Basic DMAN Operational Service and Environment Definition (OSED)

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Abstract

This document is the Operational Services and Environment Description (OSED) relating to the basic Departure Manager (DMAN) element of the SESAR operational concept. This document covers basic DMAN operations within an Airport CDM context, taking into account multiple constraints such as:

- Scheduled departures times,
- Updated departure times provided by airlines,
- Slot constraints from ATFCM,
- Estimated taxi times,
- Basic runway constraints such as runway pressure, runway allocation strategy, departure rate …

This document takes into account common characteristics of the DMAN already operational in Europe in Zürich, Paris-CDG, Munich and Frankfurt, and requirements detailed in the European Airport CDM Manual.

Coupling of AMAN/DMAN will probably require new functionalities in the DMAN. These functionalities will be developed in the upcoming tasks for coupled AMAN/DMAN.

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[1] EUROCONTROL was not not in a position to approve this document as they consider that the DMAN Operating method 1 is not in accordance with the A-CDM Manual and foreseen SESAR Concept

Edition	Date	Status	Author	Justification
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Table of Contents

List of tables

List of figures

Executive summary

This document describes the generic operational concept for a basic Departure Management supported by a Departure Management System (DMAN).

Departure Management comprises of:

- **Pre-departure management,**
  with the objective of metering the departure flow to a runway by managing Off-block-Times (via Start-up-Times) which consider the available runway capacity. In combination with CDM, Pre-departure management aims thus at reducing taxi times, increasing CFMU-Slots compliance and increasing predictability of departure times for all linked processes.
- **Departure management,**
  with the objective of maximising traffic flow on the runway by setting up a sequence with minimum separations.

The Basic Departure Management Concept will focus on pre-departure management only, TTOTs will be generated but the ATCOs will not be expected to follow the TTOT order.

According to the definition (See ref. [19]) it is part of the Airport CDM (A-CDM) process. The departure management will be supported by a DMAN that provides the controllers with up to date pre-departure information (TSAT).

An essential pre-requisite for the Basic Departure Management Concept is the availability of the following information provided to the DMAN for calculating the pre-departure sequence:

- **Runway Capacity,**
- **Target Off Block Times (TOBT),**
  provided as up to date information by the airlines or ground handlers as part of the A-CDM process
- **Variable Taxi Times (VTT)**,
  with high quality which have to be provided to DMAN either by A-CDM or ASMGCS functionalities.
- **Aircraft type and SID,**
- **CFMU-Slots,**
  which possibly have been improved by DPI-exchange with CFMU.

Management of the runway configuration in closely linked to basic departure management (but will not be considered in this concept as it is seen as part of Airport Demand and Capacity Balancing which is part of P 6.5.3).
Runway configuration provides the following basic input to the departure management and will be considered by all DMAN calculations:

- **Runway configuration**,
  which describes all the runways that can be used and the way they are used in terms of
  - Operating direction
  - Operating mode (ARR/ DEP mixed or segregated mode)
- **Allocation of traffic streams to runways**,
  which might be used for shifting traffic streams to different runways in order to maximise overall airport capacity usage.

This document will serve as basis for further concept development such as the integration of Arrival and Departure Management for runways or runway systems with interdependencies between arriving and departing traffic of the same airport.

Furthermore this OSED can be used as reference by any SESAR project referring to basic Departure Management functionalities.
It should be noted that the basic functionalities described in this OSED **will probably change with the AMAN/DMAN integration.**

1 Introduction

1.1 Purpose of the document

This document is the Operational Service and Environment Definition (OSED) for a **basic** Departure Manager (DMAN) system.

The Operational Service and Environment Definition (OSED) describe the operational concept defined in the Detailed Operational Description (DOD) in the scope of its Operational Focus Area (OFA). It defines the operational services, their environment, scenarios and use cases and requirements.

The OSED is used as the basis for assessing and establishing operational, safety, performance and interoperability requirements for the related systems further detailed in the Safety and Performance Requirements (SPR) document. The OSED identifies the operational services supported by several entities within the ATM community and includes the operational expectations of the related systems.

The figure below presents the location of the OSED within the hierarchy of SESAR concept documents, together with the SESAR Work Package or Project responsible for their maintenance.

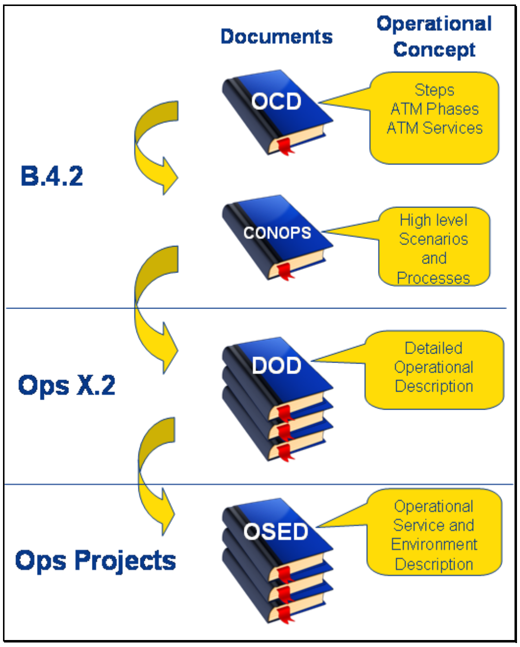

Figure 1: The 4 types of SESAR Operational Concept documents

It is important to note that this OSED is produced in the context of early Step 1 activities; the relevant DOD is not yet available (only a baseline version of the Airport DOD was released at date – See section 7 References).

Therefore, this OSED describes the operational concept basic for Departure Manager (DMAN) system through a “bottom up” approach. Hence it mainly contains information which should be consolidated back into the higher level SESAR concepts using a “bottom up” approach, in particular

- Into the documents produced by WPB.04.02 project (SESAR OCD and ConOps), and
- Into the Airport DOD produced by the federating OPS 6.2 project.

It is expected that this OSED will be complemented during the lifecycle of the **P06.08.04** project execution phase. Indeed, this document is intended to serve as basis for further concept development such as the integration of Arrival and Departure Management for runways or runway systems with interdependencies between arriving and departing traffic.

Furthermore it is likely this OSED will be used as reference by any SESAR project referring to basic Departure Management functionalities.

1.2 Scope

This document details the **generic** operational concept for a basic Departure Management supported by a Departure Management System (DMAN).

Departure Management comprises of:

- **Pre-departure management,**
  with the objective of metering the departure flow to a runway by managing Off-block-Times (via Start-up-Times) which consider the available runway capacity. In combination with CDM, Pre-departure management aims thus at reducing taxi times, increasing CFMU-Slot compliance and increasing predictability of departure times for all linked processes.
- **Departure management,**
  with the objective of maximising traffic flow on the runway by setting up a sequence with minimum separations.

The Basic Departure Management Concept will focus on pre-departure management only, TTOTs will be generated but the ATCOs will not be expected to follow the TTOT order.

According to the definition (See ref. [19]) it is part of the Airport CDM (A-CDM) process. The departure management will be supported by a DMAN that provides the controllers with up to date pre-departure information (TSAT).

It is important to note that this document takes into account common characteristics of the DMAN already operational in Europe like in Zürich (DARTS), in Paris-CDG (MAESTRO), Munich (SEPL) and Frankfurt (Sequence Planner) and requirements detailed in the European Airport CDM Manual.

It describes the generic operational concept for a basic DMAN within an Airport CDM context, taking into account multiple constraints such as:

- Estimated Off Block times (from flight plan),
- Updated departure times provided by aircraft operators (TOBT),
- Slot constraints from ATFCM (CTOT),
- Variable Taxi Times (VTT),
- Aircraft Wake Vortex separations (optional),
- Basic runway constraints such as runway pressure, runway allocation strategy, capacity or departure rate, etc…,
- Standard Instrument Departure (SID) and Minimum Departure Interval (MDI).

This OSED defines also the Operational Requirements, based on the expected performance, scenarios and use cases.

It should be noted that the basic functionalities described in this OSED **will probably change with the AMAN/DMAN integration.**

1.3 Intended audience

This document is intended for the following audience:

- Primary projects **P6.8.4** (Coupled Arrival and Departure Management) and **P12.3.5** (DMAN), to provide the reference set of DMAN operational requirements describing a basis for further operational improvements;
- Potentially: projects P6.7.2 (A-SMGCS Routing and planning), P6.7.3 (A-SMGCS Guidance), P12.3.3/4 (SMAN), P12.4.4 (DMAN-SMAN integrated);
- Potentially project WP5.6,
- WP6.2 for consolidation, WPB for architecture and performance modelling, and Transverse and federating projects;
- And, more generally, the SESAR JU community.

1.4 Structure of the document

The structure of this OSED is as follows:

- **Chapter 1** (the present section) provides general information about the document;
- **Chapter 2** details the operational perimeter of the document;
- **Chapter 3** defines the operational environment in which the future concept is presented. (main operational characteristics, actors and constraints);
- **Chapter 4** describes the current and the new operating methods and provides an analysis of the differences between those operating methods;
- **Chapter 5** details the Use Cases describing the concept;
- **Chapter 6** lists the operational and performance requirements derived from the future concept. This chapter provides also initial safety requirements for Application and Information Services related to the operational Processes and Services.
- **Chapter 7** Lists the reference and applicable documents.

1.5 Background

Since the nineties the concept of departure management has been explored in different operational environments by several research projects funded by the European Commission, amongst which EMMA II (see Ref [16] & [17]).

More recently, a generic operational concept providing view on the implementation of DMAN, mainly for large airports with high density traffic volumes, but applicable to any airport globally has been described by EUROCONTROL (see Ref [18]). This concept is in line with the Airport CDM concept (see Ref [19]) and supports as well the functionalities of the DMAN products already available in the market.

In addition to the outcomes of these activities, this OSED considers also experience from DMAN already in operations in Europe (DARTS, MAESTRO …).

1.6 Glossary of terms

A list of the important terminology and acronyms used in this document is presented below; they are taken, when available, from the SESAR ATM Lexicon (Ref. [8]). In case of any difference between the definitions provided here and the SESAR Lexicon, the SESAR Lexicon should be taken as the authority. Definitions under refinement are included here and will be submitted to the Lexicon when they are mature and agreed across the Programme.

Term	Definition
A-CDM Platform **(ACISP)**	*The Airport CDM Information Sharing Platform (ACISP) is a generic term used to describe the means at a CDM Airport of providing Information Sharing between the Airport CDM Partners.* *The ACISP can comprise of systems, databases, and user interfaces.*
A-CDM Process	*A-CDM is the process used to calculate and continuously update the Target Off-block Time (TOBT). It also covers the adjustment and alignment between DPI and the CFMU Slot Calculation process.* *Currently establishing the pre-departure sequence (TSAT) is also considered a CDM-process.*
Advanced Surface Movement Guidance and Control System (A-SMGCS)	*A system providing routing, guidance and surveillance for the control of aircraft and vehicles in order to maintain the declared surface movement rate under all weather conditions within the aerodrome visibility operational level (AVOL) while maintaining the required level of safety*.
AOBT	*The Actual Off-Block Time (AOBT) is the time the aircraft pushes back / vacates the parking position. (Equivalent to Airline / Handlers ATD – Actual*

Term	Definition
	Time of Departure & ACARS=OUT)
Application service	*An **application service** is a service provided by an automated application to support the tasks of a user (a human actor or a technical system), ignoring the way its functionalities are activated (manually or automatically). An application service involves the processing and/or transformation of information and/or data.*
Arrival Management Service	*Arrival Management Service describes the procedures used to establish sequences and target times planned by the arrival manager.*
Arrival Manager (AMAN)	*AMAN is a planning system to improve arrival flows at one or more airports by calculating the optimised approach / landing sequence and Target Landing Times (TLDT) and where needed times for specific fixes for each flight, taking multiple constraints and preferences into account.*
ASAT	*Actual Start Up Approval Time is the time that an aircraft receives its start up approval.*
ATOT	*The Actual Take Off Time (ATOT) is the time that an aircraft takes off from the runway. (Equivalent to ATC ATD–Actual Time of Departure, ACARS = OFF).*
CTOT	*The Calculated Take Off Time (CTOT) is a time calculated and issued by the appropriate Central Management unit, as a result of tactical slot allocation, at which a flight is expected to become airborne. (ICAO Doc 7030/4 – EUR, Table 7)*
Departure Management Service	*Departure Management Service describes the procedures used to establish sequences and target times planned by the departure manager.*
Departure Manager (DMAN)	*DMAN is a planning system to improve departure flows at one or more airports by calculating the Target Take Off Time (TTOT) and Target Start Up Approval Time (TSAT) for each flight, taking multiple constraints and preferences into account.*
Departure Rate	*Rate of flights at the departure from a runway: Minimum average separations in seconds between 2 take-offs.*
EIBT	*The Estimated In-Block Time (IOBT) is the estimated time that an aircraft will arrive in-blocks. (Equivalent to Airline/Handler ETA – Estimated Time of Arrival).*
EOBT	*The Estimated Off-Block Time (EOBT) is the estimated time at which the aircraft will start movement associated with departure (ICAO).*
ERBP	*Expected Runway Delay Buffer (ERBP) is the buffer of delay planned at runway hold to maintain pressure on runway*
ERWP	*The Expected Runway Waiting Period (ERWP) is the planned delay at the runway holding point.* *Depending on the operating method at the airport, the ERWP is split between the runway (E**R**BP) and the stand (E**S**WP) in order optimize the waiting time at the runway threshold (Runway Pressure).*
ESWP	*Expected Stand Waiting Period (ESWP) is the planned delay waiting on the stand*

Term	Definition
EXOP	*The estimated Outbound Taxi (EXOP) is the Expected Taxi Period from Off-Block to Runway Holding Point (with no buffer or delay) including time to line up and roll to airborne.*
EXOT	*The Estimated taXi Out Time (EXOT) is the estimated taxi time between off-block and take-off. This estimate includes any delay buffer time at the holding point or remote de-icing prior to take off.*
Holding point	*Position in the runway access area where aircraft stops and waits for the line-up clearance on the runway.*
Information Service	*An **information service** is a service delivering information or data to actors and/or systems without transformation of the underlying data. Information services can include filtering and/or combining of information. They are the only responsible for system data exchange, they can be considered as interfaces among systems.*
MTTT	*The Minimum Turn-round Time (MTTT) is the minimum turn-round time agreed with an AO/GH for a specified flight or aircraft type.*
NextFreq	*The **NextFreq** for a concerned controller represents the frequency of the downstream controller to be contacted by the aircraft.*
Operational Process	*A process is composition of activities that are triggered by an event and transforms a specific input into a meaningful output.*
Operational Service	*An operational service is a product of a sequence of **operational processes** on request of an actor to another actor who will execute the service with clear identification of an output* *A service is offered by an operational entity, (i.e. an organisational actor (e.g. ANSP,) or a human actor (e.g. ATCO).* *There are several levels of operational service, depending on the level of granularity required.* *At lower level an **operational service** () can be supported by:* • ***Information service(s)** to carry out information needed by the operational service without transforming the information, and/or* • ***Application service(s)** to use this information in order to provide an output via automation/computation i.e. with transformation of the information.*
Pre-Departure Sequence	*The Pre-Departure Sequence is the order that aircraft are planned to leave their stands (Off-Blocks) taking into account partners preferences and multiple constraints.* *The Pre-Departure Sequence is the order automatically generated by the Target Start-Up Approval Times (TSAT) calculated by the DMAN.* *The DMAN elaborates the Pre-Departure Sequence based on:* • *The Target Off-Block Times (TOBT) received from Airlines/Ground Handlers, and* • *The existing constraints (runway capacity constraints, CFMU slot).*
Push-Back	*Movement of an aircraft on the ground consisting of leaving the parking area in reverse motion as far as alignment on the taxiway.*

Term	Definition
Runway availability delay	*The Runway availability delay represents the time an aircraft has to wait before its actual departure slot on the runway.*
Runway Pressure	*The Runway Pressure represents the maximum number of flights allowed to wait at the last holding point for take-off.*
SID	*The Standard Instrument Departure (SID) represents the departure route of the aircraft to the ACC entry point.*
SOBT	*The Scheduled Off-Block Time (SOBT) is the time that an aircraft is scheduled to depart from its parking position (the coordinated Airport Slot and normally the time that the Aircraft Operators publish in their timetables).*
SSR code	*The Secondary Surveillance Radar code (SSR code) is a four digits number identifying the aircraft through its transponder.*
Surface Manager (SMAN[2])	*An ATM tool that determines optimal surface movement plans (such as taxi route plans) involving the calculation and sequencing of movement events and optimising of resource usage (e.g. de-icing facilities).*
Take-Off Sequence	*The Take-Off Sequence is the order that aircraft are planned to take-off.* *The Take-Off Sequence is the order automatically generated by the Target Take Off Times (TTOT) calculated by the DMAN.* *The DMAN elaborates Take-Off Sequence Sequence based on:* • *the Target Off-Block Times (TOBT) received from Airlines/Ground Handlers,* • *the existing constraints (runway capacity constraints, CFMU slot), and* • *the Estimated Taxi-Out Times (EXOT).*
TOBT	*The Target Off-Block Time (TOBT) is the time that an Aircraft Operator or Ground Handler estimates that an aircraft will be ready, all doors closed, boarding bridge removed, push back vehicle available and ready to start up / push back immediately upon reception of clearance from the Tower Controller.*
Tower Controller	*Position(s) or person(s) in a control tower responsible for take-off and landing of aircraft on airports.*
TSAT	*The time provided by ATC taking into account TOBT, CTOT and/or the traffic situation that an aircraft can expect start-up / push-back approval* *Note: The actual start up approval (ASAT) can be given in advance of TSAT*
TSAT Window	*A time-frame of +/- 5 minutes around the TSAT, in which a Start-Up and Push-Back approval may be issued.*
TTOT	*The Target Take Off Time taking into account the TOBT/TSAT plus the EXOT.* *Each TTOT on one runway is separated from other TTOT or TLDT to represent vortex and / or SID separation between aircraft.*

[2] When the term SMAN is used in this document it can be considered as equivalent to A-SMGCS

Term	Definition
Variable Taxi Time	*Variable Taxi Time is the estimated time that an aircraft spends taxiing between its parking stand and the runway or vice versa.* *Variable Taxi Time is the generic name for both inbound as outbound taxi time parameters, used for calculation of TTOT or TSAT. Inbound taxi time (EXIT) includes runway occupancy and ground movement time, whereas outbound taxi time (EXOT) includes push back & start up time, ground movement, remote or apron de-icing, and runway holding times.*

1.7 Acronyms and Terminology

Term	Explanation
ACARS	*Aircraft Communications Addressing and Reporting System*
ACC	*Area Control Centre*
A-CDM	*Airport CDM*
ACISP	*Airport CDM Information Sharing Platform*
AMAN	*Arrival Manager*
ANSP	*Air Navigation Service Providers*
AOP	*Airport Operations Plan*
A-SMGCS	*Advanced Surface Movement Guidance and Control System*
ATC	*Air Traffic Control.*
ATFCM	*Air Traffic Flow and Capacity Management. Generic term. In this document, ATFCM refers to an ATFM information server.*
ATM	*Air Traffic Management*
CFMU	*Central Flow Management Unit.*
ConOps	*Concept of Operations*
CWP	*Controller Working Position*
DARTS	*Departure and ARrival Traffic management System.* *The pre-departure sequencer in operation at ZRH airport.*
DCB	*Demand and Capacity Balancing*
DMAN	*Departure Manager*
DOD	*Detailed Operational Description*
DPI	*Departure Planning Information*
FDPS	*Flight Data Processing System*
FPL	*Flight Plan*
HMI	*Human Machine Interface*
IFR	*Instrument Flight Rules*
KPA	*Key Performance Area*
MAESTRO	*Means to Aid Expedition and Sequencing of Traffic with Research of Optimisation.* *The AMAN-DMAN suite in use at CDG*
MVT	*Movement message*
NOP	*Network Operations Plan*

Term	Explanation
OCD	*Operational Concept Description*
OS	*Operational Scenarios*
OSED	*Operational Service and Environment Description*
RDPS	*Radar Data Processing System*
RWY	*Runway*
SES	*Single European Sky*
SESAR	*Single European Sky ATM Research*
SJU	*SESAR Joint Undertaking*
SMAN	*Surface Manager.*
SPR	*Safety and Performance Requirements*
TMA	*Terminal Manoeuvring Area*
TWR	*Control Tower or Tower position*

2 Summary of Operational Concept

This details the operational concept in the scope of the **Basic DMAN** Operational Focus Area (OFA).

As noted in section 1.1, this OSED is produced in the context of early Step 1 activities so that the backward traceability of the concept developed in this document towards higher level documents such as the Airport DOD cannot be described.

Hence this chapter provides only:

- The list of OIs steps covered by the Basic DMAN OFA;
- A high-level description of the Operational Concept;
- The identification of the services and processes supporting the Operational Concept.

2.1 Mapping tables

Table 1 lists the Operational Improvement steps addressed by the OSED.

Relevant OI Steps ref. (coming from the definition phase)	Any new / changed OI-step (textual form)	Operational Focus Area name	Story Board Step	Master or Contributing (M or C)	Contribution to the OIs short description
TS-0201 : **Basic Departure Management (DMAN)**	No change	Integrated AMAN/DMAN	1	M	The Basic DMAN determines the optimum runway for departure, when appropriate, and elaborates a **pre-departure** sequence taking into account : EOBT/TOBT, Scheduled departure times, Slot constraints, Runway constraints such as: • departure rate, • Etc.…

Table 1: List of relevant OIs within the OFA

TS-0201 is an IP1 OI Step totally superseded by TS-0202 in Step 1.

Therefore this OI Step has to be considered as an assumption for the project P06.08.04 since it is being already implemented and no further research is required (See Airport VALS for STEP 1 (Ref.[13]) – Assumption: **ASM-06.02-VALS-0000.0018**)

According to the Airport DOD for STEP 1 (See Ref. [12]), OI Step TS-0202 describes the concept for two Operational Focus Areas (OFAs) namely:

- **OFA.04.01.01 - Integrated AMAN/DMAN**
- **OFA.04.02.03 - Surface Management integrated with Arrival and Deaprture Management.**

As TS-0201 is superseded by TS-0202 in STEP 1, it contributes to the same two Operational Focus Areas (OFAs) mentioned above.

2.2 Operational Concept High-Level Description

2.2.1 Basic DMAN main features

Departure Management encompasses procedures used to establish sequences and target times (TSAT/TTOT) with the support of a Departure Manager (DMAN) .

Currently there are only procedures established for controlling target times at start-up approval. Thus the main objective of the current Departure Management is to control the traffic flow to the runway, i.e., ensuring high traffic flow whilst preventing stretching line-up queues at the runway.

The definition for DMAN, accepted by the wide majority of stakeholders, in line with Airport-CDM concept, is as follows:

> *DMAN is a planning system to improve departure flows at one or more airports by calculating the Target Take-Off Time (TTOT) and Target Start-Up Approval Time (TSAT) for each flight, taking multiple constraints and preferences into account*.

In this context, the **Basic DMAN** is designed to support **current** Departure Management procedures.

As mentioned in section 1.2, the main function of the Basic DMAN is to establish **a pre-departure sequence** (i.e. an order of aircraft automatically generated by their Target Start-Up Approval Time, TSAT).

