SUPPORTING EUROPEAN AVIATION

What is A-CDM

Airport-Collaborative Decision Making

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Co-funded by the European Union

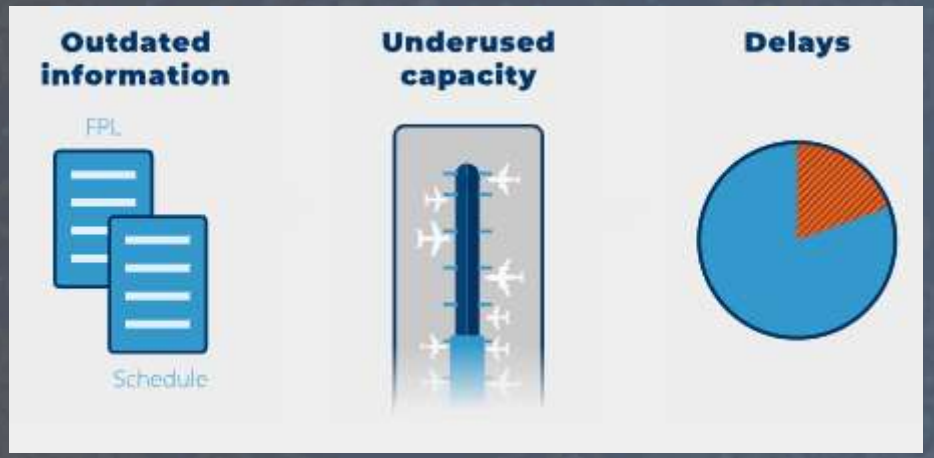
CONSORTIUM COORDINATOR sesar DEPLOYMENT MANAGER

FOUNDING MEMBER sesar JOINT UNDERTAKING

NETWORK MANAGER

Airport Challenges

Airports have **limited opportunity to expand infrastructure** so improvements in airport throughput have to come from **operational optimisations**. In non A-CDM airports, one such optimisation is to improve the **timely sharing of accurate information**.



At non A-CDM airports, operational decisions are often based on aircraft operators' **published schedules**, which are developed months prior to the day of operation, or their **flight plans**, which are submitted around three hours prior to departure. Both sources are often **not updated and shared** to reflect the current operational status.

Operational planning based on such information creates **inefficiencies** across the network, **underutilises airport capacity** and generates **delays**.

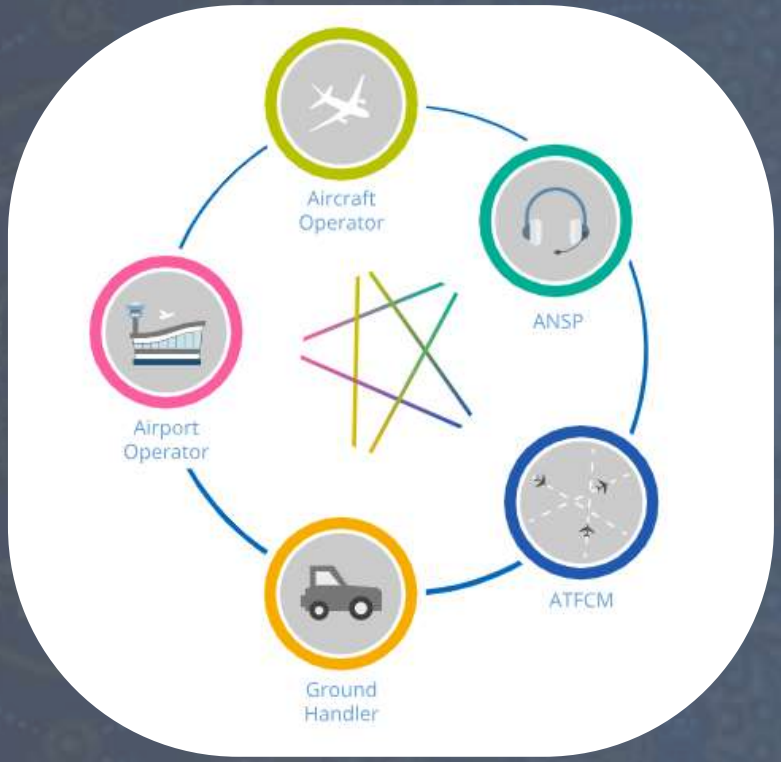
A-CDM is a solution

To address the challenges and issues that arise from ineffective data and information exchange between airports and airspace operations, **Airport Collaborative Decision Making (A-CDM)** has been developed. A-CDM caters for both **normal** and **disrupted** operations with the aim of increasing the efficiency of airport operations and **improving the performance** of the overall ATM network, by:

Another advantage of improving the efficiency of the operation is that aircraft spend **less time taxiing and standing** with engines running in queues for departure. This is good for the environment as less fuel is burnt.

