Step 1 Technical Specification

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Abstract

This document is the Technical Specification (TS) for AMAN for SESAR Step1. This technical Specification has been jointly developed by the projects P10.9.1 and P10.9.2. It covers all the AMAN enhancements addressed in SESAR Step1 by each project It includes final technical requirements for SESAR solutions 5 (Extended Arrival Management horizon) and solution 54 (Flow based Integration of Arrival and Departure Management), and requirements for solution 6 (Controlled Time of Arrival (CTA) in Medium density / medium complexity environment) and requirements for solution 8 (Arrival Management into Multiple Airports).

Authoring & Approval

Prepared By - *Authors of the document.*		
Name & Company	Position & Title	Date
[redacted] INDRA	[redacted]	26.03.2015
[redacted] INDRA		26.03.2015
[redacted] /THALES		31.03.2015
[redacted] (NATMIG)		31/03/2015
[redacted] (ENAV)		31/03/2015
[redacted] (DSNA)		24/03/2015

Reviewed By - *Reviewers internal to the project.*		
Name & Company	Position & Title	Date
[redacted] DFS	[redacted]	25/04/2016
[redacted] INDRA		26/03/2015
[redacted] NATMIG		25/04/2016
[redacted] THALES		14/09/2015
[redacted] THALES		25/04/2016
[redacted] (NATMIG)		25/04/2016
[redacted] (DSNA)		25/04/2016
[redacted] (INDRA)		25/04/2016
[redacted] ENAV		25/04/2016

Reviewed By - *Other SESAR projects, Airspace Users, staff association, military, Industrial Support, other organisations.*		
Name & Company	Position & Title	Date
[redacted] (DFS)	[redacted]	31/03/2015
[redacted] (ENAIRE)		31/03/2015
[redacted] (INDRA)		25/09/2015
[redacted] (Eurocontrol)		25/04/2016
[redacted] (DFS)		25/09/2015
[redacted] (DFS)		25/09/2015
[redacted] (DSNA)		25/09/2015
[redacted] (Eurocontrol)		25/09/2015
[redacted] (Eurocontrol)		25/09/2015
[redacted] (DFS)		25/09/2015
[redacted] (NORACON)		28/09/2015
[redacted] THALES		14/09/2015
[redacted] DFS		25/04/2016

Approved for submission to the SJU By - *Representatives of the company involved in the project.*		
Name & Company	Position & Title	Date
[redacted] THALES	[redacted]	24/10/2016
[redacted] INDRA		24/10/2016

[redacted] NATMIG	[redacted]	24/10/2016
[redacted] DSNA		24/10/2016

Rejected By - *Representatives of the company involved in the project.*		
Name & Company	Position & Title	Date
<Name / Company>	<Position / Title>	<DD/MM/YYYY>

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Executive summary

This document is the Technical Specification (TS) for AMAN for SESAR Step1, based on operational requirements developed by projects P5.6.4, P5.6.7, P6.8.4 and P5.6.1 and P5.4.2

This technical Specification has been jointly developed by the projects P10.9.1 and P10.9.2. It covers all the AMAN enhancements addressed in SESAR Step1 by each project. It includes final technical requirements for SESAR solutions 5 (Extended Arrival Management horizon) and 54 (Flow based Integration of Arrival and Departure Management), and requirements for solution 6 (Controlled Time of Arrival (CTA) in Medium density / medium complexity environment) and requirements for Solution 8 (Arrival Management into Multiple Airports). This unique TS ensures the consistency and coherence of the AMAN specifications for the scope of the two projects.

This technical specification covers the following AMAN enhancements addressed in SESAR Step1 by projects P10.9.1 and P10.9.2:

- Sequence & Stability
- Extension of AMAN horizon
- Handling of departures from nearby airports
- AMAN/DMAN coupling on local airport
- AMAN and Point Merge System
- AMAN & CTA
- Arrival Management into multiple airports

The table below summaries the enablers supported by this Technical Specification and their maturity:

Code	Name	Maturity
APP ATC 111	Enhance AMAN to extend arrival management to en-route airspace - single TMA	TRL6
APP ATC 148	System Support For Controlled Time of Arrival (CTA)	TRL5
APP ATC 158	Enhanced arrival management to cover ground holding at the departure aerodrome	TRL5
ER APP ATC 109	Support for Metering Of Interacting Arrival Flows to Multiple Airports Upstream of the TMAs	TRL6
APP ATC 110	Enhance Arrival Management to collaborate with non-local Departure Management	TRL5
APP ATC 161	Enhance AMAN to support Flow based Integration of Arrival and Departure Management	TRL6
ER ATC 163	Support to En-route delay absorption for cross-border implementation of arrival sequence	TRL6

1 Introduction

1.1 Purpose of the document

This document describes the technical requirements for the AMAN for Step 1, mainly derived from the operational requirements developed by P5.6.4, P5.6.7, P5.6.1, P5.4.2 and P6.8.4 available at the time this TS has been elaborated. This TS has been developed, according to a 'meet in the middle approach' highlighted by the arrow in the figure below.

This technical specification covers the AMAN enhancements addressed in SESAR Step1 by projects P10.9.1 and P10.9.2

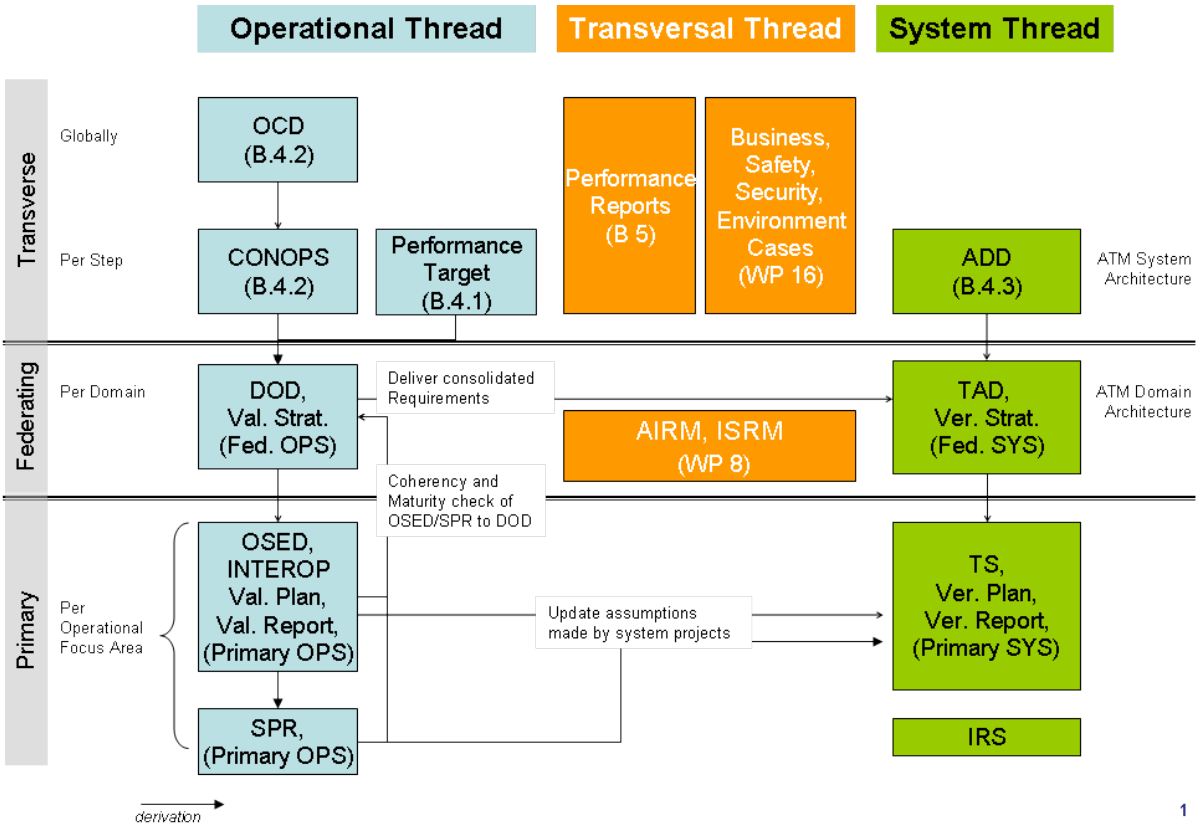

Figure 1: Flow of documentation overview [PMP]

1.2 Intended readership

The intended audience for this document encompasses but is not limited to the following projects within SESAR programme:

- P10.1.7 (ATC System Specification) as federating project, in charge of ensuring coherence among all the system requirements derived from all WP10 projects
- P5.6.4 (QM-4 – Tactical TMA and En-route Queue Management) as operational project dealing with the extension of the AMAN Horizon and the handling of departures from nearby airports.
- P5.6.7 (QM-7 – Integrated Sequence Building/Optimisation of Queues) as operational project dealing with Point Merge Structures (PMS) and Extended AMAN.

- P5.6.1 Ground and Airborne Capabilities to Implement Sequence as operational project dealing with CTA.
- P6.8.4 (Coupled AMAN/DMAN) as operational project dealing with AMAN and DMAN coupling
- P5.4.2 (TMA-2 Co-Operative Planning Requirements and Validation) as operational project dealing with Arrival Management into multiple airports
- P12.3.5 (Enhanced Sequencing Tools) for developing coherent DMAN requirements for coupling AMAN and DMAN
- P12.4.4 (Integration of departure management and surface management) for developing coherent DMAN SMAN requirements for coupling AMAN with DMAN integrated to SMAN.
- P10.9.4 (CDA/CCD in high density traffic) for review to ensure that results from its supported validation exercises are taken into account.
- P10.9.1 (Integration of queue management) for the implementation of the AMAN requirements relative to the scope of the project. P10.9.1.
- P10.9.2 (Multiple airport arrival/departure management) for the implementation of the AMAN requirements relative to the scope of the project. P10.9.2.

1.3 Inputs from other projects

. The following documents have been used for this Technical Specification as relevant inputs from other projects:

- [7] WP10.01.07-D38-Pilot AMAN Baseline Specification 00.01.00 provides a baseline set of AMAN requirements in the context of Pilot 1
- [17] P10.01.07 D120 -Technical Architecture Description - Cycle 2015-, edition 00.01.00, 19/01/2016
- [10] 05.06.07 D04 Step 1 AMAN + Point Merge in E-TMA OSED 00.00.03 10-03-2013
- [12] 05.06.01-D74 Step 1 OSED - Iteration 3 01.00.00 11-09-2013
- [13] P06.08.04.D17 S01V3 Final OSED, edition 01.01.00, 22/07/2015
- [14] P06.08.04.D18_ S01V3 Final SPR, edition 00.01.00, 04/05/2015
- [15] P05.06.07.D16_ Update of 5.6.4 SPR-INTEROP – Step 1, edition 00.01.00, 30/09/2015
- [16] P05.06.07 -D15-Update of 5 6 4 OSED-Step 1, edition 00.01.00, 31/07/2015
- [18] P05.04.02 D04 Step 1 Final OSED , edition 00.01.02, 18/05/2016
- [19] P05.04.02 D05 Step 1 Final SPR, edition 00.01.03, 28/06/2016

1.4 Structure of the document

Chapter 1: Purpose and scope; Requirements structure; Component purpose and high level overview

Chapter 2: General component description;

Chapter 3: Component Capabilities, Conditions and Constraints

Chapter 4: Referenced documents

1.5 Requirements Definitions – General Guidance

The requirement identifiers in the document follow the following syntax:

REQ-10.09.02-XXXX-YYYY

XXXX is the reference number1 which identifies the section of the document where the requirement is defined – 031x are used in the current version of the document for each subsection 3.1.x.

YYYY is the reference number2 which identifies the requirement for the subset of requirements REQ-10.09.02-TS-XXXX-YYYY is used from 0010 and by increment of 10 (0010, 0020, 0030,..)

The layout to be used in this document is the following:

[REQ]

Identifier	
Requirement	
Title	
Status	
Rationale	
Category	
Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	Enabler code	<Full>
<SATISFIES>	<ATMS Requirement>	INTEROP or SPR Requirement Identifier	<Full>
<ALLOCATED_TO>	<Functional block>	Functional block Identifier	N/A
<APPLIES_TO>	<Operational Focus Area>	Operational Focus Area Identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	Project Identifier	N/A

Table 1: Requirements layout

1.6 Functional block Purpose

The Arrival Manager (AMAN) is intended to:

- Support air traffic controllers in the management of the flow of arriving traffic.
- Act as a collaborative tool in the arrival management process for the controller and airport.

The aims of the AMAN are to:

- Allocate the optimal runway
- Optimise the arrival sequence at the runway and in TMA,
- Regulate/manage (meter) the flow of arrival aircrafts,
- Provide advisories (TTL/TTG, CTA…) to controllers to support them in the management of arrival traffic.

To meet these objectives AMAN provides:

- Sequence at the runway or at the metering point
- Scheduled target time at the runway or at the metering point (APTT/APTO)
- Advisories to implement the target sequence (time to lose/time to gain, and optionally speed, route, manoeuvres advisories).

1.7 Functional block Overview

The Arrival Management function is defined in [17] P10.01.07 D120 -Technical Architecture Description - Cycle 2015-, edition 00.01.0 as a function in charge of:

- Providing optimal arrival sequence planning

- Supporting arrival delays optimization
- Distributing arrivals information to external clients
- Allowing manual actions over the sequence

In step 1 the Arrival Management function may interact with a Departure Management function in Master/Slave configuration in order to manage arrivals on a runway in mixed mode operations.

The Arrival Management function is a part of the global ER/APP ATC system, the figure below shows a high level functional decomposition of the ER/APP ATC System for Step1.

