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SORT

SAFELY OPTIMISED RUNWAY THROUGHPUT

This VLD3-W2-SORT DEMO report – Part V Performance Assessment Report (PAR) for WP2 is part of a project that has received funding from the SESAR3 Joint Undertaking under grant agreement No 874520 under European Union’s Horizon 2020 research and innovation programme.



Abstract

This document is the fifth part of the DEMO Report document for WP2 of the SESAR 2020 VLD3-W2-SORT project that addresses traffic optimisation on single and multiple runway airports by integrating multiple concepts operating in both Execution and Planning Phases and supporting both Tower Controllers and Supervisors in monitoring and optimising runway usage.

The present document belongs to the final D1.4 report version and contains the demonstration Performance Assessment Report (PAR) related to the concept. The contents are based on the results of the demonstration and validation of the solution.

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1 Executive Summary

This document constitutes the Performance Assessment Report (PAR) for WP2, hence is part of the contractual deliverable D1.4 (DEMOR). It consists of Part V of the DEMOR for the VLD-03-001C Exercise held under WP2 of the SESAR 2020 VLD3-W2-SORT project.

The PAR is consolidating DEMO performance validation results addressing KPIs/PIs and metrics from the SESAR2020 Performance Framework [3].

Description:

The demonstration was a real-time simulation (RTS) using the operational pre-deployment system of Leidos integrated into the NATS Simulation environment.

The purpose of this exercise was to demonstrate the evolution from eTBS to the Intelligent Approach (IA) platform, including optimised pairwise wake separation rules (RECAT-PWS, solution PJ.02-01-04) together with the optimised ROT Spacing rules (solution PJ.02-08-03) and the 2 NM MRS (solution PJ.02-03), and the procedural, system support and regulatory enablers required for deploying these more efficient separation and spacing rules.

Assessment Results Summary:

The following tables summarises the assessment outcomes per KPI (Table 1) and mandatory PI (Table 2) puts them side-by side against Validation Targets in case of KPI from PJ19 [7].

There are three cases:

1. An assessment result of 0 with confidence level other level High, Medium or Low indicates that the Demo is expected to impact in a marginal way the KPI or mandatory PI.
2. An assessment result (positive or negative) different than 0 with confidence level High, Medium or Low indicates that the Demo is expected to impact the KPI or mandatory PI.
3. An assessment result of N/A (Not Applicable) with confidence level N/A indicates that the Demo is not expected to impact at all the KPI or mandatory PI consistently with the Benefit Mechanism.

KPI	Validation Targets – Network Level (ECAC Wide)	Performance Benefits at Network Level (ECAC Wide or Local depending on the KPI) ¹	Confidence in Results ²
FEFF1: Fuel Efficiency - Actual average fuel burn per flight	N/A*	6.85 kg/flight in fuel savings	Low
CAP1: TMA Airspace Capacity - TMA throughput, in challenging airspace, per unit time.	N/A	N/A	N/A
CAP2: En-Route Airspace Capacity - En- route throughput, in challenging airspace, per unit time	N/A	N/A	N/A
CAP3: Airport Capacity – Peak Runway Throughput (Mixed mode).	N/A*	See CAP3.2 below	N/A
PRD1: Predictability – Average of Difference in actual & Flight Plan or RBT durations	N/A	No data from demonstration	N/A
PUN1: Punctuality – Average departure delay per flight	N/A	No data from demonstration	N/A

Table 1: KPI Assessment Results Summary

¹ Negative impacts are indicated in red.

² High – the results might change by +/-10%
Medium – the results might change by +/-25%
Low – the results might change by +/-50% or greater
N/A – not applicable, i.e., the KPI cannot be influenced by the Solution

Mandatory PI	Performance Expectations at Network Level (ECAC Wide or Local depending on the KPI) ³	Benefits at Network	Confidence in Results ⁴
SAF1.X: Mid-air collision - En-Route	N/A		N/A
SAF2.X: Mid-air collision - TMA	N/A		N/A
SAF3.X: RWY-collision accident	N/A		N/A
SAF4.X: TWY-collision accident	N/A		N/A
SAF5.X: CFIT accident	N/A		N/A
SAF6.X: Wake related accident	N/A		N/A
SAF7.X: RWY-excursion accident	N/A		N/A
SAF8.X ...: Other SAF Risks	N/A		N/A
SEC1: A security risk assessment has been carried out	N/A		N/A
SEC2: Risk Treatment has been carried out	N/A		N/A
SEC3: Residual risk after treatment meets security objective.	N/A		N/A
ENV1: Actual Average CO2 Emission per flight	21.59 kg CO2/flight saving		Low
NOI1: Relative noise scale	N/A		N/A
NOI2: Size and location of noise contours	N/A		N/A
NOI4: Number of people exposed to noise levels exceeding a given threshold	N/A		N/A
LAQ1: Geographic distribution of pollutant concentrations	N/A		N/A
CAP3.1: Peak Departure throughput per hour	N/A		N/A

³ Negative impacts are indicated in red.

⁴ High – the results might change by +/-10%
Medium – the results might change by +/-25%
Low – the results might change by +/-50% or greater
N/A – not applicable, i.e., the KPI cannot be influenced by the Solution

Mandatory PI	Performance Expectations at Network Level (ECAC Wide or Local depending on the KPI) ³	Benefits at Network	Confidence in Results ⁴
(Segregated mode)			
CAP3.2: Peak Arrival throughput per hour (segregated mode)	-0.2 to 3.4 movements/hour (-0.44-8.11%) impact, compared to eTBS.		Medium
CAP4: Un-accommodated traffic reduction	N/A		N/A
RES1: Loss of Airport Capacity Avoided	N/A		N/A
RES1.1: Airport time to recover from non-nominal to nominal condition	N/A		N/A
RES2: Loss of Airspace Capacity Avoided.	N/A		N/A
RES2.1: Airspace time to recover from non-nominal to nominal condition.	N/A		N/A
RES4: Minutes of delays.	N/A		N/A
RES5: Number of cancellations.	N/A		N/A
TEFF2: Taxi in time	N/A		N/A
TEFF3: Taxi out time	N/A		N/A
TEFF4: TMA arrival time	N/A		N/A
TEFF5: TMA departure time	N/A		N/A
TEFF6: En-Route time	N/A		N/A
PRD2: Variance of Difference in actual & Flight Plan or RBT durations	N/A		N/A
PUN2: % Flights departing within +/- 3 minutes of scheduled departure time due to ATM and weather related delay causes	N/A		N/A
CEF1: Direct ANS Gate-to-gate cost per flight	N/A		N/A
AUC3: Direct operating costs for an airspace user	N/A		N/A
AUC4: Indirect operating costs for an airspace user	N/A		N/A

