

P04.07.07 Safety and Performance Requirements (SPR)

Document information	
Project Title	Implementation of Dynamic Capacity Management in a High Density Area
Project Number	04.07.07
Project Manager	AENA
Deliverable Name	Final Safety and Performance Requirements (SPR)
Deliverable ID	D26
Edition	00.02.00
Template Version	03.00.00
Task contributors	
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Abstract

This report addresses the Safety and Performance Requirements (SPR) for the Dynamic Capacity Management in a High Density Area for Step 1. This is the Final edition, which is an enhancement of the Preliminary edition (04.07.07.D22) and contains Safety and Performance Requirements derived from the P04.07.07.D25 OSED Operational Requirements.

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Rational for rejection

None.

Document History

Edition	Date	Status	Author	Justification
00.00.01	19/03/2013	Draft		New document
00.00.02	21/03/2013	Draft		Draft for Internal Review
00.01.01	25/03/2013	Draft		Draft for External Review
00.01.01	03/04/2013	Final		Final for Issue
00.01.02	03/04/2013	Final		Change to REQ Trace: from 4.7.7 to 04.07.07
00.02.00	29/04/2013	Final		Final with updates after SJU comments

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Executive summary

This document is the final version that specifies the Safety and Performance Requirements for Dynamic Capacity Management in a High Density Area within the context of the Single European Sky Air Traffic Management (ATM) Research and Development Programme (SESAR) Concept Story Board - Step 1. The SESAR concept envisages managing capacity in high-density airspace. P04.07.07 provides part of the solution to addressing a mismatch of demand and capacity in high density airspace.

AENA has developed a prototype tool that assesses predicted demand and provides advice on matching capacity to this demand. The tool recommends a sector configuration at Barcelona Area Control Centre (ACC), utilising bandboxing and splitting sectors to best match forecast demand. This has been validated at V3 using the scenario of Northbound summer traffic from the Balearics to the UK and Germany (that can overload French sectors) as it leaves the Barcelona FIR.

NATS has validated at V2 three complementary concept 'layers' to progressively reduce forecast complexity in a pre-tactical to near-tactical time-scale using the scenario of Eastbound traffic on the North Atlantic (NAT) tracks that interferes with the first rotation of UK domestic and other short haul traffic. The concept layers are an oceanic clearance optimiser that recommends optimised clearances based on forecast demand, replacing clearances based on the basis of first come, first served. The second concept element is High Level Direct Routing (HLDR) that permits aircraft overflying the UK to take a more direct track to their destination, thereby saving fuel and reducing traffic bunching. The third concept element is Inbound Longitudinal Streaming, which uses an extended Arrival Manager (AMAN) horizon concept developed in SESAR project P05.06.04. However, whereas P05.06.04 developed this streaming concept for benefits in Terminal Control Area (TMA) and approach airspace, P04.07.07 seeks to integrate the same concept for a benefit in en route airspace well before the descent phase.

While the scenarios above have been validated in airspace specific to the project partners, the concepts have a wider European applicability. The Barcelona ACC sector configuration tool could be used in many ACCs throughout Europe. Similarly, while the NATS layered planning concept is set in domestic airspace adjacent to the North Atlantic, the concepts could be used in any airspace where long haul overflights interact with aircraft that will shortly be descending to their destination airports.

This document details the Safety and Performance Requirements (SPRs) and provides traceability to the operational requirements (ORs), functional blocks (FBs) and Operational Focus Areas (OFAs) based on the P04.07.07 Operational Service and Environment Definition (OSED) Ref.[7] Operational Requirements and using the Air Navigation System Safety Assessment Methodology Ref [6].

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1 Introduction

1.1 Purpose of the document

This Safety and Performance Requirements (SPR) document provides the safety and performance requirements for Services related to the operational Processes defined in the P04.07.07 OSED Dynamic Capacity Management in a High Density Area Ref [7]. The SPR also provides their allocation to Functional Blocks. It identifies the requirements needed to fulfil each KPA and include, or reference, the sources justifying those requirements. This document is used to provide the basis for ensuring that these SPR requirements are applicable during initial implementation and continued operation.

1.2 Scope

This document supports the operational services and concept elements identified in the Operational Service and Environment Definition (OSED), Ref.[7]. These services are expected to be operational in the 2014-2020 timeframe.

It was originally intended that Performance Requirements should be defined using the Top-down principle, originating at the level of Work Package - WP B.4.1 Key Performance Areas (KPAs), cascaded down from strategic targets to operational SWP 4.2 project level and subsequently to primary projects. However at the time of developing and refining the initial requirements during the production of the Preliminary SPR the B.4.1 Performance Framework document (Ref [5]) and SWP 04.02 Detailed Operational Description (DOD) (Ref.[8]) and SWP07.02 DOD (Ref.[9]) were not sufficiently mature in order to allow the adoption of this approach. As the V2 and V3 validations have now been conducted it is considered that adjusting the requirements at this late stage in the lifecycle of P04.07.07 would prove nugatory.

Consequently this document includes safety and performance requirements and system integrity requirements based on the P04.07.07 OSED (Ref.[7]) Operational Requirements.

Likewise at the time of definition of the requirements the Safety Reference Material was not available and therefore their definition has utilised the EUROCAE Air Navigation System Safety Assessment Methodology (Ref. [6]).

Traceability between the OSED requirements and the SPRs has been generated. The relationship of the various levels of documents is identified in Figure 1.