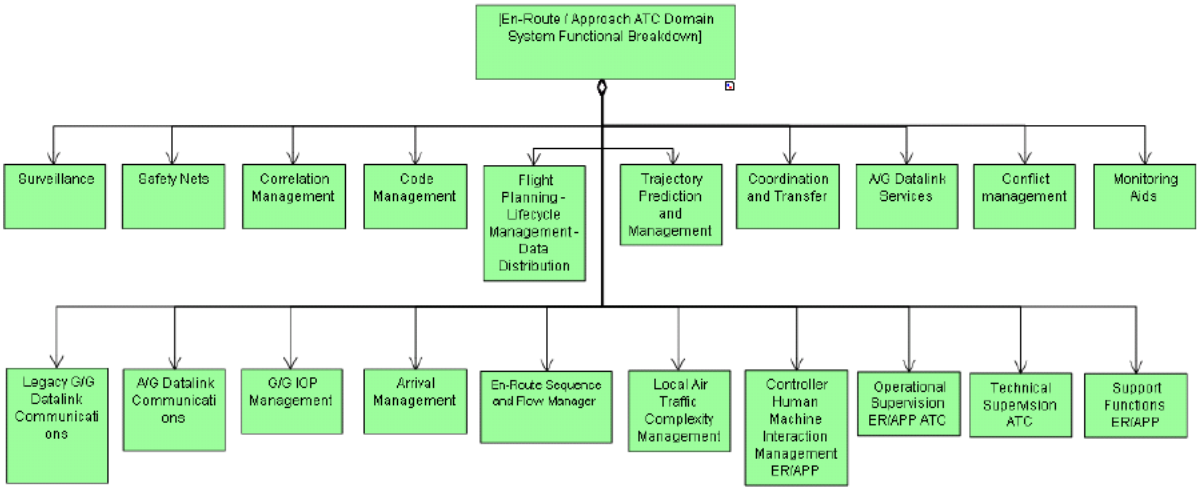

Figure 2: ER/APP ATC System Functional View

1.8 Glossary of terms

N/A

1.9 Acronyms and Terminology

Term	Definition
ADD	Aircraft Derived Data
AFI	Arrival Free Interval
AMA	Arrival Management Message
AMAN	Arrival MANager function
APTO	Arrival Planned Time Over
APTT	Arrival Planned Threshold Time
ATM	Air Traffic Management
ATSU	Air Traffic Service Unit
CDM	Colaborative Decision Making

Term	Definition
CTA	Controlled Time of Arrival
CTOT	Calculated Take-Off Time
DCB	Demand and Capacity Balancing
DCT	DireCt To
DMAN	Departure MANager
DOD	Detailed Operational Description
ESFM	En-Route Sequence and Flow Manager
E-ATMS	European Air Traffic Management System
E-TMA	Extended TMA
ETA	Estimated Time of Arrival
ETOT	Estimated Take Off Time
FP	Flight Plan
HMI	Human Machine Interface
IAF	Initial Approach Fix
INTEROP	Interoperability Requirements
NM	Nautical Miles
OSED	Operational Service and Environment Definition
PMS	Point Merge Structure
SESAR	Single European Sky ATM Research Programme
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SM	Sequence Manager
SJU Work Programme	The programme which addresses all activities of the SESAR Joint Undertaking Agency.
SESAR Programme	The programme which defines the Research and Development activities and Projects for the SJU.
STAR	Standard Terminal Arrival Route
SPR	Safety and Performance Requirements
TLDT	Target Landing Time

Term	Definition
TOBT	Target Off-Block Time
TTA	Target Time of Arrival
TTG	Time To Gain
TTL	Time To Lose
TTOT	Target Take Off Time
TS	Technical Specification
TAD	Technical Architecture Description

2 General Functional block Description

2.1 Context

This document is the Technical Specification (TS) for the SESAR Step1 AMAN.

The document [7] WP10.01.07-D38-Pilot AMAN Baseline Specification 00.01.00 has been considered as a baseline and has been taken as an input to develop this Technical Specification

This TS contains some essential baseline requirement and new ones developed over the analysed baseline, based on the operational concept developed by the operational thread, mainly in P5.6.1, P5.6.4, P5.6.7 , P5.4.2 and P6.8.4.

P5.6.1 is focussing its work in STEP 1 on:

Investigation of procedures and tools taking advantage of ground system support and airborne capability to implement sequences by issuing and applying CTA's.

P5.6.7 is focussing its work in STEP 1 on:

- Evaluation of the use of CTA techniques by AMAN in a mixed mode environment where not all aircraft are CTA (RTA) capable.
- Impact on AMAN of mixed equipage operations and/or of the use of different techniques to integrate arrivals in the sequence.

P5.6.4 is focussing its work in STEP1 on:

- The effect of extending the arrival management horizon into En Route airspace, especially on feasibility, including the En Route controllers workload, sequence stability issues and integration of flights departing from airports within the expended horizon
- The implementation of AMAN directives through advanced 'closed loop' procedures
- The identification of aspects of aircraft derived data (ADD) that may be useful in Arrival Management processes

P6.8.4 is focussing its work in STEP 1 on:

- Optimize traffic flow rather than to provide a proper integrated arrival/departure sequence.
- AMAN/DMAN will be coupled in a Master/Slave configuration, where the AMAN, as master, will be in charge of calculating the arrival sequence and providing Arrival Free Intervals (AFIs) where DMAN will allocate the departure sequence.

P5.4.2 covers the use of advanced CDM concepts as defined in SESAR in the planning of TMA operations, aiming to investigate the procedures and rules to implement Collaborative Planning Processes as described in the SESAR concept. The goal is the Optimization of Airspace Usage whilst facilitating the Shared/ Reference Business Trajectories from the Long-term Planning Phase to the pre-flight execution phase.

2.2 Functional block Modes and States

The state is a technical configuration of the system. The system can be in only one state at a time even if it is possible to switch from one state to another by a supervision command.

The system can be configured in three different states to provide operational and test capabilities:

- **Operational** state identifies AMAN running in the operational environment of the system for ER/APP ATC control purposes.
- **Shadow** state offers the same capacities as the operational state, but the AMAN is not being used for control purpose.

- **Test** state identifies the AMAN running in the ATC system test environment.

The mode characterises the way the system is operating in respect to the availability of its functions.

The system can be in three different modes:

- **Operational:** In operational state, the system is designed to provide continuous operational service despite the failure of a function. Under normal circumstances all functions are in use, and actively processing data. This mode is the operational one which is the system's normal mode of operation.
- **Degraded**: A function can automatically (as a result of failure) or manually be switched off at any time, leading to a degraded mode of operation.
- **Failure**: A significant set of functions, necessary for the continuation of the ER/APP ATC service, are not available.

Transitions between these three modes can be illustrated as follows:

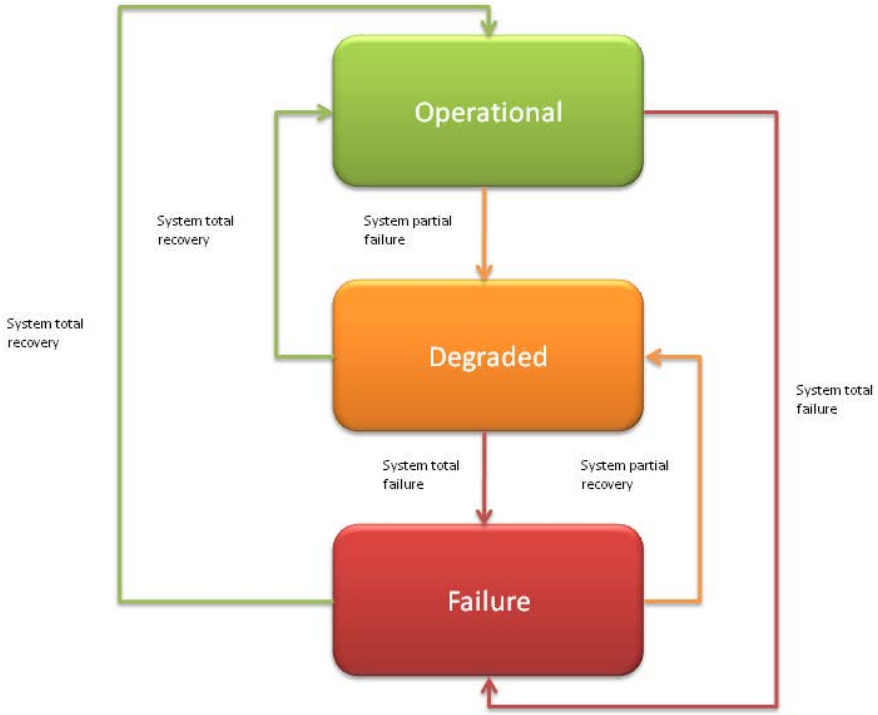

Figure 3: Functional blocks modes and states

2.3 Major Functional block Capabilities

To cover AMAN STEP 1 SESAR scope the following capability topics have been identified to be improved:

- AMAN Horizon
- Sequence & Stability
- AMAN & CTA

- AMAN extended Horizon
- Cross Border Arrival Management
- Departure from nearby airports
- AMAN/DMAN coupling
- AMAN & PMS
- AMAN HMI
- Arrival Management into multiple airports

In Chapter 3 a set of requirements has been established for each of these topics.

2.4 User Characteristics

This section describes the main actors involved in using AMAN.

2.4.1 Sequence Manager

The Sequence Manager (SM) plays an essential role in the AMAN operational environment, being responsible for the whole arrival traffic management in the overall airspace. He has to monitor a wide working area, must be familiar with the applied procedures and local practices and his key role shall be recognised and accepted by the other ATCOs involved in terminal and approach operations. Although responsible for the sequence management in the overall airspace involved, the SM does not intervene tactically and directly in arrival sectors (ARR), in order not to interfere with the arrival operations, but coordinates with the Sequence Manager of adjacent airports the most suitable strategy and/or tactical action. This position has been designed to be coherent with the current Coordinator position. Basically he is an enhanced Coordinator, playing the same role of Coordinator with the addition of the AMAN Decision Support Tool.

The Sequence Manager ensures the provision of the pattern based on the Demand Vs Capacity planning expected for the next x [minutes]. The role of the Sequence Manager is the monitoring of the approach sequence defined by AMAN and the adjustments aiming at the smoothing of the arrival traffic management and the reduction of the overall delay. For these purposes, the SM has two main strategies:
The primary strategy is to intervene manually on the Arrival sequence and schedule to resolve the problem. This can be achieved by:

- Swapping the aircraft position in the sequence,
- Changing the aircraft scheduled arrival time,
- Removing a flight temporarily from the sequence and manually re-inserting it when traffic permits.

If the primary strategy is not applicable, the SM applies a secondary strategy involving the Planning Controller of the concerned sectors, providing him with a specific instruction to apply. This strategy may involve one of the following actions:

- Apply speed control, early descent, or a combination of both, if this has not already been implemented by the sector inside his/her intervention area.
- Apply strategic headings, re-routing or change of IAF.

The upstream sector planner informs the tactical controller in order to evaluate the applicability of the proposal. If unable to comply, the planning or tactical controller may reject the proposal. In case the instruction is provided to the SM, this latter in turn informs the Arrival Controllers and evaluates with them the applicability of the solution proposed.
In case of a rejected proposal, the SM may:

- Provide the concerned (en-route) sector with an alternative strategy
- Apply one of the primary strategies if now possible or it has not already been addressed

In all cases the SM monitors the strategy applied or the instruction given.

2.4.2 E-TMA Controller

E-TMA controllers conform to the standard Tactical and Planning Controller roles in use, apply delay actions suggested by the Sequence Manager. They are requested to apply specific speed reduction/adjustment rules or act according to the AMAN advisories or SM approach strategy.
If necessary they coordinate different delay actions with the SM in order to absorb the delay. In dealing with AMAN advisories, the main Planner tasks are to:

- Comply with the instruction received from the Sequence Manager (in this case the planner evaluates the applicability of the proposed strategy in co-operation with the Executive Controller if needed, and if unable to comply rejects the proposal).
- Monitor the delay advisories, assessing the sequence proposed by AMAN
- Ensure handover of aircraft to the sectors in the correct order.

In detail, each Executive Controller shall apply the following rules when dealing with the AMAN advisories:

- Act on the advisory only when it is stable (e.g. when the trend of Advisories or number in sequence is constant)
- Act on the advisories only when the a/c is in the intervention area

Therefore when the a/c enters the intervention area with a stable advisory, the Executive Controller shall react to the advisory by applying:

- Speed reductions
- Early descent
- A combination of speed reduction and early descent.

Coordination with the SM is necessary in the case a deviation from the principles above is needed. In this case the Executive Controller may have to:

- Deal with advisories outside the intervention area
- Deal with the advisory in a different way (e.g. different speed reduction, earlier descent, heading, re-routing, etc.)

In order to allow AMAN to operate efficiently, the upstream sector controllers are requested to follow AMAN advisories.

2.4.3 Approach Controller

Approach controllers clear the traffic to comply with a pre-sequencing phase as established by the Sequence Manager and comply with AMAN advisories associated with the inbound traffic in his sector. In case of PMS airspace, they manage the aircraft entrance into the sequencing legs and the navigation through the sequencing legs until the instruction to the merge point.

2.5 Operational Scenarios

The operational scenarios are described in OSEDs of the related operational projects (P05.04.02, P05.06.01, P05.06.04, P05.06.07 and P06.08.04).

2.5.1 Functional decomposition

2.5.1.1 ER/APP ATC System Context

The Arrival Management function is a part of the global ER/APP ATC system. The figure below shows a high level functional decomposition of the ER/APP ATC System for Step1 (provided by [17] P10.01.07 D120 -Technical Architecture Description - Cycle 2015-, edition 00.01.00, 19/01/)

The main functions of the ER/APP ATC system that are involved in Arrival Management operations are highlighted with a red circle.

