

Decoding NOTAMs with GenAI

Enhancing aviation efficiency

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235
AIRPORTS

37
COUNTRIES

3600
FLIGHTS
(+9)

183.7
MILLION PAX
P.A. FY24

300
MILLION PAX
/ 22/23



"Driving innovation, efficiency, and exceptional value across Europe's favourite airline"



NOTAM: Notice to Airmen

B2515/22 NOTAMN

Q) ESAA/QMRLC/IV/NB0/A/000/999/5935N01638E005

A) ESOW

B) 2208040600

C) 2208040900

E) RWY 01/19 CLSD DUE MAINT.

NOTAM: Notice to Airmen

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← **Q-CODE**
(structured)

13K+
Q-CODES
(20% NOTAMS w/o defined Q-code)

↑
\$+(- \$
(free text)

- Hard to read
- Inconsistent
- Uses heavy abbreviations

The NOTAM Overload Problem



Safety-critical decisions depend on fast and accurate NOTAM processing

4] W
NOTAMS
DAILY

93
ICAO
MEMBERS
(Each issuing own NOTAMs)

NOTAM Support System for Flight Ops

Inspired by the “Fixing NOTAMs” initiative (51 tags across 8 categories)

AIRPORT

TAXIWAY

ATC

LIBRARY

RUNWAY

APPROACH

AIRSPACE

HAZARDS

AIRPORT

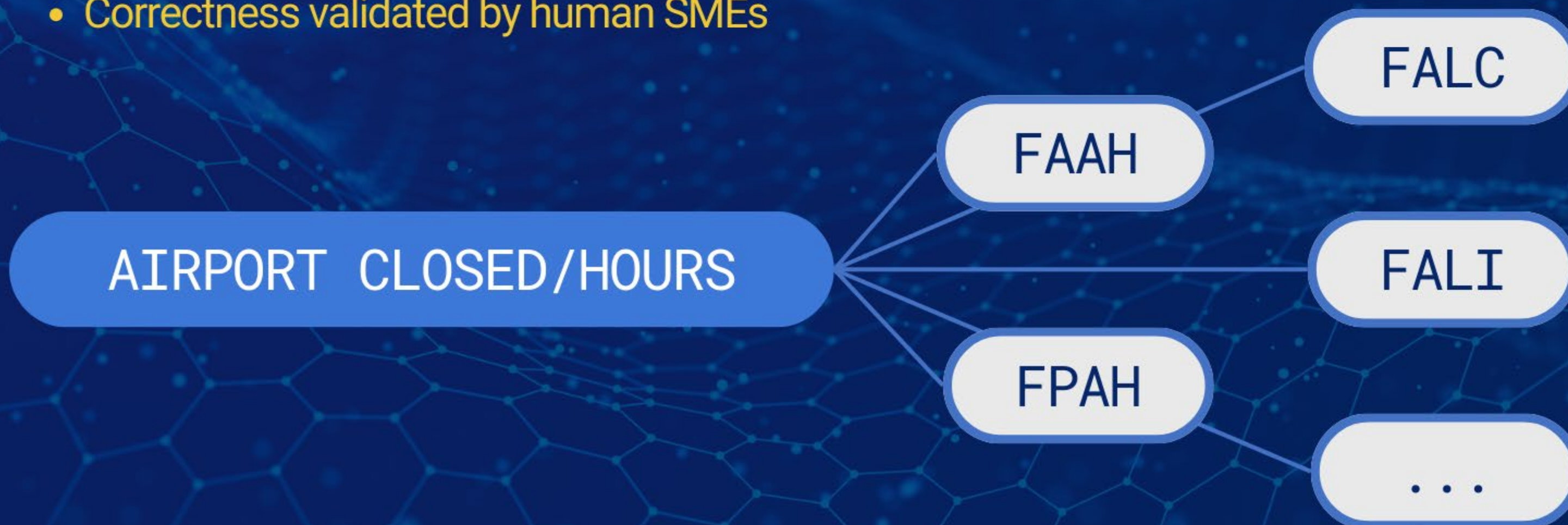
P1	Airport status/hours	Airport Closed, Airport operating hours, AD AP not available
P2	Airport restriction	Not available as alternate, airport slots, PPR required, max aircraft weight, etc.
P3	Fire & Rescue	RFF Category change, Rescue equipment
P4	Fuel	All fuel related NOTAMs, JET, JETA1, Avgas, Hydrants, Tankering
P5	Apron & Parking	Apron, Stands, Gates, Followme, Apron lighting, docking, guidance, limited parking
P6	Airport Facilities	Equipment (GSE, Rwy/Twy equip, WDI etc.), Facilities Pax processing, airport strikes
P7	Airport Procedure	Manoeuvring, Handling, Deboarding, APU usage etc. NABT and noise curfew
P8	WIP & Construction	Work in Progress, WIP, Construction, Building works, digging, men and equipment