Airport Partners

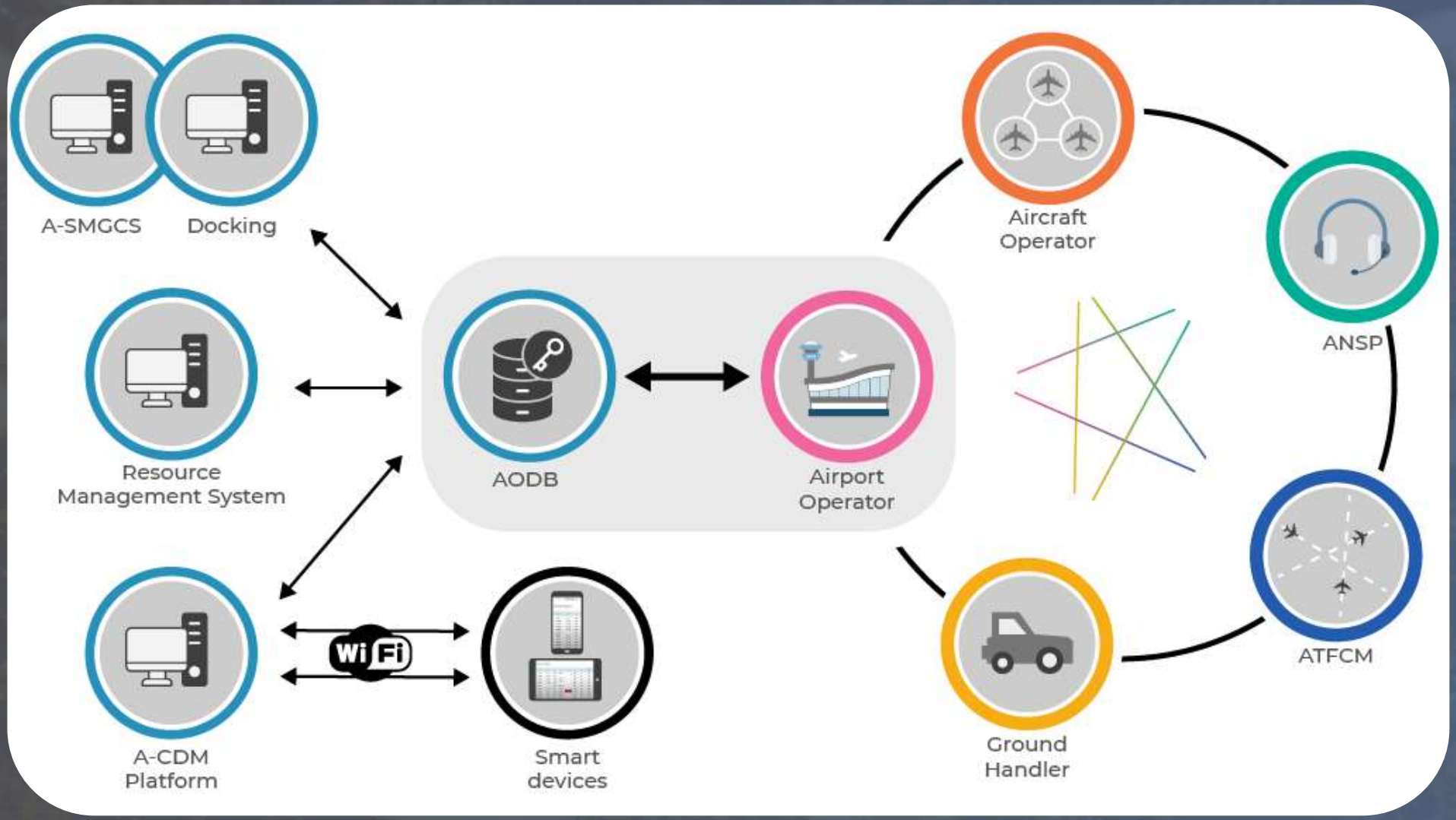
To enable A-CDM to function, the following airport **partners** must be on board:



To bring all the operational benefits stemming from A-CDM implementation, a collaboration between the airport partners and the **entities providing the ATFCM service** should be established.

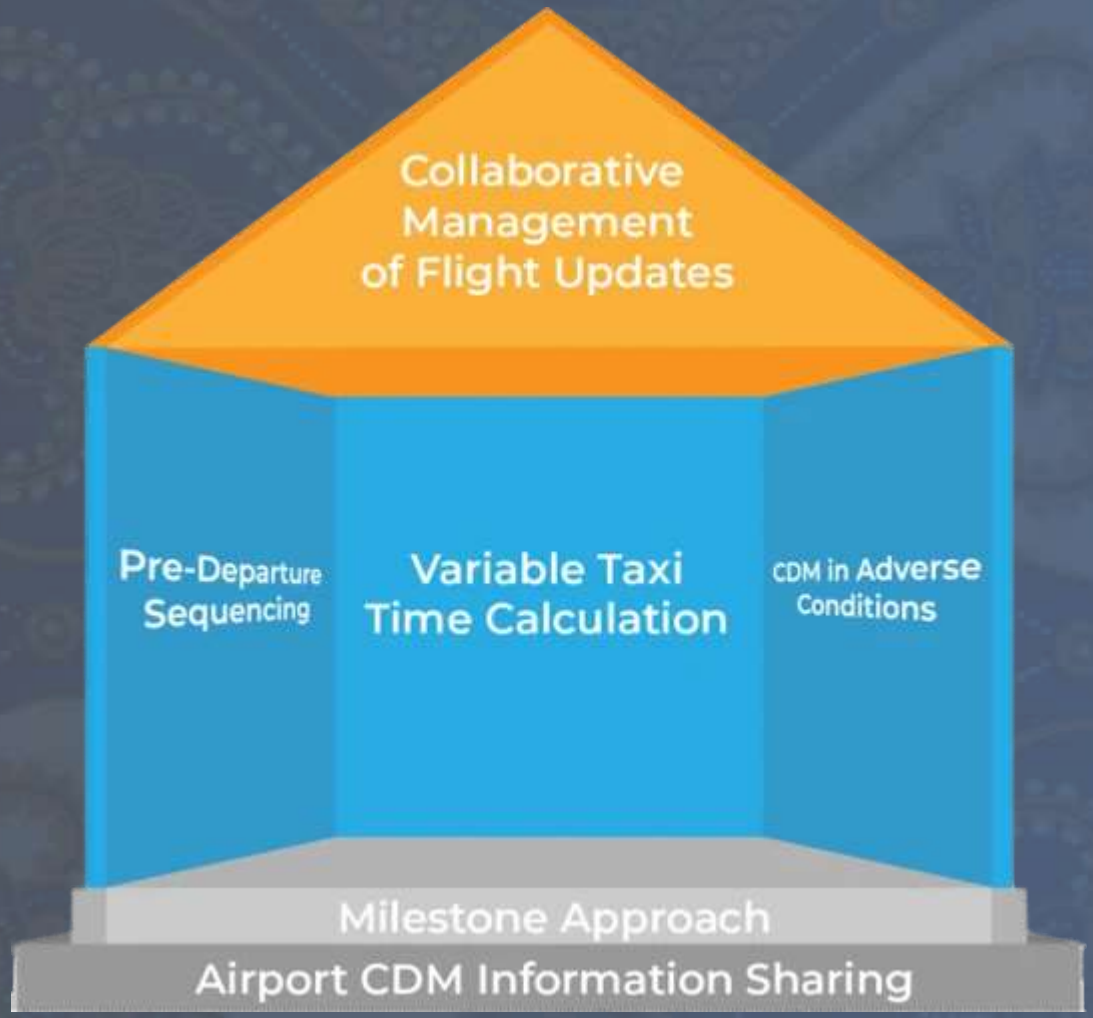
In the European airspace, EUROCONTROL **NMOC** provides the full ATFCM service to all ECAC Member States and works with **ANSPs** to collect A-CDM data, in order to perform multiple functions associated with **en-route and sectoral planning**.