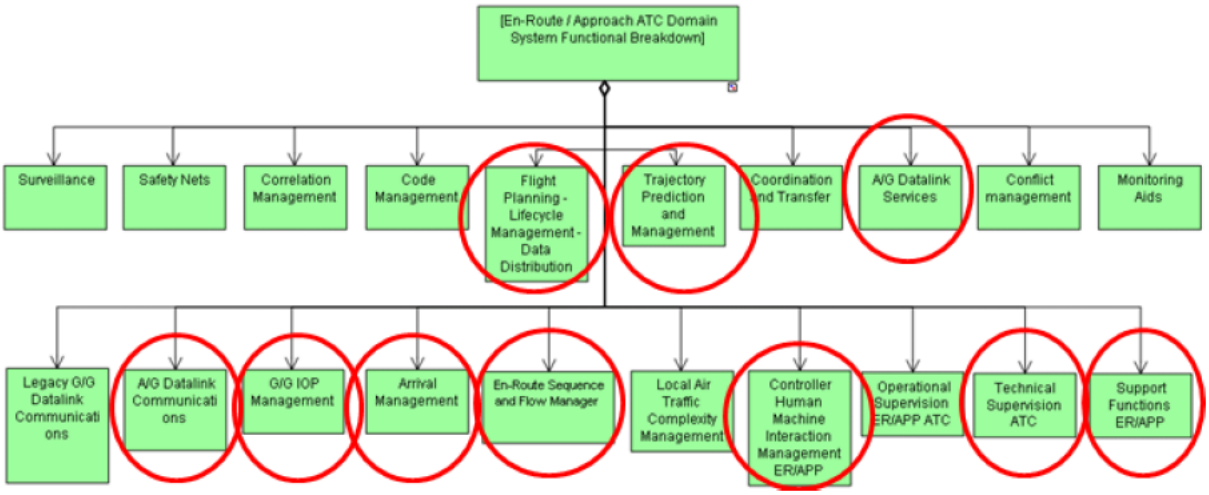

Figure 4: ER/APP ATC System Context

2.5.1.2 AMAN Functional decomposition

Below is the functional decomposition of the Arrival Management function as defined in [8] 10.01.07 D37 Pilot ATC System Architecture – Arrival Management 00.04.00. The Technical Management sub function has been reintroduced as an initial Pilot architecture. The nature of the AMAN enhancements in Step 1 developments does not require a more detailed decomposition. These evolutions do not introduce new functions but improve the existing ones.

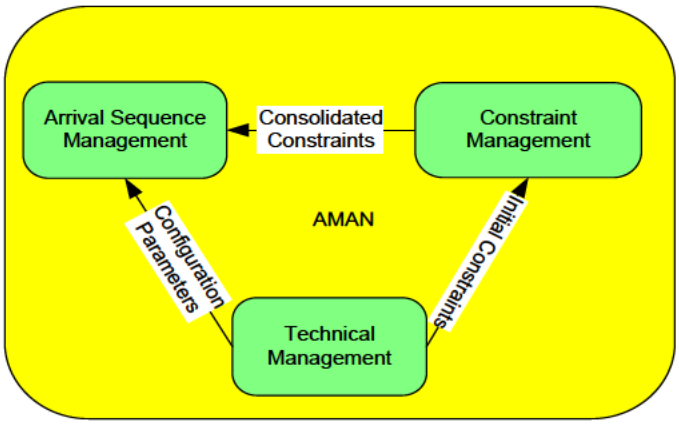

Figure 5: Arrival Management - Functional Decomposition

The Arrival Management function can be divided into three main sub functions:

- Arrival Sequence Management

This function calculates an optimized arrival sequence at pre-defined sequencing points (Metering Fixes, runway threshold…) for the incoming traffic. This function allocates for each sequenced flight the arrival runway and the metering fix. The sequence is optimised according to the density of traffic and the performance characteristics of the aircrafts. It generates control actions advisories necessary to achieve the computed arrival sequence and ensures distribution of this information. The arrival sequence on the sequencing point is determined from the ETO calculated by a trajectory prediction function.

- Constraint Management

This function is in charge of the management of all the constraints to be taken into account by the Arrival Sequence Management for the computation of the arrival sequence (initialisation of the constraints from the off-line defined data, controller action modifying the AMAN configuration,

Aerodrome ATC runway changes, departure slots). In order to keep the controller informed, this function is also in charge of providing the controller HMI with the current AMAN configuration.

- Technical Management

This function is in charge of the technical support of the Arrival Management function. It interfaces the Support function for initial configuration of the AMAN function and the recording. It has also an interface with the technical supervision for monitoring of the function.

2.5.2 Functional analysis

The following NSV-4 diagram represents a functional decomposition analysis of the Arrival Management function. It gives a high level picture of different ATC system sub functions that are involved in the realisation of Arrival Management operational needs and different necessary data flows between these sub functions. The purpose here is not to give detailed architecture views, but to ease an initial understanding of how Step 1 AMAN system requirements will impact the global system from a functional point of view.

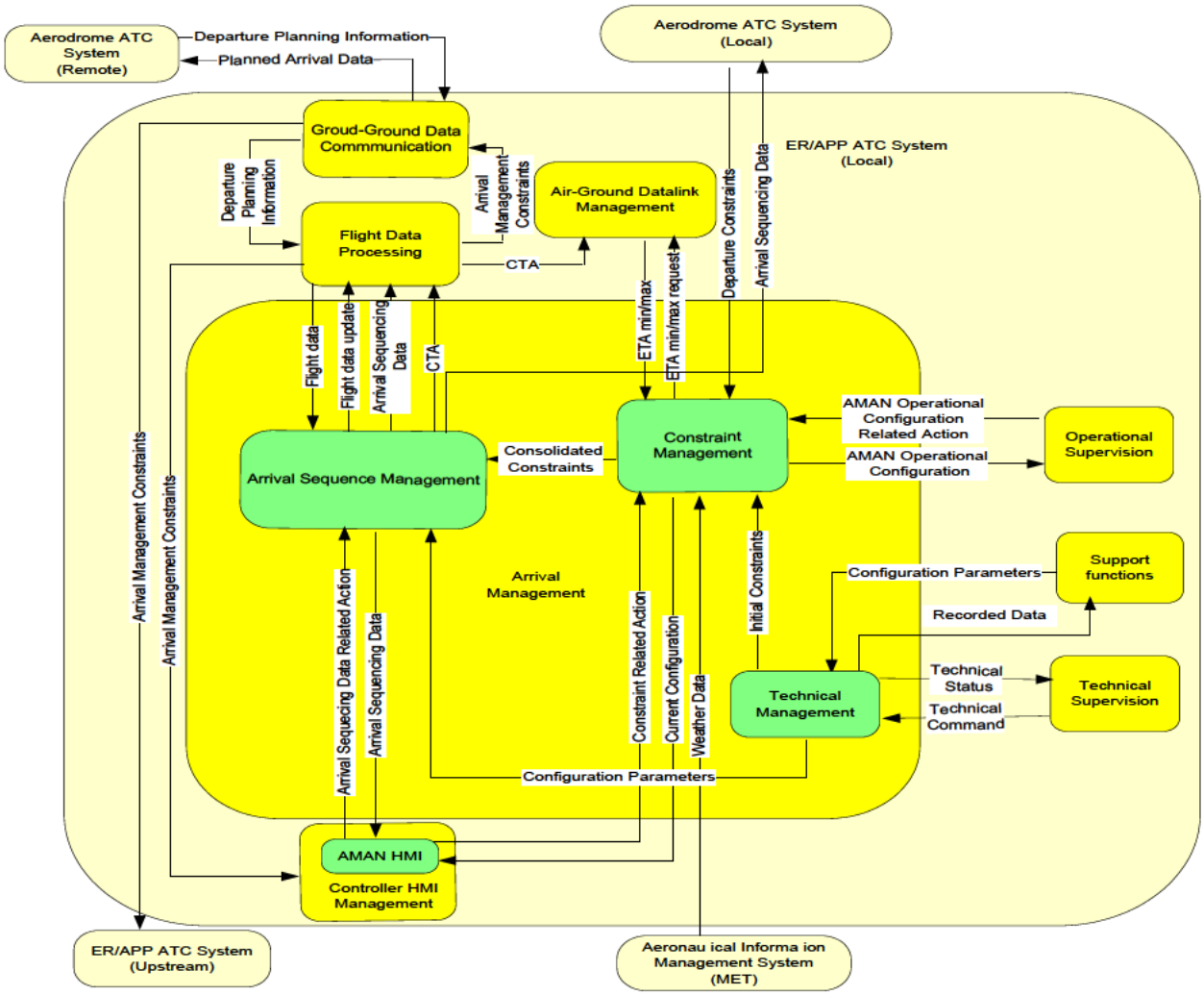

Figure 6: Arrival Management - Functional Analysis

The detail of data flows description can be found in [9] 10.09.01 10.09.02 Architecture Definition Report .

The following table summarizes the impact of AMAN Step 1 enhancements on the ATC systems functions and the involved external systems.

Step 1 Enhancement	Impacted ER/APP ATC system Functions	Involved external system
Sequence & Stability	Arrival Sequence Management	
Extension of the AMAN Horizon	Arrival Sequence Management Flight Data Processing Ground-Ground Data Communication	ER/APP ATC System (Upstream)
Handling of departures from nearby airports	Arrival Sequence Management Flight Data Processing Ground-Ground Data Communication	Aerodrome ATC System (Remote)
AMAN/DMAN coupling on local airport	Arrival Sequence Management Constraint Management	Aerodrome ATC System (Local)
AMAN and Point Merge System	Arrival Sequence Management	
AMAN & CTA	Arrival Sequence Management Constraint Management Flight Data Processing Air-Ground Datalink	
Arrival Management into multiple airports	Arrival Sequence Management Flight Data Processing Constraint Management Ground-Ground Data Communication	ER/APP ATC System (Upstream)

Note: No enhancements related to MET in the context of Arrival/Departure management have been performed by 10.09.01 and 10.09.02.

2.6 Service View

In the scope of Extended Arrival Management “Arrival Management Information Service (SCV005)” has been defined in the ISRM 1.3.

3 Functional block Functional and non-Functional Requirements

3.1 Capabilities

3.1.1 AMAN Horizon Requirements

The Extended AMAN horizon in comparison with a baseline or current AMAN representing a typical current European AMAN implementation is an horizon of up to 200 NM or beyond.

The following configurable horizons are considered for arrival management:

- **The eligibility horizon**: AMAN shall build the arrival sequence taking into account the flights located at least in the Eligibility Horizon (Eligible flights). While inserting flights entering the eligibility horizon in the sequencing process, the arrival sequence is built and may be unstable due to optimisation computation in this elaborating phase and is not intended to be applied by the controllers.
- **The active advisory horizon**: AMAN shall provide advisories for the flights located in the Active Advisory horizon in order to provide Controllers with guidance to implement the arrival sequence. The controllers are responsible for issuing the control actions in order to achieve the arrival sequence.
- **Frozen horizon**: Within this horizon no automatic update of the sequence by AMAN will occur (no automatic swapping of flights, no automatic optimization of the sequence position, no automatic update of arrival sequence). But manual updates of the sequence are allowed within this horizon.

Note: ETA referred in the requirements below is ground system computed time. The ground system could use aircraft derived data in its calculation.

[REQ]

Identifier	REQ-10.09.02-TS-0311.0010
Requirement	AMAN shall compute a arrival sequence for a set of runways of a list of managed airports.
Title	Arrival sequence computation
Status	<Validated>
Rationale	This high level requirement defines the main role of the AMAN.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0001	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0001	<Full>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED BECAUSE OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0311.0020
Requirement	AMAN shall create a Flight upon the first reception of data for the flight if the destination airport is a managed airport.
Title	Flights creation
Status	<Validated>
Rationale	AMAN manages its own representation of a flight plan, which is named Flight

	in this section and the following ones.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0001	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0006	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0006	<Full>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0311.0030
Requirement	AMAN shall update a Flight upon the reception of updated data for this Flight.
Title	Flights update
Status	<Validated>
Rationale	Flight information will be updated with the new data received.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0011	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0012	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0011	<Full>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0311.0040
Requirement	AMAN shall consider a Flight eligible for the Arrival sequence computation if the flight satisfies either the [Eligibility_Horizon_Time] or the [Eligibility_Horizon_Geographic] criteria.
Title	Eligibility Horizon
Status	<Validated>
Rationale	This requirement defines the Eligibility horizon either in a timely or distance manner. The Flights previously created but not eligible for the Arrival sequence computation) are not scheduled.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0040	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0295	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0003	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0311.0050
Requirement	AMAN shall consider a Flight within the Active Advisory Horizon if the Flight satisfies either the [Active_Horizon_Time] or the [Active_Horizon_Geographic] criteria.
Title	Active Advisory Horizon
Status	<Validated>
Rationale	This requirement defines the Active Advisory horizon either in a timely or distance manner.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0080	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0295	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0311.0060
Requirement	AMAN shall be provided with Flight Plan information for flights arriving at airports managed by AMAN once they reach the defined Eligibility Horizon.
Title	Flight Plan Information Provision
Status	<Validated>
Rationale	Flight Plan information is used by AMAN to sequence flight.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0002	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0003	<Full>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.1.2 Sequence & Stability Requirements

These requirements present the different steps of the arrival sequence computation for each flight and the stability model to be applied:

- Arrival runway allocation,
- Metering point allocation,
- Sequence computation
- Schedule, APTO, APTT and delay computation

- Delay apportionment strategy,
- Priority and stability model.

