SESAR Solution PJ04-W2-28.1 SPR-INTEROP/OSED for V3 - Part I

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PJ.04-W2 Solution 28.1

CONNECTED REGIONAL AIRPORTS

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Abstract

The Connected Regional Airports focus is on the integration of the regional airports into the network through the sending of DPI messages and the implementation of a quasi-automatic milestone surveillance process, reducing the workload of airlines / ground handlers and increasing the predictability.

This document is the solution PJ.04-W2-28.1 SPR-INTEROP/OSED V3 document – final version as part of the PJ04-W2-Solution Data Pack at the conclusion of Wave 2. Solution 28.1 builds on the (V2) work performed in SESAR1 specifically in relation to SESAR Solution PJ.04-1 "Enhanced Collaborative Airport Performance Planning and Monitoring" developed from the SESAR Solution 21 (Airport Operations Plan and AOP-NOP Seamless Integration).

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Table of Contents

EUROPEAN PARTNERSHIP

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EUROPEAN PARTNERSHIP

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List of Tables

EUROPEAN PARTNERSHIP

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1 Executive Summary

This document is the OSED Part I (Operational Services and Environment Description), SPR and INTEROP relating to the 'Connected Regional Airports' development of the SESAR operational concept within Wave 2 Solution 28.1 leading to a V3 maturity level.

This SPR-INTEROP/OSED defines the operational methods, environments, scenarios, uses cases and requirements for the operational concept of the Total Airport Management (TAM relating to connectivity of regional airports with the ATM Network).

Solution PJ.04-W2-28.1[1] 'Connected Regional Airports' builds on the work performed in SESAR1, specifically in relation to SESAR Solution PJ.04-1 'Enhanced Collaborative Airport Performance Planning and Monitoring' developed from the SESAR Solution 21 (Airport Operations Plan and AOP-NOP Seamless Integration). Solution 21 focused on demonstrating how the Airport Operations Plan (AOP) improved the situation awareness of Airport Stakeholders, though common information sharing, and how the exchange of information between AOP and the Network Operations Plan (NOP) improved the integration of airports in the overall ATM network. PJ04-01 aims to keep improving the 'quality' of the AOP information through the inclusion of an increased set of data, captured from a wider range of airport processes. Based on these two previous solutions, the solution 28.1 seeks to integrate the regional airports into the network through a turnaround process monitoring and including specifically the notion of automated milestone generation in an A-CDM context. It could provide sufficient motivation for regional airports to enhance overall network predictability, reducing substantially the workload and obtaining the benefits of the A-CDM (such as greater predictability and network integration inputs).

The milestone process of A-CDM has been simplified, reducing the milestones, decreasing the complexity of the definition and the operation under this new concept. The inputs by the Ground Handlers / Aircraft Operators have been reduced as a result of automatic determination of the Target Off block time (TOBT) based on the aircraft event-based milestones to ease the process and adapt it to the operations volume of the regional airports. A DMAN or a Pre-Departure Sequence is not mandatory; therefore, the milestones associated are not required either, they are not required at any point within this solution.

The applicability to regional airports is reliant on the high degree of predictability of airport parameters including taxi-times, turnaround times and passenger boarding times. These parameters will be defined by the regional airports based in their own experience and the historical data, taking into account those variables they consider appropriate to assure the high predictability of the values. Nevertheless, a recommendation is made in this document.

[1] Hereafter generally referred to simply as 'Solution 28.1'

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2 Introduction

2.1 Purpose of the document

The document describes solution 28.1 “Connected Regional Airports” of the Wave 2 Total Airport Management project within SESAR2020. The document provides the requirements specification, covering functional, non-functional and interface requirements related to SESAR PJ04 Solution 28.1.

The work elaborated in this document builds on the work performed in SESAR1, specifically in relation to SESAR Solution 21 (’Airport Operations Plan and AOP-NOP Seamless Integration’). Solution 21 focused on demonstrating how the Airport Operations Plan (AOP) improved the situation awareness of Airport Stakeholders, though common information sharing, and how the exchange of information between AOP and the Network Operations Plan (NOP) improved the integration of airports in the overall ATM network. Because of this, a new category, the RNI Airport is defined, seeking the integration with the NM.

The SESAR Solution Development Life Cycle aims to structure and perform the work at project level and progressively increase SESAR Solution maturity, with the final objective of delivering a SESAR Solution data package for industrialisation and deployment. The SPR-INTEROP/OSED represents one of the key parts of this SESAR Solution data package.

The SPR-INTEROP/OSED Template is composed of different parts. This document (PART I) provides the Safety and Performance Requirements (SPR) and Interoperability Requirements (INTEROP), related to a SESAR Solution, which aim at being validated at a V3 level. They are presented in the context of the Operational Service and Environment Definition (OSED), which describes the environment, assumptions, etc, that are applicable to the SPR and INTEROP requirements. These requirements will cover safety, performance, operational aspects as well as the interoperability aspects.

2.2 Scope

This document is the V3 SPR-INTEROP/OSED 28.1 for Wave 2 PJ04 Solution 28.1 “Connected Regional Airports”. It will serve to support validation activities whose outputs will lead to consolidation and update of this document. The final version of this document will be included in the so-called Solution 28.1 data pack.

In the solution PJ.04-W2-28.1 just one OI step applies, the “Network-Connected Regional Airports operational improvement” (AO-0824 reference DS21), which has been validated in a V2 exercise at Alicante Airport.

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2.3 Intended readership

The intended audience of this document are those who are interested in how the partners involved in PJ04 are defining the operational concept associated to solution PJ.04-W2-28.1 “Connected Regional Airports”. This includes, but it is not limited to, SESAR2020 project members of PJ04, PJ.07, PJ.09, PJ19, P20, and PJ.22 and the representatives of the SESAR SJU.

Project number	Output description
PJ04 Solution 1 Members	To further develop, elaborate and align all aspects of the project in close cooperation with solution 1 team members
PJ04-Solution 2 Members	To further develop and align all aspects of the project in close cooperation with solution 2 partners
PJ.07 Members	Share view on concept such as APOC (Airport Operations Centre), AOP (Airport Operation Plan), Landside CDM, DCB and UDPP
PJ.09 Members	Share view on AOP-NOP integration.
PJ.19 Members	Responsible for managing the content integration process to ensure the needed coherency (in terms of operational concept, architecture) between the different SESAR 2020 projects
PJ.20 Members	Responsible for ATM Master Plan maintenance
SESAR JU	Governance and Progress Assessment

Table 1: Intended Readership

2.4 Background

Previous work performed on the new operating method as described within this document was done under the auspices of SESAR1 PJ.04-1. Details on the concept description can be found in:

- SESAR Solution PJ.04-01 SPR-INTEROP/OSED for Part I [37]
- SESAR Solution 04.01 SPR-INTEROP/OSED - Part V - Performance Assessment Report (PAR) [38]
- [SESAR Solution XX SPR-INTEROP/OSED Template for Vx - Part I] [39]

2.5 Structure of the document

The document has the following structure:

EUROPEAN PARTNERSHIP

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- Chapter 1 and Chapter 2 of this document provides a high-level description of the document, indexes, glossary, acronyms, dependencies and other short introductory information
- Chapter 3 describes the operational environment that is applicable for the SESAR PJ.04-W2-28.1 Solution. This includes specifying the operational context (e.g., actors, processes, services and application/information services), the present operating method and the new operating method
- Chapter 4 specifies the safety; performance and interoperability requirements relevant for the SESAR PJ.04-W2-28.1 Solution Requirements follow the SESAR Requirements and V&V guidelines [40]
- Chapter 5 identifies applicable and reference documents
- Appendix A develops in a high level the Cost and Benefit Mechanisms, identifying the Stakeholders and their benefits, the Benefit Mechanisms following the Validation Targets in PJ.19VALS [41] and developing the Cost Mechanisms.

2.6 Glossary of terms

Term	Definition	Source of the definition
Advanced ATC Tower Airport (AAT)	Airports that have no plans to implement the A-CDM process but still wish to integrate into the ATM network may do so as an Advanced ATC TWR Airport. Such an Airport may provide a reduced set of DPI messages with a reduced set of advantages (compared to CDM Airports). An Advanced ATC TWR Airport provides Target Take-Off-Time (TTOT) estimations as well as Variable Taxi-Times (VTTs) and SIDs to the NMOC. These are provided from the moment that the aircraft leaves the blocks.	Advanced ATC TWR Implementation Guide Edition Nº 1.6
Aircraft stand	An aircraft stand is the parking position on the apron and thus is part of the “airside” of an airport. It needs to be distinguished between aircraft stands and terminal gates. The gates are usually located inside the terminal building and belong to the landside. A gate change not necessarily implies a change of the aircraft stand and vice versa.	ATM lexicon
Airport Collaborative Decision Making (Airport CDM)	Airport Collaborative Decision Making is the concept, which aims at improving Air Traffic Flow and Capacity Management (ATFCM) at airports by reducing delays, improving the predictability of events and optimising the utilisation of resources.	EUROCONTROL IP1 A-CDM Implementation Manual

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	Implementation of Airport CDM allows each Airport CDM Partner to optimise their decisions in collaboration with other Airport CDM Partners, knowing their preferences and constraints and the actual and predicted situation. The decision making by the Airport CDM Partners is facilitated by the sharing of accurate and timely information and by adapted procedures, mechanisms and tools. The Airport CDM concept is divided in the following Elements: - Information Sharing - Milestone Approach - Variable Taxi Time - Pre-departure Sequencing - Adverse Conditions - Collaborative Management of Flight Updates	
Airport Operations Plan (AOP)	The AOP (Airport Operations Plan) is the single, common and collaboratively agreed rolling plan used by all involved stakeholders whose purpose is to provide common situational awareness. It requires individual stakeholders to make changes within their own sphere of operations. The AOP interacts with a number of services, systems and external stakeholders (e.g. Network).	ATM Lexicon
Airport Operations Centre (APOC)	A platform / operational structure, which pro-actively manages the performance of present and short-term airport operations, giving relevant airport stakeholders a common operational overview of the airport, and allowing them to communicate, coordinate and collaboratively decide on their progress.	ATM Lexicon
Arrival Manager (AMAN)	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.	SESAR Concept of Operations Step 1 Edition 2013 (Ed. 01.02.00)
Airport Operations Centre (APOC)	The central organisational unit responsible for airport airside operations. In terms of human actors the role and responsibilities of the APOC	SESAR Concept of Operations Step 1 Final

	may be represented by an APOC Supervisor among APOC Stakeholder Agents.	Edition 2015 Del ID D124 (Ed. 02.02.00)
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.	ICAO Doc 9830: Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual
ATFCM	A service complementary to Air Traffic Control (ATC), the objective of which is to ensure an optimum flow of air traffic to or through areas within which traffic demand at times exceeds the available capacity of the ATC system.	EUROCONTROL, CFMU (2002), Air Traffic Flow Management Operations: ATFM Users Manual, Edition 8.0, 18.3.2002
Demand Capacity Balancing (DCB)	Integrated Local DCB (Demand and Capacity Balancing) Processes see the seamless integration of local network management with extended ATC planning and arrival management activities in short-term and execution phases. It represents the core functionality for the Integrated Network ATM Planning (INAP) process through an enhanced Local DCB tool set. The solution will improve the efficiency of ATM resource management, as well as the effectiveness of complexity resolutions by closing the gap between local network management and extended ATC planning.	SOL PJ09.02
Departure Manager (DMAN)	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.	SESAR Concept of Operations Step 2 Edition 2014 (Ed. 01.01.00)
DPI	The purpose of the Departure Planning Information (DPI) message is to supply the NMOC with flight data related updates that are made available by DCB tools, sequencing tools (e.g. DMAN), ANI-, CDM-, RNI- or ADV ATC TWR Airport systems. The main data elements to be received via the DPI message are: - An accurate estimation of the take-off time	DPI Implementation Guide Edition Nº 2.3

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	- The taxi-time (EXOT) - The SID - TOBT & TSAT At CDM airports where the Aircraft Type and Registration are verified, the DPI message can also contain updates of: - The aircraft type - The aircraft registration These DPI messages are described in more detail in Reference [61].	
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.	OFA 5.1.1, Section 1.6
Network Operations Plan (NOP)	A set of information and actions derived and reached collaboratively both relevant to, and serving as a reference for, the management of the Pan-European network in different timeframes for all ATM stakeholders, which includes, but is not limited to, targets, objectives, how to achieve them, anticipated impact.	ATM Lexicon
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 organizational actor (e.g. ANSP (Air navigation Services Provider)) or a human actor (e.g. ATCO (Air Traffic Controller)). There are several levels of operational service, depending on the level of granularity required. At lower level an operational service can be supported by:	OFA 5.1.1, Section 1.6

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	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	
Regional Network Integrated Airport	Currently the integration of airports into the ATM Network is achieved through either the A-CDM concept or the Advanced Tower concept. A third category of airport (regional airports) is proposed where a reduced set of CDM milestones is implemented and calculated in a quasi-automatic fashion - reducing the need for Airline / Ground Handler inputs. Such an approach relies on the stability and predictability of taxi-times which is considered as feasible in such airports. This will be a way to simplify the work needed to manually update CDM milestones, and also to enable the connection of regional airport to NMOC.	Operational Improvement AO-0824
SWIM (System Wide Information Management)	The aim of SWIM (System Wide Information management) is to provide information users with relevant and commonly understandable information. This information should be of the right quality, provided at the right time and delivered to the right place, so enabling the concept of net-centric ATM operations. This is achieved through the following SWIM principles: - Separation of information provision/consumption - Loosely system coupling - Open Standards - Service oriented architecture	SESAR SWIM Fact Sheet 01/2016
Total Airport Management (TAM)	The Total airport management (TAM) project (PJ04) is a SESAR 2020 research project that focuses on a range of different airport complexity levels, developing scalable and cost-effective solutions, optimising both the local benefits and the benefits for the European network. Societal concerns will be addressed by ensuring that environmental mitigation measures and impact are included in the airport performance trade-off.	SOL PJ.04 TAM

	The integration of airports into the air traffic management (ATM) network will be addressed through timely information sharing between the Network Operations Plan and the individual airports, with the help of the SWIM technology.	
User Driven Prioritisation Process (UDPP)	A process which permits Airspace Users to change the prioritisation of their own flights in order to best respects their business interests in case of capacity deterioration, without impacting the flights of other AUs. It is primarily for use during periods of capacity constraint, but available at all times in order to support business efficiency. UDPP is available at both planning and execution phases and is enabled by the Network Management Function.	SOL PJ09.02
Validation Targets (VALS)	Targets that focus the development of enhanced capabilities by the SJU Projects. They aim to get from the R&D the required performance capability to contribute to the achievement of a strategic target and, thus, to the SES high level goals.	SESAR Guidance on KPIs and Data Collection Version 1 (D85, Ed. 00.01.01, 2014)

Table 2: Glossary of terms

2.7 List of Acronyms

Acronym	Definition
AAT	Advanced Airport Tower
ACARS	Aircraft Communication Addressing and Reporting System
A-CDM	Airport Collaborative Decision Making
ACGT	Actual Commence of Ground Handling Time
ADMO	Airport Data Model
ADP	Aéroports de Paris
A-DPI	Air Traffic Control Departure Planning Information
ADV	Advanced
AIBT	Actual In Block Time
AIP	Airport Information Publication

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ALDT	Actual Landing Time
AMAN	Arrival Manager
ANI	Advanced Network Integrated
ANSP	Air Navigation Service Provider
AO	Airport Operator
AOBT	Actual Off Block Time
AOCC	Aircraft Operator Control centre
AODB	Airport Operational Database
AOP	Airport Operations Plan
APOC	Airport Operations Centre
ARCTYP	Aircraft Type
ARDT	Actual Start Up Ready Time
ARES	Airspace Reservation
ASAS	Airborne Separation Assistance System
ASAT	Actual Start Up Approval Time
ASBT	Actual Start Boarding Time
A-SMGCS	Advanced Surface Movement Guidance and Control System
ASPA	ASAS Spacing
ASRT	Actual Start Up Request Time
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATFCM	Air Traffic Flow and Capacity Management
ATFM	Air Traffic Flow Management
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATMS	Advanced Air Traffic Management System
ATOT	Actual Take Off Time
ATS	Air Traffic Services
ATV	Airport Transit View
AU	Aircraft User
AVOL	Aerodrome Visibility Operational Level
AXIT	Actual Taxi in Time

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AXOT	Actual Taxi Out Time
BIM	Benefit Impact Mechanisms
BRD	Boarding
CBA	Cost Benefit Analysis
CDM	Collaborative Decision Making
C-DPI	Cancel Departure Planning Information
CDTI	Cockpit Display of Traffic Information
CFMU	Central Flow Management Unit
CNL	Cancel
CNS	Communication Navigation and Surveillance
CONOPS	Concept of Operations
CR	Change Request
CTA	Controlled Time of Arrival
CTFM	Current Tactical Flight Model
CTOT	Calculated Take-Off Time
DCB	Demand and Capacity Balancing
DLA	Delay
DMAN	Departure Manager
DPI	Departure Planning Information
EATMA	European ATM Architecture
E-ATMS	European Air Traffic Management System
EC	European Commission
ECGT	Estimated Commence of Ground Handling Time
E-DPI	Early Departure Planning Information
EEA	European Environment Agency
EIBT	Estimated In Block Time
EDIT	Estimated De-icing duration time
ELDT	Estimated Landing Time
EN	Enabler
ENVI	Environment
EOBT	Estimated Off Block Time
ETFMS	Enhanced Tactical Flow Management System

