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PJ.02-W2-14.5 TS IRS

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AART

AIRPORT AIRSIDE AND RUNWAY THROUGHPUT

This Technical Specification is part of a project that has received funding from the SESAR Joint Undertaking under grant agreement No 874477 under European Union's Horizon 2020 research and innovation programme.

Abstract

This Technical Specification provides the requirements for ground based ATC systems and aircraft systems supporting the solution PJ.02-W2-14.5:

- AO – 0331 - Enhanced Arrival procedures using an Increased Glide Slope to a Second Runway Aiming Point (A-IGS-to-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-W2-14.5 . It will focus on the following change to current capabilities:

- The capability to operate on two runway thresholds permanently published with a higher glide slope towards the second one (IGS-to-SRAP).

Enhanced Arrival Procedures concepts were already investigated within SESAR 2020 W1 in PJ02-02, but they did not achieve full V3 maturity. Solution PJ.02-W2-14.5 aims then at completing the validation activities on IGS-to-SRAP concept, so that they can be moved to next phases of validation cycle.

Code	Concept Name	Description	Maturity at PJ02-02 start	Maturity target at PJ02-02 end
AO-0331	Increased Glide Slope to Second Runway Aiming Point (IGS-to-SRAP)	A glide path anchored to shifted touch down points, with a glide slope angle value that can be set between the conventional approach angle (3°) and the beginning of the "steep approach" domain (4,5°)	V3 on-going	V3

Table 1: Initial and targeted maturity level of concepts encompassed by PJ02-02

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

- [NOV-5][EAP-03] IGS-to-SRAP Published Approach

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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-W2-14.5.

The requirements included in this TS/IRS satisfy 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 so as to allow the functional block (or parts of it in which the project is working) to be designed and implemented either as 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-W2-14.5 aims at improving airport performances on the Environmental Sustainability and Capacity Key Performance Areas by introducing Increased Glide Slope to Second Runway Aiming Point Procedures (IGS-to-RAP).

IGS-to-SRAP procedures/operations allow reducing the environmental impact (e.g. noise, fuel). In addition, runway throughput may be increased (e.g. via 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-W2-14.5 is to bring them to V3.

The following table provides the scope of SESAR solution PJ.02-W2-14.5 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-0331	Enhanced Arrival Procedure using an Increased Glide Slope to a Second Runway Aiming Point (IGS-to-SRAP)	Full
This enhanced arrival procedure, applying an Increased Glide Slope (above the approach angle in use to the considered runway threshold and up to 4.49°) to an Aiming Point further down the runway threshold (as specified in the published chart), will enable inbound aircraft to reduce noise footprint (environmental benefit) and possibly reduce runway occupancy time and/or taxi-in time depending on local runway/taxiway layout. Unlike the Increased Glide Slope concept (which applies to the runway physical threshold), increasing the glide slope on an additional (second) runway aiming point should prevent a potential reduction of airport capacity and potentially increasing it through optimization in wake turbulence separations. Compared to benefits gained from the Second Runway Aiming Point concept (using the same glide path angle for both glide slopes), increasing the glide slope on the additional (second) runway aiming point allows a potential increase of airport capacity through optimization in wake turbulence separations with a limited / shorter displacement of the additional runway aiming point.		

Table 2: SESAR Solution PJ.02-W2-14.5 Scope and related OI

This document contains requirements for ground based ATC systems and aircraft systems supporting IGS-to-SRAP Procedures. Requirements are based on the five use cases defined in SPR-INTEROP/OSED (reference [37]):

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- [NOV-5][EAP-03] IGS-to-SRAP Published Approach

2.3 Intended readership

The intended audience of this document is initially the partners of Solution PJ.02-W2-14.5 in order to support suitable validation exercises.
Airborne and ground industries are also a primary audience as the TS/IRS allows 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-W2-14.5 complements studies carried out in the frame of SESAR 2020 PJ02-02 W1.
The picture below shows the validation activities performed in PJ02 W1 on IGS-to-SRAP. Details on the outputs of these activities can be found in [38].

Figure 1: Validations activities performed on IGS-to-SRAP in SESAR 2020 W1 PJ02-02

The major recommendations from PJ02-02 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.

2.5 Structure of the document

The structure of the document is as follows:

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- 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 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
  Chapter 8: This chapter presents the Service Description Document (SDD).
- Chapter 9: This chapter presents the Service Technical Design Document (STDD).

2.6 Glossary of terms

Term	Definition	Source of the definition
Enhanced arrival procedures	Generic term referring in a general manner to all PJ02-02 operational concepts: IGS, A-IGS, SRAP, IGS-to-SRAP, CSPR-ST	ICAO Annex
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*

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Space Based Augmentation System (SBAS)	Civil aviation safety-critical systems that support wide-area or regional augmentation though a monitoring and reference stations network and geostationary (GEO) satellites (35.786 km altitude) which broadcast GNSS augmentation information (correction & integrity).	*EATMA*

205 **Table 3: Glossary**

206 2.7 Acronyms and Terminology

Acronym	Definition
AAL	Above Aerodrome Level
ACC	Area Control Center
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
AO	Aerodrome Operations
AODB	Airport Operational Data Base
AOM	Airspace Organisation and Management
AOP	Airport Operational Plan
AP	Auto Pilot
APOC	Airport Operations Center
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
CDI	Course Deviation Indicator
CDM	Collaborative Decision Making
CDO	Continuous Descent Operations
CONOPS	Concept of Operations
CP	Control Panel
CSPR-ST	Closely Space Parallel Runway - Staggered Thresholds
CWP	Controller Working Position
DA(H)	Decision Altitude/Height
DCB	Demand and Capacity Balancing
DMAN	Departure Manager
DOD	Detailed Operational Description
DS	Double Slope
DT	Displaced Threshold
E-ATMS	European Air Traffic Management System

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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
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
HMI	Human Machine Interface
IFR	Instrument Flight Rules
IGE	In Ground Effect
IGS	Increased Glide Slope
IGS-to-SRAP	Increased Glide Slope to Second Runway Aiming Point
INTEROP	Interoperability Requirements
IRS	Interface Requirements Specification
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
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
OSED	Operational Service and Environment Definition
OTS	Other Than Standard
PAN	Precision Approach Navigator
PANS	Procedures for Air Navigation Service
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

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RPID	Reference Path IDentifier
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
STAR	Standard Terminal Arrival Route
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

207 **Table 4: Acronyms and terminology**

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3 SESAR Solution Impacts on Architecture

3.1 Target Solution Architecture

3.1.1 SESAR Solution(s) Overview

PJ.02-W2-14.5: Increased glide slope to a second runway aiming point (IGS-to-SRAP)

This Solution introduces the Increased Glide Slope to a Second Runway Aiming Point (IGS-to-SRAP) as a new concept of enhanced approach operation. The distance between the second threshold and the nominal one is at least of 1100m.
IGS-to-SRAP increases runway performance by using two active thresholds on a single runway and an increased glide slope to the second one.
By doing so, the environmental impact (e.g. noise, fuel) should be reduced. In addition, runway throughput may be increased (e.g. via optimization of ROT and/or wake turbulence separations).

OI Step		OI description	Open CR
AO-0331		Enhanced approach operations using an increased glide slope to a second runway aiming point (IGS-to-SRAP)	CR 06476 Update AO-0331 (unlink Institutional EN)
	EN code	EN description	Open CR
	A/C-86	On-board assistance to aircraft energy management	
	A/C-87	On-board assistance to flare	
	AERODROME-ATC-102	Aerodrome ATC system to support final approach operations (distinguish approach procedures)	
	AERODROME-ATC-94	Aerodrome ATC system to support IGS-to-SRAP operations (separation delivery)	
	AIRPORT-56	Runway marking, lighting and PAPI for SRAP/IGS-to-SRAP approach procedures	
	APP ATC 163	Approach ATC system to support IGS-to-SRAP operations (separation delivery)	
	APP ATC 170	Approach ATC system upgraded to support approach procedure assignment	
	HUM-024	Flight Crew new role for handling IGS-to-SRAP approach	

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	HUM-033	ATC new role for handling IGS-to-SRAP approach	
	REG-0533	Regulatory provisions for Increased Glide Slope to Second Runway Aiming Point operations (IGS-to-SRAP)	
	STD-112	Update of EASA and ICAO regulatory frameworks for new visual ground aids (SRAP)	

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Type	Element	EN Code	EN/CR Title	Coverage
		AERODROME-ATC-94	Aerodrome ATC system to support IGS-to-SRAP operations (separation delivery)	
		APP ATC 163	Approach ATC system to support IGS-to-SRAP operations (separation delivery)	
		HUM-024	Flight Crew new role for handling IGS-to-SRAP approach	
		HUM-033	ATC new role for handling IGS-to-SRAP approach	
Role	ATC Executive Controller (PJ.02-W2-14.5)			considered
Role	Tower Runway Controller (PJ.02-W2-14.5)			considered
		REG-0533	Regulatory provisions for Increased Glide Slope to Second Runway Aiming Point operations (IGS-to-SRAP)	

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

Enabler	Opt/Req	Deviation
A/C-86_On-board assistance to aircraft energy management	Optional	
A/C-87_On-board assistance to flare	Optional	
AERODROME-ATC-102_Aerodrome ATC system to support final approach operations (distinguish approach procedures)	Required	
AERODROME-ATC-94_Aerodrome ATC system to support IGS-to-SRAP operations (separation delivery)	Optional	
AIRPORT-56_Runway marking, lighting and PAPI for SRAP/IGS-to-SRAP approach procedures	Required	
APP ATC 163_Approach ATC system to support IGS-to-SRAP operations (separation delivery)	Optional	
APP ATC 170_Approach ATC system upgraded to support approach procedure assignment	Required	
HUM-024_Flight Crew new role for handling IGS-	Required	

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to-SRAP approach		
HUM-033_ATC new role for handling IGS-to-SRAP approach	Required	
REG-0533_Regulatory provisions for Increased Glide Slope to Second Runway Aiming Point operations (IGS-to-SRAP)	Required	
STD-112_Update of EASA and ICAO regulatory frameworks for new visual ground aids (SRAP)	Required	

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223 ### 3.1.1.3 Relevant Use Cases

