Airport Collaborative Decision Making

A-CDM in Germany

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Introduction

- Senior expert Airport CDM/Total Airport Management at DFS – German ANSP

- DFS Focal point A-CDM/TAM

- Chairman German A-CDM harmonisation group

- In aviation since 1984:

  - 1984 – 1990   German Airforce
  - 1990 – 1996   DFS AIS/ARO Officer AIS Frankfurt
  - 1997 – 2000   DFS Expert Office TWR/APP Frankfurt
  - 2001 – today   DFS Senior expert at DFS Headquarter

- Licences:
  - AIS/ARO – DFS
  - FAA Aircraft dispatcher – Simuflite
  - Flow Manager – Eurocontrol
  - TWR/APP Frankfurt – DFS

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Content

- Motivation for Airport CDM in Germany

- Implementation basics – Definition / Process essentials

- Status of Airport CDM in Germany

- Results

- International

Motivation for Airport CDM

Start and motivation of A-CDM in Germany

- It all started in the late 90´s, after a very extreme adverse situation experience at Munich Airport

- Joint evaluation meeting was held to investigate what went wrong

    - Airlines; ATC; Airport Operations; Ground handling….

- One of the most surprising findings/conclusion was:

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Motivation for Airport CDM

Start and motivation of A-CDM in Germany

- Despite the same language and although we operate at the same airport
………**we do not understand each other**…….

- Abbreviations

- Definitions

- Partners needs

- Reactions

- Way of thinking

- Regulations and requirements

- Processes for problem solving

different or unknown

"If I had known this, I would have reacted differently…"

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Motivation for Airport CDM

- So the very first idea of Collaborative Decision Making was born at Munich airport, with the main focus on:

→ Common Situational Awareness

→ General process during all kind of operations (regular/irregular)

→ Coordinated execution of operational processes and decisions

→ No Blame Culture

→ Focus on the overall system "Airport"

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Motivation for Airport CDM

- The main challenges and questions in this period were:

  → Convincing, convincing, convincing, …………

  → What is my benefit…

  → What is with my data…

  → What are the costs….

  → We have never done this…….

  → Can´t we buy a tool….

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Motivation for Airport CDM

- After a bumpy start of the first CDM attempt in the early 2000´s the decision was taken to start an official ACDM@MUC project in 2004

- Main project partners:

  - Munich Airport Company

  - DFS (ATC)

- Permanent participation of other local partners ensured Airlines, GH, De-Icing Company, etc.

- Close co-operation during the project implementation between ACDM@MUC and Eurocontrol

  - Proof of concept for European Airport operation programme

  - Support of European harmonisation and standardization issues

  - Joint development of ATFM network connection

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Implementation basics - Definition

- Airport CDM is an overall operational process supporting an optimized TurnRound at an airport for all stakeholder/partner

- Airport CDM is about people and processes, not just about tools

- Airport CDM partners are:

ATC Tower

Service providers
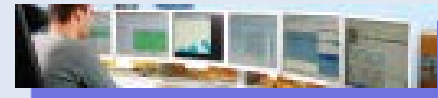
Airlines

Apron Control
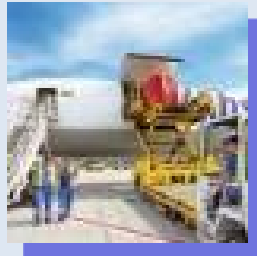
Ground handling

ATFM

Airport Traffic Ops Centre

Gate + Positioning

Adjacent units

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Implementation basics - Process - Essentials

- Let us build an A-CDM tower

- Important ➡ Start with the foundation and build it up step by step

Implementation basics - Process - Essentials

Airport CDM Information Sharing

Common Situational awareness ➔ Baseline for all process parts

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Implementation basics - Process - Essentials

- Transparency and Information Sharing is the most important basic step to ensure „Common Situational Awareness" for all partners

A-CDM alerts

IT-Interfaces

A-CDM dialog systems

Direct coordination

Web

Gate & Position

De-Icing

Airport Ops

Airlines

Airport CDM Process

Tower

ATFM Network

Ground handling

Apron Control

....

„The right information, at the right time, to the right people"

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Implementation basics - Process - Essentials