Mandatory PI	Performance Expectations at Network Level (ECAC Wide or Local depending on the KPI) ³	Benefits at Network	Confidence in Results ⁴
AUC5: Overhead costs for an airspace user	N/A		N/A
CMC1.1: Allocated vs. Requested ARES duration	N/A		N/A
CMC1.2: Allocated vs. Requested ARES dimension	N/A		N/A
CMC1.3: Deviation of Transit Time to/from airbase to ARES	N/A		N/A
CMC 1.3.1: Allocated ARES duration vs. total mission duration	N/A		N/A
CMC 1.3.2: Deviation of total mission duration by iOAT FPL validation	N/A		N/A
CMC 1.4.1: Rate of iOAT FPLs acceptance by NM systems	N/A		N/A
CMC 1.4.2: Rate of iOAT FPLs acceptance by ATC systems	N/A		N/A
CMC2.1: Fuel and Distance saved by GAT	N/A		N/A
HP1: Consistency of human role with respect to human capabilities and limitations	N/A		N/A
HP2: Suitability of technical system in supporting the tasks of human actors	N/A		N/A
HP3: Adequacy of team structure and team communication in supporting the human actors	N/A		N/A
HP4: Feasibility with regard to HP-related transition factors	N/A		N/A
FLX1: Average delay for scheduled civil/military flights with change request and non-scheduled or late flight plan request	N/A		N/A

Table 2: Mandatory PIs Assessment Summary

Additional Comments and Notes:

* No validation targets are apportioned to VLD3

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2 Introduction

2.1 Purpose of the document

The Performance Assessment covers the Key Performance Areas (KPAs) defined in the SESAR2020 Performance Framework [3]. Assessed are at least the Key Performance Indicators (KPIs) and the mandatory Performance Indicators (PIs), but also additional PIs as needed to capture the performance impacts of the Demo. It considers the guidance document on KPIs/PIs [3] for practical considerations, for example on metrics.

The purpose of this document is to present the performance assessment results from the validation exercises at SESAR Demo level. The KPA performance results are used for the performance assessment at strategy level and provide inputs to the SESAR3 Joint Undertaking (S3JU) for decisions on the SESAR2020 Programme.

In addition to the results, this document presents the assumptions and mechanisms (how the validation exercises results have been consolidated) used to achieve this performance assessment result.

2.2 Intended readership

In general, this document provides the ATM stakeholders (e.g. airspace users, ANSPs, airports, airspace industry) and S3JU performance data for the Demo addressed.

Produced by the SESAR project, the main recipient in the SESAR performance management process is PJ19, which will aggregate all the performance assessment results from the SESAR2020 solution projects, and provide the data to PJ20 for considering the performance data for the European ATM Master Plan. The aggregation will be done at higher levels suitable for use at Master Planning Level, such as deployment scenarios.

2.3 Inputs from other projects

The document includes information from the following SESAR 2020 Wave1 projects:

- PAGAR 2019 [4] Performance Assessment and Gap Analysis Report (2019), where are collected the final benefits from SESAR 2020 Wave1.

PJ19 will manage and provide:

- SESAR Performance Framework (2019) [3], guidance on KPIs and Data collection supports.
- S2020 Common Assumptions, used to aggregate results obtained during validation exercises (and captured into validation reports) into KPIs at the ECAC level, which will in turn be captured in Performance Assessment Reports and used as inputs to the CBAs produced by the Solution projects. Where are also included performance aggregation assumptions, with traffic data items.

- For guidance and support PJ19 have put in place the Community of Practice (CoP)⁵ within STELLAR, gathering experts and providing best practices.

2.4 Glossary of terms

See the AIRM Glossary [1] [6] for a comprehensive glossary of terms.

2.5 Acronyms and Terminology

Term	Definition
ANS	Air Navigation Service
ANSP	Air Navigation Service Provider
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
BAD	Benefits Assessment Date
BAER	Benefit Assessment Equipment Rate
CBA	Cost Benefit Analysis
DOD	Detailed Operational Description
E-ATMS	European Air Traffic Management System
ECAC	European Civil Aviation Conference
DB	Deployment Baseline
IA	Intelligent Approach
KPA	Key Performance Area
KPI	Key Performance Indicator
N/A	Not Applicable

⁵ Go to “Advanced Portfolio Manager” on the left navigation menu, and select “Coordination Group – ATM Performance Assessment (APA)” in STELLAR:

https://stellar.sesarju.eu/?link=true&domainName=saas&redirectUrl=%2Fjsp%2Fproject%2Fproject.jsp%3FobjId%3Dxrn%3Aview%3Axrn%3Adatabase%3Aondb%2Ftable%2FSYS_MESSAGE%402333834.13%40xrn%3AprototypeView%3Adatabase.view.message.private.AllMyMessages

OI	Operational Improvement
PAR	Performance Assessment Report
PI	Performance Indicator
PRU	Performance Review Unit
PU	PUBLIC
QoS	Quality of Service
RBT	Reference Business / Mission Trajectory
SESAR	Single European Sky ATM Research Programme
S3JU	SESAR3 Joint Undertaking (Agency of the European Commission)
SESAR2020 Programme	The programme which defines the Research and Development activities and Projects for the S3JU.

Table 3: Acronyms and terminology

The following is a list of the concepts, terms or definitions introduced or commonly referred to in this document.