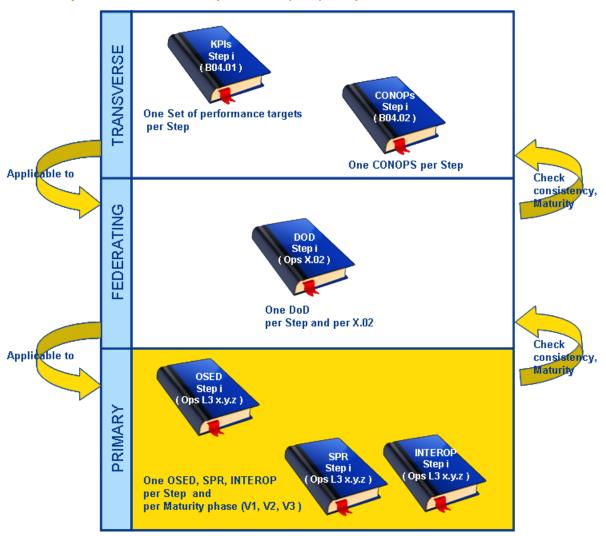


Figure 1: SPR document with regards to other SESAR deliverables

In Figure 1, the Steps are driven by the OI Steps addressed by the project in the Integrated Roadmap document Ref [11]

1.3 Intended readership

The intended audience for this document is the following:

- Primary Projects:
 - o WP4: P04.07.01, P04.07.07
 - o WP5: P05.06.04
 - o WP7: P07.06.03
 - o WP7: P07.06.05
 - o WP10: P10.08.01
 - o WP13: P13.02.03
- Federating Projects:
 - o 4.2, 5.2, and 7.2 for Consolidation;
 - o 4.3 for cross WP integrated validation

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1.4 Structure of the document

Section 1: Introduces the document purpose, objectives and scope; the structure (this section) and includes the Glossary

Section 2: Summarizes the operational concept, based on the descriptions provided in the corresponding OSED [Ref[7]].

Section 3: Provides the Safety and Performance Requirements and System Integrity Requirements and their traceability to the Operational Requirements found in the OSED [Ref[7]].

Section 4: Lists the Applicable and Referenced Documents

Appendix A: Provides details of the safety objective classes and the requirement assessment and lists the assumptions

1.5 Background

This Final SPR document builds upon the Preliminary SPR document Ref.[10] by providing traceability links to the Final OSED Operational Requirements

1.6 Glossary of terms

Term/Source	Definition
Airspace Configuration SOURCE: SWP 7.2	Is a pre-defined and coordinated organisation of ATS routes and/or terminal routes and their associated airspace structures, including airspace reservations/restrictions (ARES), if appropriate, and ATC sectorisation.
Airspace Management SOURCE: SWP 7.2 and SWP 4.2	Airspace Management is integrated with Demand and Capacity Balancing activities and aims to define, in an inclusive, synchronised and flexible way, an optimised airspace configuration that is relevant for local, sub-regional and regional level activity to meet users requirements in line with relevant performance metrics.
	Airspace Management primary objective is to optimise the use of available airspace, in response to the users demands, by dynamic time-sharing and, at times, by the segregation of airspace among various airspace users on the basis of short-term needs.
	It aims at defining and refining, in a synchronised and a flexible way, the most optimum airspace configuration at local, sub-regional and regional levels in a given airspace volume and within a particular timeframe, to meet users requirements while ensuring the most performance of the European Network and avoiding as much as possible any disruption. Airspace Management in conjunction with AFUA is an enabler to improve civil-military co-operation and to increase capacity for the benefit of all users.
Dynamic Capacity Management SOURCE: 04.07.07	Concept proposed by P04.07.07 to adapt the capacity to the traffic load by grouping and de-grouping sectors and managing the staff resources.
Dynamic sectorisation SOURCE: SWP 4.2	The geographical and vertical limits of a control sector will be adapted to the traffic flow to optimise the capacity in real-time. Flexible sectorisation does not imply that ATC will be faced with sector configurations that are not known either to them or to the supporting FDP and RDP systems. Sector configurations will be part of the pre-determined scenarios of the ACC and will be simulated and training will be provided prior to usage.