[REQ]

Identifier	REQ-10.09.02-TS-0312.0010
Requirement	AMAN shall update the arrival sequence • periodically according to the [Sequencing Period] and possibly event-based on a receipt of Flight data update • or on receipt of a command from a sequence manager. • Airport configuration change (runway configuration change, capacity change, runway closure..).
Title	Arrival sequence update
Status	<Validated>
Rationale	This requirement specifies the sequencing trigger: manual (to be reactive and up to date) or periodic (to revise the eligibility of the flights). Manual command from a sequence manager may include flight swap, runway closure or slot insertion.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0270	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0295	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0131.0220	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0131.0240	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0020
Requirement	AMAN shall allocate a landing runway to sequence a Flight taking into account the TMA configuration (runway orientation and dependencies, runway rates and closures), the Arrival Runway Allocation rules and the Flight ETA for the possible landing runways.
Title	Arrival runway allocation and sequence computation
Status	<Validated>
Rationale	The Sequence computation consists in ordering the flight for each runway and is the first step of the arrival management. Any change in the order triggers cascading computation on the arrival sequence (separations are applied) and the associated delays. TMA Configuration and General Runway Allocation rules are identified in the P10.1.7 AMAN baseline requirements
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0014	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0015	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0051	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0051	<Full>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0030
Requirement	For each eligible flight AMAN shall set a route point in the Active Advisory Horizon as the Metering Point according to the allocated runway and the TMA configuration.
Title	Metering Point allocation
Status	<Validated>
Rationale	One Metering Point is allocated for each flight. Flow constraints can be applied to the Metering Points. The Metering Point might be used to set a CTA to be provided to the flight.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0230	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-Step 1SPR IT3-SAF1.0041	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0040
Requirement	AMAN shall allow the manual assignment of the Metering Point for a Flight.
Title	Manual Metering Point assignment
Status	<Validated>
Rationale	AMAN allows the controller to assign a metering point that is different from the one that has been automatically allocated by AMAN.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0120	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-Step 1SPR IT3-SAF1.0041	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0050
Requirement	AMAN shall apply a Flow constraint on each Metering point to determine the spacing between two successive flights over the Metering Point when computing the APTO on the Metering Point.
Title	Flow constraint on Metering Point

Status	<Validated>
Rationale	AMAN applies Flow constraint on Metering Points
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0410	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0570	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0060
Requirement	For each sequenced Flight, AMAN shall compute the APTT at the runway threshold taking into account the Flight ETA, the TMA configuration, the allocated landing runway and the separation constraints (at the runway and at the allocated metering point).
Title	Arrival sequence computation
Status	<Validated>
Rationale	The arrival sequence defines the Target Time of Arrival for the flight in order to respect the arrival sequence and the time separations constraints with other flights.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0070
Requirement	The APTOs on any allocated metering point and intermediate points shall be computed from the flight's APTT at the runway threshold.
Title	Arrival sequence on other points upstream from runway threshold
Status	<Validated>
Rationale	The arrival sequence defines the Target Time of Arrival for the flight in order to respect the arrival sequence and the time separations constraints with other flights. The intermediate points are the ones to support the provision of partial delays or advisories.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0250	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.1080	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0080
Requirement	The arrival sequence shall be revised on any arrival sequence update.
Title	Arrival sequence update
Status	<Validated>
Importance	<Essential>
Rationale	AMAN arrival sequence after any flight plan data update or airport configuration change.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0270	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0090
Requirement	For each Flight AMAN shall compute the total delay at the runway to be absorbed after each schedule update for the allocated runway.
Title	Computation of the Total delay at the runway threshold
Status	<Validated>
Rationale	Total delay is the difference between the APTT at the runway threshold and the current ETA at the runway threshold. Total delay could be positif (TTL) or negatif (TTG).
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0270	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0049	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0100
Requirement	For each Flight, AMAN shall compute the total delay at the Metering Point to

	be absorbed after each schedule update for the allocated Metering Point.
Title	Computation of the Delay on Metering Point
Status	<Validated>
Rationale	Total delay shall be the difference between the APTO at the Metering Point and the current ETA on the Metering Point of this Flight.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0250	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0270	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0110
Requirement	AMAN shall allow splitting the total delay for a Flight to different segments of the Flight route according to a predefined delay apportionment strategy.
Title	Delay apportionment
Status	<Validated>
Rationale	Several apportionment strategies can be defined depending on the context. P10.1.7 AMAN baseline provides examples of such strategies. (§ 4.1.9.1) Relevant segments of the trajectories are defined by using intermediate points.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0250	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0295	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.1080	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0115
Requirement	AMAN shall allow allocating the resulting partial delays to different segments of the Flight route according to a predefined delay apportionment strategy.
Title	Allocation apportionment
Status	<Validated>
Rationale	Several apportionment strategies can be defined depending on the context. P10.1.7 AMAN baseline provides examples of such strategies. (§ 4.1.9.1) Relevant segments of the trajectories are defined by using intermediate points.
Category	<Functional>

Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0250	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0295	<Partial>

[REQ]

Identifier	REQ-10.09.02-TS-0312.0120
Requirement	AMAN shall provide delay absorption advisories for any scheduled Flight.
Title	Delay absorption advisories
Status	<Validated>
Rationale	The delay absorption advisories are based on TTG/TTL combined with a suggested control action.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0260	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0130
Requirement	The AMAN shall implement a priority model to manage the sequence of the flights to cope with specific operational situations such as emergency flights, state flights.
Title	Priority model of the arrival sequence
Status	<Validated>
Rationale	Specific operational flights such as emergency flights or state flights must be considered with a greater priority than other flights.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0295	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0140

Requirement	The AMAN shall implement a stability model to cope with different levels of automation of the arrival management between the system and the controllers: • Unstable : the arrival sequence is managed by the system • Stable : the management of the arrival sequence is shared by the system and the controllers, controllers commands enable to adjust the sequence • Frozen : the arrival sequence is managed by the controllers The level of automation applied to a flight schedule shall decrease as the flight advances to its destination depending on the stability model configuration. In addition specific triggers set the stability for a given Flight prevailing on the above standard rule.
Title	Stability model of the arrival sequence
Status	<Validated>
Rationale	This requirement provides the AMAN stability model in order to make the arrival sequence stable enough to be workable by controllers. Geographic or time rules are used to trigger the advance among the level of automation (From Unstable to Frozen). The closer the flight is to the runway the more stable is the flight arrival sequence shall be. This model is completed by specific triggers such as CTA process to be applied for i4D addressed in some other requirements.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0048	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0180	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0190	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0200	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0210	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0220	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0295	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0150
Requirement	AMAN shall take into account applicable ATC strategies in the sequence computation.
Title	ATC strategies implementation
Status	<Validated>
Rationale	AMAN shall allow the sequence manager to select a predefined ATC strategy and take it into account in its sequence calculation. AMAN offline rules shall allow to define rules to govern potential overtake situations, as functions of route, aircraft type and its associated performance characteristics, distance-to-go, downlinked aircraft parameters if available, strategic prioritization, other data sources and other operational parameters as available
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0008	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0040	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0040	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0312.0160
Requirement	AMAN shall provide Arrival Management Information to be distributed to all concerned actors.
Title	Arrival Management Information
Status	<Validated>
Rationale	Arrival Management information shall be made available to all actors (including Upstream Unit) and shall include at least the following : - Sequence Number. - APTO - APTT. - Allocated Metering Fix. - Allocated runway - Distance to go (Optional). - TTL/TTG - Advisory (CTA/CTA Status (if applicable), Speed, …..). TTL/TTG advisory shall be computed/updated and be available for display at any time even if a CTA is proposed.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0044	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0213	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0216	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0217	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-INTEROP-GGDC-0108	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-INTEROP-GGDC-0109	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 128	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 111	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A
<SATISFIES>	<ATMS Requirement>	IER-5.6.4-IERS-0032-0010	<Partial>

[REQ]

Identifier	REQ-10.09.02-TS-0312.0170
Requirement	Arrival Management Information items referring to a time constraint established for the purposes of Arrival Management shall be made available with precision of one second.
Title	Arrival Management Information precision
Status	<Validated>
Rationale	The precision of time constraints are to be in seconds.
Category	<Functional>
Validation Method	

Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-INTEROP-OLDI.0020	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.1.3 AMAN & CTA Requirements

The Arrival Management uses i4D operations and capabilities in the sequencing process. In this section “i4D capable” means that aircraft and airground ATC system support the ETA min/max dialog and the uplink and application of CTA. For i4D capable aircraft, the system allows to first get a time window on the metering point (ETA min/max). AMAN takes into account the aircraft ETA min/max when received for the flight sequencing and proposes a CTA on the metering point. The AMAN proposed CTA value is the APTO value resulting of the sequencing and scheduling process. For i4D capable aircraft the CTA is uplinked to the aircraft by datalink.

For aircraft that are neither i4D equipped nor CTA equipped, AMAN does not propose a CTA but only advisory (including APTO). The controller may negotiate with the aircraft and set directly a CTA on the metering point to implement the sequence advisory. In such a case the Arrival Management shall update the sequence for the traffic, taking into account this contracted time constraint for this flight if it is compatible with the global sequence.

When a CTA is set for a flight on the metering point, the arrival management shall handle the flight as collaborative in the sequence since it is more predictable.

[REQ]

Identifier	REQ-10.09.02-TS-0313.0010
Requirement	For i4D capable aircraft, AMAN shall request the ETA min/max on the metering point.
Title	AMAN ETA min/max request
Status	<Validated>
Rationale	AMAN shall take into account the ETA min/max when calculation its time constraint.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG5a.0400	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-Step 1SPR IT3-SAF1.0034	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-Step 1SPR IT3-SAF1.0037	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0020

Requirement	The system shall uplink the request for the ETA min/max to the aircraft and make available to AMAN the ETA min/max received from the aircraft.
Title	ETA min/max available upon request.
Status	<Validated>
Rationale	ETA min/max request is to be transferred to the aircraft and the ETA mion/max value made available to AMAN for calculation.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG01.0310	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG5a.0400	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED BECAUSE OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0030
Requirement	AMAN shall allow a controller to manually request the ETA min/max on the metering point.
Title	Manual request of ETA min/max on a metering point.
Status	<Validated>
Rationale	The controller is able to manually request an ETA min/max for information purposes.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG5a.0400	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0120	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED BECAUSE OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0040
Requirement	For i4D capable aircraft, AMAN shall schedule the flight taking into account the ETA min/max when available and propose a CTA on the metering point.
Title	Scheduling and CTA on metering point taking into account ETA min/max.
Status	<Validated>
Rationale	The AMAN proposed CTA value is the APTO value resulting of the sequencing and scheduling process. CTA may be calculated and proposed only for flights for which the calculated schedule introduces a delay.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0018	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0019	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0049	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0211	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-Step 1SPR IT3-SAF1.0037	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG04.0100	<Partial>
<ALLOCATED TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED BECAUSE OF>	<Change Order>	N/A	N/A
<ALLOCATED TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0050
Requirement	The system shall inform AMAN of any CTA acceptance on the metering point once performed by system and aircraft.
Title	CTA acceptance information
Status	<Validated>
Rationale	AMAN shall be informed when a CTA is agreed between aircraft and ground system, For i4D capable aircraft, the AMAN proposed CTA shall be validated by controller and aircraft and be uplinked to the aircraft) For non-i4D capable aircraft, AMAN does not propose a CTA but only advisory. The controller can implement the proposed AMAN sequence and advisory with a CTA on the metering point negotiated and agreed with the aircraft.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG06.0500	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG06.0600	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0353	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0670	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED BECAUSE OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0060
Requirement	If the flight is not under control of the system hosting or associated with the AMAN, the system shall transmit the AMAN proposed CTA to the upstream ATC system.
Title	Transmission of CTA to upstream ATSU
Status	<Validated>
Rationale	The flight can be sequenced and a CTA can be proposed on the metering point in the destination ATSU that operates AMAN while the flight is still under control of the upstream ATSU.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0003	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0353	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0680	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0500	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0070
Requirement	When the AMAN proposed CTA is set for a flight on the metering point, AMAN shall handle the flight as collaborative in the sequence and increase flight's stability in the sequencing process.
Title	Sequence stability for a flight with a CTA on metering point
Status	<Validated>
Rationale	When a CTA is set for a flight, the flight is more predictable
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0670	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0200	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0080
Requirement	When a CTA on the metering point is cancelled, AMAN shall handle the flight as in normal operations in the sequence and re-evaluate flight's stability in the sequencing process.
Title	Resume of flight sequencing when CTA is cancelled
Status	<Validated>
Rationale	AMAN shall switch flight from CTA operations to standard operations when the CTA is cancelled.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG08.0300	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0670	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0200	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0090
Requirement	When a CTA is set for a flight on the metering point, without being proposed by AMAN, AMAN shall try to update the sequence for the traffic taking into

	account this contracted time constraint for this flight. When the sequence update is possible, AMAN shall update the sequence, handle the flight as collaborative in the sequence and increase flight's stability in the sequencing process.
Title	CTA on metering point not proposed by AMAN compatible with sequence.
Status	<Validated>
Rationale	For aircraft that are neither i4D equipped nor CTA equipped, AMAN does not propose a CTA but only an advisory. The controller can implement the proposed AMAN sequence and advisory with a CTA on the metering point, negotiated and agreed with the aircraft. The sequence is updated taking into account the agreed time constraint if it is compatible with the global sequence.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0670	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0200	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0100
Requirement	When a CTA is set for a flight on the metering point, without being proposed by AMAN, AMAN shall try to update the sequence for the traffic taking into account this contracted time constraint for this flight. When the sequence update is not possible, AMAN shall provide a feedback to the appropriate controllers.
Title	CTA on metering point not proposed by AMAN not compatible with sequence
Status	<Validated>
Rationale	For aircraft that are neither i4D equipped nor CTA equipped , AMAN does not propose a CTA but only advisory. The controller can implement the proposed AMAN sequence and advisory with a CTA on the metering point negotiated and agreed with the aircraft. When the agreed time constraint is not compatible with the global sequence, actions have to be taken by appropriate controllers.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0160	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0690	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0200	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0110

Requirement	Ground computed constraints shall only be proposed as a CTA when the CTA is known (i4D flights) or estimated by the ground system (non i4D flights) to be within the aircraft's performance and navigation capability or to indicate to the ATCO that the proposed CTA is outside the aircraft's performance.
Title	CTA within Aircraft Performance Capability
Status	<Validated>
Rationale	AMAN shall propose only CTA that aircraft is capable to achieve.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0300	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG5a.0500	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0211	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0120
Requirement	In the Arrival Management process where a CTA is to be applied, the ground unit(s) shall complete the process (CTA assigned to and agreed by the Flight Crew) 5-10 minutes prior Top of Descent. When Flight is still under Upstream ATSU control, downstream ATSU shall provide the upstream ATSUs with any required time constraint in a time consistent with the requirement to complete the CTA allocation and agreement process 5-10 minutes prior to border crossing time
Title	CTA Completion Time Prior ToD.
Status	<Validated>
Rationale	CTA shall be proposed and agreed sufficiently early to allow its implementation
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0700	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0800	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0130
Requirement	2D trajectory synchronisation shall be performed and completed before starting CTA process by AMAN (ETA min/max request …)
Title	2D Route Synchronisation
Status	<Validated>
Rationale	Ground and Airborne trajectory shall be synchronised before CTA process

	starts.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG5a.0100	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG5a.0200	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG06.0300	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Trajectory Prediction & Mgt (TP&M)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0313.0140
Requirement	Only one CTA shall be proposed by AMAN automatically.
Title	CTA proposal
Status	<Validated>
Rationale	Once a CTA proposal was withdrawn as lapsed, or cancelled by operator, AMAN shall not automatically propose a new CTA.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0207	<Full>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.1.4 AMAN Extended Horizon Requirements

The system informs the upstream ATC system of the arrival management constraints for flight under the control of the upstream ATC unit and subject to transfer to the ATC system, in order to allow the upstream ATSU to perform the required control actions in its area of responsibility to implement the arrival management sequence.