Term	Definition	Source
Airport Capacity Focus Area	Capture the peak runway throughput in the most challenging (or constrained) environments at busy hours, i.e. the capacity at a “maximum observed throughput” airport.	PAGAR
Airspace Capacity Focus Area	Capture the capability of a challenging volume of airspace to handle an increasing number of movements per unit time – through changes to the operational concept and technology.	PAGAR
Airspace Reservation/Restriction (ARES)	Airspace Reservation means a defined volume of airspace temporarily reserved for exclusive or specific use by categories of users (Temporary Segregated Area (TSA), Temporary Reserved Area (TRA), and Cross-Border Area (CBA)) whereas Airspace Restriction designates Danger, Restricted and Prohibited Areas.	EC Regulation No 2150/2005
Airspace User Cost-Efficiency Focus Area	Cost-Efficiency obtained by Airspace Users other than direct gate-to-gate ATS costs (CEF1) or AU cost improvements assessed through other KPIs: Fuel Efficiency, Punctuality, etc. Note: Benefits assessed through other KPIs should not be included in this focus area to avoid double counting of benefits. AU Cost-Efficiency includes reduction of direct (AUC3) and indirect (AUC4) operational costs of the AU, as well as overhead costs (AUC5). In addition, there are two specific PIs, Strategic Delay (AUC1) and Sequence Optimisation Benefit (AUC2).	PAGAR

Term	Definition	Source
ARES Capacity	The ability of an ATM system to accommodate specific training events which require airspace reservations and/or restrictions during a specific period of time, taking into account the duration of the training events, ATM inefficiency, planning inefficiency and weather impact on training and operations.	Performance Framework 2017
ATM Master Plan	The European ATM Master Plan is the agreed roadmap to bring ATM R&I to the deployment phase, introducing the agreed vision for the future European ATM system. It provides the main direction and principles for SESAR R&I, as well as the deployment planning and an implementation view with agreed deployment objectives. Through the SESAR Key Features, the ATM Master Plan identifies the Essential Operational Changes (both Essential Operational Changes featured in the Pilot Common Project and New Essential Operational Changes) and key R&I activities that support the identified performance ambition. The ATM Master Plan is updated on a regular basis in collaboration and consultation with the entire ATM community. Amendments are submitted to the S3JU Administrative Board for adoption. The content of the European ATM Master Plan is structured in three levels (Level 1 – Executive View, Level 2 – Planning and Architecture View, and Level 3 – Implementation View) to allow stakeholders to access the information at the level of detail that is most relevant to their area of interest. The intended readership for Level 1 is executive-level stakeholders. Levels 2 and 3 of the ATM Master Plan provide more detail on the operational changes and related elements and therefore the target audience is expert-level stakeholders.	SESAR2020 Project Handbook, European ATM Master Plan (9 Edition)
Civil-military coordination and cooperation	The coordination between the civil and military parties authorised to make decisions and agree a course of action.	Performance Framework 2017
Cost-Benefit Analysis	A Cost-Benefit Analysis is a process for quantifying in economic terms the costs and benefits of a project or a programme over a certain period, and those of its alternatives (within the same period), in order to have a single scale of comparison for unbiased evaluation. This process helps decision-makers to compare an investment with other possible investments and/or to make a choice between different options / scenarios and to select the one that offers the best value for money while considering all the key criteria affecting the decision.	PAGAR
Deployment Scenario	Set of SESAR Solutions selected to satisfy the specific Performance Needs of operating environments in the European ATM System and based on the timescales in which their performance contribution is needed in the respective operating environments.	PAGAR

Term	Definition	Source
Flexibility KPA	The ability of the ATM System and airports to respond to changes in planned flights and missions. It covers late trajectory modification requests as well as ATFCM measures and departure slot swapping and it is applicable to military and civil airspace users covering both scheduled and unscheduled flights. In terms of specific military requirements, it also covers the ability of the ATM System to address military requirements related to the use of airspace and reaction to short-notice changes.	Performance Framework 2017
Focus Area	Within each KPA, a number of more specific “Focus Areas” are identified in which there are potential intentions to establish performance management. Focus Areas are typically needed where performance issues have been identified.	ICAO Doc 9883
Fuel Efficiency Focus Area	The SESAR performance Focus Area concerned with fuel efficiency. How much fuel is used by aviation or by extension “Fuel efficiency” (how much fuel can be saved?) is one of the performance aspects. Note: Policy places considerable focus on this. Fuel efficiency contributes to 3 of the 11 KPAs defined by ICAO: Cost-efficiency, Efficiency, and Environment.	PAGAR
Gap Analysis	Difference between the validation targets and the performance assessment. It is used to: 1. Anticipate any deviation from the design performance targets; 2. Identify the underlying reasons; 3. Derive the appropriate recommendations to be taken on board to redirect the R&D activities within the Programme towards the ultimate achievement of SESAR2020's performance ambitions.	PAGAR
G2G ANS Cost-Efficiency Focus Area	One of the SESAR performance Focus Areas concerned with Cost Efficiency. Direct G2G ANS costs are those costs that are charged to Airspace Users via unit rates, including ATM/CNS costs, regulatory costs, Met costs and EUROCONTROL Agency costs.	Performance Framework new
Human Performance (HP)	Human capabilities and limitations which have an impact on the safety, security and efficiency of aeronautical operations.	EUROCONTROL ATM Lexicon
Key Performance Area	A way of categorising performance subjects related to high level ambitions and expectations. ICAO Global ATM Concept sets out these expectations in general terms for each of the 11 ICAO defined KPAs.	EUROCONTROL ATM Lexicon

Term	Definition	Source
Key Performance Indicator	Current/past performance, expected future performance (estimated as part of forecasting and performance modelling), as well as actual progress in achieving performance objectives is quantitatively expressed by means of indicators (sometimes called Key Performance Indicators, or KPIs). To be relevant, indicators need to correctly express the intention of the associated performance objective. Since indicators support objectives, they should not be defined without having a specific performance objective in mind. Indicators are not often directly measured. They are calculated from supporting metrics according to clearly defined formulas, e.g. cost-per-flight-indicator = Sum (cost)/Sum (flights). Performance measurement is therefore carried out through the collection of data for the supporting metrics.” In SESAR2020 Performance Framework, Key Performance Indicators are those that have a validation target associated derived from the corresponding Performance Ambition.	ICAO Doc 9883 Performance Framework
Local Air Quality Focus Area	One of the SESAR performance Focus Areas concerned with Environment. Local air quality is a term commonly used to designate the state of the ambient air to which humans and the ecosystem are typically exposed at a specific location. In the case of aviation, local air quality studies are generally conducted near airports.	PAGAR
Noise Focus Area	One of the SESAR performance Focus Areas concerned with Environment. The term Noise is used in this document to designate noise pollution, which is defined as unwanted sound. The impact of unwanted sounds on the recipients (in this case, people living around airports) causes adverse effects.	PAGAR
Operational Environment (OE)	An environment with a consistent type of flight operations.	EUROCONTROL ATM Lexicon
Performance Ambitions	Performance capability that may be achieved if SESAR Solutions are made available through R&D activities, deployed in a timely and, when needed, synchronised way and used to their full potential.	EUROCONTROL ATM Lexicon
Performance assessment	This term relates to the quantitative estimate of the potential performance benefit of an operational improvement based on outputs from validation projects, collected and analysed by PJ19.04.02	ICAO Doc 9883 updated in PAGAR