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ETO	Estimated Time Over
EU	European Union
EXIT	Estimated Taxi In Time
EXOT	Estimated Taxi Out Time
FAM	Flight Activation Monitoring
FIM	Flight Information Message
FIR	Flight Information Region
FLS	Flight Suspension Message
FMP	Flow Management Position
FOC	Flight Operations Control
FPL	Flight plan
FTFM	Filed Tactical Flight Model
FUM	Flight Update Message
GH	Ground Handler
HLOR	High Level Operational Requirement
HP	Human Performance
HPAR	Human Performance Assessment Report
HUM	Human
IAF	Initial Approach Fix
IBK	In Block
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
INAP	Integrated Network Management and extended ATC Planning
INTEROP	Interoperability Requirements
ISRM	Information Services Reference Model
JU	Joint Undertaking
KPA	Key Performance Area
LBST	Last boarding start time
LND	Landing
MAX	Maximum
MET	Meteorological
NEC	National Emission Ceilings

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NM	Network Manager
NMOC	Network Manager Operations Centre
NOP	Network Operations Plan
NOTAM	Notice to Airmen
OCVM	Operational Concept Validation Methodology
OE	Operational Environment
OFA	Operational Focus Area
OI	Operational Improvement
OPAR	Operational Performance Assessment Report
OSED	Operational Service and Environment Definition
PAR	Performance Assessment Report
PCIL	Project Content Integration Leader
PDM	Pre-Departure Manager
PDS	Pre Departure Sequencer
PIRM	Programme Information Reference Model
PJ	Project
PRD	Ready
PRD#M1	Predictability Metric # 1
PRM	Passengers with Reduced Mobility
QoS	Quality of Service
RBT	Reference Business Trajectory
RDY	Ready
REQ	Requirement
RMT	Reference Mission Trajectory
RNI	Regional Network Integrated
RNIA	Regional Network Integrated Airport
SAC	Safety Criteria
SAR	Safety Assessment Report
SBT	Shared Business Trajectory
SEAC	SESAR European Airports Consortium
SecAR	Security Assessment Report
SEQ	Sequenced

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SES	Single European Sky
SESAR	Single European Sky ATM Research Programme
SID	Standard Instrumental Departure
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SMGCS	Surface Movement Guidance and Control System
SMT	Shared Mission Trajectory
SOBT	Schedule Off Block Time
SPR	Safety and Performance Requirements
SWIM	System Wide Information Model
SYS	System Wide Information Model
TAM	Total Airport Management
T-DPI-t	Target Departure Planning Information Target
T-DPI-s	Target Departure Planning Information Sequenced
TLDT	Target Landing Time
TOBT	Target Off Block Time
TOT	Take Off Time
TS	Technical Specification
TSAT	Target Start Up Approval Time
TTOT	Target Take Off Time
TWR	Tower
UC	Use Case
UDPP	User Driven Priorisation Process
VALP	Validation Plan
VALS	Validation Strategy
VLD	Validation
WOC	Wing Operations Centre
XBTD	Expected Boarding Time Duration
XTTA	Expected time of Turnaround
ZRH	Zurich

Table 3: List of acronyms

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3 Operational Service and Environment Definition

3.1 SESAR Solution PJ.04-W2-28.1: a summary

Currently the integration of airports into the ATM Network is achieved through either the A-CDM concept or the Advanced Tower concept. A third category of airport (regional airports) is proposed where a reduced set of CDM milestones is implemented and calculated in a quasi-automatic fashion - reducing the need for Airline / Ground Handler inputs. Such an approach relies on the stability and predictability of taxi-times which is considered as feasible in such airports.

This Solution is aiming at improving the connectivity between regional airports and the NMOC thanks to the provision of DPI messages based on target times and a reduced set of turnaround milestones compared to the full A-CDM implementation. The applicability to regional airports is reliant on the high degree of predictability of airport parameters including taxi-times, turnaround times and passenger boarding times. Ground handler workload is reduced as a result of automatic determination of the aircraft-ready time (TOBT) based on the aircraft event-based milestones and the status of the passenger boarding provided by the local airport system.

SESAR Solution ID	Title	
PJ.04-W2-28.1	Connected Regional Airports	
OI code	Title	Coverage
AO-0824	Regional network-integrated airports (RNI)	
The connectivity between regional airports and the NMOC is improved thanks to the provision of DPI messages based on target times and a reduced set of turnaround milestones compared to the full A-CDM implementation. The applicability to regional airports is reliant on the high degree of predictability of airport parameters including taxi-times, turnaround times and passenger boarding times. Ground handler workload is reduced as a result of automatic determination of the aircraft-ready time (TOBT) based on the status of the passenger boarding provided by the local airport system. The expected benefits relate to Predictability and capacity.		
EN code	Title	Coverage
AIRPORT-03c	Light Airport Operational Plan (AOP) Management Tool (for RNI airports)	Required/Develop
A local management tool dedicated to regional airports allowing: • All airport partners (Airspace Users/Ground handlers, ANSP and Airport Operator) to access the set of ATV (airport transit views) forming a light version of an AOP (which provides a common and collaboratively agreed rolling plan that will form the single source of airport operations information),		

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	• The Airspace Users/Ground handlers to manually update TOBTs when it could improve the overall operations predictability, • The monitoring of 8 A-CDM milestones (out of the original set of 16 A-CDM milestones) using statistical historical analysis (to create VTTs, expected turnaround time and expected boarding duration time) • The sending of corresponding DPIs towards NM through a B2B service connection. • PDS or DMAN might be integrated with the solution, but they are not mandatory, providing the Lite AOP Management tool a pseudo pre-departure sequencer		
	AERODROME-ATC-114	Update of the Aerodrome ATC system to align with RNI airport operations	Required/Develop
	Update of the Aerodrome ATC system to align with RNI airport operations to enable display and management of TSAT.		
	HUM-036	Ground Handling Agent role updated for RNI concept of operations	Required/Develop
	Ground Handling Agent role updated for RNI concept of operations. The GH mainly deals with TOBT management (check and manual update)		
	HUM-058	Tower Ground Controller role updated for RNI concept of operations	Required/Develop
	Tower Ground Controller role updated for RNI concept of operations: management of TSAT notion.		
	HUM-059	Flight Crew role updated for RNI concept of operations	Required/Develop
	Flight Crew role updated for RNI concept of operations : management of TSAT notion		

Table 4 : SESAR Solution 28.1 Scope and related OI Steps / Enablers

High Level CONOPS Requirement ID	High Level CONOPS Requirement	Reference to relevant CONOPS Sections e.g. Operational Scenario applicable to the SESAR Solution
S04-28-HLOR-01	The Enhanced Planning by Regional Airports shall contribute to enhancements of their Predictability, Flexibility and Efficiency by the exchange with the NMOC of improved Departure Planning Information built/based on : • Last defined Target Times (when applicable),	*High Level Operational Requirements for Wave 2 Solutions (04 December 2020)* *"4.1 High level Requirements applicable to Solution 28.1"*

	• Take-offs from Outstations, • Continuously predicted Passenger boarding times, Locally enabled by : • Accurate information received on applicable TTAs/TTOs • Accurate Boarding information • Highly predictable airport-related parameters including accurate estimates of Taxi-Out and Taxi-In times and turnaround times • Streamlined set of Turnaround milestones Highly automated computation of CDM/Turnaround milestones	
S04-28-HLOR-02	The Enhanced Planning by Regional Airports shall increase the Predictability, Flexibility and Efficiency of Operations, thanks to : • Increased efficiency of the Ground handling supported by Accurate and updated Departure Planning Information (see above S04-28.1-HLOR-01)	*High Level Operational Requirements for Wave 2 Solutions (04 December 2020)* *"4.1 High level Requirements applicable to Solution 28.1"*

Table 5 : High level CONOPS requirements related to Solution 28.1

3.1.1 Deviations with respect to the SESAR Solution(s) definition

The deviations with respect SESAR solution definition has been already integrated in the SESAR SOL PJ.04-1, so no further deviations are included in this SPR-INTEROP/OSED.

3.2 Detailed Operational Environment

3.2.1 Operational Characteristics

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Operational interactions per context (NOV-2)	Operating Environment
[NOV-2] Regional Airport Network-Integrated (RNI)	Airport;
Comment	
The airports considered in this OSED are part of the category defined as “Medium Airports” which Parent Operating Environment is the “Airport Category“, as defined in the EATMA. A Medium Airport Operating Environment corresponds to the aerodrome movement area and the volume of controlled airspace around an airport with a number of annual movements greater or equal to 40.000 and less than 150.000, where a movement is either an IFR departure or an IFR arrival.	

3.2.2 Roles and Responsibilities

Node	Responsibilities
Aerodrome ATS	Performs all the aerodrome ATS operations. [RELATED ACTORS/ROLES] Runway controller, ground controller, etc.
Air Traffic Flow and Capacity Management	The ATFCM node is responsible for the demand and capacity balancing activities.
Airport Ops Support	Perform all the airport ops support activities, including analysis of airport resources, long term planning of infrastructures, coordination of airport slots, management of airport resources on the day of operation (gates, vehicles, stands, de-icing...), information sharing and CDM, etc. [RELATED ACTORS/ROLES] Airport Operator, Airport Slot Negotiator

Operational interactions per context (NOV-2)		Operating Environment
[NOV-2] Regional Airport Network-Integrated (RNI)		Airport;
Node	Node instance	Node instance description
Aerodrome ATS	Aerodrome ATS	Tower Clearance Delivery Controller: • Receive “aircraft ready” calls and change the status if the aircraft is ready when the call is received • Issuance of push-back / start approval through the corresponding frequency Tower Ground Controller: • Receive calls from aircraft in case of push-back and approves or denies accordingly Airport Tower Supervisor:

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		• Manage ATIS broadcast content in the event of suspension and resumption of the RNI Airport procedure • Participate in the activities and functions of the RNI Airport program in a collaborative way • Send the Milestone16 (Take Off) to the Information Sharing Platform • Send the Milestone6 (Landing) to the Information Sharing Platform • Send the Milestone12 (ASAT) to the Information Sharing Platform
Airport Ops Support	Airport Ops Support	• Assure the security, integrity, access and correct maintenance of the RNI Platform • Implement an Information Sharing Platform that meets the criteria required within the operation of an RNI Airport • Provide the Milestone 1 by checking the consistency of the FPL • Send the Milestone7 (In Block) to the Information Sharing Platform • Send the Milestone15 (Off Block) to the Information Sharing Platform • Monitor the RNI platform to detect conflicts (through alerts) • Act and manage Information Sharing Platform warnings • Determine solutions and adequate mitigation measures to resolve problems and conflicts that arise in real time, including the readjustment of resource allocations (if necessary) • Participate in the activities and functions of the RNI Airport program in a collaborative way
Airport Ops Support	AO/GH	As Ground Handling Agent: • Update the TOBT when necessary (always in coordination with the Aircraft Operator and through internal agreements) • Participate in the activities and functions of the RNI Airport program in a collaborative way • Obtain the generic credentials that the staff will use to access the Information Sharing Platform and establish the internal procedures necessary to keep all the information of the operations on the Platform updated As Aircraft Flight Operations Centre: • Provide the programming information in a timely manner • Provide the TOBT as EOBT in the flight plan for each of its flights or through updates from its own systems and through interfaces

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		• Update the TOBT when necessary • Participate in the activities and functions of the RNI Airport program in a collaborative way (through your handler in case it is consensual) • Obtain the generic credentials that your staff will use to access the Information Sharing Platform and establish the internal procedures necessary to keep all the information on the operations on the Platform updated • Provide the Milestone11 on time and with integrity
Air Traffic Flow and Capacity Management	NM	• Provide CTOT values where applicable and keep them updated • Send FUM messages when information is available
Flight Deck	Flight Deck	• Flight Deck shall assure they know the TSAT depending on how each airlines considers it appropriate • Flight Deck shall call within the TSAT tolerances defined locally in each airport

3.2.3 CNS/ATS description:

This section does not apply to this solution.

3.2.4 Applicable standards and regulations

Several existing standards ensure the interoperability of the technical systems that will be developed by the industrial partners to implement the concept and the functionality of the solution. Further, by having the standard in place, a set of data elements with defined quality are considered to be available. Below a (non-exhaustive) overview of the applicable standards and regulations is provided.

3.2.4.1 A-CDM

There is currently no implementing rule for A-CDM (yet) but there is a European Standard (ETSI EN 303 212) “Airport Collaborative Decision Making (A-CDM); Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004” [42]

In addition, several EUROCAE (European Organisation for Civil Aviation Equipment) documents (European Standards) of relevance are:

- ED-141 System Requirements Document [43]
- ED-145 Interface Definition Document [44]
- ED-146 Test and Validation Document [45]

These are considered to ensure interoperability between technical system enablers, when adhered to.

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Safety assessment is covered “SAFETY ASSESSMENT OF AIRPORT COLLABORATIVE DECISION MAKING (A-CDM) Ed. 2.0” [61], which covers the whole scope of the safety analysis that RNI Airports might require to be performed and its operation under abnormal situations.

3.2.4.2 Single European Sky

PJ.04-W2-28.1 will need to take account of the Single European Sky Interoperability Regulation (EC 552/2004) [42] and amended (SES2) by regulation EC 1070/2009 [46]. Specifically the pillars relating to managing capacity on the ground as well as EC Implementing Rule IR390/2013 [47] laying down a performance scheme for air navigation services and network functions with respect to the airport-related KPIs ([47] - Annex 1).

3.2.4.3 Environmental

Several EU Regulations and Directives already constrain aviation and airports current operations and future development, and at least impose airports to monitor their impact notably on noise and ambient air quality:

- The Regulation No 598/2014 of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a balanced approach and repealing Directive 2002/30/EC [48]
- The Directive No 2002/49/EC of 25th June 2002 relating to the assessment and management of environmental noise [49]
- The Directive No 2008/50/EC of 21st May 2008 on ambient air quality and cleaner air for Europe [50]
- The Directive No 2016/2284 of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC, the National Emission Ceilings Directive (NEC Directive) from the date of its transposition (30 June 2018) ensuring that the emission ceilings for 2010 set in that Directive shall apply until 2020 [51]

Additional national or local regulations might also impose other constraints and obligations on airports. For example, the French Law No2015-992 [52] (and particularly Article 45) obliges larger French airports to take immediate action to reduce their emissions (by -10% in 2020, and -20% by 2025 compared to 2010).

3.2.4.4 Common Project One

Commission Implementing Regulation (EU) 2021/116 of 1 February 2021 on the establishment of the Common Project One supporting the implementation of the European Air Traffic Management Master Plan provided for in Regulation (EC) No 550/2004 of the European Parliament and of the Council. Amends Commission Implementing Regulation (EU) No 409/2013 and repeals Commission Implementing Regulation (EU) No 716/2014 (Text with EEA relevance).

3.2.4.5 STD-116 — Update of EUROCONTROL DPI implementation guide to cover RNI (Regional Network Integrated) airports

Within the solution, the need for an EN STD (Standard) has been identified. There is the need to update of the EUROCONTROL DPI implementation guide to address the RNI (Regional Network Integrated)

airports which level of connection to the Network Manager stands between Advanced ATC TWR airports and A-CDM airports. This document update should include a specific (low-level) description of how the DPIs for RNI airports are derived.

3.3 Detailed Operating Method

3.3.1 Previous Operating Method

The integration of an Airport into the ATM Network currently takes place through the provision of Departure Planning Information (DPI) messages to the NMOC.

The Network Manager (NM) uses three different classifications for indicating the level of integration of the airports into the ATM network:

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

A-CDM Airports are those airports that have implemented the full Collaborative Decision Making (CDM) [54] process as is specified in the Airport CDM Implementation Manual and provide the full set of DPI messages to the Network Manager.

Through the sharing of information between different airport stakeholders, the A-CDM process leads to an improved efficiency of the turnaround process and improved resource utilisation. In addition, the sharing of off-block (TOBT) and take-off (TTOT) targets with the Network Manager through the DPI message set results in an improved view of the expected traffic for the network and all its users. The Airport CDM process starts approximately 3hrs before off-block and ends at take-off, which is also the period during which the data exchange between the A-CDM Airport and Network Manager takes place.

Advanced ATC TWR (AAT) Airports are airports that have not implemented the Airport CDM process but still would like to integrate with the ATM Network using a restricted set of DPI messages. In fact, AAT Airports provide only the ATC-DPI (A_DPI) message reflecting the Actual Off-Block event. Such a DPI message contains an accurate estimation of the taxi-time and the take-off time (TTOT).

Therefore, data sharing between an AAT airport and the Network Manager commences at the aircraft push-back and terminates at the take off.

Standard Airports are not integrated into the network via the transmission of DPI messages to the NMOC.

Before take-off of a given flight, the accuracy of the data available to the ATM network is based upon the EOBT from the ICAO flight plan and an extrapolation of the take-off time based on an average taxi-time available in the NMOC systems.

EOBTs in flight plans are not always updated or delayed. In addition, the taxi-time and runway in use in NMOC systems are not always adjusted to the actual operational situation. This results in a reduced

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accuracy of traffic predictions for the network (+/- 15 minutes at best). Due to this uncertainty level, Flow Managers (FMP) reserve buffers in available sector capacities in order to offer a degree of protection against potential overloads.

In addition, for 'standard' airports, the ATFCM process may mean that flights are allocated an ATFM slot (CTOT) which is unlikely to be met, resulting in last-minute CTOT extension requests or CTOT modifications even after the flight has left the stand. The consequence is extra delays for Aircraft Operators, longer stand occupation times, extra workload for the TWR controller, and less accurate occupancy counts in en-route sectors.

3.3.2 New SESAR Operating Method

The RNI (Regional airport Network-Integrated) concept was defined and tested for the first time in SESAR 1 under P06.03.01 project. A V2 validation activity was run at Alicante airport with EUROCONTROL's Airport Gaming Platform. The activity concentrated in airside processes. Feasibility of the concept was partially proved and a set of recommendations were derived to continue with the R&D work.

The following supporting material was used:

- ATFCM Operations Manual; Edition 19.3; 07 January 2016 [55]
- DPI Implementation Guide; Edition 1.800; 19 Mar 2015 [56]
- Flight Progress Messages Document; Edition 2.100; 19 Mar 2015 [57]
- Airport CDM Implementation Manual; Edition 4; April 2012 [54]
- AIP (Aeronautical Information Publication)-Munich. CDM. ver.2011-11-17 [58]

Regional Network Integrated Airports (RNI Airports) solution is a cost-efficient way of achieving the connection with the NM reducing the effort of the Stakeholders compared to the one of a full A-CDM operation. As such, the only pre-requisite for a targeted regional airport is the availability of an Airport Operational Database (AODB).

