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Solution PJ.02-W2-14.2 TS IRS

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AART

AIRPORT AIRSIDE AND RUNWAY THROUGHPUT

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Abstract

This Technical Specification provides the requirements for ground based ATC systems and aircraft systems supporting the solution PJ.02-W2-14.2:

AO – 0319 - Enhanced Arrival procedures using Secondary Runway Aiming Points (SRAP)

Those requirements were consolidated and refined during the validation exercises.

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1 Executive summary

This TS/IRS document provides the architecture and the requirements for SESAR 2020 solution PJ.02-W2-14.2. It will focus on the following change to current capabilities:

- The capability to operate on two runway thresholds, permanently published (SRAP).

Enhanced Arrival Procedures concepts were already investigated within SESAR1 Program in PJ06.08.08 and P06.08.05, and within SESAR 2020 W1 in PJ02-02, but they did not achieve full V3 maturity. Solution PJ.02-W2-14.2 aims then at completing the validation activities on SRAP concept, so that they can be moved to the next phases of the validation cycle.

Code	Concept Name	Description	Maturity at PJ.02-W2 start	Maturity target at PJ.02-W2 end
AO-0319	Second Runway Aiming Point (SRAP)	A glide path anchored to shifted touch down points with respect to the standard threshold. NB: in SESAR 1, this operation was known as "MRAP : Multiple Runway Aiming Points"	V3 On-going	V3

Table 1: Initial and targeted maturity level of SRAP concept

This document provides requirements for ground based ATC systems and aircraft systems supporting SRAP Procedures. Those requirements are based on the use cases defined in SPR-INTEROP/OSED [37]:

- [NOV-5][EAO-02] SRAP Published Approach
- [NOV-5][SRAP-Non-Nominal-01] Missed Approach (Pilot Initiated) / Go-Around Management
- [NOV-5][SRAP-Non-Nominal-02] Procedure for Glide Alert Management
- [NOV-5][SRAP-Non-Nominal-03] Loss of TBS-ORD separation indicators.

2 Introduction

2.1 Purpose of the document

This TS/IRS document is used to capture and consolidate the set of Technical Requirements related to SESAR 2020 W2 solution PJ.02-W2-14.2.

The requirements included in this TS/IRS satisfy the requirements captured at SPR-INTEROP/OSED and are associated with Functions, Functional blocks and Roles available in EATMA applicable version.

TS/IRS aims to provide sufficient information to enable the functional block (or parts of it in which the project is working) to be designed and implemented either as a separate functional block or as part of an integrated system, depending upon the design choice, for V&V activity within the programme and ultimately for industrialization, standardization and deployment.

2.2 Scope

Solution PJ.02-W2-14.2 aims at improving airport performances on the Environmental Sustainability and Capacity Key Performance Areas by introducing Second Runway Aiming Point Procedures (SRAP).

SRAP procedures/operations enable reducing the environmental impact (e.g. noise, fuel). In addition, the runway throughput may be increased (e.g. via the optimization of wake turbulence separations).

The OI is considered to have reached V3 ongoing maturity level at the end of SESAR 2020 PJ02 W1 and the aim of PJ.02-W2-14.2 is to bring it to V3.

The following table provides the scope of the SESAR solution PJ.02-W2-14.2 and the related OI. The description of the procedures associated to the concept is detailed in SPR-INTEROP/OSED document [37].

OI Step code	OI Step title	OI Step coverage
AO-0319	Enhanced Arrival Procedures using a Second Runway Aiming Point (SRAP)	Full
Enhanced arrival procedures using a Second Runway Aiming Point (SRAP) will allow inbound aircraft reducing noise footprint impact in the surrounding areas of the airport and possibly runway occupancy time and/or taxi-in time, while also allowing potential increased runway capacity (via optimized wake separations). - The SRAP concept is a published approach procedure, enabling aircraft to land on a second further runway aiming point (with associated runway ground markers, lights and visual aids). - The SRAP procedure is designed with a glide slope parallel to the nominal one operated for the first aiming point. - Choosing a SRAP approach (over the conventional one) could be the result of the best compromise between available runway length, preferential runway exit use, noise, wake turbulence separation constraints, and the runway occupancy time.		

Table 2: SESAR Solution PJ.02-W2-14.2 Scope and related OI

This document contains the requirements for ground based ATC systems and aircraft systems supporting SRAP Procedures. The requirements are based on the use cases defined in SPR-INTEROP/OSED [37]:

- [NOV-5][EAO-02] SRAP Published Approach
- [NOV-5][SRAP-Non-Nominal-01] Missed Approach (Pilot Initiated) / Go-Around Management
- [NOV-5][SRAP-Non-Nominal-02] Procedure for Glide Alert Management
- [NOV-5][SRAP-Non-Nominal-03] Loss of TBS-ORD separation indicators.

2.3 Intended readership

The intended audience of this document is initially the partners of Solution PJ.02-W2-14.2 in order to support suitable validation exercises.

Airborne and ground industries are also a primary audience as the TS/IRS enables them to assess the impact on airborne systems and ground-based ATC systems of implementing SRAP Procedures.

Finally, this document will support Airspace Users, ANSPs, Airport Operators and Safety Regulators willing to develop SRAP procedures.

2.4 Background

PJ.02-W2-14.2 complements studies carried out in the frame of SESAR1 in projects P06.08.08 and P06.08.05, and in SESAR 2020 PJ02-02 W1.

The picture below shows the validation activities performed in P06.08.08 and in PJ02 W1 on SRAP. Details on the outputs of PJ02-02 activities can be found in [39].

It has to be noticed that P06.08.08 MRAP (Multiple Runway Aiming Points) has been reduced in PJ02 W1 to only one additional aiming point called now SRAP (Second Runway Aiming Point), with the constraint to have a minimal distance of 1100m between the two thresholds.

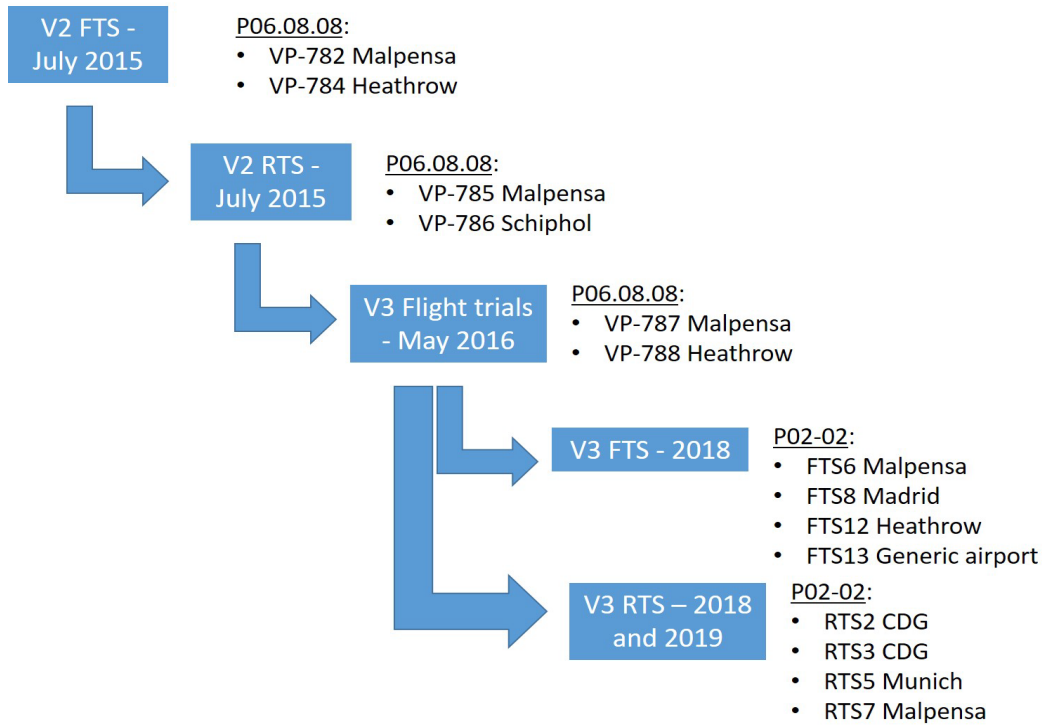


Figure 1: Validations activities performed on SRAP in SESAR1 P06.08.08 and in SESAR 2020 W1 PJ02-02

The major recommendations from PJ02-02 [39] were:

- the need to consider the non-nominal situations, and in particular the loss of the ATC tool supporting the controllers in ensuring the needed separations between the aircraft approaching on standard and SRAP procedures
- the need to consider go-arounds/missed approaches
- the need to have a controller alert when an aircraft is not flying the expected glide
- the need to further evaluate the proposed runway marking and lighting solutions.

Following these recommendations, additional validation activities took place in the frame of PJ02 W2. The results can be found in [38].

2.5 Structure of the document

The structure of the document is as follows:

- Chapter 1: This section introduces the document.
- Chapter 2: This section provides the document introduction, its scope, purpose, intended audience, background information as well as the glossary of terms and acronyms.
- Chapter 3: This section gives a description overview of the SESAR Solution developed in this TS document.
- Chapter 4: This section provides the Technical Specifications (TS) that have been validated during the validation activities at V3 level.
- Chapter 5: This section describes the options that can be chosen when implementing the solution.

- Chapter 6: This section describes any assumptions made that have an impact on the technical specifications described in section 5.
- Chapter 7: This section lists the references and applicable documents used in producing this TS document.
- Appendix A: This appendix presents the Service Description Document (SDD) and is not applicable here.

2.6 Glossary of terms

Term	Definition	Source of the definition
Enhanced arrival Operations/Procedures	Generic term referring in a general manner to all operational concepts: ISGS, A-IGS, SRAP, IGS-to-SRAP, CSPR-ST	Project proposed definition
Obstacle Clearance Altitude/Height (OCA/H)	In a precision approach procedure, the OCA/H is defined as the lowest altitude/height at which a missed approach must be initiated to ensure compliance with the appropriate obstacle clearance design criteria	ICAO Doc 8168 PANS OPS
Autopilot / Flight Director	AP/FD means that both the Autopilot and the Flight Director are used by the flight crew. They are both driven by the guidance targets coming either from the FMS (FPLN follow up) or the flight crew itself (target selected on Auto Flight system Control Panel). The pilot does not touch the aircraft stick command. FD only means that the Flight Director is displayed and followed manually (using the stick command) by the flight crew on the Primary Flight Display. Without AP/FD means that the flight crew flies a pure manual final approach with the unique aid of lateral and vertical deviations displayed on the Primary Flight Display.	Project proposed definition
Ground Based Augmentation System (GBAS)	Civil-aviation safety-critical system that supports local augmentation of the primary GNSS constellation(s) by providing enhanced levels of service that support all phases of approach (precision and non-precision), landing, departure, surface operations and it may support additional operations: en route and terminal operations. While the main goal of GBAS is to provide integrity assurance, it also increases the accuracy. The technology can be based on GPS L1 providing Cat I, GPS L1 providing up to Cat III, and Multi-Constellation / Multi-Frequency GBAS providing up to Cat III with improved integrity and availability compared to GBAS based on GPS L1 only.	EATMA
Space Based Augmentation System (SBAS)	Civil aviation safety-critical systems that support wide-area or regional augmentation through a monitoring and reference stations network and geostationary (GEO)	EATMA

satellites (35.786 km altitude) which broadcast GNSS augmentation information (correction & integrity).

Table 3: Glossary

2.7 Acronyms and Terminology

Acronym	Definition
A/C	Aircraft
AAL	Above Aerodrome Level
ACC	Area Control Centre
ACM	
ADD	Architecture Definition Document
AFCS	Automatic Flight Control System
AFS	Automatic Flight System
AGL	Above Ground Level
A-IGS	Adaptive Increased Glide Slope
AMAN	Arrival Manager
ANP AR	Required Navigation Performance Authorization Required
ANSP	Air Navigation Service Provider
AO	Aerodrome Operations
AODB	Airport Operational Data Base
AOM	Airspace Organisation and Management
AOP	Airport Operational Plan
AP	Auto Pilot
APM	Approach Path Monitoring
APOC	Airport Operations Centre
APW	Airspace Proximity Warning
ASAS	Airborne Separation Assistance System
A-SMGCS	Advanced Surface Movement Guidance and Control System
ATC	Air Traffic Control
ATCO	Air Traffic Controller Operator
ATFCM	Air Traffic Flow and Capacity Management
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATS	Air Traffic Services
ATSU	Air Traffic Service Unit
CDI	Course Deviation Indicator
CDM	Collaborative Decision Making
CDO	Continuous Descent Operations
CFMU	Central Flow Management Unit
CNS	Communication, Navigation & Surveillance
CONOPS	Concept of Operations
CP	Control Panel

CSPR-ST	Closely Space Parallel Runway - Staggered Thresholds
CWP	Controller Working Position
DA(H)	Decision Altitude/Height
DBS	Data Base System
DCB	Demand and Capacity Balancing
DMAN	Departure Manager
DOD	Detailed Operational Description
DS	Double Slope
DT	Displaced Threshold
EAO	Enhanced Approach Operation
EAP	Enhanced Arrival Procedure
E-ATMS	European Air Traffic Management System
ETFMS	Enhanced Tactical Flow Management System
FAF	Final Approach Fix
FAP	Final Approach Point
FAS	Final Approach Segment
FCOM	Flight Crew Operating Manual
FD	Flight Director
FMS	Flight Management System
FPL	Flight Plan
FRAP	Further Runway Aiming Point
FTD	Final Target Distance
GGDC	Ground/Ground Data Communications
G/S	Glide Slope
GAST	GBAS Approach Service Type
GBAS	Ground-Based Augmentation System
GLS	GBAS Landing System
GNSS	Global Navigation Satellite System
GPA	Glide Path Angle
GPS	Global Positioning System
HMI	Human Machine Interface
ICAO	International Civil Aviation Organization
IFPS	Integrated Initial Flight Plan Processing System
IFR	Instrument Flight Rules
IGE	In Ground Effect
IGS-to-SRAP	Increased Glide Slope to Second Runway Aiming Point
ILS	Instrument Landing System
ISGS	Increased Second Glide Slope
INTEROP	Interoperability Requirements
IRS	Interface Requirements Specification
ITD	Initial Target Distance
KPI	Key Performance Indicator
LNAV	Lateral Navigation
LOC	Localizer

LPV	Localizer Performance with Vertical Guidance
LTS	Lower Than Standard
LVTO	Low Visibility Take-Off
MAPt	Missed Approach Point
MRAP	Multiple Runway Aiming Points
MRS	Minimum Radar Separation
MSAW	Minimum Safe Altitude Warning
NavDB	Navigation Database
NM	Nautical Mile
OAT	Outside Air Temperature
OCA/H	Obstacle Clearance Altitude/Height
OCD	Operational Concept Description
OFA	Operational Focus Areas
OGE	Out-of-Ground Effect
OI	Operational Improvement
ORD	Optimised Runway Delivery
OSD	Operational Service and Environment Definition
OTS	Other Than Standard
PAN	Precision Approach Navigator
PANS	Procedures for Air Navigation Service
PAPI	Precision Approach Path Indicator
PBN	Performance Based Navigation
QNH	Barometric pressure adjusted to sea level
RAVC	Reduced Aerodrome Visibility Conditions
RAVP	Reduced Aerodrome Visibility Procedures
RET	Rapid Exit Taxiway
RF	Radius to Fix
RMP	Radio Management Panel
RNP	Required Navigation Performance
ROT	Runway Occupancy Time
RPID	Reference Path Identifier
S-PWS	Static Pairwise separation
SESAR	Single European Sky ATM Research Programme
SESAR Programme	The programme which defines the Research and Development activities and Projects for the SJU.
SID	Standard Instrument Departure
SIS	Signal-in-space
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SJU Work Programme	The programme which addresses all activities of the SESAR Joint Undertaking Agency.
SOP	Standard Operating Procedure
SPR	Safety and Performance Requirements
SRAP	Second Runway Aiming Point
SSR	Secondary Surveillance Radar

STAR	Standard Terminal Arrival Route
STCA	Short Term Conflict Alert
TAD	Technical Architecture Description
TBD	To Be Defined
TBS	Time Based Separations
TCH	Threshold Crossing Height
TIBT	Target In-Block Time
TLDT	Target Landing Time
TMA	Terminal Manoeuvring Area
ToD	Top Of Descent
TS	Technical Specification
TTOT	Target Take Off Time
Vapp	Approach Speed
VDB	VHF Data Broadcast
VHF	Very High Frequency
VIS	Visibility
VNAV	Vertical Navigation
VPA	Vertical Path Angle
WTC	Wake Turbulence Category
WVE	Wake Vortex Encounter

Table 4: Acronyms and terminology

3 SESAR Solution Impacts on Architecture

3.1 Target Solution Architecture

3.1.1 SESAR Solution(s) Overview

PJ.02-W2-14.2: Second runway aiming point (SRAP)

This Solution introduces the Second Runway Aiming Point (SRAP) as a new concept of enhanced approach operations. The distance between the second threshold and the nominal one is at least of 1100m.