The Milestones Approach

Airport CDM Information Sharing
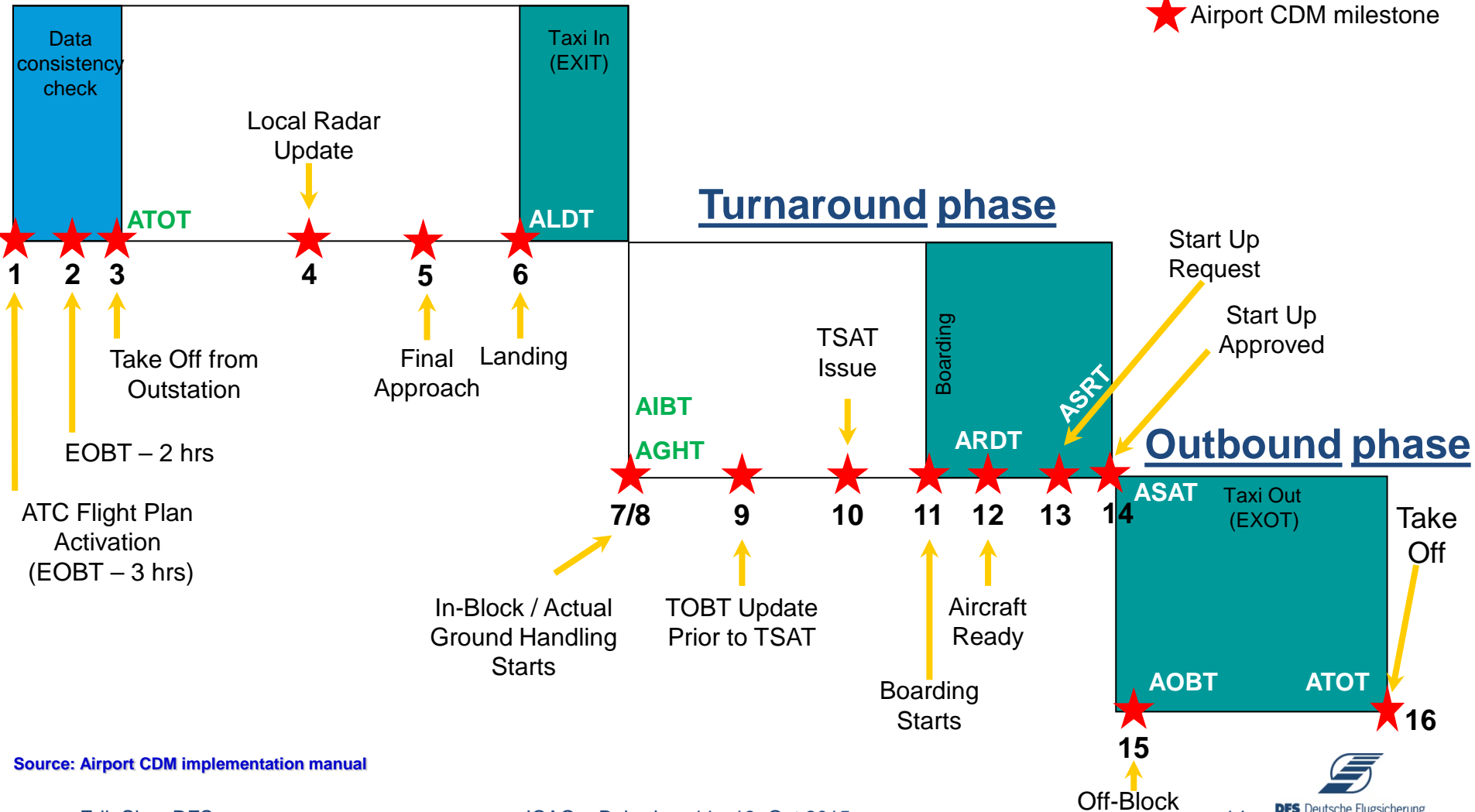
Key steps for the successfull A-CDM process

Common Situational awareness ➜ Baseline for all process parts

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Implementation basics - Process - Essentials