The full A-CDM milestone approach concept relies on an enhanced level of information sharing between the different airport stakeholders and a high degree of monitoring of the turnaround process epitomised through 16 different milestones. In addition, the concept describes 5 different DPI messages (corresponding to different time horizons on a given flight or the cancellation of a previously sent message) for transmission to the Network manager.

A number of airports have been reluctant to implement the full A-CDM concept for a variety of reasons - but perceptions around the milestone complexity, increased workload for airport stakeholders (notably the ground handlers) as well as overall cost have all been cited.

There is therefore the potential for the creation of an additional 'category' of airport, namely the "Regional Network Integrated (RNI) Airport" compared to the three categories described in section 3.3.1 (previous operating method). The high level aims behind the operational concept for such RNI airports are:

- To implement a reduced set of turnaround milestones to be monitored, concentrating on those which are 'event driven' rather than 'time driven'.
- To generate such milestones in a quasi-automatic manner
- To reduce ground handler workload in terms of inputs to the system so as to become the 'exception' rather than the 'rule'
- To offer the full set of DPI messages to the Network Manager and simultaneously respecting the quality criteria inherent in the full A-CDM implementation.

RNI airports will therefore be positioned between full A-CDM airports and AAT airports concerning the degree of turnaround process monitoring and the level of information provided to the Network Manager.

The concept for RNI airports will aim to improve the efficiency of the turnaround process locally at the airport as part of the process of information sharing. The key milestones for each flight will be available to each of the airport CDM partners. In addition, the provision of DPI messages to the Network Manager will satisfy the associated quality requirements and ensure that those airports deploying the RNI process have an affordable means of achieving the Network manager accuracy criteria.

High Level Operational Requirement on the airport

An RNI airport will require the implementation of an Information Sharing Platform which enables sharing, sorting and correlation of data with all stakeholders at the Airport. Data exchange with the NMOC will be via B2B services in an identical way to A-CDM or AAT airports.

The Airport shall store an accurate Estimated Landing Time (ELDT), based in the first instance from the ELDT provided by the NM and being able to be updated using more accurate local knowledge such as from the airport ANSP.

An RNI airport will implement a turn-around process monitoring derived from the ELDT of an arrival flight. The DPI message set will be derived from this information – see Section 3.3.2 for the detailed process description.

The Airport shall reliably link inbound flights to outbound flights at flight plan filing time or earlier. This is consistent with the SESAR concept of the Airport Transit View (ATV). This should normally be done automatically, however it shall allow to solve special cases by Human Intervention/Operational Staff.

Although not specifically detailed in this document, it is expected that the procedures to be introduced around TOBT compliance will be similar, if not identical, to those for A-CDM airports and AAT airports. The RNI concept should be structured in such a way as to cater for the specific needs of both coordinated and non-coordinated airports. Certain airports will possibly require a pre-departure sequencer encompassing the TSAT element of the A-CDM process. For non-coordinated airports, the TSAT calculation will be simple, reflecting the TOBT. Regardless of the TSAT calculation complexity, the CTOT compliance criteria will be respected via the allocation of a TSAT. Hence this concept assumes the A-CDM Milestone 10 – 'TSAT issued'.

An RNI Airport shall implement Quality Control procedures in order to ensure that data provided to the Network is accurate and timely.

High Level Data Requirement on the airport

The following data elements (event timestamps) shall be available for all flights:

- Actual Off-Block Time (AOBT)
- Actual Start Off Boarding Time (ASBT)

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- Actual Take-Off Time (ATOT)
- Estimated Landing Time (ELDT)
- Actual Landing Time (ALDT)
- Estimated In Block Time (EIBT)
- Actual in block time (AIBT)

The following data elements (schedule and target times) shall be available for all flights:

- Scheduled Off-Block Time (SOBT)
- Target Off-Block Time (TOBT)
- Target Start-Up Approval Time (TSAT)
- Target Take Off Time (TTOT)

The determination of the milestones associated with the turnaround monitoring in an RNI airport is performed essentially in an automated manner based on previous event milestones and accurate estimates of a number of operational parameters at the airport. If these milestones can be determined accurately then the necessity for Ground Handler inputs (update of TOBT notably) can be significantly reduced.

Taxi-time generation

For a given stand and runway in use, the airport will need to calculate the Estimated Taxi-In Time (EXIT) and Estimated Taxi-Out Time (EXOT) for each flight. Therefore, an RNI airport should determine the following for each stand and runway combination:

- EXIT = f(arrival runway, parking stand, time frame) – where f() is to be understood as meaning “as a function of)
- EXOT = f(parking stand, departure runway, time frame)

The key assumption for the RNI airport concept is that for a given stand, runway combination that both EXIT and EXOT are highly predictable and are subject to little variability across different flights. Of course, these values can change as a function of the operational conditions at the airport, for example during low visibility operations, and the RNI airport should update as appropriate the EXIT and EXOT values in such circumstances in order to ensure the quality of ‘downstream’ predictions.

A continual monitoring of the calculated EXIT and EXOT values against actual values should be performed to enhance the predictability of the values.

Turnaround time generation

The RNI airport shall store an XTTA, dependent on the airport operational model. This model is based on a statistical analysis. The RNI airport shall store an ‘Expected Turnaround Time’ (XTTA), dependent on the Aircraft Operator (AO), the aircraft type, the boarding type (contact, remote or by stand) and the flight destination.

- XTTA = f(AO, aircraft type, boarding type, flight destination)

It has been demonstrated during previous validations, that variables including Aircraft Operator, aircraft type, boarding type (remote, contact or by stand) and flight destination are quite common performance drivers relating to XTTA. The list of variables to be introduced in the XTTA function could be expanded to include other airport characteristics (for example PRM data) or reduced in less complex airports.

Boarding duration time generation

The RNI airport shall store an 'Expected Boarding duration time', (XBTD) dependent on the aircraft type, the handling agent and the boarding type (contact, remote, etc.).

- XBTD = f(aircraft type, handling agent, boarding type, Flight Destination)

The XBTD is used to raise an alert/warning if boarding has not started at a pre-determined time in relation to the TOBT.

De-icing time generation

The RNI airport shall store an 'Estimated De-icing duration time', (EDIT) dependent on the aircraft type, the handling agent, runway, moment of the day and other factors that could be considered relevant in each airport.

- EDIT = f(aircraft type, handling agent, hour)

The EDIT is used to include the de-icing time in the Milestone process. There is two possibilities:

1. Apron de-icing: EDIT is added to XTTA to compute the TOBT and later Milestones
2. Remote de-icing: EDIT is added to the EXOT to compute the TTOT. This case will require special precision in the EDIT and EXOT computation.

Proposal for Milestone and DPI generation

A-CDM Milestones

The following A-CDM Milestones are described in the CDM Implementation Manual [54]:

Number	Milestone	Time Reference	Recommendation
1	ATC Flight Plan activation	3hrs – 2hrs before EOBT	Highly Recommended
2	EOBT-2 Hr	2hrs before EOBT	Highly Recommended
3	Take off from outstation	ATOT from outstation	Highly Recommended
4	Local Radar update	Varies according to airport	Highly Recommended
5	Final Approach	Varies according to airport	Highly Recommended
6	Landing	ALDT	Highly Recommended
7	In-block	AIBT	Highly Recommended

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8	Ground Handling starts	ACGT	Recommended
9	TOBT update prior to TSAT	Varies according to airport	Recommended
10	TSAT issue	Varies according to airport	Highly Recommended
11	Boarding starts	Varies according to airport	Recommended
12	Aircraft ready	ARDT	Recommended
13	Start-up request	ASRT	Recommended
14	Start-up approved	ASAT	Recommended
15	Off-block	AOBT	Highly Recommended
16	Take off	ATOT	Highly Recommended

Table 6: Standard A-CDM Milestones

DPI Messages:

There are 5 main types of DPI messages, the Early-DPI, the Target DPI-target, Target DPI-sequenced, the ATC-DPI and the Cancel-DPI. Each DPI serves a specific purpose and should be sent at its appropriate event and time frame. The DPI messages are recognised by their DPISTATUS in the message. The transmission time frames and the DPISTATUS of the messages are:

DPI Type	Message filing time frame	DPI Status
E-DPI	3hrs – 2hrs before EOBT	DPISTATUS EARLY
T-DPI-t	2hrs – TSAT issue (Non regulated) or TSAT Publication to NMOC (regulated)	DPISTATUS TARGET
T-DPI-s	TSAT issue – AOBT	DPISTATUS SEQ
A-DPI	From the AOBT until ATOT	DPISTATUS ATC
C-DPI	Any time after a DPI has been sent	DPISTATUS CNL

Table 7 A-CDM DPIs

Each DPI messages also provides the Network Manager with:

- A variable taxi-time per flight
- The SID (Standard Instrument Departure) per flight selected by ATC

DPI messages may also provide the airport with the aircraft type (ARCTYP) and the aircraft registration as updated by the airport.

One or more E-DPI (Early – DPI) T-DPI-t (Target DPI-target), T-DPI-s (Target DPI-sequenced) and A-DPI (ATC DPI) messages may be transmitted if the departure times differ from those previously transmitted by a defined parameter.

Normally, the sequence of DPI messages is E-DPI > T-DPI-t > T-DPI-s > A-DPI.

RNI Airport Milestones

1. To merge milestones 6, 7, 8 and 9 in a single time reference ACGT (Actual Commencement of Ground Handling Time).

Milestone 1: Early T-DPI delivery

Its objective is to incorporate the information from the FPL into the Information Sharing Platform so that the flight out of the airport can be monitored. Additionally, the consistency between the FPL information and the programmed information is verified.

It starts whenever a new FPL is received and the information incorporated from the departure FPL into the Information Sharing Platform and connects it with the information of the arrival flight to the airport.

A check of the discrepancy between SOBT and EOBT is carried out and the actors are informed if there is any difference. For the purposes of this milestone EOBT = TOBT unless a manual TOBT is entered.

An E-DPI is produced and sent no earlier than 3hrs before the EOBT as the current NM system will reject the message if this time constraint is not respected.

Milestone 3: Take-off from Outstation:

The take-off from the origin airport represents a key point at which the stability of future milestone estimates increases. At this milestone, the first TOBT estimate is made and the Network Manager receives its first TTOT estimate via the T-DPI-t message.

- TOBT(calculated) = max(EOBT, ELDT + EXIT + XTTA + EDIT[2])
- TTOT = TOBT + EXOT + EDIT[3]

Milestone 6 to Milestone 10: Aircraft status change from LND to IBK and TSAT issue

Its objective is to update in the Information Sharing Platform the information of the inbound flight to the RNI Airport. Taxi-in predictability is very high thanks to the High Level Data Requirements definition, so EIBT can be determined with confidence:

- EIBT = ALDT + EXIT
- If SOBT-AIBT < 2h then ACGT = AIBT otherwise ECGT = EOBT – XTTA - EDIT[4]
- TOBT(calculated) = max(EOBT, ACGT + XTTA + EDIT[4])

[2] Just applicable in case of de-icing conditions in stand

3 Just applicable in case of de-icing conditions remote

[4] Just applicable in case of de-icing conditions in stand

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At TSAT issue (local implementation timestamp), the airport will send the first T-DPI-s.

For non-coordinated airports where local traffic conditions do not require the implementation of a DMAN (pre-departure sequence tool), then the target time for start-up approval will be computed and shared with ATCOs for them to follow the TSAT sequence. This might be shared through an additional screen if ATC does not count with a proper system to integrate and show the sequence (which is the recommendable option):

- TSAT = CTOT – EXOT - EDIT[5] (regulated flight)
- TSAT = TOBT (non-regulated flight)

Milestone 11: Aircraft status change to BRD

Its objective is to check the consistency of the TOBT at the time of passenger boarding, providing greater visibility of the status of the aircraft's turnaround and compliance with its FPL. This data corresponds to the moment in which the first passenger passes the boarding pass control, and with that the boarding begins.

Based on the expected boarding time duration (XBTD, see Section 3.5.3), the necessary (latest) boarding start time (LBST) is computed:

- LBST = TOBT – XBTD

If boarding has not started at LBST then:

- Issue a warning to the relevant Aircraft Operator / Handling Agent.
- Automatically increase TOBT by 5’ and update TTOT, TOBT and TSAT via transmission of new T-DPI-s, a maximum of 2 times. In case the maximum is surpassed, the flight will be extracted from the sequence and await a manual TOBT input.

The Aircraft Operator / handling agent shall have the possibility to manually enter a TOBT value based on their local knowledge. Should this be the case then the automatic updates of TOBT for the flight in question shall be suspended.

Milestone 15: Off-Block

Its objective is to update in the Information Sharing Platform the information of the departure flight with the AOBT. This milestone triggers the last automatic calculation of the TTOT.

- TTOT = AOBT + EXOT + EDIT[6]

5 Just applicable in case of de-icing conditions remote

6 Just applicable in case of de-icing conditions remote

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Milestone 16: Take Off

Its objective is to update in the Information Sharing Platform the latest information of the departure flight with the ATOT. As in the A-CDM Milestones.

There is no UCs regarding this milestone because there is no action but an automated exchange of information between systems.

Benefits
Benefits can be expected for each of the principal airport stakeholders as a result of implementation of the RNI concept as described below:

1. Airport Operators:

- Improved estimated landing time (ELDT) estimates via the NMOC FUM message or B2B web services
- Improved estimated in block times (EIBT) leading to improved stand and gate planning
- Reduction of last minute CTOT updates due to more realistic and stable CTOT
- Improved estimated off block times (EOBT) leading to improved resource allocation

2. Aircraft Operators / Handling Agents:

- Improved estimated landing time (ELDT) estimates from NM, leading to improved estimated in block times (EIBT) in order to optimise resource planning
- Provision of TOBT and TTOT values leading to more realistic and stable CTOT. Avoid last minute CTOT issue and delays
- Flight Activation Monitoring (FAM) is based upon the Take-Off-Time received from the airport, which reduces the risk on FLS messages due to “not reported as airborne” in case the flight suffers from a longer ATC Ground delay
- Reduction in workload (compared to A-CDM) associated with TOBT system entries
- Reduction in workload due to the possibility to subscribe to the NMOC’s “EOBT Update Service”, i.e. the automatic transmission of DLA messages based upon TOBT values in case of delay of the flight
- Improve of the ATV monitoring, leading to a fleet and crew monitoring that will allow to improve the staff allocation and last hour changes

3. ATC:

- DPI message creation in the RNI concept results in provision of accurate TOBT and TTOT values leading to more realistic and stable CTOT
- CTOT is frozen once the aircraft leaves the blocks
- Flight Activation Monitoring (FAM) is based upon the Take-Off-Time received from the airport, which reduces the risk on FLS messages due to “not reported as airborne” in case the flight suffers from a longer ATC Ground delay
- Increased slot tolerance windows as per A-CDM

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4. The ATM Network:

- Improved traffic predictability for FMPs
- Improved flight plan consistency
- Reduced the missed CTOT slots and the en-route capacity buffer.

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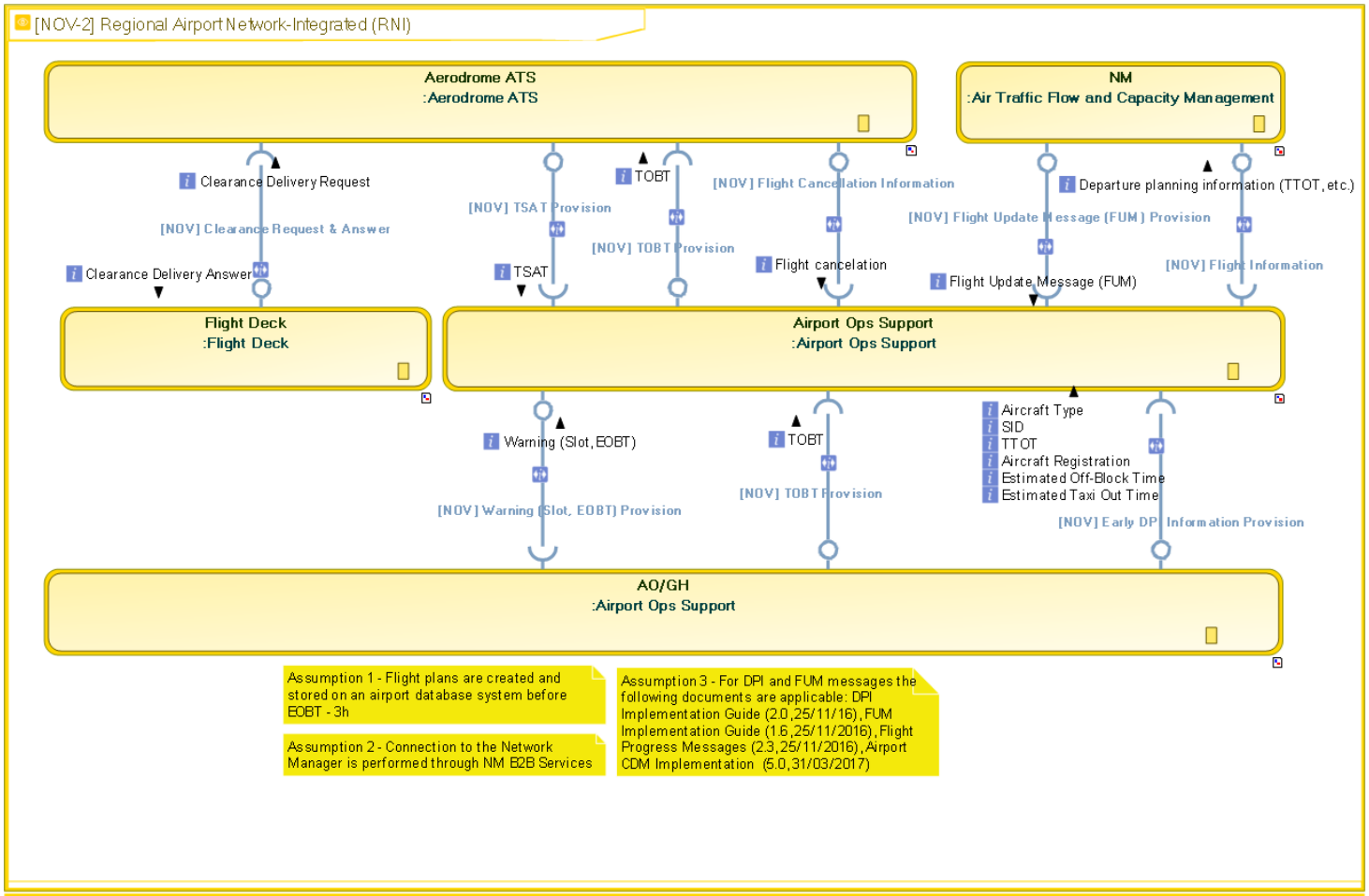