SRAP increases the runway performance by using two active thresholds on a single runway.

By doing so, the environmental impact (e.g. noise, fuel) should be reduced. In addition, the runway throughput may be increased (e.g. via optimization of ROT and/or wake turbulence separations).

OI Step	OI description		Open CR
AO-0319	Enhanced approach operations using a second runway aiming point (SRAP)		CR 06474 Update AO-0319 (unlink Institutional EN)
	EN code	EN description	Open CR
	AERODRO ME-ATC-102	Aerodrome ATC system to support final approach operations (distinguish approach procedures)	
	AERODRO ME-ATC-25	Aerodrome ATC system to support SRAP operations (separation delivery)	
	AIRPORT-56	Runway marking, lighting and PAPI for SRAP/IGS-to-SRAP approach procedures	
	APP ATC 115	Approach ATC system to support SRAP operations (separation delivery)	
	APP ATC 170	Approach ATC system upgraded to support approach procedure assignment	
	HUM-023	Flight Crew new role for handling SRAP approach	
	HUM-031	ATC new role for handling SRAP approach	
	STD-112	Update of EASA/ICAO regulatory frameworks for new visual ground aids (SRAP)	

REG-0529	Regulatory provisions for Second Runway Aiming Points operations (SRAP)	
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Type	Element	EN Code	EN/CR Title	Coverage
		AERO DROM E-ATC-102	Aerodrome ATC system to support final approach operations (distinguish approach procedures)	
		AERO DROM E-ATC-25	Aerodrome ATC system to support SRAP operations (separation delivery)	
		AIRPO RT-56	Runway marking, lighting and PAPI for SRAP/IGS-to-SRAP approach procedures	
		APP ATC 115	Approach ATC system to support SRAP operations (separation delivery)	
		APP ATC 170	Approach ATC system upgraded to support approach procedure assignment	
		HUM-023	Flight Crew new role for handling SRAP approach	
		HUM-031	ATC new role for handling SRAP approach	
Role	Executive Controller (also called Tactical Controller)			considered
Role	Tower Runway Controller (PJ.02-W2-14.2)			considered
		STD-112	Update of EASA and ICAO regulatory frameworks for new visual ground aids (SRAP)	
		REG-0529	Regulatory provisions for Second Runway Aiming Points operations (SRAP)	

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

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Enabler	Opt/Req	Deviation
AERODROME-ATC-102_Aerodrome ATC system to support final approach operations (distinguish approach procedures)	Required	
AERODROME-ATC-25_Aerodrome ATC system to support SRAP operations (separation delivery)	Optional	
AIRPORT-56_Runway marking, lighting and PAPI for SRAP/IGS-to-SRAP approach procedures	Required	
APP ATC 115_Approach ATC system to support	Optional	

SRAP operations (separation delivery)		
APP ATC 170_Approach ATC system upgraded to support approach procedure assignment	Required	
HUM-023_Flight Crew new role for handling SRAP approach	Required	
HUM-031_ATC new role for handling SRAP approach	Required	
REG-0529_Regulatory provisions for Second Runway Aiming Points operations (SRAP)	Required	
STD-112_Update of EASA and ICAO regulatory frameworks for new visual ground aids (SRAP)	Required	

221 3.1.1.3 Relevant Use Cases

Operational Use Case	Description
[NOV-5][EAO-02] SRAP Published Approach	The use case takes place in the execution phase. It describes how one flight performing a published Enhanced Approach Operation (EAO) as a Second Runway Aiming Point (SRAP) approach is integrated in a flow of traffic. The use case starts when the flight enters the approach control area (taking into account that the Flight Deck has performed a "Prepare & Brief Approach" at the end of cruise), and is initiated following a request from Approach Executive Control and ends when the aircraft has landed. Pre-conditions: • The ANSP shall inform Airspace Users (e.g. via AIC) about the availability of SRAP procedure with their differences from the local conventional approaches (including applicable separation minima, location of the second aiming point, landing distance available etc.) The need for displaying to the Controllers the interception points respective for each procedure shall be evaluated as part of the local deployment, such that the visual references are operationally relevant and unambiguously presented without e.g. cluttering on the controller air surveillance display. • ANSPs shall reinforce through a request to Aircraft Operators the need for Flight Plans to be complete and correctly filled with aircraft navigation capabilities. • A single SRAP procedure type may be supported by different navigation guidance systems and part of or all the SRAP procedures may be active at the same time. • The SRAP approach chart shall be specific to one final

	approach path (i.e. touchdown aiming point) and supporting navigation guidance mean. The position and color of the associated PAPI shall be indicated on the chart. If both PAPIs (for SRAP and nominal approach) are indicated on the chart, it shall be clear which one is for which procedure, and the way they are drawn shall be consistent with the procedure (number of red lights). • SRAP procedures shall be published approach procedures flown based on ILS or GLS or RNP APCH with vertical guidance. • The SRAP approach chart shall include altitude/distance information for the applicable runway aiming point to facilitate Flight Crew procedure check during the approach. • When designing the SRAP local procedure and the location of the second threshold and aiming point, the current and future taxiway layout of the aerodrome shall be taken into consideration for facilitating runway vacation. • When designing the SRAP local procedure, the location of the second runway aiming point shall provide sufficient landing distance available for all eligible aircraft at that specific airport. • Contingency procedures shall be revised as appropriate to accommodate non-nominal modes or degraded modes of operations like the navigation guidance supporting an active procedure is no longer serviceable or the ATC separation support function is no longer serviceable (e.g. loss of separation distance indicator). • Approach Supervision shall decide when a published SRAP becomes active/inactive for operations, considering the conditions for application are and remain met: 1. No operational ATC & weather limitations 2. Necessary navigation guidance means are serviceable. • Approach / Tower Supervision shall inform the Approach / Tower Control about the list of active approach procedures. • Information about a published SRAP being active to a given runway QFU shall be available to Flight deck in
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	order to prepare the expected approach briefing (e.g. via ATIS). • SRAP Approach separation minima shall be specified for each combination of published approach procedure with different glideslopes, taking into account the associated navigation means and the corresponding vertical accuracy around the published profile, for ○ Leader and follower on same glideslope ○ Leader upper glide - follower lower glide ○ Leader lower glide - follower upper glide. • If the Runway Occupancy Time (ROT) is affected by landing on an active further runway aiming point, this ROT spacing shall be taken into account in the runway separation management (ROT might become the most constraining factor due to changes in separation minima). • For high density operations supported by Separation Delivery Function with TDIs, when SRAP are flown based on RNP APCH navigation, there is a need for flexibility in the final approach axis interception (e.g. using vectoring). In such cases, the ANSP shall request on the charts Flight Crew to inform Approach Controller when aircraft is unable to use the FMS guidance for final approach axis interception. • When the second runway threshold is not active (i.e. operating only the conventional threshold), the lightings of the secondary runway threshold and aiming point shall be switched off such as to avoid confusing Flight Deck.
[NOV-5][SRAP-Non-Nominal-01] Missed Approach (Pilot Initiated) / Go-Around Management	This Use Case describes a non-nominal scenario in which missed approach or go-around procedure is initiated during SRAP approach.
[NOV-5][SRAP-Non-Nominal-02] Procedure for Glide Alert Management	This Use Case describes a non-nominal scenario in which a glide alert is activated during SRAP approach.
[NOV-5][SRAP-Non-Nominal-03] Loss of TBS-ORD separation indicators	This Use Case describes a non-nominal scenario for the loss of TBS/ORD separation indicators during SRAP approach.

222

System Process	Description
[NSV-4][EAO-02a] SRAP Published Approach (Airborne)	This is the technical Use Case for the SRAP procedure from an airborne point of view.

[NSV-4][EAO-02b] SRAP Published Approach (Ground)	This is the technical Use Case for the SRAP procedure from an ATC point of view.
[NSV-4][SRAP-Non-Nominal-01a] Missed Approach (Pilot Initiated) / Go-Around Management (TWR)	This is a technical realisation of a non-nominal Use Case for missed approach or go-around management during SRAP approach.
[NSV-4][SRAP-Non-Nominal-01b] Missed Approach (Pilot Initiated) / Go-Around Management (APP)	This is a technical realisation of a non-nominal Use Case for a missed approach or go-around management during SRAP approach.
[NSV-4][SRAP-Non-Nominal-02] Procedure for Glide Alert Management	This is a technical realisation of a non-nominal Use Case for a glide alert management during SRAP approach.
[NSV-4][SRAP-Non-Nominal-03] Loss of TBS-ORD separation indicators	This is a technical realisation of a non-nominal Use Case for the loss of TBS/ORD separation indicators during a SRAP approach.

223

224 3.1.1.4 Applicable standards and regulations

225 The current existing regulations are applicable and may need evolution to cover SRAP:

- 226 • For the visual aids, including lighting, marking and PAPI:
 - 227 ○ AMC/GM to Aerodrome regulation EU 139/2014
 - 228 ○ ICAO Annex 14
 - 229 ○ AMC/GM to Common Requirements regulation EU 2020/469 Part-ATS.
- 230 • For the SRAP procedure and phraseology, the current regulatory framework.

231 3.1.2 Capability Configurations required for the SESAR Solution

Enhanced Arrival Operations			Airport	
CC	Op Env	Capability	Node	Stakeholder
APP ACC	Terminal Airspace;	Airspace Reservation Management; Arrival Sequencing; Arrival Traffic Merging; Arrival/Departure Routes Management; Clearance/Instruction Management; Coordination and Transfer; CTA/CTO Management; Integrated Arrival/Departure Sequencing; Mid-Air Collision Avoidance; Minimum Pair Separation Provision; RNP based Operations Execution; Separation Service Provision (airspace); Spacing Technique Management; Trajectory Information Synchronisation; Wake Turbulence Separation Provision; Weather-Dependent Separation	Airspace Organisation; En-Route/Approach ATS;	Civil ATS Approach Service Provider; Military ATS Approach Service Provider;

		Provision;		
Civil Aircraft	Airport; En-Route; Terminal Airspace;	Arrival Sequencing; CTA/CTO Management; Optimised Climb Execution; Optimised Descent Execution; Optimised Take-Off / Landing Execution; RNP based Operations Execution	Flight Deck;	Civil Business Aviation- Fixed Wing; Civil Business Aviation- Rotorcraft; Civil Scheduled Aviation
Communication Infrastructure	Airport; En-Route; NET- Network; Terminal Airspace	Network connectivity provision for aeronautical communications on the airport surface		Civil CNS Service Provider; Military CNS Service Provider
Civil Aircraft	Airport; En-Route; Terminal Airspace	Optimised Descent Execution; Optimised Take-Off / Landing Execution; PinS Operations Execution; RNP based Operations Execution	Flight Deck;	Civil Business Aviation- Fixed Wing; Civil Business Aviation- Rotorcraft; Civil Scheduled Aviation
Navigation Infrastructure Ground Based	Airport; Terminal Airspace		En- Route/Approach ATS	Civil CNS Service Provider; Military CNS Service Provider
Navigation Infrastructure Satellite Based		Positioning/Navigation/Timing of Mobiles (airspace) independent of Ground Infrastructure		

TWR	Airport	Airspace Reservation Management; Arrival Sequencing; Clearance/Instruction Management; Coordination and Transfer; Departure Sequencing; Dynamic Runway Allocation; Integrated Arrival/Departure Sequencing; Minimum Pair Separation Provision; Remote Tower Operations Provision; Spacing Technique Management; Wake Turbulence Separation Provision; Weather-Dependent Separation Provision	Aerodrome ATS;	Civil ATS Aerodrome Service Provider; Military ATS Aerodrome Service Provider
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3.2 Changes imposed by the SESAR Solution on the baseline Architecture

Enabler	Element type	Element name	Impact	Change
HUM-031	ATC new role for handling SRAP approach			
	Role	Executive Controller (also called Tactical Controller)	Update	
	Role	Tower Runway Controller (PJ.02-W2-14.2)	Update	