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Operational Use Case	Description
[NOV-5][EAO-03] IGS-to-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 an Increased Glide Slope on a Second Runway Aiming Point (IGS-to-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 IGS-to-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 IGS-to-SRAP procedure type (i.e. one glideslope angle) may be supported by different navigation guidance systems and part of or all the procedures with same glideslope angle may be active at the same time. ? The IGS-to-SRAP approach chart shall be specific to one final approach path (i.e. angle and touchdown aiming point) and supporting navigation guidance mean, and shall highlight the glide path angle in case it is significantly increased (e.g. more than 3.5°). The position and color of the associated PAPI shall be indicated on the chart. ? The IGS-to-SRAP approach chart shall include

	altitude/distance information for the applicable runway aiming point to facilitate Flight Crew procedure check during the approach. ? Procedure design for IGS-to-SRAP operation shall use a glide path angle limited to 4.49°. ? 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. ? When designing the IGS-to-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. ? IGS-to-SRAP procedures shall be published approach procedures flown based on ILS or GLS or RNP APCH with vertical guidance. ? The design of the GLS or RNAV (LPV, LNAV-VNAV) procedures supporting IGS-to-SRAP shall be compliant with ICAO Doc 8168 and shall be validated in accordance with the Instrument Flight Procedure process specified in ICAO Doc 9906. ? 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 IGS-to-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 Supervisors shall inform the Approach / Tower Controllers about the list of active approach procedures. ? Information about a published IGS-to-SRAP being active to a given runway QFU shall be available to the Flight Crew in order to prepare 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 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. ? When the second runway threshold is not active (i.e. operating only the conventional threshold), the lightings of

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	the secondary runway threshold and aiming point shall be switched off such as to avoid confusing the Flight Crew. ? 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 IGS-to-SRAP are flown based on RNP APCH navigation, there is a need for flexibility in 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 FMS guidance for final approach axis interception.
[NOV-5][IGS-to-SRAP-Non-Nominal-01] Missed Approach (Pilot Initiated) / Go-Around Management	This Use Case describes a non-nomial scenario in which missed approach or go-around procedure is initiated during IGS-to-SRAP approach.
[NOV-5][IGS-to-SRAP-Non-Nominal-02] Procedure for Glide Alert Management	This Use Case describes a non-nomial scenario in which glide alert is activated during IGS-to-SRAP approach.
[NOV-5][IGS-to-SRAP-Non-Nominal-03] Loss of TBS-ORD separation indicators	This Use Case describes a non-nomial scenario for the loss of TBS/ORD separation indicators during ISGS approach.

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

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227 #### 3.1.1.4 Applicable standards and regulations

Institutional Enabler	Standard

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229 ### 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 Provision;	Airspace Organisation; En-Route/Approach ATS;	Civil ATS Approach Service Provider; Military ATS Approach Service Provider;
Civil Aircraft	Airport; En-Route; Terminal Airspace;	Arrival Sequencing; Clearance/Instruction Management; 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 connectivity provision for aeronautical communications on the airport surface;		Civil CNS Service Provider;

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	Network; Terminal Airspace;			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 Navaids;		
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-033	ATC new role for handling IGS-to-SRAP approach			
	Role	ATC Executive Controller (PJ.02-W2-14.5)	Update	
	Role	Tower Runway Controller (PJ.02-W2-14.5)	Update	

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4 Technical Specifications

4.1 Functional architecture overview

Functions required to perform needed Operational Activities can be allocated to Resources of a different type: Human Role, Infrastructure System or Functional Block.

4.1.1 Resource Connectivity View

This view describes the resource connectivity for Solution PJ02-W2-14.5.
It covers the realization of the following Technical UCs:

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

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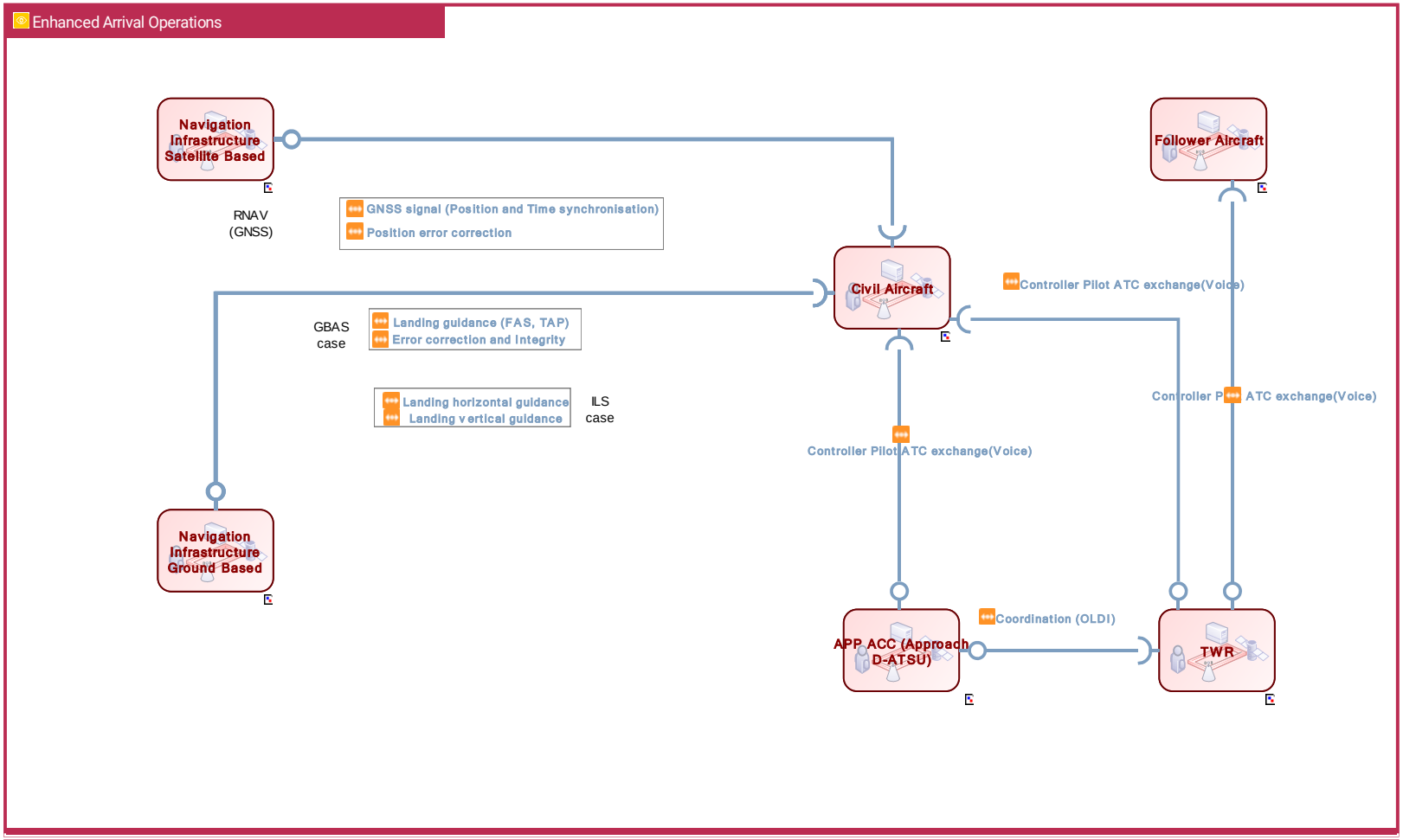
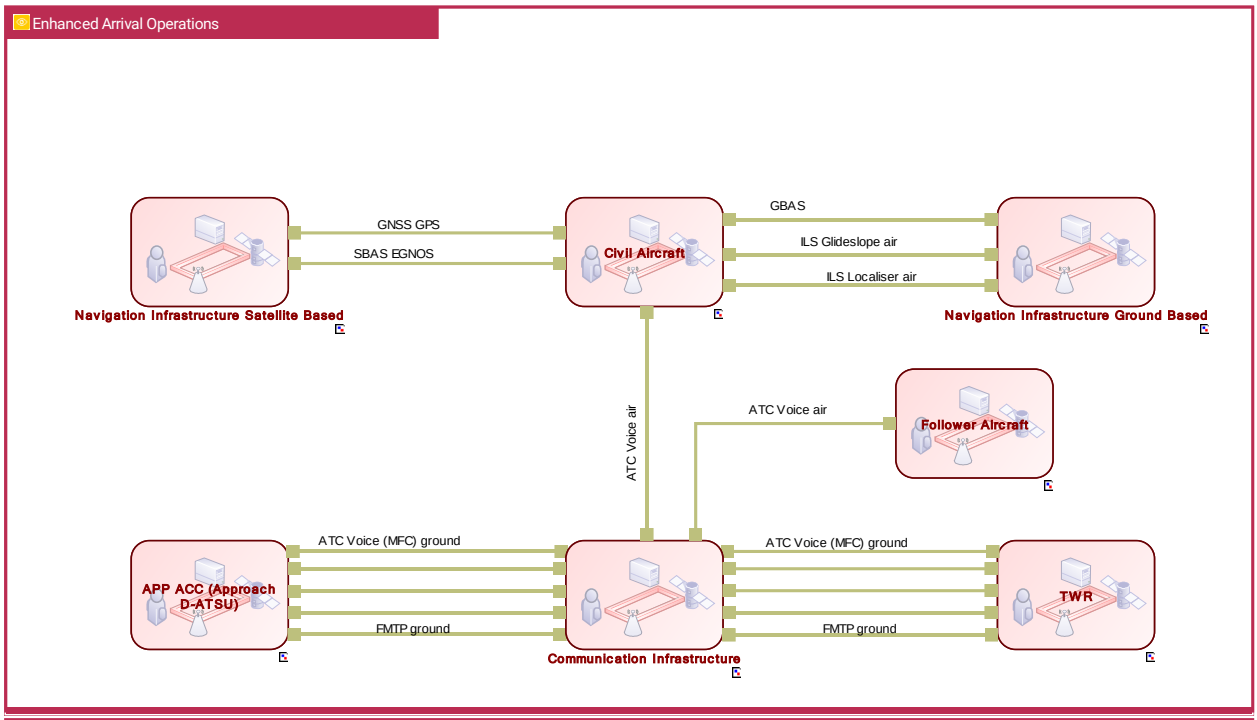