Basic DMAN uses the Target Off-Block Time (TOBT) provided by the A-CDM process as input for elaborating the pre-departure sequence

However, to build an accurate pre-departure sequence, the first step is to calculate the Target Take-Off Time (TTOT) which represents the aircraft rank in the Take-off sequence from which the pre-departure sequence is deduced.
It is important to highlight that the TTOT has no relevance for the controllers meaning that the Tower Runway Controllers are not expected to follow the TTOT order.

- The TSAT times and their spacing (close together or farther apart) have the function of controlling the flow to the runway:
    - On airports with single runway entry point and no possibilities for overtaking, it is the sequence that needs to be maintained in order to achieve a "short" take-off sequence with little delay. Achieving the intended throughput depends on establishing the pre-departure sequence already with TSAT.
    - On airports with multiple runway entry points the TSAT "sequence" is of no importance. The TSATs purpose is to control a quantitiy of aircraft traveling to the threshold within a defined time interval.
- In case of multiple entry points, a take-off sequence with little delay (i.e. the intended throughput) can be achieved by mixing aircraft at the runway threshold. Here, only controlling the flow to the runway, regulated by assigning a number of TSAT is important, not the sequence.
- As stated above the TTOT sequence is important for achieving a short sequence with little delay. The sequence itself however is not the main concern with respect to achieving a good TTOT predictability, which is also one of the goals of departure management. Here, the stability of the previously communicated TTOTs is of relevance.

The reference time used by the Basic DMAN to elaborate the pre-departure sequence is the **Target Off-Block Time** (TOBT).

As part of the agreed A-CDM process at an airport **if no TOBT** is provided for a flight, **the reference time used is the Estimated Off-Block Time** (EOBT).

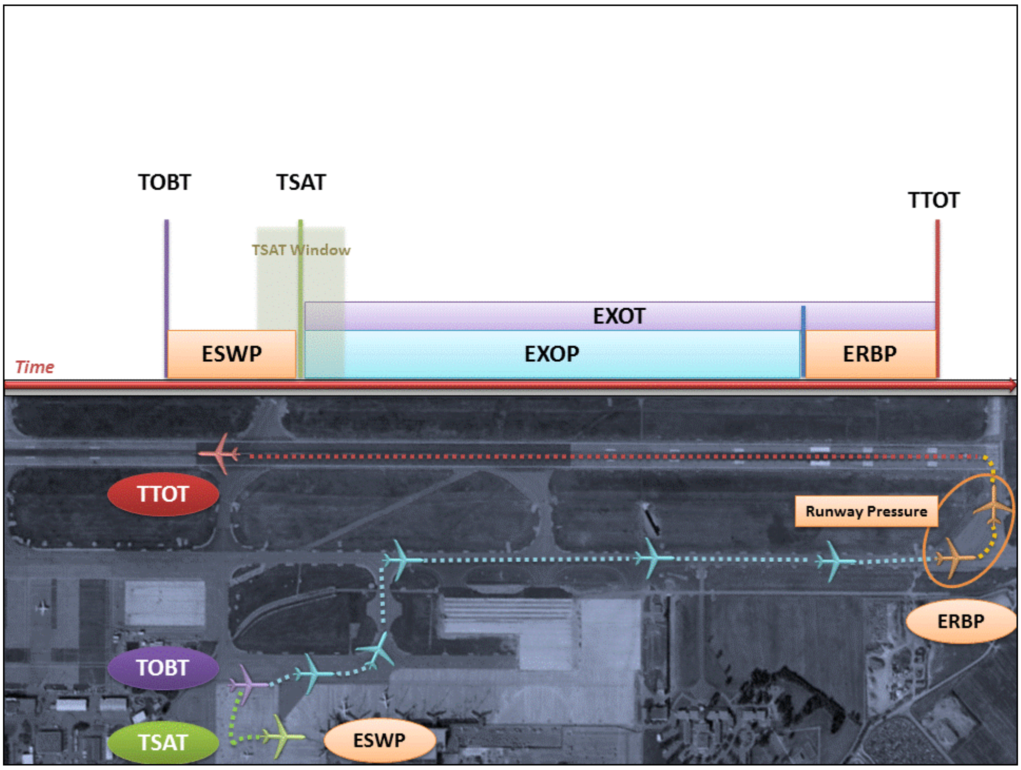

Figure 2: Basic DMAN milestones

In this context the basic DMAN elaborates the pre-departure sequence based on the following principles:

- Each flight is scheduled in the pre-departure sequence according to its first TTOT [TOBT+EXOT],
- The TSAT order might change for optimization or due to constraints (runway capacity constraints),
- Maximum priority is given to flights with a CTOT in order to respect the CFMU slot.
- Additional prioritization and optimization criteria can be applied, disturbing the TTOT order derived from TOBT, thereby giving up the 'First Come First Served' (FCFS) principle.
- In case of competing TTOTs priority is given to the flight with the "older" TOBT, meaning the one was planned earlier (rewarding stability)

Flights are in the Basic DMAN planning scope;

- From a parameter time before their (TOBT+EXOT) – generally 40' -, and
- Up to their Actual Take-Off Time (ATOT).

For each flight, **based on the TOBT (/EOBT)** the Basic DMAN:

- Firstly allocates a departure runway according to the forecast runway orientation and the runway allocation strategy.
  It should be noted that the next DMAN versions (Step 2) should integrate new runway allocation process performed by a Runway management tool developed in the scope of project P12.2.1.

- Then calculates the Target Take-Off Time (TTOT) that represents the Aircraft rank in the take-off sequence (TTOT = TOBT + EXOP + ERWP[3]); The ERWP represents the total waiting time for a flight at the runway to access the next available take-off slot if leaving at TOBT.

  Depending on the operating method at the airport, the ERWP is split between the runway (E**R**BP) and the stand (E**S**WP) in order optimize the waiting time at the runway threshold (Runway Pressure).

[3] **ERWT** in the 1st Edition. Indeed, since the 1st issue of this OSED (Feb. 2011), new terms and definitions have been introduced to clarify the concept of ERWT. In particular EXOT and ERWT will be respectively replaced by EXOP and ERWP.

- Then deduces the Target Start-Up Approval Time (TSAT) which represents the Aircraft rank in the pre-departure sequence. The TSAT differs from TTOT by the Estimated Outbound Taxi Period (EXOP) and the Expected Runway Delay Buffer (ERBP). The TSAT differs from TOBT by the Expected Stand Waiting Period (ESWP).

When elaborating the pre-departure sequence the Basic DMAN takes into account:

- Existing CFMU slots (CTOT);
- Variable Taxi Times (including remote de-icing times when needed),
- Basic runway constraints such as capacity, runway pressure, departure rate, etc…,
- Aircraft Wake Vortex separations (optional),
- Standard Instrument Departure (SID) and Minimum Departure Interval (MDI)

The TSAT order might change for optimization or due to constraints.
The Basic DMAN efficiency relies on accurate TOBTs the provision of which is defined in CDM procedures.
The basic DMAN constantly monitors the reference time (i.e. EOBT/TOBT) against the current time. It maintains internal values used for computing the sequence. Hence, when no TOBT is provided for a flight **and** the EOBT is past, the basic DMAN will keeps providing an actualised TSAT for the concerned flight.

> *It is however important to note that the A-CDM process will alert if the "EOBT+15 / TOBT" is passed and ask for an update.*

The Basic DMAN sequence(s) update is time based and is also triggered by specific events as soon as they are known to the system:

- AOBT ,
- ASAT,
- ATOT.

The Basic DMAN provides specific HMI for the different actors:

- Tower Supervisor,
- Tower Delivery Controller,
- Apron Manager,
- Tower Ground Controller,
- Tower Runway Controller.

2.2.2 Expected operational improvements

In terms of improvement, Basic DMAN permits:

- To share Pre-Departure Sequence planning,
- To share a same real-time vision of the Take-Off Sequence,
- To anticipate the flow variation (Departure demand) more precisely
- To monitor flight progress using the off-block target of each flight
- To take airport resources availability into account in the prediction
- To take airport capacity more precisely into account
- To be clearer on the priorities used to allocate runway slot
- To reduce runway waiting time (engines running)
- To regulate Start-Up request (TOBT adherence)
- To enhance ATFCM (and the overall network) prediction if the dissemination of DPIs is activated

2.2.3 Expected benefits

Implementing DMAN concept in combination with A-CDM, the expected benefits are:

- Improving safety by reducing taxi times or number of ground movement in the same time,
- Fuel saving and noise reduction by reducing taxi times and waiting times,
- Facilitating ATC Start-Up deliveries by regulating the request,

- Increasing capacity by using airport resources efficiently,
- Improving network predictions by providing departure information to CFMU.

However it is worth noting that some potential antagonist effects could appear, with impact on arrivals, when holding the aircraft too long in their stand.

2.3 Processes and Services (P&S)

This section identifies the services and processes that support the high-level Operational Concept described above.

2.3.1 Assumptions

- According to B4.2 Processes and Services document ([10],basic departure management can be seen as part of "*Departure Traffic Sequencing*" Operational Service;

Operational Service Group	Operational Service Family	Operational Service
ATM Network Management Service Group	Traffic Synchronisation Service Family	Departure Traffic Sequencing Service

Table 2 : Operational Services Covered by the OSED

Operational service description	Service Provider	Operations (shared with external world)	Input	Output
Allocate one place in the departure sequence for an individual flight	ATS Ops	Assign TSAT	TOBT	TSAT

Table 3 : Departure Traffic Sequencing Service main characteristics

- According to definitions (see §1.6) the Basic DMAN can be defined as an automated application supporting the eponym **application service.**

2.3.2 Breakdown of services and processes

Based upon the two assumptions above, in this document we will consider that Basic DMAN Application Service breaks down into:

- The following Application Services
  - **Pre-Departure Sequence** management
  - **Take-Off Sequence** management
  - **Supervision**
- Which encompass the following system functions:
  - Handle OBT (EOBT/SOBT/TOBT)
  - Handle CTOT
  - Compute (/Update) Pre-Departure Sequence / TTOT
  - Compute (/Update) TSAT
  - Handle AOBT
  - Handle ATOT

Additionally the basic DMAN uses information from a so-called "*Runway Configuration Management*" application service that provides Airport Configuration, Airport Capacity and Runway Strategy which depends on Airport Demand and Capacity Balancing Operational Service.

This breakdown of services is illustrated on the figure hereafter.

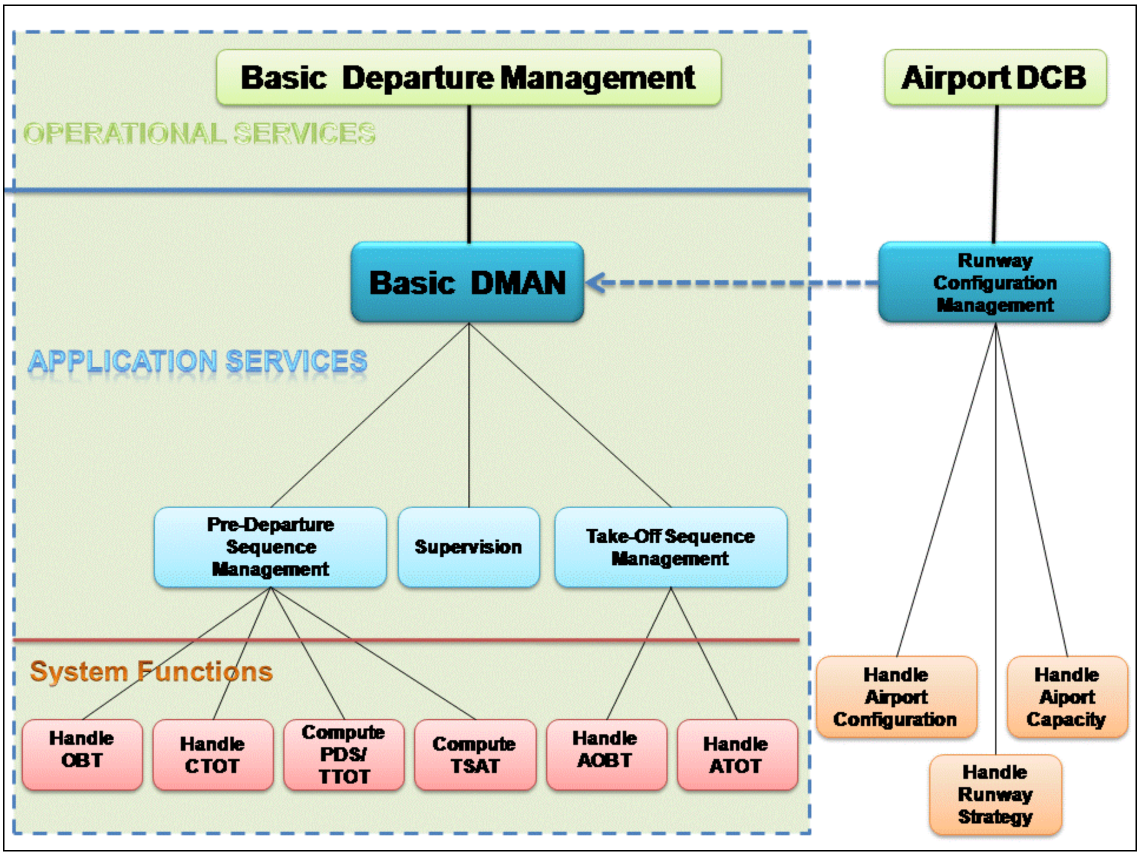

Figure 3: Basic DMAN Services and system functions

3 Detailed Operational Environment

The procedures described in this document are concerned with the departure phase of flights (typically starting when aircraft are in-block and ending when aircraft take-off).

The departure phase relates to ground operations mainly encompassing activities during aircraft Turn-Round and Taxi-Out but may also include pre-turn-round activities that may be done during Short-term planning phase.

As mentioned in section 1.2, this document takes into account the common characteristics of the few DMAN in operation at European Airports. The analysis of these DMAN systems (see Ref. [12]) has shown that two different planning strategies are in place today, closely related to the airport operational environment:

> For for the purpose of this document, we will focus on Departure Management supported by DMAN **as today**, at airports with a runway dedicated to departures, with multiple entry points at the runway threshold or a complex taxiway which allows the controller to modify, if necessary, the take-off sequence.
> →This is the **baseline** operational environment for this Basic DMAN OSED.
>
> However to take into account the different existing operational environments, the chapter 4 of this document will also describe procedures at airports with only few runway entry points and no possibilities for aircraft to pass each other on alternative taxiways.
>
> This latter more closely follows the A-CDM and SESAR concept and represents the method **that should be developed for the future versions of the DMAN**.
>
> In the context of this document it is an **alternative** operational environment for this Basic DMAN OSED.

The airport parking facilities are composed of gates connected to the terminal (two thirds of the gates) and of remote gates (a third of the gates).

The computation deals with a sequence of departures exclusively, and is based upon a turn round flight.

During the taxi phase the pilots are responsible for their own separation with the other aircraft. The ground controllers provide them with assistance for this purpose.

3.1 Operational Characteristics

This section provides the main characteristics of the Operational Environment suitable for the basic DMAN (I.e. :airport layout, runway operating mode, other systems needed (or not), type of traffic and weather restrictions (if any)).

- **Airport Layout**

  All layouts from single to multiple runways with simple or complex taxiways.

- **Runway operating mode**

  Differences for mixed mode operations and segregated mode operations for Departure Management and DMAN will be described.

- **Other Systems**
  - A-CDM,
  - Electronic Flight Strip System,
  - Stand and Gate Management,
  - (ASMGCS – is advanced),
  - (no AMAN required, no coupling to AMAN),
  - CFMU.
- **Traffic**

  High Traffic Density (Major hubs) esp. with Departure Peaks.

No traffic from other airports considered (would be advanced).

- **Weather**

  All weather conditions (including Instrument meteorological conditions (IMC) and de-icing).

3.2 Roles and Responsibilities

This section describes the responsibilities of the actors involved in the use of services supported by the DMAN.
This description relies on the hierarchical organisation of actors of the ATM system defined in the document [11]: *SESAR B4.2 Actors - Roles and Responsibilities.*

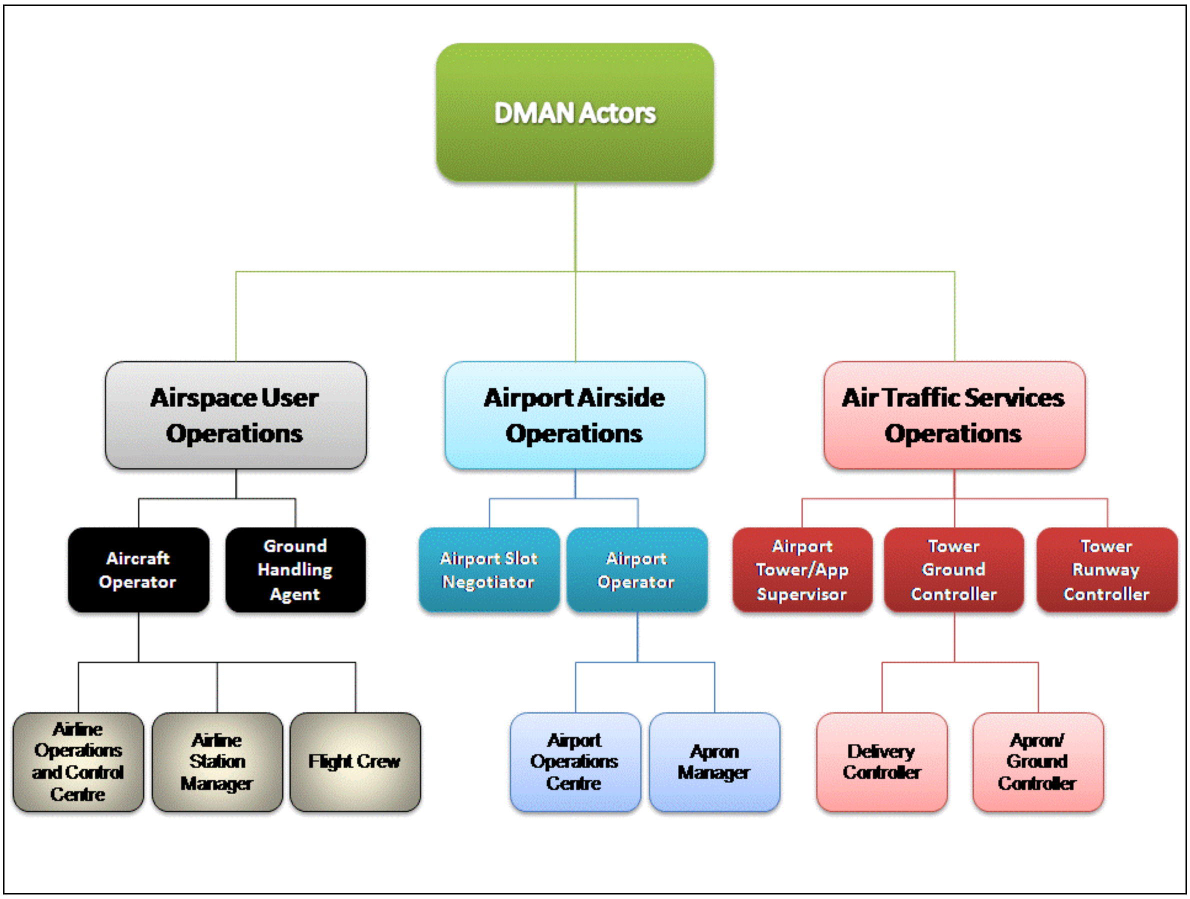

Figure 4: Hierarchy of DMAN actors

In order to simplify an avoid superfluous duplications, this section is limited to list responsibilities mentioned for the actors of the Use Cases presented in Chapter **5**.

Actors	Responsibilities in Basic DMAN context
Flight Crew	Coordinate with the AOCC/GH to agree on a TOBT
	Provide ATC with mandatory information: • Requests ATC Clearance and Start-up approval at TSAT, • Acknowledges and gives verbatim read-back of the provided clearance(s), • Requests Push-Back approval • Acknowledges the Push-Back approval
Aircraft Operator (AOC)/Ground Handler	Coordinate with Flight Crew to agree on target aircraft ready time (TOBT)
	Provide agreed TOBT to ATC

Actors	Responsibilities in Basic DMAN context
	Update target aircraft ready time (TOBT) when aircraft is delayed
Airport Operator	Decide on runway closure in co-operation with all concerned partners.
Airport Slot Negotiator	Update the airport slot allocation plan
Tower Supervisor	Decide on the runway capacity in co-operation with all concerned partners. (Including Approach Supervisor)
	Decide on runway configuration in co-operation with all concerned partners (Including Approach Supervisor)
	Enter runway closure command into the DMAN system.
Tower Runway Controller	Issue clearance to enter/ leave/ cross the control zone.
	Sequence departures
	Ensure sufficient spacing between successive departures.
	Provide information on runway braking action.
	Give instructions to taxi to the take-off position for departing flights and operate the stop bars if required.
	Issue take-off clearance to departing flights in accordance with the CTOT, if issued.
	Give authorisation to the Tower Ground Controller for the crossing of runways by surface traffic.
	Manage integration of departures in the arrival sequence in mixed-mode operations
Tower Delivery Controller	Manages the execution of the Pre-Departure Sequence provided by the DMAN
	Issue Departure Clearance
	Issue Start-Up approval
Tower Apron/Ground Controller	Manages the execution of the Pre-Departure Sequence provided by the DMAN
	Issue Push-Back approval;

Table 4 – Responsibilites of Actors involved in Basic DMAN procedures

Remark: On military aerodromes the role of Ground Controller is generally combined with that of the Runway Controller.

In the context of this OSED the Tower Ground Controller role iis split nto the two following sub-roles:

- The **Tower Delivery Controller**, and
- The **Tower Apron/Ground Controller**.

According to the aerodrome environment (e.g. airport complexity, traffic density, etc.) and the local regulations at a specific airport, the above positions may share tasks and responsibilities. To this respect, control areas and responsibilities are clearly defined in local documents and agreements at each airport.

3.3 Constraints

No particular technical constraint has been identified that might impact the concept or the solution.

It should be noted that section (§6.2) provides requirements for basic DMAN environment where all the interfaces of the Basic DMAN with external systems are identified.

However it should be noted the sequence calculation requirements are not very detailed. It leaves room for implementation to striking the right balance depending on local constraints which is key for DMAN efficiency.

4 Detailed Operating Method

4.1 Previous Operating Method

The previous operating method assumes that there is no DMAN available at the airport in general.

At the time this document was produced, there were only a few DMAN in operation at European Airports, and are not always operated in line with the EUROCONTROL A-CDM concept, which means that network planning does not benefit from accurate data .

At some airports departure clearance is given together with start-up, at other airports departure clearance is requested some time before Start-Up Request. The pre-departure sequence (push back sequence) is established according to the First Come First Served (FCFS) principle. As soon as the aircraft is ready, the pilot calls the ATC, who gives or delays the start-up according to CFMU-slot or foreseeable congestions that exceeds a 20 minute timeframe.

FCFS pre-departure sequence results in a FCFS departure sequence. This can lead to long queues at the runway line-up areas with less than optimum traffic mix in terms of outbound routing (SID allocation) and wake vortex separation for achieving high throughput and small time buffer to slot end. ATCOs will manage the departure separation and try to minimize the outbound delay at the threshold to the best of their ability and try to respect CTOTs, however, the traffic mix presented to them does not always mean that the runway can be utilised to its optimum throughput capacity. The chance for building a runway sequence with little delay increases with the number of runway entry points.