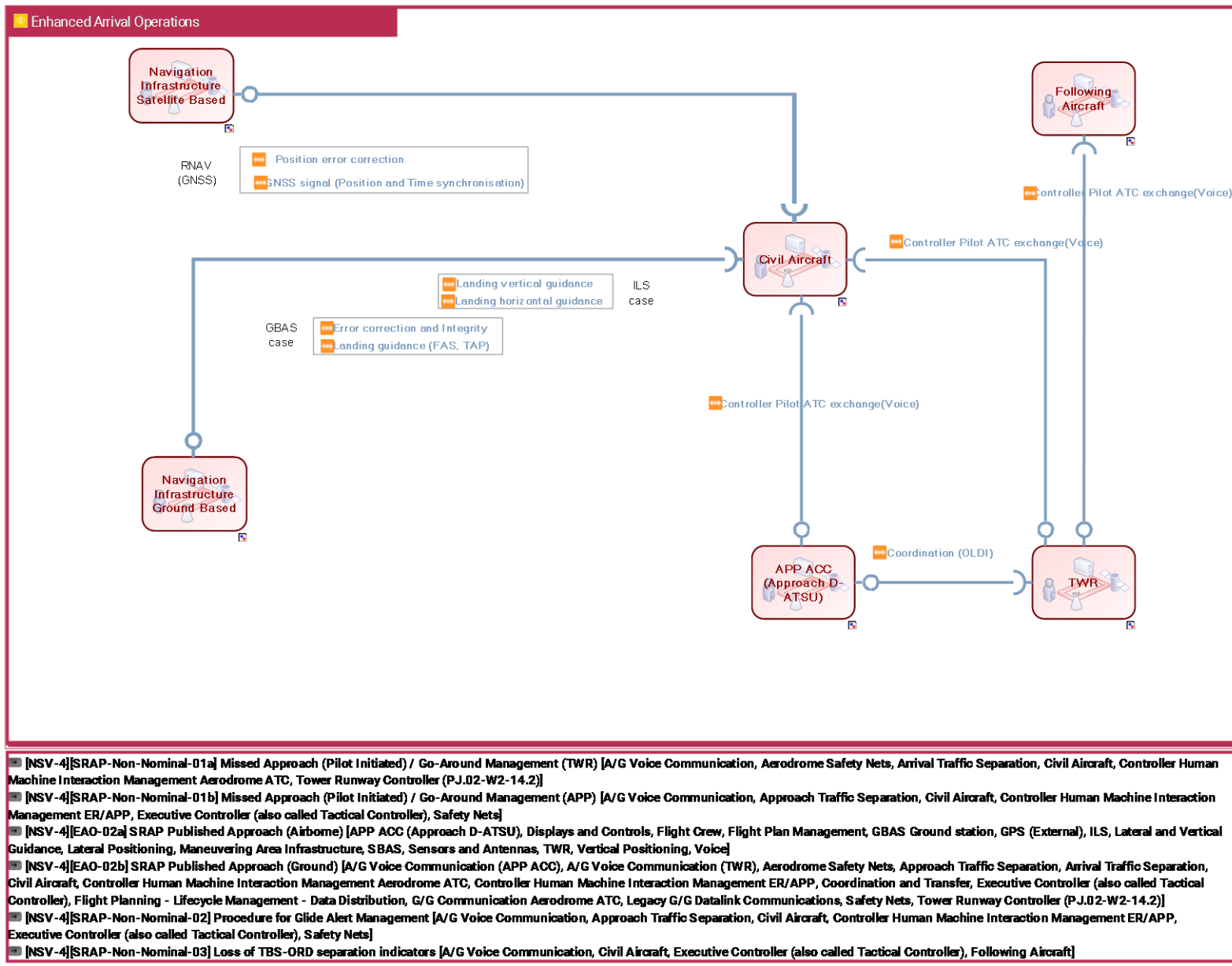
4 Technical Specifications

4.1 Functional architecture overview

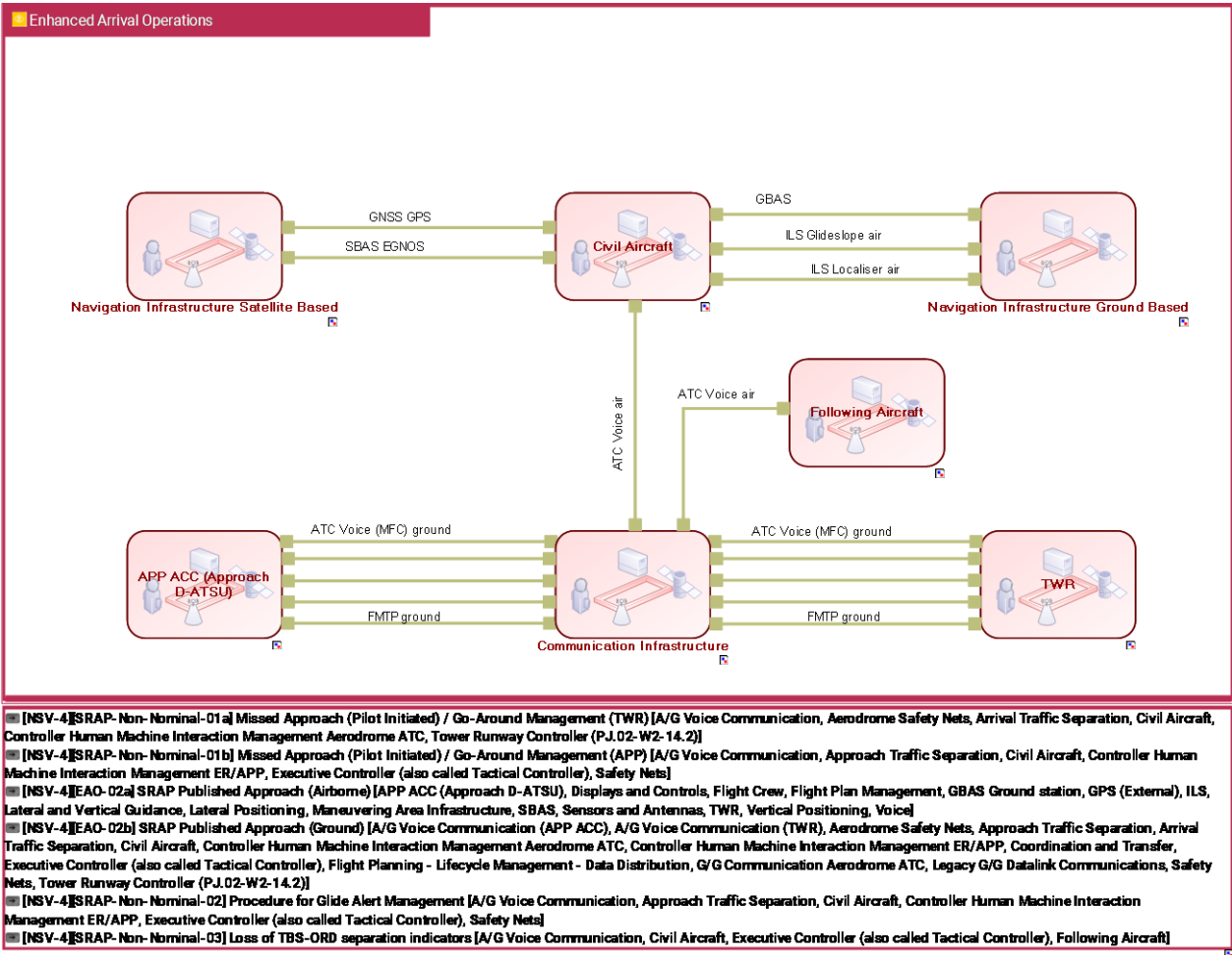
4.1.1 Resource Connectivity View

This view describes the resource connectivity for Solution PJ02-W2-14.2.
It covers the realization of the following Technical UCs:

- SRAP Published Approach (Airborne)
- SRAP Published Approach (Ground)



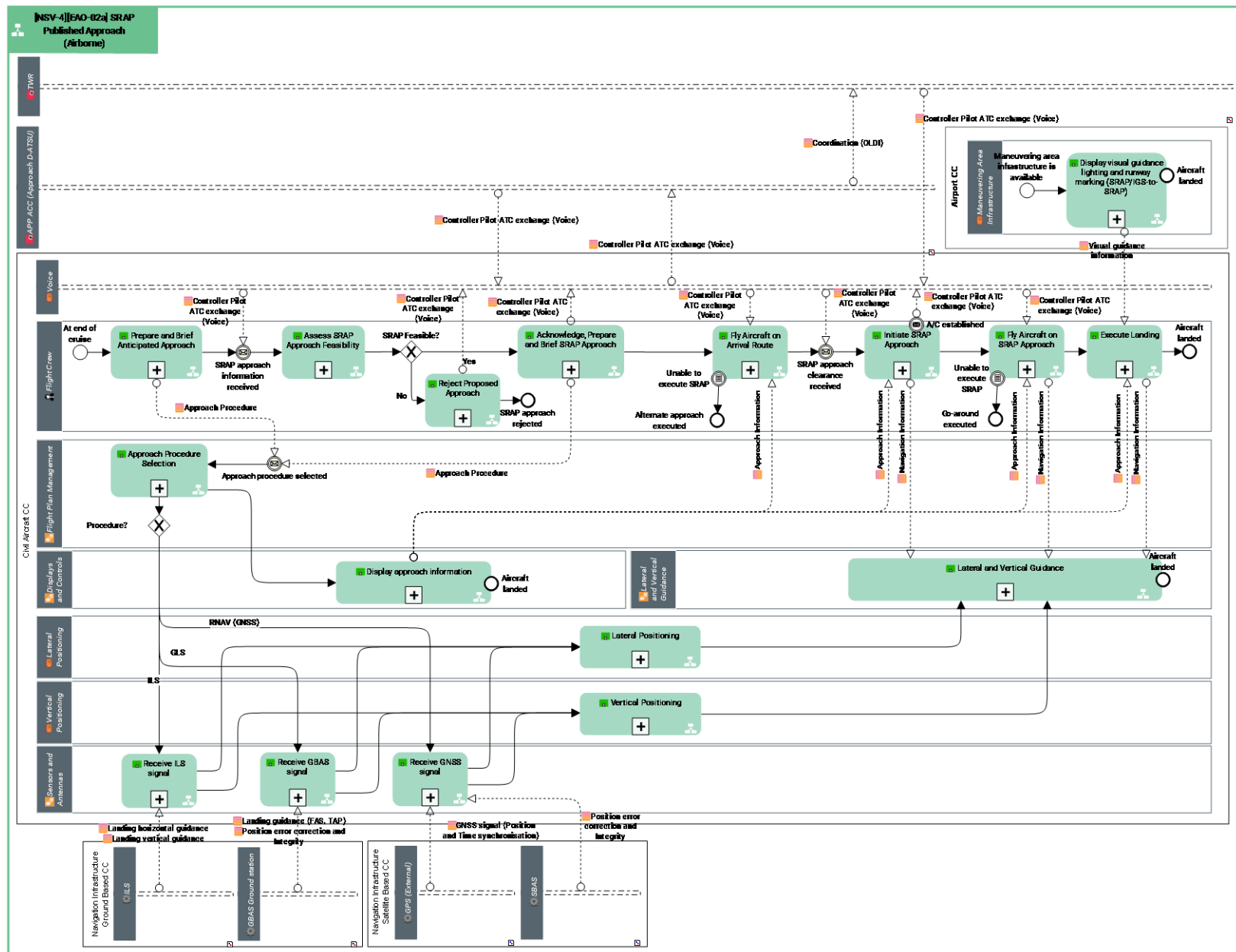
4.1.1.1 Resource Infrastructure View



4.1.1.2 Resource Orchestration view

4.1.1.2.1 [NSV-4][EOP-02a] SRAP Published Approach (Airborne)

This is the technical Use Case for the SRAP procedure from an airborne point of view.



252

Role	Functional Block	Function
	Displays and Controls	Display approach information;
Flight Crew		Acknowledge, Prepare and Brief SRAP Approach; Assess SRAP Approach Feasibility; Execute Landing; Fly Aircraft on Arrival Route; Fly Aircraft on SRAP Approach; Initiate SRAP Approach; Prepare and Brief Anticipated Approach; Reject Proposed Approach;
	Flight Plan Management	Approach Procedure Selection;
	Lateral and Vertical Guidance	Lateral and Vertical Guidance;
	Lateral Positioning	Lateral Positioning;
	Manoeuvring Area Infrastructure	Display visual guidance lighting and runway marking (SRAP/IGS-to-SRAP);
	Sensors and Antennas	Receive GBAS signal; Receive GNSS signal; Receive ILS signal
	Vertical Positioning	Vertical Positioning;

253

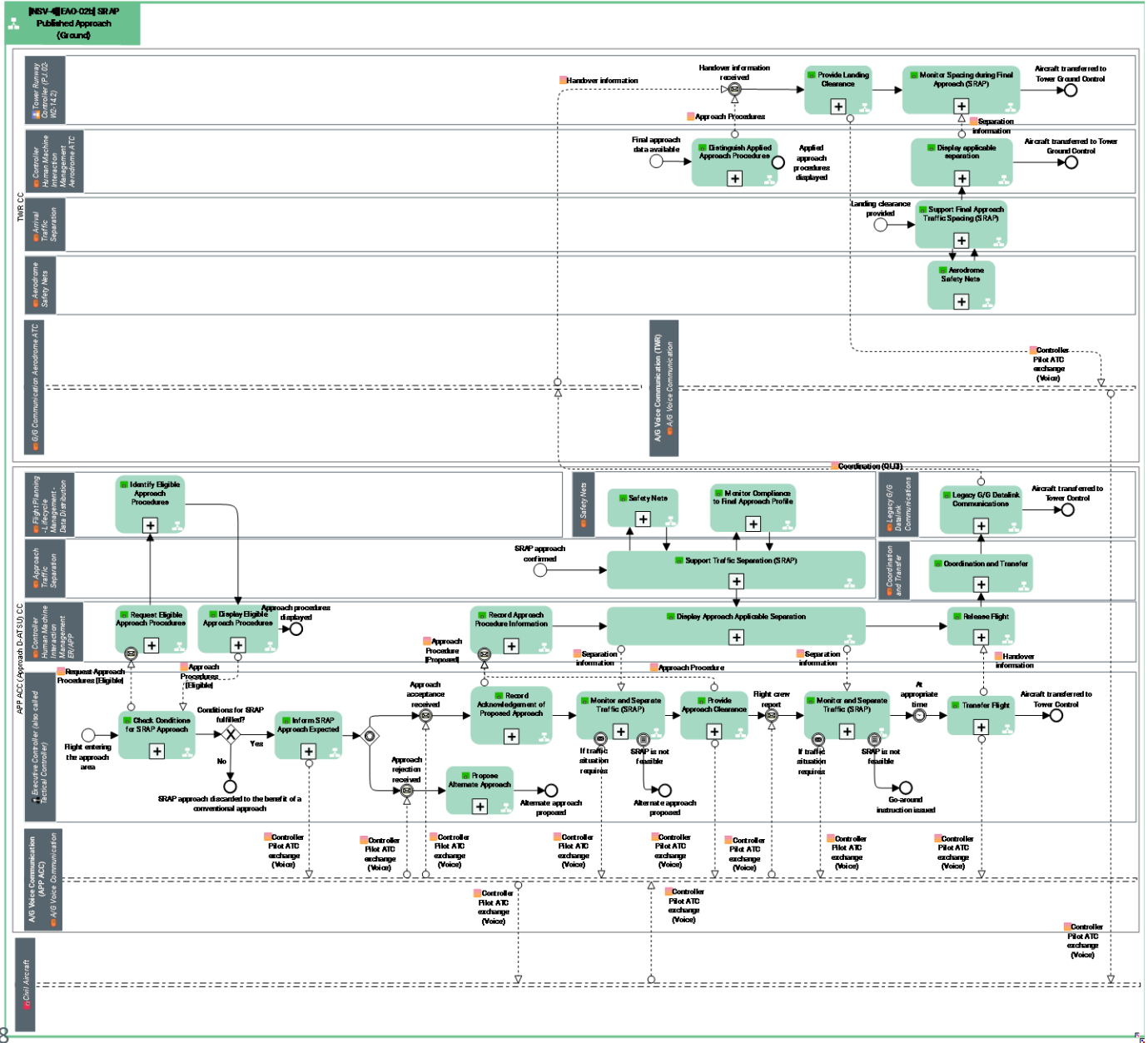
Function	Description
Acknowledge, Prepare and Brief SRAP Approach	Upon proposal of a SRAP procedure by Approach Executive Control, the Flight Deck acknowledges it and immediately initiates the corresponding briefing to prepare the aircraft to fly the IGS-to-SRAP approach procedure, if not anticipated during approach preparation and briefing at the end of cruise.
Approach Procedure Selection	The aircraft system enables the flight crew to select the approach procedure as performed today for any approach.