Note: Extended AMAN may require or include cross border arrival management operations, depending in the local context where it is implemented. (3.1.9 Cross Border Arrival Management requirements)

[REQ]

Identifier	REQ-10.09.02-TS-0314.0010
Requirement	If the flight is not under control of the system, the system shall transmit to the upstream ATC system arrival management constraints applicable for the flight in order to implement the arrival sequence. According to the LoAs between the ATSUs, the arrival management information to be transferred shall include one or more of the following data: • metering point and time over metering point • total delay to be absorbed at metering fix • advisory to implement the target (time at COP, or speed or route advisory) • Sequence number of the flight

Title	Transmission of arrival management information to upstream ATSU
Status	<Validated>
Rationale	Some additional information, such as the sequence number, CTA shall be added sent if required/applicable. The information is transferred via the OLDI AMA message or via SWIM service.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-034.0013	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0039	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-INTEROP-0010-0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-INTEROP-0020-0010	<Partial>
<SATISFIES>	<ATMS Requirement>	IER-5.6.4-IERS-0032-0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0240	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0540	<Full>
<SATISFIES>	<Enabler>	APP ATC 111	<Full>
<ALLOCATED_TO>	<Functional block>	Ground-Ground Voice Communication	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0314.0020
Requirement	According to LoAs between the ATSUs and to the delay apportionment strategy, AMAN shall allow to allocate a part of the delay to be absorbed by the upstream ATC system prior to the transfer of the flight.
Title	Delay apportionment to upstream ATSU
Status	<Validated>
Rationale	A part of the total is allocated to the upstream Unit to be absorbed.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0070	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0240	<Full>
<SATISFIES>	<Enabler>	APP ATC 111	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0314.0030
Requirement	The system shall make available to the appropriate controller working position the arrival management constraints applicable for a flight and notified to the upstream ATSU in order to support the coordination/transfer dialog with the upstream ATSU.
Title	Arrival management information available to support coordination/transfer dialog
Status	<Validated>
Rationale	All applicable arrival constraints are to made available to the controller for

	situation awareness.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0070	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0150	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0550	<Partial>
<SATISFIES>	<Enabler>	APP ATC 111	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0314.0040
Requirement	The system shall allow to identify discrepancy between coordination data with the upstream ATSU and applicable arrival management constraints for the corresponding flight (such as on time at COP).
Title	Comparison of coordination data and applicable arrival management constraints
Status	<Validated>
Rationale	Coordination data and AMAN constraints comparison . Information about any discrepancy improves the controller situation awareness.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0070	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0430	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0550	<Full>
<SATISFIES>	<Enabler>	APP ATC 111	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0314.0050
Requirement	In case the discrepancy between coordination data with the upstream ATSU and applicable arrival management constraints for the corresponding flight exceeds a predefined value, an indication shall be presented at the appropriate working position
Title	Indication of discrepancy between coordination data and applicable arrival management constraints
Status	<Validated>
Rationale	Controller is alerted in case of discrepancy between coordination data and AMAN constraints.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0070	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0440	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0550	<Full>
<SATISFIES>	<Enabler>	APP ATC 111	<Full>
<ALLOCATED_TO>	<Functional block>	Controller Human Machine Interaction Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.1.5 Departure from nearby airports Requirements

Some requirements in this section are allocated to the aerodrome system of the regional airport and not to the ATC system.

In order to prevent disturbance of the arrival sequence for late appearing flight and to reduce the delay to be absorbed while the flight is airborne, flight departing from a nearby airport within the AMAN Extended horizon is considered in the arrival sequencing process prior to its departure when departure planning information is available with a reasonable confidence in its planned estimated departure time.

AMAN at the destination sequences the flight and computes a APTO on the metering point taking into account the flight data and trajectory estimates based on the airport ETOT.
The computed APTO is made available at regional airport. The aim here is to allow the aircraft to absorb some delay on the ground. The regional airport will issue a TTOT compatible with the departing traffic and the delay absorbable on ground.
Prior to departure, updates of ETOT/TTOT will not trigger flight re-sequencing at the destination as long as these updates are compatible with the APTO.

The provision of requirements for handling departures from nearby airports with Airport system with a complete DMAN and integrating the CDM process is not in the scope of Step1.
In Step1 we only consider the interaction with regional airports with airport system with a simplified set of functions to handle the airport traffic.

In this section the requirements are presented in two subsections, the first one with the requirements allocated to the ATC system, the second one with the requirements allocated to the aerodrome system of the regional airport.

3.1.5.1 Requirements allocated to ATC system

[REQ]

Identifier	REQ-10.09.02-TS-0315.0010
Requirement	AMAN shall receive updates of flight data and trajectory estimates taking into account the departure planning information (ETOT/TTOT, departure route) from the departure airport for a flight departing from a nearby regional airport in AMAN extended horizon..
Title	Flight plan update with departure planning information
Status	<Validated>
Rationale	Flight data updates are performed by ATC system Flight Data Processing and delivered to AMAN.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0009	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0810	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0820	<Partial>
<SATISFIES>	<Enabler>	APP ATC 158	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0315.0020
Requirement	AMAN shall sequence a flight departing from a nearby airport in the AMAN extended horizon prior to departure when reliable departure planning information is available. AMAN shall compute a APTO on the metering point for such a flight.
Title	Sequencing a flight at destination prior to departure and APTO computation
Status	<Validated>
Rationale	Departures from nearby airports are to be put in the sequence while they are still on the ground.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-5.6.4-SPR-0034.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-5.6.4-SPR-0034.0017	<Partial>
<SATISFIES>	<Enabler>	APP ATC 158	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0315.0030
Requirement	Updates of departure planning information shall trigger a revision of APTO only if the updated planned trajectory is incompatible with the currently allocated APTO.
Title	Revision of APTO
Status	<Validated>
Rationale	AMAN sequence shall be updated if required.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-5.6.4-SPR-0034.0035	<Partial>
<SATISFIES>	<Enabler>	APP ATC 158	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0315.0040
Requirement	The system shall publish planned arrival data for each flight departing from a nearby airport and sequenced at destination prior to departure with the

	following data : • Flight identification data that allows external systems to uniquely identify the flight • APTT for runway threshold • APTO for metering point • STAR if applicable • TTL/TTG. The data has to be transferred to the nearby airport. Time delivery shall not exceed 10 seconds.
Title	ATC system publishing planned arrival data
Status	<Validated>
Rationale	This information is needed for the operations to be supported by the Aerodrome system.
Category	<Interoperability>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0032	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-INTEROP-0050-0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-INTEROP-0050-0020	<Partial>
<SATISFIES>	<ATMS Requirement>	IER-5.6.4-IERS-0032-0050	<Partial>
<SATISFIES>	<Enabler>	APP ATC 158	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.1.5.2 Requirements allocated to aerodrome system

[REQ]

Identifier	REQ-10.09.02-TS-0315.0050
Requirement	The Aerodrome System shall publish departure planning data for each flight departing from the aerodrome with the following data : • Flight identification data that allows external systems to uniquely identify the flight • ETOT / TTOT • Departure route Revision of departure planning data shall be published along the departure planning process. Departure planning data time of delivery shall not exceed 10 seconds.
Title	Aerodrome System publishing departure planning data
Status	<Validated>
Rationale	Information published for a departing flight
Category	<Interoperability>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034-0034	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-INTEROP-0060-0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-INTEROP-0060-0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0810	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0820	<Full>

<SATISFIES>	<ATMS Requirement>	IER-5.6.4-IERS-0032-0060	<Partial>
<SATISFIES>	<Enabler>	APP ATC 158	<Full>
<ALLOCATED_TO>	<Functional block>	Departure Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0315.0060
Requirement	The Aerodrome System shall receive and shall take APTO, TTL/TTG advisory from AMAN into account and computes TTOT for the departing flight from the aerodrome.
Title	Aerodrome System calculating TTOT
Status	<Validated>
Rationale	The details of TTOT calculation may differ on different airports, e.g. an airport equipped with a DMAN may use more sophisticated methods than airports without a DMAN. The basic implementation could be to propose a TTOT absorbing the total delay on ground to be validated by the Tower controller. The Tower Controller on the departure aerodrome decides how much of the delay shall be taken on ground and can coordinate with the flight crew.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034-0032	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034-0033	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0880	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0890	<Partial>
<SATISFIES>	<Enabler>	APP ATC 158	<Full>
<ALLOCATED_TO>	<Functional block>	Departure Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0315.0070
Requirement	The Aerodrome system shall have the capacity to display the planned arrival data and allow to manually input a TTOT for departing flight from the aerodrome.
Title	Manual TTOT input
Status	<Validated>
Rationale	Display of planned arrival data capacity and manual TTOT input
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0120	<Full>
<SATISFIES>	<Enabler>	APP ATC 158	<Full>
<ALLOCATED_TO>	<Functional block>	Departure Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.1.6 AMAN/DMAN coupling Requirements

For step 1 operations, AMAN/DMAN coupling is expected to optimise traffic flows rather than to provide a proper integrated arrival/departure sequence. Therefore, for step1, AMAN/DMAN coupling will only achieve a flow-based integration supported by a Master/Slave configuration between AMAN (Master) and DMAN (Slave).

In principles, AMAN, as master, will elaborate the arrival sequence and offer some so-called Arrival Free Intervals (AFIs) for departure where DMAN will allocate the departure sequence.
AFIs will only be modifiable by AMAN and will always represent constraints for DMAN.

AMAN will calculate AFIs by taking into account departure demand and sequence patterns that reflect the strategy to allocate AFIs i.e. the standard order for processing in- & outbound flights (in other terms the number of departures that can be placed between two successive arrivals).

The sequence patterns shall be established taking into account the following separation constraints:

- Separations between Arrivals
- AFIs
- No separations between Departures (neither SID nor Vortex separation, like with basic DMAN only capacity is considered)

The supervisor shall be the one that manually adjusts the pattern based on the forecasted KPIs (for the time being, we are considering only the runway rate). Sequence patterns will be established automatically by the system if no pattern is established by the Sequence Manager.

An AFI describes the standard amount of nautical miles (gap) to be maintained between two consecutive arrivals in order to process one or more departures in between, according to the pattern. Sequence Manager shall provide as an input to AMAN (also available by adaptation data):

- Size of gap in NM needed to accommodate a departure between successive arrivals
- Size of gap in NM needed to accommodate two departures between successive arrivals
- Minimum gap in NM between arrivals when there is no vortex separation.

The separations associated to each pattern might vary on a daily basis (e.g. due to different weather conditions) and have to be adjusted by the Sequence Manager whenever necessary in distance – but the system has to transfer these distances into times in order to be able to provide the times as output.

[REQ]

Identifier	REQ-10.09.02-TS-0316.0010
Requirement	AMAN and local DMAN shall manage the arrival sequence and the departure sequence at the airport in a master/slave configuration where AMAN is the Master and DMAN is the slave.
Title	Basic coupling configuration
Status	<Validated>
Rationale	AMAN is the master of the runway sequence and the DMAN is the slave.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1100.0010	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0020
Requirement	AMAN shall be able to use ETA as the runway threshold arrival demand time for all expected arrivals, a configurable value of minutes in advance. (i.e. the earliest possible time to schedule that aircraft to land).
Title	Use Arrival demand times
Status	<Validated>
Rationale	The configurable value of minutes depends on local implementation.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0800	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0295	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0030
Requirement	AMAN shall be able to use a revised value of ETA, whenever it changes by more than a configurable value of minutes.
Title	Use Arrival demand times change
Status	<Validated>
Rationale	The configurable value of minutes is unknown because it depends on local implementation.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0295	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-10.09.02-SPR-0131.1030	<Partial>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0040
Requirement	AMAN shall be able to use TOT (Take-Off Time) as the take-off demand time for all expected departures, a configurable value of minutes in advance (i.e. the earliest possible time to schedule that departure).
Title	Use Departure Demand Time
Status	<Validated>
Rationale	The configurable value of minutes is unknown because it depends on local implementation.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1200.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-10.09.02-SPR-0131.1030	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0050
Requirement	AMAN shall be able to use a revised value of TOT (Take-Off Time) whenever it changes by more than a configurable value of minutes.
Title	Use Departure Demand Time Changes
Status	<Validated>
Rationale	The configurable value of minutes is unknown because it depends on local implementation.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1200.0020	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0060
Requirement	AMAN shall receive the size of gap in NM needed to accommodate the required number of departures between two successive arrivals, to be able to satisfy the established pattern.
Title	Availability of required size of AFI to accommodate required departures between two arrivals
Status	<Validated>
Rationale	The needed gap will be received as input by the Sequence Manager.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1200.0030	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0070
Requirement	AMAN shall be able to use the minimum gap in NM between arrivals when there is no vortex separation.
Title	Use input on required arrival-arrival spacing

