SUPPORTING EUROPEAN AVIATION

Reactionary Delay and AOP-NOP integration

ATFM Tools to balance demand with capacity

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Co-funded by the European Union

CONSORTIUM COORDINATOR sesar DEPLOYMENT MANAGER

FOUNDING MEMBER sesar JOINT UNDERTAKING

NETWORK MANAGER

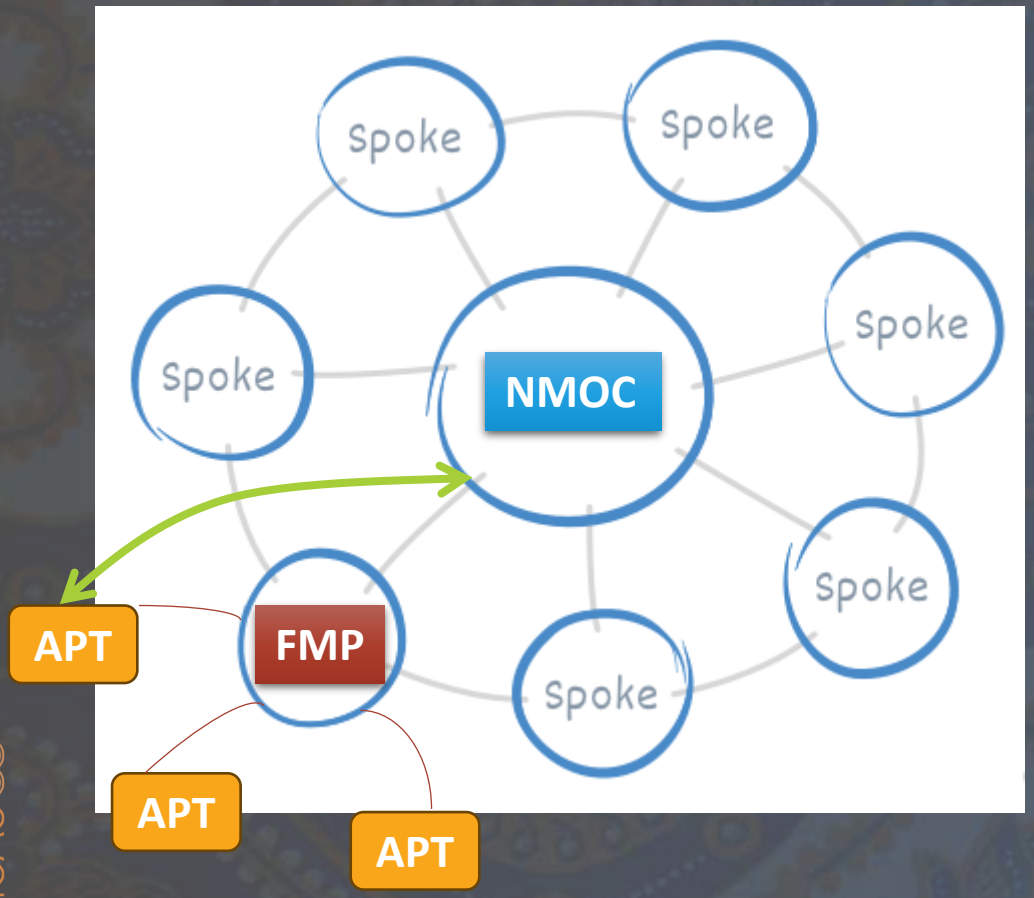
Airport – Network connectivity

Connected airports

- **Provide per flight information to ETFMS (Enhanced Tactical Flow Management System) via DPI and API messages**

- **ETFMS provides enhanced tactical data to all operational stakeholders.**
- **ETFMS has two main functions:**
  - Calculation of traffic demand in every sector of the NM area of operations, using information received from AO, Airports and ANSPs.
  - Computer-assisted slot allocation (CASA), calculation, slot allocation and distribution of resulting lists to all parties involved.

Airport – Network connectivity



Integration of Airports with the ATM Network

- Data exchange

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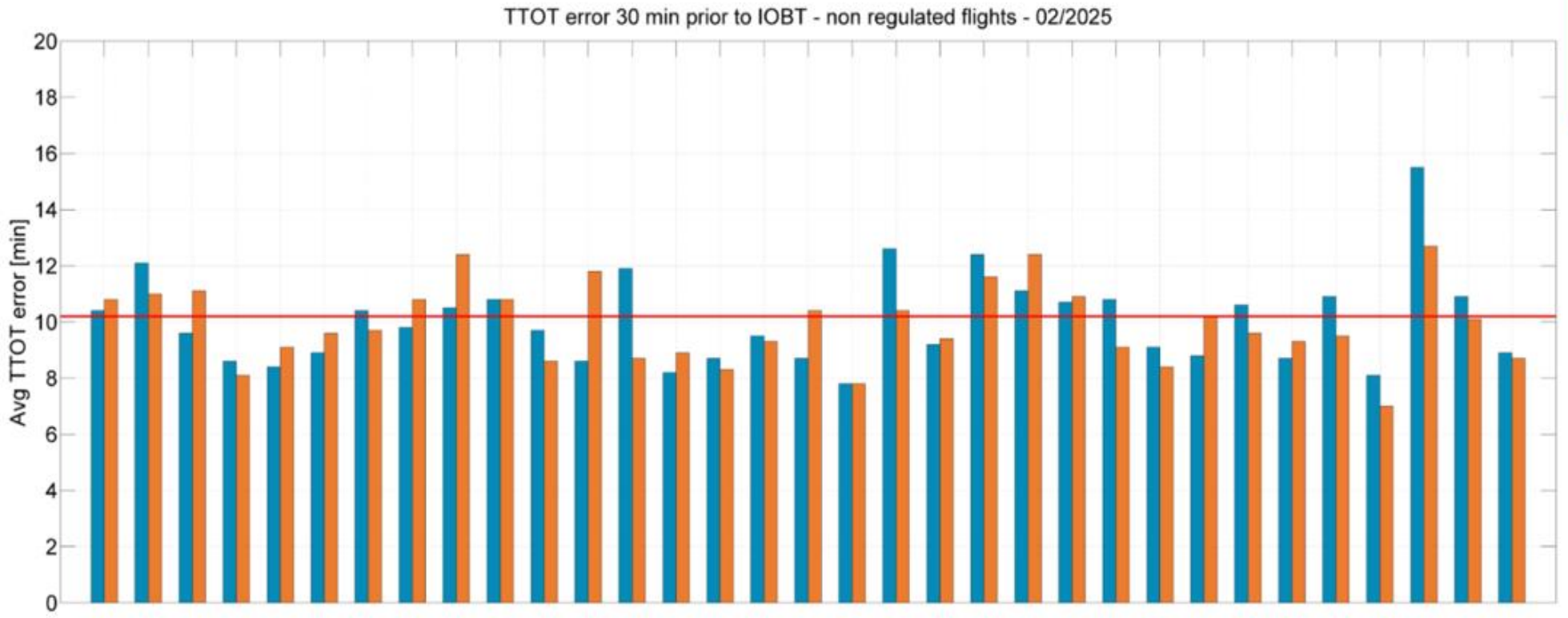
- Supporting processes