4.2 New SESAR Operating Method

The new SESAR operating method must incorporate A-CDM concept elements which are part of IP1 acting as an enabler to IP2 and IP3 development.

Airport CDM procedures aim at improving predictability for en-route traffic and network planning.

The second objective is to reduce taxi times having a positive impact on fuel costs an environment.

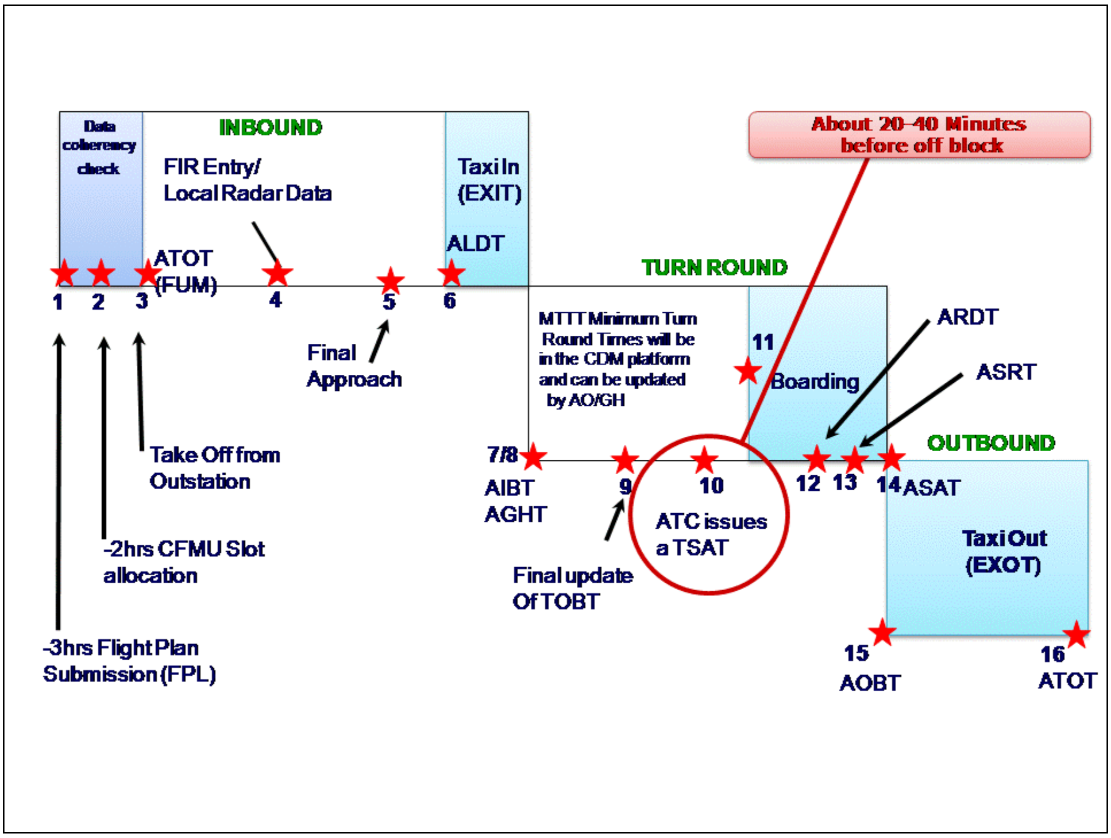

Figure 5: A-CDM milestones

Pre-requisite for effective departure management is the submission of a “best guess” TOBT by the airline to the A-CDM Milestone Manager and attached modules.

Before the submission of TOBT by the airline, “best guess” is automatically generated through EIBT+MTTT (i.e. Estimated In-Block Time + Minimum Turn-round Time)

In the SESAR environment a demand capacity balancing is in place delivering a departure capacity to the DMAN that has to be respected.

The analysis of existing DMAN systems (see Ref. [12]) has shown that two different planning strategies are in place today, closely related to the airport operational environment. Hence two operating methods can be distinguished as follows:

- **Operating Method 1** can be applied at airports with multiple entry points at the runway threshold or a complex taxiway system:

  For Operating Method 1, it is **mandatory** for the Tower Ground Controller **to follow the TSAT.** But TSAT is a window (-/+ x min) so the ASAT order might be different from the TSAT order.

  Although basic DMAN generates TTOTs (even if the TTOTs do not respect runway separation rules) the Tower Runway Controllers are **not expected to follow the TTOT order.**

- **Operating Method 2** can be applied at airports with only few runway entry points and no possibilities for aircraft to pass each other on alternative taxiways:

  For Operating Method 2, it is **mandatory** for the Tower Ground Controller **to follow the TSAT order.**

  The basic DMAN generates TTOTs with runway separations respected. It is not mandatory for the Tower Runway Controllers to follow the TTOT order but they are asked to follow the TTOT order as close as possible.

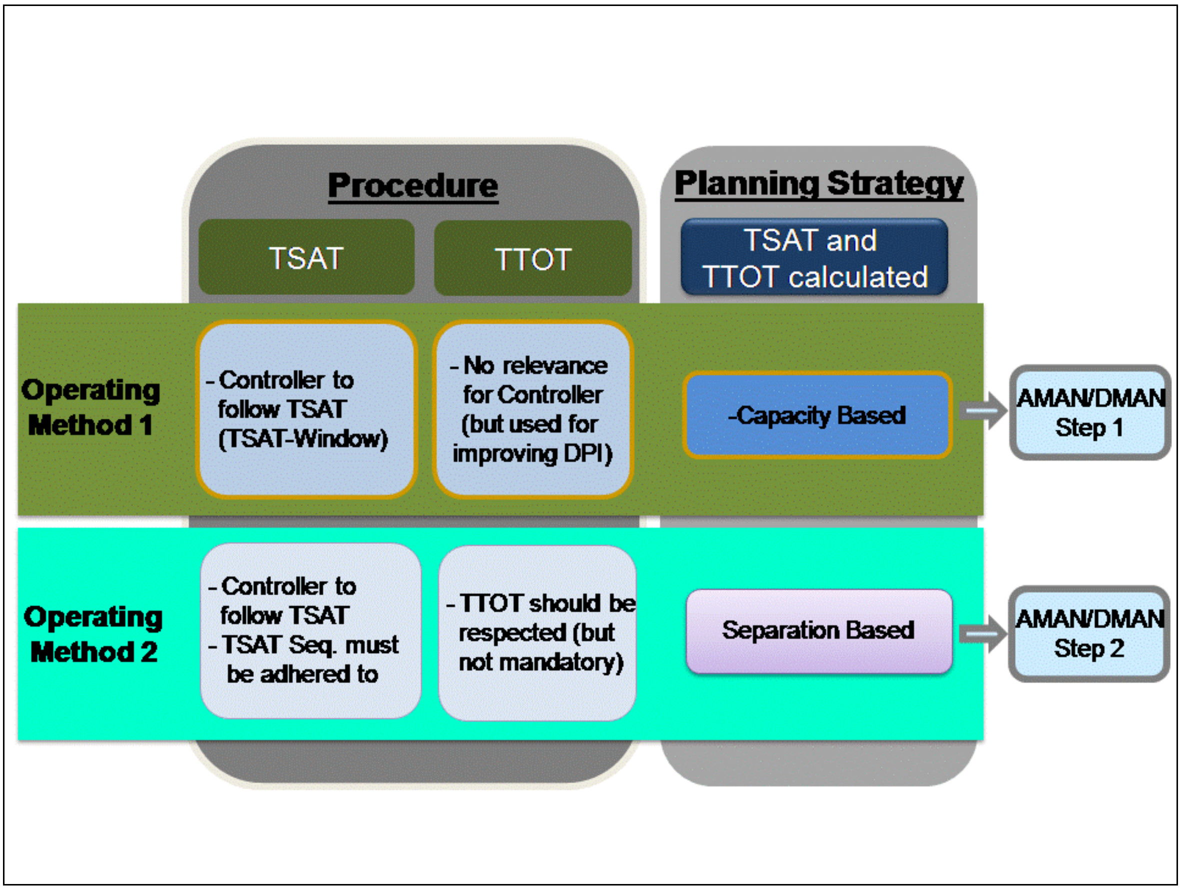

Figure 6: Operating Methods illustration

For for the purpose of this document, we will focus on the **Operating Method 1** which corresponds to the **baseline operational environment** for this Basic DMAN OSED as defined in chapter 3. In particular, procedures corresponding the Operating Method 1 will fully be described through use-cases in chapter 5.
However, as mentioned previously, the **Operating Method 2** is also described in section 4.2.2 of this document as it more closely follows the A-CDM and SESAR concept and as it represents the method that should be developed for the future versions of the DMAN (DMAN coupling to SMAN and AMAN) that can be applied once process uncertainties have been reduced to a certain level.

4.2.1 Operating Method 1

This operating method reflects the ones currently in use at several European airports.

The planning strategy associated to Operating Method 1 is ***planning strategy 1*** from State of the Art Analysis (Ref. [12]). It is related to an **airport environment with more than two runway entry points**.

Planning strategy 1 is characterized by the fact that the objective of departure management and purpose of issuing Target Start-up Times (TSATs), besides their role in the A-CDM process, is to **control the traffic flow to the runway**. In operating method 1 the purpose of TSATs is not to establish a sequence which produces the least delay, meaning the DMAN tool **does not support planning for maximum throughput**. In the airport environment corresponding to operating method 1 there are enough possibilities which enable the ATCO of an effective sequence management (many taxiways, multiple runway entry points) provided that there is a number of aircraft available close to the runway threshold. The number of aircraft waiting at the threshold or almost having reached the threshold (runway pressure) is controlled by the capacity entered in the DMAN tool.

When applying operating method 1 taxi times are not fully optimized. Waiting time at the threshold is reduced, because the flow to the runway is controlled but some delay is generated because more than one aircraft might be waiting at the threshold depending on the runway pressure.

In planning strategy 1:

- No real sequence is built
- TSAT calculation is based on a capacity value
- TSAT order is a result of flight prioritization following “First Scheduled (Planned) First Served” principle
- **Wake Vortex separation is not considered** in prioritization process
- Push-back dependencies are not considered
- SID/MDI separation might be considered on the basis of number of aircraft with same SID per unit of time.

The reason for not considering wake vortex separations in the described environment is the inevitable appearance of process uncertainties in pushback and taxi, with a certain probability distribution over process times.

In operating method 1:

- Start-up clearance request initiated by pilot in TSAT-window
- It is **mandatory** for the Tower Ground Controller **to respect the TSAT(window)**
- Tower Ground Controller manages pushback sequence
- Tower Runway Controller manages sequence at runway
- Although basic DMAN generates TTOTs (even if the TTOTs do not respect runway separation rules) the Tower Runway Controller is **not expected to follow the TTOT order.**

In the operating procedure associated to planning strategy 1, start-up clearance request is initiated by the pilot (departure clearance is requested before or together with start-up). A different operating method might apply for Datalink Clearance (DCL).

The request can be issued within a time window of +/-5 Minutes around TSAT, allowing for uncertainties in the TOBT estimate due to unexpected events (e.g. unloading baggage of no show passenger, etc…).

In case of compliance to TSAT window, Tower Delivery Controller then issues the clearances. Otherwise the aircraft is blocked (i.e. removed from the sequence). Tower Delivery Controller **is not required** to respect the TSAT order.

Upon receiving the Start-Up-given data Apron/Ground controller might directly contact the pilot for push-back (Different procedures for remote parking position apply). According to procedures, flight crew has to be ready at that time. If the flight crew does not answer the request immediately, the Apron/Ground Controller decides on blocking the aircraft. Providing aircraft ready data to Apron/Ground controller might be useful. Apron/Ground controllers are responsible for establishing a proper push-back sequence within their zone of responsibility. They are **not required** to respect the TSAT order.

Once push back is given, basic departure management procedures are completed.

4.2.2 Operating Method 2

This operating method reflects the one currently in use at one European airport. It represents the method that should be developed for the future versions of the DMAN within SESAR that can be applied once process uncertainties have been reduced to a certain level.

The planning strategy associated to Operating Method 2 is ***planning strategy 2*** from State of the Art Analysis (Ref. [12]). It is related to an **airport environment with few runway entry points**.

In operating method 2, pre-departure and departure management cannot be considered separately from each other. Also in planning strategy 2 the purpose of issuing Target Start-up Times is to contribute to A-CDM as well as to control the traffic flow to the runway. Planning strategy 2 however, is characterized by the fact that In addition to that the purpose of TSATs is to establish a runway departure sequence with the least possible delay , meaning the DMAN tool **does support planning for maximum throughput**. This is done because in the airport environment corresponding to operating method 2 there are not enough possibilities which enable the ATCO to manage the departure sequence effectively at the threshold (few taxiways, few runway entry points).

In operating method 2 taxi times are fully optimized by the DMAN tool. If no process uncertainties are present, there is no waiting time at the threshold, because TSATs are calculated considering the applicable separations.

The reason for not applying this planning strategy at airports where the runway sequence can be optimized during taxiing is the fact that in operating method 2 additional delay is introduced (waiting time at intersections when establishing sequence), when process uncertainties in pushback and taxi are present, which is almost always the case.

In planning strategy 2:

- TSAT calculation is based on separations
- **Wake vortex and capacity separations are considered**
- SID/MDI sequence constraints are considered
- Push-back dependencies are considered
- “First Scheduled (Planned) First Served” principle might have to give way to sequence delay optimization

When building the TSAT sequence wake vortex separations and minimum separations resulting from a departure capacity figure are taken into account. If the runways managed by the DMAN do not show any interdependencies with traffic on other runways which limit the departure capacity, minimum separation resulting from capacity constraints do not have to be considered.

SID/MDI dependencies are considered in terms of a minimum time spacing value between aircraft that depart using the same SID.

In operating method 2:

- Start-up clearance initiated by ATCO at TSAT (earliest)
- It is **mandatory** for the Tower Ground Controller **to follow the TSAT order**
- Tower Ground Controller does not manage pushback sequence but manages push-back times

- Tower Runway Controller establishes TTOT sequence at intersections
- Basic DMAN generates reliable TTOTs with runway separations respected.,
- In order to make use of the separation based optimisation, the Tower Runway Controller is requested to depart aircraft following the planned TTOT order as close as possible (**but it is not mandatory)**.

In operating method 2 pilots do not initiate the start-up request. They must expect to receive the start-up clearance at TSAT. When start-up is given, Apron/Ground controller can call the crew for pushback immediately (in ZRH start-up and push-back clearance are given together). If the flight crew does not answer to the pushback clearance immediately, Apron/Ground Controller might decide on b?locking the aircraft, thereby triggering a sequence recalculation.

Since push-back dependencies are considered in TSAT calculation, Apron/Ground Controller does not have to manage the push-back order but establish what has been calculated. However the optimization task of Apron/Ground Controller consist of optimizing pushback times at parking stands with different taxi times to same runway, relative to process uncertainties of the aircraft in the sequence that is ahead of the one awaiting pushback. TSAT sequence is to be maintained. TTOT sequence has to be established at intersections. If two or more Apron/Ground controllers operate dedicated airport areas, achieving this coordination might be difficult.

A different operating method might apply for Datalink Clearance (DCL).

No specific use-case is developed for **Operating Method 2** in chapter 5 of this document.

4.3 Differences between new and previous Operating Methods

In new SESAR Method, input of capacity from DCB to DMAN is expected. Otherwise stand and gate management conflicts may arise, since in case of low departure flow, aircraft are held back at positions, which are then blocked for inbounds.

In addition to the controlled flow to the runway, the new SESAR operating methods introduce a prioritization among the flights that the demand is comprised of, replacing the FCFS regime.

In **operating method 1** the flow to the runway might be adjusted within a certain range in order to increase the number of aircraft to choose from, when building an optimized take-off sequence for best runway usage.

In **operating method 2** a better usage of available runway capacity can already be achieved by establishing the TSAT sequence, but additional delay might be introduced.

TTOT quality will be improved by both methods, when CDM procedures are instated.

A change in procedures for start-up clearance will have to occur at some airports, depending on the operating Method that is applied.

Pushback procedures will also change at some airports, since in SESAR environment the pushback process is to be initiated by Apron/Ground Controllers.

5 Detailed Use Cases

5.1 Overview of the Use Cases

Application services	Use cases		Conditions	Result
	ID	Title		
Pre-Departure Sequence (PDS) Management	UC1	The Delivery controller issues the Departure and Start-Up approvals at Flight Crew request	Flight crew Dep. / En-route clearance **and** Start-Up request within TSAT-Window. **TOBT=TSAT +/-5**	*Departure clearance **and** Start-Up approval provided.*
	UC2	The Delivery controller issues the Departure Clearance at Flight Crew request but has to delay the issuance of the Start-Up approval	Flight crew request before TSAT. **TSAT-10 <TOBT<TSAT**	*Departure clearance provided;* *Start-Up delayed.*
	UC3	The Delivery controller does not issue the Departure Clearance at the Flight Crew Departure request on request too early	Flight crew dep. / en-route clearance request too early. **TOBT< TSAT - 10**	*No clearance provided.* *Flight state unchanged.*
	UC4	The Delivery controller blocks the flight at the Flight Crew Departure request: Late Departure request	Flight crew dep. clearance request too late. **Clearance request time > TSAT + 5**	*No Departure clearance issued. Flight taken out of planning sequence until a new TOBT is provided.*
	UC5	The Delivery controller blocks the flight after issue of the Start-Up approval: Aircraft not ready or no acknowledgement on Start-Up approval	Aircraft not ready or no acknowledgement on **Start-Up approval**	*Flight taken out of planning sequence until a new TOBT is provided.*
	UC6	AOC updates TOBT following a delay to the flight	Flight not ready at TOBT.	*New TOBT entered, New TSAT calculated*
	UC7	TSAT computation - CTOT improvement on new earlier TOBT provision	Aircraft Operator wants to notify an earlier TOBT for a CTOT constrained Flight	*New TOBT entered, new CTOT provided, new TSAT calculated*
Take-Off Sequence (TOS) Management	UC8	The Apron/Ground Controller issues the Push-Back approval with no delay on request	Push-Back request within TSAT window. Traffic situation permits P/B	*Push-Back approval issued.*
	UC9	The Apron/Ground Controller issues the Push-Back approval with some delay at Push-Back – Delay at the block.	Push-Back request within TSAT-Window. Traffic situation does not permit P/B.	*No Push-Back approval issued.* *On-Block delay.*
	UC10	The Apron/Ground Controller issues the Push-Back approval with some delay at Push-Back - Early Push-Back request	Push-Back request outside of TSAT-Window (earlier). Traffic situation irrelevant.	*No Push-Back approval issued. Flight delayed until reaching TSAT-Window.*
	UC11	The Apron/Ground Controller locks an Aircraft on late Push-Back request	Push-Back request outside of TSAT-Window (later). Traffic situation irrelevant.	*No Push-Back approval issued. Flight taken out of planning sequence until new TOBT is provided.*

Application services	Use cases		Conditions	Result
	ID	Title		
	UC12	The Apron/Ground Controller blocks an Aircraft on no acknowledgement or not ready on Push-Back approval	No Push-Back request within TSAT-Window or no acknowledgement of Push-Back approval.	*Push-Back approval not provided or revoked.* *Flight taken out of planning sequence until a new TOBT is provided.*
Runway configuration management	**UC13**	The Tower Supervisor schedules a Change of capacity	RWY capacity value changed by TWR Supervisor.	*TSATs re-calculated according to new RWY capacity value.*
	UC14	The Tower Supervisor schedules a Change of runway configuration	RWY configuration changed by TWR Supervisor	*If necessary, TSATs re-calculated.*
	UC15	The Tower Supervisor schedules a Runway Closure	RWY closed by Airport operator.	*TSATs re-calculated according to new capacity.*
Supervision / System Status		A-CDM mode interruption (System state, not Use-Case)	Degraded environment or CDM not available	*No TSATs calculated.* *Sequence computed according to EOBTs.*

Table 5: List of Use-Cases

For each use case, the following items are provided:

- A **summary,** briefly describing the Use Case;
- The list of all the **actors** involved and their actions in each use-case;
- An **operational view** of the use case: this figure shall describe the sequencing procedure between the concerned actors;
- A **transactional view**: this figure shall describe the Basic DMAN entries and actions to cope with the current case in accordance with the procedures;
- The **general conditions**: these conditions include the operational mode environment;
- The **pre-conditions**: the conditions include the timing pre-requisites motivating the use case;
- The **operating method**: it provides the high level description of the new operating method in the normal mode, in the form of successive steps to be implemented.

Important notice :

The Use Cases described herafter are only guidelines.

5.2 Pre-Departure Sequence management

5.2.1 UC1: The Delivery controller issues the Departure and Start-Up approvals at Flight Crew Departure request

5.2.1.1 Summary

This Use Case describes the best-case scenario: The TOBT is provided by the AOC to the DMAN system (Use Case start) earlier than TSAT-10' and the TSAT computed by the Basic DMAN is close to the TOBT provided by the AOC (**TSAT-5<TOBT<TSAT+5**).

In this case, the Flight Crew (pilot) can initiate a combined departure and Start-Up approval request within TSAT window and the Delivery Controller can provide these clearances **simultaneously.**

Once having acknowledged the Start-Up approval, the Flight Crew can then request its Push-Back approval (Use Case End).

5.2.1.2 Actors

AOC:

- Coordinates with the Flight Crew to agree on a TOBT,
- Provides the agreed TOBT to the Basic DMAN system.

Flight Crew:

- Coordinates with the AOC to agree on a TOBT,
- Requests ATC Clearance and Start-up approval at TSAT,
- Acknowledges and gives verbatim read-back of the provided clearance(s).
- Requests Push-Back approval.

Delivery Controller:

- Provides the Flight Crew with its Departure Clearance on Flight Crew request.
- Provides the Flight Crew with its Start-Up approval.

Note: The Apron/Ground Controller is not explicitly listed among this Use Case as he is the addressee of the last request of the Use Case.