[NSV-4][IGS-to-SRAP-Non-Nominal-01a] Missed Approach (Pilot Initiated) / Go-Around Management (TWR) [A/G Voice Communication, Aerodrome Safety Nets, Arrival Traffic Separation, Civil Aircraft, Controller Human Machine Interaction Management Aerodrome ATC, Tower Runway Controller (PJ.02-W2-14.5)]
[NSV-4][IGS-to-SRAP-Non-Nominal-01b] Missed Approach (Pilot Initiated) / Go-Around Management (APP) [A/G Voice Communication, Approach Traffic Separation, ATC Executive Controller (PJ.02-W2-14.5), Civil Aircraft, Controller Human Machine Interaction Management ER/APP, Safety Nets]
[NSV-4][IGS-to-SRAP-Non-Nominal-03] Loss of TBS-ORD separation indicators [A/G Voice Communication, Civil Aircraft, Follower Aircraft, Tower Runway Controller (PJ.02-W2-14.5)]
[NSV-4][IGS-to-SRAP-Non-Nominal-02] Procedure for Glide Alert Management [A/G Voice Communication, Approach Traffic Separation, ATC Executive Controller (PJ.02-W2-14.5), Civil Aircraft, Controller Human Machine Interaction Management ER/APP, Safety Nets]
[NSV-4][EAO-03a] IGS-to-SRAP Published Approach (Airborne) [Airborne Predictions, APP ACC (Approach D-ATSU), Displays and Controls, Flight Crew, Flight Plan Management, GBAS Ground station, GPS (External), ILS, Lateral and Vertical Guidance, Lateral Positioning, Maneuvering Area Infrastructure, SBAS, Sensors and Antennas, TWR, Vertical Positioning, Voice]
[NSV-4][EAO-03b] IGS-to-SRAP Published Approach (Ground) [A/G Voice Communication (APP ACC), A/G Voice Communication (TWR), Aerodrome Safety Nets, Approach Traffic Separation, Arrival Traffic Separation, Civil Aircraft, Controller Human Machine Interaction Management Aerodrome ATC, Controller Human Machine Interaction Management ER/APP, Coordination and Transfer, Executive Controller (also called Tactical Controller), Flight Planning - Lifecycle Management - Data Distribution, G/G Communication Aerodrome ATC, Legacy G/G Datalink Communications, Safety Nets, Tower Runway Controller]

4.1.1.1 Resource Infrastructure View



4.1.1.2 Resource Orchestration View

4.1.1.2.1 [NSV-4][EAO-03a] IGS-to-SRAP Published Approach (Airborne)

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

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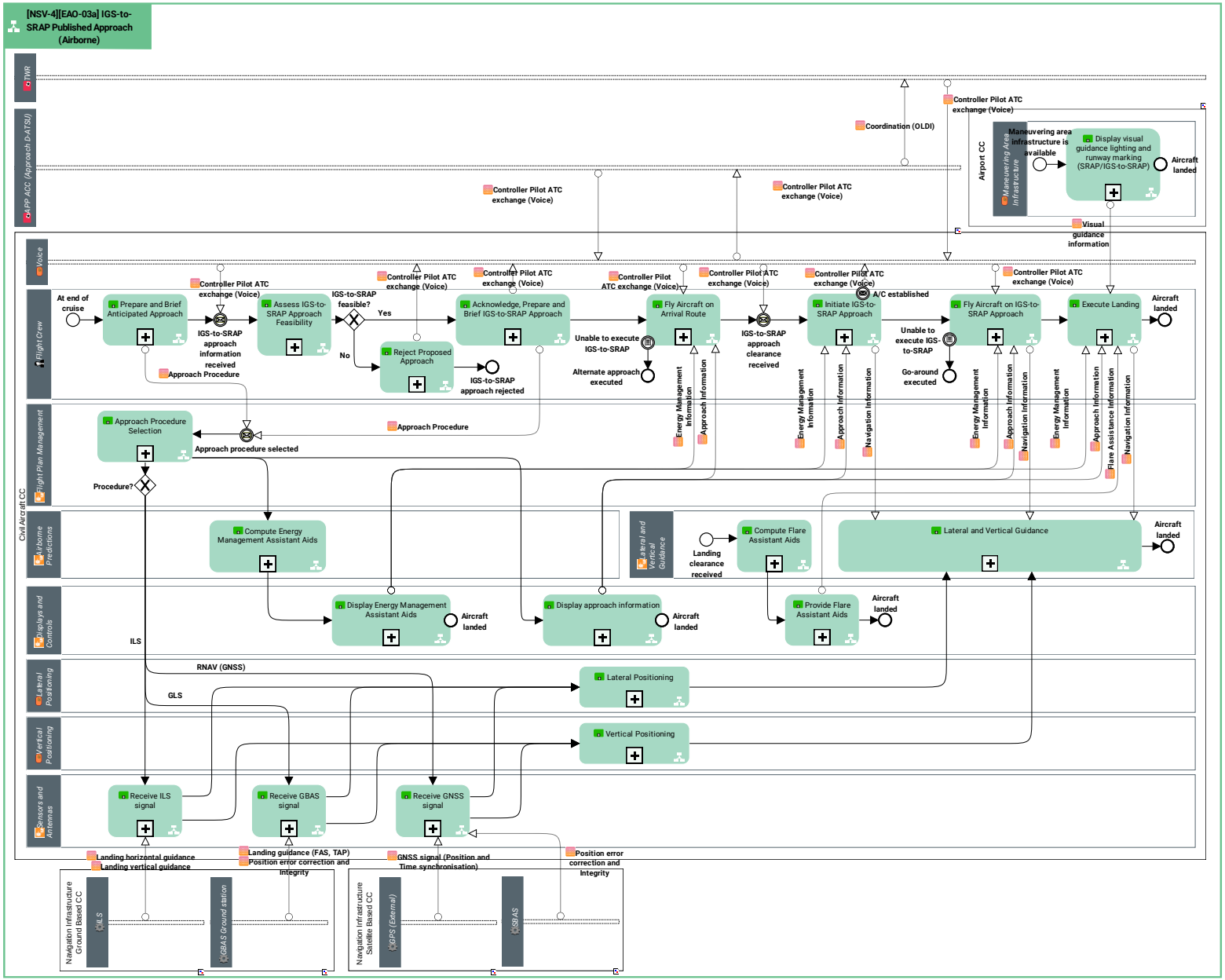

258

Role	Functional Block	Function
	Airborne Predictions	Compute Energy Management Assistant Aids;
	Displays and Controls	Display approach information; Display Energy Management Assistant Aids; Provide Flare Assistant Aids;
Flight Crew		Acknowledge, Prepare and Brief IGS-to-SRAP Approach; Assess IGS-to-SRAP Approach Feasibility; Execute Landing; Fly Aircraft on Arrival Route; Fly Aircraft on IGS-to-SRAP Approach; Initiate IGS-to-SRAP Approach; Prepare and Brief Anticipated Approach; Reject Proposed Approach;
	Flight Plan Management	Approach Procedure Selection;
	Lateral and Vertical Guidance	Compute Flare Assistant Aids; Lateral and Vertical Guidance;
	Lateral Positioning	Lateral Positioning;
	Maneuvering 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;

259

Function	Description

Acknowledge, Prepare and Brief IGS-to-SRAP Approach	Upon proposal of an IGS-to-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 allows the flight crew to select the approach procedure as performed today for any approach.
Assess IGS-to-SRAP Approach Feasibility	The Flight Deck assesses the feasibility of the IGS-to-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 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.
Compute Energy Management Assistant Aids	The Energy Management assistant computes an aid considering the state of the aircraft (e.g. weight and landing configuration chosen by flight crew), destination airport information (e.g. final glide slope) and the external environment i.e. destination airfield weather (wind, temperature, pressure).
Compute Flare Assistant Aids	The Flare assistant computes an aid considering the state of the aircraft (e.g. weight and landing configuration chosen by flight crew), destination airport information (e.g. final glide slope) and the external environment i.e. destination airfield weather (wind, temperature, pressure).
Display approach	Approach information are displayed as for any other approach. In case of increased glide slope, function features (e.g. increased

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information	glide slope value) are displayed in addition the approach information for standard slopes.
Display Energy Management Assistant Aids	Energy management assistant features are displayed in addition the approach information for standard slopes.
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 IGS-to-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 landing clearance. When visual contact is established with the runway (at or before DH), the Flight Deck needs to properly identify visual references.
Initiate IGS-to-SRAP Approach	Once the IGS-to-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 aircraft energy and configuration following SOP, while respecting 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.
Provide Flare Assistant Aids	The Flare assistant features are provided to the crew (e.g. audio cue for Flare anticipation and initiation).
Receive GBAS signal	(self-explanatory)
Receive GNSS signal	(self-explanatory)
	(self-explanatory)

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Receive ILS signal	
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)

260

261 #### 4.1.1.2.2 [NSV-4][EAO-03b] IGS-to-SRAP Published Approach (Ground)