Assess SRAP Approach Feasibility	The Flight Deck assesses the feasibility of the SRAP proposed by ATC, i.e.: 1. Aircraft equipment that is necessary for this procedure is available, 2. The proposed published procedure is already available on board, 3. The Flight Deck is able to fly such an approach 4. Meteorological conditions do not prevent the execution of such a procedure The feasibility assessment is considered when receiving the expected approach information and then until the final approach is being flown.
Display approach information	Approach information are displayed as for any other approach.
Display visual guidance lighting and runway marking (SRAP/IGS-to-SRAP)	That function corresponds to the ground infrastructure necessary to support pilots when landing on a second threshold. That includes the runway marking, the lighting and the PAPI.
Execute Landing	The Flight Deck flies the visual segment after DH (if any) and safely executes landing on the runway.
Fly Aircraft on Arrival Route	The Flight Deck follows arrival procedure or ATC instructions towards the final approach.
Fly Aircraft on SRAP Approach	The Flight Deck flies and monitors the lateral and vertical approach trajectory until reaching the decision height (DH). If distance/altitude information is provided on the chart, it can be used to perform distance/altitude checks. The Flight Deck continues managing aircraft energy and configuration following SOP to prepare aircraft for landing, while respecting potential ATC speed instructions as long as they are compatible with stabilization criteria. Meanwhile, the Flight Deck contacts Tower Runway Control when instructed to do so in order to receive the landing clearance. When visual contact is established with the runway (at or before DH), the Flight Deck needs to properly identify visual references.
Initiate SRAP Approach	Once the SRAP approach clearance has been received, the Flight Deck manages aircraft navigation as appropriate to capture the final approach lateral and vertical path. The Flight Deck also manages the aircraft energy and configuration

	following SOP, while respecting the procedure altitude and speed constraints, or ATC speed instructions if any. Once the aircraft is established on the final approach lateral and vertical path, the Flight Deck reports to ATC.
Lateral and Vertical Guidance	Flight Control i.e. the control of the aircraft on its lateral and vertical axis (e.g. Autopilot, Flight Director, Head up display)
Lateral Positioning	Elaboration of A/C latitude and longitude based on external means (GNSS, Radio Navigation, TACAN for Mil A/C) or autonomous means (Inertial Reference System).
Prepare and Brief Anticipated Approach	The Flight Deck performs the following sub-tasks: 1. obtain weather and landing information for destination and alternate airports 2. check current aircraft approach and landing capabilities against available airport means and weather conditions 3. insert expected arrival and approach procedures into the flight plan and check them against published charts 4. insert relevant performance parameters for approach 5. insert landing minimum 6. check/edit relevant performance parameters for go-around 7. check/perform tuning of relevant NAVAIDs 8. perform approach briefing If the airport operates an Enhanced Arrival Procedure (EAP) approach, the Flight Deck also briefs the most likely EAP procedure.
Receive GBAS signal	(self-explanatory)
Receive GNSS signal	(self-explanatory)
Receive ILS signal	(self-explanatory)
Reject Proposed Approach	Once the proposed approach has been assessed as "not feasible", the Flight Deck rejects it (possibly providing the reason why).
Vertical Positioning	Elaboration of A/C vertical position (altitude, height) based on external means (GNSS) or autonomous means (Baro-Altitude, Radio-Altitude measurements)

4.1.1.2.2 [NSV-4][EAO-02b] SRAP Published Approach (Ground)

This is the technical Use Case for the SRAP procedure from an ATC point of view.



259

Role	Functional Block	Function
	Aerodrome Safety Nets	Aerodrome Safety Nets;
	Approach Traffic Separation	Support Traffic Separation (SRAP);
	Arrival Traffic Separation	Support Final Approach Traffic Spacing (SRAP);
	Controller Human Machine Interaction Management Aerodrome ATC	Display applicable separation; Distinguish Applied Approach Procedures;
	Controller Human Machine Interaction Management ER/APP	Display Approach Applicable Separation; Display Eligible Approach Procedures; Record Approach Procedure Information; Release Flight; Request Eligible Approach Procedures;
	Coordination and Transfer	Coordination and Transfer;
Executive Controller (also called Tactical Controller)		Check Conditions for SRAP Approach; Inform SRAP Approach Expected; Monitor and Separate Traffic (SRAP); Propose Alternate Approach; Provide Approach Clearance; Record Acknowledgement of Proposed Approach; Transfer Flight;
	Flight Planning - Lifecycle Management - Data Distribution	Identify Eligible Approach Procedures;
	Legacy G/G Datalink Communications	Legacy G/G Datalink Communications;
	Safety Nets	Monitor Compliance to Final Approach Profile;

		Safety Nets;
Tower Runway Controller (PJ.02-W2-14.2)		Monitor Spacing during Final Approach (SRAP); Provide Landing Clearance;

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Function	Description
Aerodrome Safety Nets	This functional block detects potential conflicts between two objects (i.e. aircraft or vehicles), or between an object and a restricted area, by processing the actual traffic situation, and triggers alerts within manoeuvring areas (runway/s and taxiways). It is also extended on final approach and take-off path. The potential safety hazards situations on the airport movement area: runway incursion, intrusion in protected areas, aircraft/aircraft and aircraft/vehicle collisions.
Check Conditions for SRAP Approach	Approach Executive Control determines whether a flight can be given an active SRAP published procedure based on: • aircraft declared navigation capabilities (assuming flight crew ability), • relevance of such a procedure for this flight in current traffic context (density, spacing management, etc.)
Coordination and Transfer	The Coordination & Transfer functional block comprises the management of coordination and transfer of flights between "internal" sectors and with external ATSUs, civil/military coordination, pre-departure clearance coordination, and the processing of oceanic clearances. The type of connection with the coordination partner (e.g. internal sector, OLDI ATSU, Flight Object ATSU) is largely transparent to the Coordination and Transfer functional block as the coordination and transfer process is common to all. C&T addresses the following aspects: • Identification of the sectors/units that are interested in the flight (i.e. that will either control the flight or for which part or all of the flight needs to be coordinated or informed) based on the airspace intersections, as provided by TP&M, together with other data such as flight category (GAT/OAT), rules (IFV/VFR), ADEP/ADES, distance flown in the sector, etc • Synchronization of the transfer of frequency with ACM when needed

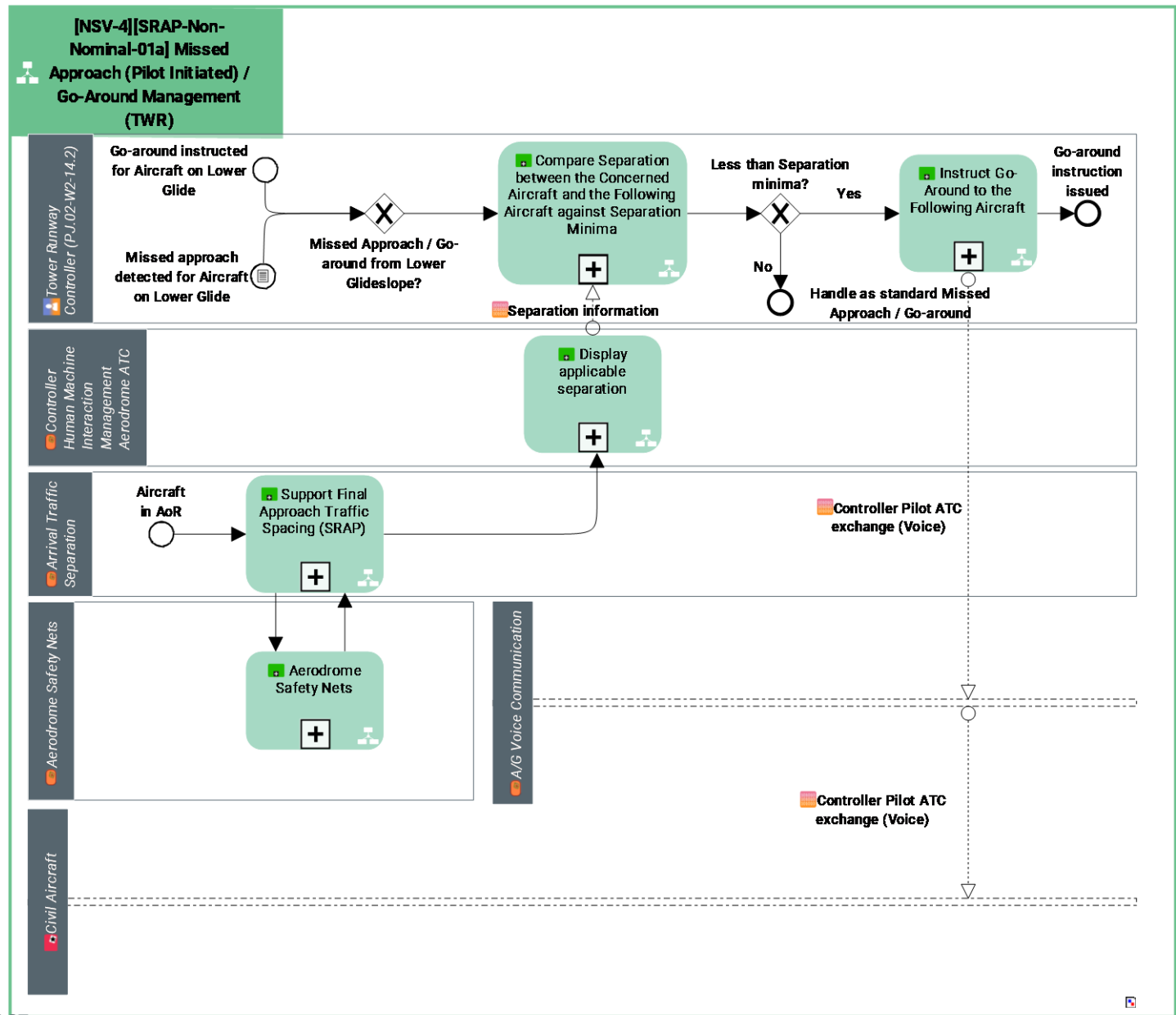
	• Synchronisation of the SSR code with the upstream centre (in conjunction with GGDC) • Identification of LOAs to be used • Check that coordinated entry/exit conditions are achievable (e.g. from planned trajectory) and generate consequent warnings • Identification of the executive data at the transfer time (i.e. CFL, Assigned ROC, Assigned Heading?)
Display applicable separation	That function displays the separation delivery indicators linked to each pair of aircraft to help the controller respect the necessary separations between aircraft and optimize the distance between 2 aircraft.
Display Approach Applicable Separation	That function displays the separation delivery indicators linked to each pair of aircraft to help the controller respect the necessary separations between aircraft and optimize the distance between 2 aircraft.
Display Eligible Approach Procedures	That function displays to Executive Controller, on his/her request, the list of active published procedures an aircraft can fly, according to its known capabilities (from flight plan).
Distinguish Applied Approach Procedures	That function displays, on Runway Tower Controller interface, the list of arriving aircraft in such a way that the controller can easily identify which procedure an aircraft is flying. According to the case, that enables the controller to discriminate aircraft going to one threshold or the other (for SRAP and IGS-to-SRAP), flying one slope or the other (IGS, A-IGS), going to one runway or the other (CSPR-ST).
Identify Eligible Approach Procedures	That function calculates the list of active procedures an aircraft can fly, according to its known capabilities (from flight plan).
Inform SRAP Approach Expected	Approach Executive Control initiates the SRAP procedure informing the Flight Deck of the expected enhanced arrival approach.
Legacy G/G Datalink Communications	The Legacy Ground-Ground Datalink Communications functional block provides the functionality processing to exchange flight and environment data with the CFMU (IFPS and ETFMS), aircraft operators, other civil and military ATS Units, Air Defence units and Aerodrome system (Departure Management). The functional block translates data between internal interfaces and the standard protocols in use with the external systems (e.g. ICAO, ADEXP, OLDI).
Monitor and Separate Traffic (SRAP)	Approach Executive Control sequences and merges the arrival traffic while respecting all separation and spacing criteria for SRAP procedure using speed and vectoring (altitude and heading)

	instructions whenever needed.
Monitor Compliance to Final Approach Profile	This Function monitors compliance to the final approach profile, i.e. interception of the right glide path and adherence to the correct glide path.
Monitor Spacing during Final Approach (SRAP)	Tower Runway Control monitors the final approach, especially: - the spacing with aircraft ahead, and - the adherence to the final approach altitude scheme. A go-around procedure may be initiated if the conditions for a safe landing are not fulfilled. Once the aircraft has landed and vacated the runway, Tower Runway Control transfers the flight to Tower Ground Control.
Propose Alternate Approach	After the Flight Deck has rejected the proposed active EAP, Approach Executive Control takes this refusal into account and clears the arrival flight for another active approach.
Provide Approach Clearance	Approach Executive Control issues, at the appropriate time, and records the approach clearance corresponding to the published chart.
Provide Landing Clearance	At the appropriate time, the tower controller provides the landing clearance as well as the wind information while ensuring that the runway is clear of traffic.
Record Acknowledgement of Proposed Approach	Once the Flight Deck has accepted the proposed approach, Approach Executive Control records the corresponding arrival approach for this particular flight.
Record Approach Procedure Information	This function allows the controller to input and record approach procedure information.
Release Flight	This function allows the controller to trigger the procedure to release the flight and transfer it to another ATS unit.
Request Eligible Approach Procedures	That function allows the Executive Controller to request to the system the list of active procedures an aircraft can fly.
Safety Nets	The Safety Nets functional block alerts the ATC controllers in case of short-term danger for an aircraft to infringe separation criteria with other aircraft or danger areas or in case the aircraft deviates from the nominal approach path. The safety nets functional block encompass the following sub-functions: Short Term Conflict Alert (STCA) detecting and alerting in

	case of infringement of separation minima between aircraft. • Minimum Safe Altitude Warning (MSAW) detecting and alerting in case of infringement the minimum safe altitude from the ground or from an obstacle. • Airspace Proximity Warning (APW) detecting and alerting in case an aircraft is going to infringe restricted airspace. • Approach Path Monitoring (APM) detecting and alerting in case an aircraft deviates from the glide path.
Support Final Approach Traffic Spacing (SRAP)	This function will support the controller in the delivery of the separation (on final approach) to apply between each pair of aircraft (one of them following a SRAP procedure).
Support Traffic Separation (SRAP)	This function will support the controller in the visualization of the separation to apply between each pair of aircraft (one of them following a SRAP procedure).
Transfer Flight	At the appropriate time, Approach Executive Control: 1. hands over and transfers the control of the flight to Tower Runway Control, mentioning the followed published approach chart, and 2. instructs the Flight Deck to contact Tower Runway Control.

4.1.1.2.3 [NSV-4][SRAP-Non-Nominal-01a] Missed Approach (Pilot Initiated) / Go-Around Management (TWR)

This is a technical realisation of a non-nominal Use Case for missed approach or go-around management during SRAP approach.



Role	Functional Block	Function
	Aerodrome Safety Nets	Aerodrome Safety Nets;
	Arrival Traffic Separation	Support Final Approach Traffic

		Spacing (SRAP);
	Controller Human Machine Interaction Management Aerodrome ATC	Display applicable separation;
Tower Runway Controller (PJ.02-W2-14.2)		Compare Separation between the Concerned Aircraft and the Following Aircraft against Separation Minima; Instruct Go-Around to the Following Aircraft