5.2.1.3 Use Case Operational and transactional views – VHF Clearance

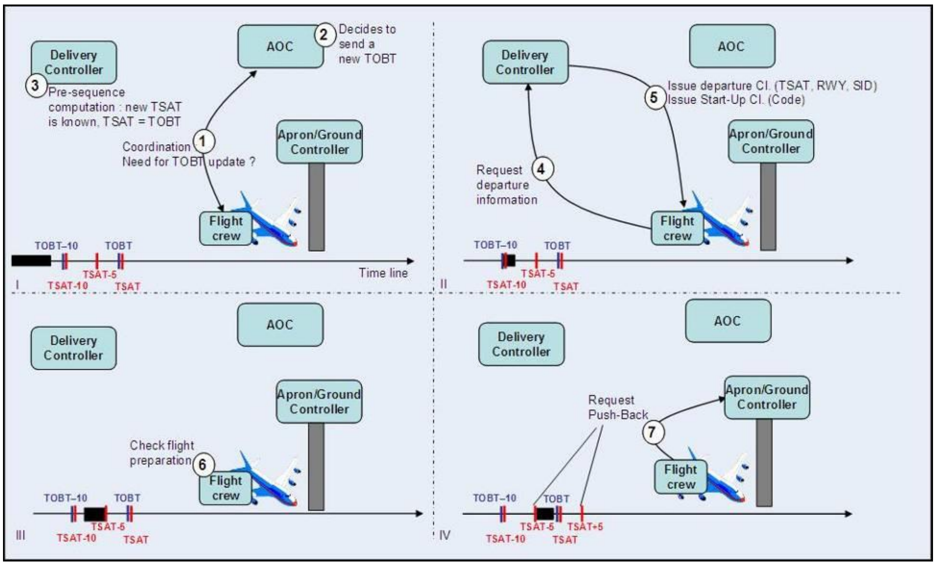

Figure 7: UC1 - Operational view – VHF Clearance

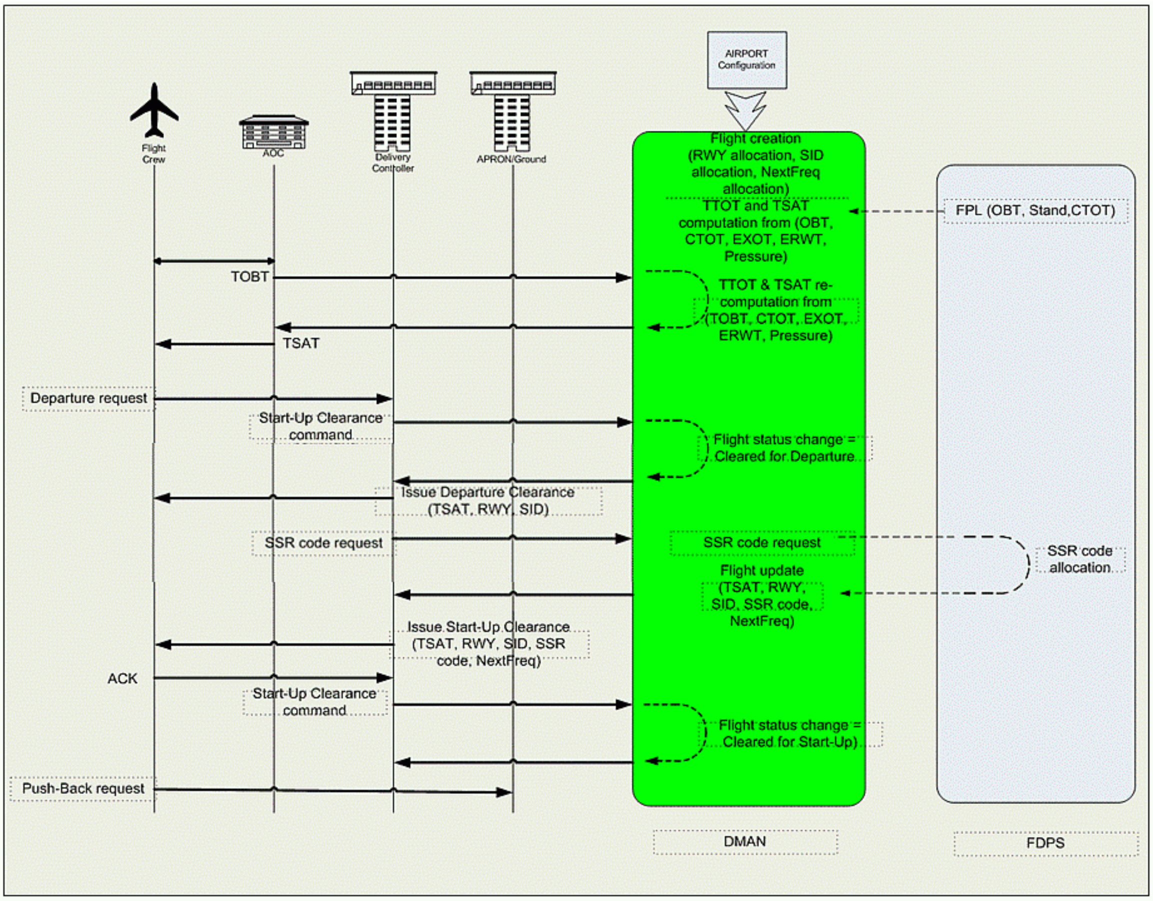

Figure 8: UC1 - Transactional view – VHF Clearance

General Conditions

GC1: Start-up request

GC2: Ground handling process completed according to TOBT

GC3: Delivery Controller responsible for Departure and Start-Up approvals.

GC4: Apron/Ground controller operates Push-Back approval

Pre-conditions

PreC1: TOBT within TSAT-Window (+/- 5 minutes)

PreC2: Flight Crew contact within TSAT-Window (+/- 5 minutes)

Operating method

Step	Delivery Controller	Flight Crew	Notes
1		Requests simultaneously departure clearance and start-up within TSAT-Window giving the following information: ▪ Call sign, ▪ Stand ▪ (A/C type) ▪ Aerodrome of destination ▪ ATIS identifier	

Step	Delivery Controller	Flight Crew	Notes
2	Issues departure clearance and start-up at the same time giving SSR code, RWY, SID.		*Depending on the traffic situation, ground controller can grant start-up and push back at the same time.*
3		Acknowledges Start-Up approval. Gives verbatim read-back of Departure clearance.	
4		Requests Push-Back approval from the Apron/Ground Controller	

Table 6: UC1 – Operating mode – VHF Clearance

5.2.1.4 Use Case transactional views – Datalink Clearance

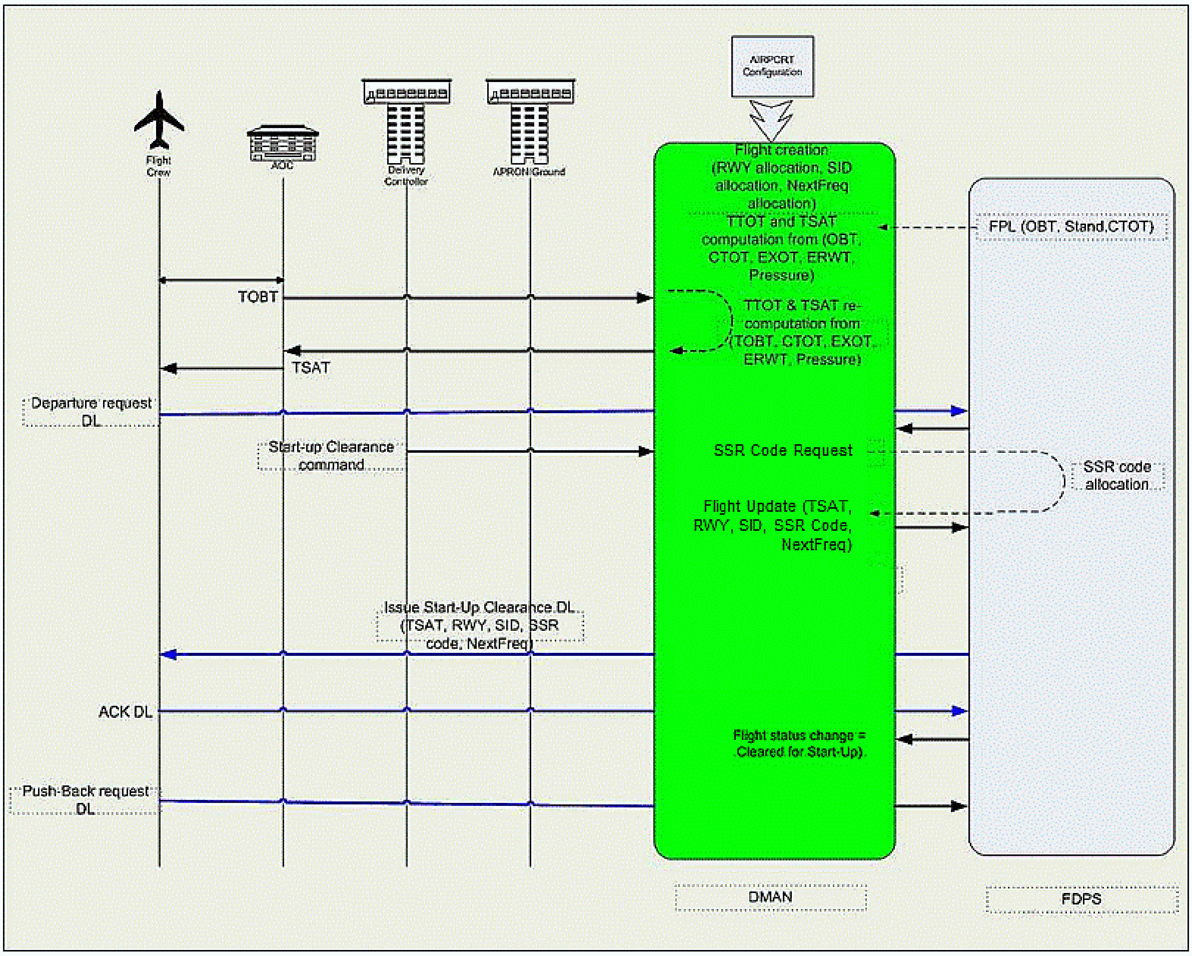

Figure 9: UC1 - Transactional view – Datalink Clearance

General Conditions

GC1: Start-up request via Datalink

GC2: Ground handling process completed according to TOBT

GC3: Delivery Controller responsible for Departure and Start-Up approvals.

GC4: Apron/Ground controller operates Push-Back approval

Pre-conditions

PreC1: TOBT within TSAT-Window (+/- 5 minutes)

PreC2: Flight Crew send request within TSAT-Window (+/- 5 minutes)

Operating method

Step	Delivery Controller	Flight Crew	Notes
1		Requests departure clearance and start-up within TSAT-Window via Datalink	
2	Issues departure clearance and start-up at the same time giving SSR code, QFU, SID via Datalink.		
3		Acknowledges Start-up clearance via Datalink. Checks Clearance data.	*The Clearance data is entered by the pilot in its system. An alarm shall be raised in the DMAN system in case of discrepancy between DMAN and Flight data.*
4		Requests Push-Back clearance via Datalink.	

Table 7: UC1 – Operating mode – Datalink Clearance

5.2.2 UC2: The Delivery controller issues the Departure Clearance at the Flight Crew Departure request and has to delay the issue of the Start-Up approval

5.2.2.1 Summary

The TOBT is provided by the AOC to the DMAN system (Use Case start) earlier than TSAT-10' and Basic DMAN is in charge of calculating TSAT.

In this case, when the Flight Crew requests Departure Clearance at close to TOBT – 10', the Delivery Controller gives the Flight Crew its Departure Clearance. The Flight Crew has to acknowledge the Departure Clearance.

The Start-Up approval will then be issued by the Delivery Controller once within the TSAT-Window [TSAT +/- 5 minutes}.

Once having acknowledged the Start-Up approval, the Flight Crew can then request its Push-Back approval (Use Case End).

5.2.2.2 Actors

AOC:

- Coordinates with the Flight Crew to agree on a TOBT,
- Provides the agreed TOBT to the Basic DMAN system.

Flight Crew:

- Coordinates with the AOC to agree on a TOBT,
- Requests Departure Clearance between TOBT-10 minutes and TOBT,
- Acknowledges and gives verbatim read-back of the provided clearance(s).

Delivery Controller:

- Provides the Flight Crew with its Departure Clearance on request.
- Provides the Flight Crew with its Start-Up approval.

Note: The Apron/Ground Controller is not explicitly listed among this Use Case as he is the addressee of the last request of the Use Case.

5.2.2.3 Use Case Operational and transactional views

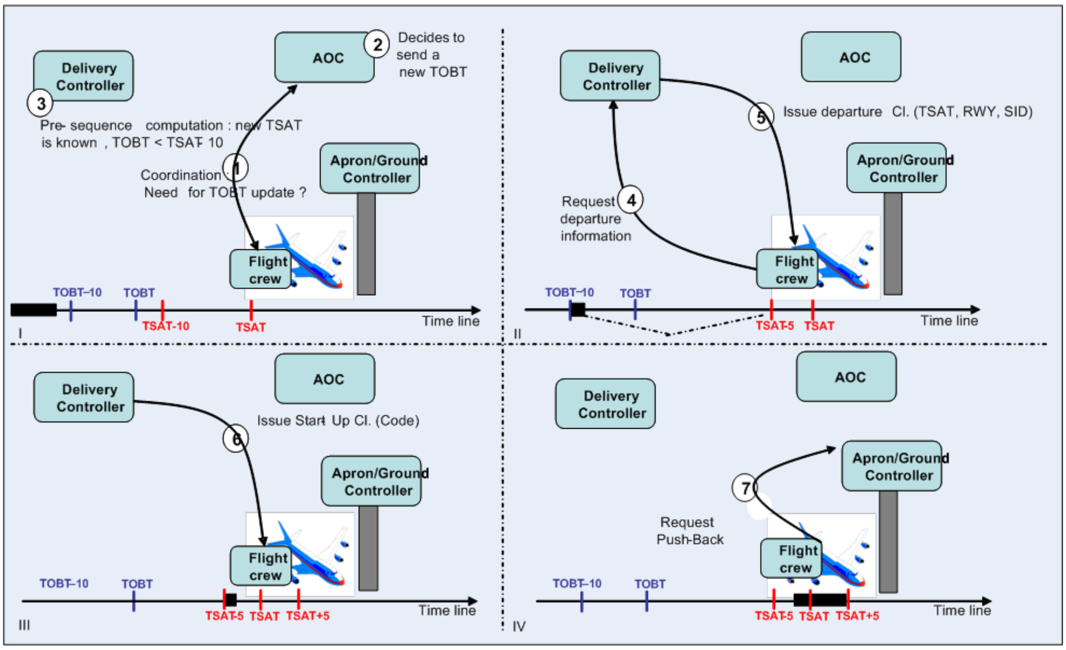

Figure 10: UC2 - Operational view

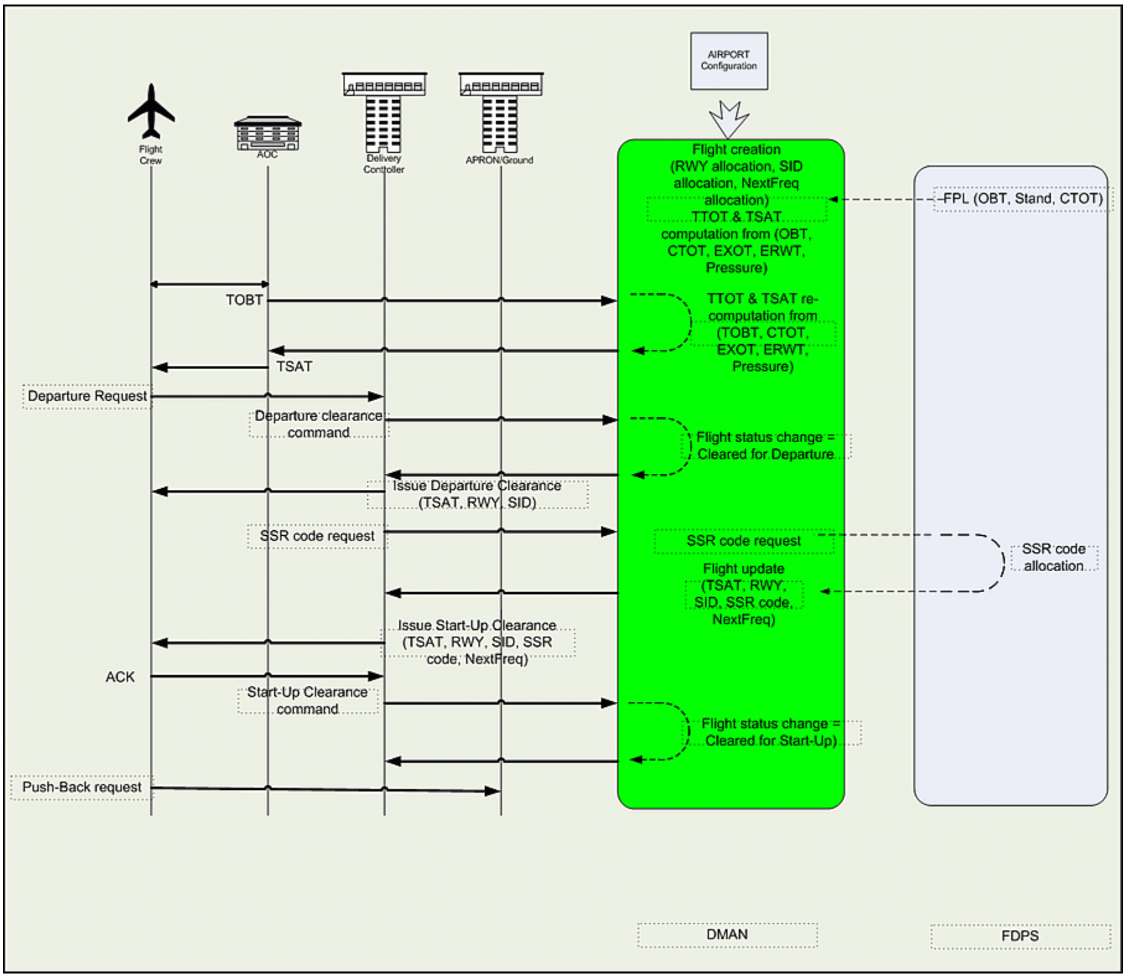

Figure 11: UC2 - Transactional view

General Conditions.

GC1: Start-up request.

GC2: Ground handling process completed according to TOBT.

GC3: Delivery Controller responsible for departure and Start-Up approvals.

GC4: The Apron/Ground controller responsible for Push-Back approval.

Pre-conditions.

PreC1: TOBT is earlier than TSAT-10 minutes

PreC2: Flight Crew contact later than TOBT-10 minutes but earlier than TSAT - 5 minutes.

Operating method

Step	Delivery Controller	Flight Crew	Notes
1		Requests **simultaneously** departure / en route clearance and start-up between TOBT-10 minutes and TSAT -5 minutes, giving the following information : ▪ Callsign ▪ Stand ▪ A/C type ▪ Airport of destination ▪ ATIS identifier	
2	Issues departure clearance giving TSAT, RWY, SID.		
3		Acknowledges Departure clearance.	
4	Issues Start-Up approval giving SSR code, RWY, SID at TSAT-5 minutes.		
5		Acknowledges Start-Up approval.	
6		Requests for Push-Back approval from the Apron/Ground Controller	

Table 8: UC2 – Operating Method

5.2.3 UC3: The Delivery controller does not issue the Departure Clearance at the Flight Crew Departure request on request too early

5.2.3.1 Summary

The TOBT is provided by the AOC to the DMAN system (Use Case start) earlier than TSAT-10' and Basic DMAN is in charge of calculating TSAT.

In this case, the Delivery Controller instructs the Flight Crew to request the clearance no earlier than, TOBT-10 minutes (Use Case End).

5.2.3.2 Actors

AOC:

- Coordinates with the Flight Crew to agree on a TOBT,
- Provides the agreed TOBT to the Basic DMAN system.

Flight Crew:

- Coordinates with the AOC to agree on a TOBT,
- Requests Departure Clearance, in this case earlier than TOBT-10 minutes.

Delivery Controller:

- Suggests new call time, if clearance is requested earlier than TOBT -10 minutes.

5.2.3.3 Use Case Operational and transactional views

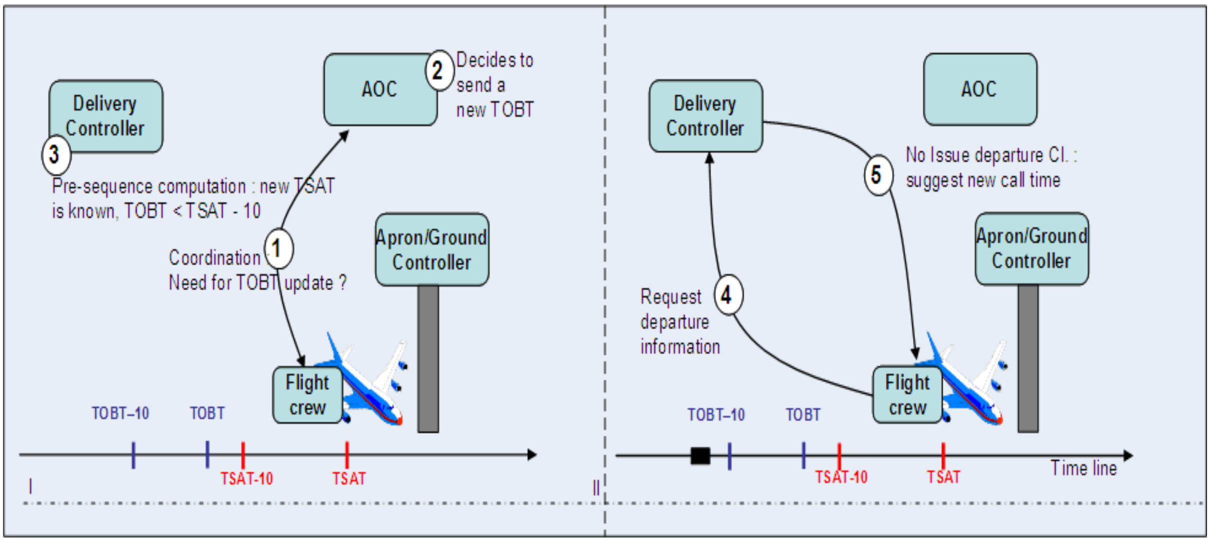

Figure 12: UC3 - Operational view

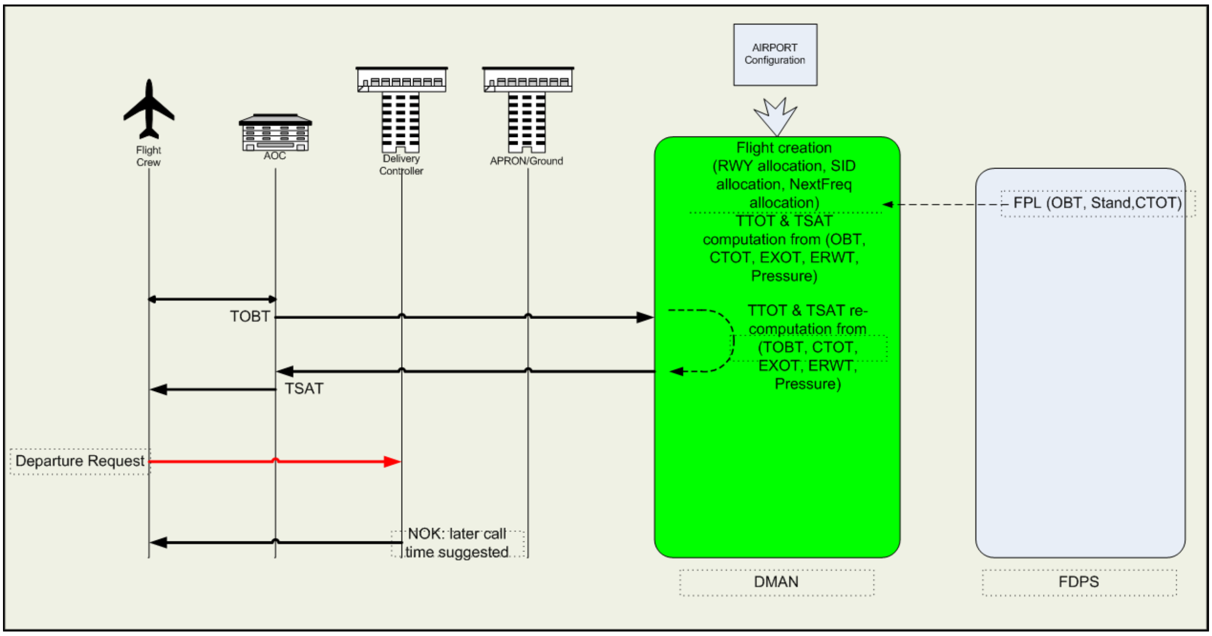

Figure 13: UC3 - Transactional view

General Conditions.