AIRPORT

Closed/Hours
Restriction
Fire
Fuel
Apron
Facilities
Procedure
WIP

Part I: From Free Text to Meaningful Tags

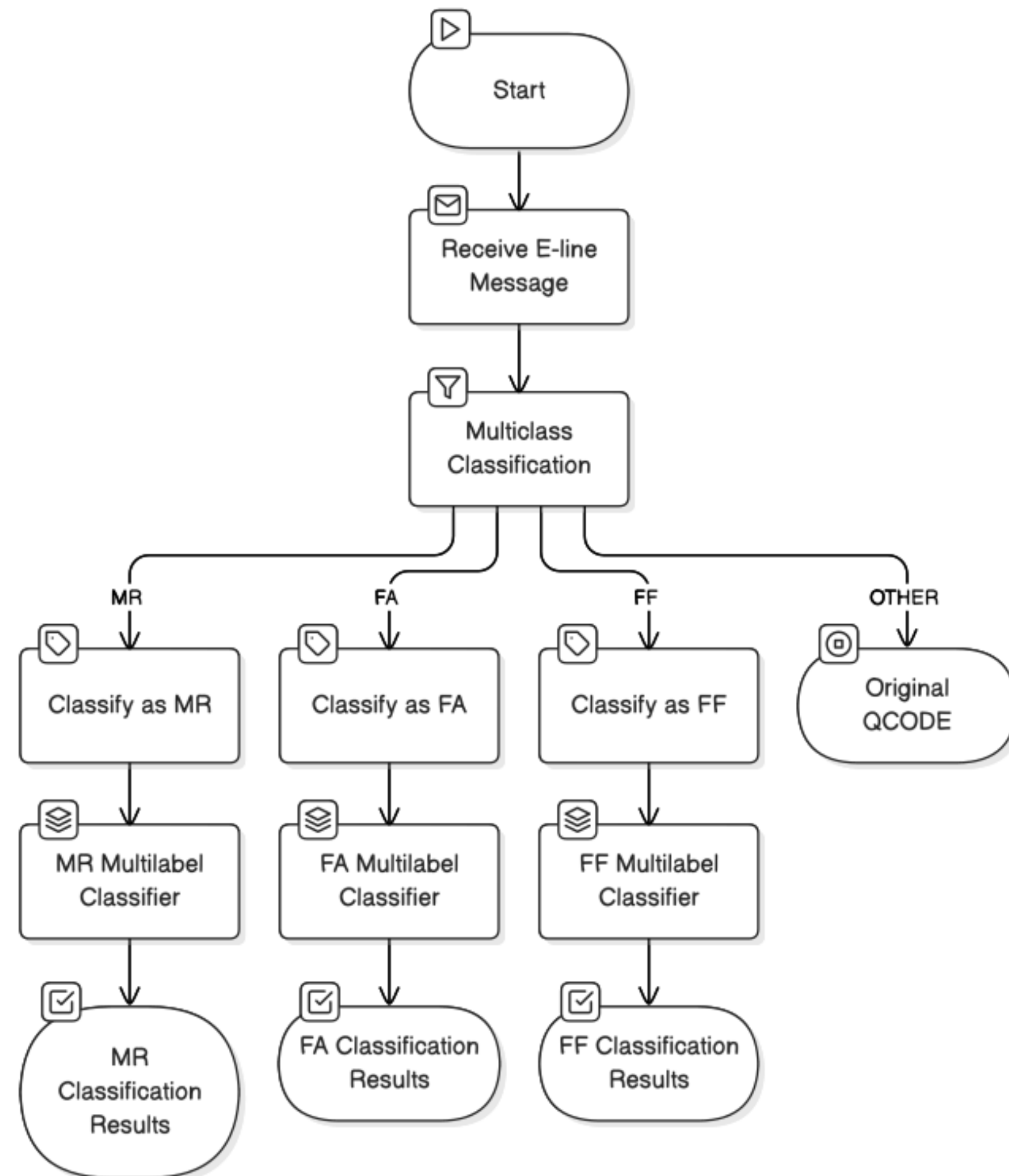
- Used LLMs to **tag** each NOTAM (2022–2024)
- **10× Tagging + Majority Vote = Robust Labels**
- Outcome: Static mapping between Q-code and meaningful tag
- Correctness validated by human SMEs