- The original Airport CDM process has 16 defined process milestones

Inbound phase

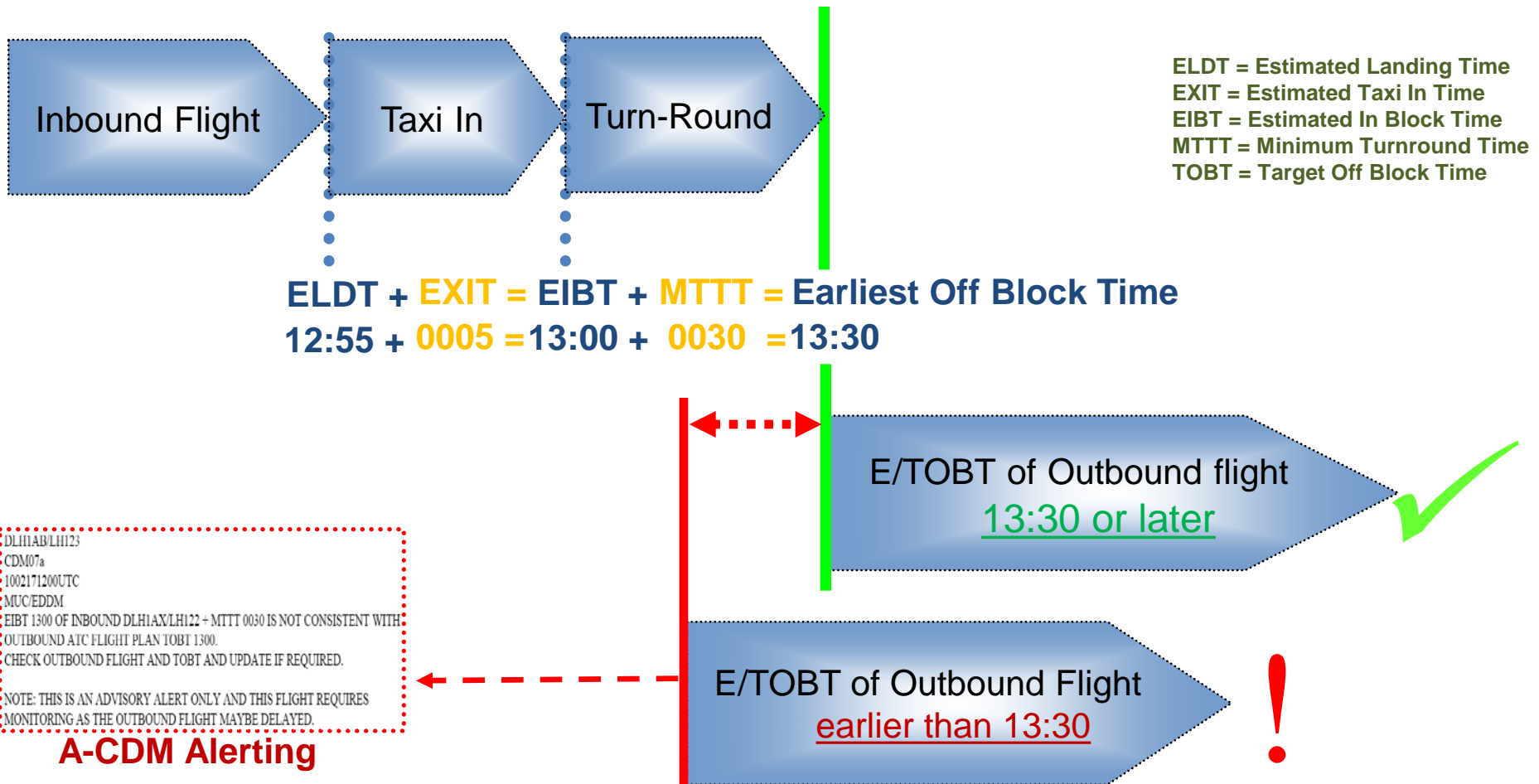**Data consistency check**

Local Radar Update

Taxi In (EXIT)

Airport CDM milestone

ATOT

ALDT

1   2   3   4   5   6

Take Off from Outstation

Final Approach   Landing

EOBT – 2 hrs

ATC Flight Plan Activation (EOBT – 3 hrs)

Turnaround phase

Start Up Request

Start Up Approved

TSAT Issue

Boarding

AIBT

AGHT

ARDT

ASRT

Outbound phase

ASAT

Taxi Out (EXOT)

7/8   9   10   11   12   13   14

Take Off

In-Block / Actual Ground Handling Starts

TOBT Update Prior to TSAT

Aircraft Ready

Boarding Starts

AOBT   **ATOT**

16

15

Off-Block

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Implementation basics - Process - Essentials

- Ensure the feasibility of flight turnround by permanent matching and correlation of related In- and Outbound flight times and data"

ELDT = Estimated Landing Time
EXIT = Estimated Taxi In Time
EIBT = Estimated In Block Time
MTTT = Minimum Turnround Time
TOBT = Target Off Block Time

Inbound Flight → Taxi In → Turn-Round

ELDT + EXIT = EIBT + MTTT = Earliest Off Block Time
12:55 + 0005 = 13:00 + 0030 = 13:30

E/TOBT of Outbound flight
13:30 or later ✓

DLH1AB/LH123
CDM07a
1002171200UTC
MUC/EDDM
EIBT 1300 OF INBOUND DLH1AX/LH122 + MTTT 0030 IS NOT CONSISTENT WITH
OUTBOUND ATC FLIGHT PLAN TOBT 1300.
CHECK OUTBOUND FLIGHT AND TOBT AND UPDATE IF REQUIRED.

NOTE: THIS IS AN ADVISORY ALERT ONLY AND THIS FLIGHT REQUIRES
MONITORING AS THE OUTBOUND FLIGHT MAYBE DELAYED.

A-CDM Alerting

E/TOBT of Outbound Flight
earlier than 13:30 !

Quality driver number one for your TurnRound efficiency

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Implementation basics - Process - Essentials