GC1: Start-up request

GC2: Ground handling process completed according to TOBT

GC3: Delivery Controller responsible for departure and Start-Up approvals.

GC4: Apron/Ground controller responsible for Push-Back approval

Pre-conditions.

PreC1: TOBT is earlier than TSAT-10 minutes

PreC2: Flight Crew contact earlier than TOBT-10 minutes

Operating method

Step	Delivery Controller	Flight Crew	Notes
1		Requests departure clearance earlier than TOBT-10 minutes giving the following information : ▪ Callsign, ▪ Stand, ▪ A/C type, ▪ Airport of destination, ▪ ATIS identifier	
2	Requests the Flight Crew to perform the Departure Request at TOBT-10 minutes.		*When the following request is performed, Use Case 5.2.1 or 5.2.2 applies.*

Table 9: UC3 – Operating Method

5.2.4 UC4: The Delivery controller blocks the flight at the Flight Crew Departure request: Late Departure request

5.2.4.1 Summary

The TOBT is provided by the AOC to the DMAN system (Use Case start). A TSAT is computed for the Flight. In this case, when the Flight Crew requests Departure Clearance after TSAT+5 minutes, Delivery Controller does not issue any clearance. The flight is removed from the planning sequence) of the Basic DMAN system until a new TOBT is issued by the AOC (Use Case end). Based on the new TOBT, a new TSAT will be calculated.

5.2.4.2 Actors

AOC:

- Coordinates with the Flight Crew to agree on a TOBT,
- Provides the agreed TOBT to the Basic DMAN system.
- Is required to provide an updated TOBT if the flight is delayed.

Flight Crew:

- Coordinates with the AOC to agree on a TOBT,
- Requests Departure Clearance, in this case later than TSAT + 5 minutes.,

Delivery Controller:

- Does not deliver any clearance, if requested later than TSAT +5 minutes.

5.2.4.3 Use Case Operational and transactional views

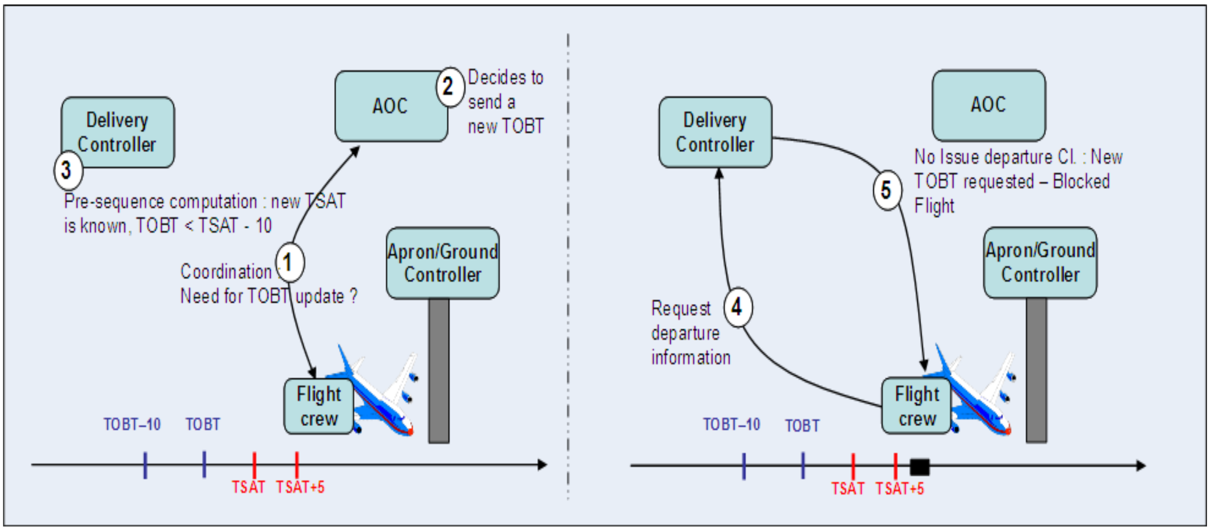

Figure 14: UC4 - Operational view

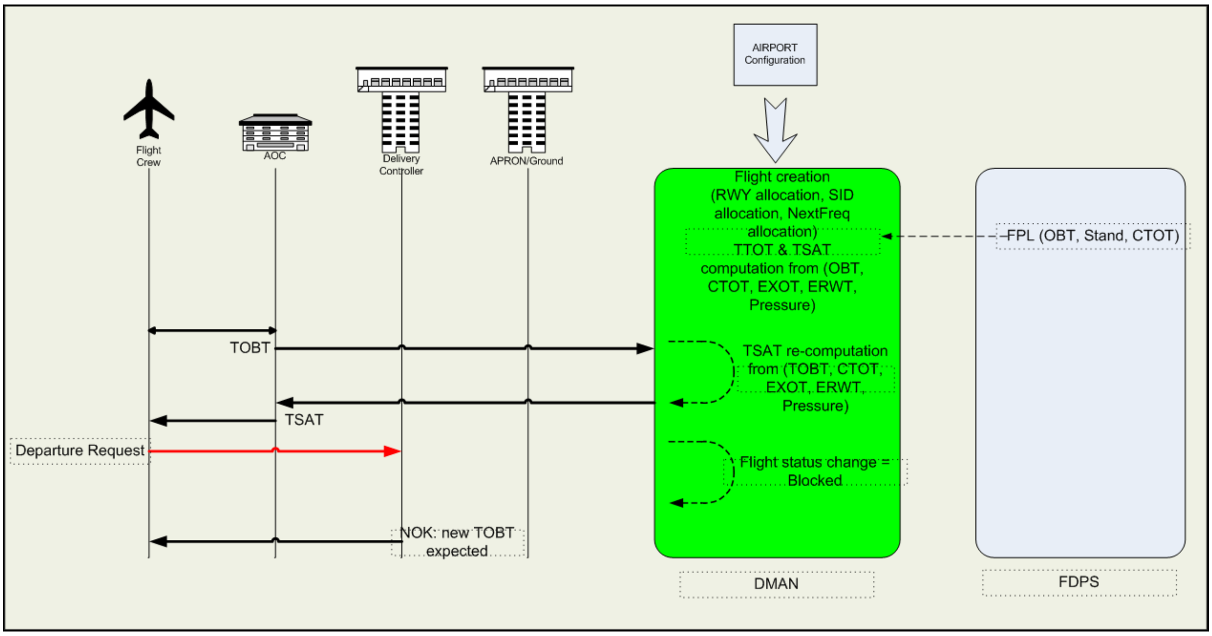

Figure 15: UC4 - Transactional view

General Conditions.

GC1: Start-up request

GC2: Ground handling process completed according to TOBT.

GC3: Delivery Controller responsible for departure and Start-Up approvals.

GC4: Apron/Ground controller responsible for Push-Back approval

Pre-conditions.

PreC1: Flight Crew contact later than TSAT + 5 minutes.

Operating method

Step	Delivery Controller	Flight Crew	Notes
1		Requests departure clearance later than TSAT+5 minutes giving the following information : ▪ Callsign, ▪ Stand, ▪ A/C type, ▪ Airport of destination, ▪ ATIS identifier	
2	Requests the Flight Crew to provide a new TOBT (via AOC).		*The Flight crew shall ask the AOC to provide a new TOBT for the Flight. Thereafter Use case 5.2.1 or 5.2.2 applies.*

Table 10: UC4 – Operating Method

5.2.5 UC5: The Delivery controller blocks the flight after issue of the Start-Up approval: Aircraft not ready or no answer on Start-Up approval

5.2.5.1 Summary

The TOBT is provided by the AOC to the DMAN system (Use Case start) and the TSAT is computed by the Basic DMAN.

When the Flight Crew requests Departure Clearance no earlier than TOBT – 10', the Delivery Controller gives the Flight Crew its Departure Clearance.

The Flight Crew has to acknowledge the Departure Clearance.

The Start-Up approval is then issued to the Flight Crew within the TSAT window (TSAT +/- 5 minutes.

The two following cases are taken into account and are operationally equivalent:

- The Flight is not ready when cleared for Start-Up by the Delivery Controller: the Flight might be manually blocked by the Delivery Controller. After TSAT + 5minutes, the Flight will be automatically blocked by the DMAN system. (Use Case end),
- The Flight Crew does not answer to the three attempts of contact from the Delivery Controller: the Flight might be manually blocked by the Delivery Controller. After TSAT + 5 minutes, the Flight will be automatically blocked by the DMAN system. (Use Case end).

5.2.5.2 Actors

AOC:

- Coordinates with the Flight Crew to agree on a TOBT,
- Provides the agreed TOBT to the Basic DMAN system.

Flight Crew:

- Coordinates with the AOC to agree on a TOBT,
- Requests Departure Clearance at between TOBT-10 minutes and TOBT,
- Is not ready for Start-Up when receiving the Start-Up approval / at TSAT +5 minutes or earlier
- Or does not reply to the attempt of the Delivery Controller to issue the Start-Up approval.

Delivery Controller:

- Provides the Flight Crew with its Departure / En-route Clearance on request.
- Attempts to Provide the Flight Crew with its Start-Up approval.
- Removes the Flight from the Basic DMAN planning sequence if Start-Up approval is not acknowledged or Flight is not ready for Start-Up at TSAT +5 minutes or earlier.

5.2.5.3 Use Case Operational and transactional views

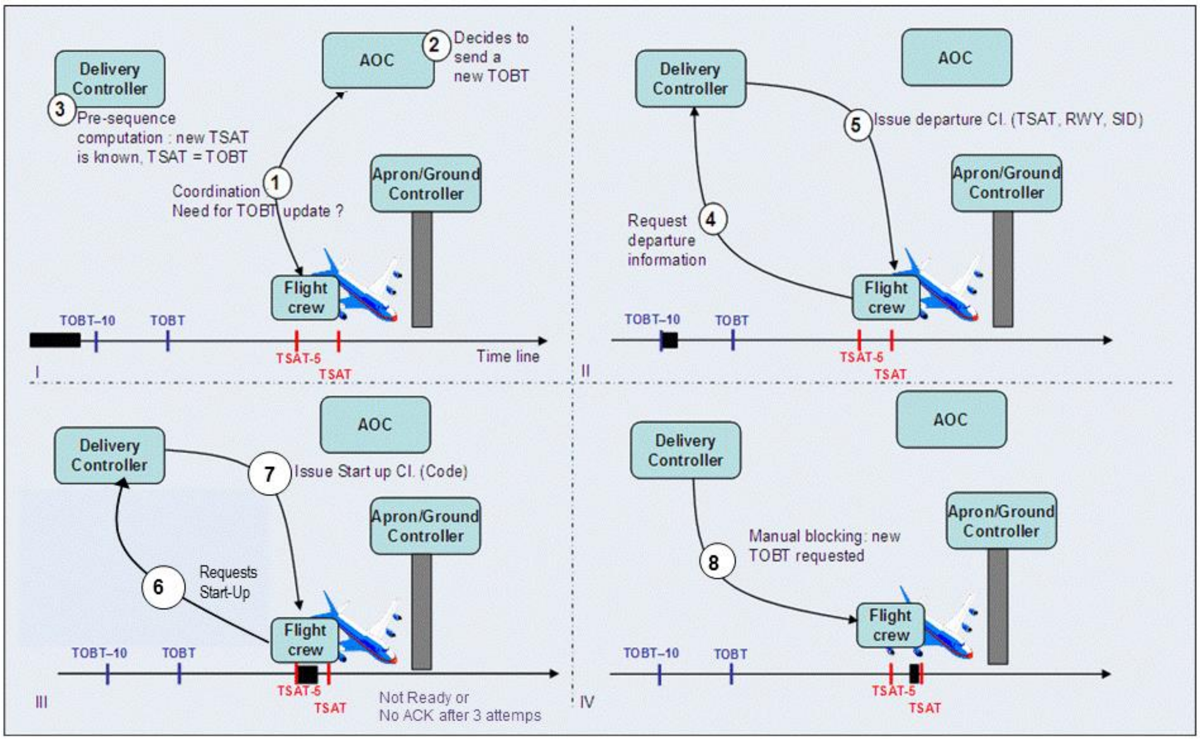

Figure 16: UC5 - Operational view

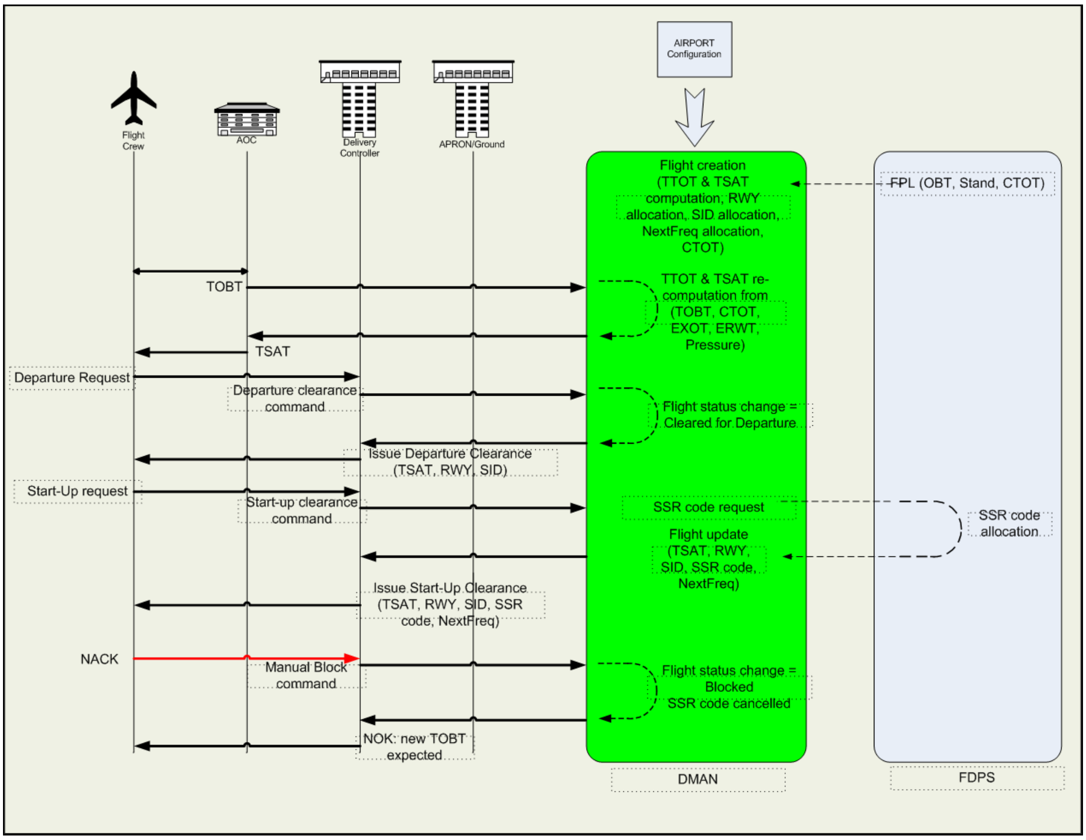

Figure 17: UC5 – Transactional view (Case 1: Flight is not ready)

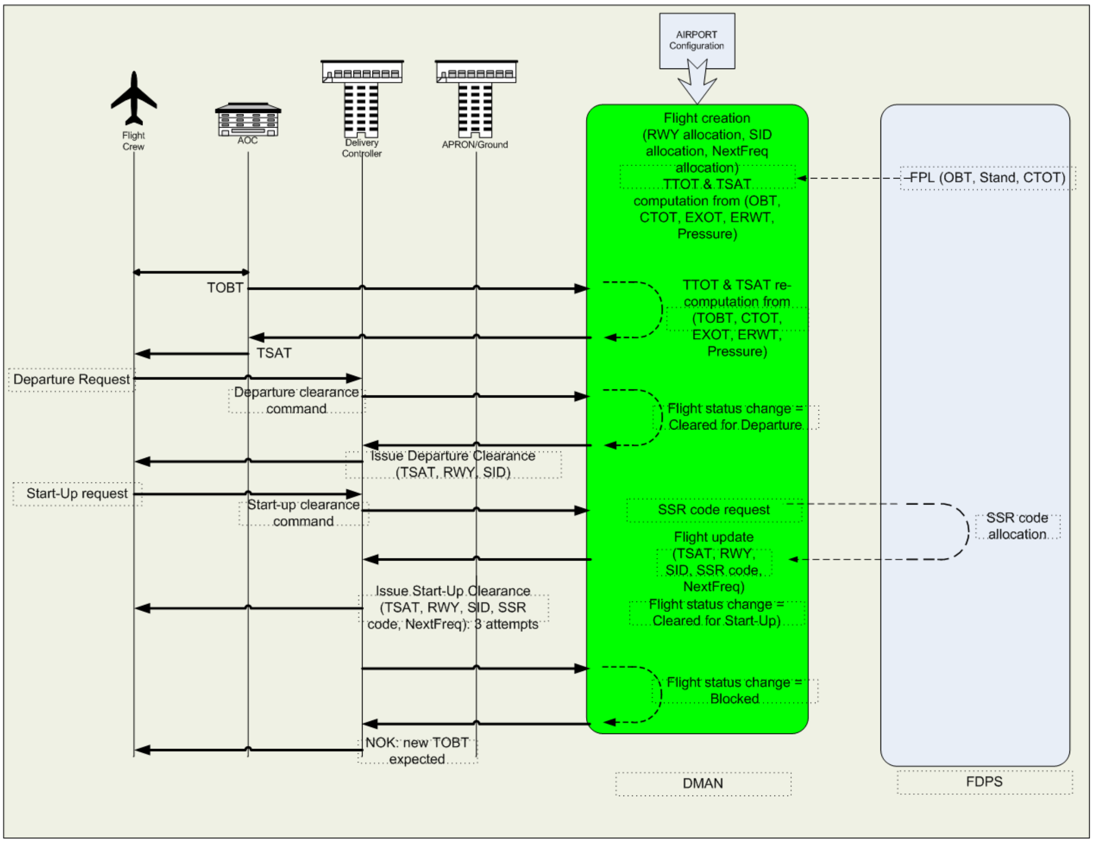

Figure 18: UC5 – Transactional view (Case 2: Flight Crew does not answer)

General Conditions.

GC1: Departure clearance request

GC2: The Delivery Controller operates departure and Start-Up approvals.

GC3: The Apron/Ground controller operates Push-Back approval

Pre-conditions.

PreC1: TOBT is less than TSAT-10 minutes

PreC2: Departure clearance request by Flight Crew at TOBT-10 minutes or later.

Operating method

Step	Delivery Controller	Flight Crew	Notes
1		Requests departure clearance at TOBT-10 minutes or later giving the following information : ▪ Callsign, ▪ Stand, ▪ A/C type, ▪ Airport of destination, ▪ ATIS identifier	

Step	Delivery Controller	Flight Crew	Notes
2	Issues departure clearance giving TSAT, RWY, SID.		
3		Acknowledges Departure Clearance Requests Start-Up	
4	Issues Start-Up approval giving SSR code, RWY, SID.		
5		Does not answer to the Start-Up approval (3 attempts) or answers "not ready".	
6	Manually Blocks the flight from planning sequence. Requests for new TOBT to be provided by AOC.		*When a new TOBT is provided, a new TSAT is calculated. Thereafter refer to use-cases 5.2.1 or 5.2.2, as far as applicable.*

Table 11: UC5 – Operating Method

5.2.6 UC6: AOC updates TOBT following a delay to the flight

5.2.6.1 Summary

The TOBT is provided by the AOC to the DMAN system (Use Case start). A TSAT is computed for the Flight.

Then a new later TOBT is agreed between the AOC and the Flight Crew and provided by the AOC to the DMAN.

The pre-sequencing process is now restarted based on the new TOBT mitigated with any applicable penalty delay strategy. Depending on the value of the new computed TSAT, UC1 or UC2 applies. (Use Case end).

5.2.6.2 Actors

AOC:

- Coordinates with the Flight Crew to agree on TOBT(s),
- Provides the agreed new TOBT(s) to the Basic DMAN system (including updates).
- Informs Flight Crew of new TSAT if applicable (?)

Flight Crew:

- Coordinates with the AOC to agree on TOBT(s),

5.2.7 UC7: TSAT computation - CTOT improvement on new earlier TOBT provision

5.2.7.1 Summary

The TOBT is provided by the AOC to the DMAN system and the considered Flight has a CTOT (Use Case start). The Flight TSAT is computed taking into account the TOBT and the CTOT. The Flight Crew provides a new TOBT prior to the original TOBT. The Basic DMAN system computes a TTOT and sends the new TOBT and TTOT to the CFMU. If the CFMU can provide a better CTOT than the original one for the considered Flight, this improved CTOT is sent to the Basic DMAN system which computes a new TSAT taking into account the new TOBT and the new CTOT.

5.2.7.2 Actors

AOC:

- Coordinates with the Flight Crew to agree on TOBTs,
- Provides the agreed TOBTs to the Basic DMAN system (including updates).
- Informs Flight Crew of new TSAT if applicable.

Flight Crew:

- Coordinates with the AOC to agree on a TOBT,

Airport Slot Negotiator:

- Updates the airport slot allocation plan.

5.3 Take-Off sequence management

5.3.1 UC8: The Apron/Ground Controller issues the Push-Back approval with no delay at push-back

5.3.1.1 Summary

The Flight Crew issues a Push-back request to the Apron/Ground Controller (Use Case start). The Apron/Ground Controller issues the Push-Back approval (Use Case end).

5.3.1.2 Actors

Flight Crew:

- Requests Push-Back approval before TSAT+5 minutes,
- Acknowledges the Push-Back approval.

Apron/Ground Controller:

- Provides the Flight Crew with its Push-Back approval on request, if within TSAT-Window.