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Term/Source	Definition
Layered Planning SOURCE: 04.07.07	Concept proposed by P04.07.07 to support complexity reduction by a series of separate actions or 'layers' that cumulatively reduce complexity. The actions would be: A NATS-developed Oceanic Domestic Interface Manager (ODIM), High Level Direct Routing and an inbound longitudinal streaming concept.
Network Operations Plan (NOP) SOURCE: SWP 7.2	A set of information and actions derived and reached collaboratively both relevant to, and serving as a reference for, the management of the Pan-European network in different timeframes for all ATM stakeholders, which includes, but is not limited to, targets, objectives, how to achieve them, anticipated impact. The NOP has a dynamic and rolling lifecycle starting in the strategic phase and progressively updated up to and including the execution and post-operations phases.
	It supports and reflects the result of the collaborative ATM planning process: at each phase, stakeholders collaborate at developing common view of the planned network situation, allowing each of them to take informed decisions considering the network effect and the Network Manager to ensure the overall coordination of individual decisions needed to support network performance.
Nominal/Non-Nominal/Exception Conditions SOURCE: SWP 4.2	Nominal conditions relate to flight circumstances which are optimal and fully reflect the SESAR objectives for flying and adhering to an agreed reference trajectory, in accordance with all ATC clearances and constraints. As Step 1 progresses towards Step 2 and onwards to Step 3 the flight conditions should increasingly tend towards the nominal case.
	Non-nominal conditions relate to circumstances which are to be expected in the Step 1 timeframe because of shortfalls in the various concepts, equipages and procedures. Typically they will involve various ATC measures such as conflict avoidance and complexity reduction. They also include situations where a dialogue or negotiation process is rejected for some reason.
	Exception conditions relate to circumstances which should not normally occur. For example this includes any failure (air or ground) to reply to an operational request or dialogue. They also include situations where flight behaviour is found to be in significant contradiction to the agreed course of action, with the exception of certain unavoidable circumstances, such as unexpected weather conditions which will be regarded as non-nominal.
PERSEO SOURCE: 04.07.07	Web-based local tool where the forecast demand is based on the processing of massive historical data obtained from multiple sources of information or a mix of real traffic data and these historical data. This tool includes an optimization algorithm to provide the most suitable airspace configuration.
Sector SOURCE: 04.07.01	A sector is the area of responsibility assigned to a Unit of Control. A sector is composed of one or several elementary sector.
Sector Cluster SOURCE: 04.07.07	A sector cluster represents a group of adjoining airspace blocks that are treated as a single ATM airspace. A sector cluster consists of several ATC sectors and multi-sectors.
Sector configuration	Airspace configuration in the Centre of Control (ACC)/ Sector Cluster

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Term/Source	Definition
SOURCE: 04.07.01	i.e. the relation between the Units of Control and sectors.
Sector configuration schedule SOURCE: 04.07.01	List of planned sector configurations with their time of activation.
Target Sector Flow SOURCE: 04.07.07	It is a level below that the sector can safely handle to allow for the inefficiencies inherent to the CFMU process and the vagaries of the subsequent control process, providing some headroom /protection of overloads.

1.7 Acronyms and Terminology

Term	Definition
ACC	Area Control Centre
AMAN	Arrival Manager/Management
ANSP	Airspace Navigation Service Provider
ATC	Air Traffic Control
АТМ	Air Traffic Management
ATMS	Air Traffic Management Service
ATS	Air Traffic Services
ATSU	Air Traffic Service Unit
CONOPS	Concept of Operations
DCM	Dynamic Capacity Management
DOD	Detailed Operational Description
ЕТА	Estimated Time of Arrival
EUROCAE	European Organisation for Civil Aviation Equipment
FB	Functional Block
FIR	Flight Information Region
FMP	Flow Management Position
HLDR	High Level Direct Routing/Routes
нмі	Human Machine Interface

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Term	Definition
iFACTS	Interim Future Area Control Tools Support.
IER	Information Exchange Requirements
КРА	Key Performance Area
NAT	North Atlantic
ODIM	Oceanic Domestic Interface Management
ODIMS	Oceanic Domestic Interface Management System
OFA	Operational Focus Area
ОІ	Operational Improvement
OR	Operational Requirement
OSED	Operational Service and Environment Definition
ΟΤS	Organised Track Structure
Р	Project
REQ	Requirement
SESAR	Single European Sky ATM Research Programme
SIR	System Integrity Requirement
SJU	SESAR Joint Undertaking
SPR	Safety and Performance Requirement
ТМА	Terminal Control Area
UK	United Kingdom
SWP	Sub-Work Package
TMA	Terminal Control Area
UK	United Kingdom
V&V	Verification and Validation
WP	Work Package



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2 Summary of Operational Concept (from OSED)

2.1 Description of the Concept Element

P04.07.07 is addressing the issue of dynamic capacity management in high density airspace. In order to achieve this objective, two operational concepts have been developed:

- 1. <u>Dynamic Capacity Management</u>: This aims to vary capacity to match forecast demand using an ACC sector configuration optimisation tool.
- 2. Layered planning: This comprises a series of layered planning measures to reduce complexity. These measures involve reducing the complexity of traffic presentation of aircraft departing the North Atlantic (NAT) track structure. This starts with the use of an Oceanic Domestic Interface Management System (ODIM) that aims to take account of aircraft destination when allocating cleared tracks and levels when appropriate and without penalising the aircraft. Subsequently aircraft transiting UK airspace at high level en route to non-UK destinations will be able to take up direct routing through UK airspace, producing a lateral 'fanning out' effect. Aircraft inbound to UK airports, which may also conduct an element of direct routing to a common descent point for their flow, will be longitudinally streamed through use of an extended Arrival Management (AMAN) horizon. This latter concept is being developed through P05.06.04 Tactical TMA and En Route Queue Management. However the focus of 05.06.04 with respect to controller workload and complexity is to produce a predominantly TMA benefit. The focus of this project is to demonstrate how this concept also produces a complexity reduction effect in the target en route airspace. A combination of all these measures should reduce the complexity faced by controllers, thereby enabling further performance improvements in line with overall SESAR goals. It is acknowledged that in SESAR Step 2, such layered planning measures are likely to be made more dynamic and more responsive to user demand. As a Step 1 SESAR project, P04.07.07 is developing the concepts that will lay the path for further refinements.

The concepts are described in detail in the P04.07.07 Final OSED Ref [7]

2.2 Description of Operational Services

The high-level process and service diagram for traffic complexity is detailed in the 4.2 DOD Ref [8] and repeated below. Further diagrams are set out in the 4.2 DOD.