Variable Taxi Time Calculation

The Milestones Approach

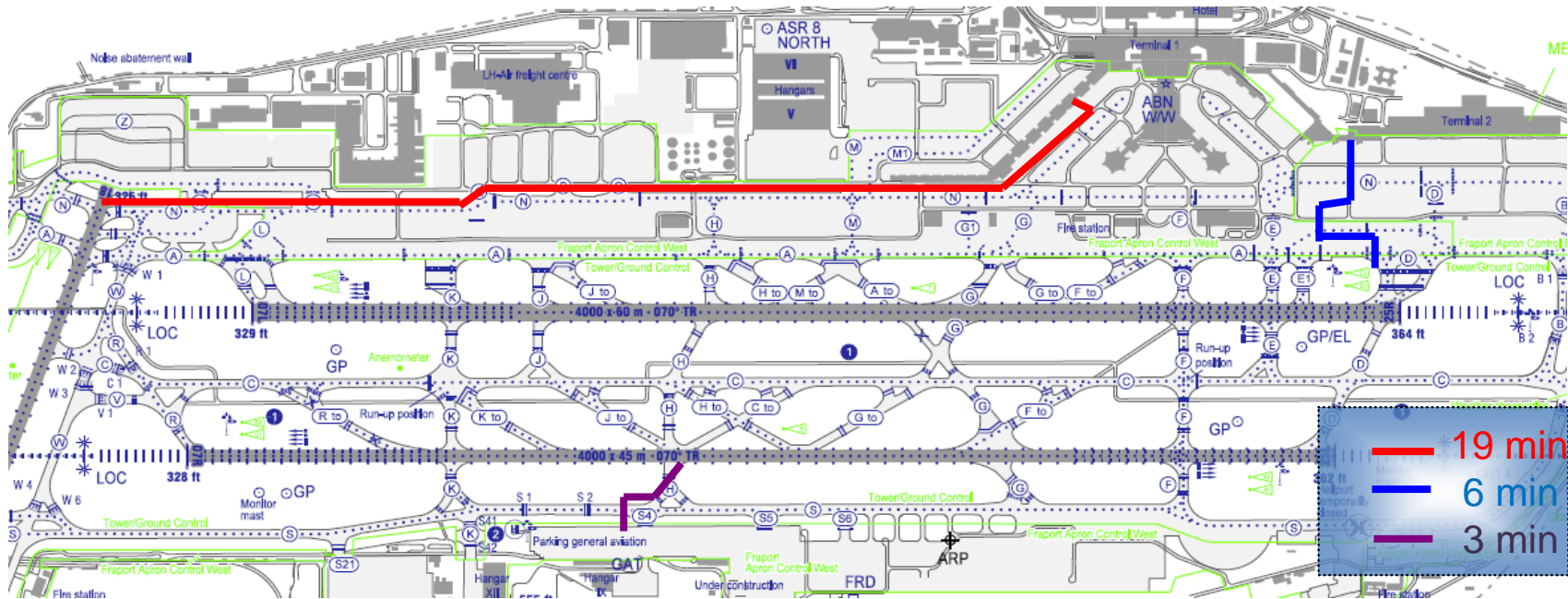**Airport CDM Information Sharing**

Better planning

Key steps for the successfull A-CDM process

Common Situational awareness → Baseline for all process parts

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Implementation basics - Process - Essentials

- The use of Variable Taxi Times (VTT) replaces "NMOC Default Taxi Times" and ensures better prediction of Target Take of Times

19 min
6 min
3 min

Average or default taxi time 15 min
= lack of Take Off prediction quality (TTOT)
= Non realistic CTOT for regulated flights

A-CDM variable taxi time considers:
Parking Position / Day / Hours / Rwy in Use
= Optimized Pre Dep Sequencing (TSAT)
= High quality of Take Off predictability (TTOT)
= Realistic CTOT for regulated flights

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Implementation basics - Process - Essentials