Term	Definition	Source
Performance Framework	1) The overall performance-driven development approach that is applied within the SESAR development programme to ensure that the programme develops the operational concept and technology needed to meet long-term performance expectations. 2) The set of definitions and terminology describing the building blocks used by a group of ATM community members to collaborate on performance management activities. This set of definitions includes the levels in the global ATM performance hierarchy, the eleven Key Performance Areas, a set of process capability areas, focus areas, performance objectives, indicators, targets, supporting metrics, lists of dimension objects, their aggregation hierarchies and classification schemes.	EUROCONTROL ATM Lexicon
Performance Indicator	PIs are defined in the SESAR performance framework and relate to performance benefits in specific KPAs. However, no validation targets are assigned to PIs. SESAR Solutions projects use the results of validation exercises to report performance assessment in terms of the PIs, reporting the expected positive and negative impacts. Certain PIs are mandatory for measurement and reporting by Solution projects.	SESAR2020 Project Handbook
Performance metrics	Sometimes proxies may be used in a validation exercise when it is not possible to measure an impact directly using the specified KPIs and PIs. In these cases, other metrics may be used provided the solution project later converts the results into the reporting KPIs and PIs.	SESAR2020 Project Handbook
Predictability Focus Area	Predictability is focused on in-flight (i.e. off-block to on-block) variability of flight duration compared to the planned duration. It is expected that this area will be extended in the future to reflect the improvement derived from better planning in pre-tactical phase.	Performance Framework 2019
Punctuality Focus Area	Refers to “ATM Punctuality”. It captures ATM issues as well as events related to ATM that cause a temporal perturbation to airspace user schedules.	PAGAR
Resilience Focus Area	Resilience focuses on the ability to withstand and recover from planned and unplanned events and conditions which cause a loss of nominal performance.	Performance Framework updated
Safety	The state to which the possibility of harm to persons or damage to property is reduced, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management .	EUROCONTROL ATM Lexicon

Term	Definition	Source
Security	(aviation) Safeguarding civil aviation against acts of unlawful interference. This objective is achieved by a combination of measures and human and material resources. Note: ATM Security is concerned with those threats that are aimed at the ATM System directly, such as attacks on ATM assets, or where ATM plays a key role in the prevention of or response to threats aimed at other parts of the aviation system (or national and international assets of high value). ATM security aims to limit the effects of a threats on the overall ATM Network. ATM Security is a subset of Aviation Security (as defined by ICAO in Annex 17).	EUROCONTROL ATM Lexicon, Note are from PAGAR
SESAR2020	The Programme for SESAR2020 was created with a clear and agreed need for continuing research and innovation in ATM beyond the SESAR 1 development phase. SESAR2020 is structured into three main research phases, starting with Exploratory Research, which is then further expanded within a Public-Private-Partnership (PPP) to conduct Industrial Research and Validation. Finally, it further exploits the benefits of the PPP in Demonstrating at Large Scale the concepts and technologies in representative environments to firmly establish the performance benefits and risks.	Performance Framework 2017
SESAR Programme	The programme which defines the Research and Development activities and Projects for the S3JU.	EUROCONTROL ATM Lexicon
SESAR Solution	A term used when referring to both SESAR ATM Solution and SESAR Technological Solution.	SESAR2020 Project Handbook
SESAR ATM Solution	SESAR Solutions relate to either an Operational Improvement (OI) step or a group of OI steps with associated Enablers (technical system, procedure or human), which have been designed, developed and validated in response to specific Validation Targets and that are expected deliver operational and/or performance improvements to European ATM, when translated into their effective realisation. SESAR Technological Solutions relate to verified technologies proven to be feasible and profitable, which may therefore be considered to enable future SESAR Solutions.	SESAR2020 Project Handbook
Single European Sky High Level Goals	The SES High Level Goals are political targets set by the European Commission. Their scope is the full ATM performance outcome resulting from the combined implementation of the SES pillars and instruments, as well as industry developments not driven directly by the EU.	SESAR2020 Project Handbook
Sub-OE	A subcategory of an Operating environment, classified according to its complexity (e.g. high complexity TMA, medium complexity TMA, low complexity TMA).	EUROCONTROL ATM Lexicon
Validation targets	Validation targets are the targets that focus on the development of enhanced capabilities by the SESAR Solutions. They aim to secure from R&D the required performance capability to contribute to the achievement of the Performance Ambitions and, thus, to the SES high-level goals. In SESAR2020 validation targets are associated with a KPI.	EUROCONTROL ATM Lexicon

Table 4: Terminology

3 Demo Scope

3.1 Detailed Description of the Demo

The operational scope of this demonstration was to utilise the Intelligent Approach (IA) Platform in a simulation of Heathrow Final approach, using the Separation and Spacing Indicators generated to position aircraft against.

Valid Heathrow Approach controllers participated in all exercises and followed procedures defined for the solution concept. Traffic samples were used that represent the change in aircraft fleet make up since the Covid-19 pandemic.

Identical traffic samples were used with both the reference and solution scenarios to allow direct comparison on the improvements enabled by use of the solution platform.

3.2 Detailed Description of relationship with other Solutions

The SESAR solutions under the scope of this exercise are:

- PJ.02-01-01 (AO-0328): Optimised Runway Delivery (ORD) on Final Approach [20]
- PJ.02-01-04 (AO-0306): Wake Turbulence Separations (for Arrivals) based on Static Aircraft Characteristics [20]
- PJ.02-03 (AO-0309): Minimum-Pair Separations based upon Required Surveillance Performance (RSP) [21]
- PJ.02-08-03 (AO-0337): Reduced separation based on local Runway Occupancy Time characterisation [22][23]

Solution #64 (TBS) is part of the baseline.

See section above and the D1.4 (DEMOR) Part I report [29] for more information.

4 Demo Performance Assessment

4.1 Assessment Sources and Summary of Validation Exercise Performance Results

Previous Validation Exercises (pre-SESAR2020 Wave 2, etc.) relevant for this assessment are listed below.