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

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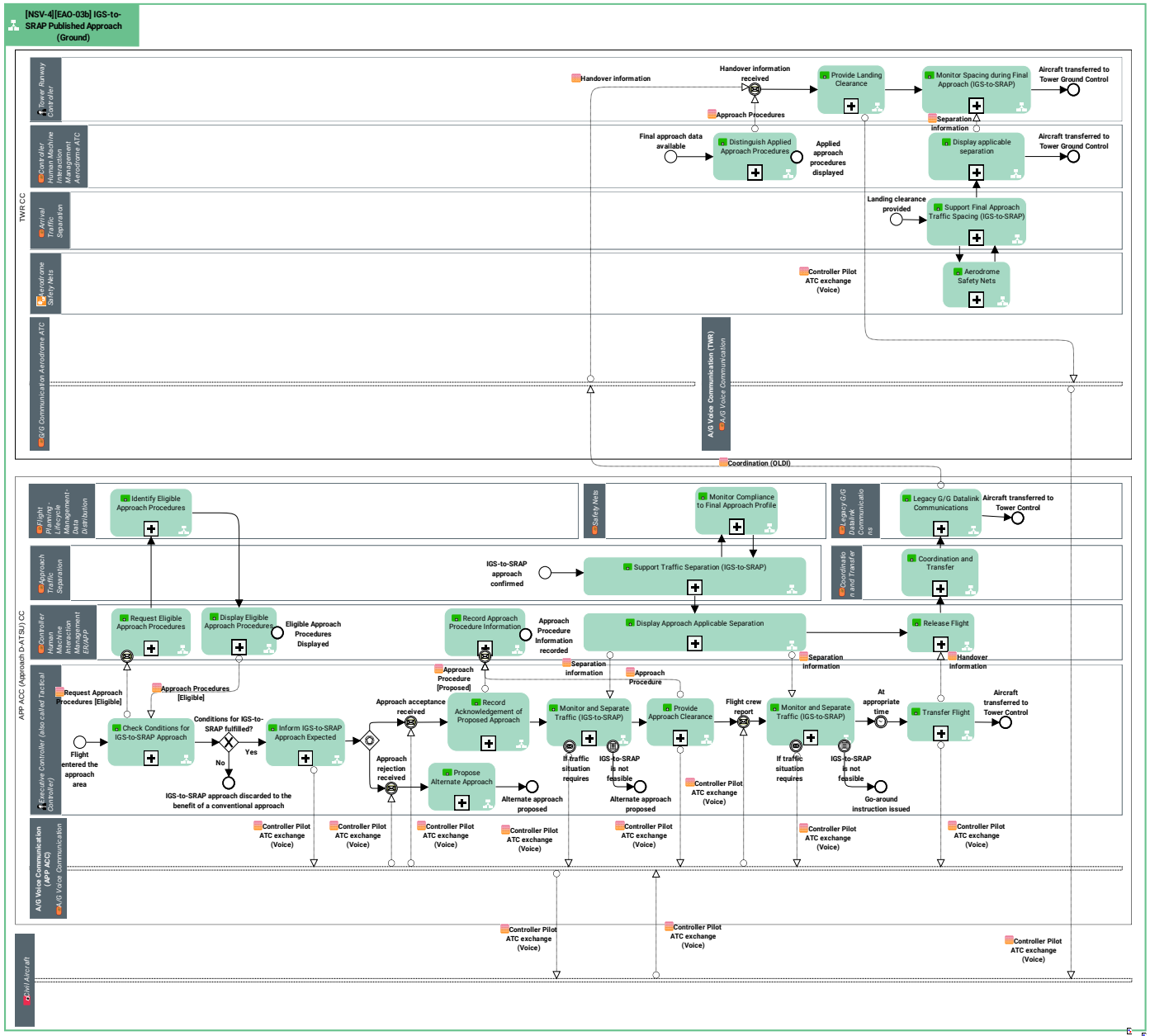

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Role	Functional Block	Function
	Aerodrome Safety Nets	Aerodrome Safety Nets;
	Approach Traffic Separation	Support Traffic Separation (IGS-to-SRAP);
	Arrival Traffic Separation	Support Final Approach Traffic Spacing (IGS-to-SRAP);
	Controller Human 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 IGS-to-SRAP Approach; Inform IGS-to-SRAP Approach Expected; Monitor and Separate Traffic (IGS-to-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	Legacy G/G Datalink

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	Communications	Communications;
	Safety Nets	Monitor Compliance to Final Approach Profile;
Tower Runway Controller		Monitor Spacing during Final Approach (IGS-to-SRAP); Provide Landing Clearance;

268

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 IGS-to-SRAP Approach	Approach Executive Control determines whether a flight can be given an active IGS-to-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 ROCD, 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	That function calculates the list of active procedures an aircraft can fly, according to its known capabilities (from flight plan).

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Procedures	
Inform IGS-to-SRAP Approach Expected	Approach Executive Control initiates the IGS-to-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 (IGS-to-SRAP)	Approach Executive Control sequences and merges the arrival traffic while respecting all separation and spacing criteria for IGS-to-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 (IGS-to-SRAP)	Tower Runway Control monitors the final approach, especially: 1. the spacing with aircraft ahead, and 2. 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 enables the controller to input and record the 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.
Support Final Approach Traffic Spacing (IGS-to-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 an IGS-to-SRAP procedure).
Support Traffic Separation (IGS-to-SRAP)	This function will support the controller in the visualization of the separation to apply between each pair of aircraft (one of them following an IGS-to-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][IGS-to-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 IGS-to-SRAP approach.

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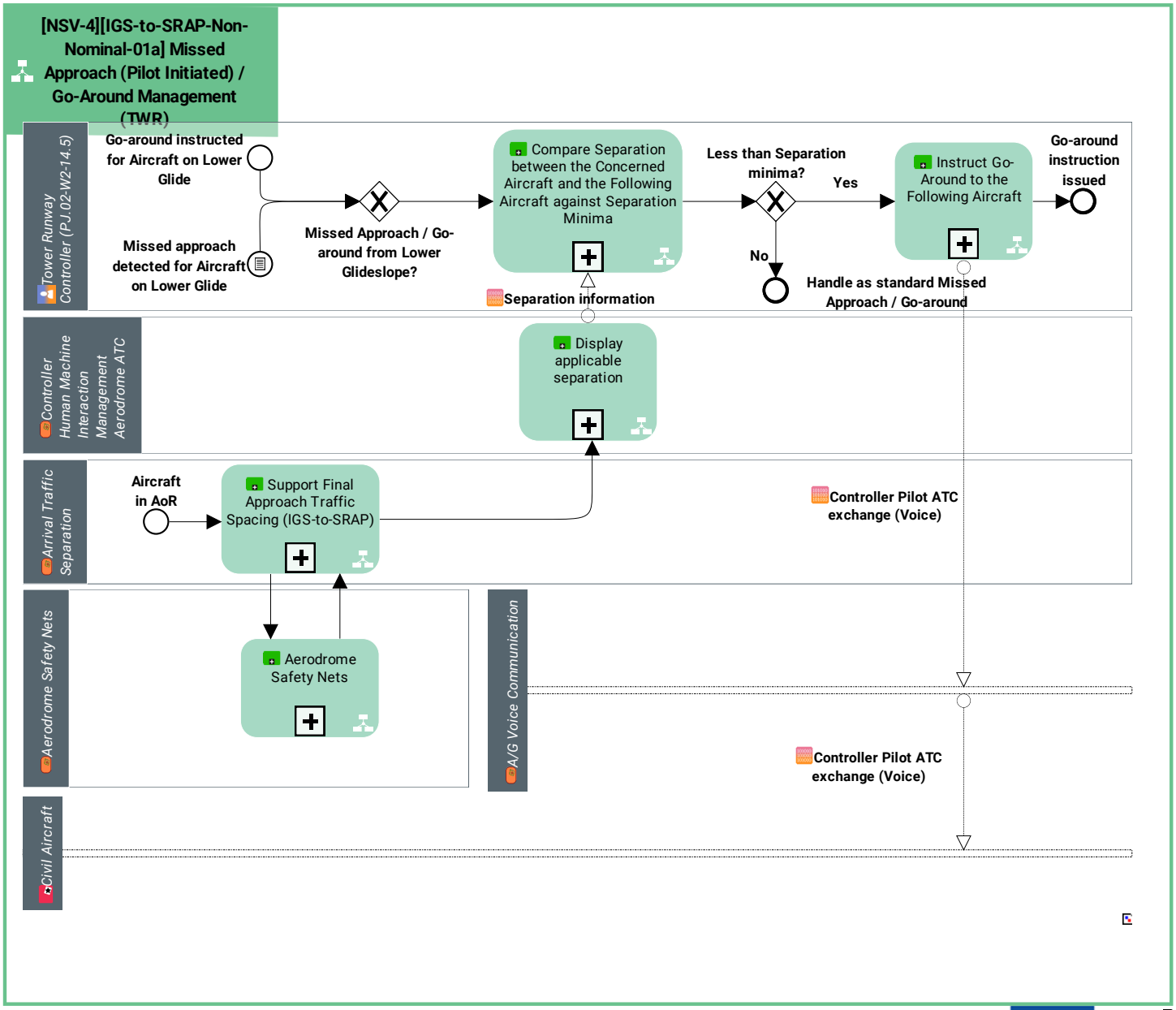

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Role	Functional Block	Function
	Aerodrome Safety Nets	Aerodrome Safety Nets;
	Arrival Traffic Separation	Support Final Approach Traffic Spacing (IGS-to-SRAP);
	Controller Human Machine Interaction Management Aerodrome ATC	Display applicable separation;
Tower Runway Controller (PJ.02-W2-14.5)		Compare Separation between the Concerned Aircraft and the Following Aircraft against Separation Minima; Instruct Go-Around to the Following Aircraft;

278

Function	Description
Aerodrome Safety Nets	This functional block detects and triggers alerts within manoeuvering 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	Executive controller or tower runway controller instructs a go-around to the aircraft following the one already going-around.

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Following Aircraft	
Support Final Approach Traffic Spacing (IGS-to-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 an IGS-to-SRAP procedure).