Pre-departure Sequence

Variable Taxi Time Calculation

The Milestones Approach

Airport CDM Information Sharing
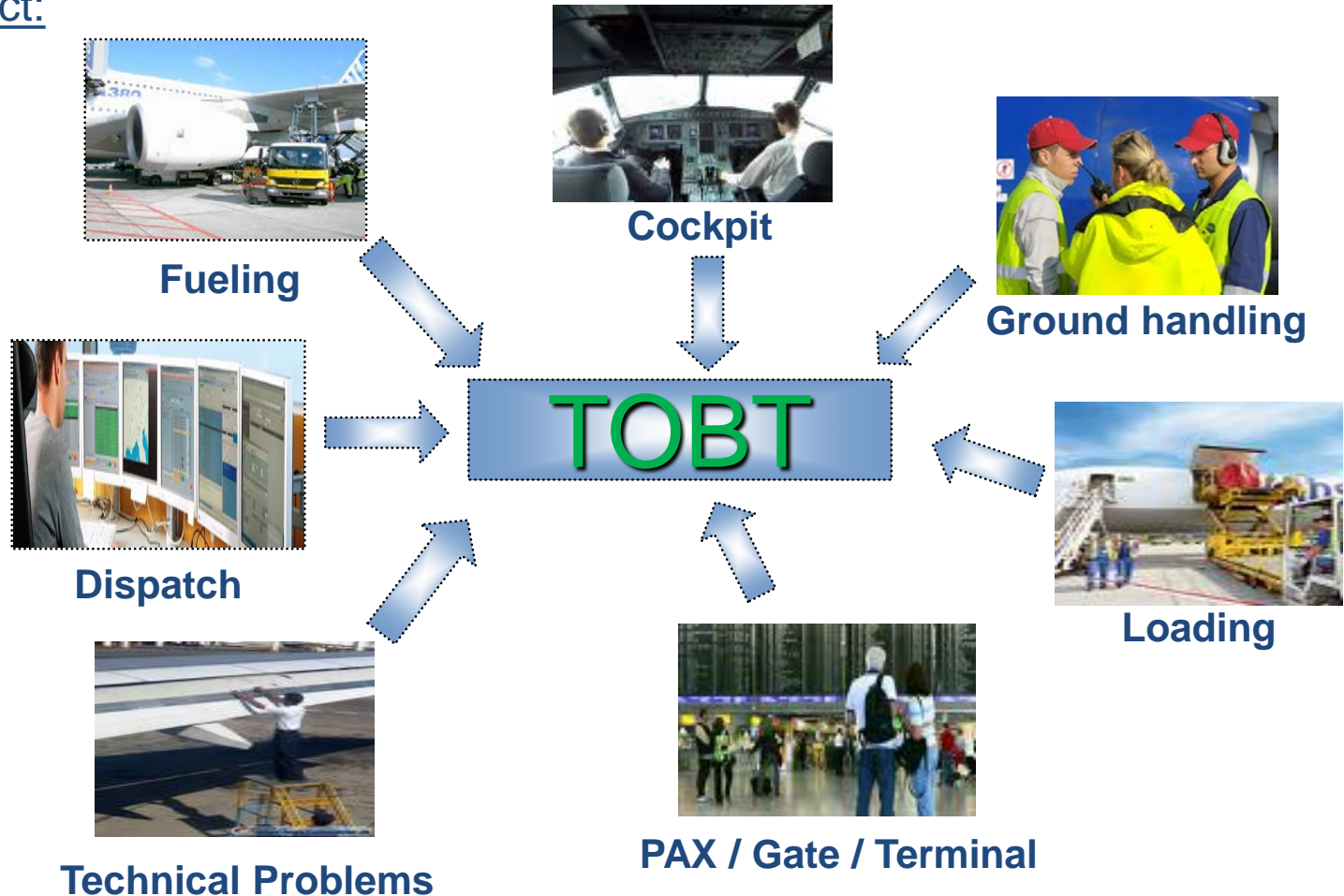
Leads from FCFS to BPBS

Better planning

Key steps for the successfull A-CDM process

Common Situational awareness ➔ Baseline for all process parts

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Implementation basics - Process - Essentials

- The Target Off Block Time (TOBT), as the estimation of aircraft ready, is the Airline commitment to the A-CDM process

- <u>Impact:</u>

Fueling

Cockpit

Ground handling

Dispatch

TOBT

Loading

Technical Problems

PAX / Gate / Terminal

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Implementation basics - Process - Essentials

- Target Start Up Approval Time TSAT is the Airport CDM commitment to the process

- Introduction of TSAT based on TOBT, VTT, CTOT and real operational capacity as driver for the „Pre Departure Sequence "

- Impact:

Weather situation

Traffic Demand
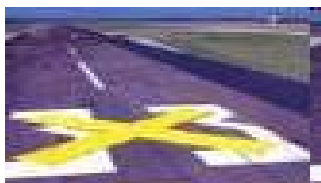
Infrastructural constraints

O P E R A T I O N A L   C A P A C I T Y

TOBT

De-Icing

Taxitime

TSAT

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Implementation basics - Process - Essentials

In- & Outbound flight updates (ATFM/ATC)

Connection to the EnRoute phase, Efficient TurnRound planning

Pre-departure Sequence

Leads from FCFS to BPBS

Variable Taxi Time Calculation

Better planning

The Milestones Approach

Key steps for the successfull A-CDM process

Airport CDM Information Sharing

Common Situational awareness ➔ Baseline for all process parts

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Implementation basics - Process - Essentials

- Linking the airport into the European ATFM network by exchanging reliable In – and Outbound estimates/target times through automated Data exchange with ATFM (NMOC)"

