

# Accelerating Artificial Intelligence use in Aviation

Supporting  
European  
Aviation



## AI at EUROCONTROL 2022



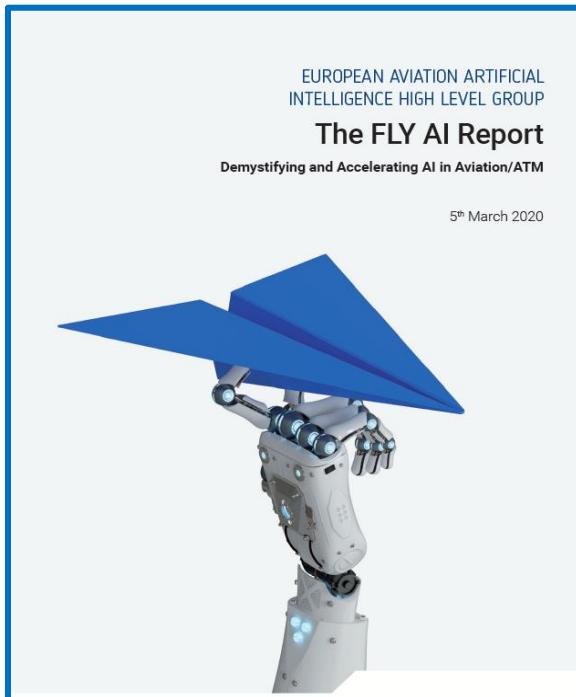
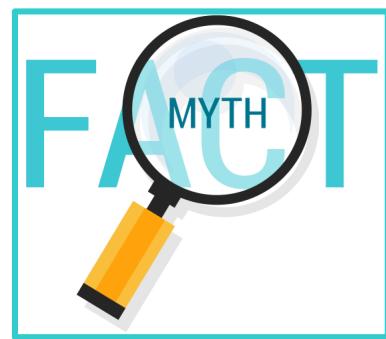
Paul Bosman  
EUROCONTROL NM  
Head of INFRASTRUCTURE  
21 June 2022







# FLY AI



<https://www.eurocontrol.int/fly-ai>



WITH INPUTS FROM EDA MILITARY EXPERTS AND **EASA** IN AN OBSERVING CAPACITY



## Data & AI infrastructure framework

## Research and Innovation

## Validation and standards

## Deployment

## Communication and Dissemination

## Training and change management

## Partnership

1- Heathrow passenger transfer improvement	11-DSNA Use of AI to optimise the sector configurations	10-THALES Airspace complexity	2- ECTL MUAC traffic prediction to optimise ATCo usage
3- HONEYWELL Maintenance cost & fuel optimisation	8 -THALES FMS Validation	7- ECTL Forecast improvement	4-ECTL GNSS monitoring
4-ECTL GNSS monitoring	5- ECTL Automated Flight Plan correction	6-Heathrow Image recognition to detect Rwy vacanc	5- ECTL Automated Flight Plan correction
7- ECTL Forecast improvement	7- ECTL Forecast improvement	6-Heathrow Image recognition to detect Rwy vacanc	5- ECTL Automated Flight Plan correction
8 -THALES FMS Validation	8 -THALES FMS Validation	6-Heathrow Image recognition to detect Rwy vacanc	5- ECTL Automated Flight Plan correction
9-THALES traffic prediction	9-THALES traffic prediction	7- ECTL Forecast improvement	4-ECTL GNSS monitoring
10-THALES Airspace complexity	10-THALES Airspace complexity	6-Heathrow Image recognition to detect Rwy vacanc	5- ECTL Automated Flight Plan correction
11-DSNA Use of AI to optimise the sector configurations	11-DSNA Use of AI to optimise the sector configurations	6-Heathrow Image recognition to detect Rwy vacanc	5- ECTL Automated Flight Plan correction
12-ECTL Runway Operational Performance predictions	12-ECTL Runway Operational Performance predictions	6-Heathrow Image recognition to detect Rwy vacanc	5- ECTL Automated Flight Plan correction
13-DFS final approach distance recommendation	13-DFS final approach distance recommendation	7- ECTL Forecast improvement	4-ECTL GNSS monitoring
14-SESAR-HONEYWELL Airborne computer vision	14-SESAR-HONEYWELL Airborne computer vision	7- ECTL Forecast improvement	4-ECTL GNSS monitoring
15-ECTL/THALES Demand and capacity balancing	15-ECTL/THALES Demand and capacity balancing	8 -THALES FMS Validation	3- HONEYWELL Maintenance cost & fuel optimisation
16-SESAR/Heathrow enhanced TBS with ML	16-SESAR/Heathrow enhanced TBS with ML	9-THALES traffic prediction	2- ECTL MUAC traffic prediction to optimise ATCo usage
17-AIRBUS Automatic Take off Taxi and landing	17-AIRBUS Automatic Take off Taxi and landing	10-THALES Airspace complexity	1- Heathrow passenger transfer improvement
18-EDA Cyber situation awareness improvement	18-EDA Cyber situation awareness improvement	11-DSNA Use of AI to optimise the sector configurations	2- ECTL MUAC traffic prediction to optimise ATCo usage
19-SESAR - HONEYWELL TCAS evolution	19-SESAR - HONEYWELL TCAS evolution	12-ECTL Runway Operational Performance predictions	3- HONEYWELL Maintenance cost & fuel optimisation
20-H2020 Safecloud rwy exit prediction (rwy occupancy optimisation)	20-H2020 Safecloud rwy exit prediction (rwy occupancy optimisation)	13-ECTL approach flight time prediction	4-ECTL GNSS monitoring
21-EADA RPAS autonomous capability	21-EADA RPAS autonomous capability	14-SESAR-HONEYWELL Airborne computer vision	5- ECTL Automated Flight Plan correction
22-EANS visual tracking in digital towers	22-EANS visual tracking in digital towers	15-ECTL/THALES Demand and capacity balancing	6-Heathrow Image recognition to detect Rwy vacanc
23-SESAR BigData4ATM Passengers behaviours understanding	23-SESAR BigData4ATM Passengers behaviours understanding	16-SESAR/Heathrow enhanced TBS with ML	7- ECTL Forecast improvement
23-SESAR MALORCA Speech recognition for ATCo	23-SESAR MALORCA Speech recognition for ATCo	17-AIRBUS Automatic Take off Taxi and landing	8 -THALES FMS Validation
23-SESAR DART data driven trajectory prediction	23-SESAR DART data driven trajectory prediction	18-EDA Cyber situation awareness improvement	9-THALES traffic prediction
23-SESAR INTUIT strategic trajectory planning	23-SESAR INTUIT strategic trajectory planning	19-SESAR - HONEYWELL TCAS evolution	10-THALES Airspace complexity
Exploration	R&D	Deployment	