A-CDM Airports TTOT Monitoring



TTOT ERROR 02/2025

2025 vs. 2024 per airport

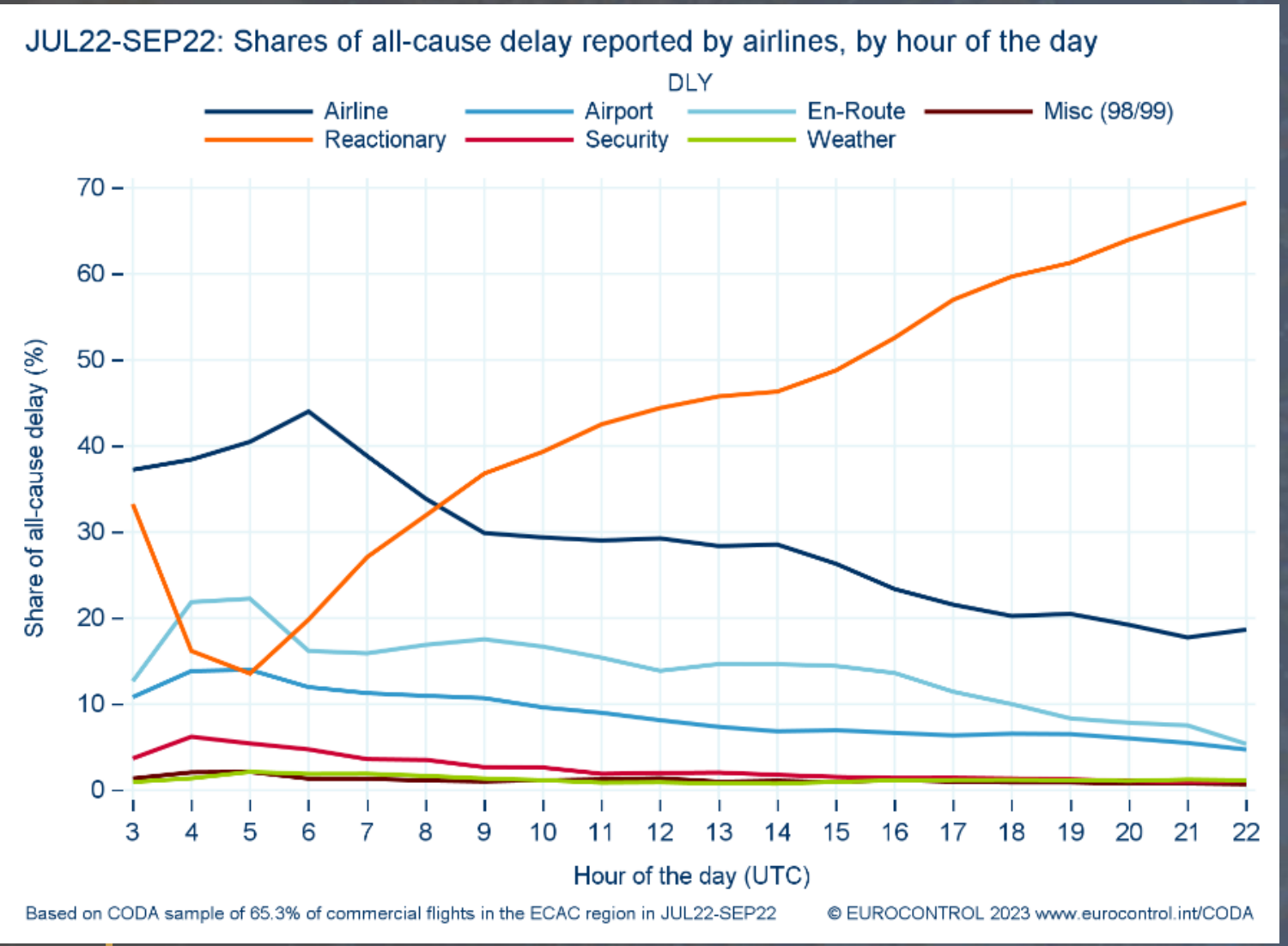
Explanation of graph:

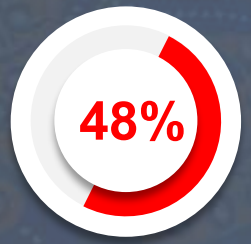
- Airport 2025
- Airport 2024
- Network 2025
- Network 2024