[NOV-5][RNI.01] DPI Provision at ATC Flight Plan Activated (Milestone 1) [Airport Ops Support, AO/GH, NM]
[NOV-5][RNI.02] DPI Provision at Take Off from Outstation (Milestone 3) [Airport Ops Support, AO/GH, NM]
[NOV-5][RNI.03a] DPI Provision at Ground Handling Started without PDM (Milestone 6 to 9) [Airport Ops Support, AO/GH, NM]
[NOV-5][RNI.03b] DPI Provision at Ground Handling Started with PDM (Milestone 6 to 9) [Aerodrome ATS, Airport Ops Support, AO/GH, NM]
[NOV-5][RNI.04] DPI Provision at TSAT Issued (Milestone 10 and 11) [Aerodrome ATS, Airport Ops Support, AO/GH, Flight Deck, NM]
[NOV-5][RNI.05] DPI Provision at Off-Block (Milestone 15) [Airport Ops Support, NM]
[NOV-5][RNI.06] DPI Provision of DPI for cancelled flight [Aerodrome ATS, Airport Ops Support, NM]

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Use case	[NOV-5][RNI.01] DPI Provision at ATC Flight Plan Activated (Milestone 1)
Use case	[NOV-5][RNI.02] DPI Provision at Take Off from Outstation (Milestone 3)
Use case	[NOV-5][RNI.03a] DPI Provision at Ground Handling Started without PDM (Milestone 8)
Use case	[NOV-5][RNI.03b] DPI Provision at Ground Handling Started with PDM (Milestone 8)
Use case	[NOV-5][RNI.04] DPI Provision at TSAT Issued (Milestone 10)
Use case	[NOV-5][RNI.05] DPI Provision at Off-Block (Milestone 15)
Use case	[NOV-5][RNI.06] DPI Provision of DPI for cancelled flight

3.3.2.1 [NOV-5][RNI.01] DPI Provision at ATC Flight Plan Activated (Milestone 1)

The RNI airport shall send automatically an E-DPI (Early) Message to NMOC at EOBT-3h with EOBT, EXOT, SID, Aircraft Type, Registration, TTOT (=EOBT+EXOT).

The transmission of an E-DPI Message confirms to NMOC that an airport slot and flight plan for a particular flight has been correlated in accordance with local rules at the airport.

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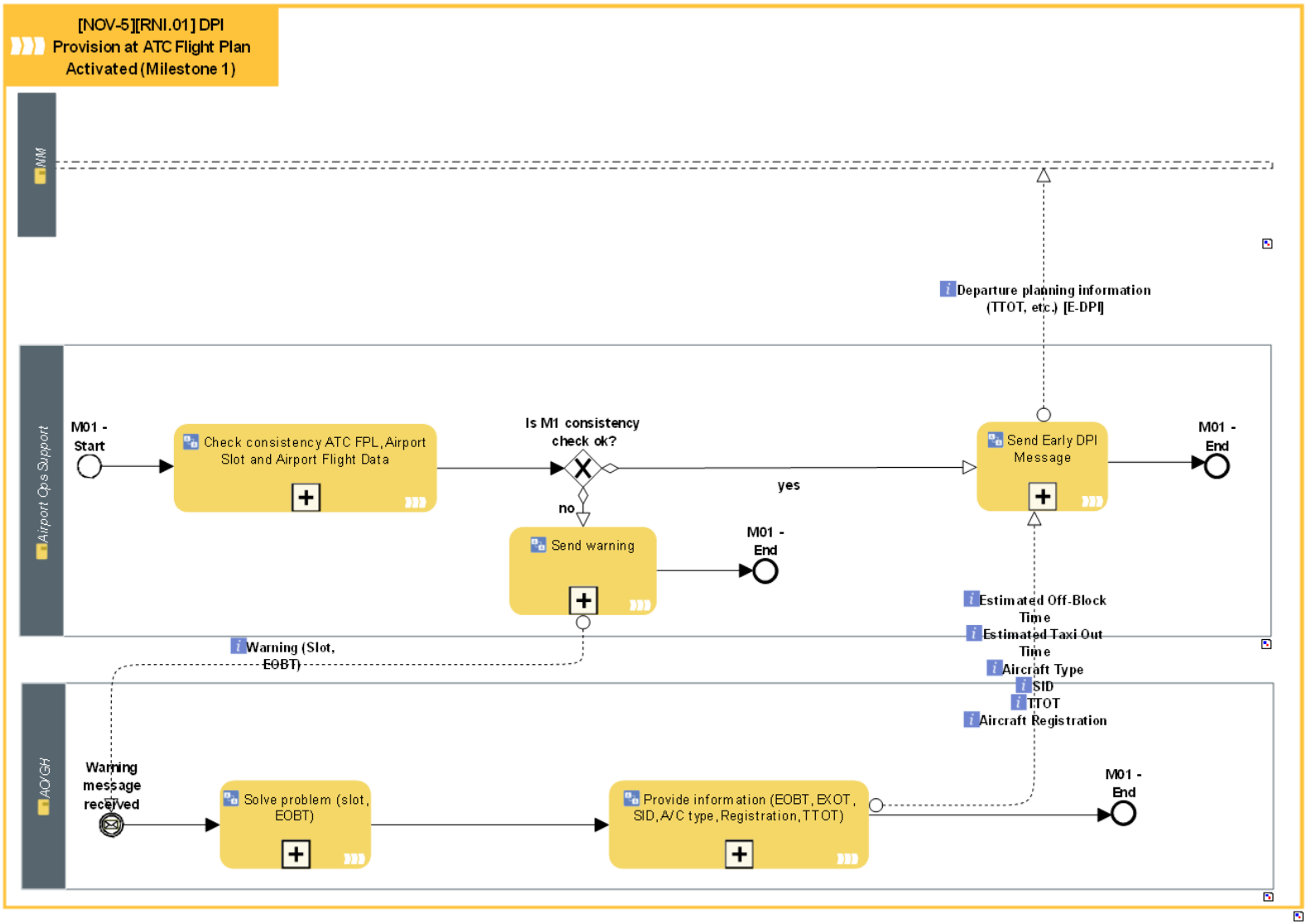

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Diagram Id: 0A723E7B597B4580

Activity	Description
Check consistency ATC FPL, Airport Slot and Airport Flight Data	This check shall be performed to verify the consistency between the ATC Flight Plan, Airport Slot and Airport flight data before the first E-DPI is sent. The AO must provide correct information before this first E-DPI message, in order to feed Network Operations with consistent SOBT, aircraft registration, and first destination data, as early in time as possible. The E-DPI message should not be sent if no or inconsistent information is provided.
Provide information (EOBT, EXOT, SID, A/C type, Registration, TTOT)	E-DPI supplies NM with the EOBT and also a first update of the EXOT, SID, Aircraft Type, Registration and TTOT.
Send Early DPI Message	The transmission of the E-DPI (or Early DPI) Message is linked to the A-CDM Milestone 1.
Send warning	When no airport slot (SOBT) is can be found or when EOBT is not consistent with SOBT, AO/GH shall be informed and E-DPI shall not be sent until the problem has been solved.
Solve problem (slot, EOBT)	Possible reasons for not sending the E-DPI are: - No airport slot exists for the flight plan - The airport slot has already been assigned to another flight plan (ghost or duplicate flight plan) - EOBT is long before SOBT of the airport slot which is an indication that EOBT is made earlier to anticipate e.g. an ATFM delay

Issuer	Info Exchange	Addressee	Info Element	Info Entity
Airport Ops Support	Send Early DPI Message o--> NM	NM	Departure planning information (TTOT, etc.)	EstimatedTakeOffTime
Airport Ops Support	Send warning o--> Warning message received	AO/GH	Warning (Slot, EOBT)	
AO/GH	Provide information (EOBT, EXOT, SID, A/C type, Registration, TTOT) o--> Send Early DPI Message	Airport Ops Support	SID	StandardInstrumentDeparture

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Issuer	Info Exchange	Addressee	Info Element	Info Entity
AO/GH	Provide information (EOBT, EXOT, SID, A/C type, Registration, TTOT) o--> Send Early DPI Message	Airport Ops Support	Aircraft Type	ICAOAircraftTypeCode
AO/GH	Provide information (EOBT, EXOT, SID, A/C type, Registration, TTOT) o--> Send Early DPI Message	Airport Ops Support	TTOT	TargetTakeOffTime
AO/GH	Provide information (EOBT, EXOT, SID, A/C type, Registration, TTOT) o--> Send Early DPI Message	Airport Ops Support	Estimated Off-Block Time	
AO/GH	Provide information (EOBT, EXOT, SID, A/C type, Registration, TTOT) o--> Send Early DPI Message	Airport Ops Support	Estimated Taxi Out Time	
AO/GH	Provide information (EOBT, EXOT, SID, A/C type, Registration, TTOT) o--> Send Early DPI Message	Airport Ops Support	Aircraft Registration	

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3.3.2.2 [NOV-5][RNI.02] DPI Provision at Take Off from Outstation (Milestone 3)

When a flight inbound to the RNI airport takes off from the outstation (status = 'airborne'), an initial TOBT and TTOT shall be calculated based on the latest time between EOBT and ELDT+EXIT+XTTA. And TTOT =NI TOBT+EXOT.

If the departure airport is more than 3hrs flying time from the destination airport the ATOT is received from either the Network Operations FUM or via the Aircraft Operator or Ground Handling Agent. Using the ATOT an ELDT can be calculated by using the Estimated Elapsed Time on the FPL.

If the flight is within 3hrs flying time of the destination airport, NMOC monitors progress of the flight and send FUM Messages to provide updated ELDT.

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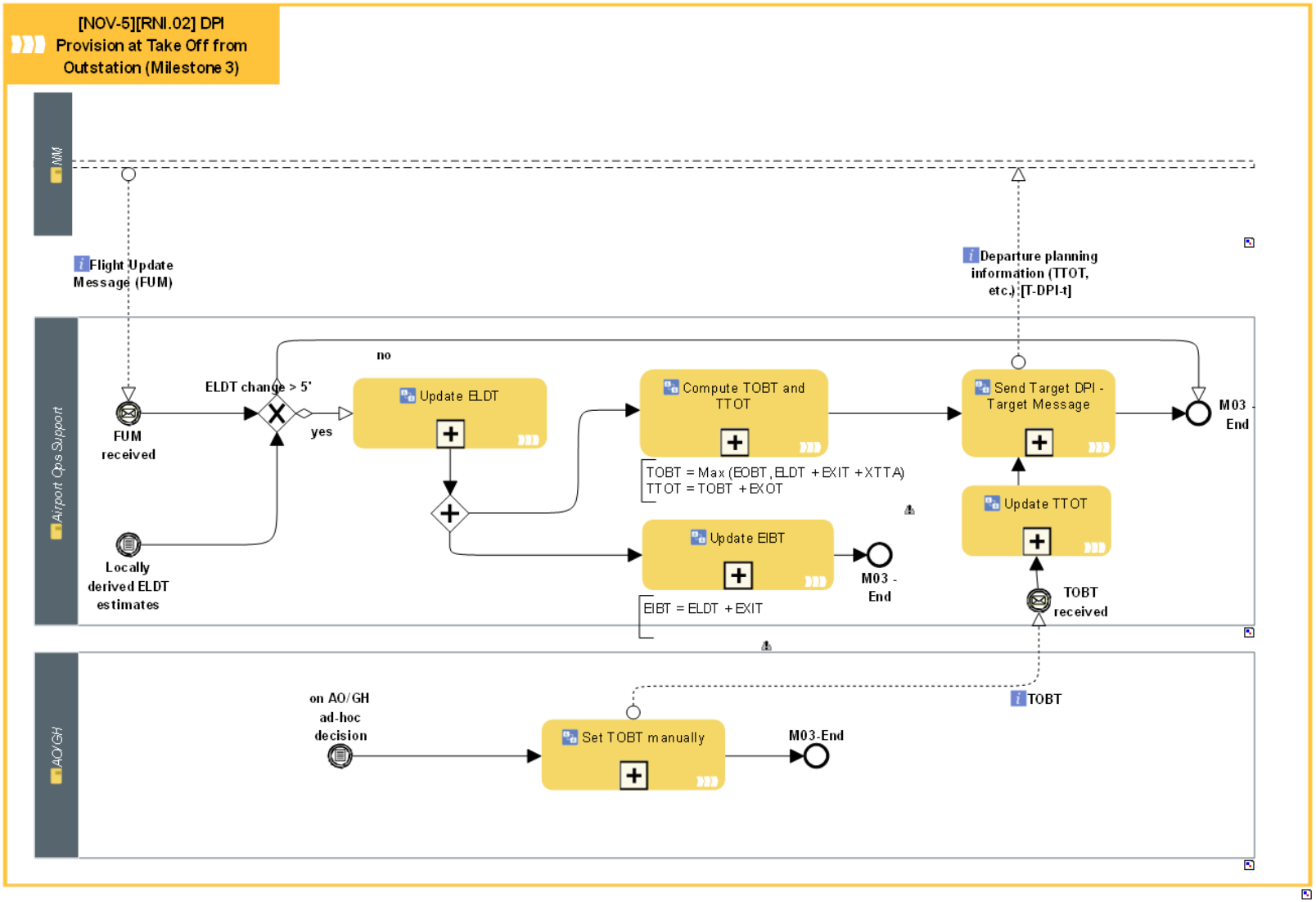

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Diagram Id: D928F99159818996

Activity	Description
Compute TOBT and TTOT	Turn-round Time and Expected Taxi-times (EXIT and EXOT) estimates are values stored in the airport database based on historical data. EIBT = ELDT + EXIT TTOT = EIBT + XTTA + EXOT
Send Target DPI - Target Message	The tranmission of a T-DPI-t (or Target DPI-target) Message at Milestone 3 aims at informing NM of an updated target take off time.
Set TOBT manually	According to local procedures AO/GH may change TOBT manually or have it confirmed automatically or manually.
Update EIBT	EIBT = ELDT + EXIT (Taxi-In Time Estimates)
Update ELDT	ELDT is updated based on information provided by the FUM messages, taking into account the actual progress of the flight.
Update TTOT	Update Target Take-Off Time with TOBT value. TTOT = TOBT + EXOT

Issuer	Info Exchange	Addressee	Info Element	Info Entity
Airport Ops Support	Send Target DPI - Target Message o--> NM	NM	Departure planning information (TTOT, etc.)	EstimatedTakeOffTime
NM	NM o--> FUM received	Airport Ops Support	Flight Update Message (FUM)	FUM
AO/GH	Set TOBT manually o--> Update TTOT	Airport Ops Support	TOBT	TargetOffBlockTime

3.3.2.3 [NOV-5][RNI.03a] DPI Provision at Ground Handling Started without PDM (Milestone 6 to 9)

This UC covers the case where no DMAN exists at the airport, but it may exist or not a PDS.

For flights that are on a normal turn-round (SOBT-AIBT) < 2h, Actual Commencement of Ground Handling Time (ACGT) = AIBT.

Use of SOBT and EOBT caters for the case of aircraft on a ‘long’ turnaround such as a night stop. ACGT = MAX(SOBT,EOBT) - XTTA.

SOBT is the scheduled off-block time, EOBT the latest estimated off-block time and XTTA is derived from the RNI database for the flight in question.