5.3.1.3 Use Case Operational and transactional views

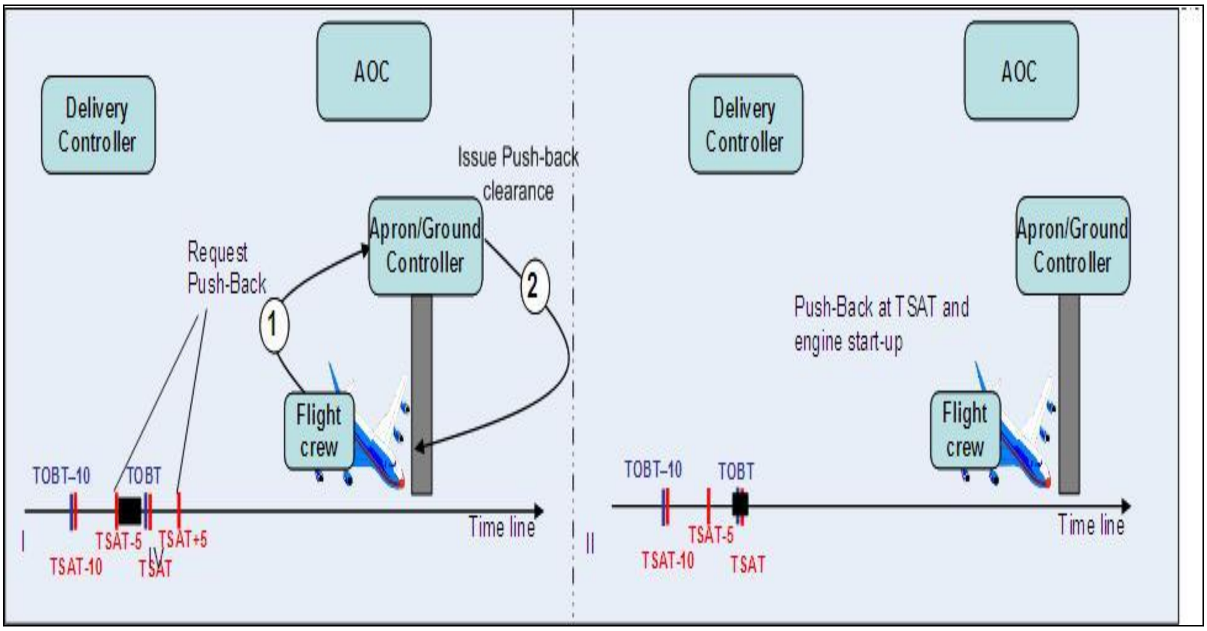

Figure 19: UC8 – Operational view

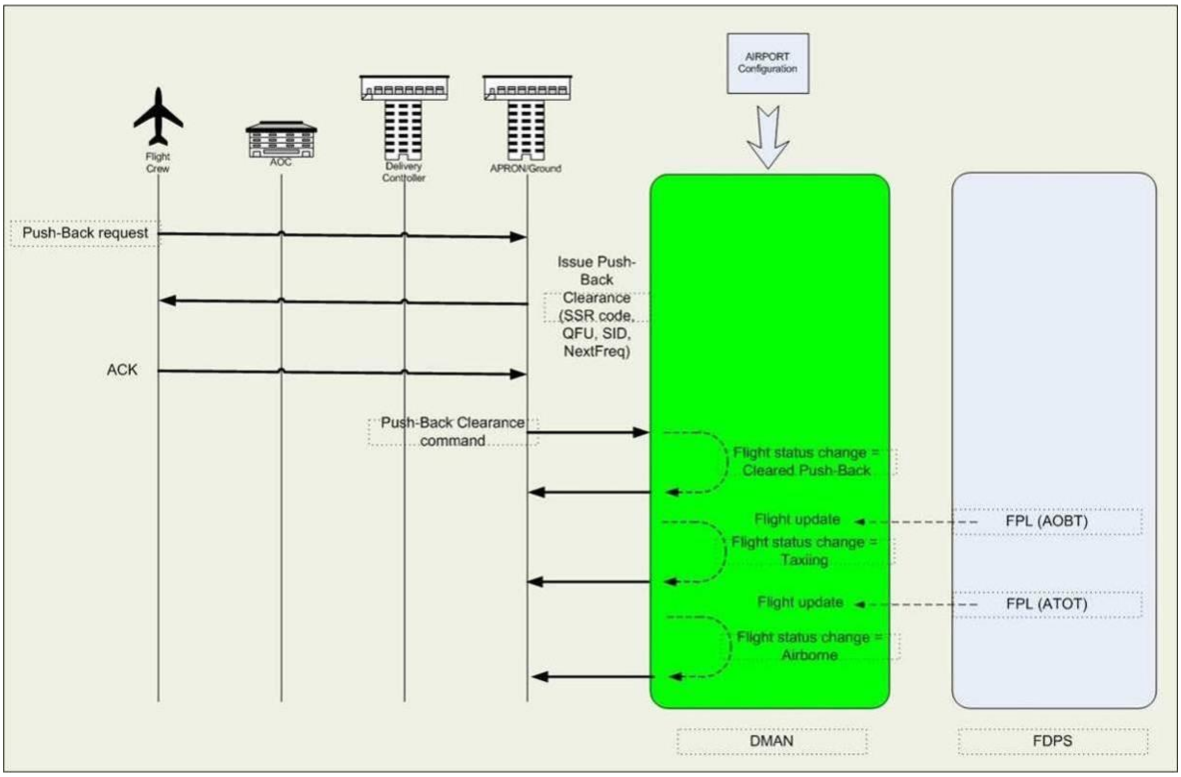

Figure 20: UC8 – Transactional view

General Conditions.

GC1: Push-Back request on frequency

GC2: Aircraft ready for Push-Back

GC3: Apron/Ground controller responsible for Push-Back approval

Pre-conditions.

PreC1: The Start-Up approval has been issued on time by the Delivery Controller and acknowledged by Flight Crew.

Operating method

Step	Apron/Ground Controller	Flight Crew	Notes
1		Requests Push-Back approval.	
2	Issues Push-Back approval (NextFreq, TTOT).		
3		Acknowledges the Push-Back approval.	*The Push-Back approval is only valid for a limited time (e.g. 1 minute)*

Table 12: UC8 – Operating Method

5.3.2 UC9: The Apron/Ground Controller issues the Push-Back approval with some delay at Push-Back – Delay at the block

5.3.2.1 Summary

The Flight Crew issues a Push-back request to the Apron/Ground Controller (Use Case start).

The Apron/Ground Controller delays the Push-Back approval but later issues the Push-Back approval still within the TSAT-Window (Use Case end).

5.3.2.2 Actors

Flight Crew:

- Requests Push-Back approval within TSAT-window,

Apron/Ground Controller:

- Provides the Flight Crew with its Push-Back approval within the TSAT-Window ,

5.3.2.3 Use Case Operational and transactional views

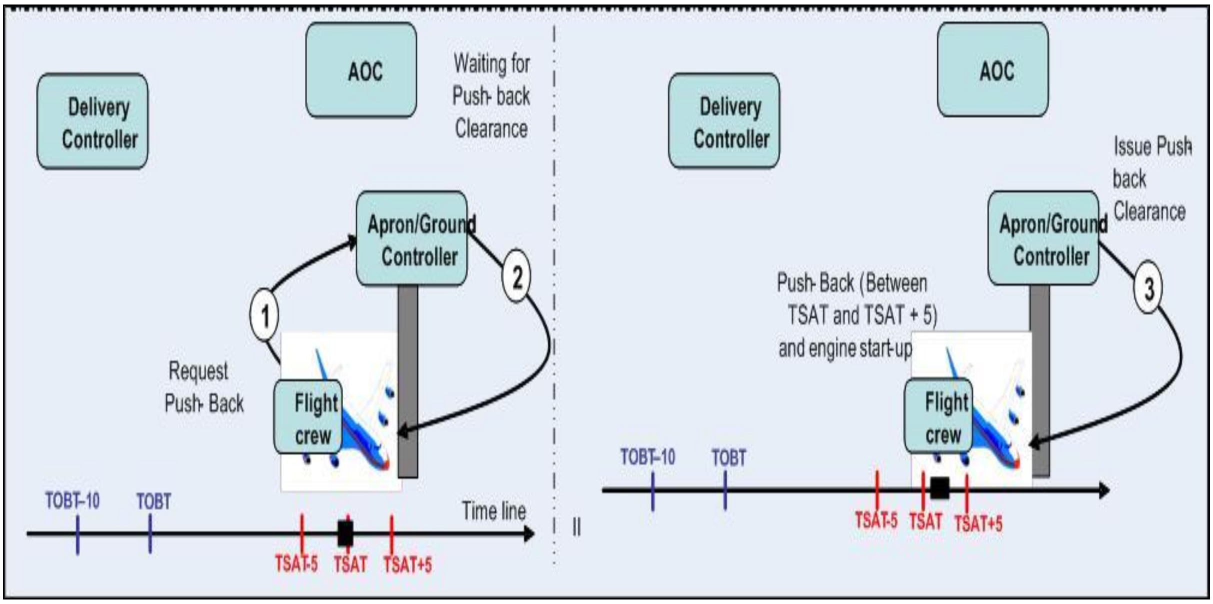

Figure 21: UC9 – Operational view

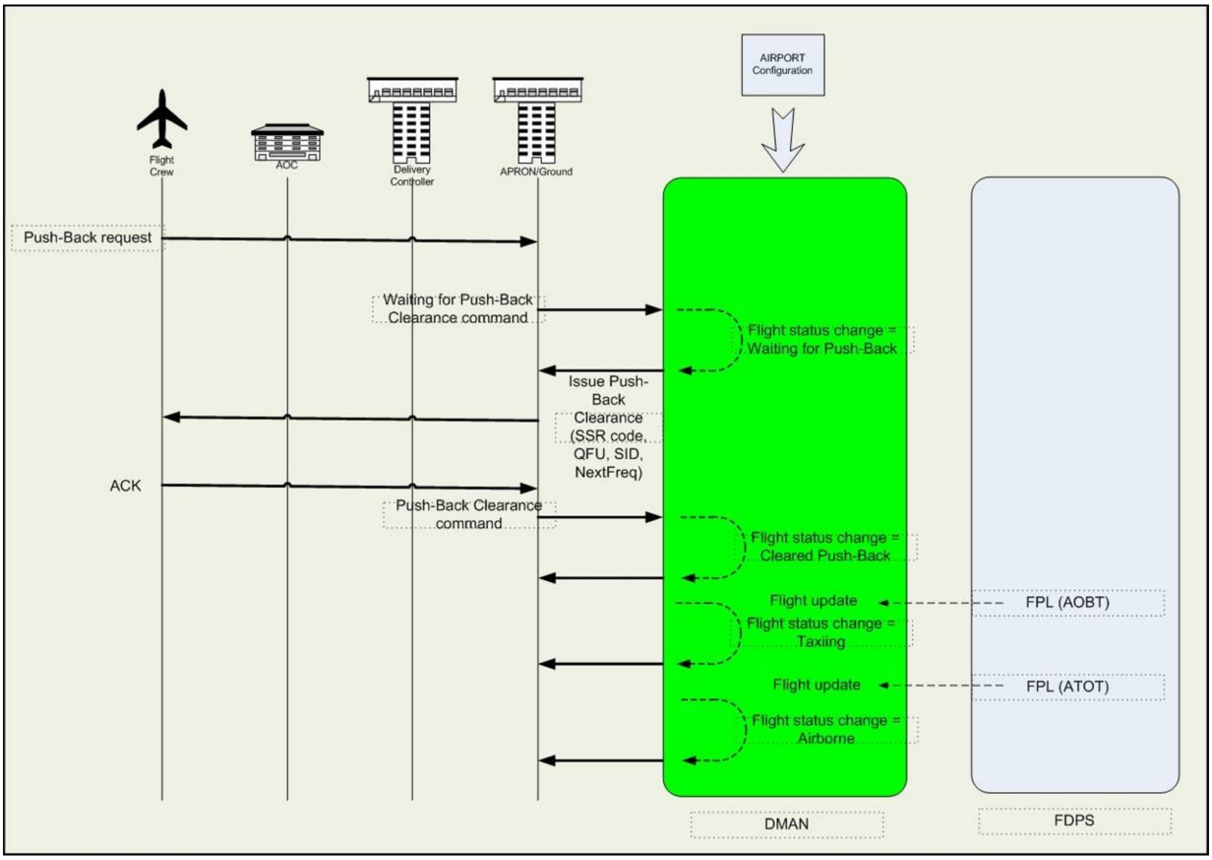

Figure 22: UC9 – Transactional view

General Conditions.

GC1: Push-Back request on frequency

GC2: Ground Handling process completed / Aircraft ready for Push-Back

GC3: GC4: Apron/Ground controller responsible for Push-Back approval

Pre-conditions.

PreC1: The Start-Up approval was issued on time.

PreC2: Push-Back cannot be performed immediately on request (e.g. due to traffic situation).

Operating method

Step	Apron/Ground Controller	Flight Crew	Notes
1		Requests Push-Back approval.	
2	Denies Push-Back approval.		
3	Issues Push-Back approval (NextFreq, TTOT).		
4		Acknowledges the Push-Back approval.	*The Push-Back approval is only valid for a limited time (e.g. 1 minute)*

Table 13: UC9 – Operating Method

5.3.3 UC10: The Apron/Ground Controller issues the Push-Back approval with some delay at Push-Back - Early Push-Back request

Flight-Crew requests Push-Back outside of the TSAT-Window (earlier). Use-case Equivalent to UC9

5.3.4 UC11: The Apron/Ground Controller blocks an Aircraft on late Push-Back request

5.3.4.1 Summary

The Flight Crew issues a Push-back request late than TSAT+5 minutes (Use Case start).

The Flight is removed from the planning sequence until a new TOBT is provided by AOC. (Use Case end).

5.3.4.2 Actors

Flight Crew:

- Requests Push-Back approval,

Apron/Ground Controller:

- Provides the Flight Crew with its Push-Back approval if requested within TSAT-Window,
- Revokes Departure / En-route clearance and Start-Up and Removes Flight from planning sequence if not ready within TSAT-Window

5.3.4.3 Use Case Operational and transactional views

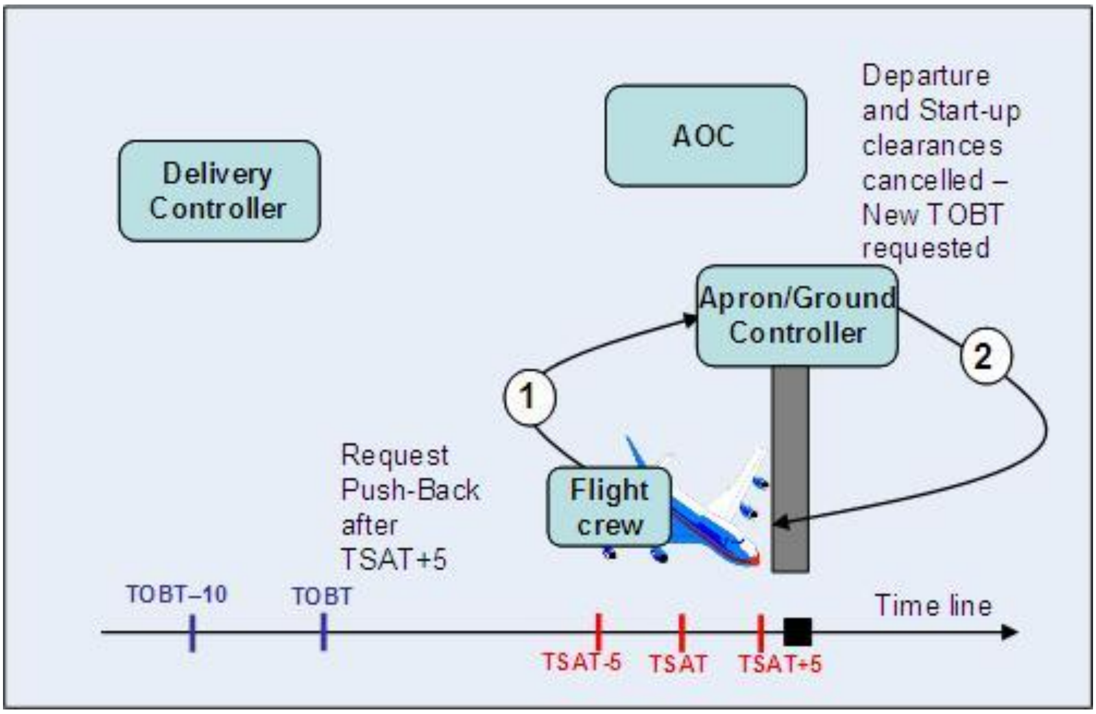

Figure 23: UC11 – Operational view

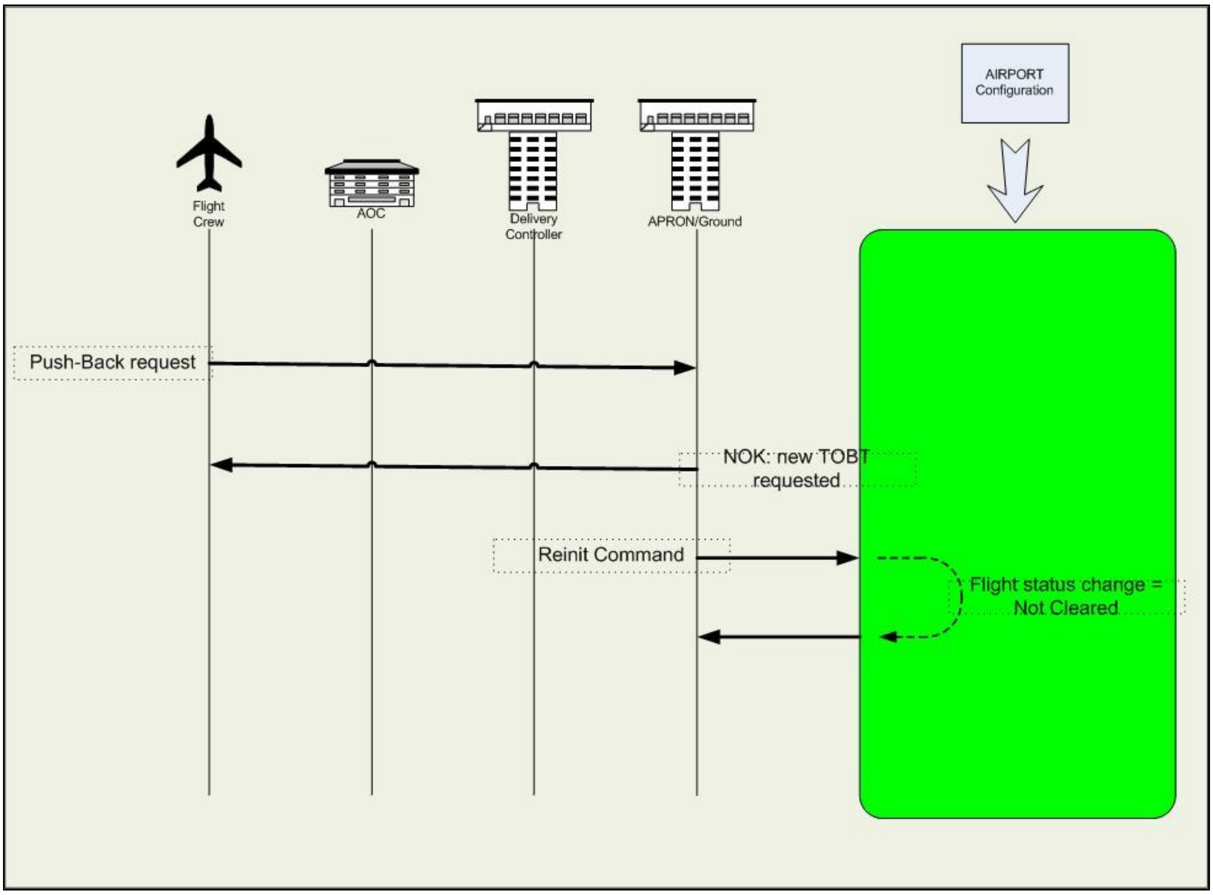

Figure 24: UC11 – Transactional view

General Conditions.

GC1: Push-Back requested on frequency

Pre-conditions.

PreC1: Departure / En-route and Start-Up approval were issued on time.

PreC2: The Flight Crew requests Push-back after TSAT+5 minutes.

Operating method

Step	Apron/Ground Controller	Flight Crew	Notes
1		Requests Push-Back approval	
2	No Clearance issued. Requests the Flight Crew to provide a new TOBT.		*The Flight crew shall ask the AOC to provide a new TOBT for the Flight. Thereafter Use case 5.2.1 or 5.2.2 applies.*

Table 14: UC11 – Operating Method

5.3.5 UC12: The Apron/Ground Controller blocks an Aircraft on no answer or not ready on Push-Back approval

5.3.5.1 Summary

The Flight Crew has requested Push-back but Push-Back approval was denied by Apron/Ground Controller (Use Case start). The Flight has been put in waiting state.

The two following cases are taken into account and are operationally equivalent:

- The Flight is not ready at the Apron/Ground Delivery Controller call-back (Use Case end),
- The Flight Crew does not answer to the three attempts of contact from the Apron/Ground Controller (Use Case end).

5.3.5.2 Actors

Flight Crew:

- Requests Push-Back approval within TSAT-Window,
- Replies to call-back and Acknowledges the Push-Back approval when provided (Not met in this case).

Apron/Ground Controller:

- Provides the Flight Crew with its Push-Back approval within TSAT-window and when traffic situation permits,

5.3.5.3 Use Case Operational and transactional views

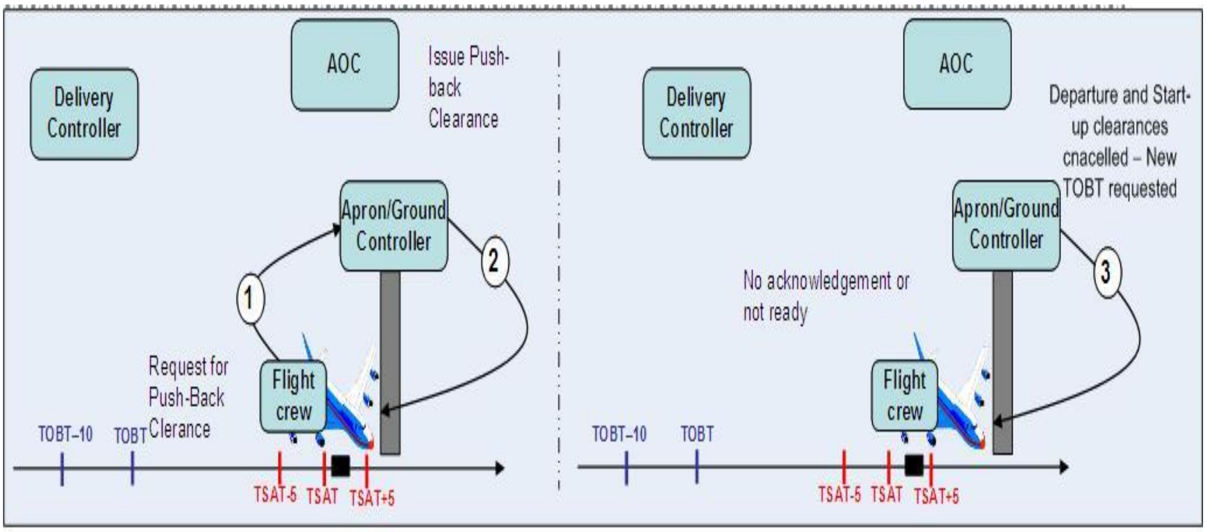

Figure 25: UC12 – Operational view

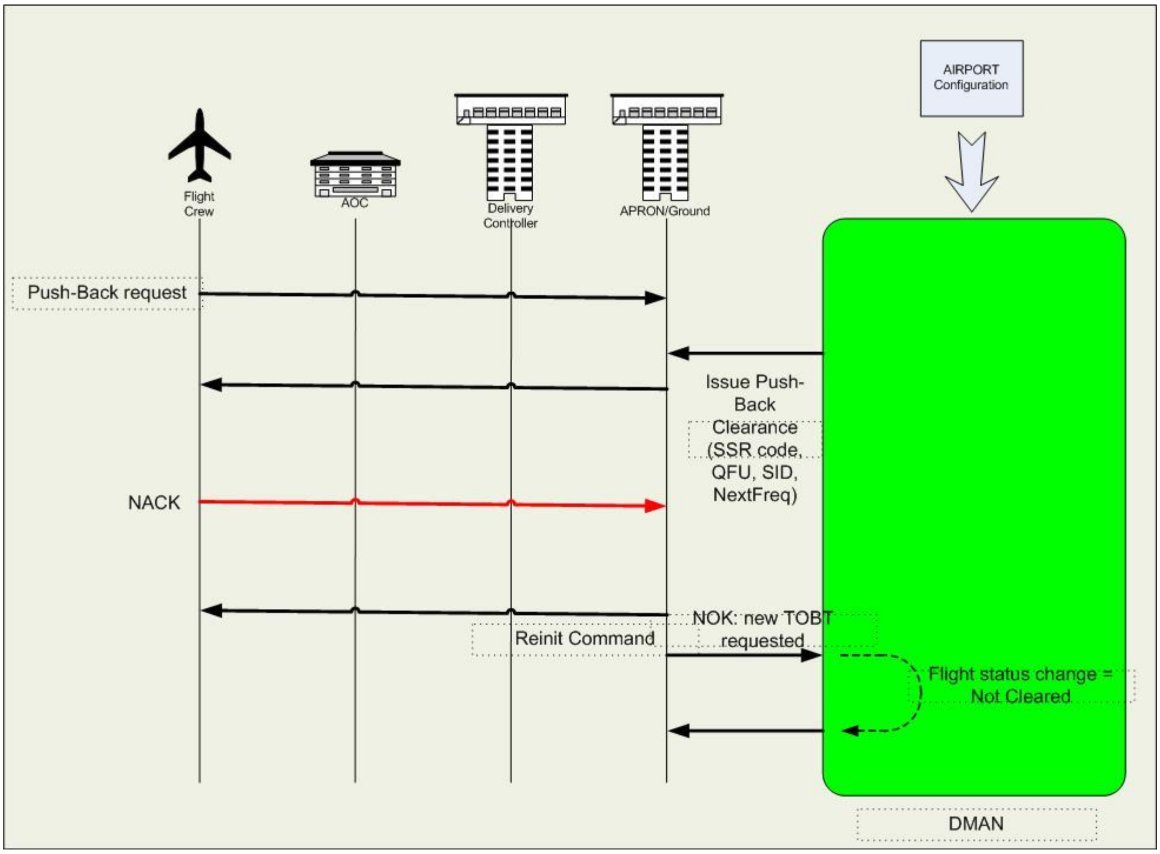

Figure 26: UC12 – Transactional view (Case 1: Flight is not ready)