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

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

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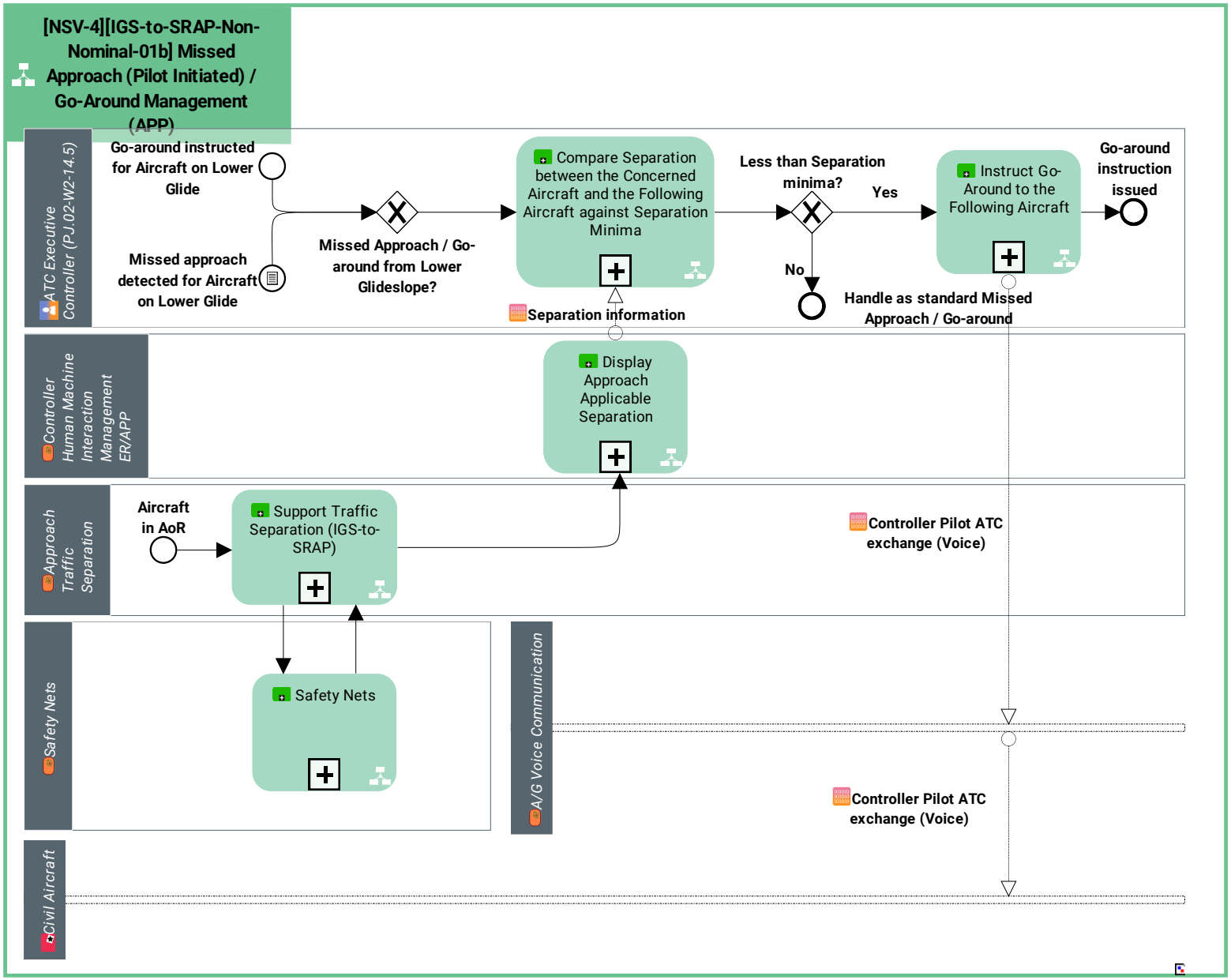

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Role	Functional Block	Function
	Approach Traffic Separation	Support Traffic Separation (IGS-to-SRAP);
ATC Executive Controller (PJ.02-W2-14.5)		Compare Separation between the Concerned Aircraft and the Following Aircraft against Separation Minima; Instruct Go-Around to the Following Aircraft;
	Controller Human Machine Interaction Management ER/APP	Display Approach Applicable Separation;
	Safety Nets	Safety Nets;

288

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.

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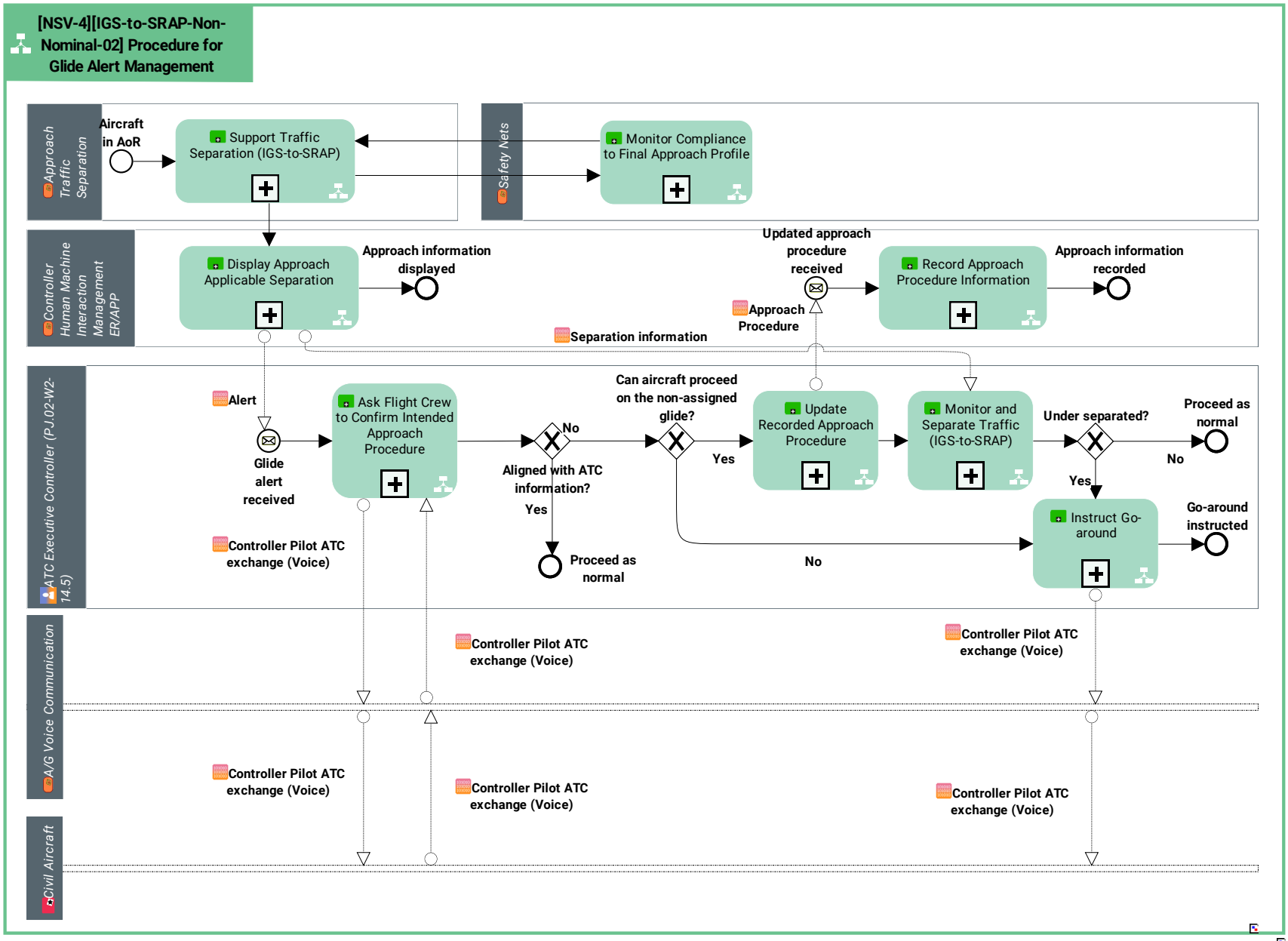
	? Minimum Safe Altitude Warning (MSAW) detecting and alerting in case of infringement the minimum safe altitude form the ground or from an obstacle. ? Airspace Proximity Warning (APW) detecting and alerting in case an aircraft is going to infringe restricted airspace. ? Approach Path Monitoring (APM) detecting and alerting in case an aircraft deviates from the glide path.
Support Traffic Separation (IGS-to-SRAP)	This function will support the controller in the visualization of the separation to apply between each pair of aircraft (one of them following an IGS-to-SRAP procedure).

4.1.1.2.5 [NSV-4][IGS-to-SRAP-Non-Nominal-02] Procedure for Glide Alert Management

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


[NSV-4][IGS-to-SRAP-Non-Nominal-02] Procedure for Glide Alert Management
Approach Traffic Separation
Aircraft in AoR
Support Traffic Separation (IGS-to-SRAP)
Safety Nets
Monitor Compliance to Final Approach Profile
Controller Human Machine Interaction Management ER/APP
Display Approach Applicable Separation
Approach information displayed
Updated approach procedure received
Approach Procedure
Record Approach Procedure Information
Approach information recorded
Separation information
ATC Executive Controller (PJ.02-W2-14.5)
Alert
Glide alert received
Ask Flight Crew to Confirm Intended Approach Procedure
No
Aligned with ATC information?
Yes
Proceed as normal
Can aircraft proceed on the non-assigned glide?
Yes
No
Update Recorded Approach Procedure
Monitor and Separate Traffic (IGS-to-SRAP)
Under separated?
No
Proceed as normal
Yes
Instruct Go-around
Go-around instructed
Controller Pilot ATC exchange (Voice)
A/G Voice Communication
Controller Pilot ATC exchange (Voice)
Controller Pilot ATC exchange (Voice)
Controller Pilot ATC exchange (Voice)
Controller Pilot ATC exchange (Voice)
Controller Pilot ATC exchange (Voice)
Civil Aircraft

296

Role	Functional Block	Function
	Approach Traffic Separation	Support Traffic Separation (IGS-to-SRAP);
ATC Executive Controller (PJ.02-W2-14.5)		Ask Flight Crew to Confirm Intended Approach Procedure; Instruct Go-around; Monitor and Separate Traffic (IGS-to-SRAP); Update Recorded Approach Procedure;
	Controller Human Machine Interaction Management ER/APP	Display Approach Applicable Separation; Record Approach Procedure Information;
	Safety Nets	Monitor Compliance to Final Approach Profile;

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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 (IGS-to-SRAP)	Approach Executive Control sequences and merges the arrival traffic while respecting all separation and spacing criteria for IGS-to-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.
Record Approach Procedure Information	This function enables the controller to input and record the approach procedure information.
Support Traffic Separation (IGS-to-SRAP)	This function will support the controller in the visualization of the separation to apply between each pair of aircraft (one of them following an IGS-to-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.