Airport Information System



Elements of A-CDM

The following are the main elements that are needed to achieve operational efficiency.



Elements of A-CDM – Information Sharing

- Information Sharing is the first A-CDM foundational and is the key work culture challenge in your environment. It requires the airport stakeholders to adopt a completely new way of thinking and acting in their daily work. It concentrates on improving the quality and consistency of the information shared with operational stakeholders to support key airside processes.
- The information sharing element supports local decision making for each individual A-CDM partner and is therefore considered to be the most important function of the A-CDM solution. Information sharing aims to support the following airside processes:

Inbound processes

- Aircraft approach (descent, arrival sequencing, approach and landing)
- Taxi to stand
- Arrival on stand

Turn-round processes

- Ramp services (towing, stairs/air-bridge, baggage/air-cargo, fuel, ground power, water and drainage, etc.)
- Passenger on-boarding
- Catering

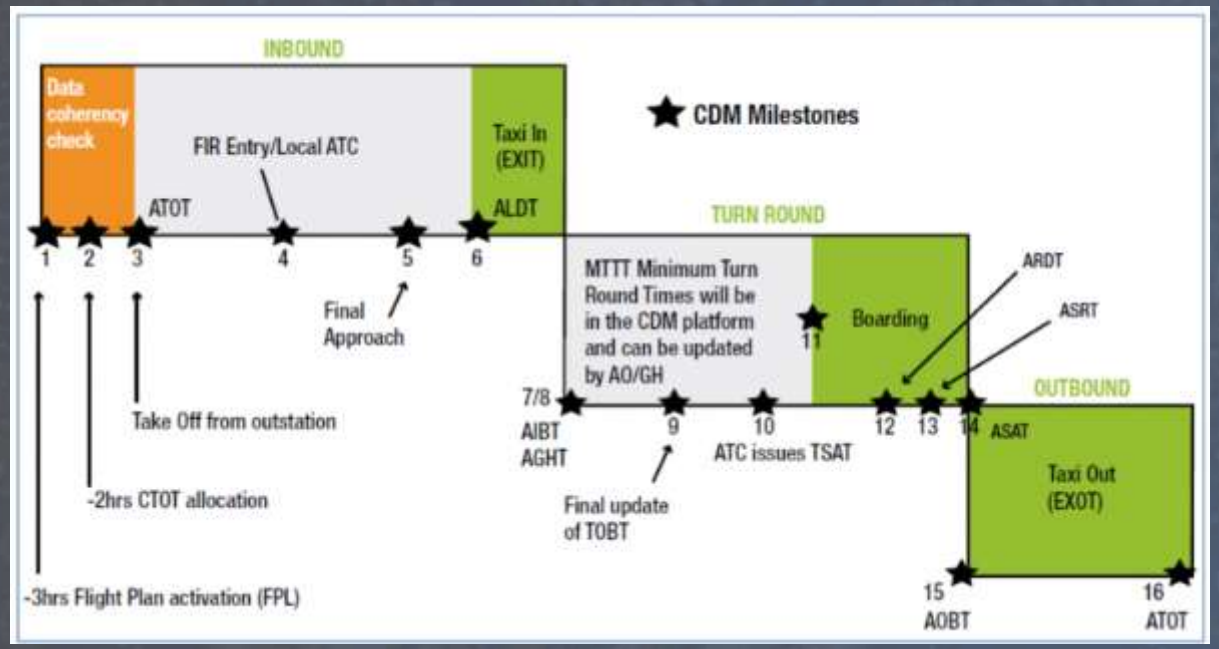
Outbound processes

- Departure planning
- Push back
- Taxi to runway
- Take-off

The information shared with partners has to be **adequate, timely** and be communicated using consistent and **uniform** language.

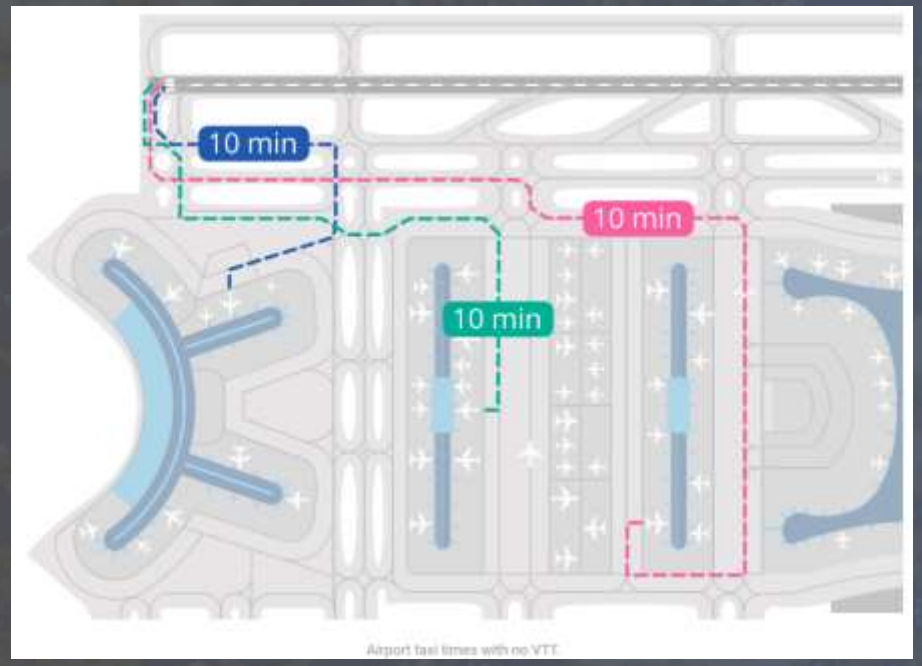
Elements of A-CDM – Milestone Approach

- Once A-CDM Information Sharing has been implemented, further improvements can be achieved by implementing the second foundational element called the Milestone Approach for the Turn-round Process.
- For this element, the progress of a flight is tracked in the A-CDM platform by a continuous sequence of events, known as milestones, with rules for updating downstream information and a defined target accuracy for the estimates. To ensure a level of consistency across the network, a common milestone process that corresponds to significant events across each of the airside processes has been established.