Organisation	Document Title	Publishing Date
PJ.02-01 members	D1.1.04 – Final PJ02-01 VALR – 00.01.01 [20]	31/01/2020
PJ.02-03 members	PJ02-03 VALR – 01.00.00 [21]	14/02/2020
PJ.02-08 members	SESAR Solution 02-08 D6.1.13 Validation Report (VALR) for V2 – v00.01.01 [22]	03/08/2018
PJ.02-08 members	SESAR 2020 PJ02-08 D6_1_23 V3 VALR 00.04.00 [23]	31/02/2020

Table 5: Pre-SESAR2020 Exercises

SESAR Validation Exercises of this Demo (completed ones and planned ones) are listed below.

Exercise ID	Exercise Title	Release	Maturity	Status
EXE-VLD-03-001C	Demonstrate the feasibility and benefits of implementing Pairwise TBS, reduced MRS and improved ROT management in an RTS pre-deployment trial for London Terminal Control Centre.	R12	V4	Complete

Table 6: SESAR2020 Validation Exercises

The following table provides a summary of information collected from available performance outcomes.

Exercise	OI Step	Exercise scenario & scope	Performance Results
EXE-VLD-03-001C	AO-0328 AO-0306 AO-0309 AO-0337	The operational scope of this demonstration is to utilise the Intelligent Approach (IA) Platform in a simulator of Heathrow approach, using the Separation and Spacing Indicators generated to position aircraft against.	Capacity: Under this exercise, the arrival throughput was assessed under a range of wind samples. However, the data set and the consistency of seating configurations for the matched run pairs was constrained. Depending on the wind profile and runway direction, a segregated runway

		Valid Heathrow Approach controllers participated in all exercises and followed procedures defined for the solution concept. The national regulator will have visibility of the simulation activity as part of the validation and assurance evidence ahead of full operational deployment.	capacity impact of -0.2 to 3.4 movements/hour (-0.44-8.11%) was identified. Note: values in red indicate a performance reduction. Fuel Efficiency: In this exercise, an average saving of 14 seconds per flight which corresponds to an average of 14.84kg of fuel saving was achieved. Using the direct link between fuel burn and the amount of CO₂ produced (3.15 times the mass of fuel burnt), this equates to 46.73kg of CO₂ saving per flight during the year 2019. Human Performance: The overall conclusion drawn from the evidence gathered is that the concept is feasible but requires further refinements being made to some components of the ATM system (i.e., technology, system design and people) and reassessing the impact on HP to improve confidence that the results are accurate and reliable. Safety: Based on post-analysis, it can be determined that the delivery of aircraft to separation minima is acceptable under the Pairwise solution, as no technical losses of MRS were reported (11 were reported during eTBS runs).
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Table 7: Summary of Validation Results.

4.2 Conditions / Assumptions for Applicability

The solution is expected to be applied in Medium to Very Large Airports. The solution is expected to provide benefits in all conditions.

The following Table 9 summarises the applicable operating environments in accordance with 2019 SESAR 2020 airports classification provided by PJ20 sWP2.2 WG.

OE	Applicable sub-OE	Special characteristics
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Airport	Very Large	<u>Multiple runways:</u> EDDF Flughafen Frankfurt/Main EDDM Munich Airport EGKK Gatwick Airport EGLL Heathrow Airport EHAM Amsterdam Airport EKCH Copenhagen Airport LEBL Aeropuerto de Barcelona-El Prat LEMD Aeropuerto de Adolfo Suárez Madrid-Barajas LFPG Aéroport de Paris-Charles de Gaulle LIRF Aeroporto di Roma-Fiumicino LSZH Flughafen Zürich ENGM Oslo-Gardermoen Airport LOWW Vienna International Airport LTBA Atatürk International Airport
	Large	<u>Single runways:</u> EGSS Stansted Airport LSGG Genève Aéroport <u>Multiple runways:</u> LFPO Aéroport de Paris-Orly ESSA Stockholm-Arlanda Airport EBBR Brussels Airport EDDL Düsseldorf International Airport EIDW Dublin Airport LEPA Aeropuerto de Palma de Mallorca EGCC Manchester Airport LIMC Milano Malpensa LPPT Lisbon Airport EFHK Helsinki-Vantaa Airport EPWA Warsaw Frederic Chopin Airport LKPR Prague Airport
	Medium	<u>Single runways:</u> EVRA Riga International Airport <u>Multiple runways:</u> LFMN Aéroport Nice Côte d'Azur EDDB Schönefeld Airport LROP Henri Coanda International Airport UKBB Boryspil State International Airport

Table 8: Applicable Operating Environments.

4.3 Safety

4.3.1 Safety Design Drivers and Performance Mechanism

Safety Criteria (SAC) define the acceptable level of safety (i.e. accident and incident risk level) to be achieved by the Solution under assessment, considering the impact on the ATM/ANS functional system and its operation.

The individual SESAR solutions included the VLD activities have already completed their V3 validations. Therefore, there was no requirement to re-validate them during this demonstration. Subsequently, the success or failure of the RTS exercise activities were solely based on the ability to meet the Demonstration Objectives and Success Criteria, extracted from the SORT Demo Plan.

4.3.2 Data Collection and Assessment

Data collection took place through questionnaires to the Sector Participants and addressed the following three key areas:

- User Interface and Procedures
- Loss of Separation
- General Safety Impact

A total of 14 questions were asked. Except for three essay-style questions, the questions were in a multiple-choice format with up to three options. Where half or more of the responses from the controller group selected favourable results, the overall status of the question was marked as OK. The questions were then mapped against the Demonstration Success Criteria to determine the overall status.

A summary is shown below:

Demonstration Objective	Demonstration Success Criteria	Status
OBJ-VLD-03-001C-SAF To assess the impact of reduced MRS and PWS TBS on operational safety	CRT-VLD-03-001C-SAF-001 The number of missed approaches due to insufficient spacing is no greater than in currently operations	Met. The participating ATCOs did not indicate that missed approaches would be affected.
	CRT-VLD-03-001C-SAF-002 Interoperability evidence can be produced to confirm that the elements of all solutions when combined do not degrade the level of safety.	Met. The overall view from the ATCOs was that the interoperability of the solutions did not degrade safety.
	CRT-VLD-03-001C-SAF-003 The combined solution and procedures cause no losses of separation in the demonstration exercise	Met. The ATCOs did not report an any LoS associated with PWS using the new MRS rules.