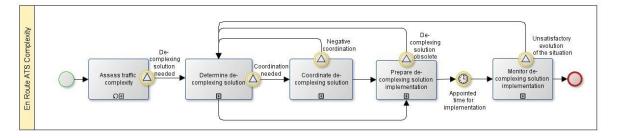


Figure 2: Traffic Complexity Process Diagram

2.3 Description of Operational Environment

The expected Operational Environments for both the Dynamic Capacity Management and the Layered Planning aspects of the P04.07.07 concepts are described in detail in Section 4 of the P04.07.07 OSED [Ref [7]].

3 Requirements

3.1 Introduction

As the SESAR Safety Reference Material (SRM) was not available at the time of definition of the safety requirements the safety requirements have been defined using the Safety Objective Classes from the Air Navigation System Safety Assessment Methodology, Ed. 2.0, ref. AF.ET1.ST03.1000-MAN-01, 30 April 2004 Ref [6]. To redefine the requirements in accordance with the SRM after this became available would be a very large task needing input from all partners and exceeding the effort available for the project. Consequently it is considered that such a change is not possible and also not essential as a recognised safety objective methodology has been used.

The Safety Objective Classes are reproduced in Table 1 which can be found in Appendix A. This should be referred to prior to reading the requirements as it provides the quantitative meaning of the qualitative words 'likely', 'occasional' etc.

The use of terms 'too many', ' too much', 'too soon', 'too late' etc cannot be quantified at this stage. Such words are normal terminology used in a safety hazard identification to define safety requirements. The exact parameters of what constitutes 'too many' etc need to be set by the ATC Unit using the system/tool/procedure. The value attached to 'too many' etc will certainly vary between ATC units and most likely between ATC sectors at any one unit. The values may also vary depending on time of year, time of day, serviceability of other tools/systems, experience and number of staff on duty etc.

Appendix A.1.3 Requirements Definition provides more information on the process used to derive the requirements and also includes the assessments on which the requirements are based. The performance requirements were defined simultaneously with the safety requirements and many requirements apply to both safety and performance. In some cases failing to comply with a requirement may maintain or even increase safety but compromise performance and vice versa. Therefore it is considered that separation of safety and performance requirements is not feasible and consequently they are presented together in this document.

Some Operational Requirements were removed from the a previous version of the OSED and consequently corresponding SPRs have also been removed from this version of the SPR Document as they are no longer relevant.

The SPRs are divided into two sections based on Operational Scenarios. Section 3.2 provides SPRs for 'Dynamic Capacity Management – Short Term' for which a prototype of the tool has been validated to V3 level in Barcelona ACC. In Section 3.3 SPRs for the UK/Irish Oceanic are detailed. This Operational Scenario has been validated to V2 and encompasses three elements of layered planning:

- Oceanic Domestic Interface Manager
- High Level Direct Routing
- Inbound Longitudinal Streaming
 - As stated in the OSED Ref [7] this concept is being developed by P05.06.04. which seeks to produce a benefit within the TMA, whereas this P04.07.07 seeks to use the same concept to measure the benefit on the target en route airspace. All requirements relating to Inbound Longitudinal Streaming have been developed by P05.06.04 and are not therefore repeated in either the P04.07.07. OSED or this SPR document

The wording of each SPR requirements remains as close as possible to the wording of the corresponding OR to which it relates.



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3.2 Operational Scenario: Dynamic Capacity Management -Short Term – Safety & Performance Requirements

Identifier	REQ-	04.07.07-SPR-DCM1.0005	
Requirement			
		OFA05.03.04	
Identifier	REQ-	04.07.07-SPR-DCM1.0006	
Requirement			

		OFA05.03.04
Identifier	RE	Q-04.07.07-SPR-DCM1.0007
Requirement		

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0008
Requirement	

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0010
Requirement	The probability of the DCM system displaying only some of the expected demand indicators per sector for a given operational environment (sector configuration) shall be no greater than Likely

	OFA05.03.04
Identifier F	REQ-04.07.07-SPR-DCM1.0015
c	he probability of the undetected incorrect calculation of the expected lemand indicators per sector for a given operational environment (sector onfiguration) by the DCM System shall be no greater than Occasional

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0016
Requirement	The probability of the undetected incorrect display of the expected demand indicators per sector for a given operational environment (sector configuration) by the DCM System shall be no greater than Occasional
	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0017
Requirement	The probability of the undetected incorrect calculation of the expected demand indicators per time interval for a given operational environment (sector configuration) by the DCM System shall be no greater than Occasional

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0018
Requirement	The probability of the undetected incorrect display of the expected demand indicators per time interval for a given operational environment (sector configuration) by the DCM System shall be no greater than Occasional

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0020
Requirement	The probability of the detected incorrect calculation of the expected demand indicators per sector for a given operational environment (sector configuration) by the DCM System shall be no greater than Likely

	OFA05.03.04	
Identifier	EQ-04.07.07-SPR-DCM1.0021	
Requirement	he probability of the detected incorrect calculation of the expected demar	าป



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indicators per time interval for a given operational environment (sector
configuration) by the DCM System shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0022
Requirement	The probability of the detected incorrect display of the expected demand indicators per sector for a given operational environment (sector configuration) by the DCM System shall be no greater than Likely

	OFA05.03.04	
Identifier	EQ-04.07.07-SPR-DCM1.0023	
Requirement	he probability of the detected incorrect display of the expected demand	
-	dicators per time interval for a given operational environment (sector	
	onfiguration) by the DCM System shall be no greater than Likely	