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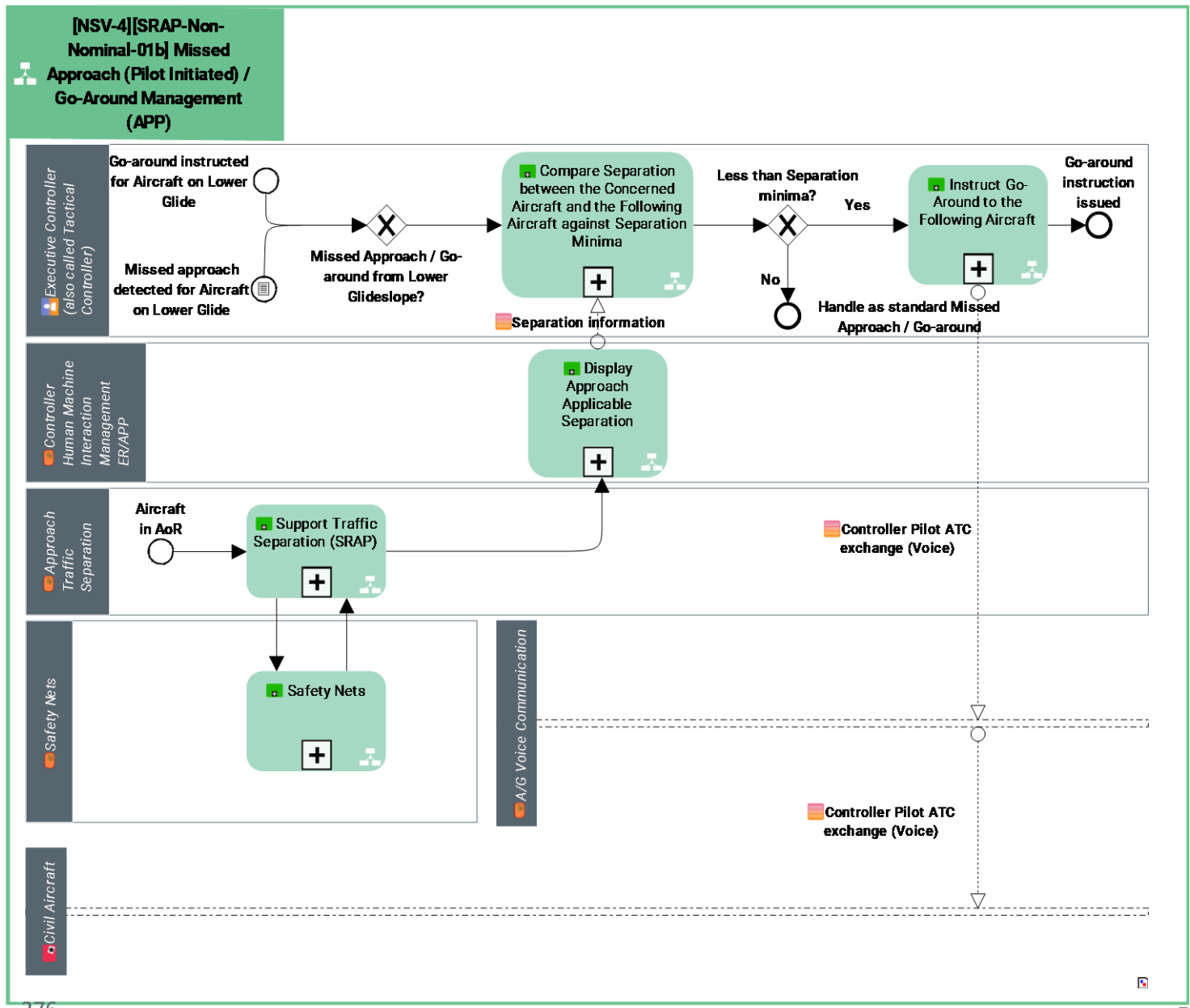
Function	Description
Aerodrome Safety Nets	This functional block detects and triggers alerts within manoeuvring areas (runway/s and taxiways) potential conflicts between two objects (i.e. aircraft or vehicles), or between an object and a restricted area, by processing the actual traffic situation. It is also extended on final approach and take-off path. The potential safety hazards situations on the airport movement area: runway incursion, intrusion in protected areas, aircraft/aircraft and aircraft/vehicle collisions.
Compare Separation between the Concerned Aircraft and the Following Aircraft against Separation Minima	Executive controller or tower runway controller compares the separation between the aircraft going around and the following one against the separation minima to be applied at the airport.
Display applicable separation	That function displays the separation delivery indicators linked to each pair of aircraft to help the controller respect the necessary separations between aircraft and optimize the distance between 2 aircraft.
Instruct Go-Around to the Following Aircraft	Executive controller or tower runway controller instructs a go-around to the aircraft following the one already going-around.
Support Final Approach Traffic Spacing (SRAP)	This function will support the controller in the delivery of the separation (on final approach) to apply between each pair of aircraft (one of them following a SRAP procedure).

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271

272 4.1.1.2.4 [NSV-4][SRAP-Non-Nominal-01b] Missed Approach (Pilot Initiated) / Go-Around 273 Management (APP)

274 This is a technical realisation of a non-nominal Use Case for missed approach or go-around
275 management during SRAP approach.



Role	Functional Block	Function
	Approach Traffic Separation	Support Traffic Separation (SRAP);
	Controller Human Machine Interaction Management	Display Approach Applicable Separation;

	ER/APP	
Executive Controller (also called Tactical Controller)		Compare Separation between the Concerned Aircraft and the Following Aircraft against Separation Minima; Instruct Go-Around to the Following Aircraft;
	Safety Nets	Safety Nets;

278

Function	Description
Compare Separation between the Concerned Aircraft and the Following Aircraft against Separation Minima	Executive controller or tower runway controller compares the separation between the aircraft going around and the following one against the separation minima to be applied at the airport.
Display Approach Applicable Separation	That function displays the separation delivery indicators linked to each pair of aircraft to help the controller respect the necessary separations between aircraft and optimize the distance between 2 aircraft.
Instruct Go-Around to the Following Aircraft	Executive controller or tower runway controller instructs a go-around to the aircraft following the one already going-around.
Safety Nets	The Safety Nets functional block alerts the ATC controllers in case of short-term danger for an aircraft to infringe separation criteria with other aircraft or danger areas or in case the aircraft deviates from the nominal approach path. The safety nets functional block encompass the following sub-functions: • Short Term Conflict Alert (STCA) detecting and alerting in case of infringement of separation minima between aircraft. • Minimum Safe Altitude Warning (MSAW) detecting and alerting in case of infringement the minimum safe altitude form the ground or from an obstacle. • Airspace Proximity Warning (APW) detecting and alerting in case an aircraft is going to infringe restricted airspace. • Approach Path Monitoring (APM) detecting and alerting in case an aircraft deviates from the glide path.
Support Traffic Separation (SRAP)	This function will support the controller in the visualization of the separation to apply between each pair of aircraft (one of them following a SRAP procedure).

279

280 **4.1.1.2.5 [NSV-4][SRAP-Non-Nominal-02] Procedure for Glide Alert Management**

281 This is a technical realisation of a non-nominal Use Case for glide alert management during SRAP
282 approach.



Role	Functional Block	Function
	Approach Traffic Separation	Support Traffic Separation (SRAP);
	Controller Human Machine Interaction Management ER/APP	Display Approach Applicable Separation; Record Approach Procedure Information;
Executive Controller (also called Tactical Controller)		Ask Flight Crew to Confirm Intended Approach Procedure; Instruct Go-around; Monitor and Separate Traffic (SRAP); Update Recorded Approach Procedure
	Safety Nets	Monitor Compliance to Final Approach Profile

284

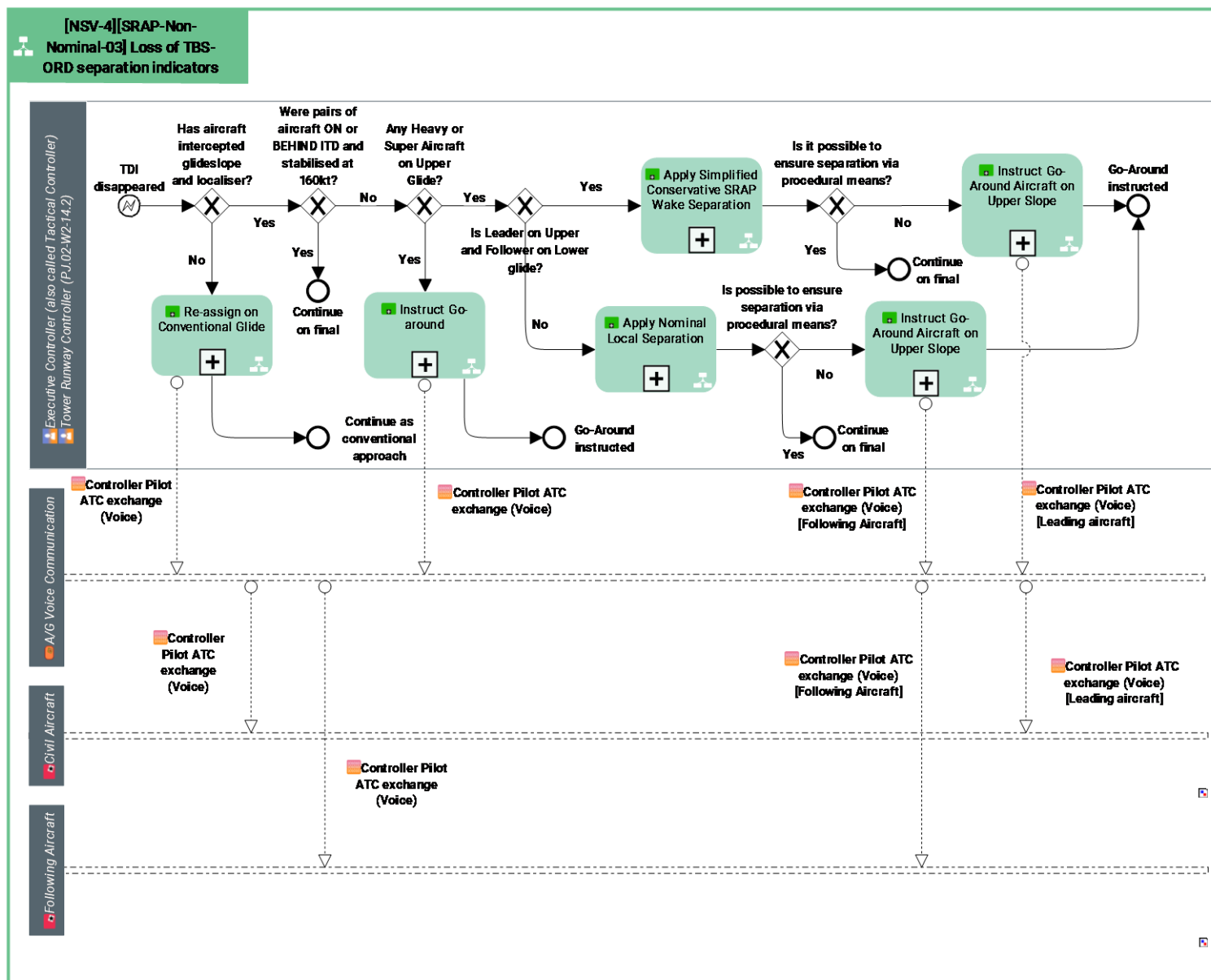
Function	Description
Ask Flight Crew to Confirm Intended Approach Procedure	ATC executive controller asks flight crew to confirm they are flying the intended approach procedure.
Display Approach Applicable Separation	That function displays the separation delivery indicators linked to each pair of aircraft to help the controller respect the necessary separations between aircraft and optimize the distance between 2 aircraft.
Instruct Go-around	Executive controller or Tower Runway Controller instructs a go-around to the aircraft that triggered the glide alert or to any heavy aircraft flying on the upper glide (SRAP one).
Monitor and Separate Traffic (SRAP)	Approach Executive Control sequences and merges the arrival traffic while respecting all separation and spacing criteria for SRAP procedure using speed and vectoring (altitude and heading) instructions whenever needed.
Monitor Compliance to Final Approach Profile	This Function monitors compliance to final approach profile, i.e. interception of the right glide path and adherence to the correct glide path.
Record Approach Procedure Information	This function enables the controller to input and record the approach procedure information.
Support Traffic Separation (SRAP)	This function will support the controller in the visualization of the separation to apply between each pair of aircraft (one of them

	following a SRAP procedure).
Update Recorded Approach Procedure	This function allows the controller to update the approach procedure information that had been recorded and to record the new one.

285

286 **4.1.1.2.6 [NSV-4][SRAP-Non-Nominal-03] Loss of TBS-ORD separation indicators**

287 This is a technical realisation of a non-nominal Use Case for the loss of TBS/ORD separation indicators
 288 during SRAP approach.



Role	Functional Block	Function
Executive Controller (also called Tactical Controller) Tower Runway Controller (PJ.02-W2-14.2)		Apply Nominal Local Separation; Apply Simplified Conservative SRAP Wake Separation; Instruct Go-around; Instruct Go-Around Aircraft on Upper Slope; Instruct Go-Around Aircraft on Upper Slope; Re-assign on Conventional Glide;

290

Function	Description
Apply Nominal Local Separation	Executive controller or Tower Runway controller applies the nominal wake separations in use at the airport.
Apply Simplified Conservative SRAP Wake Separation	Executive controller or Tower Runway controller applies the additional simplified mixed slope pairs table in use at the airport.
Instruct Go-around	Executive controller or Tower Runway Controller instructs a go-around to the aircraft that triggered the glide alert or to any heavy aircraft flying on the upper glide (SRAP one).
Instruct Go-Around Aircraft on Upper Slope	When necessary, separation cannot be ensured, Executive controller or Tower Runway Controller instructs a go-around to the aircraft flying on the upper glide (SRAP one).
Re-assign on Conventional Glide	When separation indicators disappear, Executive controller reassigns to the conventional glide, all aircraft expected to fly a SRAP procedure or already cleared to it, that have not yet intercepted the glide.

291

292 4.1.2 Resource Composition

293 N/A

294

4.1.3 Service view

4.1.3.1 Service description

Service	Service description
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4.1.3.2 Service Provisioning

Interaction	Consumer CC	Consumer System	Provider CC	Provider System
Error correction and Integrity Civil Aircraft CC and Navigation Infrastructure Ground Based_CC	Civil Aircraft	Aircraft;	Navigation Infrastructure Ground Based	GBAS Ground station;
Landing horizontal guidance Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Ground Based_CC	Civil Aircraft	Aircraft;	Navigation Infrastructure Ground Based	ILS;
Landing vertical guidance Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Ground Based_CC	Civil Aircraft	Aircraft;	Navigation Infrastructure Ground Based	ILS;
Position error correction Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Satellite Based_CC	Civil Aircraft	Aircraft;	Navigation Infrastructure Satellite Based	SBAS;
Coordination (OLDI).TWR_CC and APP ACC (Approach D-ATSU)_CC	TWR	Aerodrome ATC;	APP ACC (Approach D-ATSU)	En-Route / Approach ATC;
Controller Pilot ATC exchange (Voice).Following Aircraft_CC and TWR_CC	Following Aircraft	Aircraft;	TWR	Voice;

Interaction	Consumer CC	Consumer System	Provider CC	Provider System
Controller Pilot ATC exchange (Voice).Civil Aircraft (PJ.02-02)_CC and TWR_CC	Civil Aircraft	Aircraft;	TWR	Voice;
Controller Pilot ATC exchange (Voice).Civil Aircraft (PJ.02-02)_CC and APP ACC (Approach D-ATSU)_CC	Civil Aircraft	Aircraft;	APP ACC (Approach D-ATSU)	Voice;
GNSS signal (Position and Time synchronisation).Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Satellite Based_CC	Civil Aircraft	Aircraft;	Navigation Infrastructure Satellite Based	GPS (External); GALILEO (External); GLONASS (External); BEIDOU (External);
Landing guidance (FAS, TAP).Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Ground Based_CC	Civil Aircraft	Aircraft;	Navigation Infrastructure Ground Based	GBAS Ground station;

300

301 **4.1.3.3 Service Realization**302 **4.1.3.3.1 Interaction Controller Pilot ATC exchange (Voice).Civil Aircraft (PJ.02-02)_CC and**
303 **APP ACC (Approach D-ATSU)_CC**304 **System Port:** ATC_VOICE_MFC_GND at APP ACC_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

305

306 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG

ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

307

308 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

309

310 **System Port:** ATC_VOICE_MFC_GND at APP ACC_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

311

312 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	

	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

313

314 **System Port:** ATC_VOICE_MFC_GND at APP ACC_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

315

316 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

317 **System Port:** ATC_VOICE_MFC_GND at APP ACC_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

318

319 **System Port:** ATC_VOICE at Civil Aircraft_CC

Protocol Stack	Protocol
ATC Voice air	
	VHF - AM 25kHz/8.33kHz

	HF - AM 25kHz
--	---------------

320

321 **System Port:** VOICE_RADIO_AIR at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice air	
	VHF - AM 25kHz/8.33kHz
	HF - AM 25kHz

322

323 4.1.3.3.2 Interaction Controller Pilot ATC exchange (Voice).Civil Aircraft (PJ.02-02)_CC and

324 TWR_CC

325 **System Port:** ATC_VOICE_MFC_GND at TWR_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

326

327 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

328

329 **System Port:** ATC_VOICE_MFC_GND at TWR_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

330

331 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

332

333 **System Port:** ATC_VOICE_MFC_GND at TWR_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

334

335 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

336

337 **System Port:** ATC_VOICE_MFC_GND at TWR_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

System Port: VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

System Port: ATC_VOICE at Civil Aircraft_CC

Protocol Stack	Protocol
ATC Voice air	
	VHF - AM 25kHz/8.33kHz
	HF - AM 25kHz

System Port: VOICE_RADIO_AIR at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice air	
	VHF - AM 25kHz/8.33kHz
	HF - AM 25kHz