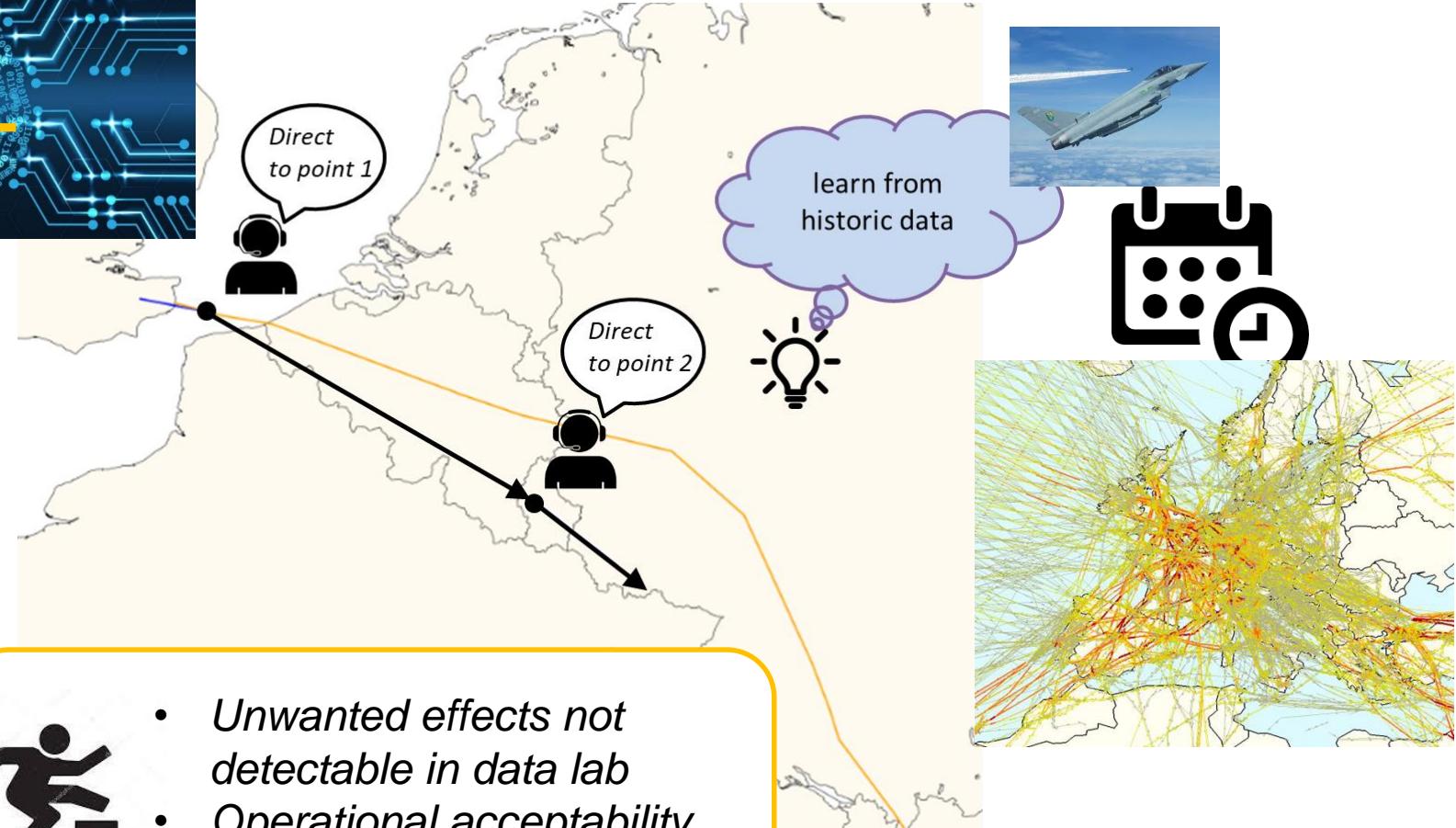
2019 : 26 AI Applications

# MUAC – Traffic Prediction Improvements

✓ Jan 2018



AI/ML



June  
2021

# AI for CYBER - Leaked aviation documents



AI identifies if a leaked doc is aviation related



- 98-99% success rate
- Saves resources (~500 h/year of boring tasks)
- Focus on added-value tasks

The screenshot shows a desktop application window titled "Analysis of leaked documents". The interface includes a sidebar with project settings like "Path to models" (set to "/Users/admin/PythonProjects/sequence"), "Input folder" (set to "/Users/admin/Desktop/test"), "Output folder" (set to "/Users/admin/Desktop/results"), and a checked "Scan images" option. Below this is a "Models to use" section with three selected items: "Text classifier", "Named Entity Rec...", and "Keyword matcher". A "Predict" button is located at the bottom of this panel.

The main area is titled "Analysis of leaked documents" and contains a sub-section titled "Techniques". It lists various MITRE ATT&CK techniques such as T1259 (Data Exfiltration), T1569 (Launchd), T1543 (File Copy Operation), T1700 (Network Share Connection Removal), T1222 (Linux and Mac File and Directory Perm), T1786 (Process Injection), T1069 (Local Groups), T1140 (Windows Service Collection), T1087 (Local Account), T1046 (Network Service Scanning), and T1113 (Screen Capture). Below this is a "Results" section with two tables:

Count	Group
3 out of 11	27%
2 out of 11	18%

Count	Group
1 out of 11	9%

At the bottom of the main window, there is a "Add Technique" dropdown menu with options "by id" and "by name", and buttons for "Add Item" and "Open File".

On the right side of the screenshot, there is a photograph of several KLM Boeing 747 aircraft parked on a runway. Each aircraft has a purple rectangular overlay with a white numerical value representing the confidence score of being aviation-related: 0.95, 0.65, 0.93, 0.92, 0.94, 0.93, and 0.93.

And more to come :

**MITRE ATT&CK – Started 06/2022**

- Improve attribution of a cyber-attack

**Password cracker – Initiated 05/2022**

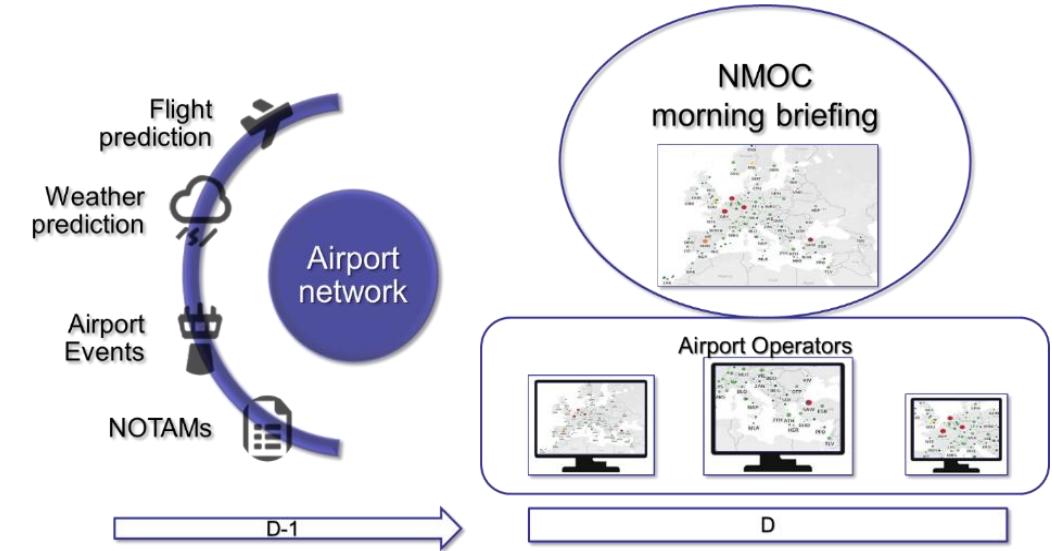
- Improve password cracking capability (pentest)
- Improve passwords – reject new passwords “too easy to guess”