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299 #### 4.1.1.2.6 [NSV-4][IGS-to-SRAP-Non-Nominal-03] Loss of TBS-ORD separation indicators

300 This is a technical realisation of a non-nomial Use Case for loss of TBS/ORD separation indicators during
301 IGS-to-SRAP approach.
302

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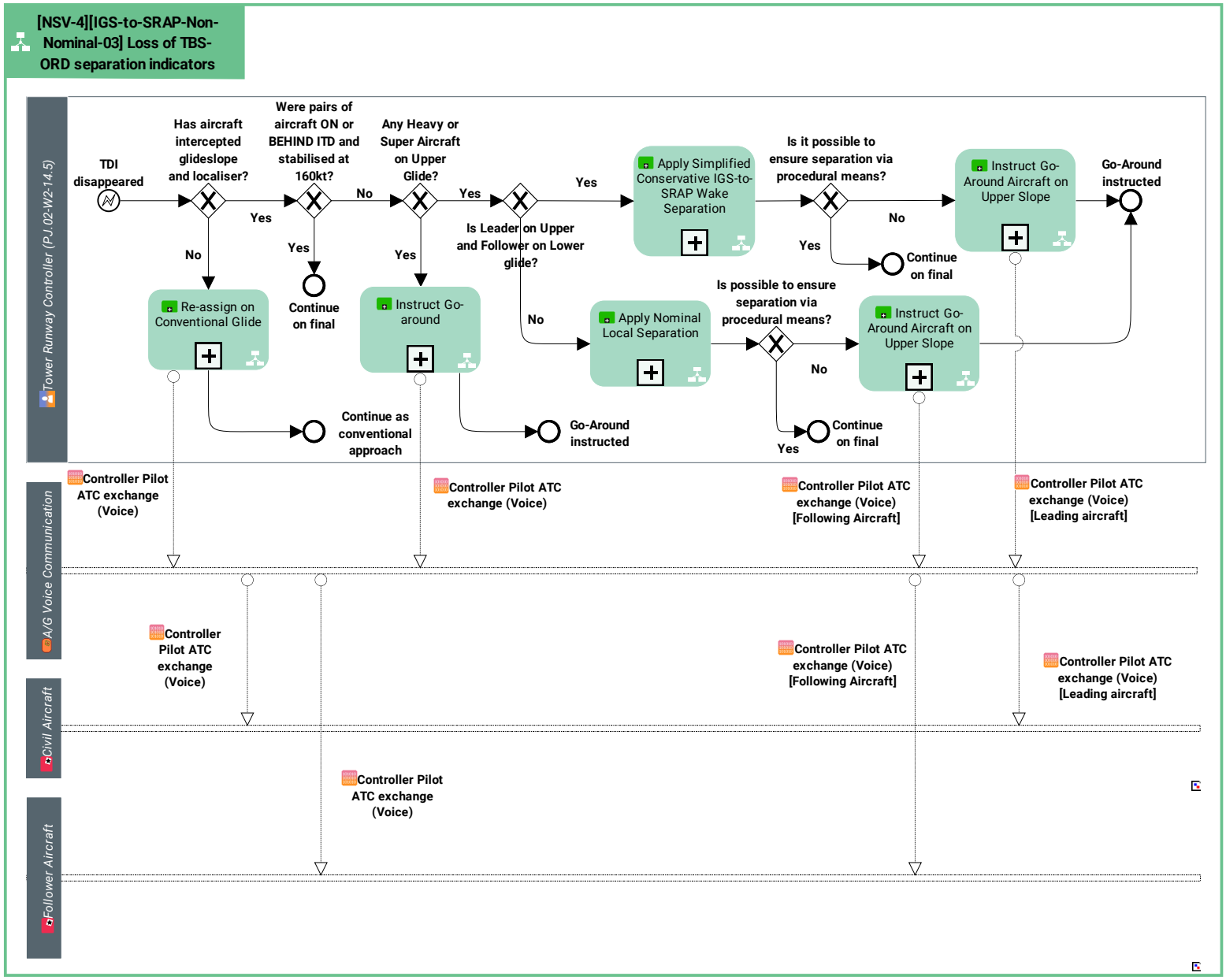
[NSV-4][IGS-to-SRAP-Non-Nominal-03] Loss of TBS-ORD separation indicators
Tower Runway Controller (PJ.02-W2-14.5)
TDI disappeared
Has aircraft intercepted glideslope and localiser?
Were pairs of aircraft ON or BEHIND ITD and stabilised at 160kt?
Any Heavy or Super Aircraft on Upper Glide?
Is Leader on Upper and Follower on Lower glide?
Apply Simplified Conservative IGS-to-SRAP Wake Separation
Is it possible to ensure separation via procedural means?
Instruct Go-Around Aircraft on Upper Slope
Go-Around instructed
Re-assign on Conventional Glide
Continue on final
Instruct Go-around
Apply Nominal Local Separation
Is possible to ensure separation via procedural means?
Instruct Go-Around Aircraft on Upper Slope
Continue as conventional approach
Go-Around instructed
Continue on final
A/G Voice Communication
Controller Pilot ATC exchange (Voice)
Controller Pilot ATC exchange (Voice) [Following Aircraft]
Controller Pilot ATC exchange (Voice) [Leading aircraft]
Civil Aircraft
Follower Aircraft

305

Role	Functional Block	Function
Tower Runway Controller (PJ.02-W2-14.5)		Apply Nominal Local Separation; Apply Simplified Conservative IGS-to-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;

306

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 IGS-to-SRAP Wake Separation	In case of leader on upper glide and follower on lower glide, the separation has to be increased. To simplify the rule as the assistance tool is lost, a simplified conservative wake separation compliant with IGS-to-SRAP is applied by the ATCO, determined at each airport level, according to the separation used locally.
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.

307

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4.1.2 Resource Composition

4.1.3 Service view

4.1.3.1 Service description

Service	Service description

4.1.3.2 Service Provisioning

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

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

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4.1.3.3 Service Realization

4.1.3.3.1 Interaction 1 Controller Pilot ATC exchange(Voice).Civil Aircraft (PJ.02-02)_CC and APP ACC (Approach D-ATSU)_CC (Duplicata)

System Port: ATC_VOICE_MFC_GND at APP ACC_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: VOICE_RADIO_GND at Communication Infrastructure_CC

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

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

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

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

329

330 **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	

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System Port: ATC_VOICE_MFC_GND at APP ACC_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_MFC_GND at APP ACC_CC

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

System Port: ATC_VOICE at Civil Aircraft_CC

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

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	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

4.1.3.3.2 Interaction 1 Controller Pilot ATC exchange(Voice).Civil Aircraft (PJ.02-02)_CC and TWR_CC (Duplicata)

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_MFC_GND at TWR_CC

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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_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	

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	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_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

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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 1 Coordination (OLDI).TWR_CC and APP ACC (Approach D-ATSU)_CC (Duplicata)

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

Protocol Stack	Protocol
IP	

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

Protocol Stack	Protocol
FMTP ground	
	FMTP
	TCP
	IP

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

Protocol Stack	Protocol
FMTP ground	
	FMTP
	TCP
	IP

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

Protocol Stack	Protocol
IP	

4.1.3.3.4 Interaction 1 Error correction and Integrity.Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Ground Based_CC (Duplicata)

System Port: NAV_GBAS_AIR at Navigation Infrastructure Ground Based_CC

Protocol Stack	Protocol
GBAS	
	VDB Link VHF 108 - 117.95 MHz

System Port: GBAS_VDB at Civil Aircraft_CC

Protocol Stack	Protocol
GBAS	
	VDB Link VHF 108 - 117.95 MHz

4.1.3.3.5 Interaction 1 GNSS signal (Position and Time synchronisation).Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Satellite Based_CC (Duplicata)

System Port: SAT_GNSS at Civil Aircraft_CC

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

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

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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

4.1.3.3.6 Interaction 1 Landing guidance (FAS, TAP).Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Ground Based_CC (Duplicata)

System Port: NAV_GBAS_AIR at Navigation Infrastructure Ground Based_CC

Protocol Stack	Protocol
GBAS	
	VDB Link VHF 108 - 117.95 MHz

System Port: GBAS_VDB at Civil Aircraft_CC

Protocol Stack	Protocol
GBAS	
	VDB Link VHF 108 - 117.95 MHz

4.1.3.3.7 Interaction 1 Landing horizontal guidance.Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Ground Based_CC (Duplicata)

System Port: ILS_LOC at Civil Aircraft_CC

Protocol Stack	Protocol

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ILS Localiser air	
	UHF 108 - 112 MHz

System Port: NAV_ILS_LOC_AIR at Navigation Infrastructure Ground Based_CC

Protocol Stack	Protocol
ILS Localiser air	
	UHF 108 - 112 MHz

4.1.3.3.8 Interaction 1 Landing vertical guidance.Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Ground Based_CC (Duplicata)

System Port: ILS_GP at Civil Aircraft_CC

Protocol Stack	Protocol
ILS Glideslope air	
	UHF 328.6 - 335.4 MHz

System Port: NAV_ILS_GP_AIR at Navigation Infrastructure Ground Based_CC

Protocol Stack	Protocol
ILS Glideslope air	
	UHF 328.6 - 335.4 MHz

4.1.3.3.9 Interaction 1 Position error correction.Civil Aircraft (PJ.02-02)_CC and Navigation Infrastructure Satellite Based_CC (Duplicata)

System Port: SAT_EGNOS at Civil Aircraft_CC

Protocol Stack	Protocol
SBAS EGNOS	
	L1 1572.42MHz

System Port: NAV_SAT_GNSS at Navigation Infrastructure Satellite Based_CC

Protocol Stack	Protocol
GNSS BEIDOU	
	B1 1561.098 MHz

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	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

409

410 **4.1.3.3.10 Interaction Controller Pilot ATC exchange(Voice).**

411 **System Port:** ATC_VOICE_MFC_GND at TWR_CC

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

412

413 **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_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_MFC_GND at TWR_CC

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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_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	

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	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
OPC (Operational) Voice air	
	VHF
	HF (selcal)

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4.2 Functional and non-Functional Requirements

4.2.1 Requirements for ground

4.2.1.1 Controller separation assistance tool

The following requirements are common to all concepts and they all refer to the controller separation assistance tool. These requirements are common with PJ02-01 requirements relating to that support tool.