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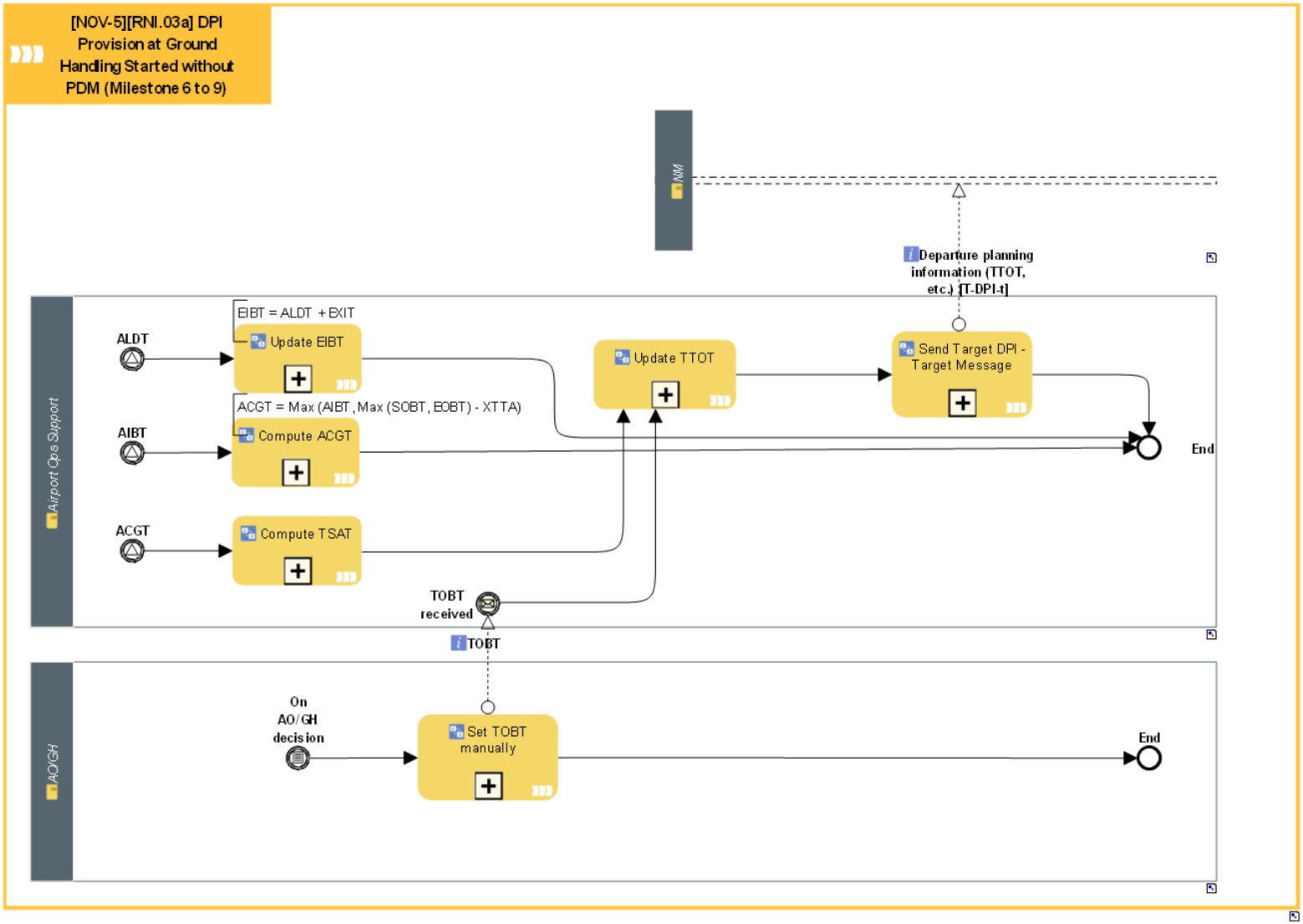

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Diagram Id: E76FFF77598249FA

Activity	Description
Compute ACGT	ACGT = Max (AIBT, Max (SOBT, EOBT) - XTTA)
Compute TSAT	TSAT = TOBT or CTOT-EXOT in case there is no PDS, otherwise PDS logic defined locally will compute TSAT
Send Target DPI - Target Message	The transmission of a T-DPI-t (or Target DPI-target) Message at Milestone 8 aims at informing NM of an updated target take off time.
Set TOBT manually	According to local procedures AO/GH may change TOBT manually or have it confirmed automatically or manually.
Update EIBT	EIBT = ALDT + EXIT
Update TTOT	Update Target Take-Off Time with TOBT value. TTOT = TOBT + EXOT

Issuer	Info Exchange	Addressee	Info Element	Info Entity
Airport Ops Support	Send Target DPI - Target Message o--> NM	NM	Departure planning information (TTOT, etc.)	EstimatedTakeOffTime
AO/GH	Set TOBT manually o--> TOBT received	Airport Ops Support	TOBT	TargetOffBlockTime

3.3.2.4 [NOV-5][RNI.03b] DPI Provision at Ground Handling Started with PDM (Milestone 6 to 9)

This UC covers the case where a DMAN is in operations at the airport.

For flights that are on a normal turn-round (SOBT-AIBT) < 2h, Actual Commencement of Ground Handling Time (ACGT) = AIBT.

Use of SOBT and EOBT caters for the case of aircraft on a ‘long’ turnaround such as a night stop. ACGT = MAX(SOBT,EOBT) - XTTA.

SOBT is the scheduled off-block time, EOBT the latest estimated off-block time and XTTA is derived from the RNI database for the flight in question.

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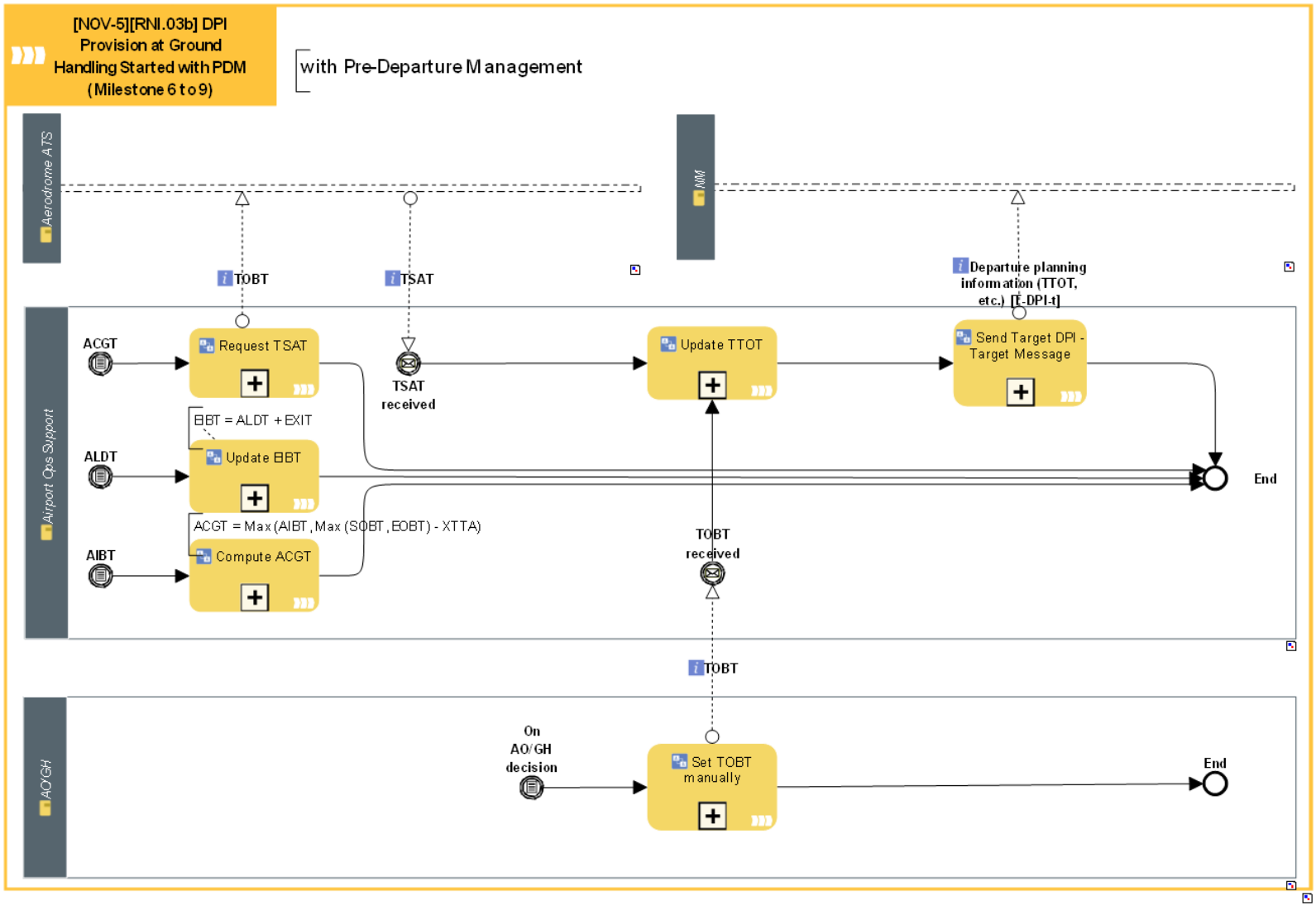

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Diagram Id: 7247826B5A5F2284

Activity	Description
Compute ACGT	ACGT = Max (AIBT, Max (SOBT, EOBT) - XTTA)
Request TSAT	A new entry into the sequence with a new TSAT is requested aligned with the new TOBT
Send Target DPI - Target Message	The tranmission of a T-DPI-t (or Target DPI-target) Message at Milestone 8 aims at informing NM of an updated target take off time.
Set TOBT manually	According to local procedures AO/GH may change TOBT manually or have it confirmed automatically or manually.
Update EIBT	EIBT = ALDT + EXIT
Update TTOT	Update Target Take-Off Time with TOBT value. TTOT = TOBT + EXOT

Issuer	Info Exchange	Addressee	Info Element	Info Entity
Airport Ops Support	Request TSAT o--> Aerodrome ATS	Aerodrome ATS	TOBT	TargetOffBlockTime
Aerodrome ATS	Aerodrome ATS o--> TSAT received	Airport Ops Support	TSAT	TargetStartUpApprovalTime
AO/GH	Set TOBT manually o--> TOBT received	Airport Ops Support	TOBT	TargetOffBlockTime
Airport Ops Support	Send Target DPI - Target Message o--> NM	NM	Departure planning information (TTOT, etc.)	EstimatedTakeOffTime

3.3.2.5 [NOV-5][RNI.04] DPI Provision at TSAT Issued (Milestone 10 and 11)

The RNI airport sends automatically a T-DPI-s (Sequenced) Message to NMOC at local implementation definition (A-CDM manual recommends between TOBT-40’ and TOBT-30’) with TTOT calculated with TSAT (output from the pre-departure sequence) and EXOT.

The inputs for the Pre-departure Sequence are the TOBT+Taxi-Time (EXOT) (for non-regulated flights), the CTOT (for regulated flights) and any Airport constraints. The output of the Pre-Departure Sequence is the TSAT.

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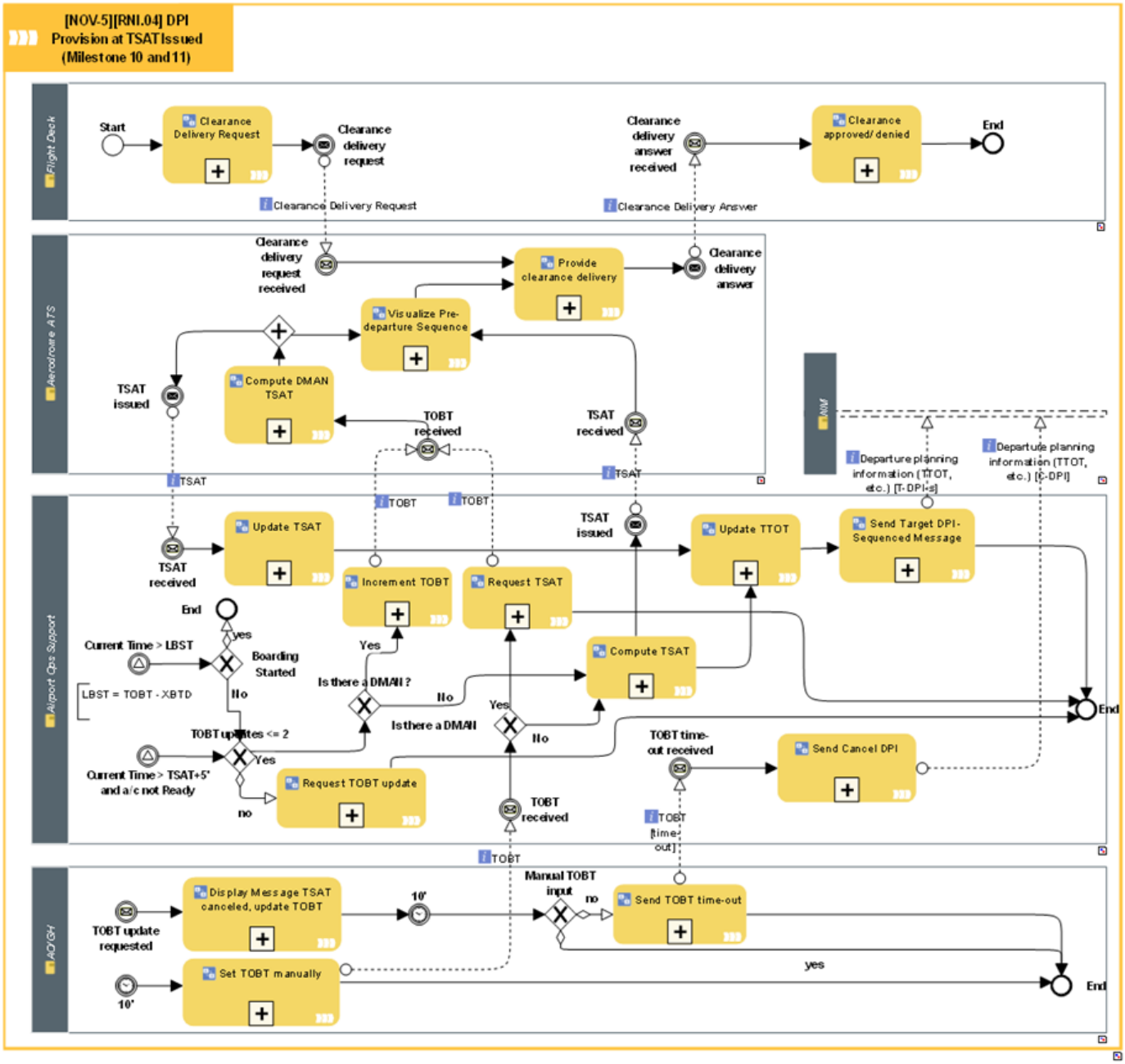

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Diagram Id: 05CB2833598C7132

Activity	Description
Display Message TSAT canceled, update TOBT	TSAT+5' is elapsed, aircraft is still not ready, two automatic TOBT increments already happened, manual TOBT is then requested to AO/GH.
Increment TOBT	Update TOBT by an increment of 5 minutes.
Request TOBT update	TSAT+5' is elapsed, aircraft is still not ready, two automatic TOBT increments already happened, manual TOBT is then requested to AO/GH. A 10' time-out is started which if reached will lead to a DPI Cancel sent to NM.
Request TSAT	AO/GH has registered a TOBT manually and the effect is a re-sequence throught a TSAT request
Send Cancel DPI	C-DPI is to inform NM that previously sent DPI information is no longer valid.
Send TOBT time-out	No TOBT entered by AO/GH within the time-out (10mn) is notified to Airport Ops Support, which eventually leads to a cancellation of the sequence.
Set TOBT manually	According to local procedures AO/GH may change TOBT manually.
Update TSAT	The Target Start-up Approval Time (TSAT) is provided by the Pre-Departure Sequence based on the TOBT+Taxi-Time(EXOT) (for non-regulated flights), the CTOT (for regulated flights) and any CDM Airport constraints. The AO/GH, in coordination with the aircrew, can manage the turn-round process accordingly.
Update TTOT	Update Target Take-Off Time with TOBT value. TTOT = TOBT + EXOT
Compute TSAT	TSAT = TOBT or CTOT-EXOT in case there is no PDS, otherwise PDS logic defined locally will compute TSAT
Send Target DPI - Sequenced Message	The transmission of a T-DPI-s (or Target DPI-sequenced) Message at Milestone 10 aims at informing all relevant partners of the TSAT that has been allocated to the flight.

Issuer	Info Flow	Addressee	Info Element	Info Entity
Aerodrome ATS	Aerodrome ATS o--> TSAT received	Airport Ops Support	TSAT	TargetStartUpApprovalTime
Airport Ops Support	Send Target DPI - Sequenced Message o--> NM	NM	Departure planning information (TTOT, etc.)	EstimatedTakeOffTime
Airport Ops Support	Increment TOBT o--> Aerodrome ATS	Aerodrome ATS	TOBT	TargetOffBlockTime

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Issuer	Info Flow	Addressee	Info Element	Info Entity
AO/GH	Send TOBT time-out o--> TOBT time-out received	Airport Ops Support	TOBT	TargetOffBlockTime
AO/GH	Set TOBT manually o--> TOBT received	Airport Ops Support	TOBT	TargetOffBlockTime
Airport Ops Support	Request TSAT o--> Aerodrome ATS	Aerodrome ATS	TOBT	TargetOffBlockTime
Airport Ops Support	Send Cancel DPI o--> NM	NM	Departure planning information (TTOT, etc.)	EstimatedTakeOffTime

3.3.2.6 [NOV-5][RNI.05] DPI Provision at Off-Block (Milestone 15)

The time (AOBT) the aircraft pushes back/vacates the parking position, an ATC DPI message is sent to NMOC, which is also informed if TTOT changes by more than the agreed tolerance.