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0025
Requirement	The probability of the late calculation of the expected demand indicators per sector for a given operational environment (sector configuration) by the DCM System shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0026
	The probability of the late calculation of the expected demand indicators per time interval for a given operational environment (sector configuration) by the DCM System shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0027
Requirement	The probability of the late display of the expected demand indicators per sector for a given operational environment (sector configuration) by the DCM System shall be no greater than Likely

	OFA05.03.04	
Identifier	EQ-04.07.07-SPR-DCM1.0028	
	ne probability of the late display of the expected demand indicators per terval for a given operational environment (sector configuration) by the CM System shall be no greater than Likely	

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0030
Requirement	The probability of the failure of all predicted demand indicators to be compared against the maximum reference level configured as acceptable for each of the sectors shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0035
Requirement	The probability of the failure of some of the predicted demand indicators being compared against the maximum reference level configured as acceptable for each of the sectors shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR- DCM1.0040
Requirement	The probability of the undetected incorrect predicted demand indicators being compared against the maximum reference level configured as acceptable for each of the sectors shall be no greater than Occasional

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	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0045
Requirement	The probability of the detected incorrect predicted demand indicators being compared against the maximum reference level configured as acceptable for
	each of the sectors shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0050
Requirement	The probability of the predicted demand indicators being compared late against the maximum reference level configured as acceptable for each of
	the sectors shall be no greater than Likely

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0055	
	The probability of the failure of the DCM system to calculate the predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Likely	

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0060	
	The probability of the DCM system calculating a greater than likely predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Occasional	

	OFA05.03.04
Identifier R	EQ-04.07.07-SPR-DCM1.0065
pi	ne probability of the DCM system calculating an undetected less than likely edicted demand for each operative sector in all the operational sector onfigurations available shall be no greater than Occasional

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0070	
	The probability of the DCM system calculating a detected less than likely predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Occasional	

	OFA05.03.04	
Identifier R	REQ-04.07.07-SPR-DCM1.0075	
d	he probability of the failure of the DCM system to calculate the predicted emand for some of the operative sectors in all the operational sector onfigurations available shall be no greater than Likely	

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0100
Requirement	The probability of the failure of the DCM system to propose the optimal configurations from a predefined list of all possible sector configurations, based of the workload indicators shall be no greater than Likely

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0110		
Requirement	less than the optimal conf	A system proposing a (detected or undetect iguration from a list of predefined list of all p ed on the workload indicators shall be no g	ossible

		OFA05.03.04	
Identifier	REQ-04.07.07-SF	SPR-DCM1.0120	
Requirement	The probability of	of the DCM system to propose a partial optimal cor	figuration



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from a list of predefined list of all possible sector configurations, based on the
workload indicators available shall be no greater than Likely

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0125	
Requirement	The probability of the DCM system proposing a (detected or undetected) incorrect configuration from a predefined list of all possible sector configurations, based on the workload indicators available shall be no greater than Occasional	

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0145	
Requirement	When proposing an optimal solution, the probability of the undetected failure by the DCM system to consider all of the applicable operational restrictions shall be no greater than Occasional	
	no more than a fixed number of configurations changes in a time interval; a minimum sector configuration time when no more changes can be done	

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0150	
Requirement	en proposing an optimal solution, the probability of the undetected	
	onsideration by the DCM system of more operational restrictions than	
	quired shall be no greater than Occasional	
	no more than a fixed number of configurations changes in a time interval; or	
	a minimum sector configuration time when no more changes can be done.	
	onsideration of more than are appropriate could result in a less than	
	optimum configuration affecting performance	

		OFA05.03.04	
Identifier	RE	Q-04.07.07-SPR-DCM1.0155	
Requirement		nen proposing an optimal solution, the probability of the undetected	
	cor	sideration by the DCM system of fewer operational restrictions than	
	req	quired shall be no greater than Occasional	
		more than a fixed number of configurations changes in a time in	
		ninimum sector configuration time when no more changes can be	
		nsideration of fewer than are appropriate could result in a less th	nan
	opt	imum configuration affecting safety and performance	

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0165
Requirement	When proposing an optimal solution, the probability of the consideration by the DCM system of undetected incorrect operational restrictions shall be no greater than Occasional
	no more than a fixed number of configurations changes in a time interval; or a minimum sector configuration time when no more changes can be done. Incorrect could be those that apply later or earlier than required, inappropriate for the sectors or just totally incorrect.

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0180	
Requirement	The probability of the detected failure of the DCM system to simultaneously take into account for its demand prediction both historical traffic data and actual system data (as available in advance) shall be no greater than Likely	
	historical traffic data and actual system data	

		OFA05.03.04
Identifier	RE	Q-04.07.07-SPR-DCM1.0185
Requirement	The	e probability of the DCM system to take into account, undetected, less

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simultaneous historical traffic data and actual system data (as available in advance) than required for its demand prediction shall be no greater than Occasional
historical traffic data and actual system data than required

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0195
Requirement	The probability of the DCM system to take into account, undetected, incorrect simultaneous historical traffic data and actual system data (as available in advance) for its demand prediction shall be no greater than Occasional
	historical traffic data and actual system data

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0200
	The probability shall be no greater than Occasional that the DCM system takes into account, undetected, historical traffic data and actual system data (as available in advance) that is too late for its demand prediction