4.1.3.3.3 Interaction Controller Pilot ATC exchange (Voice).Following Aircraft_CC and TWR_CC

System Port: ATC_VOICE_MFC_GND at TWR_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	

	ATS MFC R2
--	------------

348

349 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

350

351 **System Port:** ATC_VOICE_MFC_GND at TWR_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

352

353 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP

OPC (Operational) Voice ground	
--------------------------------	--

354

355 **System Port:** ATC_VOICE_MFC_GND at TWR_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

356

357 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP
	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

358

359 **System Port:** ATC_VOICE_MFC_GND at TWR_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2

360

361 **System Port:** VOICE_RADIO_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice (MFC) ground	
	ATS MFC R2
ATC Voice (QSIG) ground	
	ATS QSIG
ATC Voice (VoIP, control) ground	
	SIP

	TCP
	IP
ATC Voice (VoIP, media) ground	
	RTP
	UDP
	IP
OPC (Operational) Voice ground	

362

363 **System Port:** VOICE_RADIO_AIR at Communication Infrastructure_CC

Protocol Stack	Protocol
ATC Voice air	
	VHF - AM 25kHz/8.33kHz
	HF - AM 25kHz
OPC (Operational) Voice air	
	VHF
	HF (selcal)

364

365 **System Port:** ATC_VOICE at Civil Aircraft_CC

Protocol Stack	Protocol
ATC Voice air	
	VHF - AM 25kHz/8.33kHz
	HF - AM 25kHz

366

367 **4.1.3.3.4 Interaction Coordination (OLDI).TWR_CC and APP ACC (Approach D-ATSU)_CC**368 **System Port:** IP_GND at Communication Infrastructure (PJ.02-02)_CC

Protocol Stack	Protocol
IP	

369

370 **System Port:** ATS_COORD_GND at APP ACC (PJ.02-02)_CC

Protocol Stack	Protocol
FMTP ground	
	FMTP
	TCP
	IP

371

372 **System Port:** ATS_COORD_GND at TWR (PJ.02-02)_CC

Protocol Stack	Protocol
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FMTF ground	
	FMTF
	TCP
	IP

373
374 **System Port:** IP_GND at Communication Infrastructure (PJ.02-02)_CC

Protocol Stack	Protocol
IP	

375
376 **4.1.3.3.5 Interaction Error correction and Integrity Civil Aircraft_CC and Navigation**
377 **Infrastructure Ground Based_CC**

378 **System Port:** NAV_GBAS_AIR at Navigation Infrastructure Ground Based_CC

Protocol Stack	Protocol
GBAS	
	VDB Link VHF 108 - 117.95 MHz

379
380 **System Port:** GBAS_VDB at Civil Aircraft_CC

Protocol Stack	Protocol
GBAS	
	VDB Link VHF 108 - 117.95 MHz

381
382 **4.1.3.3.6 Interaction GNSS signal (Position and Time synchronisation).Civil Aircraft (PJ.02-**
383 **02)_CC and Navigation Infrastructure Satellite Based_CC**
384 **System Port:** SAT_GNSS at Civil Aircraft_CC

Protocol Stack	Protocol
GNSS GPS	
	L1 1575.42MHz
	L2 1227.6 MHz
	L5 1176.45 MHz

385
386 **System Port:** NAV_SAT_GNSS at Navigation Infrastructure Satellite Based_CC

Protocol Stack	Protocol
GNSS BEIDOU	
	B1 1561.098 MHz
	B2 1207.147 MHz
	B3 1268.52 MHz

GNSS GALILEO	
	E1 1575.42 MHz
	E5a 1176.45 MHz
	E5b 1207.14 MHz
	E6 1278.75 MHz
GNSS GLONASS	
	L1 1598.0625 - 1605.375 MHz
	L2 1242.9375 - 1248.625 MHz
	L3 1201 MHz
GNSS GPS	
	L1 1575.42MHz
	L2 1227.6 MHz
	L5 1176.45 MHz
SBAS EGNOS	
	L1 1572.42MHz

387

388 4.1.3.3.7 Interaction Landing guidance (FAS, TAP).Civil Aircraft (PJ.02-02)_CC and

389 Navigation Infrastructure Ground Based_CC

390 **System Port:** NAV_GBAS_AIR at Navigation Infrastructure Ground Based_CC

Protocol Stack	Protocol
GBAS	
	VDB Link VHF 108 - 117.95 MHz

391

392 **System Port:** GBAS_VDB at Civil Aircraft_CC

Protocol Stack	Protocol
GBAS	
	VDB Link VHF 108 - 117.95 MHz

393

394 4.1.3.3.8 Interaction Landing horizontal guidance Civil Aircraft (PJ.02-02)_CC and

395 Navigation Infrastructure Ground Based_CC

396 **System Port:** NAV_ILS_LOC_AIR at Navigation Infrastructure Ground Based_CC

Protocol Stack	Protocol
ILS Localiser air	
	UHF 108 - 112 MHz

397

398 **System Port:** ILS_LOC at Civil Aircraft_CC

Protocol Stack	Protocol
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ILS Localiser air	
	UHF 108 - 112 MHz

399

4.1.3.3.9 Interaction Landing vertical guidance Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Ground Based_CC

System Port: ILS_GP at Civil Aircraft_CC

Protocol Stack	Protocol
ILS Glideslope air	
	UHF 328.6 - 335.4 MHz

403

System Port: NAV_ILS_GP_AIR at Navigation Infrastructure Ground Based_CC

Protocol Stack	Protocol
ILS Glideslope air	
	UHF 328.6 - 335.4 MHz

405

4.1.3.3.10 Interaction Position error correction Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Satellite Based_CC

System Port: SAT_EGNOS at Civil Aircraft_CC

Protocol Stack	Protocol
SBAS EGNOS	
	L1 1572.42MHz

409

System Port: NAV_SAT_GNSS at Navigation Infrastructure Satellite Based_CC

Protocol Stack	Protocol
GNSS BEIDOU	
	B1 1561.098 MHz
	B2 1207.147 MHz
	B3 1268.52 MHz
GNSS GALILEO	
	E1 1575.42 MHz
	E5a 1176.45 MHz
	E5b 1207.14 MHz
	E6 1278.75 MHz
GNSS GLONASS	
	L1 1598.0625 - 1605.375 MHz
	L2 1242.9375 - 1248.625 MHz
	L3 1201 MHz

GNSS GPS	
	L1 1575.42MHz
	L2 1227.6 MHz
	L5 1176.45 MHz
SBAS EGNOS	
	L1 1572.42MHz

411

412

4.2 Functional and non-Functional Requirements

4.2.1 Requirements for ground

4.2.1.1 Controller separation assistance tool

The following requirements refer to the controller separation assistance tool. These requirements are common with H2020 W1 PJ02-01 requirements relating to that support tool.

[REQ]

Identifier	REQ-12.02.02-TS-INT1.0040
Title	Runway Intent
Requirement	Each aircraft's runway intent shall be provided by the Flight Data Processing
Status	<validated>
Rationale	Aircraft live FPL data in appropriate category is necessary for display on the HMI
Category	

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

[REQ]

Identifier	REQ-12.02.02-TS-INT1.0030
Title	Flight data
Requirement	The Flight Data Processing shall provide - a unique identifier - aircraft type - wake category to each arrival aircraft that is correlated in the traffic
Status	<validated>
Rationale	Aircraft live FPL data in appropriate category is necessary for display on the HMI
Category	

424 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

425

426 [REQ]

Identifier	REQ-12.02.02-TS-INT1.0020
Title	Traffic data
Requirement	The surveillance system shall provide - a unique identifier - a position value - altitude information - ground speed to each arrival aircraft that is correlated in the traffic
Status	<validated>
Rationale	Aircraft live track data in appropriate category is necessary for display on the HMI
Category	

427

428 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

429

430 [REQ]

Identifier	REQ-12.02.02-TS-INT1.0013
Title	Forecast runway surface wind
Requirement	The MET data provider shall send the forecast runway surface wind heading and wind speed to the separation delivery tool
Status	<in progress>
Rationale	MET forecast data are necessary for separation provision

Category	<Interoperability>
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431

432 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

433

434 [REQ]

Identifier	REQ-12.02.02-TS-INT1.0012
Title	Runway surface wind
Requirement	The MET data provider shall send the current runway surface wind heading and wind speed to the separation delivery tool
Status	<validated>
Rationale	MET current data are necessary for separation provision
Category	

435

436 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

437

438 [REQ]

Identifier	REQ-12.02.02-TS-INT1.0011
Title	Input wind format for prediction
Requirement	The system supporting the separation delivery tool should receive the following wind data - forecast heading - forecast speed from the MET data provider
Status	<in progress>

Rationale	MET data are necessary for separation provision
Category	<Interoperability>

439

440 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

441

442 [REQ]

Identifier	REQ-12.02.02-TS-INT1.0010
Title	Input Wind format for separation
Requirement	The separation delivery tool shall receive at each online update the following wind data for each Runway and for each predefined altitude layer - current heading to apply - current speed to apply from the MET data provider
Status	<validated>
Rationale	heading and speed are needed to be provided to the separation delivery tool
Category	

443

444 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

445

446 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0170
Title	System failure

Requirement	The separation delivery tool shall send to the HMI an error message in case of system failure
Status	<in progress>
Rationale	Controllers need to be aware of any system failure
Category	<Safety>

447

448 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

449

450 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0160
Title	Sequence alert
Requirement	The separation delivery tool shall send a sequence alert to the HMI when the order of arrival in the arrival sequence list differs from the order of aircraft position on the extended runway centerline starting from the Runway threshold
Status	<validated>
Rationale	Sequence order on the final approach need to be correct for safety
Category	<Safety>

451

452 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

453

454 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0150
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Title	Catch-up alert
Requirement	The Separation delivery tool may send a catch-up alert to the HMI when a follower aircraft is expecting to reach the ITD in less than T seconds, T being an offline defined parameter.
Status	<validated>
Rationale	Controller may need to be aware of any potential separation infringement in the near future
Category	

455

456 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1107

457

458 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0140
Title	Speed conformance alert
Requirement	The Separation Delivery Tool shall send to CWP HMI a speed conformance alert when an aircraft's ground speed exceeds its offline defined air speed - corrected by the wind value - by a predefined offline tolerance value
Status	<validated>
Rationale	Controller needs to aware of any inconsistency between offline data and real data
Category	

459

460 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

461

462 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0132
------------	---------------------------

Title	TDIs display on the centerline 3
Requirement	If - the Leader aircraft is eligible for TDIs display - the Leader aircraft is not established on the centerline - the Leader aircraft's projected position on the centerline is in front of its targeted ITD Then its TDIs shall be displayed on the extended centerline at the correct distance behind the position of the leader's ITD on the extended centerline
Status	<validated>
Rationale	Controllers need an aiming point on the extended centreline
Category	

463

464 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

465

466 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0130
Title	TDIs display on the centerline 1
Requirement	TDIs shall be displayed on the extended centerline at the correct distance (FTD and ITD) behind the Leader.
Status	<validated>
Rationale	Controllers need an aiming point on the extended centreline
Category	<Functional>

467

468 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

469

470 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0131
Title	TDIs display on the centerline 2
Requirement	If - the Leader aircraft is eligible for TDIs display - the Leader aircraft is not established on the centerline - the Leader aircraft's projected position on the centerline is behind its targeted ITD Then its TDIs shall be displayed on the extended centerline at the correct distance behind the projected position of the Leader on the extended centerline
Status	<validated>
Rationale	Controllers need an aiming point on the extended centreline
Category	

471

472 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

473

474 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0121
Title	Wake separation Definition for TBS mode
Requirement	In any TBS and WDS mode – ICAO, RECAT-EU or S-PWS - the wake constraint shall match the time to fly defined in the separation table
Status	<validated>
Rationale	Offline data and displayed data need to be consistent in time and in distance
Category	

475

476 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2

<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

477

478 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0120
Title	Wake separation Definition for DBS mode
Requirement	In any DBS mode – ICAO, RECAT-EU or S-PWS - the wake constraint shall match the distance to fly defined in the separation table
Status	<validated>
Rationale	Offline data and displayed data need to be consistent in time and in distance
Category	<Functional>

479

480 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

481

482 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0110
Title	ITD greater than FTD
Requirement	For a pair of (Leader;Follower) aircraft, if the initially computed ITD value is smaller than the FTD, the ITD shall automatically take the same value as the FTD
Status	<validated>
Rationale	FTD is the minimum applicable separation between 2 consecutive aircraft
Category	

483

484 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

485

486 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0103
Title	Sequence arrival
Requirement	One arrival sequence per runway shall be provided to the Separation delivery tool
Status	<validated>
Rationale	Each runway needs one and only one sequence as input
Category	

487

488 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

489

490 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0102
Title	Sequence change
Requirement	For each pair of consecutive arriving aircraft,(Leader ; Follower), if either the Leader or the Follower changes, TDIs shall be recomputed at the next update
Status	<validated>
Rationale	TDIs must be updated upon any input change
Category	

491

492 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

493

494 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0100
Title	Required data for FTD update in TBS mode
Requirement	For a pair of consecutive arriving aircraft (Leader;Follower), the system shall update the FTD upon any online change among the following data - Glide slope wind data (strength and direction) - Wake separation value to apply - Leader's ROT - Follower's Speed Profile - MRS value - Any potential Gap request behind the leader - Leader's position
Status	<validated>
Rationale	TDIs must be updated upon any input change
Category	

495

496 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1206

497

498 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0101
Title	Required data for ITD update in TBS mode
Requirement	For a pair of consecutive arriving aircraft (Leader;Follower), the system shall update the ITD upon any online change among the following data - Glide slope wind data (strength and direction) - Wake separation value to apply - Leader's ROT

	- Leader's True Air Speed profile on the glideslope - Follower's True Air Speed Profile on the glideslope - MRS value - Any potential Gap request behind the leader - FTD position
Status	<validated>
Rationale	TDIs must be updated upon any input change
Category	<Functional>

499

500 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

501

502 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0091
Title	Required data for ITD computation in TBS mode
Requirement	For a pair of consecutive arriving aircraft (Leader;Follower), the system shall compute the ITD based on the following data - Glide slope wind data (strength and direction) - FTD position - Follower's Air Speed Profile - Leader's Air Speed profile
Status	<validated>
Rationale	ITD needs wind and speed information on top of FTD data
Category	

503

504 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

505

506 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0090
Title	Required data for FTD computation in TBS mode
Requirement	For a pair of consecutive arriving aircraft (Leader;Follower), the system shall compute the FTD based on the following data - Glide slope wind data (strength and direction) - Wake separation value to apply (in time or distance depending on the chosen mode) - Leader's ROT - Follower's Air Speed Profile - MRS value - Any potential Gap request behind the leader
Status	<validated>
Rationale	FTD computation needs all applicable constraints
Category	

507

508 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

509

510 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0070
Title	FTD computation with constraints
Requirement	For each pair of arriving aircraft, in case one set of TDIs is computed by the system, the FTD shall take the value of of the greatest separation constraints among ROT, Gap request, MRS, Wake separation and any other offline defined specific separation involving one of the aircraft in the pair
Status	<validated>
Rationale	FTD represents the most constraining separation to respect between 2 consecutive aircraft
Category	

511

512 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

513

514 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0071
Title	Second FTD computation with constraints
Requirement	For each pair of arriving aircraft, in case a second set of TDIs is computed by the system (infringement of Gap or ROT ITD), the FTD of the second set shall take the value of of the greatest separation constraints among MRS and Wake separation.
Status	<validated>
Rationale	Safety critical separation need to be displayed even if not the most constraining separation
Category	

515

516 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

517

518 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0080
Title	Arrival Sequence
Requirement	The system shall be provided with the online current arrival sequence, updated at least at each change in the sequence among the following - Aircraft removed from the sequence - Aircraft added in the sequence - Change of index of an Aircraft in the sequence - Runway Intent for each aircraft in the sequence
Status	<validated>