Status	<Validated>
Rationale	The needed gap will be received as input by the Sequence Manager.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0410	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-10.09.02-SPR-0131.1030	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0080
Requirement	AMAN shall be able to use a specific pattern for arrivals and departures, as input by the Sequence Manager.
Title	Use input on required pattern.
Status	<Validated>
Rationale	The pattern specifies the number of departures between two consecutive arrivals, depending on early DCB processes.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1200.0040	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0090
Requirement	AMAN shall have, as adaptation data, a default pattern for arrivals and departures, in the case that no pattern is provided as input by the Sequence Manager or no self-computed pattern could be calculated by AMAN
Title	Default pattern to be established if no pattern is provided by the controller.
Status	<Validated>
Rationale	If the controller does not provide a pattern for arrivals and departures, AMAN will use a default pattern.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0132.0060	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0100
Requirement	When applying coupled AMAN/DMAN the maximum throughput to the runway must not exceed the capacity.
Title	Basic coupling capacity limit.
Status	<Validated>
Rationale	The throughput shall not exceed the runway capacity.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0340	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0410	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0110
Requirement	AMAN shall send the APTO to DMAN.
Title	Send arrival information to DMAN.
Status	<Validated>
Rationale	Arrival information is sent to DMAN.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1200.0070	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0120
Requirement	AMAN shall use the same patterns naming as the DMAN.
Title	Patterns naming
Status	<Validated>
Rationale	The same pattern naming is be shared between AMAN and DMAN.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1200.0045	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0130
Requirement	AMAN shall have an option to self-calculate on request a specific optimised pattern (one or more) for arrivals and departures to support ATCO. The calculated patterns shall be modifiable and selectable for use by ATCO.
Title	Patterns Calculation
Status	<Validated>
Rationale	The self-calculated patterns shall be modifiable and selectable for use by ATCO.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0132.0030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0132.0040	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0140
Requirement	The AMAN shall send to the DMAN the sequence pattern under use.
Title	Send pattern to DMAN
Status	<Validated>
Rationale	Pattern under use shall be shared between AMAN and DMAN.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1200.0080	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0160
Requirement	The AMAN shall provide a “what-if” function to allow the operator to evaluate scenarios with different sequence patterns.
Title	Send pattern to DMAN
Status	<Validated>
Rationale	What if function is optional.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1200.0090	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0170
Requirement	The status of Coupled AMAN/DMAN function shall be continuously monitored. Any failure shall be notified in the HMI.
Title	
Status	<Validated>
Rationale	Continuous monitoring of the Coupled AMAN/DMAN function status allows detecting any possible failure (partial or total loss).
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0131.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0131.0020	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0180
Requirement	When the traffic is below a predefined threshold, first-come-first-served (FCFS) principle shall be applied instead of a pattern. FCFS principle shall be applicable at any time on manual request by the operator.
Title	First come first serve principle application
Status	<Validated>
Rationale	During phases where traffic demand is well below the available capacity values, the FCFS principle shall be applied in order to give the ATCO the closest coupled sequence to the natural sequence.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0132.0070	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0190
Requirement	AMAN shall allow the manual adjustment of the sequence pattern and the

	AFI-size by Approach or Tower Supervisor in order to provide sufficient spacing for departures in a mixed mode environment.
Title	Manual adjustment for adequate departure spacing
Status	<Validated>
Rationale	A safe operation in mixed mode is conditioned by the ability of the AMAN to provide sufficient spacing for departures
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-10.09.02-SPR-0131.1020	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0316.0200
Requirement	In mixed mode operations AMAN shall take the following inputs in the sequence computation : • AFI-size • CTOT.
Title	AMAN inputs in mixed mode operations
Status	<Validated>
Rationale	AMAN shall take AF-sizes and CTOT in addition to other inputs in the sequence calculation.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-10.09.02-SPR-0131.1020	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.1.7 AMAN & PMS Requirements

In the declared STARs, the shortest path of the PMS shall be published as the standard procedure to follow.

AMAN shall be able to use PMS based on one or two legs.
The AMAN stability horizon and the location of the PMS legs need to be compatible.

[REQ]

Identifier	REQ-10.09.02-TS-0317.0010
Requirement	AMAN shall be able to use a Point Merge Structure (PMS), as an option, in the sequencing process to propose advisories to absorb delay inside the

	PMS by flying a PMS leg.
Title	PMS structure.
Status	<Validated>
Rationale	PMS operations is optional.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0200-0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0200-0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0200.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0200-0040	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0080	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0170	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0180	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0190	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0200	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0210	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0220	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0230	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0040	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0050	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED BECAUSE OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0317.0020
Requirement	When using a PMS, the arrival sequence shall be stabilized before the entrance in a leg of the Point Merge structure.
Title	PMS structure sequence stability
Status	<Validated>
Rationale	The arrival sequence is stabilized before the entrance in a leg of the Point Merge structure when a PMS is used.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0040	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0050	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0060	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0070	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0080	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0090	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0100	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0110	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0120	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0130	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0140	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0150	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0160	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0170	<Full>

<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0180	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0317.0030
Requirement	AMAN shall know the delay that each leg of the PMS structure may absorb
Title	AMAN delay knowledge
Status	<Validated>
Rationale	PMS structure shall be known by AMAN to calculate
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0120	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0130	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0140	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0160	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0170	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0300-0180	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0050	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0060	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0080	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.07-OSED-0400-0090	<Full>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.1.8 HMI Requirements

[REQ]

Identifier	REQ-10.09.02-TS-0318.0010
Requirement	AMAN shall display in the HMI the TTG/TTL for each aircraft in terms of minutes and seconds. Depending on local implementation the precision shall be adaptable to local needs.
Title	AMAN time to lose/gain displayed to controllers.
Status	<Validated>
Rationale	AMAN information shall be made available to the controller.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0026	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0223	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0150	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0351	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0690	<Partial>
<SATISFIES>	<Enabler>	APP ATC 111	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A

<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0020
Requirement	AMAN shall propose in the HMI some 2D manoeuvres in order to gain or lose time, those manoeuvres shall be: - 360 maneuvers - Different possible arrival procedures (STARs) - Different Runway paths (from IAF to Runway Threshold) - Holding - Direct To (DCT) - Speed constraints
Title	Manoeuvres to propose.
Status	<Validated>
Rationale	2D manoeuvres are proposed in order to lose/gain time.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0150	<Partial>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0030
Requirement	Upstream ATSU HMI shall be able to display the AMAN proposed CTA received from the downstream ATSU
Title	CTA display on the upstream ATSUs HMI
Status	<Validated>
Rationale	Controllers in upstream ATSU receive information related to CTA proposed by AMAN
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0039	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0353	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0690	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0800	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG05.0500	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG06.0400	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0040
Requirement	Current ATSU HMI shall be able to display the CTA calculated by the AMAN.
Title	CTA display on the current ATSU.
Status	<Validated>
Rationale	Displayed CTA in the current ATSU is not mandatory (Configurable On/Off)
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG04.0100	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-OSED-SG06.0400	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0150	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0353	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0690	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0050
Requirement	Information on TTOT, Vortex Category and Status of the Flight (i.e. SUR, SUG, Begin Taxi) of each departing flight shall be available in the AMAN display of the arrival sequence.
Title	Departure information on AMAN HMI
Status	<Validated>
Rationale	Departure information display on AMAN HMI.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0150	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1500.0020	<Full>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0060
Requirement	Information on the active pattern shall be displayed on the appropriate controller position. The HMI shall allow manual modification of the active pattern at any time. In addition, the next pattern to take effect shall be displayed, with the callsign of the last arrival before the change shall take effect.
Title	Display and manual input of sequence pattern
Status	<Validated>
Rationale	The Sequence Manager will decide the precise instant the new pattern will appear online.
Category	<Functional>

Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0131.0040	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0312.0050	<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0070
Requirement	Information on KPIs (such as runway rate) shall be displayed for arrival and departures separately on the appropriate controller position.
Title	Display of KPIs
Status	<Validated>
Rationale	KPIs shall be available on the appropriate controller position.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-OSED-1500.0040	<Full>
<SATISFIES>	<Enabler>		<Partial>
<SATISFIES>	<Enabler>	APP ATC 161	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0080
Requirement	AMAN shall display in the HMI the CTA status for each i4D aircraft for which a CTA is proposed.
Title	AMAN CTA status displayed to controllers.
Status	<Validated>
Rationale	CTA status is made available for the controller.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0025	<Full>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0090
Requirement	AMAN shall allow manual update of the arrival sequence
Title	AMAN manual update

Status	<Validated>
Rationale	AMAN shall allow the sequence manager to update the arrival sequence (this includes assigning a runway to a flight, change the arrival sequence order and scheduled time of arrival, trigger a new arrival sequence calculation with different ATC strategy, insert runway closures, increase or decrease of a flight priority in the sequence, desequence a flight, solicit a CTA proposal …).
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0041	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0042	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0046	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0054	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0055	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0056	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0057	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0058	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0122	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0100
Requirement	AMAN shall implement a what-if function.
Title	AMAN What-it function
Status	<Validated>
Rationale	The what-if function allows the sequence manager to assess impact of a prospective action before the action is committed and implemented in the sequence. This requirement is optional.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0114	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0110
Requirement	Manual swap in a flight pair within the stable horizon shall not impact aircraft other than those directly targeted.
Title	Manual swaps in sequence
Status	<Validated>
Rationale	Manual swaps in sequence limited to involved flights only
Category	<Functional>

Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0201	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0120
Requirement	Runways configuration shall be displayed.
Title	Display_Runway Configuration
Status	<Validated>
Rationale	Runway configuration shall be made available to the appropriate controller.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0131.0230	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0130
Requirement	When operating in mixed mode in a single runway, AMAN HMI shall display the arrival/departure integrated sequence
Title	Display_Runway Configuration
Status	<Validated>
Rationale	Runway configuration shall be made available to the appropriate controller.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.08.04-SPR-0131.1010	<Partial>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0140
Requirement	The crossing point calculated by The En-route Sequence and Flow Manager

	shall be displayed in the Upstream ATSU.
Title	En-Route Sequence and Flow Manager crossing point display
Status	<Validated>
Rationale	The crossing point is displayed in the controller working position for situation awareness and advisory application.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0050	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0318.0150
Requirement	The crossing point delay calculated by The En-route Sequence and Flow Manager shall be displayed in the Upstream ATSU.
Title	En-Route Sequence and Flow Manager crossing point delay display
Status	<Validated>
Rationale	The crossing point delay is displayed in the controller working position for situation awareness and advisory application.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0050	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.1.9 Cross Border Arrival Management requirements

The En-Route Sequence and Flow Manager Functional Block supports ATCOs for smoother En-route delay absorption in controlling Upstream ATSU prior to delivering traffic to Destination Downstream ATSU. The Upstream ATSU contributes to the implementation of the arrival sequence received from Downstream ATSU. En-Route Sequence and Flow Manager translates Downstream ATSU sequence demands in control advisories to absorb some delay, according to local operational strategies. The system delivers these advisories to relevant positions according to apportionment between sectors and supports ATCO's advisories implementation.

[REQ]

Identifier	REQ-10.09.02-TS-0319.0010

Requirement	The En-route Sequence and Flow Manager of the Upstream ATSU shall receive arrival management constraints from the downstream ATSU. According to the LoAs between the ATSUs, the arrival management constraints applicable to a flight shall include one or more of the following data: • Target time over exit point (COP) • Total delay allocated to the flight • Delay allocated to the Upstream Unit.
Title	Reception of arrival management constraints by Upstream ATSU
Status	<Validated>
Rationale	The Downstream arrival management constraints applicable for each flight are received from Upstream ATSU in order to allow the upstream ATSU to contribute to the implementation of the arrival sequence.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0070	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0550	<Partial>
<SATISFIES>	<Enabler>	APP ATC 111	<Partial>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0319.0020
Requirement	The En-route Sequence and Flow Manager of the Upstream ATSU shall calculate control advisories (Speed reduction, CTA...) allowing meeting arrival management constraints applicable to each concerned flight. Theses advisories shall translate the applicable delay sharing strategy between concerned Upstream ATSU sectors.
Title	Cross Border Arrival Management control advisories calculation
Status	<Validated>
Rationale	Control advisories are calculated to support the ATCO in meeting the applicable arrival management constraints.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<Enabler>	APP ATC 111	<Partial>
<SATISFIES>	<Enabler>	ER ATC 163	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0070	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0319.0030
Requirement	Cross Border Arrival Manager constraints and control advisories shall be

	displayed to the appropriate ATCO of Upstream ATSU sectors.
Title	Cross Border Arrival Management control advisories display
Status	<Validated>
Rationale	Control advisories may be also displayed for other non-concerned ATCOs for information purposes.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<SATISFIES>	<Enabler>	APP ATC 111	<Partial>
<SATISFIES>	<Enabler>	ER ATC 163	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0070	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0130	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED BECAUSE OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0319.0040
Requirement	Feedback on the intended or applied control actions to meet Arrival Management Constraints shall be provided to the Downstream ATSU.
Title	Cross Border Arrival Management feedback to Downstream ATSU
Status	<Validated>
Rationale	Feedback on the undertaken control actions by Upstream ATSU shall be provided to the Downstream ATSU for either situation awareness or arrival management process refinement. The feedback nature and applicability is a local implementation and may differ from one context to another.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-OSED-0028.0550	<Partial>
<SATISFIES>	<Enabler>	APP ATC 111	<Partial>
<SATISFIES>	<Enabler>	ER ATC 163	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED TO>	<Project>	10.09.02	N/A

3.1.10 Arrival Management into multiple airports

The En-Route Sequence and Flow Manager Functional Block supports ATCOs for smoother En-route delay absorption in controlling Upstream ATSU prior to delivering traffic to Destination Downstream ATSU. En-Route Sequence and Flow Manager calculates the integrated sequence in the en-route area where the arrival flows intersect, based on the arrival management information (sequence and preferred times) from all relevant Downstream ATSUs, and the user defined spacing on the integrated sequence. The resulting delay advisory is provided to the upstream ACC.