Reactionary **DELAYS**

A driver for **poor** demand predictability

Reactionary delays





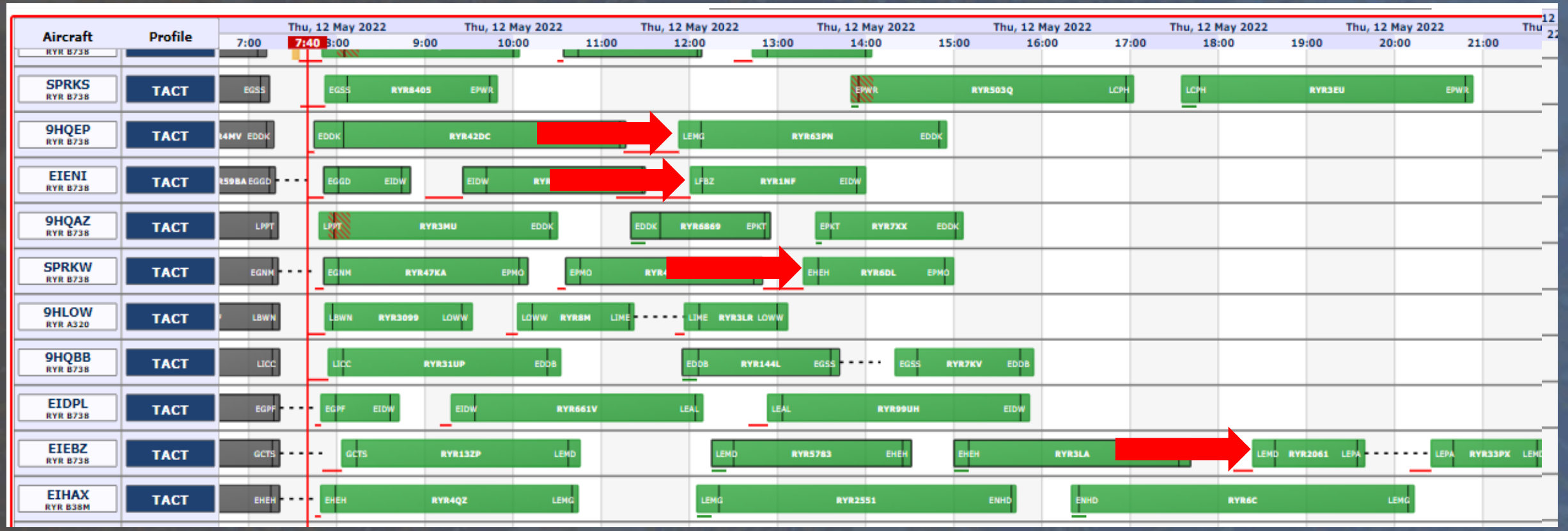
Reactionary delays

48% of all delays in the European Network was caused by knock-on delay (Summer 2022)*

How we translate this into traffic predictability?

*Source: airline data provided to EUROCONTROL

Impact of reactionary delay in traffic predictions (iDemand Model)



What is the AOP/NOP Integration and ANI airports?

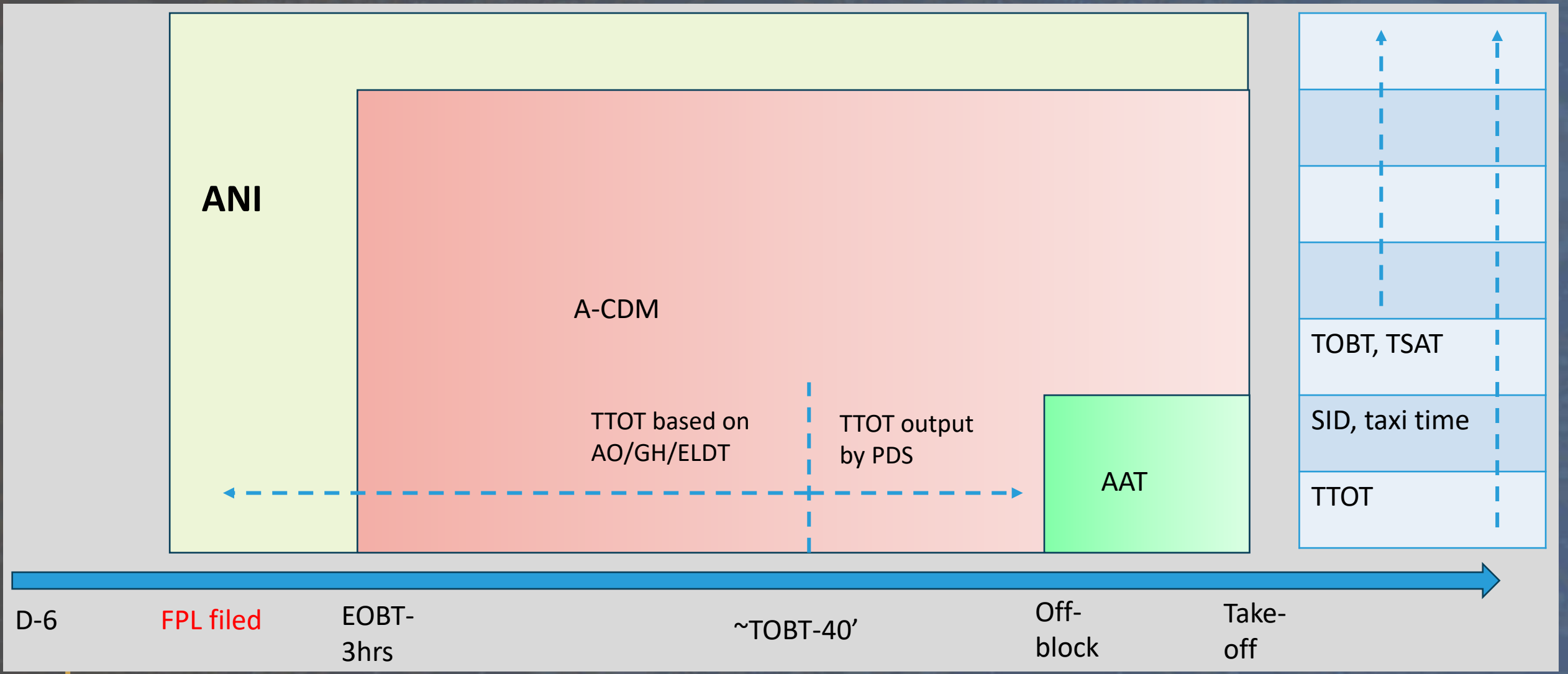
- **Strategic project for higher integration than A-CDM between Airports and NM via the Airport Operations Plan (AOP) and the Network Operations Plan (NOP). It is mandated by the European Commission CP1 regulation.**

- **It is divided in two phases:**
  - Initial AOP/NOP integration for 19 airports by end of 2023
  - Full AOP/NOP integration for 31 airports by end of 2027