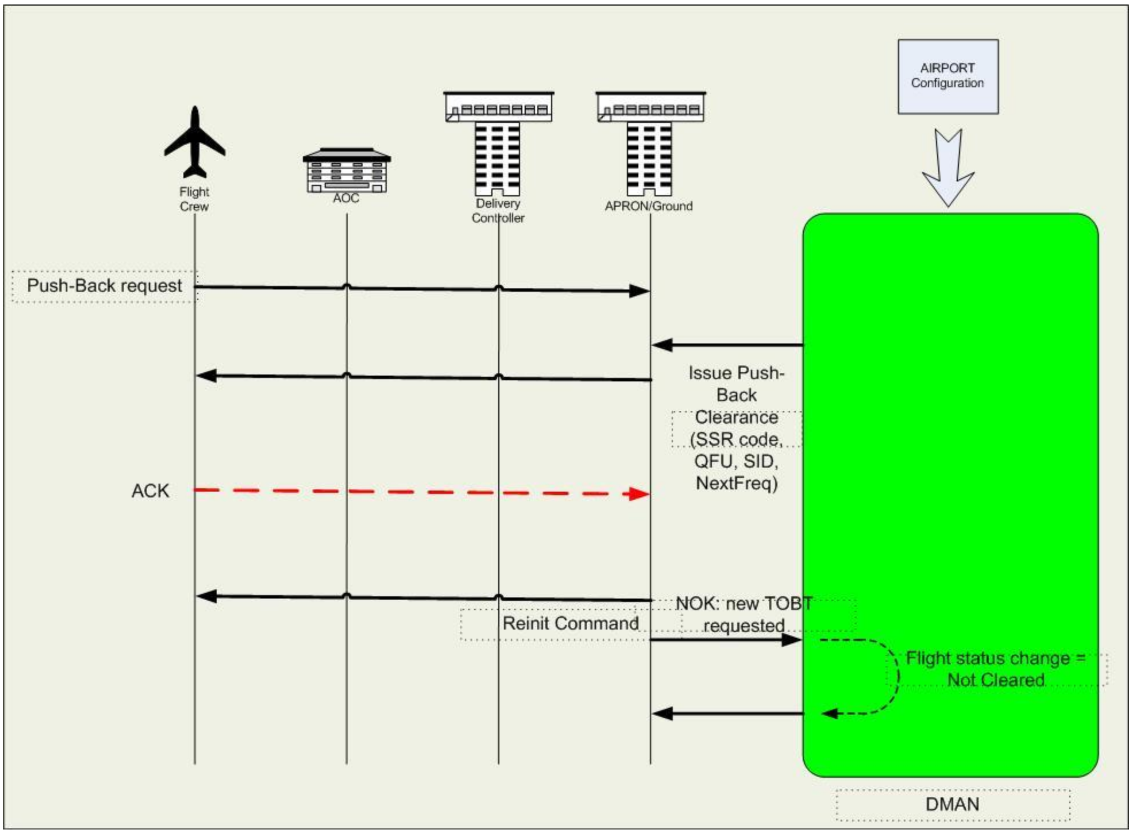

Figure 27: UC12 – Transactional view – (Case 2 Flight Crew does not answer)

General Conditions.

GC1: Push-Back request on frequency

GC2: The Delivery Controller operates departure and Start-Up approvals.

GC3: The Apron/Ground controller operates Push-Back approval

Pre-conditions.

PreC1: The Start-Up approval was issued on time.

PreC2: Push-Back was requested but denied.

Operating method

Step	Apron/Ground Controller	Flight Crew	Notes
1		Requests for Push-Back approval.	
2	Issues Push-Back approval (NextFreq…).		
3		Does not answer to the Push-Back approval or answers “not ready”.	
4	Blocks the Flight. Requests the Flight Crew to provide a new TOBT.		*The Departure Clearance and Start-Up approval are cancelled. The Flight crew shall ask the AOC to provide a new TOBT for the Flight. Depending on the first Flight Crew request time, Use case 5.2.1 or 5.2.2 applies.*

Table 15: UC12 - Operating Method

5.4 Runway Configuration management

5.4.1 UC13: The Tower Supervisor schedules a Change of capacity

5.4.1.1 Summary

Tower Supervisor decides to modify runway capacity (In coordination with the Airport Operator).

No change for the flights with a derived TTOT/CTOT before the scheduled change of capacity and TSAT is recomputed for the flights initially sequenced before the change of capacity.

For flights having already received a clearance, the controller shall manually manage the situation. For example, the cleared departure runway is maintained for the already cleared flights but can be manually modified by the Delivery or the Apron/Ground controllers.

5.4.1.2 Actors

Tower Supervisor:

- Modifies the runway capacity.

Delivery Controller:

- Manually handles each specific Flight.

Apron/Ground Controller:

- Manually handles each specific Flight.

5.4.2 UC14: The Tower Supervisor schedules a Change of runway configuration

5.4.2.1 Summary

Tower Supervisor decides to modify runway configuration (In coordination with the Airport Operator where applicable).

No change for the flights with a derived TTOT/CTOT before the scheduled change of runway configuration. TSAT is recomputed for all flights sequenced after the change of runway configuration, according to the new Runway configuration.

For the flights having already received a clearance, the controller shall manually manage the situation. For example, the RWY is maintained for the already cleared flights but can be manually modified by the Delivery or the Apron/Ground controllers.

5.4.2.2 Actors

Tower Supervisor:

- Modifies the runway configuration.

Delivery Controller:

- Manually handles each specific Flight.

Apron/Ground Controller:

- Manually handles each specific Flight.

5.4.3 UC15: The Tower Supervisor schedules a Runway closure

5.4.3.1 Summary

Tower Supervisor enters a temporary runway closure into the Basic DMAN system (In coordination with the Airport Operator's decision).

No change for the flights with a derived TTOT/CTOT before the scheduled runway closure. Recalculation of TSAT for all flights planned for the time of the runway closure and after the runway re-opening.

For the flights having already received a clearance, the controller shall manually manage the situation. For example, the runway in use is maintained for the already cleared flights but can be manually modified by the Delivery or the Apron/Ground controllers.

5.4.3.2 Actors

Airport Operator:

- Decides to temporarily close a runway.

Tower Supervisor:

- Enters a runway closure into the DMAN system.

Delivery Controller:

- Manually handles each specific Flight.

Apron/Ground Controller:

- Manually handles each specific Flight.

5.5 Supervision

5.5.1 The Tower Supervisor switches DMAN into a non A-CDM mode

5.5.1.1 Summary

Tower Supervisor decides to switch DMAN into a non A-CDM mode (E.G. in case of unavailability of ACISP).

In this case, the previous cases apply except the fact that no TSAT is computed and the pre-sequencing is performed using the EOBT of each flight.

5.5.1.2 Actors

Tower Supervisor:

- Switches DMAN into a non A-CDM mode.

6 Requirements

As mentioned in section 1.1, this OSED is produced in the context of early Step 1 activities so that the backward traceability of the concept developed in this document towards higher level documents **can not be described**.

In this chapter, requirements have been organised according to the following breakdown:

1. Basic DMAN environment (covering basic DMAN input and output);
2. Sequence management;
3. Runway Configuration management;
4. Basic DMAN supervision.
5. Basic DMAN HMI;

The requirements identifiers are set accordingly to the rules defined in the chapter 4 of the *Requirements and V&V Guidelines* document (See doc. [4]).

The generic pattern applied is as follows:

<Object type>-<Project code>-<Document code>-<Reference number 1>.<Reference number 2>

Where:

- <Object type> is **REQ**
- <Project code> is **06.08.04**
- <Document code> is **OSED**
- <Reference number 1> reflects the above-mentioned organisation as follows:
    - **0100**: Basic DMAN environment
    - **0200**: Sequence management
    - **0300**: Runway Configuration management
    - **0400**: Basic DMAN supervision
    - **0900**: Basic DMAN HMI
- <Reference number 2> is a sequence number for each series of requirements (from 10 in 10).

6.1 Requirements overview

Identifier	Title	Description
Basic DMAN environment		
REQ-06.08.04-OSED-0100.0020	**Basic DMAN Inputs – Exchanges with ATC systems**	*DMAN uses basic flight data received from ATC systems (FDPS). Information might also be provided by other systems.*
REQ-06.08.04-OSED-0100.0030	**Basic DMAN Inputs – Exchanges with A-CDM systems**	*DMAN uses flight data from A-CDM system (TOBT, Stand CTOT AOBT ATOT) collected from all stakeholders systems (AO, APOP, ATC and ATFCM) Information might also be provided by other systems.*
REQ-06.08.04-OSED-0100.0040	**Basic DMAN Inputs – Exchanges with EFS systems**	*DMAN uses flight data entered by Controllers via EFS systems (Runway allocation, SID, ASAT)*
REQ-06.08.04-OSED-0100.0050	**Basic DMAN Outputs – Exchanges with A-CDM systems**	*DMAN provides TSAT and TTOT on a DMAN-HMI or integrated into other HMIs.*
REQ-06.08.04-OSED-0100.0060	**Basic DMAN Outputs – Exchanges with EFS systems**	*DMAN-HMI displays TSAT, TTOT, Allocated Departure Runway, Allocated*

Identifier	Title	Description
		SID.
Sequence management		
REQ-06.08.04-OSED-0200.0010	**Basic DMAN Pre-Departure Sequence - Planning Horizon**	*DMAN Planning Horizon starts a parameter time before TOBT (generally 40 min) and ends at ATOT* *=> More flexibility*
REQ-06.08.04-OSED-0200.0020	**Basic DMAN Pre-Departure Sequence - Flight Eligibility**	*TSAT and TTOT computation for each flight (except „CFMU suspended", „removed from sequence" and „special flights")*
REQ-06.08.04-OSED-0200.0030	**Basic DMAN Pre-Departure Sequence - Manual insertion of a flight in the sequence**	*Flights not eligible to DMAN automated processing can be inserted in the Pre-Departure Sequence upon TSAT manual input.*
REQ-06.08.04-OSED-0200.0040	**Basic DMAN Pre-Departure Sequence - Reference time for sequence computation**	*Use TOBT for flight rank allocation (pre-departure and take-off). Otherwise use EOBT*
REQ-06.08.04-OSED-0200.0050	**Basic DMAN Pre-Departure Sequence - Sequence computation principles**	*Off-block regulation by* • *First: Calculating TTOT (TTOT = TOBT + EXOP + ERWP)* • *Then: Deducing TSAT representing A/C rank in pre-departure sequence (TSAT = TTOT – EXOT)*
REQ-06.08.04-OSED-0200.0060	**Basic DMAN Pre-Departure Sequence - CTOT constraints**	*DMAN optimises Pre-Departure Sequence through CFMU slots (CTOT)*
REQ-06.08.04-OSED-0200.0070	**Basic DMAN Pre-Departure Sequence - Taxi Times constraints**	*DMAN optimises Pre-Departure Sequence accounting for VTT*
REQ-06.08.04-OSED-0200.0080	**Basic DMAN Pre-Departure Sequence - Airport preferences**	*Account for airport preferences (departure rate, RWY pressure configuration and availability etc.)*
REQ-06.08.04-OSED-0200.0090	**Basic DMAN Pre-Departure Sequence - Time-based sequence updates**	*Pre-Departure Sequence update:* • *time based* • *refreshed periodically*
REQ-06.08.04-OSED-0200.0100	**Basic DMAN Pre-Departure Sequence - Event-based sequence updates**	*Trigger Pre-Departure Sequence updates as soon as following events are known: AOBT, ASAT, ATOT*
REQ-06.08.04-OSED-0200.0110	**Basic DMAN Pre-Departure Sequence - Sequence updates notification**	*Pre-Departure Sequence updates to external systems (either time-based or event-based)*
REQ-06.08.04-OSED-0200.0120	**Basic DMAN Pre-Departure Sequence - Manual removal of a flight from the sequence**	*Permit manual removing of flight from Pre-Departure Sequence* ➔ *new TOBT to re-sequence the flight or manual re-sequencing*
REQ-06.08.04-OSED-0200.0130	**Basic DMAN Pre-Departure Sequence - Impact of removed flights on the sequence**	*Flights removed from the Pre-Departure Sequence shall be taken out of the overall*

Identifier	Title	Description
		sequence list ➔ *no longer scheduled by DMAN*
REQ-06.08.04-OSED-0200.0140	**Basic DMAN Pre-Departure Sequence - Manual re-sequencing of a flight**	*Permit manual re-sequencing of a flight previously removed from the Pre-Departure Sequence*
REQ-06.08.04-OSED-0200.0150	**Basic DMAN Pre-Departure Sequence - Automatic re-sequencing of a flight**	*Automatically re-sequence a flight previously removed from Pre-Departure Sequence when new TOBT is provided*
REQ-06.08.04-OSED-0200.0160	**Basic DMAN Pre-Departure Sequence - TSAT output**	*TSAT as the result of a pre-departure sequence computation*
REQ-06.08.04-OSED-0200.0170	**Basic DMAN Pre-Departure Sequence - Automatic removal of a flight from the sequence before Start-Up**	*Automatically remove flight from Pre-Departure Sequence* • *Late for push-back request (TSAT + 5 min)* • *Not acknowledging Push-Back approval*
REQ-06.08.04-OSED-0200.0180	**Basic DMAN Pre-Departure Sequence - Automatic removal of a flight from the sequence after Start-Up**	*Automatically remove flight from Pre-Departure Sequence* • *Late for departure request / Start-Up approval* • *Not acknowledging departure request / Start-Up approval* *New TOBT to re-sequence flight*
REQ-06.08.04-OSED-0200.0190	**Basic DMAN Take-Off Sequence - TTOT output**	*TTOT as result of take-off sequence computation*
Runway Configuration Management		
REQ-06.08.04-OSED-0300.0010	**Basic DMAN – Runway configuration**	*DMAN provides the ability to handle:* ▪ *RWY configuration* ▪ *RWY capacity (including closures)* ▪ *RWY pressure*
Basic DMAN supervision		
REQ-06.08.04-OSED-0400.0010	**Basic DMAN System Supervision**	*Supervision facility shall provide synthetic view of system status:* • *operational status of the system* • *communication status with external systems*
REQ-06.08.04-OSED-0400.0020	**Basic DMAN - Manual control of exchanges with A-CDM systems**	*Supervision shall permit to switch off exchanges with A-CDM systems and versa*
Basic DMAN HMI		
REQ-06.08.04-OSED-0900.0010	**Basic DMAN HMI – Delivery services**	*The specialised HMI for the Tower Delivery controller.*
REQ-06.08.04-OSED-0900.0020	**Basic DMAN Delivery HMI – Flight status**	*Display the status of the flights under the responsibility of the Tower Delivery controller.*

Identifier	Title	Description
REQ-06.08.04-OSED-0900.0030	**Basic DMAN Delivery HMI – Manual removal/re-sequencing of a flight**	*Allows to remove a flight from the sequence or to re-sequence a flight previously removed*
REQ-06.08.04-OSED-0900.0040	**Basic DMAN Delivery HMI – Manual insertion of a flight in the Pre-Departure Sequence**	*Allows to manually insert in the Pre-Departure Sequence a flight not eligible to DMAN automated processing*
REQ-06.08.04-OSED-0900.0050	**Basic DMAN Delivery HMI – Displaying the flight list**	*Sort order is up to the controller.*
REQ-06.08.04-OSED-0900.0060	**Basic DMAN HMI – Apron/Ground services**	*The specialised HMI for the Tower Apron/ground Controller.*
REQ-06.08.04-OSED-0900.0070	**Basic DMAN Apron/Ground HMI – Manual removal/re-sequencing of a flight**	*Allows to remove a flight from the Pre-Departure Sequence or to re-sequence a flight previously removed*
REQ-06.08.04-OSED-0900.0080	**Basic DMAN Apron/Ground HMI - Flight status**	*Display the status of the flights under the responsibility of the Tower Apron/ground Controller.*
REQ-06.08.04-OSED-0900.0090	**Basic DMAN Apron/Ground HMI - Displaying the flight list**	*Sort order is up to the controller.*
REQ-06.08.04-OSED-0900.0100	**Basic DMAN HMI – Supervision services**	*Display status of the DMAN*
REQ-06.08.04-OSED-0900.0110	**Basic DMAN Supervisor HMI – Runway configuration**	*Allows Supervisor to change the runway configuration*
REQ-06.08.04-OSED-0900.0120	**Basic DMAN Supervisor HMI – A-CDM systems switch**	*Allows Supervisor to change the switch DMAN mode*
REQ-06.08.04-OSED-0900.0130	**Basic DMAN Supervisor HMI – Runway allocation strategy**	*Allows Supervisor to change the runway strategy*

Table 16: List of Operational Requirements

6.2 Requirements for Basic DMAN environment

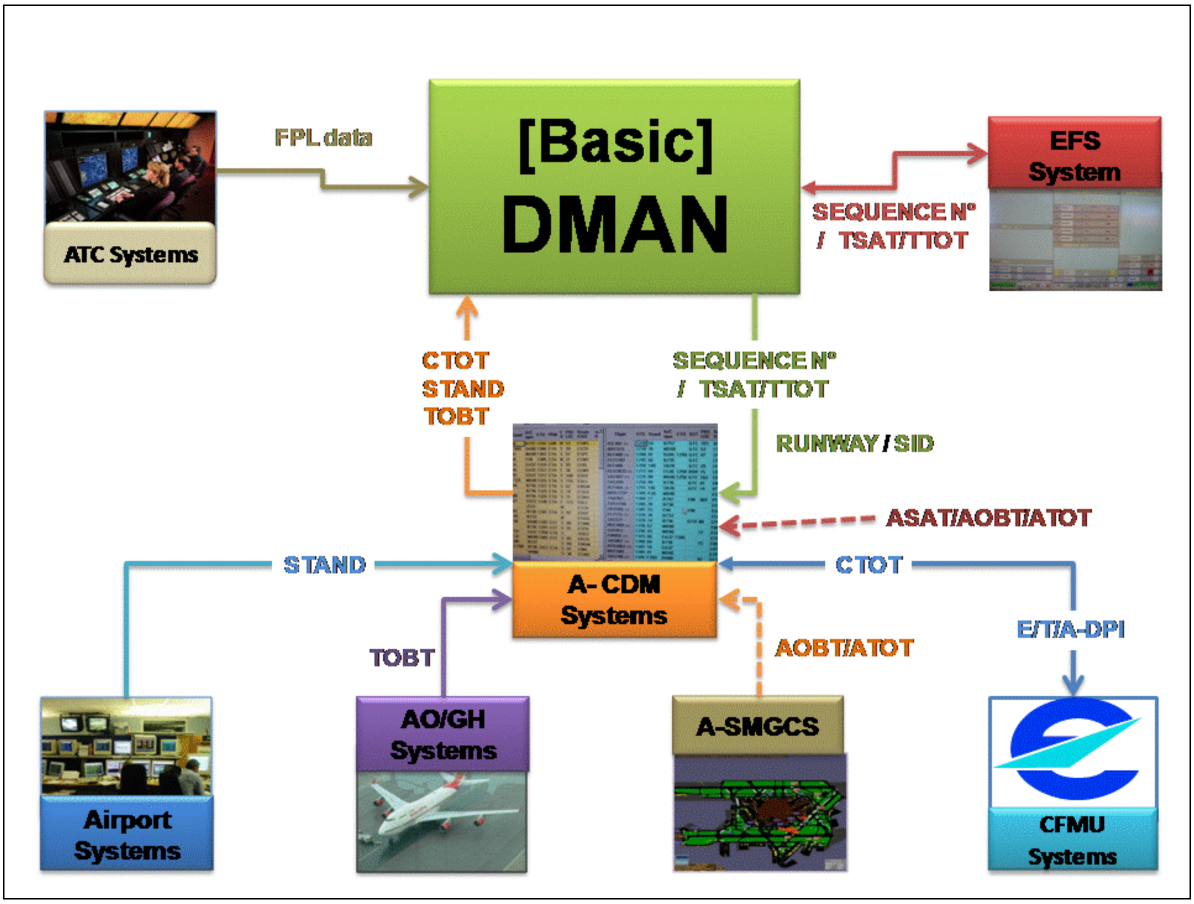

Figure 28: DMAN Environment

6.2.1 DMAN inputs

[REQ]

Identifier	**REQ-06.08.04-OSED-0100.0020**
Requirement	The basic DMAN shall take into account the following flight data from ATC: • Call sign • Departure Aerodrome • Destination Aerodrome • EOBT • Aircraft Type • Route (SID exit Point)
Title	**Basic DMAN Inputs – Exchanges with ATC systems**
Status	<In Progress>
Importance	<Essential>
Rationale	ATC systems (FDPS) provide basic flight data information. Information might also be provided by other systems.
Category	<Interoperability>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0058	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6210.0004	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6230.0004	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6260.0006	<Full>

		REQ-06.02-DOD-6260.0007	
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0100.0030**
Requirement	The basic DMAN shall take into account the following flight data from A-CDM : • TOBT (Collected from AO/GH system), • Stand (Collected from SG Mgt system), • CTOT (Collected from CFMU system), • AOBT (Collected from A-SMGCS, ACARS or MVT), • ATOT (Can be provided by an A-SMGCS system).
Title	**Basic DMAN Inputs – Exchanges with A-CDM systems**
Status	<In Progress>
Importance	<Essential>
Rationale	A-CDM system collect flight data from all stakeholders systems (AO, APOP, ATC and ATFCM) Information might also be provided by other systems.
Category	<Interoperability>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0100.0040**
Requirement	The basic DMAN shall take into account the following flight data entered by Controllers via EFS systems: • Runway allocation, • SID, • ASAT.
Title	**Basic DMAN Inputs – Exchanges with EFS systems**
Status	<In Progress>
Importance	<Essential>