Part 2: Trustworthy Classifications

- Focused on 3 critical cases:
 - Airport Closure,
 - Runway Closure,
 - Firefighting Downgrade
- Trained a cascade of transformer models to assign alternative Q-codes
 - Step 1: Identify topic (airport, runway, fire)
 - Step 2: Assign correct Q-code within topic

E-line Classification Flowchart





A tool for Ops, Built for Safety

- Service now in production, used daily by Ryanair OPS
- NOTAMs enriched with:
 - Tag
 - Color-coded categorization
- No filtering, just **smart augmentation** for faster human comprehension

14-04-2025 12:40 15-04-2025 06:00 08-05-2025 03:00 NOTAMN A0161/25 NOTAMN

A0161/25 NOTAMN
Q)OJAC/QMRXX/IV/NBO/A/000/999/3143N03600E005
A) OJAI
B) 2504150600 C) 2505080300
E) -DEP FROM RWY 08L PERMITTED ONLY FOR ACFT CODE C AND BLW WITH WINGSPAN 36M OR LESS.
-LDG ON RWY 26R PERMITTED ONLY FOR ACFT CODE C AND BLW WITH WINGSPAN 36M OR LESS.
-IN EVENT OF REJECTED TKOF ON RWY 26R, ACFT CODE D, E OR F WITH WINGSPAN GREATER THAN 36M SHALL VACATE RWY VIA RWY END, TAXI VIA TWY H TO RE-ENTER RWY 26R VIA TWY M, THEN EXIT RWY VIA TWY L UNDER FLW-ME GUIDANCE.

>	ARN	MR	LC	Runway	CLOSED
>	BEG	MR	LT	Runway	CLOSED
>	BES	MR	LT	Runway	CLOSED
>	BFI	MR	LC	Runway	CLOSED
>	BFI	MR	LC	Runway	CLOSED
>	BFI	MR	LC	Runway	CLOSED
>	BFI	MR	LC	Runway	CLOSED
>	BFI	MR	LC	Runway	CLOSED
>	BFI	MR	LC	Runway	CLOSED
>	BFI	MR	LC	Runway	CLOSED
>	BFI	MR	LC	Runway	CLOSED
>	BFI	MR	LC	Runway	CLOSED