[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>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

[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	

[REQ Trace]

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Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

446

447 [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	

448

449 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

450

451 [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 fort TDIs computation but may increase controllers situational awareness
Category	

452

453 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

454

455 [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	

456

457 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

458

459 [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	

460

461 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5

<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

462

463 [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	<Interoperability> , <Safety>

464

465 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

466

467 [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 if 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	

468

469 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

470

471 [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	

472

473 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

474

475 [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	

476

477 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

478

479 [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	

480

481 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

482

483 [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>

484

485 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

486

487 [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>

488

489 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

490

491 [REQ]

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

492

493 [REQ Trace]

Relationship	Linked Element Type	Identifier

<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

494

495 [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>

496

497 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

498

499 [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>

500

501 [REQ Trace]

Relationship	Linked Element Type	Identifier

<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

502

503 [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>

504

505 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1204
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1205

506

507 [REQ]

Identifier	REQ-02.01-TS-ARR3.0022
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>

508

509 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

510

511 [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 aircrafts 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	

512

513 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

514

515 [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>

516

517 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

518

519 [REQ]

Identifier	REQ-02.01-TS-ARR3.0030
Title	Visual Approach
Requirement	Upon a Visual Approch 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>

520

521 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

522

523 [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	

524

525 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

526

527 [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>

528

529 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

530

531 [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	

532

533 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

534

535 [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>

536

537 [REQ Trace]

Relationship	Linked Element Type	Identifier

<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

538

539 [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	

540

541 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

542

543 [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	

544

545 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

546

547 [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	

548

549 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

550

551 [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	

552

553 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

554

555 [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	

556

557 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

558

559 [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	

560

561 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

562

563 [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	

564

565 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

566

567 [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	

568

569 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

570

571 [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	

572

573 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

574

575 [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	

576

577 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

578

579 [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 Ocupancy Time - Runway Intent
Status	<validated>
Rationale	Aircraft offline data in appropriate category is necessary for display on the HMI
Category	<Data> , <Interoperability>

580

581 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

582

583 [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	<Data> , <Interoperability>

584

585 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

586

587 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0070
Title	FTD computation with constraints
Requirement	For each pair of arrivaing 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	

588

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589 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

590

591 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0071
Title	Second FTD computation with constraints
Requirement	For each pair of arrivaing 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	

592

593 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

594

595 [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

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	- 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	<Interoperability> , <Functional>

596

597 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

598

599 [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	

600

601 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

602

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603 [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	

604

605 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

606

607 [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	

608

609 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1206

610

611 [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>

612

613 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

614

615 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0102
Title	Sequence change
Requirement	For each pair of consecutive arriving aircrafts,(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	

616

617 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

618

619 [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	

620

621 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

622

623 [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 that 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	

624

625 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

626

627 [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>

628

629 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

630

631 [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	

632

633 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

634

635 [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>

636

637 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

638

639 [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	

640

641 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

642

643 [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	

644

645 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

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646

647 [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	

648

649 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

650

651 [REQ]

Identifier	REQ-12.02.02-TS-OPS1.0150
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	

652

653 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1107

654

655 [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>

656

657 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

658

659 [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>

660

661 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

662

663 [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	<HMI> , <Interoperability>

664

665 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

666

667 [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>

668

669 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

670

671 [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 to insert a gap behind an aircraft for departure or other reason
Category	<HMI>

672

673 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

674

675 [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 aircrafts on the centre line for the gap value to be inserted, etc.
Category	<Functional>

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676

677 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

678

679 [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	<Interoperability> , <HMI>

680

681 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

682

683 [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>

684

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685 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

686

687 [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>

688

689 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

690

691 [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 dispolay the chevron differently taking into account the associated constraint
Category	<Interoperability>

692

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693 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

694

695 [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 differenciate the constraint behind the TDIs
Category	<HMI>

696

697 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

698

699 [REQ]

Identifier	REQ-02.01-TS-ARR1.0040
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 constaint behind non safety constraints
Category	<Functional>

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700

701 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

702

703 [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 constraintbehind the non safety constraint
Category	<HMI>

704

705 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

706

707 [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

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	for al aircrafts
Category	<Interoperability> , <HMI>

708

709 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

710

711 [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>

712

713 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105

714

715 [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 aircrafts.
Status	<in progress>
Rationale	Computation of TDIs in CSPR

Category	<Functional>

716

717 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106

718 #### 4.2.1.1.1 Other ground requirements

719 [REQ]

Identifier	REQ-14.5-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	<Functional> , <HMI> , <Safety> , <Design>

720

721 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1006
<ALLOCATED_TO>	<Function>	Identify Eligible Approach Procedures Request Eligible Approach Procedures

722

723 [REQ]

Identifier	REQ-14.5-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	<Functional> , <HMI> , <Safety> , <Design>

724

725 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1006
<ALLOCATED_TO>	<Function>	Display Eligible Approach Procedures

726

727 [REQ]

Identifier	REQ-14.5-TS-GND-0003
Title	Cleraed 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	<Design> , <Safety> , <Functional> , <HMI>

728

729 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1015
<ALLOCATED_TO>	<Function>	Record Approach Procedure Information

730

731 [REQ]

Identifier	REQ-14.5-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> , <Functional> , <Safety>

732

733 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1006
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1015

734

735 [REQ]

Identifier	REQ-14.5-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	<Functional> , <Safety> , <Design> , <HMI>

736

737 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1017
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1016
<ALLOCATED_TO>	<Function>	Display Eligible Approach Procedures

738

739 [REQ]

Identifier	REQ-14.5-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	<Functional> , <Design> , <HMI> , <Safety>

740

741 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1106
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1104

742

743 [REQ]

Identifier	REQ-14.5-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>

744

745 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1109

746

747 [REQ]

Identifier	REQ-14.5-TS-GND-0008
Title	Final approach interception location references display for Approach Executive Controller
Requirement	Final approach interception location references should be

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	displayed on the Approach Executive Controller display, according to local assessment.
Status	<validated>
Rationale	Self explanatory
Category	<Design> , <Safety> , <Functional> , <HMI>

748

749 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1109
<ALLOCATED_TO>	<Function>	Monitor and Separate Traffic (IGS-to-SRAP)

750

751 [REQ]

Identifier	REQ-14.5-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	<in progress>
Rationale	Self explanatory
Category	<Safety> , <Functional>

752

753 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1108

754

755 [REQ]

Identifier	REQ-14.5-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

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	optimise the sequence.
Status	<in progress>
Rationale	Self explanatory
Category	<Functional> , <Performance>

756

757 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1112

758

759 [REQ]

Identifier	REQ-14.5-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	<Performance> , <Functional>

760

761 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1112

762

763 [REQ]

Identifier	REQ-14.5-TS-GND-0012
Title	Training/briefing on IGS-to-SRAP procedures
Requirement	Approach Executive Control and Tower Runway Control shall be briefed and trained on how to conduct IGS-to-SRAP operations, and the impact compared to conventional approaches with regards 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>

764

765 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1005
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1008
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1007
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1014
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1013
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1113
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GALT.0001
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GALT.0002
<ALLOCATED_TO>	<Role>	ATC Executive Controller (PJ.02-W2-14.5) Tower Runway Controller (PJ.02-W2-14.5)

766

767 [REQ]

Identifier	REQ-14.5-TS-GND-0013
Title	Training on non nominal cases and degraded modes linked to IGS-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 (see list of hazards..), 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>

768

769 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1011
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1010
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GALT.0001
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GALT.0002
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GALT.0003
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GALT.0004
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GOAR.0001
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GOAR.0002
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ORDF.0001
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ORDF.0002
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ORDF.0003
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ORDF.0004
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ORDF.0005
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ORDF.0006
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ORDF.0007
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ORDF.0008
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ORDF.0009
<ALLOCATED_TO>	<Role>	ATC Executive Controller (PJ.02-W2-14.5) Tower Runway Controller (PJ.02-W2-14.5)

770

771 [REQ]

Identifier	REQ-14.5-TS-GND-0014
Title	Particular training for vectoring for IGS-to-SRAP
Requirement	Training of Approach Executive Control shall consider the need for vectoring the aircraft onto ITSR approach such as to avoid final approach interception from above
Status	<validated>
Rationale	Self explanatory
Category	<Safety>

772

773 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1009

774

775 [REQ]

Identifier	REQ-14.5-TS-GND-0015
Title	Runway marking for IGS-to-SRAP
Requirement	IGS-to-SRAP runway marking shall consist of a set of threshold markings, aiming point markings, touch down zone (TDZ) markings
Status	<in progress>
Rationale	Self explanatory
Category	<Interoperability> , <Design> , <Safety>

776

777 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-APT.1301

778

779

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780 [REQ]

Identifier	REQ-14.5-TS-GND-0016
Title	Threshold, aiming point and TDZ markings for IGS-to-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	<in progress>
Rationale	Self explanatory
Category	<Interoperability> , <Safety> , <Design>

781

782 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-APT.1301
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-APT.1302

783

784 [REQ]

Identifier	REQ-14.5-TS-GND-0017
Title	Identification of second threshold for IGS-to-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 an specific letter in addition of the runway identifier
Status	<in progress>
Rationale	Self explanatory
Category	<Performance> , <Safety> , <Design> , <Functional>

785

786 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-APT.1301

787

788

789 [REQ]

Identifier	REQ-14.5-TS-GND-0018
Title	Approach lighting system for IGS-to-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	<in progress>
Rationale	Self explanatory
Category	<Interoperability> , <Safety> , <Design>

790

791 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-APT.1301
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-APT.1302
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-APT.1303
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-APT.1304

792

793 [REQ]

Identifier	REQ-14.5-TS-GND-0019
Title	PAPI/VASI for IGS-to-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	<in progress>
Rationale	Self explanatory
Category	<Design> , <Safety> , <Interoperability>

794

795 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-APT.1301

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796

797 [REQ]

Identifier	REQ-14.5-TS-GND-0020
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	<Safety> , <Functional> , <HMI> , <Design>

798

799 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1016
<ALLOCATED_TO>	<Role>	ATC Executive Controller (PJ.02-W2-14.5)

800

801 [REQ]

Identifier	REQ-14.5-TS-GND-0021
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>

802

803 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GOAR.0003
<ALLOCATED_TO>	<Role>	ATC Executive Controller (PJ.02-W2-14.5)

4.2.2 Requirements for aircraft systems

4.2.2.1 IGS to SRAP airborne function

The following requirements apply to aircraft systems supporting IGS to SRAP concept.