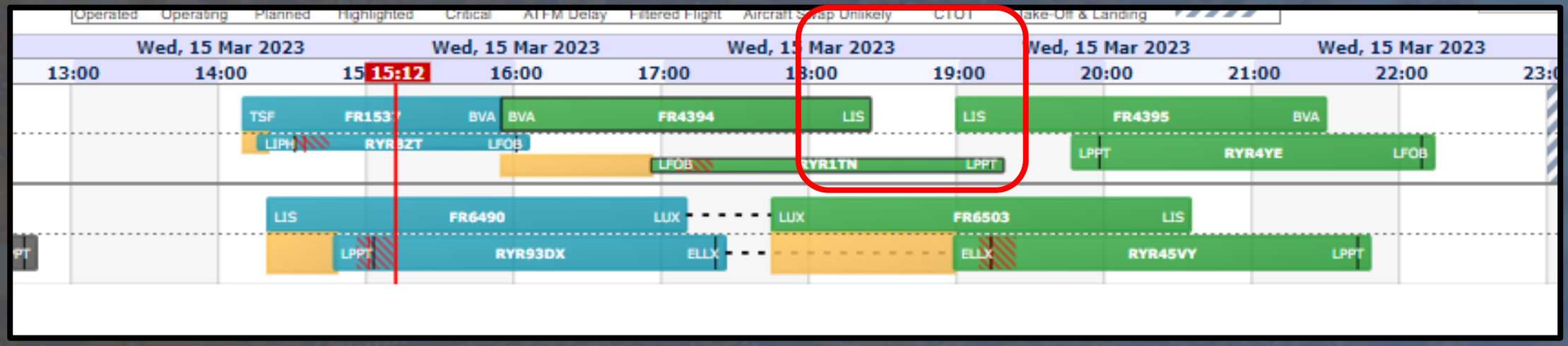
- **Airports in the AOP/NOP programme are called Advanced Network Integrated (ANI) Airports.**

Commission Implementing Regulation (EU) 2021/116

Airport – Network connectivity iAOP-NOP
DPI + API messages



TurnaroundTTOT benefits with inbound-outbound linking

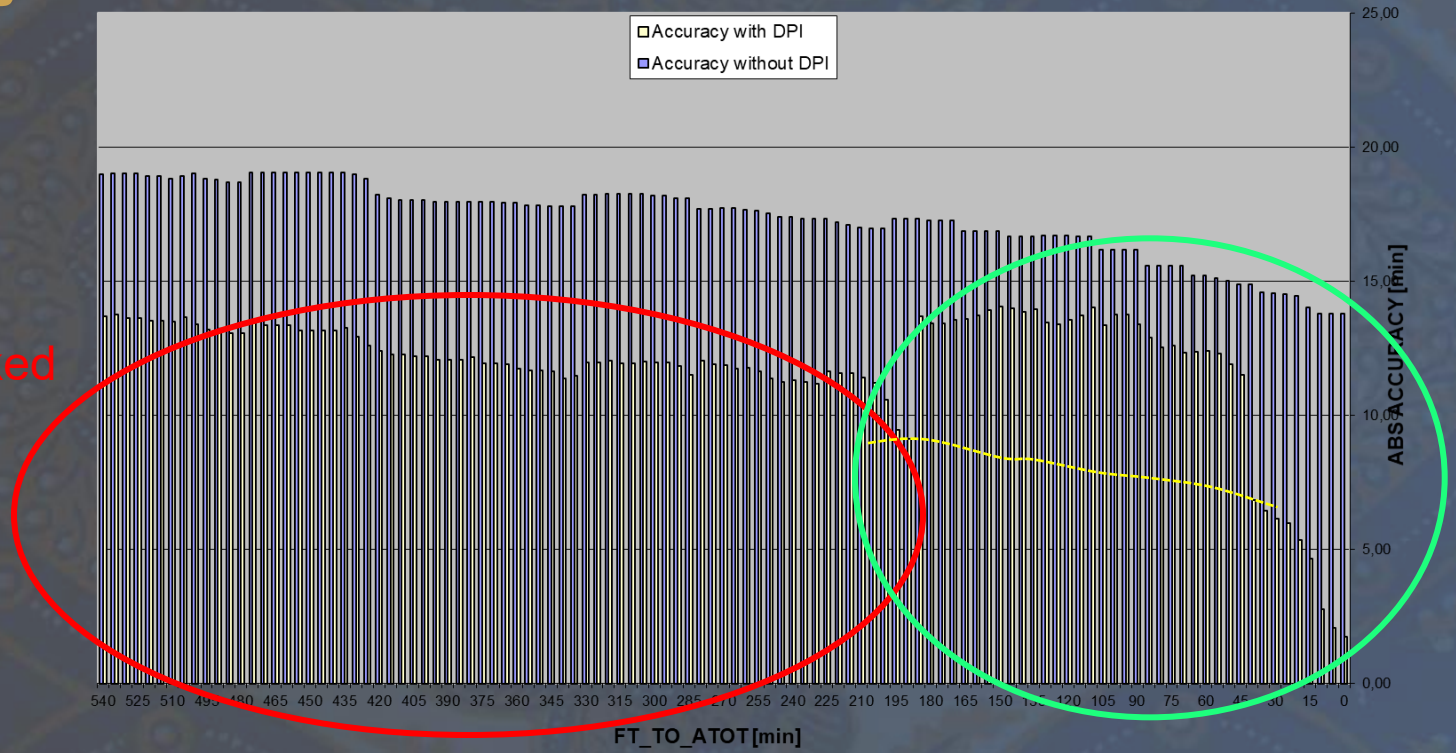


RYR Flight FR4394 to Lisbon is late due to ATFM delay, turnaroundTTOT (sent with P-DPI in this case) provides a good estimation of the TTOT compared to the FPL information currently available.