Inbound Flight

ATFM Slot Adherence

Ghost flight plans

ATC Sector Demand

Target Take Off Times

DPI

NMOC

FUM

CDM-Airport

Outbound Flight

Estimated Landing times

Feasability Turn-Round

Gate and Positioning

Ground Handling

Other resources

DPI = Departure Planning Information Message (Outbound)
FUM = Flight Update message (Inbound)
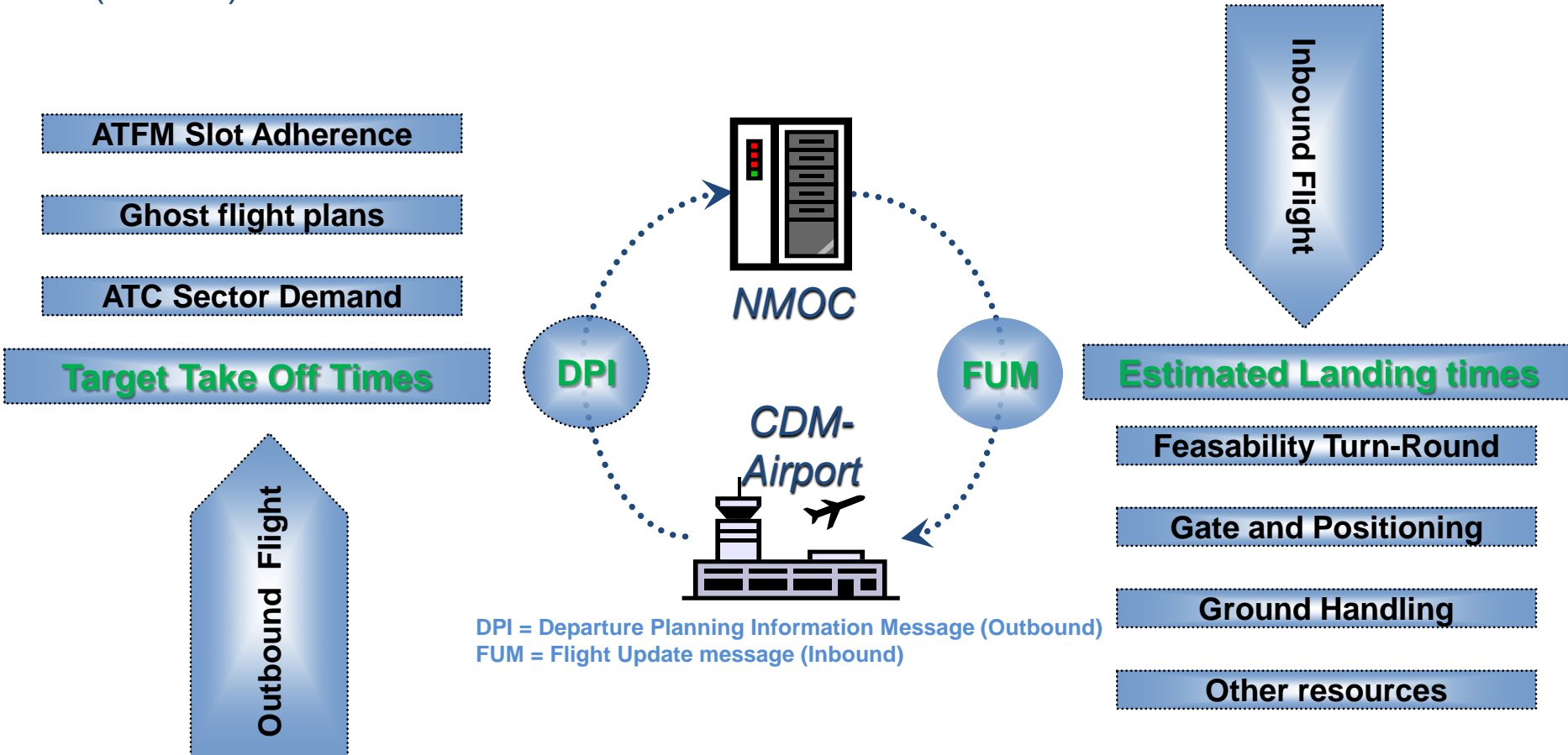
- *For countries or regions without C-ATFM – Connect your adjacent ATC units*

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Implementation basics - Process - Essentials

Adverse Conditions		**Completes A-CDM for all kind of ops**
In- & Outbound flight updates (ATFM/ATC)		**Connection to the EnRoute phase, Efficient TurnRound planing**
Pre-departure Sequence		**Leads from FCFS to BPBS**
Variable Taxi Time Calculation		**Better planning**
The Milestones Approach		**Key steps for the successfull A-CDM process**
Airport CDM Information Sharing		**Common Situational awareness → Baseline for all process parts**