[REQ]

Identifier	REQ-14.5-TS-ACFT-0001
Title	SRAP training
Requirement	The Flight Crew shall be trained for managing and flying SRAP operations
Status	<in progress>
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-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2103
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2105
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2108
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2109

[REQ]

Identifier	REQ-14.5-TS-ACFT-0002
Title	IGS training
Requirement	The Flight Crew shall be trained for managing and flying IGS operations
Status	<validated>
Rationale	e.g. IGS principles, differences in visual references, etc
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5

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<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2101
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2102
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2104
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2103
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2108
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2109
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-GOAR.0004

814

815 [REQ]

Identifier	REQ-14.5-TS-ACFT-0003
Title	Operational conditions for IGS (1/2)
Requirement	Aircraft Manufacturer may define per aircraft type the suitable operational conditions for flying an increase glideslope, as function of the slope angle
Status	<in progress>
Rationale	Flight crew shall be aware of the aircraft capability for IGS operations
Category	<Functional> , <Safety>

816

817 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2101
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2102
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2108
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2103

818

819 [REQ]

Identifier	REQ-14.5-TS-ACFT-0004
Title	Operational conditions for IGS (2/2)
Requirement	Aircraft Operators should define per aircraft type the suitable operational conditions for flying an increase glideslope, as function of the slope angle
Status	<in progress>

Rationale	Flight crew shall be aware of the aircraft capability for IGS operations
Category	<Safety> , <Functional>

820

821 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2101
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2102
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2103
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2108

822

823 [REQ]

Identifier	REQ-14.5-TS-ACFT-0005
Title	IGS impact on MMEL
Requirement	The Aircraft Manufacturer shall provide in the master minimum equipment list (MMEL) the operational impact in case a specific functionality is required by IGS operations (e.g. the energy management function and/or the flare assistance supporting function)
Status	<in progress>
Rationale	Flight crew shall be aware of the aircraft capability for IGS operations
Category	<Safety> , <Functional>

824

825 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2103
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2108

826

827 [REQ]

Identifier	REQ-14.5-TS-ACFT-0006
Title	IGS impact on MEL

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Requirement	The Aircraft Operator may provide in its minimum equipment list (MEL) the operational impact in case a specific functionality is required by IGS operations (e.g. the energy management function and/or the flare assistance supporting function)
Status	<in progress>
Rationale	Flight crew shall be aware of the aircraft capability for IGS operations
Category	<Functional> , <Safety>

828

829 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2103
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2108

830

831 [REQ]

Identifier	REQ-14.5-TS-ACFT-0007
Title	Flare assistant slope range
Requirement	Flare assistant shall support glideslopes up to 4.49°.
Status	<validated>
Rationale	Maximum slope considered by PJ02-02 enhanced approach procedures.
Category	<Design>

832

833 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2102
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1212

834

835 [REQ]

Identifier	REQ-14.5-TS-ACFT-0008
Title	Flare assistant
Requirement	Flare assistant shall help flight crew to correctly perform flare
Status	<validated>

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Rationale	To avoid hard landing or long landing.
Category	<Functional>

836

837 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2102

838

839 [REQ]

Identifier	REQ-14.5-TS-ACFT-0009
Title	Flare assistant compatibility with flight modes
Requirement	Flare assistant shall be available with manual flight only.
Status	<validated>
Rationale	If Flare assistant indications do not correspond to Autopilot actions, It could disturb the monitoring performed by the flight crew, encourage them to takeover controls or perform a go-around.
Category	<Design>

840

841 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2102
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2106

842

843 [REQ]

Identifier	REQ-14.5-TS-ACFT-0010
Title	Flare assistant SOP
Requirement	Flare assistant shall not significantly modify current SOP.
Status	<validated>
Rationale	For Human Performance reasons
Category	<Functional>

844

845 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2102

846

847 [REQ]

Identifier	REQ-14.5-TS-ACFT-0011
Title	Flare assistant compatibility with approaches
Requirement	Flare assistant should be available on any type of approaches.
Status	<validated>
Rationale	For Human Performance reasons, it is important to provide a similar level of assistance whatever the type of approach
Category	<Design>

848

849 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2102

850

851 [REQ]

Identifier	REQ-14.5-TS-ACFT-0012
Title	Energy management assistant for IGS
Requirement	Flight Crew may be assisted by an energy management function
Status	<validated>
Rationale	An energy management assistance function may be useful for flying approaches under operational conditions leading to more complex management of energy dissipation (e.g. increased glide path angle, tailwind, etc)
Category	<Functional>

852

853 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2101
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2107

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854

855 [REQ]

Identifier	REQ-14.5-TS-ACFT-0013
Title	EM assistant slope range
Requirement	Energy management assistant shall support glideslopes up to 4.49°.
Status	<validated>
Rationale	Maximum slope considered by PJ02-02 enhanced approach procedures
Category	<Design>

856

857 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-CTL.1212
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2101

858

859 [REQ]

Identifier	REQ-14.5-TS-ACFT-0014
Title	Energy management assistant
Requirement	Energy management assistant shall help flight crew determine whether the aircraft can decelerate to be timely stabilized.
Status	<validated>
Rationale	Flight Deck shall be able to decelerate the aircraft during final approach, even under flight conditions that reduce deceleration capability
Category	<Functional>

860

861 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2101

862

863 [REQ]

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Identifier	REQ-14.5-TS-ACFT-0015
Title	EM compatibility with flight modes
Requirement	Energy management assistant should be available with both manual and automatic flight.
Status	<validated>
Rationale	As long as the flight crew is involved in the energy management task, assistance is useful both in manual and automatic flight.
Category	<Design>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2101
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2106

[REQ]

Identifier	REQ-14.5-TS-ACFT-0016
Title	EM SOP
Requirement	Energy management assistant shall not significantly modify current SOP.
Status	<validated>
Rationale	For Human Performance reasons
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2107
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2101

[REQ]

Identifier	REQ-14.5-TS-ACFT-0017
Title	EM assistant compatibility with approaches
Requirement	Energy management assistant shall be available on any type of approaches.

Status	<validated>
Rationale	For Human Performance reasons, it is important to provide a similar level of assistance whatever the type of approach
Category	<Design>

872

873 [REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.02-PJ.02-W2-14.5
<SATISFIES>	< ATMS Requirement>	REQ-14.5-SPRINTEROP-ACFT.2101

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5 Implementation Options

PJ.02-W2-14.5 solution encompasses several technical enablers. The chapter 3.1.1 of this document specify for each enabler if it is optional or required.

The list of the optional enablers is given below.

EN code	EN description
A/C-01	Enhanced positioning for LPV/RNP based on Single Frequency SBAS
A/C-02a	Enhanced positioning using GBAS single frequency
A/C-04a	Flight management and guidance for Advanced RNP
A/C-04	Flight management and guidance for improved lateral navigation in approach via RNP
A/C-05a	APV Barometric VNAV
A/C-06	Flight management and guidance for LPV approach based on SBAS
A/C-56a	Flight management and guidance for Precision Approach GBAS CATII/III using GPS L1
A/C-86	On-board assistance to aircraft energy management
A/C-87	On-board assistance to flare
AERODROME-ATC-94	Aerodrome ATC system to support IGS-to-SRAP operations (separation delivery)
APP ATC 163	Approach ATC system to support IGS-to-SRAP operations (separation delivery)
CTE-N06	Space Based Augmentation System (SBAS)
CTE-N07a	GBAS Cat I based on Single-Constellation / Single-Frequency GNSS (GPS L1)
CTE-N07b	GBAS Cat II/III based on Single-Constellation / Single-Frequency GNSS (GPS L1)
CTE-N07	Ground Based Augmentation System (GBAS)

Table 5: optional enablers of solution PJ.02-W2-14.5

A/C-01 to A/C-56a, and CTE enablers reflect the fact that SRAP can be guided by any of the means listed.
A/C-86 and A/C-87 may complement the training required for the AO-331 (HUM-024 – Flight Crew training for IGS-to-SRAP approach), as they are meant to assist the pilot during a manual landing. They may become necessary on some aircraft types, and/or for some slope values.
AERODROME-ATC-94 and APP ATC 163 enablers are inked to separation delivery assistance. They are not necessarily required if IGS-to-SRAP procedure is active when the traffic pressure if not high (at night, for example), when few aircraft types are coming to an airport, etc.

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6 Assumptions

This section aims at describing the assumptions made that have an impact on the technical specification.

The optional enabler A/C 87 (On-board assistance to flare) proposed in the scope of IGS operations is based on the assumption that increased glide slope operations will be possible on manual landing.

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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

24. SESAR 2020 Requirements and Validation Guidelines

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Safety

25. SESAR, Safety Reference Material, Edition 4.0, April 2016
26. SESAR, Guidance to Apply the Safety Reference Material, Edition 3.0, April 2016
27. SESAR, Final Guidance Material to Execute Proof of Concept, Ed00.04.00, August 2015
28. SESAR, Resilience Engineering Guidance, May 2016

Human Performance

29. 16.06.05 D 27 HP Reference Material D27
30. 16.04.02 D04 e-HP Repository - Release note

Environment Assessment

31. SESAR, Environment Reference Material, alias, “Environmental impact assessment as part of the global SESAR validation”, Project 16.06.03, Deliverable D26, 2014.
32. ICAO CAEP – “Guidance on Environmental Assessment of Proposed Air Traffic Management Operational Changes” document, Doc 10031.

Security

33. 16.06.02 D103 SESAR Security Ref Material Level
34. 16.06.02 D137 Minimum Set of Security Controls (MSSCs).
35. 16.06.02 D131 Security Database Application (CTRL_S)

7.2 Reference Documents

36. ED-78A GUIDELINES FOR APPROVAL OF THE PROVISION AND USE OF AIR TRAFFIC SERVICES SUPPORTED BY DATA COMMUNICATIONS.
37. PJ.02-W2.14.5 D4.5.002, PJ.02-W2-14.5 SPR-INTEROP/OSED V3 Final
38. PJ02-02 D2.1.04 SESAR PJ02-02 VALR, Edition 00.01.00

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8 Service Description Document (SDD)

N/A

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9 Service Technical Design Document (STDD)

N/A

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