Impact of inbound-outbound linking in Network predictability

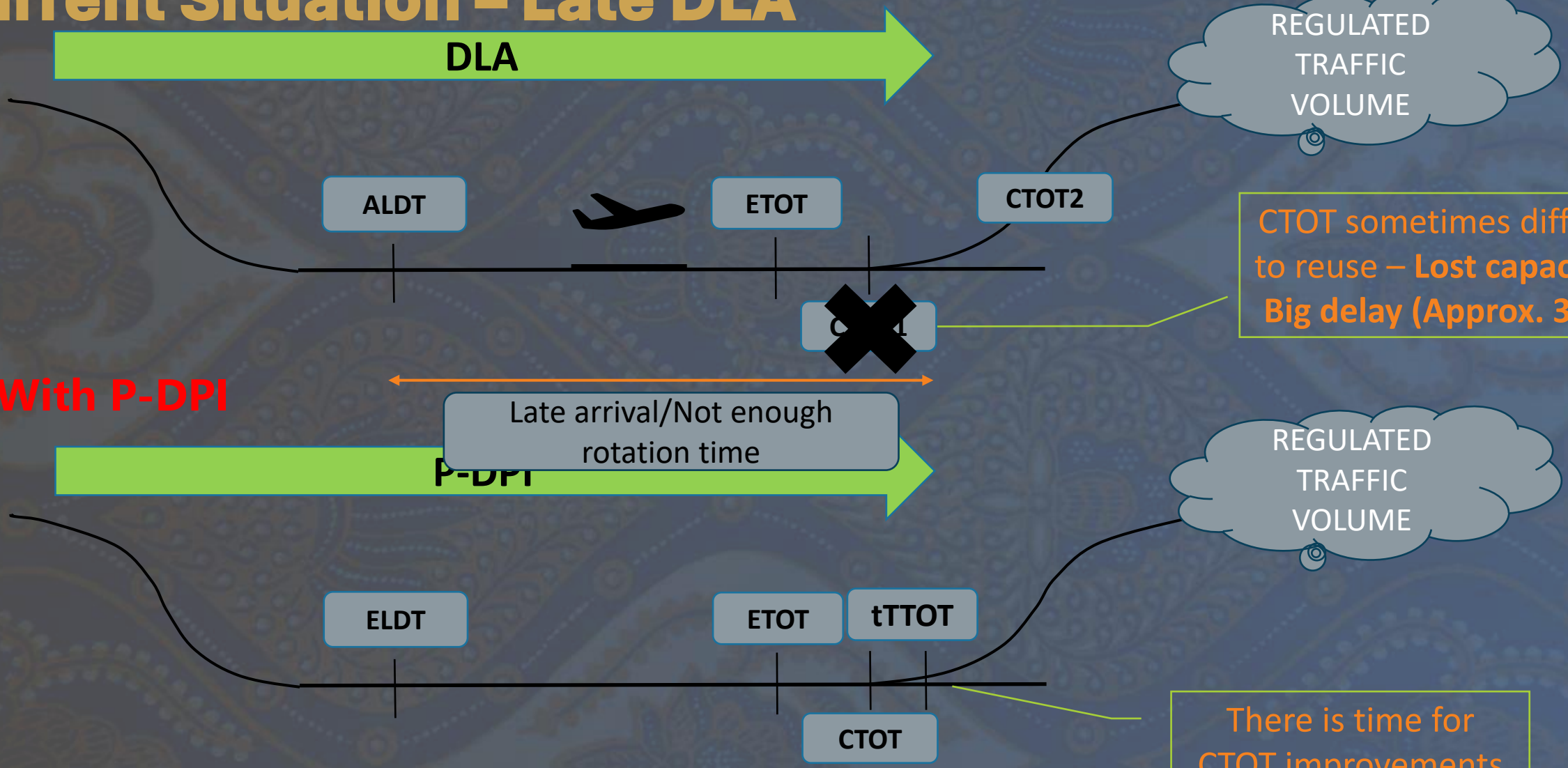
- **Plot shows the difference between ATOT and TTOT up to 9 hours before flights take-off. The lower the bar, the more accurate the information is.**
- **In yellow the information from DPI messages, in blue information from Flight Plans only.**