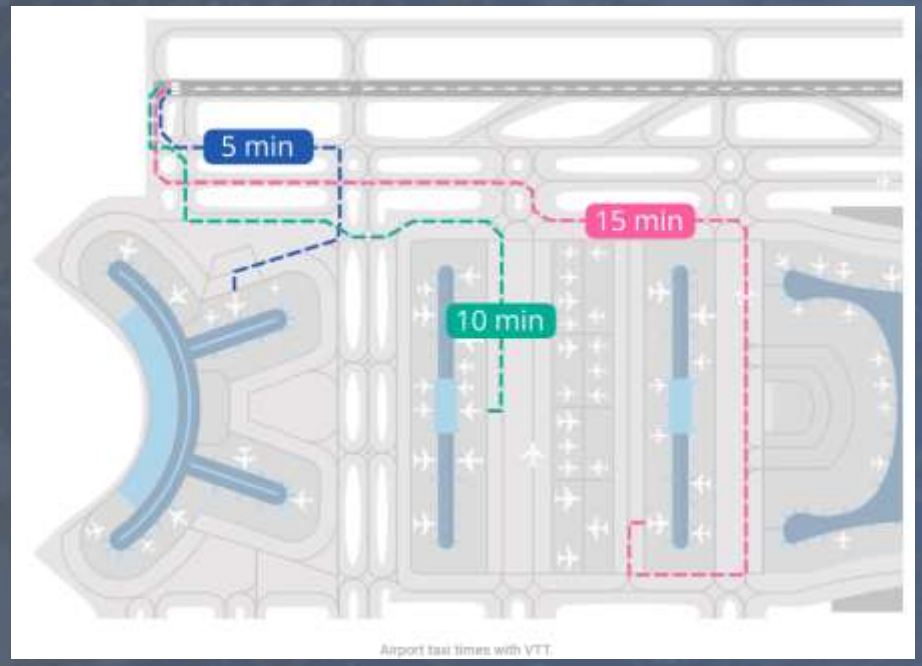


Elements of A-CDM – Variable Taxi Time

- The Variable Taxi Time element (VTT) introduces more accurate taxi times compared to the default taxi times applied today in most non-CDM airports. VTT is calculated for both arriving and departing aircraft.
- At complex airports the layout of runways and parking stands can result in large differences in taxi times. Instead of using a standard default value, a calculation of the different permutations based upon historic data, operational experience and/or an integrated tool will provide a set of more realistic individual taxi times.



Airport taxi times with no VTT



Airport taxi times with VTT

Elements of A-CDM – Pre-Departure Sequencer

- At non-CDM airports, ATC focuses on serving the aircraft that is first to report ready. This is the "first come first served" principle. At CDM airports, this principle is replaced with the "best planned, best served" principle. By planning the PDS early, all partners have access to the same view of planned departure times and their push back order.
- This will ensure that the number of queuing aircraft at the runway holding points is reduced. Ultimately, with a shorter runway queue, adherence to CTOT can be improved. In addition, reliable off-block information increases stand management planning quality.

TOBT

- This time is considered one of the key A-CDM time events as it serves as the basis for the PDS calculation.
- **The TOBT refers to the time when the aircraft operator or ground handler expect an aircraft to be ready for push-back**.
- The TOBT can be generated automatically, and it is updated every time there is a change in the expected ready-time.

TSAT

- The **TSAT refers to the time when the aircraft operator can request engine start up from ATC**.
- The issuance of the TSAT is the responsibility of ATC and takes into account the TOBT/EOBT.
- In general, the TSAT is derived from the TTOT estimate and gives each departing aircraft a place in the off-block queue.

TTOT

- The **TTOT is a time used to plan when aircraft will take-off**.
- The time is progressively refined taking into account various constraints (e.g. restrictions in the airspace, local traffic issues)
- It is calculated to sequence the flights at the runway holding point to build the PDS.