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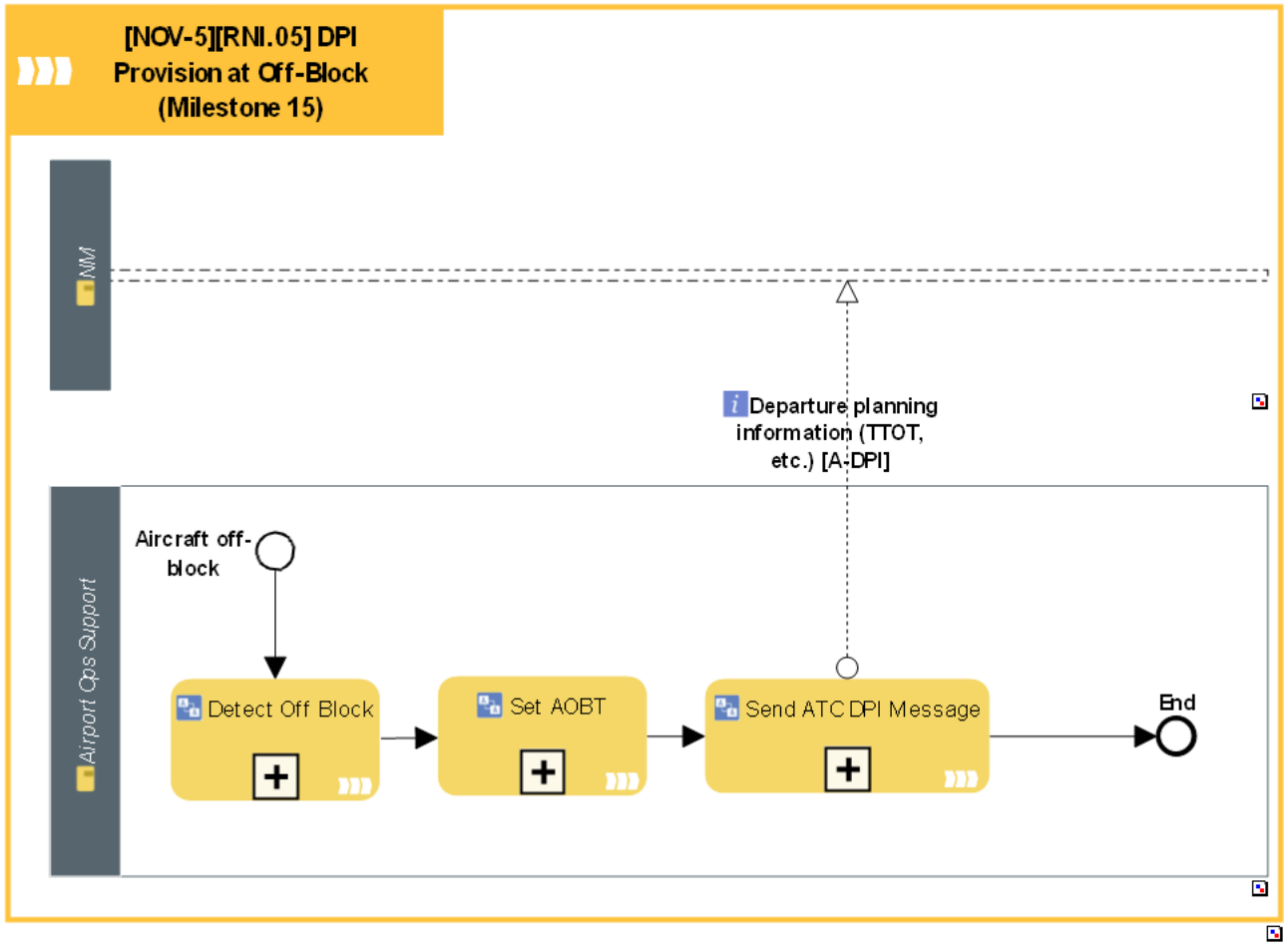

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Diagram Id: 05CB93CE598CC786

Activity	Description
Send ATC DPI Message	AOBT always triggers an A-DPI message to NM.
Set AOBT	The aircraft has commenced push-back or taxi from parking position. The trigger comes from Aerodrome ATS through ACARS equipped aircraft, automated docking systems, ATC systems or manual input.
Detect Off Block	Airport Operator detects Off Block event.

Issuer	Info Flow	Addressee	Info Element	Info Entity
Airport Ops Support	Send ATC DPI Message o--> NM	NM	Departure planning information (TTOT, etc.)	EstimatedTakeOffTime

3.3.2.7 [NOV-5][RNI.06] DPI Provision of DPI for cancelled flight

The airport will send a C-DPI (CNL) Message to NMOC at the time when a previously sent TTOT is no longer valid and a new TTOT is not yet known.

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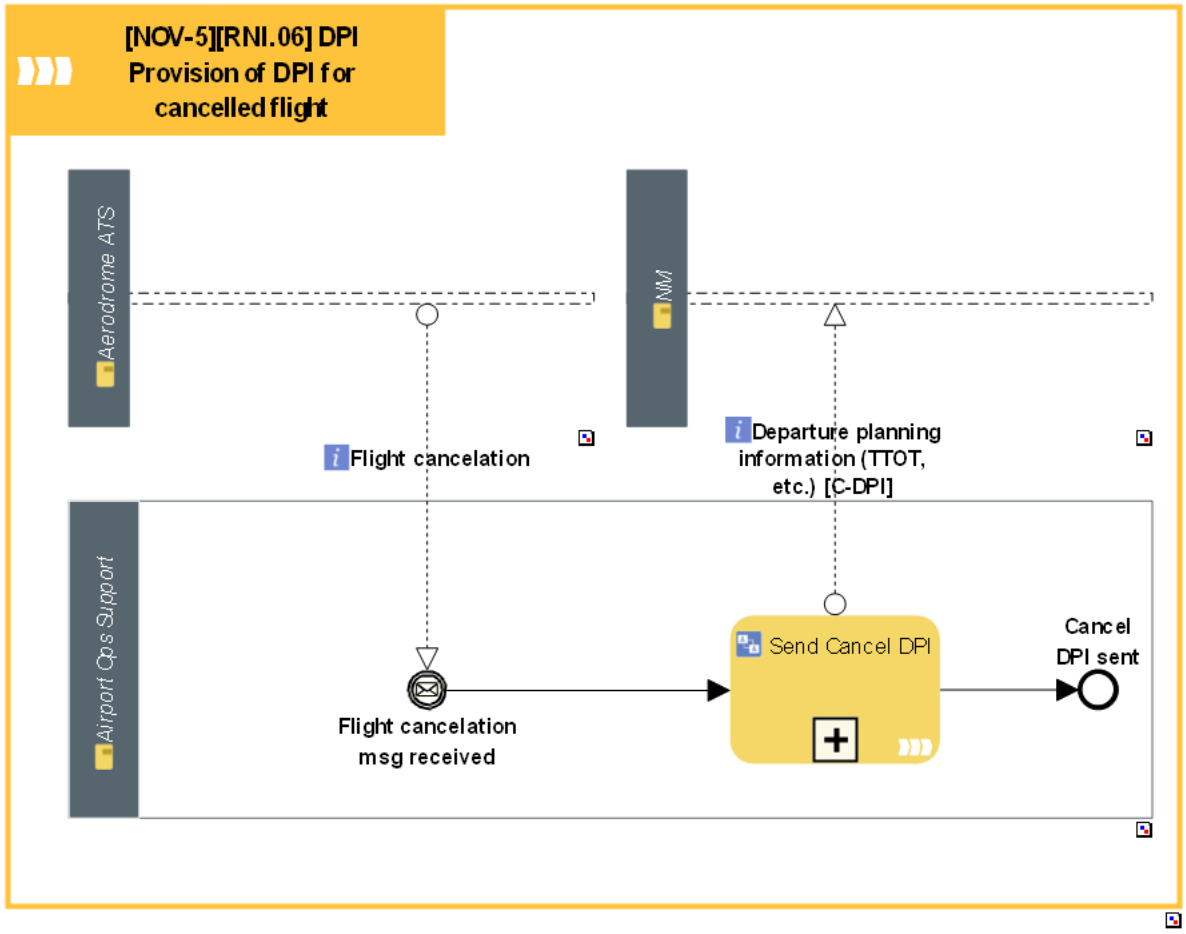

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Diagram Id: 05CB93D5598CC97F

Activity	Description
Send Cancel DPI	C-DPI is to inform NM that previously sent DPI information is no longer valid.

Issuer	Info Exchange	Addressee	Info Element	Info Entity
Aerodrome ATS	Aerodrome ATS o--> Flight cancelation msg received	Airport Ops Support	Flight cancelation	
Airport Ops Support	Send Cancel DPI o--> NM	NM	Departure planning information (TTOT, etc.)	EstimatedTakeOffTime

3.3.3 Differences between new and previous Operating Methods

OI Step code - title		
AO-0824 - Regional network-integrated airports (RNI)		
Check consistency ATC FPL, Airport Slot and Airport Flight Data	Introduce	This operational activity contributes to achieve Milestone 1 which does not exist in baseline concept
Compute ACGT	Introduce	This operational activity contributes to achieve Milestone 8 which does not exist in baseline concept
Compute TOBT and TTOT	Introduce	This operational activity contributes to achieve Milestone 2 and 3 which does not exist in baseline concept
Compute TSAT	Introduce	This operational activity contributes to achieve Milestone 8 which does not exist in baseline concept
Display Message TSAT canceled, update TOBT	Introduce	This operational activity contributes to achieve Milestone 10 which does not exist in baseline concept
Increment TOBT	Introduce	This operational activity contributes to achieve Milestone 10 which does not exist in baseline concept
Provide information (EOBT, EXOT, SID,	Introduce	This operational activity contributes to achieve Milestone 1 which does not exist in baseline concept

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A/C type, Registration, TTOT)		
Request TOBT update	Introduce	This operational activity contributes to achieve Milestone 10 which does not exist in baseline concept
Request TSAT	Introduce	This operational activity contributes to achieve Milestones 8 (when Pre-Departure Management is active) and 10 which do not exist in baseline concept
Send ATC DPI Message	Introduce	DPI messages will be sent in accordance with the "DPI Implementation Guide"
Send Cancel DPI	Introduce	WARNING: EATMA:This operational activity contributes to achieve Milestone 10 which does not exist in baseline concept OSED: DPI messages will be sent in accordance with the "DPI Implementation Guide"
Send Early DPI Message	Introduce	WARNING: EATMA: This operational activity contributes to achieve Milestone 1 which does not exist in baseline concept OSED: DPI messages will be sent in accordance with the "DPI Implementation Guide"
Send Target DPI - Target Message	Introduce	WARNING: EATMA: This operational activity contributes to achieve Milestones 2, 3, 8 and 10 which do not exist in baseline concept OSED: DPI messages will be sent in accordance with the "DPI Implementation Guide"
Send TOBT time-out	Introduce	This operational activity contributes to achieve Milestone 10 which does not exist in baseline concept
Send warning	Introduce	This operational activity contributes to achieve Milestone 1 which does not exist in baseline concept
Set TOBT manually	Introduce	WARNING: EATMA: This operational activity contributes to achieve Milestones 2, 3, 8 and 10 which do not exist in baseline concept OSED: A TOBT will be created by the Information Sharing Platform
Solve problem (slot, EOBT)	Introduce	This operational activity contributes to achieve Milestone 1 which does not exist in baseline concept
Update EIBT	Introduce	This operational activity contributes to achieve Milestones 2, 3 and 8 which do not exist in baseline concept
Update ELDT	Introduce	This operational activity contributes to achieve Milestone 2 and 3 which does not exist in baseline concept

Update TSAT	Introduce	This operational activity contributes to achieve Milestone 10 which does not exist in baseline concept
Update TTOT	Introduce	This operational activity contributes to achieve Milestones 2, 3, 8 and 10 which do not exist in baseline concept

Table 8 : Differences between new and previous operating methods

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4 Safety, Performance and Interoperability Requirements (SPR-INTEROP)

4.1 Operational Requirements

4.1.1 Requirements relating to the creation of the CDM information sharing environment

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-ENVI.0010
Title	RNI Airport CDM System (RNI)
Requirement	The RNI Airport shall implement an information sharing system
Status	<Validated>
Rationale	The RNI Airport relies on the CDM System to enable the Information Sharing, the Information Updates from the Airport CDM Partners, and the Management of the Milestone Approach. The RNI may consist on a set of connected tools or one integrated system.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<SATISFIES>	<High Level Operational Requirement>	S28.1-HLOR-01 S28.1-HLOR-02
<ALLOCATED_TO>	<Activity>	N/A
<ALLOCATED_TO>	<Activity view>	N/A
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-ENVI.0020
Title	RNI Airport CDM Milestones
Requirement	The RNI Airport shall implement a set of internally agreed Airport CDM Milestones from M1 to M16, covering at least

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	Milestones M1, M3, M8, M10, M11, M12, M15 and M16 as described in the CDM Implementation manual.
Status	<Validated>
Rationale	The Airport CDM Implementation Manual defines a set of 16 Milestones to track the progress of a flight by a continuous set of events (arrival, landing, taxi-in, turn-round, taxi-out, departure). This functionality is based on the Information Sharing and the Updates performed by the Airport CDM Partners. These event-based Milestones are the minimum needed to ensure the integrity of Target Take-Off Time calculation.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<SATISFIES>	<High Level Operational Requirement>	S28.1-HLOR-01 S28.1-HLOR-02
<ALLOCATED_TO>	<Activity>	N/A
<ALLOCATED_TO>	<Activity view>	N/A
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-ENVI.0030
Title	RNI Airport Daily Operations Plan
Requirement	The RNI airport shall provide the flight plans and stand plan from the airport operations database for the platform to manage them
Status	<Validated>
Rationale	The RNI platform requires connecting to the Airport Database to download the Plan for the day of operations. The set of data includes Flight Plans and the Stand Plan. The RNI Airport shall assure this could be achieved to check the consistency between the flight plan, the slot and the flight data
Category	<Operational>

[REQ Trace]

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Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<SATISFIES>	<High Level Operational Requirement>	S28.1-HLOR-01 S28.1-HLOR-02
<ALLOCATED_TO>	<Activity>	Check consistency ATC FPL, Airport Slot and Airport Flight Data
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.01] DPI Provision at ATC Flight Plan Activated (Milestone 1)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-ENVI.0040
Title	Airport Transit View information sharing
Requirement	The RNI Airport shall have an integrated view of arriving aircraft, linked to the corresponding departure (same airframe) and the associated Turnaround milestones with each linked arrival and departure.
Status	<Validated>
Rationale	The RNI Airport link inbound flights to outbound flights at flight plan filling time or earlier. This operation reflects the SESAR Concept of the Airport Transit View (ATV) and although performed automatically, special cases may require Human Intervention to solve special cases.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<SATISFIES>	<High Level Operational Requirement>	S28.1-HLOR-01 S28.1-HLOR-02
<ALLOCATED_TO>	<Activity>	N/A
<ALLOCATED_TO>	<Activity view>	N/A
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-ENVI.0050
Title	RNI Airport Pre-Departure Sequencing List

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Requirement	The RNI Airport shall manage a pre-departure sequencing list, possibly derived by a Departure Manager (DMAN).
Status	<Validated>
Rationale	The pre-departure sequencing list is the order that aircraft are planned to depart from their stands (push off-blocks) taking into account partners' preferences. The pre-departure sequence can also be derived by a departure manager (DMAN), which calculates based on demand the take-off time TTOT and derives the TSAT from the runway sequence. Airports can implement different solutions to achieve the pre-departure sequence, depending on local traffic complexity and surface congestion.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<SATISFIES>	<High Level Operational Requirement>	S28.1-HLOR-01 S28.1-HLOR-02
<ALLOCATED_TO>	<Activity>	Compute TSAT Update TSAT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.05] DPI Provision at TSAT Issued (Milestone 10)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

4.1.2 Requirements relating to the building of the airport data model (strategic phase)

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-ADMO.0010
Title	RNI Airport Taxi-times Estimates
Requirement	The RNI Airport shall define a method to determine taxi-times estimates from historical data, where taxi-in (EXIT) is a function of arrival runway and parking stand, and taxi-out (EXOT) is a function of parking stand and departure runway.
Status	<Validated>
Rationale	The key assumption for the RNI Airport concept is that for a given stand and runway combination that both EXIT and EXOT are highly predictable and are subject to little variability across different flights. The values can change as a function of the operational conditions at the airport.
Category	<Performance>

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[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Update EIBT Compute TOBT and TTOT Update TTOT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.01] DPI Provision at ATC Flight Plan Activated (Milestone 1) [NOV-5][RNI.02] DPI Provision at EOBT - 2 hr (Milestone 2) [NOV-5][RNI.03] DPI Provision at Take Off from Outstation (Milestone 3) [NOV-5][RNI.04a] DPI Provision at Ground Handling Started without PDM (Milestone 8) [NOV-5][RNI.04b] DPI Provision at Ground Handling Started with PDM (Milestone 8) [NOV-5][RNI.05] DPI Provision at TSAT Issued (Milestone 10)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-ADMO.0020
Title	RNI Airport Expected Turnaround Time (XTTA)
Requirement	The RNI Airport shall define a method to determine Turnaround duration estimates from historical data, based typically on Aircraft Operator, Aircraft Type, Boarding Type and Flight Destination.
Status	<Validated>
Rationale	Variables including Aircraft Operator, Aircraft Type, Boarding Type and Flight Destination are common performances drivers relating to XTTA. The list of variables could be expanded to include other airport characteristics or reduced in less complex airports.
Category	<Performance>

[REQ Trace]

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Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Compute TOBT and TTOT Compute ACGT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.02] DPI Provision at EOBT - 2 hr (Milestone 2) [NOV-5][RNI.03] DPI Provision at Take Off from Outstation (Milestone 3) [NOV-5][RNI.04a] DPI Provision at Ground Handling Started without PDM (Milestone 8) [NOV-5][RNI.04b] DPI Provision at Ground Handling Started with PDM (Milestone 8)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-ADMO.0030
Title	RNI Airport Boarding Time Duration Estimates (XBTD)
Requirement	The RNI Airport shall define a method to determine boarding time estimates derived from historical data, based on Aircraft Type, Handling Agent, Boarding Type.
Status	<Validated>
Rationale	Variables including Aircraft Type, Handling Agent, Boarding Type are common performances drivers relating to XBTD. The list of variables could be expanded to include other airport characteristics or reduced in less complex airports.
Category	<Performance>

[REQ Trace]

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Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Compute TOBT and TTOT Compute ACGT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.02] DPI Provision at EOBT - 2 hr (Milestone 2) [NOV-5][RNI.03] DPI Provision at Take Off from Outstation (Milestone 3) [NOV-5][RNI.04a] DPI Provision at Ground Handling Started without PDM (Milestone 8) [NOV-5][RNI.04b] DPI Provision at Ground Handling Started with PDM (Milestone 8)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

4.1.3 Requirements relating to the reception and processing of Flight Update Messages from the Network Manager

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-FUMS.0010
Title	RNI Airport Flight Updates Messages (FUM)
Requirement	The RNI Airport shall receive Flight Update Messages (FUM) Flight Progress Messages from NMOC.
Status	<Validated>
Rationale	The FUM is sent by NMOC to provide the destination airport with the Estimated Landing Time (ELDT) of a flight. The FUM also contains the following: - Estimated Time Over (ETO) of the last point en-route or of the Inbound Approach Fix (IAF) - Status of the flight in ETFMS (e.g. filed, delayed by ATFM, updated by Airport, Airborne,…) - Departure airport type, e.g. CDM Airport, Advanced TWR Airport, RNI Airport or Standard Airport - Status of the flight during the Turnround process (DPI Expected, E-DPI received, T-DPI-t received, T-DPI-s received, ATC-DPI received) More details for implementation are laid down in the FUM Implementation Guide.
Category	<IER>

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[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Flight update message (FUM) Provision NM and Airport OPS Support
<ALLOCATED_TO>	<Information Flow>	NM o→ FUM received

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-FUMS.0020
Title	Estimated Landing Time maintenance
Requirement	On receipt of the first FUM message for a given flight and at each subsequent FUM message reception for the same flight, the RNI Airport procedures shall initiate and maintain the estimated landing time (ELDT) for the flight.
Status	<Validated>
Rationale	The ELDT is used as the basis for milestone calculation at the RNI airport.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Update ELDT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.02] DPI Provision at EOBT - 2 hr (Milestone 2) [NOV-5][RNI.03] DPI Provision at Take Off from Outstation (Milestone 3)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-FUMS.0030
Title	Estimated In-Block Time maintenance for inbound aircraft
Requirement	On reception of the ELDT in each received FUM message, the RNI Airport shall calculate the estimated in-block time (EIBT) derived from:

	EIBT = ELDT + EXIT (where EXIT is extracted from the RNI database and applicable for the flight in question).
Status	<Validated>
Rationale	The EIBT is a value parameter allowing ground handlers to optimise their operations.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Update EIBT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.02] DPI Provision at EOBT - 2 hr (Milestone 2) [NOV-5][RNI.03] DPI Provision at Take Off from Outstation (Milestone 3)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

4.1.4 Requirements relating to the determination of Target off Block and Target Take-off Times (TOBT and TTOT)

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0010
Title	Determination of initial Target-Off Block Time (TOBT) and Target Take-off time (TTOT)
Requirement	When a flight inbound to the RNI airport takes off from the outstation (status = 'airborne'), the RNI Airport shall compute an initial TOBT and TTOT based on: TOBT = max(EOBT, ELDT + EXIT + XTTA + EDIT) TTOT = TOBT + EXOT + EDIT
Status	<Validated>
Rationale	The take-off from the outstation is an important event-based milestone used to initiate the TOBT / TTOT calculation. It corresponds to Milestone M3 in the A-CDM Implementation Manual. If the departure airport is more than 3hrs flying time from the destination airport the ATOT is received from either the Network Operations FUM or via the Aircraft Operator or Ground Handling Agent. Using the ATOT an ELDT can be calculated by using the Estimated Elapsed Time on the FPL.