Demonstration Objective	Demonstration Success Criteria	Status
		There were 11 technical losses of MRS during the eTBS runs. Through expert judgement, it was identified that in all but one case of the eTBS losses; the event would not have triggered a loss under the new Pairwise MRS procedures if aircraft had been positioned in the same way. Based on this analysis, it can be determined that the delivery of aircraft to separation minima is acceptable under the Pairwise solution.
	CRT-VLD-03-001C-SAF-004 The combined solution and procedures cause no increase in the frequency of go arounds when compared to the reference scenario	See CRT-VLD-03-001C-SAF-001 above

Observations and debriefings from the demonstration showed the potential of the solution being able to lower ATCOs workload and stress while improving the Situational Awareness. These results are consistent with earlier validations results.

4.3.3 Extrapolation to ECAC Wide

The results obtained from the validation activities are for the moment limited to the specific set of aerodrome environments the concepts have been simulated in. These results could be extrapolated to similar aerodromes in ECAC, but not enough evidence is available to extrapolate this statement to the rest of aerodromes in other categories. The number of aerodromes to which this Solution could be applied while ensuring the level of safety is maintained needs then to be defined.

4.3.4 Discussion of Assessment Result

Results on safety are based on earlier validations results from PJ02-08 and observations from demonstration which shows that the solution ensure a maintained level of safety.

All Demonstration Success Criteria were met. Further, the ATCOs confirmed that the level of safety during the demonstration was acceptable with no significant issues being reported.

Subsequently the Demonstration Objective has been met.

4.3.5 Additional Comments and Notes

No additional comments.

4.4 Environment: Fuel Efficiency / CO2 emissions

4.4.1 Performance Mechanism

4.4.2 Assessment Data (Exercises and Expectations)

4.4.2.1 Assumptions

4.4.3 Extrapolation to ECAC wide

<i>KPIs / PIs</i>	Unit	Calculation	Mandatory	Absolute expected performance benefit in SESAR2020	% expected performance benefit in SESAR2020
FEFF1 Actual Average fuel burn per flight	Kg fuel per movement	Total amount of actual fuel burn divided by the number of movements	YES	6.85 kg/flight	0.13%
ENV1 Actual Average CO2 Emission per flight	Kg CO2 per flight	Amount of fuel burnt x 3.15 (CO2 emission index) divided by the number of flights	YES	21.59 kg/flight	0.13%

Table 9: Fuel burn and CO2 emissions saving for Mandatory KPIs /PIs

	Taxi out	TMA departure	En-route	TMA arrival	Taxi in
FEFF1 Actual Average fuel burn per flight	N/A	N/A	N/A	6.85 kg/flight	N/A
ENV1 Actual Average CO2 Emission per flight	N/A	N/A	N/A	21.59 kg/flight	N/A

Table 10: Fuel burn and CO2 emissions saving per flight phase.

4.4.4 Discussion of Assessment Result

4.4.5 Additional Comments and Notes

No additional comments.

4.5 Airport Capacity (Runway Throughput Flights/Hour)

4.5.1 Performance Mechanism

By delivering aircraft with further optimised wake separations at threshold, there is a reduction of the overall wake separation that is required that affects runway throughput. The following mechanisms are re-purposed from the Wave 1 PJ.02-01 PAR:

AO-0306 – PWS-A:

- The use of PWS-A is expected to reduce wake separation between arrivals. The use of a separation delivery tool impacts the separation and spacing delivery between arrivals. The resulting optimised separation and spacing delivery increases the runway throughput. The higher the throughput, the higher the number of movements, leading to a positive impact on Capacity.

AO-0328 – ORD

- The use of a separation delivery tool impacts the separation and spacing delivery between arrivals. The resulting optimised separation and spacing delivery increases the runway throughput. The higher the throughput, the higher the number of movements, leading to a positive impact on Capacity.
- With the use of the indicators, the accuracy of the spacing between aircraft is improved compared to what is achieved today (e.g. distance between pair of aircraft closer to separation minima) and will reduce the margins delivered. Improving spacing accuracy will enable more aircraft to be sequenced with reduced spacing which links to Capacity.

4.5.2 Assessment Data (Exercises and Expectations)

KPIs / Pls	Unit	Calculation	Mandatory	Absolute expected performance benefit in SESAR2020	% expected performance benefit in SESAR2020
CAP3 Peak Runway Throughput (Mixed mode)	% and Flight per hour	% and also total number of movements per one runway per one hour for specific traffic mix and density (in mixed mode RWY operations). The percentage change is measured against the maximum observed throughput during peak demand hours in the mixed-mode RWY operations airports group.	YES	N/A	N/A
CAP3.1 Peak Departure throughput per hour	% and Flight per hour	% and also total number of departures per one runway per one hour for specific traffic mix and density (in segregated mode of operations). The percentage change is measured against the maximum	YES	N/A	N/A

KPIs / Pls	Unit	Calculation	Mandatory	Absolute expected performance benefit in SESAR2020	% expected performance benefit in SESAR2020
(Segregated mode)		observed throughput during peak demand hours in the segregated-mode RWY operations airports group.			
CAP3.2 Peak Arrival throughput per hour (Segregated mode)	% and Flight per hour	% and also total number of arrivals per one runway per one hour for specific traffic mix and density (in segregated mode of operations). The percentage change is measured against the maximum observed throughput during peak demand hours in the segregated-mode RWY operations airports group.	YES	-0.2 to 3.4 movements/hour impact, compared to eTBS.	-0.44-8.11% impact, compared to eTBS.
CAP4 Un-accommodated traffic reduction	Flights/year	Reduction in the number of un-accommodated flights i.e. a flight that would have been scheduled if there were available slots at the origin/destination airports. NB: Supports CBA Inputs. NB: Relates to Airport Capacity because this is STATFOR computation. CBA calculate this based on the assessment of the runway throughput we provide with and without the solutions and STATFOR data.	YES For CBA.	N/A	N/A

Table 11: Airport Capacity for Mandatory KPIs /Pls

4.5.3 Extrapolation to ECAC wide

There is no ECAC wide extrapolation required for this KPI.

4.5.4 Discussion of Assessment Result

The results confirm the increase in landing rate in strong wind conditions. A considerably greater headwind component at all levels in this sample increases the proportion of non-wake pairs able to use less than 3NM spacing delivered to 4DME. Overall, a benefit to arrival throughput is seen under all conditions.