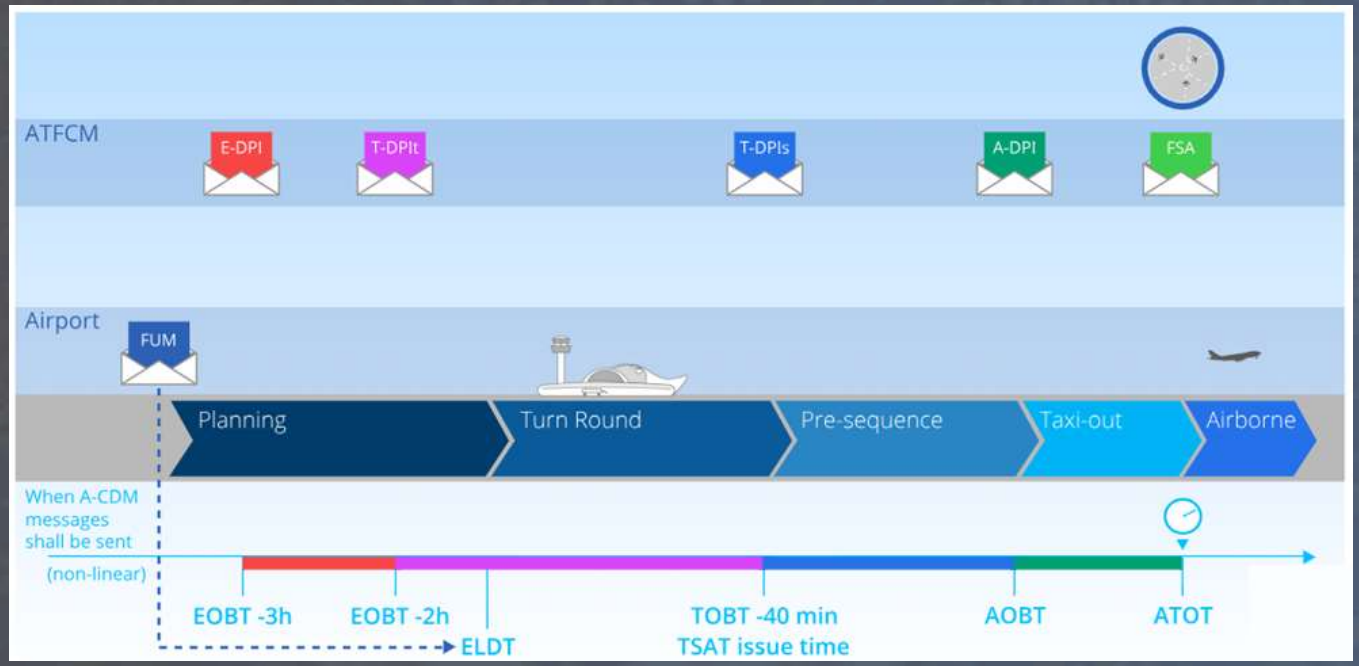
Elements of A-CDM – Adverse Conditions

- Adverse conditions are a situation where capacity levels are heavily reduced, so normal operations are disrupted
- Some adverse conditions can be foreseen with varying accuracy. Both their scope and likely effects are predictable. For example, snowy conditions resulting in de-icing operations and maintenance of elementary services would fall in this category.
- However, there are also unpredictable adverse conditions such as aircraft incidents or accidents, unpredictable weather conditions, security problems or power outages. These are more difficult to prepare for.

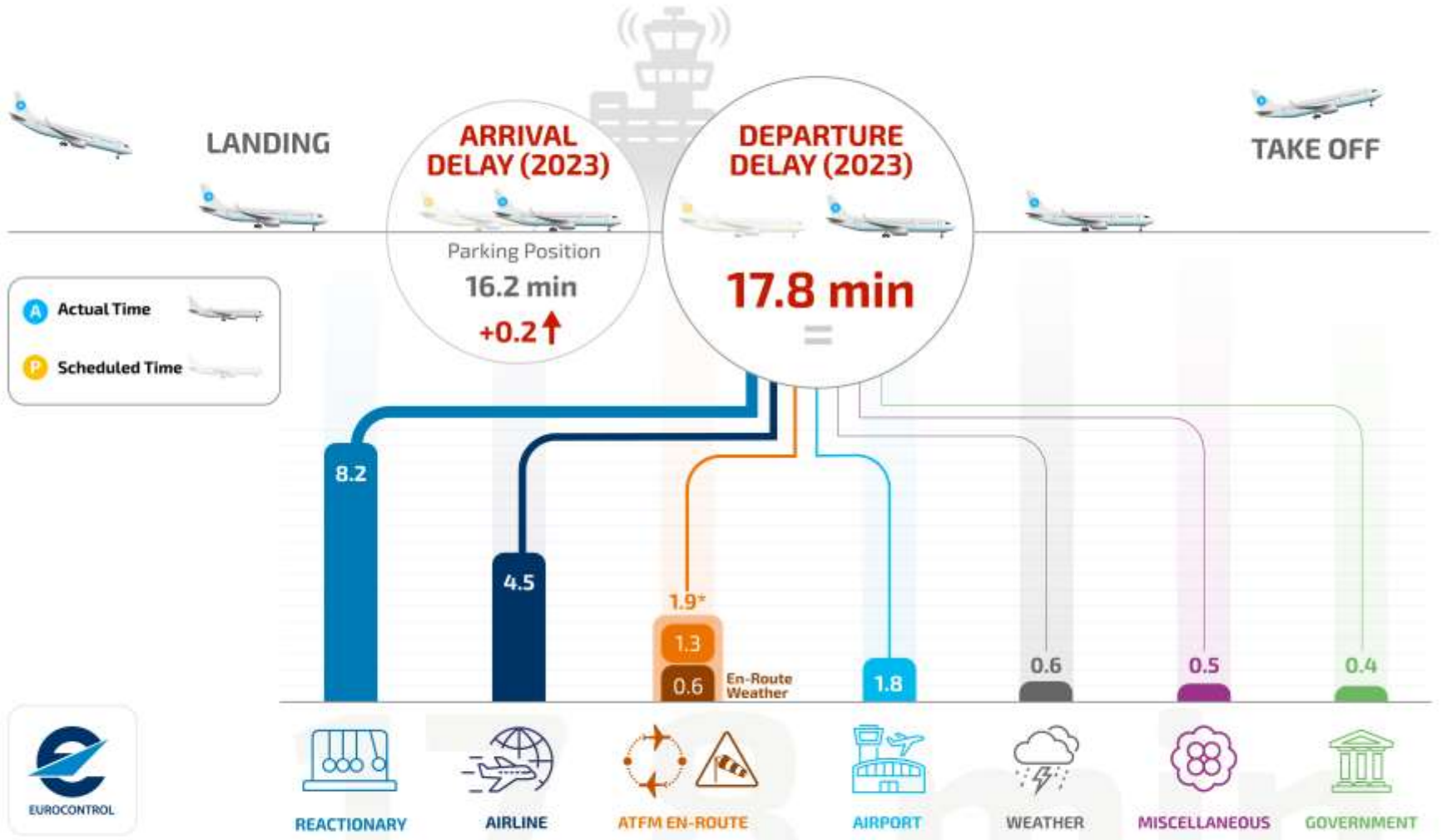
PREDICTABLE	UNPREDICTABLE
• Snowy conditions resulting in de-icing operations • Industrial action • Maintenance of crucial services • Predictable weather	• Accidents • Incidents • Equipment failures • Security problems • Unpredictable weather conditions

Elements of A-CDM – Collaborative Management of Flight Updates

- This element integrates airports with the ATFM unit to share more precise and detailed information about airside processes and enable an optimised PDS.
- Departure Planning Information (DPI) messages containing planned departure times are sent to the network. The network sends Flight Update Messages (FUM) for arrivals.
- The early exchange of information on arriving and departing flights improves event planning. By updating and sharing these planned time events, all partners will have an enhanced view of the progress of flights.
- This improved awareness facilitates ATFCM's role of balancing demand and capacity across the network in order to improve flight punctuality and efficiency.