[REQ]

Identifier	REQ-10.09.02-TS-3110.0010
Requirement	The En-route Sequence and Flow Manager of the Upstream ATSU shall receive arrival management information (sequence and preferred times) from all relevant downstream ATSUs.
Title	En-Route Sequence and Flow Manager information reception
Status	<Validated>
Rationale	The AMAN info from the individual airports is needed to calculate the integrated sequence in the en-route area where the arrival flows intersect.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0404	<Full>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-3110.0020
Requirement	The En-route Sequence and Flow Manager of the Upstream ATSU shall calculate the integrated sequence in the en-route area where the arrival flows intersect.
Title	Integrated sequence calculation
Status	<Validated>
Rationale	En-Route Sequence and Flow Manager calculates integrated sequence on the crossing points
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0050	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-3110.0030
Requirement	The En-route Sequence and Flow Manager of the Upstream ATSU shall impose an user defined spacing on the integrated sequence. Based on this additional constraint updated Arrival management information (sequence and preferred times) for the individual airports shall be calculated
Title	Integrated sequence spacing
Status	<Validated>
Rationale	The user could define a specific spacing to be applied when calculating integrated sequence on the crossing points.
Category	<Functional>

Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0050	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-3110.0040
Requirement	The En-route Sequence and Flow Manager of the Upstream ATSU shall provide the individual AMANs in the downstream ATSU with the updated Arrival management information
Title	En-Route Sequence and Flow Manager feedback to AMAN
Status	<Validated>
Rationale	AMAN receives feedback from En-Route Sequence and Flow Manager.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0080	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-3110.0050
Requirement	The En-route Sequence and Flow Manager shall be configurable and applicable for multiple sectors and multiples airports
Title	En-Route Sequence and Flow Manager applicable for multiple sectors/airports
Status	<Validated>
Rationale	ESFM configuration
Category	<Functional>
Validation Method	ESFM is to be used in multiple setors and multiple airports configuration
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0050	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-3110.0060
Requirement	The En-route Sequence and Flow Manager shall calculate a combined crossing point sequence for traffic streams to different airports passing the same sector.
Title	En-Route Sequence and Flow Manager crossing point calculation
Status	<Validated>
Rationale	ESFM calculates a crossing point where the delay advisory will be applied.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0050	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-3110.0070
Requirement	The En-route Sequence and Flow Manager shall calculate the crossing point time. The crossing point time shall be the minimum of earliest estimated time to reach the crossing point and the sum of the crossing point time of the predecessor and the configured crossing point spacing.
Title	En-Route Sequence and Flow Manager crossing point calculation
Status	<Validated>
Rationale	The crossing point time is the minimum of earliest estimated time to reach the crossing point and the sum of the crossing point time of the predecessor and the configured crossing point spacing
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	En-Route Sequence and Flow Manager	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-OSED-CMAN.0050	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.2 Adaptability

N/A

3.3 Performance Characteristics

3.3.1 Requirements

[REQ]

Identifier	REQ-10.09.02-TS-0331.0010
Requirement	The likelihood AMAN being not available or unserviceable shall be no more than once every 5.5 months.
Title	AMAN unavailability
Status	<Validated>
Rationale	AMAN availability shall not fail more than once each 5,5 months
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0101	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0331.0020
Requirement	The likelihood of AMAN operating on an incorrect time reference shall be no more once every 5.5 months.
Title	AMAN incorrect time reference
Status	<Validated>
Rationale	AMAN time reference calculation shall not fail more than once each 5,5 months
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0102	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0331.0030
Requirement	The likelihood of AMAN failing to accept and correctly process human input shall be no more than once every 6 weeks.
Title	AMAN failure to accept input
Status	<Validated>
Rationale	AMAN process human input shall not fail more than once each 6 weeks.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0103	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0331.0040
Requirement	The likelihood of AMAN failing to provide applicable arrival management information to the controller shall be no more than once every 12 weeks.
Title	AMAN arrival management information not provided to controller
Status	<Validated>
Rationale	The process of providing the AMAN information to the controller shall not fail more than once each 12 weeks
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0109	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0110	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0331.0050
Requirement	The trajectory prediction used within AMAN shall be consistent and have a maximum drift of +/-30 seconds over the span of 30 minutes, or one second of drift per minute in the entirety of the implementation horizon .
Title	Accuracy of trajectory prediction used by AMAN
Status	<Validated>
Rationale	Accuracy of trajectory prediction used by AMAN.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0202	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.06.04-SPR-0034.0203	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<ALLOCATED_TO>	<Functional block>	Trajectory Prediction & Mgt (TP&M)	N/A
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0331.0060
Requirement	The likelihood of En-Route Sequence and Flow Manager being not available or unserviceable shall be no more than 2e-4 SOH, approximately once every 7

	months.
Title	En-Route Sequence and Flow Manager unavailability
Status	<In Progress>
Rationale	En-Route Sequence and Flow Manager availability shall not fail more than once each 7 months
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0451	<Full>
<SATISFIES>	<Enabler>	APP ATC 128	<Partial>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<SATISFIES>	<Enabler>	ER ATC 163	<Partial>
<ALLOCATED_TO>	<Functional block>	Trajectory Prediction & Mgt (TP&M)	N/A
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0331.0070
Requirement	The likelihood of En-Route Sequence and Flow Manager incorrectly integrated sequence shall be no more than 2e-4 SOH, approximately once every 7 months
Title	En-Route Sequence and Flow Manager incorrect integrated sequence
Status	<In Progress>
Rationale	En-Route Sequence and Flow Manager incorrect sequence shall not be incorrect more than once every 7 months
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.04.02-SPR-0005.0452	<Full>
<SATISFIES>	<Enabler>	ER APP ATC 109	<Partial>
<ALLOCATED_TO>	<Functional block>	Trajectory Prediction & Mgt (TP&M)	N/A
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0331.0080
Requirement	AMAN shall provide an alert to advice ATCO in case of failure in CTA calculation
Title	AMAN CTA calculation failure
Status	<Validated>
Rationale	AMAN provides an alert to advise ATCO in case of a failure in CTA calculation function. ATCO is then aware that CTAs are no longer calculated by AMAN.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-Step 1SPR IT3-PRF1.0001	<Full>

<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

[REQ]

Identifier	REQ-10.09.02-TS-0331.0090
Requirement	AMAN shall only propose CTA that are achievable (within ETA min max window)
Title	AMAN CTA Achievable
Status	<Validated>
Rationale	CTA calculated by AMAN shall be within the ETA min max window to be achievable by the aircraft.
Category	<Functional>
Validation Method	
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.06.01-Step 1SPR IT3-PRF1.0004	<Full>
<SATISFIES>	<Enabler>	APP ATC 148	<Partial>
<ALLOCATED_TO>	<Functional block>	Arrival Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.01.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A
<ALLOCATED_TO>	<Project>	10.09.02	N/A

3.4 Safety & Security

N/A

3.5 Maintainability

N/A

3.6 Reliability

N/A

3.7 Functional block Internal Data Requirements

N/A

3.8 Design and Construction Constraints

N/A

3.9 Functional block Interface Requirements

N/A

4 Assumptions

N/A

5 References

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[2] Requirements and V&V Guidelines 03.00.00
https://extranet.sesarju.eu/Programme%20Library/Requirements%20and%20VV%20Guidelines.doc

[3] Templates and Toolbox User Manual 03.00.00
https://extranet.sesarju.eu/Programme%20Library/Templates%20and%20Toolbox%20User%20Manual.doc

[4] EUROCONTROL ATM Lexicon
https://extranet.eurocontrol.int/http://atmlexicon.eurocontrol.int/en/index.php/SESAR

[5] B4.3 D128 SESAR 1 ADD 00.01.00, 11/07/2016

[6] IEEE / MIL Standards

[7] WP10.01.07-D38-Pilot AMAN Baseline Specification 00.01.00

[8] 10.01.07 D37 Pilot ATC System Architecture – Arrival Management 00.04.00

[9] 10.09.01 10.09.02 Architecture Definition Report

[10] 05.06.07 D04 Step 1 AMAN + Point Merge in E-TMA OSED 00.00.03 10-03-2013

[11] TAD Trace Extract in Support of Partial Requirements Consolidation Activity

[12]05.06.01-D74 Step 1 OSED - Iteration 3 01.00.00 11-09-2013

[13] P06.08.04.D17 S01V3 Final OSED, edition 01.01.00, 22/07/2015

[14] P06.08.04.D18_ S01V3 Final SPR, edition 00.01.00, 04/05/2015

[15] P05.06.07.D16_ Update of 5.6.4 SPR-INTEROP – Step 1, edition 00.01.00, 30/09/2015

[16] P05.06.07 -D15-Update of 5 6 4 OSED-Step 1, edition 00.01.00, 31/07/2015

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[19]P05.04.02 D05 Step 1 Final SPR, edition 00.01.03, 28/06/2016

[20]B.01.D83 Step 1 Technical Specification, edition 00.01.00, 21/12/2015

[21] 05.06.01-D85-Step_1 – Fully Validated INTEROP, edition 00.01.00, 09/07/2016

[22]05.06.01-D84-Step_1 – Fully Validated SPR, edition 00.02.00, 04/08/2016

[23]B.01.D83 WPB.01 Integrated Roadmap Dataset15 Release Note, edition 00.01.00, 21/12/2015

5.1 Use of copyright / patent material /classified material

5.1.1 Classified Material

N/A

Appendix A Requirements to SESAR Solutions

The following table identifies for each requirement the SESAR solutions it contributes to.
Note: Some requirements have not been validated as part of the project because they are AMAN baseline driven requirements.

AMAN Baseline requirements:

Requirement Identifier	Requirement Text	Enabler	SESAR Solution	Validation Exercises
REQ-10.09.02-TS-0311.0010	AMAN shall compute a arrival sequence for a set of runways of a list of managed airports.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-804 EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0311.0020	AMAN shall create a Flight upon the first reception of data for the flight if the destination airport is a managed airport.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-804 EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0311.0030	AMAN shall update a Flight upon the reception of updated data for this Flight.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-804 EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0311.0040	AMAN shall consider a Flight eligible for the arrival sequence computation if the flight satisfies either the [Eligibility_Horizon_Time] or the [Eligibility_Horizon_Geographic] criteria.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-804 EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0311.0050	AMAN shall consider a Flight within the Active Advisory Horizon if the Flight statisfies either the [Active_Horizon_Time] or the [Active_Horizon_Geographic] criteria.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-804 EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0311.0060	AMAN shall be provided with Flight Plan information for flights arriving at aiports managed by AMAN once they reach the defined Eligibility Horizon.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-804 EXE-05.06.07-VP485 EXE-05.06.01-

				VP477
REQ-10.09.02-TS-0312.0010	AMAN shall update the arrival sequence periodically according to the [Sequencing Period] and possibly event-based on a receipt of Flight data update or on receipt of a command from a sequence manager.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0020	AMAN shall allocate a landing runway to sequence a Flight taking into account the TMA configuration (runway orientation and dependencies, runway rates and closures), the Arrival Runway Allocation rules and the Flight ETA for the possible landing runways.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0060	For each sequenced Flight, AMAN shall compute the APTT at the runway threshold taking into account the Flight ETA, the TMA configuration, the allocated landing runway and the separation constraints (at the runway and at the allocated metering point).	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0070	The APTO's on any allocated metering point and intermediate points shall be computed from the flight's APTT at the runway threshold.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0080	The arrival sequence shall be revised on any arrival sequence update.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0090	For each Flight AMAN shall compute the total delay at the runway to be absorbed after each schedule update for the allocated runway.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0110	AMAN shall allow splitting the total delay for a Flight and allocating the resulting partial delays to different segments of the Flight route according to a predefined delay apportionment strategy.	ER APP ATC 128	AMAN Baseline	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0115	AMAN shall allow allocating the resulting partial delays to different segments of the Flight route according to a predefined delay apportionment strategy.	ER APP ATC 128	AMAN Baseline	EXE-05.06.07-VP485 EXE-05.06.01-VP477

REQ-10.09.02-TS-0312.0120	AMAN shall provide delay absorption advisories for any scheduled Flight.	ER APP ATC 128	AMAN Baseline	EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0130	The AMAN shall implement a priority model to manage the sequence of the flights to cope with specific operational situations such as emergency flights, state flights.	ER APP ATC 128	AMAN Baseline	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0140	The AMAN shall implement a stability model to cope with different levels of automation of the arrival management between the system and the controllers:	ER APP ATC 128	AMAN Baseline	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0150	AMAN shall take into account applicable ATC strategies in the sequence computation.	ER APP ATC 128	AMAN Baseline	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0160	AMAN shall provide Arrival Management Information to be distributed to all concerned actors.	ER APP ATC 128 ER APP ATC 111	AMAN Baseline	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0317.0010	AMAN shall be able to use a Point Merge Structure (PMS), as an option, in the sequencing process to propose advisories to absorb delay inside the PMS by flying a PMS leg.		AMAN Baseline	
REQ-10.09.02-TS-0317.0020	When using a PMS, the arrival sequence shall be stabilized before the entrance in a leg of the Point Merge structure.		AMAN Baseline	
REQ-10.09.02-TS-0317.0030	AMAN shall know the delay that each leg of the PMS structure may absorb		AMAN Baseline	
REQ-10.09.02-TS-0318.0010	AMAN shall display in the HMI the TTG/TTL for each aircraft in terms of minutes and seconds. . Depending on local implementation the precision shall be adaptable to local needs.	APP ATC 111	Solution 5	EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0318.0020	AMAN shall propose in the HMI some 2D manoeuvres in order to gain or lose time, those manoeuvres shall be:	APP ATC 128	AMAN Baseline	EXE-05.03-VP-034
REQ-10.09.02-TS-0318.0090	AMAN shall allow manual update of the arrival sequence	APP ATC 128	AMAN Baseline	EXE-05.06.07-VP485 EXE-05.06.01-VP477

REQ-10.09.02-TS-0318.0100	AMAN shall implement a what-if function.	APP ATC 128	AMAN Baseline	
REQ-10.09.02-TS-318.0110	Manual swap in a flight pair within the stable horizon shall not impact aircraft other than those directly targeted.	APP ATC 128	AMAN baseline	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0331.0010	The likelihood AMAN being not available or unserviceable shall be no more than once every 5.5 months.	APP ATC 128	AMAN Baseline	
REQ-10.09.02-TS-0331.0020	The likelihood of AMAN operating on an incorrect time reference shall be no more once every 5.5 months.	APP ATC 128	AMAN Baseline	
REQ-10.09.02-TS-0331.0030	The likelihood of AMAN failing to accept and correctly process human input shall be no more than once every 6 weeks.	APP ATC 128	AMAN Baseline	
REQ-10.09.02-TS-0331.0040	The likelihood of E-AMAN failing to provide applicable arrival management information to the controller shall be no more than once every 12 weeks.	APP ATC 128	AMAN Baseline	
REQ-10.09.02-TS-0331.0050	The trajectory prediction used within AMAN shall be consistent and have a maximum drift of +/-30 seconds over the span of 30 minutes, or one second of drift per minute in the entirety of the implementation horizon.	APP ATC 128	AMAN Baseline	EXE-05.06.07-VP485 EXE-05.06.01-VP477

SESAR Solution 5 requirements:

Requirement Identifier	Requirement Text	Enabler	SESAR Solution	Validation Exercises
REQ-10.09.02-TS-0314.0010	If the flight is not under control of the system, the system shall transmit to the upstream ATC system arrival management constraints applicable for the flight in order to implement the arrival sequence.	APP ATC 111	Solution 5	EXE-05.03-VP-804 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0314.0020	According to LoAs between the ATSUs and to the delay apportionment strategy, AMAN shall allow to allocate a part of the delay to be absorbed by the upstream ATC system prior to the transfer of the flight.	APP ATC 111	Solution 5	EXE-05.03-VP-804 EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0314.0030	The system shall make available to the appropriate controller working position the arrival management constraints applicable for a flight and notified to the upstream ATSU	APP ATC 111	Solution 5	EXE-05.03-VP-804 EXE-05.06.07-VP485 EXE-05.06.01-

	in order to support the coordination/transfer dialog with the upstream ATSU.			VP477
REQ-10.09.02-TS-0314.0040	The system shall allow to identify discrepancy between coordination data with the upstream ATSU and applicable arrival management constraints for the corresponding flight (such as on time at COP).	APP ATC 111	Solution 5	EXE-05.03-VP-804
REQ-10.09.02-TS-0314.0050	In case the discrepancy between coordination data with the upstream ATSU and applicable arrival management constraints for the corresponding flight exceeds a predefined value, an indication shall be presented at the appropriate working position	APP ATC 111	Solution 5	EXE-05.03-VP-804
REQ-10.09.02-TS-0315.0010	AMAN shall receive updates of flight data and trajectory estimates taking into account the departure planning information (ETOT/TTOT, departure route) from the departure airport for a flight departing from a nearby airport in AMAN extended horizon..	APP ATC 158	Solution 5	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS0315.0020	AMAN shall sequence a flight departing from a nearby airport in the AMAN extended horizon prior to departure when departure planning information is available.	APP ATC 158	Solution 5	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0315.0030	Updates of departure planning information shall trigger a revision of APTO only if the updated planned trajectory is incompatible with the currently allocated APTO.	APP ATC 158	Solution 5	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0315.0040	The system shall publish planned arrival data for each flight departing from a nearby airport and sequenced at destination prior to departure with the following data :	APP ATC 158	Solution 5	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0315.0050	The Aerodrome System shall publish departure planning data for each flight departing from the aerodrome with the following data :	APP ATC 158	Solution 5	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0315.0060	The Aerodrome System shall receive and shall take APTO, TTL/TTG advisory from AMAN into account and computes TTOT for the departing flight from the aerodrome.	APP ATC 158	Solution 5	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0315.0070	The Aerodrome system shall have the capacity to display the planned arrival data and allow to manually input a TTOT for departing flight from the aerodrome.	APP ATC 158	Solution 5	EXE-05.06.07-VP485 EXE-05.06.01-VP477

REQ-10.09.02-TS-0319.0010	The En-route Sequence and Flow Management of the Upstream ATSU shall receive arrival management constraints from the downstream ATSU.	APP ATC 111	Solution 5	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0319.0020	The En-route Sequence and Flow Management of the Upstream ATSU shall calculate control advisories (Speed reduction, CTA...) allowing meeting arrival management constraints applicable to each concerned flight. Theses advisories shall translate the applicable delay sharing strategy between concerned Upstream ATSU sectors.	ER APP ATC 109	Solution 5	EXE-05.06.07-VP695
REQ-10.09.02-TS-0319.0030	Cross Border Arrival Management constraints and control advisories shall be displayed to the appropriate ATCO of Upstream ATSU sectors.	ER APP ATC 109	Solution 5	EXE-05.06.07-VP695
REQ-10.09.02-TS-0319.0040	Feedback on the intended or applied control actions to meet Arrival Management Constraints shall be provided to the Downstream ATSU.	ER APP ATC 109	Solution 5	EXE-05.06.07-VP695
REQ-10.09.02-TS-0318.0030	Upstream ATSU HMI shall be able to display the AMAN proposed CTA received from the downstream ATSU	APP ATC 148	Solution 5 Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477

SESAR Solution 6 requirements:

Requirement Identifier	Requirement Text	Enabler	SESAR Solution	Validation Exercises
REQ-10.09.02-TS-0312.0030	For each Flight AMAN shall set a point route in the Active Advisory Horizon as the Metering Point according to the allocated runway and the TMA configuration.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477
REQ-10.09.02-TS-0312.0040	AMAN shall allow the manual assignment of the Metering Point for a Flight.	APP ATC 148	Solution 6	EXE-0 EXE-05.06.01-VP4785.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0312.0050	AMAN shall apply a Flow constraint on each Metering point to determine the separation between two successive flights	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477

	over the Metering Point when computing the APTO on the Metering Point.			EXE-05.06.01-VP478
REQ-10.09.02-TS-0312.0100	For each Flight, AMAN shall compute the total delay at the Metering Point to be absorbed after each schedule update for the allocated Metering Point.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0312.0170	Arrival Management Information items referring to a time constraint established for the purposes of Arrival Management shall be specified with precision of one second.	ER APP ATC 128	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0010	For i4D capable aircraft, AMAN shall request the ETA min/max on the metering point.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0020	The system shall uplink the request for the ETA min/max to the aircraft and make available to AMAN the ETA min/max received from the aircraft.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0030	AMAN shall allow a controller to manually request the ETA min/max on the metering point.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0040	For i4D capable aircraft, AMAN shall schedule the flight taking into account the ETA min/max and propose a CTA on the metering point.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0050	The system shall inform AMAN of any CTA acceptance on the metering point once performed by system and aircraft.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0060	If the flight is not under control of the system, the system shall transmit the AMAN proposed CTA to the upstream ATC system.	APP ATC 148	Solution 6	EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0070	When the AMAN proposed CTA is set for a flight on the metering point, AMAN shall handle the flight as collaborative in the sequence and increase flight's stability in the sequencing process.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478

REQ-10.09.02-TS-0313.0080	When a CTA on the metering point is cancelled, AMAN shall handle the flight as in normal operations in the sequence and re-evaluate flight's stability in the sequencing process.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0090	When a CTA is set for a flight on the metering point, without being proposed by AMAN, AMAN shall try to update the sequence for the traffic taking into account this contracted time constraint for this flight. When the sequence update is possible, AMAN shall update the sequence, handle the flight as collaborative in the sequence and increase flight's stability in the sequencing process.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0100	When a CTA is set for a flight on the metering point, without being proposed by AMAN, AMAN shall try to update the sequence for the traffic taking into account this contracted time constraint for this flight. When the sequence update is not possible, AMAN shall provide a feedback to the appropriate controllers.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0110	Ground computed constraints shall only be proposed as a CTA when the CTA is known (i4D flights) or estimated by the ground system (non i4D flights) to be within the aircraft's performance and navigation capability or to indicate to the ATCO that the proposed CTA is outside the aircraft's performance.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0120	In the Arrival Management process where a CTA is to be applied the ground unit(s) shall complete the process (CTA assigned to and agreed by the Flight Crew) 5-10 minutes prior Top of Descent.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0130	2D trajectory synchronisation shall be performed and completed before starting CTA process by AMAN (ETA min/max request …)	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0313.0140	Only one CTA shall be proposed by AMAN automatically.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478

REQ-10.09.02-TS-0313.0150	AMAN shall allow a controller to manually request a CTA for a CTA capable aicraft	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0318.0030	Upstream ATSU HMI shall be able to display the AMAN proposed CTA received from the downstream ATSU	APP ATC 148	Solution 5 Solution 6	EXE-05.06.01-VP478
REQ-10.09.02-TS-0318.0040	Current ATSU HMI shall be able to display the CTA calculated by the AMAN.	APP ATC 148	Solution 6	EXE-05.03-VP-034 EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0318.0080	AMAN shall display in the HMI the CTA status for each i4D aircraft for which a CTA is proposed.	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0331.0080	AMAN shall provide an alert to advice ATCO in case of failure in CTA calculation	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478
REQ-10.09.02-TS-0331.0090	AMAN shall only propose CTA that are achievable (within ETA min max window)	APP ATC 148	Solution 6	EXE-05.06.07-VP485 EXE-05.06.01-VP477 EXE-05.06.01-VP478

SESAR Solution 8 requirements:

Requirement Identifier	Requirement Text	Enabler	SESAR Solution	Validation Exercies

REQ-10.09.02-TS-0318.0140	The crossing point calculated by The En-route Sequence and Flow Manager shall be displayed in the Upstream ATSU.	ER APP ATC 109	Solution 8	EXE-05.04.02-VP778
REQ-10.09.02-TS-0318.0150	The crossing point delay calculated by The En-route Sequence and Flow Manager shall be displayed in the Upstream ATSU.	ER APP ATC 109	Solution 8	EXE-05.04.02-VP778
REQ-10.09.02-TS-3110.0010	The En-route Sequence and Flow Manager of the Upstream ATSU shall receive arrival management information (sequence and preferred times) from all relevant downstream ATSUs.	ER APP ATC 109	Solution 8	EXE-05.04.02-VP778
REQ-10.09.02-TS-3110.0020	The En-route Sequence and Flow Manager of the Upstream ATSU shall calculate the integrated sequence in the en-route area where the arrival flows intersect.	ER APP ATC 109	Solution 8	EXE-05.04.02-VP778
REQ-10.09.02-TS-3110.0030	The En-route Sequence and Flow Manager of the Upstream ATSU shall impose an user defined spacing on the integrated sequence. Based on this additional constraint updated Arrival management information (sequence and preferred times) for the individual airports shall be calculated	ER APP ATC 109	Solution 8	EXE-05.04.02-VP778
REQ-10.09.02-TS-3110.0040	The En-route Sequence and Flow Manager of the Upstream ATSU shall provide the individual AMANs in the downstream ATSU with the updated Arrival management information	ER APP ATC 109	Solution 8	EXE-05.04.02-VP778
REQ-10.09.02-TS-3110.0050	The En-route Sequence and Flow Manager shall be configurable and applicable for multiple sectors and multiples airports	ER APP ATC 109	Solution 8	EXE-05.04.02-VP778
REQ-10.09.02-TS-3110.0060	The En-route Sequence and Flow Manager shall calculate a combined crossing point sequence for traffic streams to different airports passing the same sector.	ER APP ATC 109	Solution 8	EXE-05.04.02-VP778
REQ-10.09.02-TS-3110.0070	The En-route Sequence and Flow Manager shall calculate the crossing point time. The crossing point time shall be the minimum of earliest estimated time to reach the crossing point and the sum of the crossing point time of the predecessor and the configured	ER APP ATC 109	Solution 8	EXE-05.04.02-VP778

	crossing point spacing.			
REQ-10.09.02-TS-0331.0060	The likelihood of En-Route Sequence and Flow Manager being not available or unserviceable shall be no more than 2e-4 SOH, approximately once every 7 months.	ER APP ATC 109 ER ATC 163	Solution 8	
REQ-10.09.02-TS-0331.0070	The likelihood of En-Route Sequence and Flow Manager incorrectly integrated sequence shall be no more than 2e-4 SOH, approximately once every 7 months	ER APP ATC 109	Solution 8	

SESAR Solution 54 requirements:

Requirement Identifier	Requirement Text	Enabler	SESAR Solution	Validation Exercises
REQ-10.09.02-TS-0316.0010	AMAN and local DMAN shall manage the arrival sequence and the departure sequence at the airport in a master/slave configuration where AMAN is the Master and DMAN is the slave.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0020	AMAN shall be able to use ETA as the runway threshold arrival demand time for all expected arrivals, a configurable value of minutes in advance. (i.e. the earliest possible time to schedule that aircraft to land).	APP ATC 161 APP ATC 128	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0030	AMAN shall be able to use a revised value of ETA, whenever it changes by more than a configurable value of minutes.	APP ATC 161 APP ATC 128	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0040	AMAN shall be able to use TOT (Take-Off Time) as the take-off demand time for all expected departures, a configurable value of minutes in advance (i.e. the earliest possible time to schedule that departure).	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0050	AMAN shall be able to use a revised value of TOT (Take-Off Time) whenever it changes by more than a configurable value of minutes.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0060	AMAN shall receive the size of gap in NM needed to accommodate the required number of departures between two successive arrivals, to be able to	APP ATC 161	Solution 54	EXE-06.08.04-VP358

	satisfy the established pattern.			
REQ-10.09.02-TS-0316.0070	AMAN shall be able to use the minimum gap in NM between arrivals when there is no vortex separation.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0080	AMAN shall be able to use a specific pattern for arrivals and departures, as input by the Sequence Manager. The pattern specifies the number of departures between two consecutive arrivals, depending on early DCB processes.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0090	AMAN shall have, as adaptation data, a default pattern for arrivals and departures, in the case that no pattern is provided as input by the Sequence Manager or no self-computed pattern could be calculated by AMAN	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0100	When applying coupled AMAN/DMAN the maximum throughput to the runway must not exceed the capacity.	APP ATC 161 APP ATC 128	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0110	AMAN shall send the APTO to DMAN.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0120	AMAN shall use the same patterns naming as the DMAN.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0130	AMAN shall have an option to self-calculate on request a specific optimised pattern (one or more) for arrivals and departures to support ATCO.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0140	The AMAN shall send to the DMAN the sequence pattern under use.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0160	The AMAN shall provide a “what-if” function to allow the operator to evaluate scenarios with different sequence patterns.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0170	The status of Coupled AMAN/DMAN function shall be continuously monitored. Any failure shall be notified in the HMI.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0180	When the traffic is below a predefined threshold, first-come-first-served (FCFS) principle shall be applied instead of a pattern.	APP ATC 161	Solution 54	EXE-06.08.04-VP358

REQ-10.09.02-TS-0316.0190	AMAN shall allow the manual adjustment of the sequence pattern and the AFI-size by Approach or Tower Supervisor in order to provide sufficient spacing for departures in a mixed mode environment.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0316.0200	In mixed mode operations AMAN shall take the following inputs in the sequence computation : • AFI-size • CTOT.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0318.0050	Information on TTOT, Vortex Category and Status of the Flight (i.e. SUR, SUG, Begin Taxi) of each departing flight shall be available in the AMAN display of the arrival sequence.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0318.0060	Information on the active pattern shall be displayed on the appropriate controller position. The HMI shall allow manual modification of the active pattern at any time.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0318.0070	Information on KPIs (such as runway rate) shall be displayed for arrival and departures separately on the appropriate controller position.	APP ATC 161	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0318.0120	Runways configuration shall be displayed	APP ATC 128	Solution 54	EXE-06.08.04-VP358
REQ-10.09.02-TS-0318.0130	When operating in mixed mode in a single runway, AMAN HMI shall display the arrival/departure integrated sequence	APP ATC 128	Solution 54	EXE-06.08.04-VP358

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