However, a low or marginal benefit is seen in Light and Moderate wind conditions for the 27L runway which is not fully in-line with the pre-validation expectations. The effects of the traffic mix and wind conditions are explored in the sections below. A marginal decrease is seen for the 09L runway direction in light wind conditions. This is understood to be due to the calibrated ROT spacing values being more conservative in this direction.

4.5.5 Additional Comments and Notes

No additional comments.

4.6 Security

In parallel to the validation process, NATS experts have undertaken a Security Risk Assessment on all changes being introduced as part of the Heathrow Pairwise concept. This is in accordance with NATS' internal processes but is aligned with the SESAR methodology. As part of this, Security Risk Treatments were also applied. In line with SESAR guidance, the detailed content of this assessment will not be provided as part of the data pack for sensitivity reasons.

4.7 Human Performance

4.7.1 HP arguments, activities and metrics

The demonstration focused on gathering data regarding HP aspects through surveys, observations and debriefings. See D1.4 - SESAR 2020 VLD3 SORT DEMO Report - Part IV - HPAR - WP2 for more information regarding HP [22].

PIs	Activities & Metrics	Second level indicators	Covered
HP1 Consistency of human role with respect to human capabilities and limitations	Real Time Simulation & SME Discussion	HP1.1 Clarity and completeness of role and responsibilities of human actors	Open
		HP1.2 Adequacy of operating methods (procedures) in supporting human performance	Open
		HP1.3 Capability of human actors to achieve their tasks in a timely manner, with limited error rate and acceptable workload level	Open
HP2 Suitability of technical system in supporting the tasks of human actors	Real Time Simulation & SME Discussion	HP2.1 Adequacy of allocation of tasks between the human and the machine (i.e. level of automation).	Closed
		HP2.2 Adequacy of technical systems in supporting Human Performance with respect to timeliness of system responses and accuracy of information provided	Open
		HP2.3 Adequacy of the human machine interface in supporting the human in carrying out their tasks.	Open
HP3 Adequacy of team structure and team communication in supporting the human actors	Real Time Simulation & SME Discussion	HP3.1 Adequacy of team composition in terms of identified roles	N/A
		HP3.2 Adequacy of task allocation among human actors	N/A
		HP3.3 Adequacy of team communication with regard to information type, technical enablers and impact on situation awareness/workload	N/A
		HP4.1	N/A

PIs	Activities & Metrics	Second level indicators	Covered
HP4 Feasibility with regard to HP-related transition factors	Real Time Simulation & SME Discussion	User acceptability of the proposed Demo	
		HP4.2 Feasibility in relation to changes in competence requirements	Open
		HP4.3 Feasibility in relation to changes in staffing levels, shift organization and workforce relocation.	N/A
		HP4.4 Feasibility in relation to changes in recruitment and selection requirements .	N/A
		HP4.5 Feasibility in terms of changes in training needs with regard to its contents, duration and modality.	N/A

Table 12: HP arguments, activities and metrics

4.7.2 Extrapolation to ECAC wide

There is no ECAC wide extrapolation required for this KPI.

4.7.3 Open HP issues/ recommendations and requirements

PIs	Number of open issues/ benefits	Nr. of recommendations	Number of requirements
HP1 Consistency of human role with respect to human capabilities and limitations	9	6	11
HP2 Suitability of technical system in supporting the tasks of human actors	4	1	5
HP3 Adequacy of team structure and team communication in supporting the human actors	0	0	0
HP4 Feasibility with regard to HP-related transition factors	1	1	1

Table 13: Open HP issues/ recommendations and requirements

It should be noted that some requirements address multiple issues. There are 15 requirements in total.

4.7.4 Concept interaction

N/A

4.7.5 Most important HP issues

PIs	Issue ID	Description	Recommendation IDs	Requirement IDs
HP1 Consistency of human role with respect to human capabilities and limitations	VLD3-WP2-HP-02	Issue: New operating methods relating to the appropriate application of the concept solutions will be needed. Failure to create such methods for all normal operating conditions could lead to forced human error, safety incidents and/or service delivery impairments.	VLD3-WP2-HP-REC-01	VLD3-WP2-HP-RQT-03
	VLD3-WP2-HP-08	Issue: According to the Technology Acceptance Model, which constitutes a good basis for assessing human actors' trust in a system, two key motivating factors that dictate humans' willingness to accept and use new tools exist. These are the perceived usefulness of the tools and the perceived ease with which the tools can be used. Failure to ensure that these perceptions are positive can lead to controllers rejecting the tools thus negating any benefits that can be realised.	VLD3-WP2-HP-REC-04	VLD3-WP2-Hp-RQT-07
			VLD3-WP2-HP-REC-05	VLD3-WP2-Hp-RQT-08
			VLD3-WP2-HP-REC-06	VLD3-WP2-Hp-RQT-09 VLD3-WP2-Hp-RQT-10
HP2 Suitability of technical system in supporting the tasks of human actors	VLD3-WP2-HP-14	Issue: According to the Technology Acceptance Model (ref 5), which constitutes a good basis for assessing human actors' trust in a system, two key motivating factors that dictate humans' willingness to accept and use new tools exist. One of these is the usability of the tools. Failure to ensure that the user interface is usable can lead to controllers rejecting the tools thus negating any benefits that can be realised. It can also lead to human error and therefore introduce a risk to safety and service delivery.	VLD3-WP2-HP-REC-07	VLD3-WP2-Hp-RQT-13 VLD3-WP2-Hp-RQT-14
HP3 Adequacy of team structure and team communication in supporting the human actors	N/A	N/A	N/A	N/A
HP4 Feasibility with regard to HP-related transition factors	VLD3-WP2-HP-15	Issue: Introducing a higher level of automation means that there is normally less work for a controller to carry out. The potential risk this poses is that controllers become de-skilled in these areas. This could lead to human error or an inability for humans to act as a fallback to system failures, which could introduce a risk to operational safety.	VLD3-WP2-HP-REC-08	VLD3-WP2-Hp-RQT-05

Table 14: Most Important HP Issues

4.7.6 Additional Comments and Notes

Reliable and valid assessment of the HP issues and benefits was limited due to the design of the demonstration/real time simulation activity as well as technical issues experienced. Full details are contained in section 4.3.1 of the HPAR and DEMOR Part I.