Increasing load on the network brought more delays...



A-CDM is far more than a tool for local coordination

- Average delay per flight was 17.8 minutes in 2023 – stable from 2022, but much worse than in pre-pandemic 2019
- 1.9 minutes per flight on average are caused by ATFM delays (1.8 on 2022)
  - En-route weather accounts on average for 0.6 minutes per flight
- Due to limited capacity on many routes / sectors, it is **essential to plan in advance**
- TOBT/TTOT provided by Airports are fundamental to have visibility on future traffic
- Knowing when flights will be ready to depart allows better CTOT calculation (for that flight and, in general, a more efficient slot allocation for **all** regulated flights)

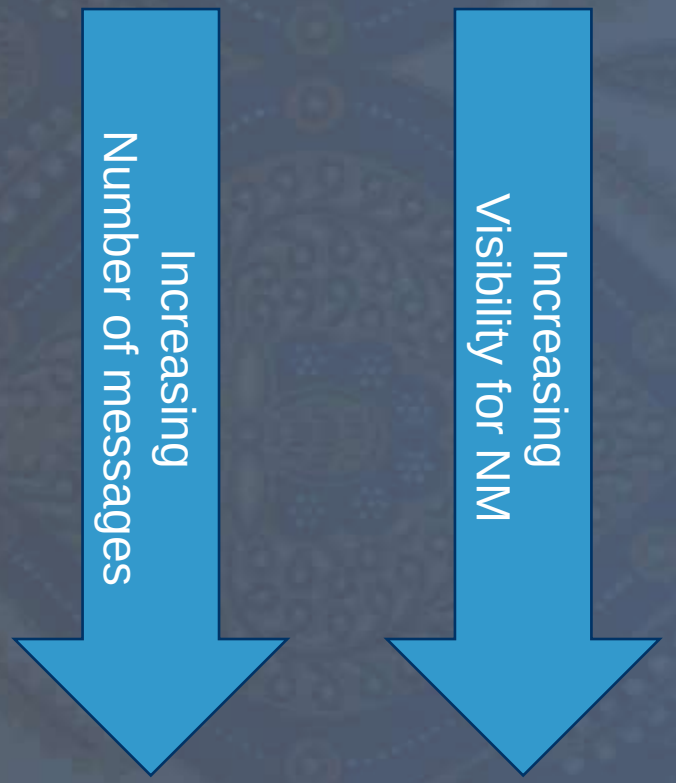
DPI (Departure Planning Information)

- Airports communicate with NM systems by transmitting **DPI Messages**
- The purpose of DPI messages is to provide ETFMS with the most accurate flight data currently available which cannot be sent via IFPS.
- DPI messages can be triggered by ATC (TWR) systems, by sequencing tools (e.g. DMAN) or by Collaborative Decision Making (CDM) systems at airports.
- The main data to be received via the DPI message are, for each flight:
  - An accurate estimation of the Target Take Off Time (TTOT)
  - The estimated taxi-time (EXOT)
  - The Standard Instrument Departure (SID)

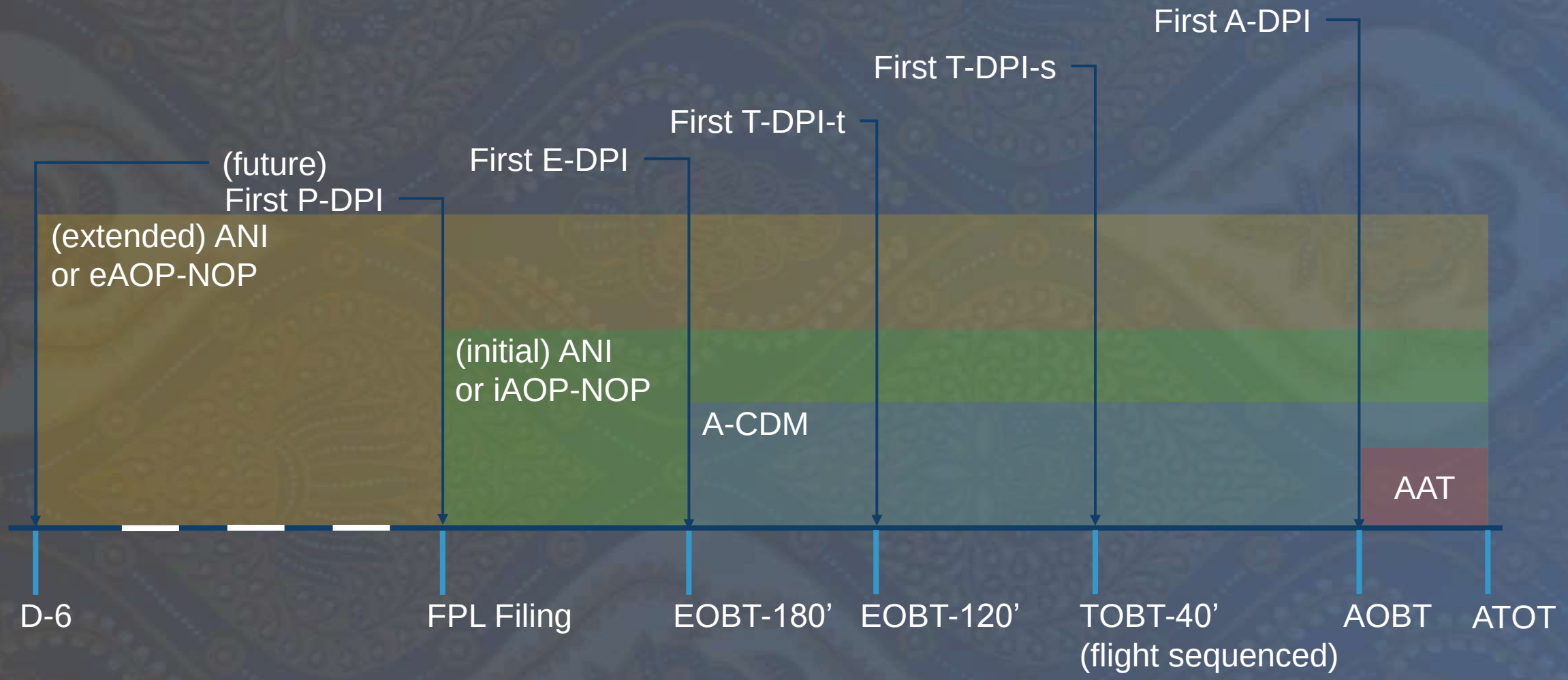
Classification of airports

To indicate the level of integration of the airports into the ATM network, NMOC uses the following classification:

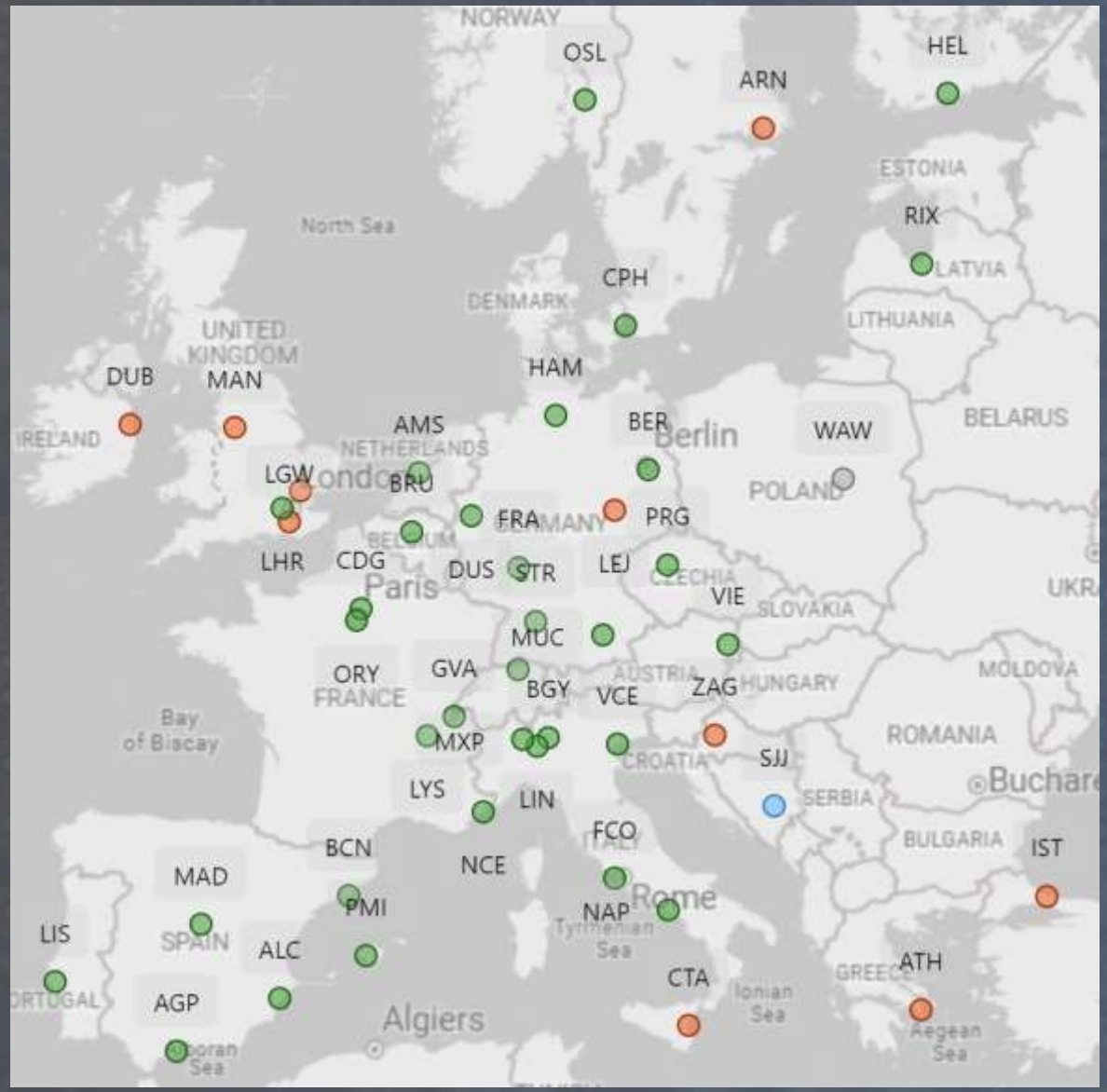
- Standard Airports
- AAT Airports (Advanced ATC TWR)
- RNI Airports
- A-CDM Airports
- ANI Airports



DPI Types


First A-DPI
First T-DPI-s
First T-DPI-t
First E-DPI
(future)
First P-DPI
(extended) ANI
or eAOP-NOP
(initial) ANI
or iAOP-NOP
A-CDM
AAT
D-6
FPL Filing
EOBT-180’
EOBT-120’
TOBT-40’
(flight sequenced)
AOBT
ATOT