Inbound-outbound linked

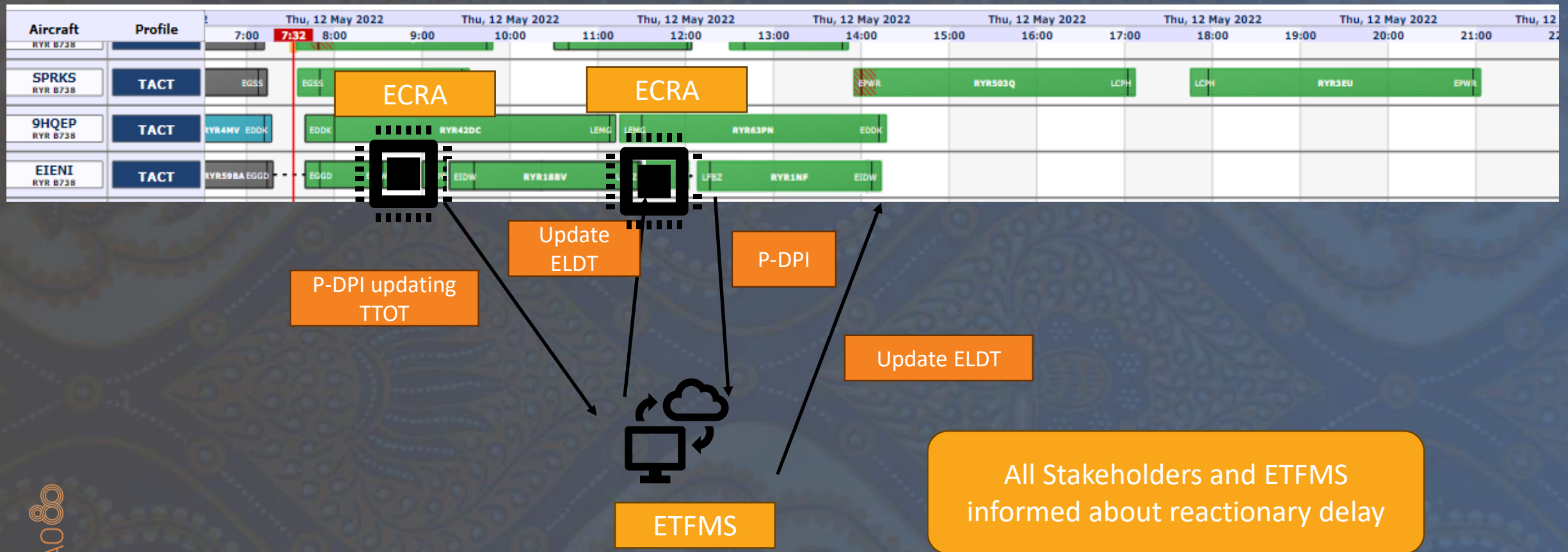


No changes to A-CDM yet

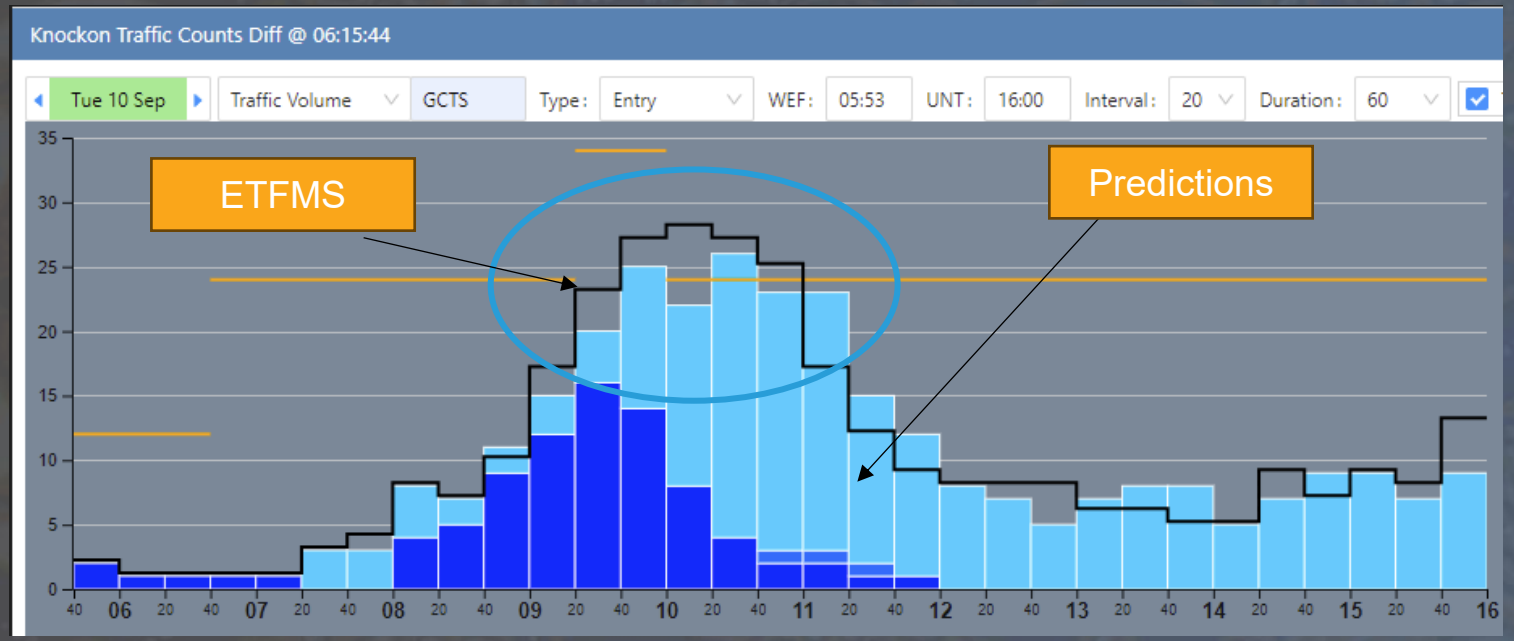
Short Available Turnaround Time
Current Situation – Late DLA



ECRA (ECTL application for the connection of Regional Airports to ETFMS)



10/09/2024 at 06:15 GCTS



Example: I can open a new position (CLD) in the TWR for only 80 minutes. When should I do it? May I really regulate or not?

A precise demand is key to know

- How many controllers are needed to balance demand vs capacity.
- When do I have to open and close positions.
- To apply ATFCM measures (regulations, etc)

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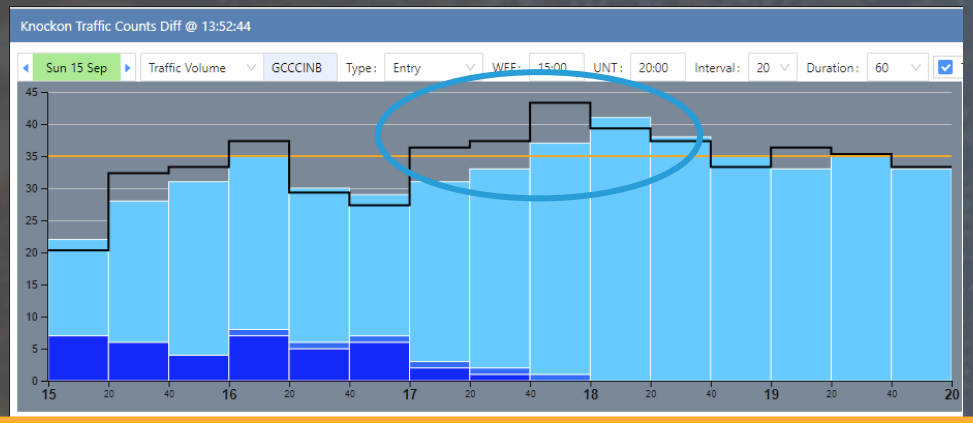
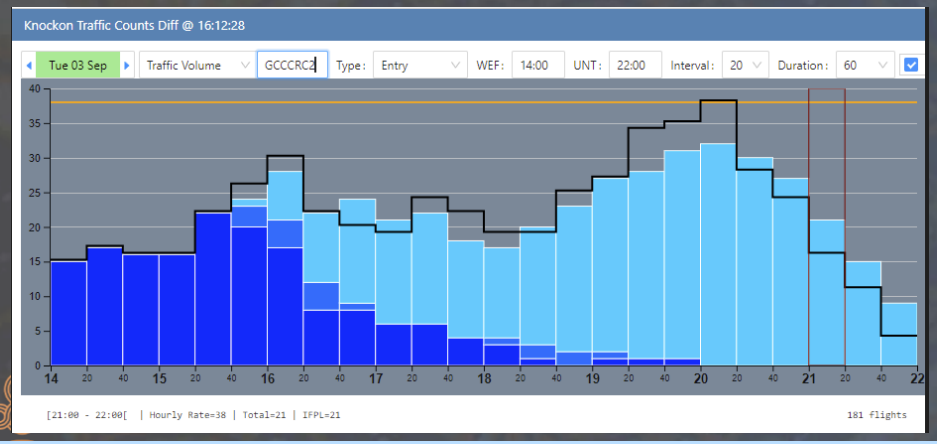
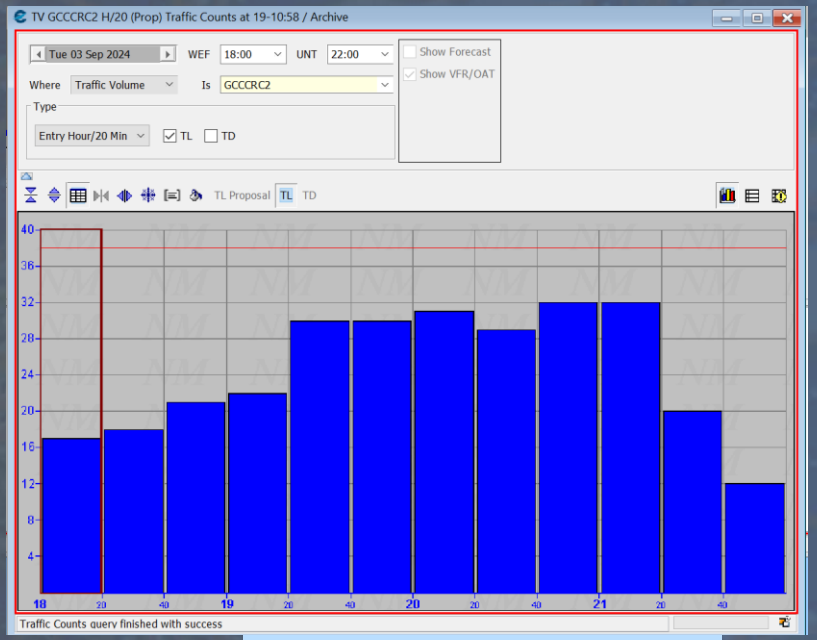
Other two cases: No need to split sectors → Better user of resources