Rationale	Any update in the sequence needs to be sent to the separation delivery tool
Category	<Functional> , <Interoperability>

519

520 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

521

522 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0061
Title	Traffic data
Requirement	The System shall be provided with the following online data for each aircraft, updated at each system timestamp - position - altitude - time of the system- current ground speed
Status	<validated>
Rationale	Aircraft live track data in appropriate category is necessary for display on the HMI
Category	<Interoperability> , <Data>

523

524 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

525

526 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0060
Title	Aircraft Data

Requirement	The Separation delivery tool shall be provided with the following online data for each aircraft in the traffic - ICAO Aircraft Type - Wake Turbulence Category - True air speed profile on the final glide slope - Runway Occupancy Time - Runway Intent
Status	<validated>
Rationale	Aircraft offline data in appropriate category is necessary for display on the HMI
Category	<Data> , <Interoperability>

527

528 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

529

530 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0050
Title	TDIs display
Requirement	The CWP HMI shall be able to display the TDIs sent by the system
Status	<validated>
Rationale	Controllers need to visualize separations to apply
Category	

531

532 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

533

534 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0040
Title	TDIs transmission in all modes
Requirement	The system shall send to CWP HMI the TDIs values for each pair of arriving aircraft in the sequence for one selected mode among the following TBS WDS S-PWS
Status	<validated>
Rationale	Controllers need to visualize separations to apply
Category	

535

536 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

537

538 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0030
Title	Buffer for uncertainties on wind and speed profile
Requirement	The system shall be provided with offline defined "buffer" separation values - in distance for DBS mode and in time for TBS mode - representing combined impact of the uncertainties for aircraft air speed profile and glideslope wind values
Status	<validated>
Rationale	Uncertainties need to be taken into account for safety matters
Category	

539

540 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

541

542 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0021
Title	MRS value
Requirement	Offline modifiable Minimum Radar Separation values shall be provided to the system
Status	<validated>
Rationale	Safety separations to apply need to be input to the separation delivery tool
Category	

543

544 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

545

546 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0022
Title	Runway Spacing
Requirement	Offline modifiable specific Spacing values shall be provided to the system
Status	<validated>
Rationale	Specific separations to apply need to be input to the separation delivery tool
Category	

547

548 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

549

550 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0020
Title	Wake separation value
Requirement	Wake separations values shall be provided to the system both - in distance and - in corresponding time to fly
Status	<validated>
Rationale	Safety separations to apply need to be input to the separation delivery tool
Category	

551

552 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

553

554 [REQ]

Identifier	REQ-02.01-TS-ARR3.0030
Title	Visual Approach
Requirement	Upon a Visual Approach clearance for aircraft A, CWP HMI shall inhibit the display of the following indications - ITD display - FTD display - Catch-up alert - Speed alert - Infringement alert
Status	<validated>
Rationale	Visual approach separation is under pilot's responsibility
Category	<HMI>

555

556 [REQ Trace]

Relationship	Linked Element Type	Identifier
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<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

557

558 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0010
Title	Wake separation provision
Requirement	The system shall allow to define wake separation tables among the following - ICAO - RECAT-EU - RECAT-2 - WDS
Status	<validated>
Rationale	Necessary inputs to the separation delivery tool must be offline configurable
Category	

559

560 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

561

562 [REQ]

Identifier	REQ-02.01-TS-ARR3.0024
Title	EAP TDI's recomputation for follower
Requirement	Upon confirmed change of approach procedure for aircraft A, and if A has a follower in the arrival sequence, the system shall recompute the TDIs of aircraft A, updating - the separation table taking into account aircraft A's new approach and aircraft A's follower approach and - the new speed profile for aircraft A corresponding to its new selected approach

Status	<validated>
Rationale	TDIs must be updated upon any input change
Category	<Functional>

563

564 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

565

566 [REQ]

Identifier	REQ-02.01-TS-ARR3.0023
Title	EAP TDI's recomputation for leader
Requirement	Upon confirmed change of approach procedure for aircraft A, and if A has a leader in the arrival sequence, the system shall recompute the TDIs targeted by A , updating - the separation table taking into account aircraft A's leader approach and aircraft A's new selected approach and - the new speed profile for aircraft A corresponding to its new selected approach
Status	<validated>
Rationale	TDIs must be updated upon any input change
Category	

567

568 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

569

570 [REQ]

Identifier	REQ-02.01-TS-ARR3.0022
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Title	Air Speed profiles
Requirement	For each aircraft, the system shall include offline defined air speed profiles for each of the procedures applicable to this aircraft among the following ILS VFR IGS SRAP CSPR-DT A-IGS IGS-to-SRAP.
Status	<in progress>
Rationale	The separation delivery tool needs inputs related to all applicable enhanced approach procedures
Category	<Data>

571

572 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

573

574 [REQ]

Identifier	REQ-02.01-TS-ARR3.0021
Title	Offline tables
Requirement	The separation delivery tool shall be provided with the approach separation minima for each combination of published approach procedure (i.e. GLS Z 32R or ILS Y 32R) with different glideslopes, which takes into account the associated navigation means and corresponding vertical accuracy around the published profile.
Status	<in progress>
Rationale	The separation delivery tool needs inputs related to all applicable enhanced approach procedures
Category	<Data>

575

576 [REQ Trace]

Relationship	Linked Element Type	Identifier
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<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1204
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1205

577

578 [REQ]

Identifier	REQ-02.01-TS-ARR3.0020
Title	List of approaches
Requirement	For each aircraft, the expected and cleared approach procedure selected by the approach controller shall be communicated to the separation delivery tool in order to use the appropriate separation minima between the leader and follower aircraft.
Status	<in progress>
Rationale	The separation delivery tool needs inputs related to all applicable enhanced approach procedures
Category	<HMI>

579

580 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

581

582 [REQ]

Identifier	REQ-02.01-TS-ARR1.0130
Title	Display approach arrival sequence
Requirement	The HMI may display the approach arrival sequence on all CWP's
Status	<validated>
Rationale	Approach arrival sequence is an additional information needed by the ATCO
Category	<HMI>

583

584 [REQ Trace]

Relationship	Linked Element Type	Identifier
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<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

585

586 [REQ]

Identifier	REQ-02.01-TS-ARR1.0140
Title	Wind display
Requirement	CWPs HMI may display glideslope and surface wind information
Status	<in progress>
Rationale	Wind information may be useful to approach controllers
Category	<HMI>

587

588 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

589

590 [REQ]

Identifier	REQ-02.01-TS-ARR1.0121
Title	TDI value
Requirement	The HMI might display the TDIs values
Status	<in progress>
Rationale	TDIs are displayed, their values may be needed for additional awareness
Category	<HMI>

591

592 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

593

594 [REQ]

Identifier	REQ-02.01-TS-ARR1.0122
Title	Distance to TDI
Requirement	The HMI might display the distance between TDIs and the associated follower aircraft
Status	<in progress>
Rationale	Distance values might be useful to controllers
Category	<HMI>

595

596 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

597

598 [REQ]

Identifier	REQ-02.01-TS-ARR1.0120
Title	TDI association
Requirement	The HMI shall be able to show the association between each TDI and its follower aircraft
Status	<validated>
Rationale	Controllers may need to identify which aircraft is associated to each TDI
Category	

599

600 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

601

602 [REQ]

Identifier	REQ-02.01-TS-ARR1.0110
Title	Distance step resolution
Requirement	The Separation Delivery tool HMI shall display indicators to at least a distance step resolution of 0.1NM
Status	<validated>
Rationale	Resolution needs to be high enough to avoid lack of situational awareness
Category	

603

604 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

605

606 [REQ]

Identifier	REQ-02.01-TS-ARR1.0102
Title	Display of infringement alert
Requirement	HMI shall display the FTD upon reception of an infringement alert on an ITD
Status	<validated>
Rationale	Infringement alert of the ITD is needed to be displayed
Category	

607

608 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

609

610 [REQ]

Identifier	REQ-02.01-TS-ARR1.0091
Title	Hide TDIS
Requirement	The HMI shall be able to hide selected TDIS
Status	<validated>
Rationale	Controller may need to unselect some displays
Category	

611

612 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

613

614 [REQ]

Identifier	REQ-02.01-TS-ARR1.0100
Title	Infringement alert 1
Requirement	An infringement alert shall be sent by the separation delivery tool to HMI as soon as the Follower aircraft established on the centerline goes beyond its targeted ITD
Status	<validated>
Rationale	Infringement alert triggered by the separation delivery tool needs to be sent to HMI
Category	<Safety> , <Interoperability>

615

616 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

617

618 [REQ]

Identifier	REQ-02.01-TS-ARR1.0101
Title	Infringement alert 2
Requirement	An infringement alert shall be sent by the separation delivery tool to HMI if both of the following conditions are met - the ORD is less than d NM - the follower aircraft established on the centerline goes beyond d NM from its targeted FTD
Status	<validated>
Rationale	Controllers need to be warned if the infringement is close but undetectable because of low compression
Category	

619

620 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

621

622 [REQ]

Identifier	REQ-02.01-TS-ARR1.0090
Title	Display Option
Requirement	The HMI may display the TDIs in different shapes depending on the type of TDI
Status	<validated>
Rationale	Controllers preferences need to be taken into account by the HMI
Category	

623

624 [REQ Trace]

Relationship	Linked Element Type	Identifier
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<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

625

626 [REQ]

Identifier	REQ-02.01-TS-ARR1.0072
Title	Mode Change Display
Requirement	The HMI shall show for each aircraft the mode of operation applied
Status	<validated>
Rationale	Controllers need to be aware of the current mode of operation
Category	

627

628 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

629

630 [REQ]

Identifier	REQ-02.01-TS-ARR1.0080
Title	Runway wind
Requirement	The current Runway surface wind may be provided to the Separation delivery tool
Status	<validated>
Rationale	Runway surface wind is not necessary for TDIs computation but may increase controllers situational awareness
Category	

631

632 [REQ Trace]

Relationship	Linked Element Type	Identifier
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<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

633

634 [REQ]

Identifier	REQ-02.01-TS-ARR1.0071
Title	Mode Change
Requirement	Upon each mode change, impacted TDIs shall be recomputed in consistency with the new mode applied
Status	<validated>
Rationale	TDIs must be recomputed upon each input change
Category	

635

636 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

637

638 [REQ]

Identifier	REQ-02.01-TS-ARR1.0070
Title	Mode Change HMI
Requirement	The HMI shall allow the following mode change from DBS to TBS from TBS to DBS for each arrival runway
Status	<validated>
Rationale	Controllers need to be able to activate or deactivate TBS mode on demand
Category	<HMI>

639

640 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

641

642 [REQ]

Identifier	REQ-02.01-TS-ARR1.0011
Title	Sending Aircraft distance to FTD
Requirement	For each aircraft in the arrival sequence which has a leader aircraft in the arrival sequence, the system shall send the distance value between the aircraft and its targeted FTD to the Tower CWP and to the Approach CWP.
Status	<validated>
Rationale	Distance Aircraft - FTD can improve situational awareness for controllers
Category	<Interoperability> , <HMI>

643

644 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

645

646 [REQ]

Identifier	REQ-02.01-TS-ARR1.0010
Title	Display of Aircraft distance to FTD
Requirement	If an aircraft is - eligible for TDIs display - established on the centerline - infringing its targeted ITD, and the separation delivery tool shall send the distance value between the aircraft and the targeted FTD to the HMI
Status	<validated>
Rationale	If the aircraft has infringed ITD, Tower CWP needs to display

	distance to FTD to verify that the aircrafts does not go beyond the FTD
Category	<HMI> , <Interoperability>

647

648 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

649

650 [REQ]

Identifier	REQ-02.01-TS-ARR1.0020
Title	Gap HMI input
Requirement	The HMI shall provide the possibility to input a gap spacing value, in distance or in time, behind any aircraft eligible for TDI computation
Status	<validated>
Rationale	ATCo needs to be able to insert a gap behind an aircraft for departure or other reason
Category	<HMI>

651

652 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104

653

654 [REQ]

Identifier	REQ-02.01-TS-ARR1.0026
Title	Feedback following gap insertion

Requirement	The tool shall provide a feedback on whether or not the gap insertion or update is successful
Status	<in progress>
Rationale	Several reasons could lead to the gap insertion to fail, such as insufficient time between two aircraft on the centre line for the gap value to be inserted, etc.
Category	<Functional>

655

656 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

657

658 [REQ]

Identifier	REQ-02.01-TS-ARR1.0021
Title	Gap transmission
Requirement	Upon reception of a gap spacing instruction behind an aircraft, CWP HMI shall send the instruction along with the value to the Separation delivery tool
Status	<in progress>
Rationale	Self-explanatory
Category	<HMI> , <Interoperability>

659

660 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

661

662 [REQ]

Identifier	REQ-02.01-TS-ARR1.0023
------------	------------------------

Title	Gap HMI cancel
Requirement	The HMI shall provide the possibility to cancel a gap spacing value previously requested for an aircraft.
Status	<validated>
Rationale	ATCo needs to be able to to cancel a gap behind an aircraft
Category	<HMI>

663

664 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

665

666 [REQ]

Identifier	REQ-02.01-TS-ARR1.0024
Title	Gap cancel recomputation
Requirement	Upon reception of a gap cancel instruction behind an aircraft, the system shall recompute the TDIs attached to the concerned aircraft taking into account the absence of Gap constraint
Status	<validated>
Rationale	Self explanatory
Category	<Functional>

667

668 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

669

670 [REQ]

Identifier	REQ-02.01-TS-ARR1.0030
Title	Constraint information transmission

Requirement	For each aircraft, the system shall send to Tower and Approach CWP HMI the constraint type MRS, or GAP, or WAKE, or ROT along with the sent TDIs
Status	<validated>
Rationale	HMI must be able to display the chevron differently taking into account the associated constraint
Category	<Interoperability>

671

672 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

673

674 [REQ]

Identifier	REQ-02.01-TS-ARR1.0031
Title	TDIs display with constraint
Requirement	The Tower CWP HMI and the Approach CWP HMI shall be able to apply different shapes to the displayed TDIs taking into account the applied constraint
Status	<validated>
Rationale	ATCO must be able to differentiate the constraint behind the TDIs
Category	<HMI>

675

676 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

677

678 [REQ]

Identifier	REQ-02.01-TS-ARR1.0040
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Title	TDIs computation WAKE and MRS
Requirement	If the most constraining separation type is of ROT or GAP type, then the system shall automatically compute a second set of TDIs related to the most constraining separation value between MRS and WAKE.
Status	<in progress>
Rationale	System must be able to send the Safety constraint behind non safety constraints
Category	<Functional>

679

680 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

681

682 [REQ]

Identifier	REQ-02.01-TS-ARR1.0041
Title	TDIs display WAKE and MRS
Requirement	If an infringement event is triggered on an ITD representing ROT or GAP constraint, the CWP HMI shall display the ITD related to related to the second set of TDIs sent by the System.
Status	<in progress>
Rationale	ATCO needs to know what is the Safety constraint behind the non safety constraint
Category	<HMI>

683

684 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

685

686 [REQ]

Identifier	REQ-02.01-TS-ARR1.0050
Title	Runway change
Requirement	The HMI shall allow each aircraft in one arrival sequence to be assigned to another arrival sequence corresponding to a different runway.
Status	<validated>
Rationale	ATCO needs to have the possibility to change the assigned runway for all aircraft
Category	<Interoperability> , <HMI>

687

688 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

689

690 [REQ]

Identifier	REQ-02.01-TS-ARR1.0060
Title	CSPR offline
Requirement	The offline configuration file for the system shall allow to specify if 2 runways are CSPR or not
Status	<in progress>
Rationale	Offline configuration of CSPR
Category	<Data>

691

692 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

693

694 [REQ]