Rationale	To get the maximum benefits from Basic DMAN implementation, connection to specialized HMI is a prerequisite. However new functionalities can be also integrated in an existing HMI.
Category	<Interoperability>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

6.2.2 DMAN outputs

[REQ]

Identifier	**REQ-06.08.04-OSED-0100.0050**
Requirement	The basic DMAN shall provide the following flight data to A-CDM : • TSAT, • TTOT.
Title	**Basic DMAN Outputs – Exchanges with A-CDM systems**
Status	<In Progress>
Importance	<Essential>
Rationale	Information is either presented on a DMAN-HMI or integrated into other HMIs
Category	<Interoperability>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0100.0060**
Requirement	The basic DMAN shall provide the following data to EFS systems : • TSAT, • TTOT.
Title	**Basic DMAN Outputs – Exchanges with EFS systems**
Status	<In Progress>
Importance	<Essential>
Rationale	To get the maximum benefits from Basic DMAN implementation, connection to specialized HMI is a prerequisite.
Category	<Interoperability>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

6.3 Requirements for Sequence Management

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0010**
Requirement	For a given flight, the basic DMAN planning (i.e the TSAT issue time) shall: • Start at **a parameter time** – generally 40' - before TOBT, and • End at Actual Take-Off Time (ATOT).
Title	**Basic DMAN Pre-Departure Sequence - Planning Horizon**
Status	<In Progress>
Importance	<Essential>
Rationale	Definition of the DMAN planning horizon as a parameter will allow more flexibility for DMAN operations.
Category	<Adaptability>
V&V Method	<Review of Design>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A

<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0020**
Requirement	The basic DMAN shall compute TSAT and TTOT for each eligible flight. Non eligible flights are not taken into account in the Pre-Departure Sequence: • CFMU suspended flights are not eligible as long as they have a "*CFMU suspended*" status; • Flights manually or automatically removed from the sequence are not eligible as long as they have a '*removed*' status. Additionally, some flights are exempted from the A-CDM process (sanitary, state…) and are not taken into the Pre-Departure Sequence.
Title	**Basic DMAN Sequence – Flight Eligibility**
Status	<In Progress>
Importance	<Essential>
Rationale	DMAN sequencing excludes flights having a 'special' status.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0030**
Requirement	The basic DMAN shall permit to manually insert a flight in the Pre-Departure Sequence by entering a TSAT for the concerned flight.
Title	**Basic DMAN Pre-Departure Sequence - Manual insertion of a flight in the sequence**
Status	<In Progress>
Importance	<Essential>
Rationale	Manual actions on the sequence shall always be possible for the controller in order to avoid blocking or degraded situations. E.g. in some cases the controller might want to 'force' the DMAN to take into account several exempted flights into the Pre-Departure Sequence in order to improve the accuracy of the planned sequence. See also: • **REQ-06.08.04-OSED-0200.0120** • **REQ-06.08.04-OSED-0200.0140** • **REQ-06.08.04-OSED-0900.0030** • **REQ-06.08.04-OSED-0900.0040** • **REQ-06.08.04-OSED-0900.0070**
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0040**
Requirement	The basic DMAN shall use Target Off-Block Time (TOBT) as reference time to allocate flight rank in Pre-Departure and Take-Off sequences. As long as no TOBT is provided for a flight, the default value is the Estimated Off-Block Time (EOBT).
Title	**Basic DMAN Pre-Departure Sequence - Reference time for sequence computation**
Status	<In Progress>
Importance	<Essential>
Rationale	The reference time used by the basic DMAN to elaborate the Pre-Departure Sequence is the Target Off-Block Time (TOBT). By default, as long as no TOBT is provided for a flight, the reference time used is the Estimated Off-Block Time (EOBT) If agreed as part of the CDM process.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>

<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0050**
Requirement	For each eligible flight, the basic DMAN shall calculate: • Firstly, the Target Take-Off Time (TTOT) which represents the Aircraft rank in the Take-Off sequence. [***TTOT=TOBT + EXOP* + ERWP**] • Secondly, the Target Start-Up Approval Time (TSAT) which represents the Aircraft rank in the pre-departure sequence. [***TTOT differs from TSAT by the Estimated Taxi out Time (EXOT***)]
Title	**Basic DMAN Pre-Departure Sequence - Sequence computation principles**
Status	<In Progress>
Importance	<Essential>
Rationale	To build an accurate Pre-Departure sequence, the basic DMAN needs to firstly calculate a likely Take-Off Sequence at the runway threshold from which the pre-departure sequence is deduced (i.e. the off-block sequence).
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0060**
Requirement	The basic DMAN shall optimise the sequence taking account of existing CFMU slots (CTOT) by adjusting the TTOT in the CTOT Window for each regulated flight.
Title	**Basic DMAN Pre-Departure Sequence - CTOT constraints**
Status	<In Progress>
Importance	<Essential>
Rationale	Sequence computation shall comply with CFMU slot allocation
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0070**
Requirement	The basic DMAN shall optimise the Pre-Departure Sequence taking account of Variable Taxi Times (VTT).
Title	**Basic DMAN Pre-Departure Sequence - Taxi Times constraints**
Status	<In Progress>
Importance	<Essential>
Rationale	Pre-Departure Sequence computation is a process that depends from taxi times. The Variable Taxi Times (VTT) provided to DMAN shall in particular include any delay buffer time required to accommodate remote parking locations. In the Basic DMAN, the Variable Taxi Times (i.e. **EXOP**) shall be extracted from tables. These tables shall be built empirically based on considered airport observations. These tables generally take into account: • The gate, • The parking type (Nose in/Nose out), • The aircraft type, the take-off runway and • The **runway entry point** (which is generally linked to the aircraft type, the configured strategy and the operating method).
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>

<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0080**
Requirement	Basic DMAN shall take into account airport preferences (Capacity or departure rate, runway pressure configuration and availability) in order to optimise the Pre-Departure Sequence.
Title	**Basic DMAN Pre-Departure Sequence - Airport preferences**
Status	<In Progress>
Importance	<Essential>
Rationale	Pre-Departure Sequence computation is a process that depends from various airport constraints
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0090**
Requirement	The Basic DMAN Pre-Departure Sequence shall be updated periodically, independently of any change, based on **a parameter time**.
Title	**Basic DMAN Pre-Departure Sequence - Time-based sequence updates**
Status	<In Progress>
Importance	<Essential>
Rationale	Pre-Departure Sequence computation is a continuous process that needs to be refreshed periodically.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>

<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0100**
Requirement	The Basic DMAN Pre-Departure Sequence update shall be triggered by specific events as soon as they are known to the Basic DMAN system: • AOBT, • ASAT, • ATOT.
Title	**Basic DMAN Pre-Departure Sequence - Event-based sequence updates**
Status	<In Progress>
Importance	<Essential>
Rationale	Pre-Departure Sequence computation is a continuous process triggered by flight data updates.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0110**
Requirement	The basic DMAN shall provide Pre-Departure Sequence updates to external systems upon each change, either time-based or event-based.
Title	**Basic DMAN Pre-Departure Sequence - Sequence updates notification**
Status	<In Progress>
Importance	<Essential>
Rationale	External systems need up to date information.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0120**
Requirement	The basic DMAN shall permit to manually remove any flight from the Pre-Departure Sequence.
Title	**Basic DMAN Pre-Departure Sequence - Manual removal of a flight from the sequence**
Status	<In Progress>
Importance	<Essential>
Rationale	Manual actions shall always be possible on flights scheduled by the DMAN in order to avoid blocking situations. A flight can be re-sequenced upon a new TOBT input from AO/GH or upon a manual action from the controller. See also: • **REQ-06.08.04-OSED-0200.0030** • **REQ-06.08.04-OSED-0200.0140** • **REQ-06.08.04-OSED-0900.0030** • **REQ-06.08.04-OSED-0900.0040** • **REQ-06.08.04-OSED-0900.0070**
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A

<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0130**
Requirement	When a flight is automatically or manually removed from the Pre-Departure Sequence, its TSAT and TTOT shall be cancelled, the flight gets a '*removed*' status.
Title	**Basic DMAN Sequence - Impact of removed flights on the sequence**
Status	<In Progress>
Importance	<Essential>
Rationale	A flight removed from the Pre6desequence its departure is no longer scheduled by the DMAN.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0140**
Requirement	The Basic DMAN shall permit to manually re-sequence a flight previously removed from the Pre-Departure Sequence (automatically or manually)
Title	**Basic DMAN Pre-Departure Sequence - Manual re-sequencing of a flight**
Status	<In Progress>
Importance	<Essential>
Rationale	Manual actions shall always be possible on flights scheduled by the DMAN in order to avoid blocking situations. Hence, the controller shall always have the capability to input a flight into the Pre-Departure Sequence, e.g. in case a new TOBT could not be provided by the AO/GH. See also: • **REQ-06.08.04-OSED-0200.0030** • **REQ-06.08.04-OSED-0200.0120** • **REQ-06.08.04-OSED-0900.0030** • **REQ-06.08.04-OSED-0900.0040** • **REQ-06.08.04-OSED-0900.0070**
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0150**
Requirement	When a new TOBT is provided for a flight previously removed from the Pre-Departure Sequence (manually or automatically) the Basic DMAN shall <u>automatically</u> re-sequence this flight. (I.e. a new TSAT and TTOT are calculated for this flight).
Title	**Basic DMAN Pre-Departure Sequence - Automatic re-sequencing of a flight**
Status	<In Progress>
Importance	<Essential>
Rationale	This is the “normal way” to reintegrate a flight in the Pre-Departure Sequence: information shall come from the AO/GH.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management**	N/A

		Integrated with Arrival and Departure Management **OFA04.01.01 – Integrated AMAN/DMAN**	
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0160**
Requirement	Basic DMAN shall provide a TSAT as the result of a pre-departure sequence computation.
Title	**Basic DMAN Pre-Departure Sequence - TSAT output**
Status	<In Progress>
Importance	<Essential>
Rationale	The TSAT represents the rank in the pre-departure sequence for an individual flight See **REQ-06.08.04-OSED-0200.0070** regarding how EXOP can be established for calculating reliable estimates of TSAT
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0170**
Requirement	The Basic DMAN shall automatically remove a flight from the Pre-Departure Sequence: • That is late to request Departure Request/Start-Up approval, or • That does not acknowledge the Departure Request/Start-Up approval.
Title	**Basic DMAN Pre-Departure Sequence - Automatic removal of a flight from the sequence before Start-Up**
Status	<In Progress>
Importance	<Essential>
Rationale	A new TOBT has to be provided to re-sequence the flight.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>

<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0180**
Requirement	The Basic DMAN shall automatically remove a flight from the Pre-Departure Sequence: • That is late to request Push-Back (Push-Back not requested at TSAT + 5'), or • That does not acknowledge the Push-Back approval.
Title	**Basic DMAN Pre-Departure Sequence - Automatic removal of a flight from the sequence after Start-Up**
Status	<In Progress>
Importance	<Essential>
Rationale	DMAN efficiency is based on TOBT/TSAT adherence, hence when a flight does not comply with its TOBT/TSAT it gets a penalty.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0200.0190**
Requirement	Basic DMAN shall provide individual TTOTs for each flight as the result of a Take-Off Sequence computation.
Title	**Basic DMAN Take-Off Sequence - TTOT output**
Status	<In Progress>
Importance	<Essential>
Rationale	To build an accurate Pre-Departure Sequence, the basic DMAN needs to firstly calculate a likely Take-Off Sequence at the runway threshold from which the pre-departure sequence is deduced (i.e. the off-block sequence). The TTOT represents the place of the flight in the take-off sequence. See **REQ-06.08.04-OSED-0200.0050.**
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

6.4 Requirements for Runway Configuration management

[REQ]

Identifier	**REQ-06.08.04-OSED-0300.0010**
Requirement	Basic DMAN shall provide the ability to handle the runway configuration, the runway capacity (including closures), and the runway pressure.
Title	**Basic DMAN – Runway configuration**
Status	<In Progress>
Importance	<Essential>
Rationale	Sequence computation is a process that depends from airport configuration
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

6.5 Requirements for Basic DMAN supervision

[REQ]

Identifier	**REQ-06.08.04-OSED-0400.0010**
Requirement	The Basic DMAN supervision facility shall provide a synthetic view of the system status: • Operational status of the system, • Communication status with external systems.
Title	**Basic DMAN - System Supervision**
Status	<In Progress>
Importance	<Important>
Rationale	This requirement gathers the general supervision needs for the BASIC DMAN.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0400.0020**
Requirement	The Basic DMAN supervision shall permit to manually control the exchanges with A-CDM systems:
Title	**Basic DMAN – Manual control of exchanges with A-CDM systems**
Status	<In Progress>
Importance	<Desirable>
Rationale	Allows to enter a degraded mode, e.g. when A-CDM systems are in a degraded mode.
Category	<Functional>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

6.6 Requirements for Basic DMAN HMI

6.6.1 Requirements for Tower Delivery controller HMI

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0010**
Requirement	Basic DMAN shall provide a specific HMI to support **Tower Delivery Controller**'s activities.
Title	**Basic DMAN HMI – Delivery services**
Status	<In Progress>
Importance	<Essential>
Rationale	The Tower Delivery Controller has a specific role in Departure Management that requires a specific HMI that can either be a dedicated DMAN HMI or integrated into other HMIs.
Category	<Interface>
V&V Method	<Review of Design>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0020**
Requirement	Basic DMAN Delivery HMI shall inform Delivery controllers about the following situations: • According to current TSAT, it's too early to issue departure clearance. • According to current TSAT, departure clearance can be issued. It's too early to issue Start-Up approval. • According to current TSAT, Start-Up approval can be issued. • The flight is currently removed from the Pre-Departure Sequence.
Title	**Basic DMAN Delivery HMI – Flight status**
Status	<In Progress>
Importance	<Essential>
Rationale	The Tower Delivery Controller always needs to know the status of each flight under his responsibility, in respect to the clearances to be delivered.
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>

<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0030**
Requirement	Basic DMAN Delivery HMI shall provide the ability: • To manually remove any flight from the Pre-Departure Sequence, • To manually re-sequence any flight
Title	**Basic DMAN Delivery HMI – Manual removal/re-sequencing of a flight**
Status	<In Progress>
Importance	<Essential>
Rationale	Manual actions shall always be possible on flights scheduled by the DMAN in order to avoid blocking situations. Hence, the Tower Delivery Controller shall always have the capability to remove from the Pre-Departure Sequence or re-sequence a flight under his responsibility See also: • **REQ-06.08.04-OSED-0200.0030** • **REQ-06.08.04-OSED-0200.0120** • **REQ-06.08.04-OSED-0200.0140** • **REQ-06.08.04-OSED-0900.0040** • **REQ-06.08.04-OSED-0900.0070**
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0040**
Requirement	Basic DMAN Delivery HMI shall provide the ability to insert a flight manually in the Pre-Departure Sequence by entering a TSAT for the concerned flight.
Title	**Basic DMAN Delivery HMI – Manual insertion of a flight in the Pre-Departure Sequence**
Status	<In Progress>
Importance	<Essential>
Rationale	Manual actions on the sequence shall always be possible for the controller in order to avoid blocking or degraded situations. E.g. in some cases the controller might want to ‘force’ the DMAN to take into account several exempted flights into the Pre-Departure Sequence in order to improve the accuracy of the planned sequence. See also: • **REQ-06.08.04-OSED-0200.0030** • **REQ-06.08.04-OSED-0200.0120** • **REQ-06.08.04-OSED-0200.0140** • **REQ-06.08.04-OSED-0900.0030** • **REQ-06.08.04-OSED-0900.0070**
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0050**
Requirement	Basic DMAN Delivery HMI shall offer the possibility to sort the flights according to various criteria.
Title	**Basic DMAN Delivery HMI – Displaying the flight list**
Status	<In Progress>
Importance	<Essential>
Rationale	The sort order of the flights is up to the controller - Displaying the flights sorted according to the Pre-Departure Sequence (i.e. TSAT order) shall not be the only way to present DMAN information.
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>

<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

6.6.2 Requirements for Tower Apron/Ground controller HMI

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0060**
Requirement	Basic DMAN shall provide a dedicated HMI to support **Tower Apron/Ground Controller**'s activities.
Title	**Basic DMAN HMI – Apron/Ground services**
Status	<In Progress>
Importance	<Essential>
Rationale	The Tower Apron/Ground Controller has a specific role in Departure Management that requires a specific HMI that can either be a dedicated DMAN HMI or integrated into other HMIs.
Category	<Interface>
V&V Method	<Review of Design>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0070**
Requirement	Basic DMAN Apron/Ground HMI shall provide the ability: • To manually remove any flight from the Pre-Departure Sequence. • To manually re-sequence any flight
Title	**Basic DMAN Apron/Ground HMI – Manual removal/re-sequencing of a flight**
Status	<In Progress>
Importance	<Essential>
Rationale	Manual actions shall always be possible on flights scheduled by the DMAN in order to avoid blocking situations. Hence, the Tower Apron/Ground Controller shall always have the capability to remove from the Pre-Departure Sequence or re-sequence a flight under his responsibility.

	See also: • **REQ-06.08.04-OSED-0200.0030** • **REQ-06.08.04-OSED-0200.0120** • **REQ-06.08.04-OSED-0200.0140** • **REQ-06.08.04-OSED-0900.0030** • **REQ-06.08.04-OSED-0900.0040**
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0080**
Requirement	Basic DMAN shall inform Apron/Ground controllers about the following situations: • The flight has to wait for Push-Back, • The flight is allowed to Push-Back, • The flight is currently removed from the Pre-Departure Sequence.
Title	**Basic DMAN Apron/Ground HMI - Flight status**
Status	<In Progress>
Importance	<Essential>
Rationale	The Tower Apron/Ground Controller always needs to know the status of each flight under his responsibility, in respect to the clearances to be delivered.
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0090**
Requirement	Basic DMAN Apron/Ground HMI shall offer the possibility to sort the flights according to various criteria.
Title	**Basic DMAN Apron/Ground HMI – Sorting the flight list**
Status	<In Progress>
Importance	<Essential>
Rationale	The sort order of the flights is up to the controller - Displaying the flights sorted according to the Pre-Departure Sequence (i.e. TSAT order) shall not be the only way to present DMAN information
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

6.6.3 Requirements for Tower Supervisor HMI

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0100**
Requirement	Basic DMAN shall provide a dedicated HMI to support **Tower Supervisor**'s activities.
Title	**Basic DMAN HMI – Supervision services**
Status	<In Progress>
Importance	<Essential>
Rationale	The Tower Supervisor Controller needs a dedicated HMI to supervise DMAN operations
Category	<Interface>
V&V Method	<Review of Design>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
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<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0110**
Requirement	Basic DMAN supervisor HMI shall permit the Tower Supervisor: • To schedule a change of runway capacity, • To schedule a change of runway configuration, • To schedule a runway closure, • To change the runway pressure.
Title	**Basic DMAN Supervisor HMI – Runway configuration**
Status	<In Progress>
Importance	<Essential>
Rationale	The Tower Supervisor Controller needs an HMI to control runway configuration
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
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<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006** **REQ-06.02-DOD-6260.0007**	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0120**
Requirement	Basic DMAN supervisor HMI shall permit the Tower Supervisor to manually control the exchanges of Basic DMAN with A-CDM systems: • Input from A-CDM systems ON (nominal mode) • Input from A-CDM systems OFF (degraded mode)
Title	**Basic DMAN Supervisor HMI – A-CDM systems switch**
Status	<In Progress>
Importance	<Desirable>
Rationale	The Tower Supervisor Controller might need to manually control the exchanges of DMAN with A-CDM systems (e.g. when A-CDM systems are in a degraded mode in order to force usage of EOBT).
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6210.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6230.0004**	<Full>
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6260.0006**	<Full>

		REQ-06.02-DOD-6260.0007	
<APPLIES_TO>	<Operational Process> or <Operational Service>	**Turn round**	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	**REQ-06.08.04-OSED-0900.0130**
Requirement	Basic DMAN supervisor HMI shall permit the Tower Supervisor to schedule a change of runway allocation strategy.
Title	**Basic DMAN Supervisor HMI – Runway allocation strategy**
Status	<In Progress>
Importance	<Essential>
Rationale	The Tower Supervisor Controller needs an HMI to control runway configuration
Category	<Interface>
V&V Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	**REQ-06.02-DOD-6200.0058**	<Full>
<SATISFIES>	<ATMS Requirement>	DOD Requirement Identifier / (KPA 1)	<Full>
<SATISFIES>	<ATMS Requirement>	DOD Requirement Identifier / (KPA n)	<Full>
<APPLIES_TO>	<Operational Process> or <Operational Service>	Operational Process or Operational Service Identifier	N/A
<APPLIES_TO>	<Operational Focus Area>	**OFA04.02.03 - Surface Management Integrated with Arrival and Departure Management** **OFA04.01.01 – Integrated AMAN/DMAN**	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Environment Class Identifier	N/A
<ALLOCATED_TO>	<Operator>	Operator identifier	N/A
<ALLOCATED_TO>	<Procedure>	Procedure identifier	N/A
<ALLOCATED_TO>	<Information Service>	Information Service identifier	N/A
<ALLOCATED_TO>	<Application Service>	Application Service identifier	N/A
<ALLOCATED_TO>	<System Function>	System Function identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

7 References

7.1 Applicable Documents

This OSED complies with the requirements set out in the following documents:

[1] IS SESAR SEMP 2.0
[2] IS SESAR SEMP Application Guidelines for 2011-2012
[3] IS SESAR Template Toolbox Latest version
[4] IS SESAR Requirements and V&V Guidelines, Ed. 01.01.00, dated 2010/12/08
[5] IS SESAR Template Toolbox Users Manual Latest version
[6] SESAR B4.2 Initial Service Taxonomy document, dated 2010/09/03
[7] SESAR Operational Focus Area, Ed. 01.01.00, dated 2010/12/08
[8] SESAR ATM Lexicon (SESAR ATM lexicon website).

7.2 Reference Documents

The following documents were used to provide input/guidance/further information/other:

7.2.1 SESAR sources

[9] SESAR B4.2 - High Level Process Models
[10] SESAR B4.2 - D08 processes and Services, dated 2010/09/12
[11] SESAR B4.2 Actors - Roles and Responsibilities, Ed. 00.01.03, dated 2010/11/29
[12] SESAR P6.2 Airport DOD STEP1 – ED 01.00.00 dated 2011/11/18
[13] SESAR P6.2 Airport VALS STEP1 – ED 00.02.00 dated 2011/05/18
[14] SESAR DEL-06.08.04 D06 State of the Art Analysis V00.01.00

7.2.2 External Sources

[15] OATA Operational Scenario and Use Case Guide V1.0
[16] EMMA 2 - A-SMGCS Services, Procedures, and Operational Requirements -V1.0 - 2008
[17] EMMA 2 - OSED Update – V1.0 – 2006
[18] EUROCONTROL - Generic Operational Concept for Pre-departure Runway Sequence Planning and Accurate Take-Off Performance Enabled by DMAN interaction with Airport CDM and A-SMGCS concepts – V07A, dated 2009/07/09
[19] EUROCONTROL CDM Manual

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