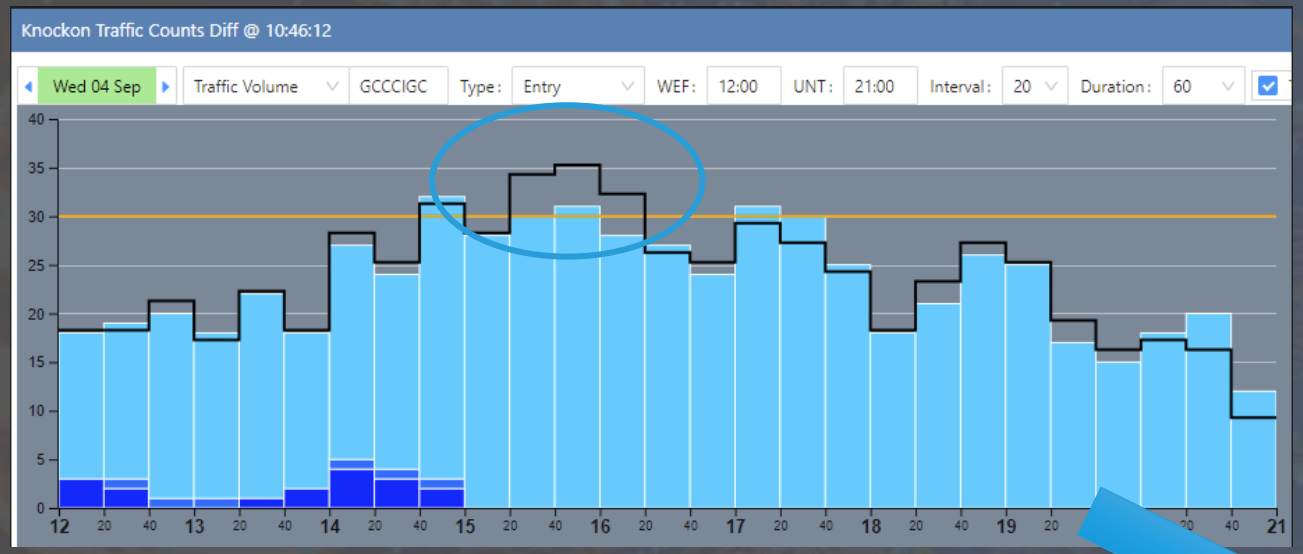


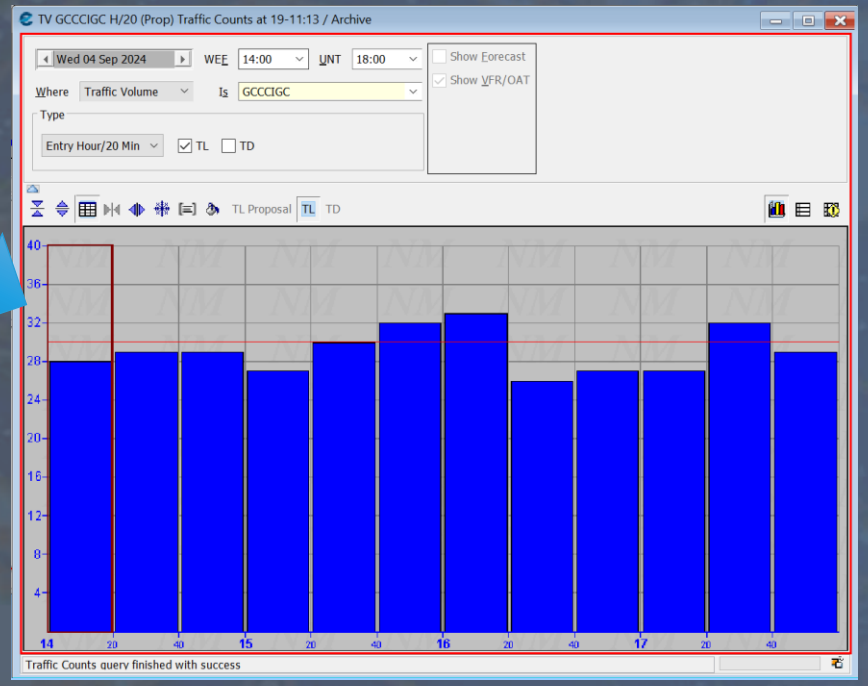


The CHMI show almost i need to split the sector, but the expected behaviour (knock on delay) is very far from this.