4.8 Gap Analysis

KPI	Validation Targets – Network Level (ECAC Wide)	Performance Benefits at Network Level (ECAC Wide or Local depending on the KPI) ⁶	Rationale ⁷
SAF1: Safety - Total number of estimated accidents with ATM Contribution per year	N/A	N/A	KPI not measured. Safety levels are seen to be maintained.
FEFF1: Fuel Efficiency - Actual average fuel burn per flight	N/A*	6.85 kg/flight in fuel savings	Fuel efficiency based only on arrival fuel burn
CAP1: TMA Airspace Capacity - TMA throughput, in challenging airspace, per unit time.	N/A	N/A	N/A
CAP2: En-Route Airspace Capacity - En- route throughput, in challenging airspace, per unit time	N/A	N/A	N/A
CAP3: Airport Capacity – Peak Runway Throughput (Mixed mode).	N/A	N/A	N/A
TEFF1: Gate-to-gate flight time	N/A	N/A	N/A

⁶ Negative impacts are indicated in red.

⁷ Discuss the outcome if the gap indicates a different understanding of the contribution of the Solution (for example, the Solution is enabling other Solutions and therefore is not contributing a direct benefit). **Please contact your PJ19.04 Solution Champion to clarify when the Gap Rationale is needed.**

KPI	Validation Targets – Network Level (ECAC Wide)	Performance Benefits at Network Level (ECAC Wide or Local depending on the KPI) ⁶	Rationale ⁷
PRD1: Predictability – Average of Difference in actual & Flight Plan or RBT durations	N/A	N/A	N/A
PUN1: Punctuality – Average departure delay per flight	N/A	N/A	N/A
CEF2: ATCO Productivity – Flights per ATCO -Hour on duty	N/A	N/A	N/A
CEF3: Technology Cost – Cost per flight	N/A	N/A	N/A

Table 15: Gap analysis Summary

* No validation targets are apportioned to VLD3

5 References

- [1] 08.01.03 D47: AIRM v4.1.0.
- [2] B05 Performance Assessment Methodology for Step 1 PJ19.04.01 Methodology for Performance Assessment Results Consolidation (2020)⁸
- [3] SESAR Performance Framework (2019), Edition 01.00.01, Dec 2019.
<https://stellar.sesarju.eu/?link=true&domainName=saas&redirectUrl=%2Fjsp%2Fproject%2Fproject.jsp%3FobjId%3Dxrn%3Adatabase%3Aondb%2Frecord%2F16414675>
- [4] Performance Assessment and Gap Analysis Report (2019), Edition 00.01.02, Dec 2019.
- [5] Methodology for the Performance Planning and Master Plan Maintenance, Edition 0.13, Dec 2017.

Content Integration

- [6] SESAR ATM Lexicon

Performance Management

- [7] PJ19.04 D4.1 Validation Targets - Wave 2 (2020)⁹

Validation

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

Safety

- [9] SESAR, Safety Reference Material, Edition 4.0, April 2016.
<https://stellar.sesarju.eu/jsp/project/qproject.jsp?objId=1795089.13&resetHistory=true&statInfo=Ogp&domainName=saas>
- [10] SESAR, Guidance to Apply the Safety Reference Material, Edition 3.0, April 2016.
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- [11] SESAR, Final Guidance Material to Execute Proof of Concept, Ed00.04.00, August 2015.

⁸ At the time of the creation of the PAR template, the Methodology (PJ19.04 Internal Document) is foreseen to be update in 2020.

⁹ At the time of the creation of the PAR template the Validation Target is foreseen to be delivered in June 2020

[12]Accident Incident Models – AIM, release 2017.

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[13]16.06.05 D 27 HP Reference Material D27.

[14]16.04.02 D04 e-HP Repository - Release note.

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[15]SESAR, Environment Assessment Process (2019), PJ19.4.2, Deliverable D4.0.080, Sep 2019.

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

<https://www.icao.int/publications/pages/publication.aspx?docnum=10031>

Security

[17]16.06.02 D103 SESAR Security Ref Material Level.

[18]16.06.02 D137 Minimum Set of Security Controls (MSSCs).

[19]16.06.02 D131 Security Database Application (CTRL_S).

5.1 Reference Documents

- [20] D1.1.04 – Final PJ02-01 VALR – 00.01.01.
- [21] PJ02-03 VALR – 01.00.00.
- [22] SESAR Solution 02-08 D6.1.13 Validation Report (VALR) for V2 – v00.01.01.
- [23] SESAR 2020 PJ02-08 D6_1_23 V3 VALR 00.04.00.
- [24] SESAR 2020 – Solution 02-08 OSED SPR INTEROP for V2 Part V Performance Assessment Report, D6.1.10, edition 00.01.01, 12 October 2018.
- [25] SESAR Solution 02-08 SPR/INTEROP-OSED for V3 - Part V - Performance Assessment Report (PAR), edition: 00.04.00, 31 January 2020.
- [26] D1.4 - SESAR 2020 VLD3 D1.1 SORT DEMO Report - Part IV - Environment Assessment Report - WP5, edition 00.02.00, issued as D1.1.01, 29/10/2021.
- [27] SESAR Solution 02-08 SPR/INTEROP-OSED for V3 - Part I.
- [28] SESAR 2020 VLD3-W2-SORT D1.1 Demo Plan - Part I, edition 00.02.00, issued as D1.1.01, 29/10/2021.
- [29] D1.4 - SESAR 2020 VLD3 SORT DEMO Report - Part I.
- [30] D1.4 - SESAR 2020 VLD3 SORT DEMO Report - Part II Safety Assessment Report (SAR).
- [31] D1.4 - SESAR 2020 VLD3 SORT DEMO Report - Part III Human Performance Assessment Report (HPAR).
- [32] D1.4 - SESAR 2020 VLD3 SORT DEMO Report - Part IV Environmental Assessment Report (ENVAR).

Appendix A Detailed Description and Issues of the OI Steps

OI Step ID	Title	Consistency with latest Dataset
AO-0328	Optimised Runway Delivery (ORD) on Final Approach	DS23
AO-0306	Static Pairwise Separations (S-PWS) for Arrivals	DS23
AO-0309	Minimum Radar Separations based upon Required Surveillance performance (RSP)	DS23
AO-0337	Reduced separation based on local Runway Occupancy Time characterization	DS23

Table 16: OI Steps allocated to the Demo