	OFA05.03.04	
Identifier	EQ-04.07.07-SPR-DCM1.0205	
	ne probability shall be no greater than Occasional that the kes into account, undetected, historical traffic data and a savailable in advance) that is too early for its demand p	ctual system data

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0210
	The probability of the failure of the DCM system to define different mixes of historical data and actual system data (configurable) shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0225
	The probability of the DCM system to define an undetected incorrect mix of historical data and actual system data (configurable) shall be no greater than Occasional

	OFA05.03.04
Identifier R	EQ-04.07.07-SPR-DCM1.0245
a	he probability that the DCM system receives undetected a list of fewer than Il possible operational sector configurations (pre-defined) shall be no reater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0255
Requirement	The probability that the DCM system receives undetected an incorrect list of possible operational sector configurations (pre-defined) shall be no greater than Likely

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0260	
Requirement	The probability of the undetected failure of the DCM system to reconfigure individual sector capacities (thresholds) as a reaction to some sector operational restrictions (eg. weather, military) shall be no greater than Occasional	

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0280

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Requirement	The probability of the failure of the DCM system to provide more than one
	proposal of sectorisation plans, according to the future time period under
	consideration shall be no greater than Likely

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0295	
Requirement	The probability of detected DCM system failure to take into account the network effects locally or at a sub-regional level, in making recommendations for sectorisation, shall be no greater than Likely	
	To optimise the DCM, limitations of configuration such as availability of voice and data communications shall be taken into account	

		OFA05.03.04	
Identifier	RE	Q-04.07.07-SPR-DCM1.0300	
Requirement	net	The probability of undetected DCM system failure to take into account the network effects locally or at a sub-regional level, in making recommendations for sectorisation shall be no greater than Occasional	
		optimise the DCM, limitations of configuration such as availability of voic I data communications shall be taken into account	ce

		OFA05.03.04
Identifier	REQ	0-04.07.07-SPR-DCM1.0305
Requirement		probability of the failure of the DCM system to perform data acquisition matically from all the available sources shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM1.0310
Requirement	The probability of the undetected failure of the DCM system to perform acquired data storage automatically shall be no greater than Occasional

		OFA05.03.04
Identifier	RE	Q-04.07.07-SPR-DCM1.0315
Requirement		e probability of the detected failure of the DCM system to perform uired data storage automatically shall be no greater than Likely

	OFA05.03.04
[REQ]	
Identifier	REQ-04.07.07-SPR-DCM1.0320
Requirement	Agreements for the opening and closing of restricted airspace structures shall be defined in such a way as to ensure the required level of integrity of the process
Title	Agreements for Opening and Closing of Restricted Airspace
Status	<in progress=""></in>
Rationale	Current safety of permanent restricted airspace must not be compromised if such airspace becomes subject to opening and closing
Category	<safety></safety>
Validation Method	·
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<satisfies></satisfies>	<atms requirement=""></atms>	REQ-04.07.07-OSED-DCM.0014	
		OFA05.03.04	

Identifier	REQ-04.07.07-SPR-DCM2.0005
Requirement	The probability that the DCM system fails to display graphically the predicted

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demand and capacity shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM2.0010
Requirement	The probability that the DCM system partially displays graphically the predicted demand and capacity and that this is detected shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM2.0020
	The probability that the DCM system partially displays graphically the predicted demand and capacity and that this remains undetected, shall be no greater than Occasional

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM2.0025	
Requirement	The probability of failure of the DCM system to be able to provide the predicted demand for each sector as tables, showing the values per time intervals shall be no greater than Likely	

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM2	.0030	
Requirement		system showing more values than actu predicted demand per sector, shall be	

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM2.0031
Requirement	The probability of the DCM system showing longer time intervals than actual in the tables for the predicted demand per sector, shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM2.0035
Requirement	The probability of the DCM system not being available both in the FMP position and in the ATC supervisor position, shall be no greater than Likely

	OFA05.03.04
Identifier R	EQ-04.07.07-SPR-DCM2.0040
de	ne probability of a failure of the DCM system causing the implantation of a etected incorrect sector configuration from the system HMI shall be no eater than Likely

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM2	2.0045	
Requirement		of the DCM system causing the implant onfiguration from the system HMI which er than Likely	

	OFA05.03.04
Identifier RI	EQ-04.07.07-SPR-DCM2.0050
pa	ne probability of a failure of the DCM system causing the implantation of a intially incorrect sector configuration from the system HMI which is indetected shall be no greater than Occasional

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM2.0055
Requirement	The probability that the DCM system is not capable of displaying errors,

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warnings and system messages shall be no greater than Likely

OFA05.03.04	
REQ-04.07.07-SPR-DCM2.0060	

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM2.0065
Requirement	The probability that the DCM system displays fewer errors, warnings and system messages that actual shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-DCM2.0070
Requirement	The probability that the DCM system displays errors, warnings and system messages later than actually apply shall be no greater than Likely

