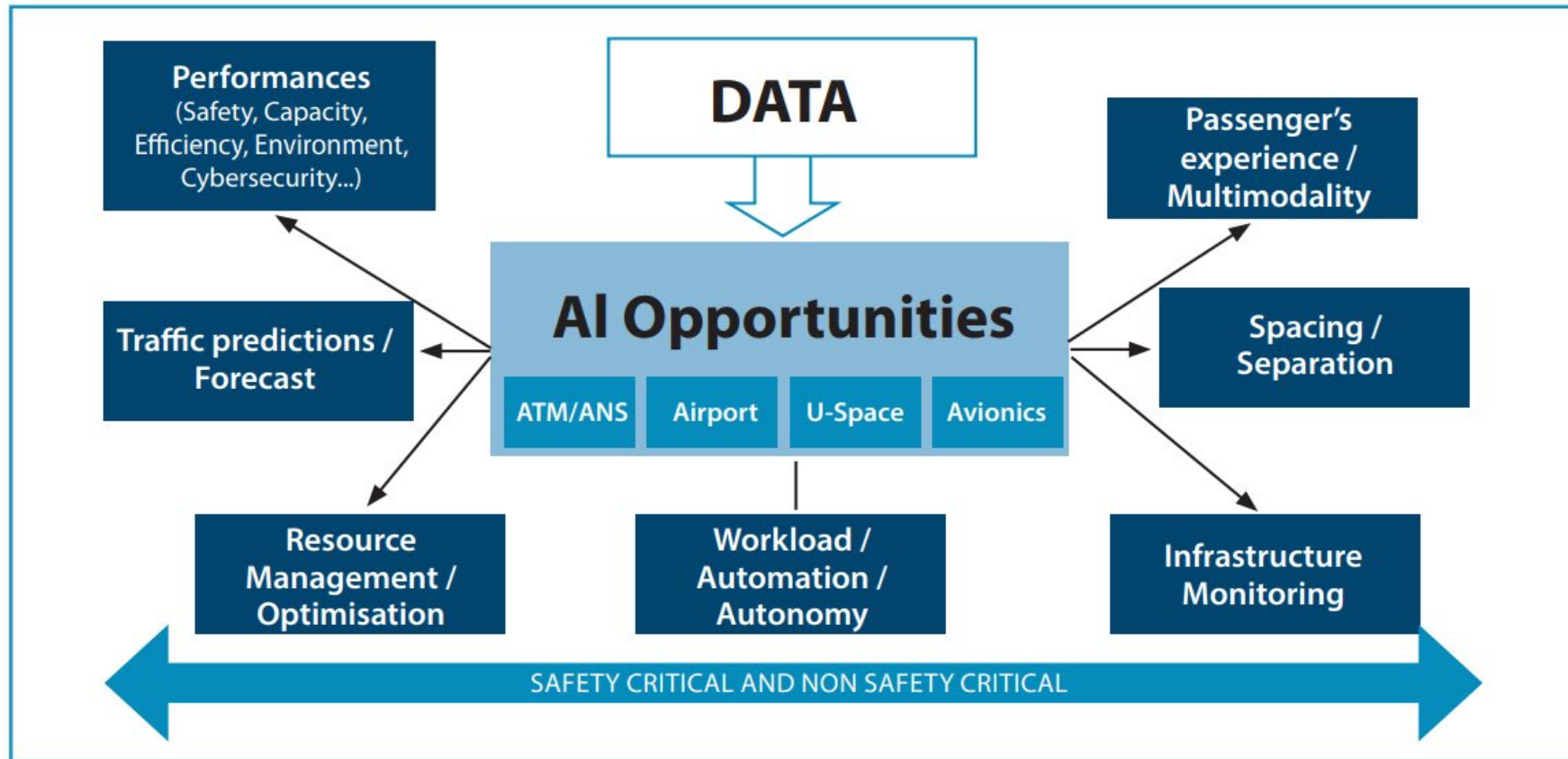


AI Technologies

- Automation
- Machine Learning
- Machine Vision
- Natural Language Processing
- Robotics
- Autonomous Vehicles



AI opportunities for Aviation (Eurocontrol, 2020)



Current use of AI in Aviation

- Revenue Management and Route Planning
- In-flight sales and food supply
- Fuel consumption optimization
- Boarding and checking bags with facial recognition
- Preparing a plane for the next flight



Airlines (Machine Learning)

- Demand Forecast
 - PredictHQ's Aviation Rank (A British Airline, Qantas)
 - Volantio's Yana (Qantas, Emirates, Alaska Airlines)
- Optimal Route Calculation
 - Airspace's Intelligence's Flyway (Alaska Airlines)
- Real-time Personalization
 - Ryanair



Airlines (Machine Learning)

- Flight Delay and Maintenance Time Estimation
 - Korean Air, AWS and IBM AI Platform
- Chatbot (+ Natural Language Processing)



Airlines (Machine Vision)

- JAL's Digital Vaccine Proof System
- Delta's Biometric Terminal (Facial Recognition)



Airlines (Investing in AI)

- Jetblue Ventures Tech Fund
- Lufthansa's Zero G
 - Forecast unplanned crew absence and standby
 - Efficiently calculate possible flight schedule changes within min



Air Traffic Management (Machine Learning)

- Flight Planning and Flow Management
- Safety Assessment
- Conflict and Complexity Prediction
- Environmental Impact
- Digital Tower Laboratory (+ Machine Vision)



Airport

- Machine Vision: Apron AI Technology (Assaia)
- Biometrics: Passenger Identification, Security, Monitoring
(Korea Airports Corporation's Use of Palm Veins;
AI Behaviour Detection and CCTV Surveillance)
- Robotics: Cleaning and Information Robots
- Machine learning: AI X-ray, AI Bridge
- Automation



Aircraft

- Cockpit with AI (Autonomous Vehicle)
 - Augmented Pilots: pilot assistant
 - Reduced Crews Operations: artificial co-pilot
 - Autonomous Aircraft: artificial pilot
- Predictive Maintenance (Machine Learning)



Urban Air Mobility

- Data + Network + Artificial Intelligence
- Real-time Monitoring (Traffic, Flow), Demand Forecasting
- Passenger Check-in and Security
- Self-driving Vehicle
- Multi-modal Hub for Future Vehicle:
 - Automated, Integrated, and Optimized



ICAO's Role

- Develop Standards
 - Use of Data: Confidentiality, Privacy
 - Cyber Security
 - Use of AI: How to verify the correctness?
 - Aviation is safety-critical

AI Airport Operations Technologies and Procedures

AI Autopilot





NO COUNTRY LEFT BEHIND



ICAO

North American
Central American
and Caribbean
(NACC) Office
Mexico City

South American
(SAM) Office
Lima

ICAO
Headquarters
Montréal

Western and
Central African
(WACAF) Office
Dakar

European and
North Atlantic
(EUR/NAT) Office
Paris

Middle East
(MID) Office
Cairo

Eastern and
Southern African
(ESAF) Office
Nairobi

Asia and Pacific
(APAC) Sub-office
Beijing

Asia and Pacific
(APAC) Office
Bangkok



THANK YOU