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	If the flight is within 3hrs flying time of the destination airport, NMOC monitors progress of the flight and send FUM Messages to provide updated ELDT. Calculation basis for the TOBT the latest time between EOBT and ELDT+EXIT+XTTA+EDIT. And TTOT = TOBT+EXOT+EDIT. In case there is no de-icing EDIT time equals zero.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Compute TOBT and TTOT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.02] DPI Provision at EOBT - 2 hr (Milestone 2)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0020
Title	Handling of Actual Landing Time (ALDT)
Requirement	The RNI Airport shall register the Actual Landing Time (ALDT).
Status	<Validated>
Rationale	Provided by ATC system or by ACARS from equipped aircraft, or input manually, this is the time that an aircraft touches down on a runway.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Update EIBT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.04a] DPI Provision at Ground Handling Started without PDM (Milestone 8) [NOV-5][RNI.04b] DPI Provision at Ground Handling Started with PDM (Milestone 8)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

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[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0030
Title	Estimated In block time for aircraft having landed
Requirement	On reception of the ALDT, the RNI Airport shall update the Estimated In-Block time derived from : EIBT = ALDT + EXIT (where EXIT is extracted from the RNI database and applicable for the flight in question)
Status	<Validated>
Rationale	Knowing ALDT permits a refinement of the EIBT.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Update EIBT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.04a] DPI Provision at Ground Handling Started without PDM (Milestone 8) [NOV-5][RNI.04b] DPI Provision at Ground Handling Started with PDM (Milestone 8)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0040
Title	Handling of Actual In-block Time (AIBT)
Requirement	The RNI Airport shall register the Actual In-block Time (AIBT).
Status	<Validated>
Rationale	Provided by ACARS equipped aircraft or automated docking systems or ATC systems, this is the time that an aircraft arrives in-blocks.
Category	<Operational>

[REQ Trace]

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Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Compute ACGT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.04a] DPI Provision at Ground Handling Started without PDM (Milestone 8) [NOV-5][RNI.04b] DPI Provision at Ground Handling Started with PDM (Milestone 8)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0060
Title	Determination of the Actual Commencement of Ground Handling Time (ACGT)
Requirement	The RNI Airport shall compute the Actual Commencement of Ground Handling Time (ACGT) derived from : If SOBT-AIBT < 2h then ACGT = AIBT otherwise ACGT = MAX(SOBT,EOBT) – XTTA Where SOBT is the scheduled off-block time and EOBT the latest estimated off-block time and XTTA is derived from the RNI database for the flight in question
Status	<Validated>
Rationale	For flights that are on a normal turn-round ACGT is considered to commence at AIBT. Use of SOBT and EOBT caters for the case of aircraft on a ‘long’ Turnaround such as a night stop. This corresponds to Milestone M8 in the A-CDM Implementation Manual.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Compute ACGT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.04a] DPI Provision at Ground Handling Started without PDM (Milestone 8) [NOV-5][RNI.04b] DPI Provision at Ground Handling Started with PDM (Milestone 8)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0070
Title	Update to TOBT on start of handling (ACGT)
Requirement	The RNI Airport shall update the TOBT for a flight once the ACGT is received and is determined as follows : TOBT = max(EOBT,ACGT+XTTA)
Status	<Validated>
Rationale	Starting the handling process permits a refinement of the TOBT calculation.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Compute ACGT
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.04a] DPI Provision at Ground Handling Started without PDM (Milestone 8) [NOV-5][RNI.04b] DPI Provision at Ground Handling Started with PDM (Milestone 8)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0080
Title	Departure Management (TSAT determination)
Requirement	The RNI Airport Airlines and Ground Handlers shall provide the TOBT as input to the TSAT calculation within the Departure manager tool. In the event that no DMAN is present (typical of a non-coordinated airport) then a 'pseudo' TSAT is calculated as follows : TSAT = TOBT (no CTOT) TSAT = CTOT – EXOT - EDIT (flight subject to CTOT)
Status	<Validated>
Rationale	TSAT is an integral element allowing ATC to manage the departure sequence. TSAT issuance corresponds to Milestone 10 within the set of 16 A-CDM Milestones. This is 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.

	All relevant partners of the TSAT are informed that it has been allocated to the flight. The Network Operations is informed by a DPI Message (T-DPI-s) for non-regulated flights. For regulated flights, TOBT might be replaced with TSAT which equals CTOT minus taxi-times. In case there is no de-icing EDIT equals zero.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Set TOBT manually
<ALLOCATED_TO>	<Activity view>	[NOV-5][RNI.04a] DPI Provision at Ground Handling Started without PDM (Milestone 8) [NOV-5][RNI.04b] DPI Provision at Ground Handling Started with PDM (Milestone 8) [NOV-5] [RNI.05] DPI provision at TSAT issued (Milestone 10)
<ALLOCATED_TO>	<Role>	Ground Handling Agent
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0090
Title	RNI estimates of Expected Boarding Time Duration (XBTD)
Requirement	The RNI Airport shall provide the estimates of the Expected Boarding Time Duration (XBTD).
Status	<Validated>
Rationale	The values depend on Aircraft Type, Handling Agent, Boarding Type (contact or remote) and the Flight Destination. Meanwhile more parameters may be required according to airport characteristics and complexity.
Category	<Operational>

[REQ Trace]

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Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Increment TOBT
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.05] DPI provision at TSAT issued (Milestone 10)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0100
Title	Derivation of latest boarding start time on start of handling (LBST)
Requirement	The RNI Airport shall compute the latest time that boarding should commence (LBST) if the TOBT for the flight will be respected as follows : LBST = TOBT - XBTD
Status	<Validated>
Rationale	Starting the handling process permits a better knowledge of the time constraints relating to the boarding process. The values depend on Aircraft Operator, Aircraft Type, Handling Agent, Boarding Type (contact or remote) and the Flight Destination. Meanwhile more parameters may be required according to airport characteristics and complexity.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Increment TOBT
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.05] DPI provision at TSAT issued (Milestone 10)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0110
Title	Handling of the Actual Start of Boarding Time (ASBT)
Requirement	The RNI Airport shall register the Actual Start of Boarding Time (ASBT).

Status	<Validated>
Rationale	Automatic from airport system or provided by Aircraft Operator or Ground Handler Agent, this is the time the Boarding starts. The gate is open for passengers to physically start boarding (independent of whether boarding takes place via an air-bridge/pier, aircraft steps or coaching to a stand). This corresponds to Milestone M11 in the A-CDM Implementation Manual.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Increment TOBT
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.05] DPI provision at TSAT issued (Milestone 10)
<ALLOCATED_TO>	<Role>	Ground Handling Agent
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0120
Title	Boarding monitoring
Requirement	Every minute the RNI Airport shall monitor for confirmation that the boarding process has started.
Status	<Validated>
Rationale	It is necessary to know the when the boarding starts in order to respect the TOBT and permit an automatic update in the event that boarding has not started.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Increment TOBT
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.05] DPI provision at TSAT issued (Milestone 10)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0121
Title	Automatic update of TOBT if boarding is delayed
Requirement	If ASBT confirmation has not been received at LBST, TOBT shall be increased by 5 minutes as well as the value of LBST.
Status	<Validated>
Rationale	When ASBT has not been received at LBST, five minutes are added to the TOBT and the LBST to give the Stakeholders 5 minutes more. This process will take place 2 times before deleting TOBT and requesting a manual TOBT.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Increment TOBT
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.05] DPI provision at TSAT issued (Milestone 10)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0122
Title	Warning when boarding is delayed
Requirement	RNI Airport shall send a warning to the Aircraft Operator / ground handler when ASBT surpasses LBST
Status	<Validated>
Rationale	GHs and Airlines are to be notified that the LBST has been surpassed and they have not complied with the boarding time for them to take actions when considered.
Category	<Operational>

[REQ Trace]

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Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Increment TOBT
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.05] DPI provision at TSAT issued (Milestone 10)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0130
Title	RDY status monitoring
Requirement	Every minute the RNI Airport shall monitor for confirmation that at TSAT+5' the aircraft RDY status is confirmed
Status	<Validated>
Rationale	Optimise the conformance between the actual take-off time and the TTOT that has been sent to NMOC.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Increment TOBT Request TOBT update
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.05] DPI provision at TSAT issued (Milestone 10)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0131
Title	Conformance of aircraft RDY status with the TSAT
Requirement	RNI Airport shall notify the GHs and Airlines when the RDY status has not been confirmed on time not complying with the TSAT tolerance
Status	<Validated>
Rationale	At TSAT+5', airport shall check that the aircraft RDY status is confirmed and shall raise a warning in the absence of the status of RDY being confirmed. If the GH enters a new TOBT then TSAT and TTOT are updated accordingly
Category	<Operational>

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[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Increment TOBT Request TOBT update
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.05] DPI provision at TSAT issued (Milestone 10)
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0140
Title	Manual TOBT management
Requirement	If an Aircraft Operator / ground handler manually enters a value for the TOBT into the RNI Platform then this value shall take precedence over any automatically calculated value.
Status	<Validated>
Rationale	Human intervention should take precedence as the handlers may have enhanced local knowledge and TSAT and TTOT shall be updated in line with the newly proposed TOBT value
Category	<IER>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] TOBT Provision AO/GH and Airport Ops Support
<ALLOCATED_TO>	<Information Flow>	Set TOBT manually o--> TOBT received

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0150
Title	ATC TSAT Provision
Requirement	Airport Operator shall provide to ATC the TSAT in case there is no DMAN implemented at the airport
Status	<In Progress >

Rationale	ATC shall have at sight the TSAT to be able to comply with the Pre-Departure Sequence defined by the RNI Airport Platform and approve or deny the clearance.
Category	<IER>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] TSAT Provision
<ALLOCATED_TO>	<Information Flow>	TSAT issued o--> TSAT received

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0160
Title	ATC clearance delivery
Requirement	ATC shall provide clearance when TSAT is requested within the TSAT tolerance defined locally
Status	<In Progress >
Rationale	ATC shall try to adhere to the Pre-Departure Sequence determined and approve the clearance obeying the local rules defined
Category	<IER>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Clearance Request & Answer
<ALLOCATED_TO>	<Information Flow>	Clearance Delivery Answer o--> Clearance Delivery Answer Received

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-TXXT.0170
Title	Flight Deck Clearance Request
Requirement	Flight Deck shall make the request for clearance within the TSAT tolerance defined locally
Status	<In Progress >
Rationale	Flight Deck shall know the clearance tolerances and call within this to be able to achieve the clearance delivery
Category	<IER>

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[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Clearance Request & Answer
<ALLOCATED_TO>	<Information Flow>	Clearance Delivery Request o--> Clearance Delivery Request Received

4.1.5 Requirements relating to the transmission of Departure Planning Information messages to the Network Manager

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-DPIs.0010
Title	RNI Airport Departure Planning Information (DPI)
Requirement	The RNI Airport shall handle the delivery of Departure Planning Information (DPI) Flight Progress Messages to NMOC.
Status	<Validated>
Rationale	DPI Messages are to better coordinate CDM Airports with ATFCM to ensure on time update of the flight data, more consistent slot calculation and improve slot adherence. DPI Messages which are mostly automatically processed, make NMOC and Airports Partners aware of the situation of a given flight in respect of the pre-departure phase, in particular with regard to Take-Off-Time. Requirements for DPI implementation are laid down in the DPI Implementation Guide.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Flight Information
<ALLOCATED_TO>	<Information Flow>	Send Target DPI Target Message o→ NM Send Target DPI Sequenced Message o→ NM Send Cancel DPI o→ NM Send ATC DPI Message o→ NM Send Early DPI Message o→ NM

[REQ]

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Identifier	REQ-04-W2-28.1-SPRINTEROP-DPIS.0030
Title	Handling of the Actual Take Off Time (ATOT)
Requirement	The RNI Airport shall receive the Actual Take Off Time (ATOT).
Status	<Validated>
Rationale	Provided by ATC system or from ACARS equipped aircraft, this is the time that an aircraft takes off from the runway. This corresponds to Milestone M16 in the A-CDM Implementation Manual.
Category	<IER>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Flight Cancellation information Aerodrome ATS and Airport OPS Support
<ALLOCATED_TO>	<Information Flow>	Aerodrome ATS o→ Flight Cancellation message received

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-DPIS.0040
Title	RNI Standard Instrumented Departure (SID)
Requirement	The RNI Airport shall handle the Standard Instrumental Departure (SID)
Status	<Validated>
Rationale	Provided normally by ATC and included in DPI Messages, SID for a given aircraft is normally used to update the Filed Tactical Flight Model (FTFM) in the Network Manager Enhanced Traffic Flow Management System (ETFMS). This field in T-DPI-s and A-DPI messages is normally only used to update the load (Actual Flight Model, CTFM).
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Check consistency ATC FPL, airport slot and airport flight data
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.01] DPI provision at ATC flight plan activated
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-DPIS.0050
Title	RNI Runway
Requirement	The RNI Airport shall handle the Arrival and Departure Runway.
Status	<Validated>
Rationale	Provided by ATC, Runway Departure is required to extract EXIT or EXOT from the RNI Airport database of Taxi-times values.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	Check consistency ATC FPL, airport slot and airport flight data
<ALLOCATED_TO>	<Activity view>	[NOV-5] [RNI.01] DPI provision at ATC flight plan activated
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-DPIS.0060
Title	RNI Early DPI Message (Milestone 1, EOBT-3h)
Requirement	The RNI Airport shall send automatically an E-DPI (Early) Message to NMOC at EOBT-3h with EOBT, EXOT, SID, Aircraft Type, Registration, TTOT (=EOBT+EXOT+EDIT).
Status	<Validated>
Rationale	The transmission of an E-DPI Message confirms to NMOC that an airport slot and flight plan for a particular flight has been correlated in accordance with local rules at the airport. In case there is no de-icing in the airport EDIT equals zero.