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM2.0075	
Requirement		

OFA05.03.04



3.3 Operational Scenario: UK/ Irish Oceanic Airspace - Safety & Performance Requirements

Identifier	REQ-04.07.07-SPR-ODIM.0005		
Requirement	The probability of 'too many' ODIM clearances being proposed for one		
	aircraft shall be no greater than Likely		
	OFA05.03.04		
Identifier	REQ-04.07.07-SPR-ODIM.0010		
Requirement	The probability of loss of proposed ODIM clearances for some but not all		
	aircraft shall be no greater than Likely		
	OFA05.03.04		
Identifier	REQ-04.07.07-SPR-ODIM.0015		
Requirement	The probability of undetected incorrect ODIM clearances being proposed		
Requirement	shall be no greater than Occasional		
	Undetected Incorrect ODIM Clearances		
	OFA05.03.04		
Identifier	REQ-04.07.07-SPR-ODIM.0020		
Requirement	The probability of detected incorrect ODIM clearances being proposed shall		
	be no greater than Likely		
	Detected Incorrect ODIM Clearances		
	OFA05.03.04		
Identifier	REQ-04.07.07-SPR-ODIM.0030		
Requirement	The probability of ODIM losing the ability to receive current flight plan data		
	and details of clearances already issued shall be no greater than Likely		
	OFA05.03.04		
Identifier	REQ-04.07.07-SPR-ODIM.0035		
Requirement	The probability of ODIM receiving 'too much' current flight plan data and		
	detail of clearances already issued shall be no greater than Likely		
	OFA05.03.04		
Identifier	REQ-04.07.07-SPR-ODIM.0040		
Requirement	The probability of undetected loss of receipt of ODIM current flight plan data		
Requirement	and details of clearances already issued for some but not all aircraft shall be		
	no greater than Occasional		
	OFA05.03.04		
Identifier	REQ-04.07.07-SPR-ODIM.0045		
Requirement	The probability of detected loss of receipt of ODIM current flight plan data		
	and details of clearances already issued for some but not all aircraft shall be		
	no greater than Likely		
	OFA05.03.04		
Identifier	REQ-04.07.07-SPR-ODIM.0050		
Requirement	The probability of undetected loss of receipt of ODIM current flight plan data		
	or details of clearances already issued for all aircraft potentially affecting the		
	aircraft for which clearance is requested shall be no greater than Occasional		

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-ODIM.0055
Requirement	The probability of detected loss of receipt of ODIM current flight plan data or detail of clearances already issued for all aircraft shall be no greater than Likely

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	OFA05.03.04
Identifier	REQ-04.07.07-SPR-ODIM.0060
Requirement	The probability of undetected incorrect ODIM current flight plan data and/or
	details of clearances already issued shall be no greater than Occasional
	Undetected Incorrect ODIM Flight Plan Data/Issued Clearances

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-ODIM.0065	
Requirement	The probability of detected incorrect ODIM current flight plan data and/or	
	details of clearances already issued shall be no greater than Occasional	
	Detected Incorrect ODIM Flight Plan Data/Issued Clearances	

	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-ODIM.0070	
Requirement	The probability of failure of the ODIM to take into account the aircraft level in relation to its destination when optimising oceanic clearances shall be no greater than Likely	

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-ODIM.0075
Requirement	The probability of undetected incorrect aircraft level data in relation to its destination being taken into account in the ODIM when optimising oceanic clearances shall be no greater than Occasional

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-ODIM.0175
Requirement	The probability of failure of the ODIM to ensure that all Proposed Clearances are issued within a time frame defined by the OSED shall be no greater than Likely

	OFA05.03.04
Identifier	REQ-04.07.07-SPR-ODIM.0180
Requirement	The probability of the failure of the ODIM to ensure that some, but not all, of the required Proposed Clearances are issued within a time frame defined by the OSED shall be no greater than Likely

		OFA05.03.04
Identifier	RE	2Q-04.07.07-SPR-ODIM.0215
Requirement		

	REQ-	04.07.07-OSED-ODIM.0005
	REQ-	04.07.07-OSED-ODIM.0015
	REQ-	04.07.07-OSED-ODIM.0004
	OFA05	5.03.04
Identifier	REQ-04.07.07-SPR-ODIM.02	20
Requirement	The allocation of clearances shall be in accordance with the separation standards in place at the time	

	REQ-04.07.07-OSED-ODIM.0015	
	REQ-04.07.07-OSED-ODIM.0005	
	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-ODIM.0225	
Requirement	The allocation of clearances shall take into consideration the capacity limitations applicable to the airspace at the time of planned aircraft	

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transit

	REQ-04.07.07-OSED-ODIM.0005	
	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-ODIM.0230	
Requirement	The accuracy of entry and exit times to/from the OTS shall be	
-	specified at a level that is consistent with the required accuracy of the	
	DIM	
	REQ-04.07.07-OSED- ODIM.0005	
	OFA05.03.04	
Identifier	REQ-04.07.07-SPR-HLDR.0005	
Requirement	Direct routing of over flights shall ensure required separation is	
-	maintained	

	REQ-04.07.07-OSED-HLDR-0060		
	OFA05.03.04		
Identifier	REQ-04.07.07-SPR-ODIM.0235		
Requirement	Tools and processes shall use consistent units of measurement for data		
	exchange		

OFA05.03.04			
		REQ-04.07.07-OSED-ODIM.0005	
Identifier	RE	REQ-04.07.07-SPR-ODIM.0240	
Requirement	Data exchanged between tools, processes and their respective		
	interfaces shall be synchronized		

OFA05.03.04		
	REQ-04.07.07-OSED-ODIM.	0005
Identifier	REQ-04.07.07-SPR-ODIM.0245	
Requirement	Data exchanged between tools, processes and their respective	
	interfaces shall be to the same required accuracy.	