Identifier	REQ-02.01-TS-ARR1.0061
Title	CSPR application
Requirement	For each pair of consecutive arrivals on 2 CSPR the TDIs shall apply an additional longitudinal constraint of a configurable minimum longitudinal separation between the 2 aircraft.
Status	<in progress>
Rationale	Computation of TDIs in CSPR
Category	<Functional>

695

696 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

697 **4.2.1.2 Other ground requirements**

698 This section gathers the ground requirements particular to the solution PJ.02-W2-14.2.

699 [REQ]

Identifier	REQ-14.2-TS-GND-0001
Title	Expected Approach procedure selection by Approach Executive Controller
Requirement	For each arrival traffic, the flight label on ATC display should enable the Approach Executive Controller to select the expected approach procedure, among the list of active approach procedures being eligible for this traffic (e.g. based on the traffic navigation guidance capabilities declared in the flight plan), and then to record it.
Status	<validated>
Rationale	Self explanatory
Category	<HMI> , <Safety> , <Design> , <Functional>

700

701 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106

<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1006
<ALLOCATED_TO>	<Function>	Identify Eligible Approach Procedures Request Eligible Approach Procedures

702

703 [REQ]

Identifier	REQ-14.2-TS-GND-0002
Title	Expected approach procedure display
Requirement	The selected expected approach procedure should be displayed in the flight label and/or flight plan information.
Status	<validated>
Rationale	Self explanatory
Category	<Safety> , <Functional> , <Design> , <HMI>

704

705

706 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1006
<ALLOCATED_TO>	<Function>	Display Eligible Approach Procedures

707

708 [REQ]

Identifier	REQ-14.2-TS-GND-0003
Title	Cleared Approach procedure selection by Approach Executive Controller
Requirement	For each arrival traffic, the flight label on ATC display should enable the Approach Executive Controller to select the cleared approach procedure among the list of active approach procedures eligible for that aircraft, not necessarily the expected one previously recorded, and then to record it.
Status	<validated>
Rationale	Self explanatory
Category	<HMI> , <Functional> , <Safety> , <Design>

709

710 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1013
<ALLOCATED_TO>	<Function>	Record Approach Procedure Information

711

712 [REQ]

Identifier	REQ-14.2-TS-GND-0004
Title	Distinct display of expected and cleared approach procedures for Approach Executive Controller
Requirement	Expected and cleared approach procedures shall be displayed in distinct ways so that the Approach Executive Controller can easily and unambiguously distinguish aircraft already cleared from the others.
Status	<validated>
Rationale	Self explanatory
Category	<Design> , <HMI> , <Safety> , <Functional>

713 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1006
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1013

714

715 [REQ]

Identifier	REQ-14.2-TS-GND-0005
Title	Update of expected approach procedure by Approach Executive Controller
Requirement	The flight label on ATC display shall enable the Approach Executive Controller to update the expected approach procedure by selecting a different one among the list of active approach procedures eligible for that aircraft.
Status	<validated>
Rationale	Self explanatory
Category	<Design> , <Functional> , <HMI> , <Safety>

716

717 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1015
<ALLOCATED_TO>	<Function>	Display Eligible Approach Procedures

718

719 [REQ]

Identifier	REQ-14.2-TS-GND-0006
Title	Display of Wake Turbulence Category (WTC) for Approach and Tower Controller
Requirement	Where a separation tool is used, the Wake Turbulence Category (WTC) shall remain displayed to the Approach and Tower Controller with the flight label
Status	<validated>
Rationale	Self explanatory
Category	<Safety> , <Functional> , <Design> , <HMI>

720

721 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1105

722

723 [REQ]

Identifier	REQ-14.2-TS-GND-0007
Title	Guidance for Approach Executive Controller's screen
Requirement	The ATC system HMI adaptations shall not clutter the Approach Executive Controller's screen, and shall follow human factor design best practices.
Status	<validated>
Rationale	Self explanatory
Category	<Design> , <HMI> , <Functional> , <Safety>

724

725 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1109

726

727 [REQ]

Identifier	REQ-14.2-TS-GND-0008
Title	Final approach interception location references display for Approach Executive Controller
Requirement	Final approach interception location references should be displayed on the Approach Executive Controller display, according to local assessment.
Status	<validated>
Rationale	Self explanatory
Category	<Design> , <HMI> , <Safety> , <Functional>

728

729

730 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1109
<ALLOCATED_TO>	<Function>	Monitor and Separate Traffic (SRAP)

731

732 [REQ]

Identifier	REQ-14.2-TS-GND-0009
Title	Alerting function for Approach Executive Controller for detecting non-compliance to assigned profile
Requirement	An alerting function shall warn the Approach Executive Controller for detecting situations when an aircraft is not complying / is deviating from the assigned published final approach profile, among multiple active approach procedures.
Status	<validated>
Rationale	Self explanatory
Category	<Functional> , <Safety>

733

734 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1108
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1114
<ALLOCATED_TO>	<Function>	Safety Nets

735

736 [REQ]

Identifier	REQ-14.2-TS-GND-0010
Title	Arrival sequencing optimisation function to Approach Executive Controller
Requirement	An arrival sequencing optimisation function should assist the Approach Executive Controller in proposing the optimum approach procedure for each aircraft, taking into account the active approach procedures and aircraft capabilities, in order to optimise the sequence.
Status	<in progress>

Rationale	Self explanatory
Category	<Functional> , <Performance>

737

738 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1113
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1112

739

740 [REQ]

Identifier	REQ-14.2-TS-GND-0011
Title	Arrival sequencing optimisation role to Approach Executive Controller
Requirement	An arrival sequencing optimisation role should assist the Approach Executive Controller in proposing the optimum approach procedure for each aircraft, taking into account the active approach procedures and aircraft capabilities, in order to optimise the sequence.
Status	<in progress>
Rationale	Self explanatory
Category	<Functional> , <Performance>

741

742 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1113
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1112

743

744 [REQ]

Identifier	REQ-14.2-TS-GND-0012
Title	Controller Training/briefing on SRAP procedures
Requirement	Approach Executive Control and Tower Runway Control shall be briefed and trained on how to conduct SRAP operations, and the impact compared to conventional approaches with regard to e.g. changes to the separation minima, working methods, impact on

	speed management instructions, new interception points, change to visual aids
Status	<validated>
Rationale	Self explanatory
Category	<Safety>

745

746 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1005
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1008
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1007
<ALLOCATED_TO>	<Role>	ATC Executive Controller (PJ.02-W2-14.2) Tower Runway Controller (PJ.02-W2-14.2)

747

748 [REQ]

Identifier	REQ-14.2-TS-GND-0013
Title	Controller training on non nominal cases and degraded modes linked to SRAP procedures
Requirement	Approach Executive Control, Tower Runway Control and Supervisors, including new recruits, shall be trained as appropriate to apply the revised contingency procedures in case of non-nominal or degraded modes of operations, including skills to work without separation indicators as necessary under application of degraded modes/contingency procedures (e.g. with manual application of simplified separation scheme)
Status	<validated>
Rationale	Self explanatory
Category	<Safety>

749

750 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1010
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GALT.0001

<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GALT.0002
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GALT.0003
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GOAR.0001
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GOAR.0002
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ORDF.0001
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ORDF.0002
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ORDF.0003
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ORDF.0004
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ORDF.0005
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ORDF.0006
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ORDF.0007
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ORDF.0008
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ORDF.0009
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GALT.0004
<ALLOCATED_TO>	<Role>	ATC Executive Controller (PJ.02-W2-14.2) Tower Runway Controller (PJ.02-W2-14.2)

751

752 [REQ]

Identifier	REQ-14.2-TS-GND-0014
Title	Runway marking for SRAP
Requirement	SRAP runway marking shall consist of a set of threshold markings, aiming point markings, touch down zone (TDZ) markings
Status	<validated>
Rationale	Self explanatory
Category	<Design> , <Safety> , <Interoperability>

753

754 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-APT.1302
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-APT.1301

755

756 [REQ]

Identifier	REQ-14.2-TS-GND-0015
Title	Threshold, aiming point and TDZ markings for SRAP
Requirement	The threshold marking, aiming point marking and TDZ markings shall be distinctive from the markings associated to the first runway threshold, and with a design being as close as possible to applicable regulatory requirements and provisions for runway markings (Annex 14).
Status	<validated>
Rationale	Self explanatory
Category	<Interoperability> , <Design> , <Safety>

757

758 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-APT.1301
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-APT.1302

759

760 [REQ]

Identifier	REQ-14.2-TS-GND-0016
Title	Identification of second threshold SRAP
Requirement	The second threshold shall be identified with a specific runway identifier (e.g. with an increment of one unit between the first and second threshold, or use of a specific letter in addition of the runway identifier
Status	<validated>
Rationale	Self explanatory
Category	<Design> , <Safety> , <Interoperability>

761

762 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-APT.1301

763

764 [REQ]

Identifier	REQ-14.2-TS-GND-0017
Title	Approach lighting system for SRAP
Requirement	The approach lighting system of the second threshold shall be distinctive from the one of the first threshold (e.g using a static or switching lighting system), with a design being as close as possible to applicable regulatory requirements and provisions for runway markings (Annex 14)
Status	<validated>
Rationale	Self explanatory
Category	<Design> , <Safety> , <Interoperability>

765

766 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-APT.1301
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-APT.1303
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-APT.1304

767

768 [REQ]

Identifier	REQ-14.2-TS-GND-0018
Title	PAPI/VASI for SRAP
Requirement	PAPI/VASI shall provide appropriate landing visual guidance when flying on a SRAP approach (e.g. second PAPI in addition of the one for conventional approach, preferably located on the other side of the runway)
Status	<validated>
Rationale	Self explanatory
Category	<Safety> , <Design> , <Interoperability>

769

770 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-APT.1301

771

772 [REQ]

Identifier	REQ-14.2-TS-GND-0019
Title	Update of cleared approach procedure by Approach Executive Controller
Requirement	The flight label on ATC display shall enable the Approach Executive Controller to update the cleared approach procedure by selecting a different one among the list of active approach procedures eligible for that aircraft.
Status	<validated>
Rationale	Self explanatory
Category	<Design> , <Safety> , <Functional> , <HMI>

773

774 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1014
<ALLOCATED_TO>	<Role>	ATC Executive Controller (PJ.02-W2-14.2)

775

776 [REQ]

Identifier	REQ-14.2-TS-GND-0020
Title	Check the aircraft vertical position
Requirement	A tool should allow the Approach Executive Controller to check the vertical position of an aircraft.
Status	<in progress>
Rationale	That tool would allow the controller identify an aircraft intercepting the wrong glide or an aircraft initiating a missed approach.
Category	<Functional> , <HMI>

777

778 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GOAR.0003
<ALLOCATED_TO>	<Role>	ATC Executive Controller (PJ.02-W2-14.2)

779

4.2.2 Requirements for aircraft systems

The following requirement apply to aircraft systems supporting SRAP concept.

[REQ]

Identifier	REQ-14.2-TS-ACFT-0001
Title	SRAP training
Requirement	The Flight Crew shall be trained for managing and flying SRAP operations
Status	<validated>
Rationale	e.g. SRAP principles, differences in visual references, etc
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.2
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ACFT.2104
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ACFT.2103
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ACFT.2102
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ACFT.2101
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GALT.0001
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GALT.0002
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ACFT.2105
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ACFT.2106
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-ACFT.2107
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-GOAR.0004
<SATISFIES>	< ATMS Requirement>	REQ-14.2-SPRINTEROP-CTL.1012

5 Implementation Options

PJ.02-W2-14.2 solution encompasses several technical enablers. The chapter 3.1.1 of this document specifies for each enabler if it is optional or required.

The list of the optional enablers is given below.

EN code	EN description
AERODROME-ATC-25	Aerodrome ATC system to support SRAP operations (separation delivery)
APP ATC 115	Approach ATC system to support SRAP operations (separation delivery)

Table 5: optional enablers of solution PJ.02-W2-14.2

AERODROME-ATC-25 and APP ATC 115 enablers are linked to the separation delivery assistance. They are not necessarily required if SRAP procedure is active when the traffic pressure is not high (at night, for example), when few aircraft types are coming to an airport, etc.

793 6 Assumptions

794 There are no assumptions.

7 References and Applicable Documents

7.1 Applicable Documents

Content Integration

1. EATMA Community pages
2. SESAR ATM Lexicon

Content Development

3. B4.2 D106 Transition Concept of Operations SESAR 2020

System and Service Development

4. 08.01.01 D52: SWIM Foundation v2
5. 08.01.01 D49: SWIM Compliance Criteria
6. 08.01.03 D47: AIRM v4.1.0
7. 08.03.10 D45: ISRM Foundation v00.08.00
8. B.04.03 D102 SESAR Working Method on Services
9. B.04.03 D128 ADD SESAR1
10. B.04.05 Common Service Foundation Method

Performance Management

11. B.04.01 D108 SESAR 2020 Transition Performance Framework
12. B.04.01 D42 SESAR2020 Transition Validation
13. B.05 D86 Guidance on KPIs and Data Collection support to SESAR 2020 transition.
14. 16.06.06-D68 Part 1 –SESAR Cost Benefit Analysis – Integrated Model
15. 16.06.06-D51-SESAR_1 Business Case Consolidated_Deliverable-00.01.00 and CBA
16. Method to assess cost of European ATM improvements and technologies. EUROCONTROL (2014)
17. ATM Cost Breakdown Structure_ed02_2014
18. Standard Inputs for EUROCONTROL Cost Benefit Analyses
19. 16.06.06_D26-08 ATM CBA Quality Checklist
20. 16.06.06_D26_04_Guidelines_for_Producing_Benefit_and_Impact_Mechanisms

Validation

21. 03.00 D16 WP3 Engineering methodology
22. Transition VALS SESAR 2020 - Consolidated deliverable with contribution from Operational Federating Projects
23. European Operational Concept Validation Methodology (E-OCVM) - 3.0 [February 2010]

System Engineering

830 24. SESAR 2020 Requirements and Validation Guidelines

831 **Safety**

832 25. SESAR, Safety Reference Material, Edition 4.0, April 2016

833 26. SESAR, Guidance to Apply the Safety Reference Material, Edition 3.0, April 2016

834 27. SESAR, Final Guidance Material to Execute Proof of Concept, Ed00.04.00, August
 835 2015

836 28. SESAR, Resilience Engineering Guidance, May 2016

837 **Human Performance**

838 29. 16.06.05 D 27 HP Reference Material D27

839 30. 16.04.02 D04 e-HP Repository - Release note

840 **Environment Assessment**

841 31. SESAR, Environment Reference Material, alias, "Environmental impact assessment
 842 as part of the global SESAR validation", Project 16.06.03, Deliverable D26, 2014.

843 32. ICAO CAEP – "Guidance on Environmental Assessment of Proposed Air Traffic
 844 Management Operational Changes" document, Doc 10031.

845 **Security**

846 33. 16.06.02 D103 SESAR Security Ref Material Level

847 34. 16.06.02 D137 Minimum Set of Security Controls (MSSCs).

848 35. 16.06.02 D131 Security Database Application (CTRL_S)

849 **7.2 Reference Documents**

850 36. ED-78A GUIDELINES FOR APPROVAL OF THE PROVISION AND USE OF AIR TRAFFIC SERVICES
 851 SUPPORTED BY DATA COMMUNICATIONS.

852 37. D4.2.002 PJ.02-W2-14.2 SPR-INTEROP/OSD final, Edition 00.01.00, 3 June 2022

853 38. D4.2.006 PJ.02-W2-14.2 VALR Final, Edition 00.00.04, 3 May 2022

854 39. PJ02-02 D2.1.04 PJ02-02 VALR, Edition 00.01.00, 19 March 2020

855 40. PJ02-02 D2.1.02 PJ02-02 TS/IRS (final), Edition 00.01.03, 24 March 2020

856 **Appendix A Service Description Document (SDD)**

857 N/A

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