A-CDM Developments



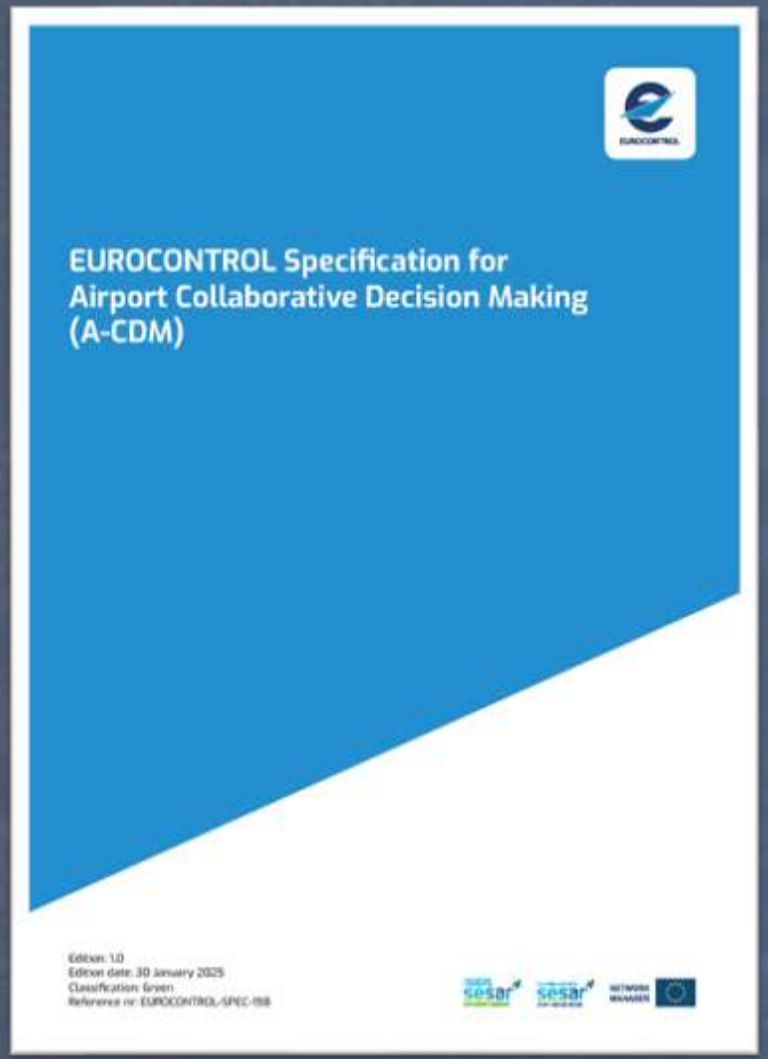
Status

- Completed
- Initial Contact
- On hold
- Ongoing

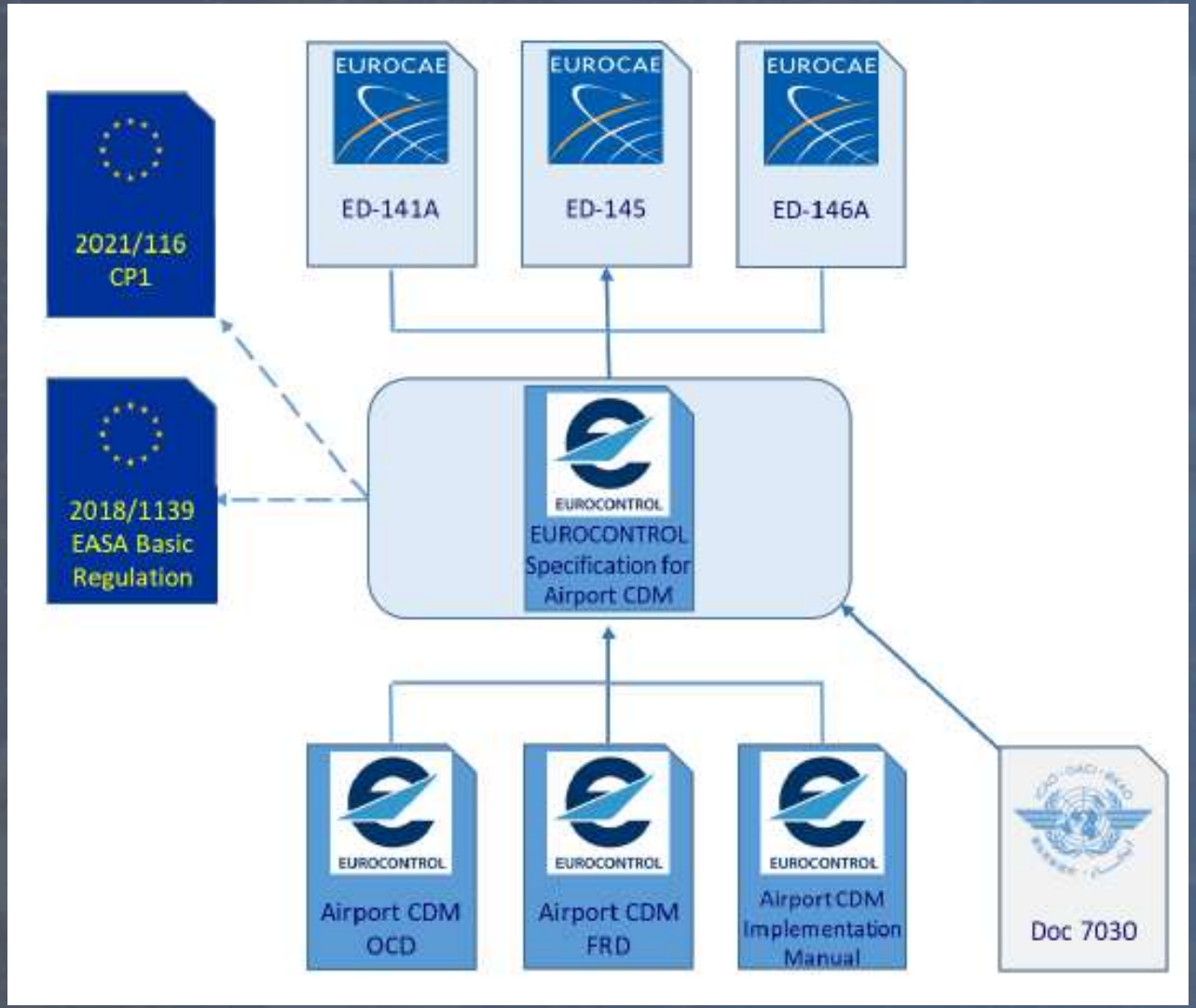
- Published in Jan 2025, following consultation with EUROCAE and Operational Stakeholders

- This Specification contributes to the implementation of the essential requirements of the EASA Basic Regulation and enables the implementation of the ATM Functionality 2 (AF 2) of the CP1 Regulation 2021/116.

- Available on EUROCONTROL Website



- Relationship with other documentation



Thank you.

ICAO