# April 2022

## NM Regulation Outlook

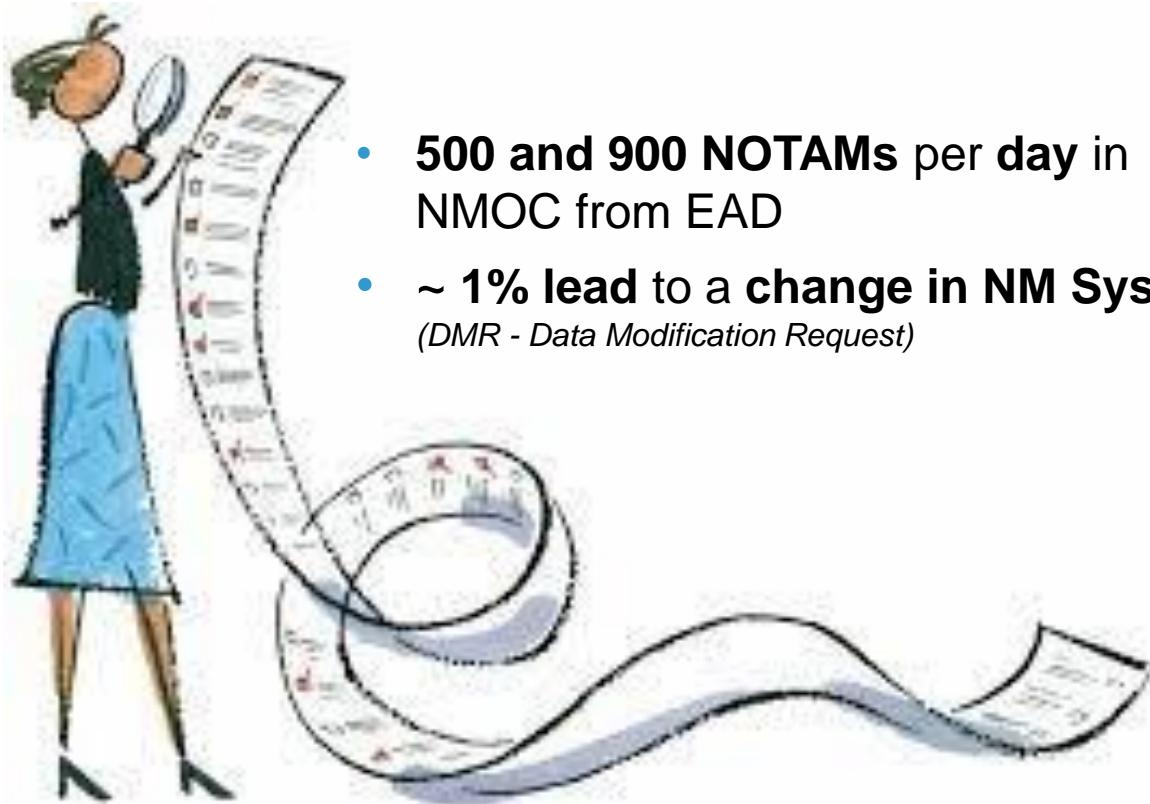


- Artificial intelligence tools to predict the likelihood of a regulation
- Using historical "normal" data to train the Machine Learning model: 2018 and 2019
- Focusing on the busiest 100 airports
- Predictions embedded in the Network Manager OPS Center Dashboard



- **Decision support tool for the NMOC Airport Function**
- **Foresees impact on Airlines/Airports => improves its management**

## Automation - NOTAM AI



- **500 and 900 NOTAMs per day in NMOC from EAD**
- **~ 1% lead to a change in NM Systems**  
*(DMR - Data Modification Request)*



Accelerates NOTAM processing by OPS Staff



And ...

[Traffic forecast](#)

[Automating flight plan p](#)

[Traffic predictions impro](#)

[Curfew infringement pre](#)

[GNSS monitoring: ionosp](#)

[Reducing operational im](#)

[COAST with use of mach](#)

[Improving climb and des](#)

**Plus many more**



ails @ our PODs  
or  
[eurocontrol.int/intelligence](http://eurocontrol.int/intelligence)