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	More details for implementation are laid down in the DPI Implementation Guide.
Category	<IER>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Flight Information
<ALLOCATED_TO>	<Information Flow>	Send Early DPI Message o→ NM

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-DPIS.0070
Title	RNI Target DPI Message (Milestone 2, EOBT-2h)
Requirement	The RNI Airport shall send automatically a T-DPI-t (Target) Message to NMOC at EOBT-2h with EOBT, EXOT, SID, Aircraft Type, Registration, TTOT (=TOBT+EXOT+EDIT or =EIBT+XTTA+EXOT+EDIT if later than EOBT+EXOT).
Status	<Validated>
Rationale	The T-DPI-t message contains the Target Take-Off Time (TTOT) that takes into account all constraints from Aircraft Operator and Ground Handling Agent perspective. The TTOT is calculated by the RNI system and shall take all known constraints such as; the ELDT from the previous leg, the flight connection, crew connection, passenger connections, the estimated turn-around process, … into account. It is usually based upon the Target Off-Block Time (TOBT) + EXOT. Updates of T-DPI-t shall be sent when the TTOT changes by 5 minutes (or more according to the agreed tolerance by Airport Partners) compared to TTOT in the previous T-DPI-t. In case there is no de-icing in the airport EDIT equals zero. More details for implementation are laid down in the DPI Implementation Guide. Note: At EOBT-2h most flights will be known in the Airport CDM Platform including if they are regulated or not. All regulated flights receive a CTOT from Network Operations.
Category	<IER>

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[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Flight Information
<ALLOCATED_TO>	<Information Flow>	Send Target DPI Target Message o→ NM

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-DPIS.0080
Title	RNI Sequence DPI Message (Milestone 10, TSAT Issue)
Requirement	The RNI Airport shall send automatically a T-DPI-s (Sequenced) Message to NMOC at TOBT-40' with TTOT calculated with TSAT (output from the pre-departure sequence) and EXOT.
Status	<Validated>
Rationale	The inputs for the Pre-departure Sequence are the TOBT+Taxi-Time (EXOT) (for non-regulated flights), the CTOT (for regulated flights) and any Airport constraints. The output of the Pre-Departure Sequence is the TSAT. It may be possible that an RNI Airport also creates an Optimal-Pre-Departure Sequence. This Optimal Pre-Departure Sequence is based upon the TOBT+Taxi-Time(EXOT)+EDIT for all flights, including regulated flights. The purpose of the Optimal Pre-Departure Sequence is to determine the earliest possible TOT for regulated flights, solely based upon CDM Airport/ATC constraints. This Optimal Pre-Departure Sequence is used to provide ETFMS with an Optimal_TTOT for regulated flights. This is the earliest possible TOT, taking all CDM Airport/ATC constraints into account. In case there is no de-icing in the airport EDIT equals zero. More details for implementation are laid down in the DPI Implementation Guide.
Category	<IER>

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[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Flight Information
<ALLOCATED_TO>	<Information Flow>	Send Target DPI Sequenced Message o→ NM

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-DPIS.0090
Title	RNI ATC DPI Message (Milestone 15, Off-block)
Requirement	The RNI Airport shall send automatically an A-DPI (ATC) Message to NMOC at AOBT.
Status	<Validated>
Rationale	The purpose of the A-DPI is to inform ETFMS that the flight has left the block and that the flight is “under ATC (or Apron) control” and taxiing to take-off. The A-DPI message supplies a reliable estimate of the Take-Off Time. More details for implementation are laid down in the DPI Implementation Guide.
Category	<IER>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Flight Information
<ALLOCATED_TO>	<Information Flow>	Send ATC DPI Message o→ NM

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-DPIS.0100
Title	RNI Cancel DPI Message
Requirement	The RNI Airport shall send a C-DPI (CNL) Message to NMOC at moments when a previously sent TTOT is no longer valid and a new TTOT is not yet known.
Status	<Validated>

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Rationale	The C-DPI should typically be sent in following situations: - at TOBT deletion (e.g. after Airport Partners agreed number of modifications) - if flight did not call for start-up x min after TSAT - if flight has a technical problem after Actual Off Block and returns to stand - when there is no airport slot for the flight - when the flight plan is considered as invalid by the airport, this could be the case when e.g. the TOBT > EOBT+15min. More details for implementation are laid down in the DPI Implementation Guide.
Category	<IER>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Information Exchange>	[NOV] Flight Information
<ALLOCATED_TO>	<Information Flow>	Send Cancel DPI o→ NM

4.1.6 Requirements relating to Regional Airports Network-Integrated

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-RNIA.0010
Title	RNI recordings
Requirement	The RNI Airport shall keep traceability of all events and related parameters for later access or for statistical analysis and database values (taxi-times, Turnround time, boarding time) improvement.
Status	<Validated>
Rationale	This function contributes to the implementation of Quality Control procedures to ensure data accuracy. More details for implementation are laid down in the FUM Implementation Guide
Category	<Operational>

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[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<SATISFIES>	<High Level Operational Requirement>	S28.1-HLOR-01 S28.1-HLOR-02
<ALLOCATED_TO>	<Activity>	N/A
<ALLOCATED_TO>	<Activity view>	N/A
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

4.1.7 Requirements relating to Human Performance

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-HP-01
Title	RNI TOBT malfunctioning
Requirement	In the event of incorrect / not functioning automated TOBT information the Ground Handler shall revert to previous operating method.
Status	<Validated>
Rationale	In terms of incorrect/ not functioning information, GH would return to previous operating method, i.e. update the TOBT manually.
Category	<Human Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	N/A
<ALLOCATED_TO>	<Activity view>	N/A
<ALLOCATED_TO>	<Role>	Ground Handling Agent
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

4.1.8 Requirements relating to Safety Assessment

[REQ]

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Identifier	REQ-04-W2-28.1-SPRINTEROP-SRD-001
Title	FPL integrity
Requirement	RNI Airport shall validate the FPL in accordance with the available information assuring the correct information availability
Status	<Validated>
Rationale	Information is key in a collaborative environment, and the RNI airports must ensure that this information is correct and up to date
Category	<Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	N/A
<ALLOCATED_TO>	<Activity view>	N/A
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-SRD-002
Title	Information Integrity
Requirement	The RNI Airport shall assure the correct computation, visualization and distribution to all the involved Stakeholders of the Target and Estimated Times
Status	<Validated>
Rationale	Information is key in a collaborative environment, and the RNI airports must ensure that this information is correct and up to date
Category	<Performance>

[REQ Trace]

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Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	N/A
<ALLOCATED_TO>	<Activity view>	N/A
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-SRD-003
Title	Operational Availability
Requirement	The RNI Airport shall have the possibility to seamlessly migrate the information to a server with reduced capabilities until the main servers recovers from the failure.
Status	<Validated>
Rationale	Airports shall assure a back-up server is available to provide service whenever the main one suffers any inconveniences or maintenance.
Category	<Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	N/A
<ALLOCATED_TO>	<Activity view>	N/A
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

[REQ]

Identifier	REQ-04-W2-28.1-SPRINTEROP-SRD-004
Title	DPIs Accuracy
Requirement	RNI Airport shall provide a capability that allows to detect when, either the information of the DPIs is not transmitted, or when this information is compromised and does not have the precision and integrity required.
Status	<Validated>
Rationale	To assure data and DPIs integrity, and ease the NM DCB process, Airports shall be able to monitor if the data is correct and

	accurate. In case it is not, NM performs the DCB process again with the flight plans data instead of the data contained in the DPIs, reducing the capacity of the sectors due to the lower precision of the information, but increasing security (old operating method).
Category	<Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier
< ALLOCATED_TO >	<SESAR Solution>	PJ.04-W2-28.1
<ALLOCATED_TO>	<Activity>	N/A
<ALLOCATED_TO>	<Activity view>	N/A
<ALLOCATED_TO>	<Role>	N/A
<ALLOCATED_TO>	<Sub-Operating Environment>	Airports

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5 References and Applicable Documents

5.1 Applicable Documents

Content Integration

[1] B.04.01 D138 EATMA Guidance Material

[2] EATMA Community pages

[3] SESAR ATM Lexicon

Content Development

[4] B4.2 D106 Transition Concept of Operations SESAR 2020

System and Service Development

[5] 08.01.01 D52: SWIM Foundation v2

[6] 08.01.01 D49: SWIM Compliance Criteria

[7] 08.01.03 D47: AIRM v4.1.0

[8] 08.03.10 D45: ISRM Foundation v00.08.00

[9] B.04.03 D102 SESAR Working Method on Services

[10]B.04.03 D128 ADD SESAR1

[11]B.04.05 Common Service Foundation Method

Performance Management

[12]B.04.01 D108 SESAR 2020 Transition Performance Framework

[13]B.04.01 D42 SESAR2020 Transition Validation

[14]B.05 D86 Guidance on KPIs and Data Collection support to SESAR 2020 transition.

[15]16.06.06-D68 Part 1 –SESAR Cost Benefit Analysis – Integrated Model

[16]16.06.06-D51-SESAR_1 Business Case Consolidated_Deliverable-00.01.00 and CBA

[17]Method to assess cost of European ATM improvements and technologies, EUROCONTROL (2014)

[18]ATM Cost Breakdown Structure_ed02_2014

[19]Standard Inputs for EUROCONTROL Cost Benefit Analyses

[20]16.06.06_D26-08 ATM CBA Quality Checklist

[21]16.06.06_D26_04_Guidelines_for_Producing_Benefit_and_Impact_Mechanisms

Validation

[22]03.00 D16 WP3 Engineering methodology

[23]Transition VALS SESAR 2020 - Consolidated deliverable with contribution from Operational Federating Projects

[24]European Operational Concept Validation Methodology (E-OCVM) - 3.0 [February 2010]

System Engineering

[25]SESAR 2020 Requirements and Validation Guidelines

Safety

[26]SESAR, Safety Reference Material, Edition 4.0, April 2016

[27]SESAR, Guidance to Apply the Safety Reference Material, Edition 3.0, April 2016

[28]SESAR, Final Guidance Material to Execute Proof of Concept, Ed00.04.00, August 2015

[29]SESAR, Resilience Engineering Guidance, May 2016

Human Performance

[30]16.06.05 D 27 HP Reference Material D27

[31]16.04.02 D04 e-HP Repository - Release note

Environment Assessment

[32]SESAR, Environment Reference Material, alias, “Environmental impact assessment as part of the global SESAR validation”, Project 16.06.03, Deliverable D26, 2014.

[33]ICAO CAEP – “Guidance on Environmental Assessment of Proposed Air Traffic Management Operational Changes” document, Doc 10031.

Security

[34]16.06.02 D103 SESAR Security Ref Material Level

[35]16.06.02 D137 Minimum Set of Security Controls (MSSCs).

[36]16.06.02 D131 Security Database Application (CTRL_S)

5.2 Reference Documents

[37]SESAR Solution PJ.04-01 SPR-INTEROP/OSED for V2 - Part I Edition 01.02.00

[38] SESAR Solution PJ.04-01 SPR/INTEROP-OSED for V2 - Part IV - Human Performance Assessment Report Edition 01.00.01

[39] SESAR Solution 04.01 SPR/INTEROP-OSED V2 - Part V - Performance Assessment Report (PAR) Edition 01.00.01

[40] SESAR 2020 Requirements and Validation Guidelines Edition 00.01.00

[41] D2.6 - PJ19: VALS (2019) Edition 00.01.00

[42] ETSI EN 303 212 V1.1.1 Airport Collaborative Decision Making (A-CDM); Community Specification for application under the Single European Sky Interoperability Regulation EC 552/2004

[43] ED-141 System Requirements Document

[44] ED-145 Interface Definition Document

[45] ED-146 Test and Validation Document

[46]Regulation (EC) No 1070/2009 of the European Parliament

[47]Commission Implementing Regulation (EU) No 390/2013

[48]Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC

[49]Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise

[50]Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

[51]Directive No 2016/2284 of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC, the National Emission Ceilings Directive (NEC Directive)

[52]Law no. 2015-992 on Energy Transition for Green Growth (Energy Transition Law)

[53]Commission Implementing Regulation (EU) No 716/2014 of 27 June 2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan Text with EEA relevance

[54]Airport CDM Implementation Manual

[55]ATFCM Operations Manual; Edition 19.3; 07 January 2016

[56]DPI Implementation Guide; Edition 1.800; 19 Mar 2015

[57]Flight Progress Messages Document; Edition 2.100; 19 Mar 2015

[58]AIP (Aeronautical Information Publication)-Munich. CDM. ver.2011-11-17

[59]ED-78A GUIDELINES FOR APPROVAL OF THE PROVISION AND USE OF AIR TRAFFIC SERVICES SUPPORTED BY DATA COMMUNICATIONS.[7]

[60]DPI Implementation Guide; EUROCONTROL; Edition 2.100; 01/08/2017

[61]SAFETY ASSESSMENT OF AIRPORT COLLABORATIVE DECISION MAKING (A-CDM) Ed. 2.0

7

Appendix A Cost and Benefit Mechanisms

A.1 Stakeholders identification and Expectations

Stakeholder	Involvement	Why it matters to stakeholder
Air Operator	Participant	Expect to improve situational awareness, reduce last minute CTOT issue and delays, improve staff and fleet monitoring and on the overall reduce workload
Airport Operator	Platform responsible and head of the RNI Airport implementation	Expect to improve resource allocation (stands, gates PLBs…), reduce last minute changes and increase situational awareness
ANSP	Participant	Expect to reduce taxiways congestion, Tower Ground Controller frequency congestion, improve flow management and reduce workload
Ground Handler	Participant	Expect to improve situational awareness, reduce last minute changes and improve resource allocation
Network Manager	Participant	Expect to improve traffic predictability, overall network situational awareness and boost DCB.

Table 9: Stakeholder's expectations

A.2 Benefits mechanisms

No BIM for each Stakeholders has been produced because it was not considered necessary. HUM KPIs applies to all Stakeholders and it will be assessed with a qualitative method (more detail is included in the VALP). PRD#M1 just applies to the Network Manager.

Whiles the aforementioned KPIs are the ones that will be measured and validated, the concept brings more benefits for all the Stakeholders, arrival predictability and regulation (CTOT) compliance will improve, between others, but are not going to be measured, considered as secondary benefits.

Sharing of accurate take-off times for flights from such airports could potentially bring network performance benefits as a result of the overall enhanced traffic predictability thereby reducing the need for sector capacity 'buffers'.

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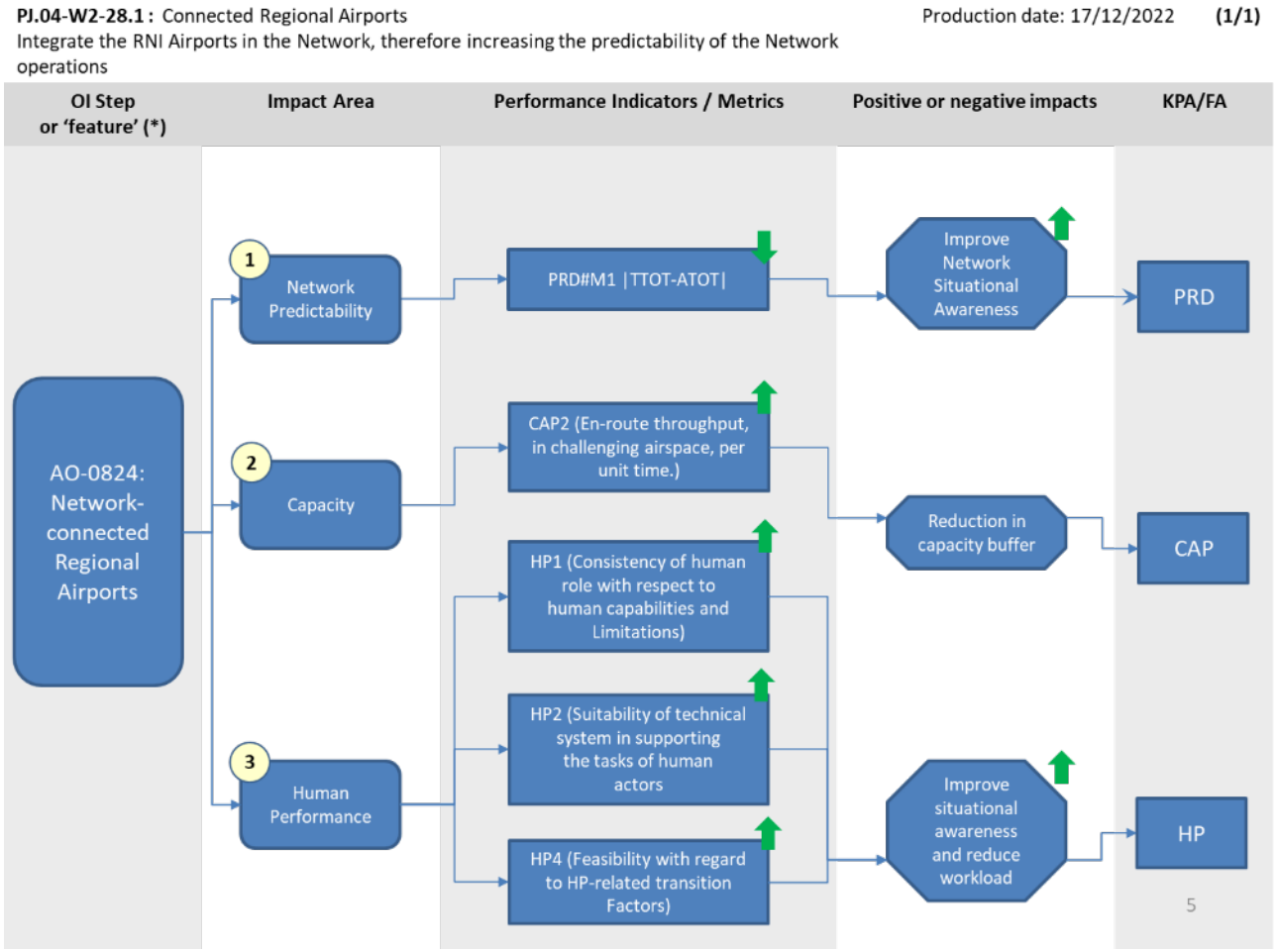

Table 10: Benefits Impact Mechanism AO-0824

Feature Description:

The **Network connected regional airports** concept aim to provide a degree of network connectivity consistent with the full A-CDM process in airports where deployment of the full set of (16) A-CDM milestones may not have a positive business case. The concept is based on the provision of DPI messages based on target times and a reduced set of Turnaround milestones to better synchronize the airport operations during the Turnaround time.

The key milestones for each flight will be available to each of the airport CDM partners. In addition, the provision of DPI messages to the Network Manager will satisfy the associated quality requirements and ensure that the airports deploying the AO-0824 OI have affordable means of achieving the Network Manager accuracy criteria. The implementation of the AO-0824 OI in regional airports will:

- Increase transparency and situational awareness among stakeholder groups at the airports
- Help react quickly to any deviation from plan during the turnaround process
- Optimise GH and other partners resources planning and management

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- Improve traffic predictability and conformance to NM quality criteria
- Improve coordination between the airport and the NMOC

Mechanisms

1. The RNI concept will have a positive impact on predictability when measured in terms of the accuracy of the target take-off time (as provided in the DPI messages) and the actual take-off time.
2. The uncertainty of the aircraft entry time to the en-route sector is one of the factors contributing to the need for a capacity buffer. The better departure (and network) predictability should allow for reducing the en-route capacity buffer and therefore increasing the declared capacity up to a closer value to the maximum safe capacity. This implies an increase in the declared en-route capacity, boosting route throughput (CAP2)
3. The inclusion of a new operating method will change the technical systems and roles of the staff, bringing benefits in terms of workload by reducing it through the improvement of the situational awareness.

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