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Implementation basics - Process - Essentials
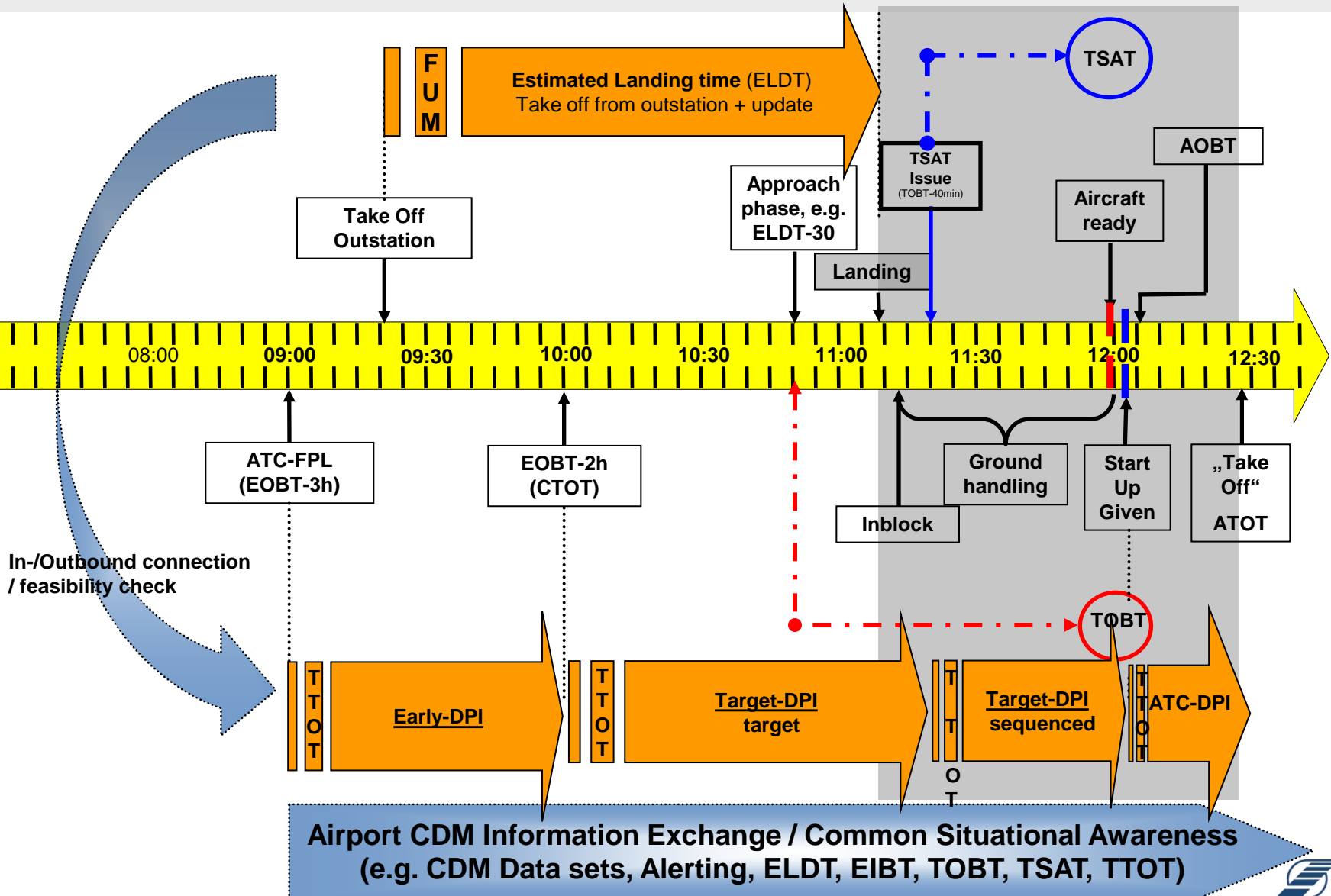
Results

- Airport CDM at Munich Airport including local issues was successfully implemented in 2007

    - Foundation of European and German harmonisation/standardization

- Airport CDM projects started in FRA; DUS; BER; STR; HAM

    - Based on European and German harmonisation/standardization

- A German A-CDM harmonisation initiative group was founded

    Objectives:

    - Exchange of information and best practices between the different German CDM airports

    - Achieve a common understanding of A-CDM in Germany and represent this understanding to the European Airport CDM harmonization process

    "One face to the customer"

Results

	Munich	Frankfurt	Berlin	Düsseldorf	Stuttgart	Hamburg
DFS Project - Partner	FMG - Airport Company	Fraport - Airport Company	FBB - Airport Company	FDG - Airport Company	FSG - Airport Company	FHG - Airport Company
Movements	400.000	500.000	70.000	217.000	121.000	145.000
Runways	2	4	1	2	1	2
Project start	9/2004	8/2008	8/2009	7/2009	12/2009	9/2011
Project end	7/2007	2/2011	5/2014	4/2013	10/2014	Planned 12/2015
ATFM connection (NMOC)	Yes	Yes	Yes	Yes	Yes	Planned
Status	Fully implemented	Fully implemented	Fully implemented	Fully implemented	Fully implemented	Project phase

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Components benefical to Airport CDM

- There are two main components beneficial to a fully implemented A-CDM:

  – Local A-CDM process/implementation

  – ATM network (ATFM) connection
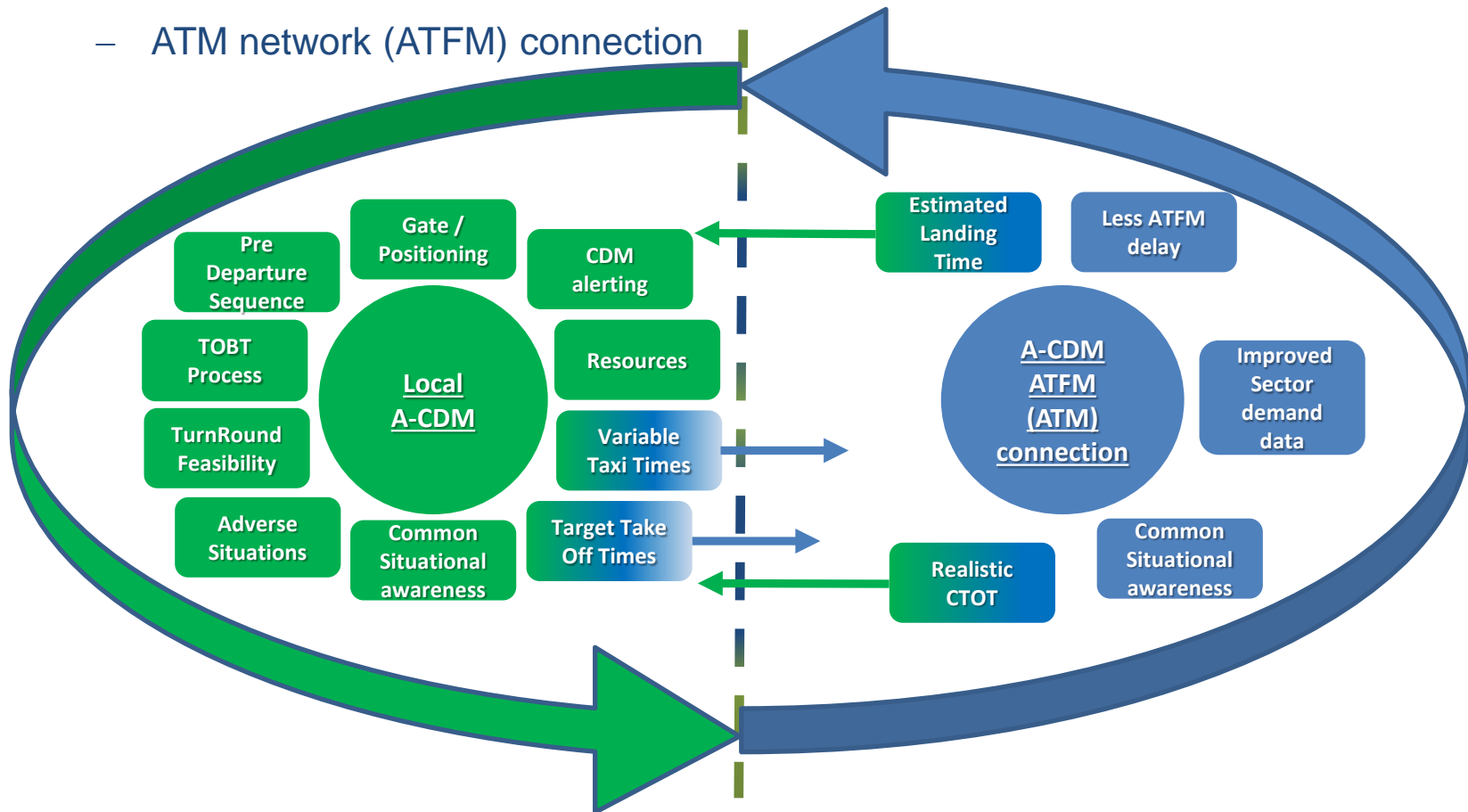
- *Only a fully implemented A-CDM will lead to all following benefits*

Results

Local results:

- Common Situational Awareness reached

- Very good involvement of all operational partners achieved

- Improved ground handling processes due to TOBT

- Reduction in controller workload

- No Blame culture due to a commonly shared A-CDM

- Improved programmability due to increased stability for all operational processes (Airlines, Airport; ATC) based on reliable target times (TOBT/TSAT/TTOT)

- Decrease in Taxi times

- Best use of available capacity

- A-CDM one of the key drivers for increasing the declared capacity

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Results

Network ATFM results:

- Flight update message (ELDT) increases the quality of the estimated landing time ➔ enhanced airport operation planning

- Local Target take off times (TTOTs) needed for the potential CTOT adjustment and sector load planning

- Identification of Ghost Flight plan ➔ More CTOTs available

- Fewer "lost CTOTs" ➔ frees available CTOT for other flights

- Quality of Airport CDM TTOTs (DPI) lead to better prediction of network traffic which will increase capacity (enroute, etc.) ➔ 2-4% for the overall European ATM system

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Results – Before / After Implementation

- Waiting time at the runway   → decrease of approximately 2 min

- ATFM CTOT adherence   → increase of approximately 20 %

- Airport Slot adherence   → almost no flight without airport slot

- Late position/gate changes   → reduced to a minimum (1%) due to better data and process quality

- Impact of arrival delay on departure flights   → 80 to 90 % of arrival delay could be reduced or absorbed during the turnround process

- Taxi time   → decrease of taxi time 10%

- Punctuality   → 4,5% increase

- Less cancelled flights during adverse situations 5000 flights/y.   → 0,5% decrease = 250 flights

- A-CDM one of the key drivers for increasing the declared capacity (1 to 4 movements per hour in average)

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Conclusion

- Airport CDM:

  - Ensures an overall process for all stakeholder

  - Is not an IT-Tool – it just needs some supporting tools

  - Considers stakeholder´s needs

  - Requires cooperation of all stakeholder

  - Improves the operational efficiency at airports

  - Is „No-Blame-Culture"

  - Connects the airport to the ATM network (ATFM or ATC)

  - It is not cost intensive

  - Is not „rocket science"

  - Allows to being pro-active instead of reactive

  - Benefits are measured and proven

  - Means: „Best planned – best served"

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Contact details

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