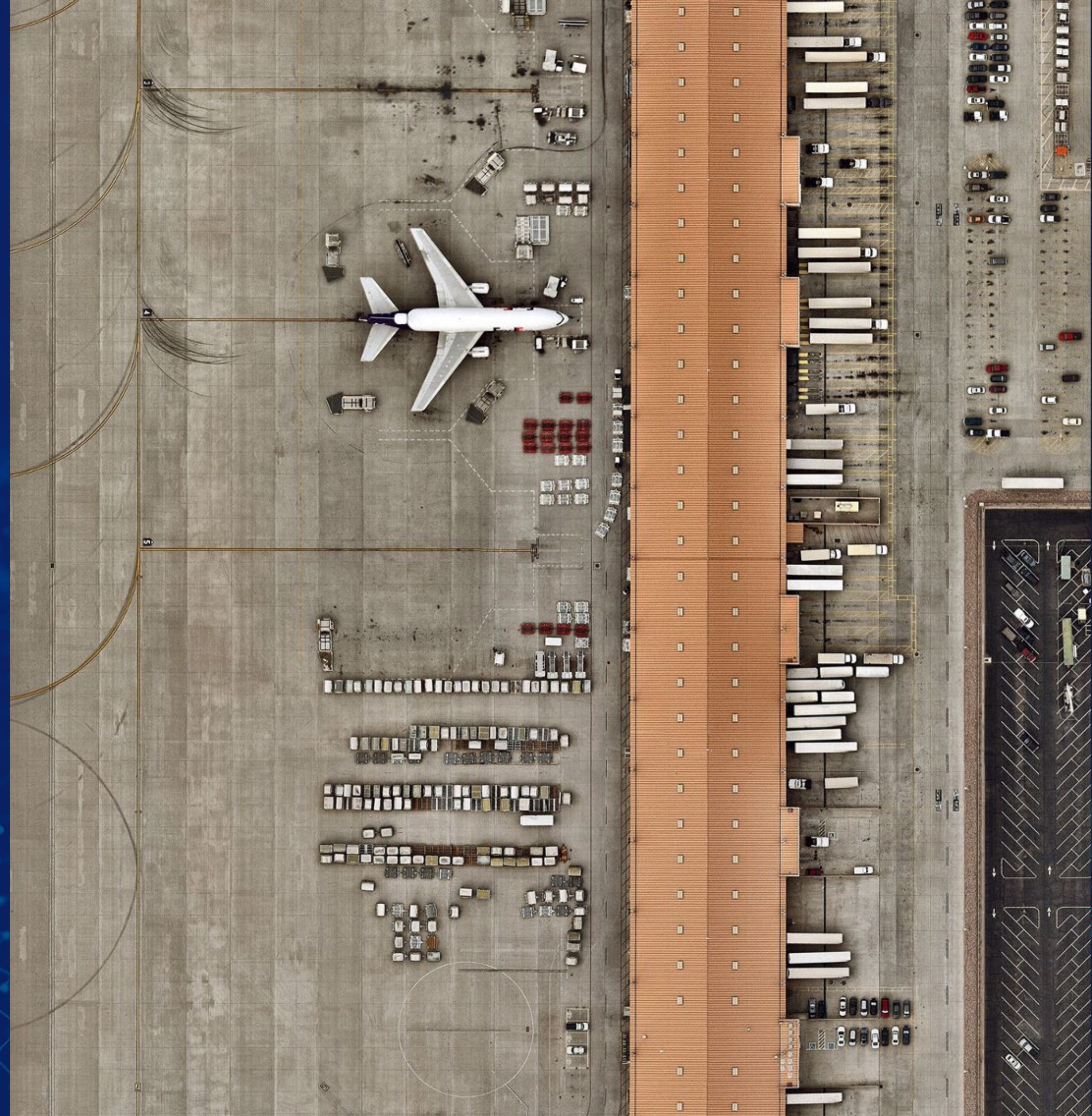


>	LUL	SE	AU	ATC	HOURS
>	LPP	ST	AH	ATC	HOURS
>	MBX	ST	AH	ATC	HOURS
>	NRK	ST	AH	ATC	HOURS
>	ORB	ST	AH	ATC	HOURS
>	POR	ST	AH	ATC	HOURS
>	POR	ST	AH	ATC	HOURS
>	SZY	SF	AH	ATC	HOURS
>	SZY	SF	AH	ATC	HOURS
>	TRN	ST	XX	ATC	HOURS
>	TUF	SF	AH	ATC	HOURS
>	VST	ST	AH	ATC	HOURS
>	XCR	SF	AU	ATC	HOURS
>	EFL	ST	LT	ATC	RADIO
>	ZAZ	ST	LT	ATC	RADIO
>	Airport (190)				
>	Approach (7)				
>	BIQ	PU	CH	Approach	CHANGE
>	HAJ	PU	CH	Approach	CHANGE
>	LEJ	PU	CH	Approach	CHANGE
>	LEJ	PU	CH	Approach	CHANGE
>	PSA	PU	CH	Approach	CHANGE
>	STR	PU	CH	Approach	CHANGE
>	PAD	PD	CH	Approach	DEPARTURE
>	Hazards (105)				
>	Library (11)				



Key Takeaways

- **Problem:** Information overload from legacy NOTAM system
- **Solution:** Tagging with Gen AI + reclassification with classic ML
- **Benefit:**
 - Enhanced human comprehension
 - Zero safety compromise
- **Outcome:** Operational AI system in use at Ryanair's operations control center today





Thank you!

If you're interested in the project or want to exchange ideas,
feel free to reach out.

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For more info, visit ryanair.com.