Final picture

Two more cases: ATFM Regulations avoided





iAOP-NOP Integration

Airports completed

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- ✓ Nice
- ✓ Lisbon
- ✓ Vienna
- ✓ Madrid
- ✓ Rome Fiumicino
- ✓ Paris CDG
- ✓ Paris Orly
- ✓ Frankfurt
- ✓ Heathrow
- ✓ Milan Malpensa
- ✓ Copenhagen

Airports planned for 2025

7

- ⏳ Amsterdam
- ⏳ Barcelona (before July)
- ⏳ Berlin (before July)
- ⏳ Brussels (before July)
- ⏳ Dusseldorf
- ⏳ Munich
- ⏳ Palma de Mallorca

Airports planned for 2026 or later

3

- ⏳ Dublin *(dependency on A-CDM)*
- ⏳ Stockholm *(dependency on A-CDM)*
- ⏳ Zurich *(planning TBC)*

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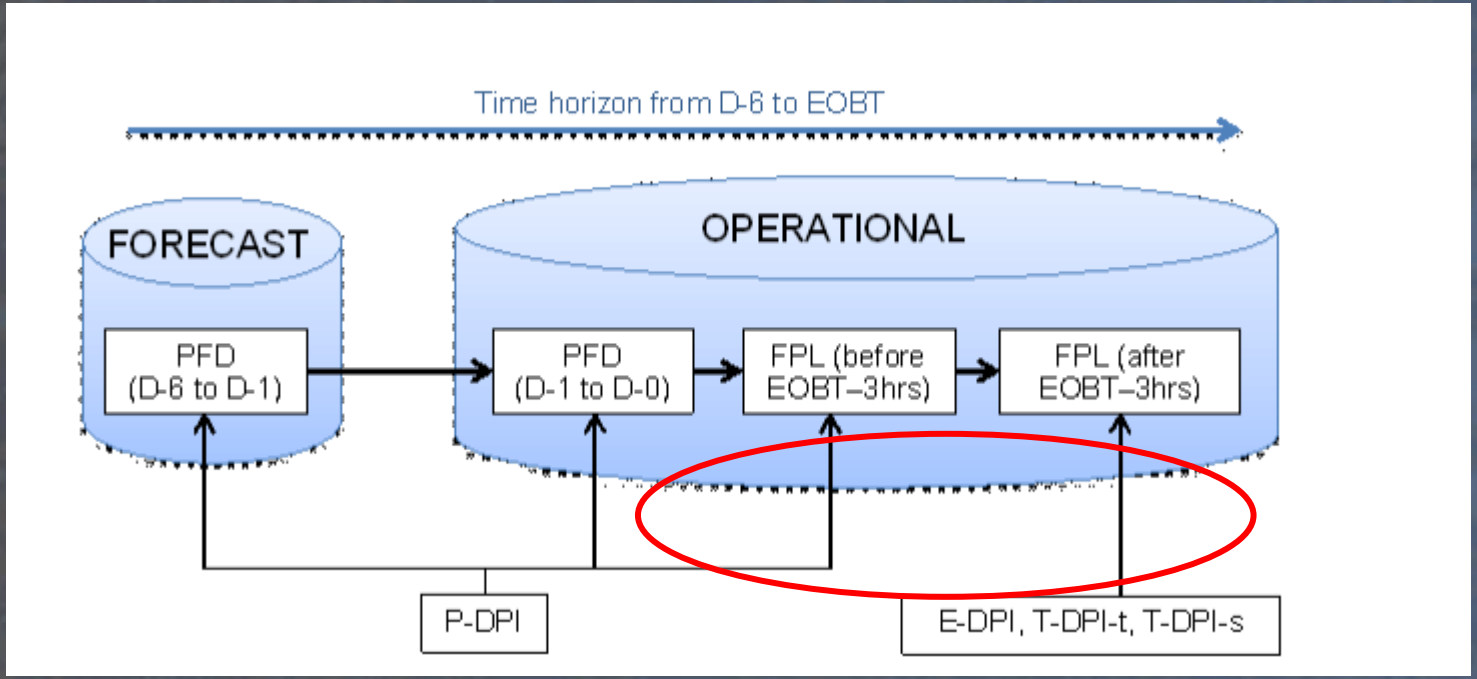
For the future: extended AOP-NOP Integration



For the extended AOP-NOP integration (eAOP-NOP), the goal is to enhance the **PREDICTABILITY**, having a 1-1 mapping with the traffic demand of airport systems

eAOP-NOP Integration - data from AOP to NOP

- **Flight schedule alignment**
  - The aim is to get rid of FPL constraints in NM systems and receive from Airports AODB the scheduled flight data (IATA format, including cancellations from airlines), several days in advance via P-DPI; allowing NM systems to have the same view on traffic as the Airports have.
- **Curfew**
  - NM systems want to put in place a harmonized databases of curfews and give possibility to airports to indicate to NM systems if aircraft are exempted from curfew.
- **Regulations**
  - More option for Airports (together with FMPs) to enable cherry pick regulations for local disruptions
- **Automated integration with Airport Corner**
  - Feed of events and other information directly from AOP
  - Curfew database

eAOP-NOP Integration - data from NOP to AOP

- **Alerting service**
  - NM developed several tools to support Stakeholders in recent years (e.g. MIRROR, Regulation prediction, AF dashboard,..).
  - There was a clear need from Stakeholders to have alerting systems in place for their AOP rather than keeping those tools monitored on screen by Staff.

- **NM predictions based on ML models**
  - Stakeholders want to have an accessible and harmonized way to use those predictions (e.g. via NM B2B services)

Airport – Network connectivity

Advanced Network Integrated airport - Summary

- **iAOP-NOP Airports provide information to Network Manager starting from when the FPL is filed (builds on A-CDM) , eAOP-NOP Airports from D-6.**

- **All DPI message types**
  - Network has better predictability from D-6 (or FPL filing) to take-off.
  - Reactionary delay is included by linking inbound and outbound flights.
  - Enables optimisation of resources locally, including in the pre-tactical phase

Departure Planning Information (DPI) implementation guide | EUROCONTROL

- **+ Arrival Planning Information (G-API)**

Arrival Planning Information (API) implementation guide | EUROCONTROL

Thank you

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