OFA05.03.04			
		REQ-04.07.07-OSED-ODIM.0005	
Identifier	REQ-04.07.07-SPR-ODIM.0255		
Requirement	equirement Data exchanged between tools, processes and their respective interfaces shall be to the highest required integrity		

	OFA05.03.04	
	REQ-04.07.07-OSED-ODIM.0005	

[REQ]	
Identifier	REQ-04.07.07-SPR-ODIM.0285
Requirement	In issuing Proposed Clearances the ODIM shall ensure it uses the current time and position boundaries of restricted airspace
Title	Avoidance of Restricted Airspace
Status	<in progress=""></in>
Rationale	It is assumed that current mitigation against intrusion into restricted airspace will be maintained
Category	<safety></safety>

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Validation Method	
Verification	
Method	

[REQ Trace]

[]			
Relationship	Linked Element Type	Identifier	Compliance
<satisfies></satisfies>	<atms requirement=""></atms>	REQ-04.07.07-OSED-ODIM.0010	
		OFA05.03.04	

[REQ]

Identifier	REQ-04.07.07-SPR-ODIM.0290
Requirement	In issuing Proposed Clearances the ODIM shall ensure it uses the up- to-date sectorisation times and position boundaries.
	to-date sectorisation times and position boundaries.
Title	Up-to-date sectorisation times and position boundaries.
Status	<in progress=""></in>
Rationale	Latest times and positions are required for proposed clearances to be
	valid
Category	<safety></safety>
Validation Method	
Verification	
Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<satisfies></satisfies>	<atms requirement=""></atms>	REQ-04.07.07-OSED-ODIM.0010	
		OFA05.03.04	

[REQ]

Identifier	REQ-04.07.07-SPR-ODIM.0300
Requirement	Following implementation of the ODIM, any improvements,
	expansions or variations in its use proposed by controllers and
	considered for introduction shall be assessed for safety impact.
Title	Improvements in Implementation of the ODIM
Status	<in progress=""></in>
Rationale	Whenever a change is suggested it must always be assessed for safety
Category	<safety></safety>
Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
		OFA05.03.04	
<satisfies></satisfies>	<atms requirement=""></atms>	REQ-04.07.07-OSED-ODIM.0005	

[REQ]

Identifier	REQ-04.07.07-SPR-ODIM.0305	
Requirement	Future changes to ODIM requirements shall be analysed for safety	
	requirements.	

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Title	Future Changes for ODIM
Status	<in progress=""></in>
Rationale	Whenever a change is suggested it must always be assessed for safety
Category	<safety></safety>
Validation Method	
Verification Method	

[REQ Trace]			
Relationship	Linked Element Type	Identifier	Compliance
		OFA05.03.04	
<satisfies></satisfies>	<atms requirement=""></atms>	REQ-04.07.07-OSED-ODIM.0005	

[REQ]

Identifier	REQ-04.07.07-SPR-ODIM.0310	
Requirement	The optimisation for all relevant flights shall be reconfirmed whenever	
	changes are made to Oceanic Clearances through receipt of information	
	sent by any route not inherent to ODIM.	
Title	Reconfirmed optimisation Using Data External to ODIM	
Status	<in progress=""></in>	
Rationale	Previous safe clearances may be compromised when new clearances	
	are issued if previous clearances are not rechecked	
Category	<safety></safety>	
Validation Method		
Verification Method		

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<satisfies></satisfies>	<atms requirement=""></atms>	REQ-04.07.07-OSED-ODIM.0005	
		OFA05.03.04	

[REQ]

Identifier	REQ-04.07.07-SPR-HLDR.0010
Requirement	The HLDR shall be supported by iFACTS and other relevant tools.
Title	Functional Interoperability of ODIM with iFACTS and Other Tools
Status	<in progress=""></in>
Rationale	HLDR cannot work without support from other tools
Category	<safety></safety>
Validation Method	
Verification	
Method	

[REQ Trace] Relationship Linked Element Type Identifier Compliance OFA05.03.04 OFA05.03.04 <SATISFIES> <ATMS Requirement> REQ-04.07.07-OSED-HLDR.0025

[REQ]

Identifier	REQ-04.07.07-SPR-HLDR.0015
Requirement	Procedures for the transition of aircraft between 'free route' type



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	airspace and the traditional ATS route structure below shall be assessed for safety impact.	
	v 1	
Title	Safety Impact of Procedures for the transition of aircraft	
Status	<in progress=""></in>	
Rationale	Separation as aircraft transit from free route to traditional route	
	structure must not be compromised	
Category	<safety></safety>	
Validation Method		
Verification		
Method		

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
		OFA05.03.04	
<satisfies></satisfies>	<atms requirement=""></atms>	REQ-04.07.07-OSED-HLDR-0005	

[REQ]

Identifier	REQ-04.07.07-SPR-HLDR.0020
Requirement	In assigning flight level allocations, the safety benefit that was provided
	through the adoption of east and westbound routes shall be protected
Title	Protection of Safety Benefits of East/Westbound routes
Status	<in progress=""></in>
Rationale	Existing safety benefits will not be compromised
Category	<safety></safety>
Validation Method	
Verification	
Method	

[REQ Trace]			
Relationship	Linked Element Type	Identifier	Compliance
<applies_to></applies_to>	<operational focus<br="">Area></operational>	OFA05.03.04	N/A
<satisfies></satisfies>	<atms requirement=""></atms>	REQ-04.07.07-OSED-HLDR- 0065	<full></full>



3.4 Information Exchange Requirements (IER)

Not applicable

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4 References and Applicable Documents

This section identifies the documents (name, reference, source project) the SPR has to comply to or to be used as additional inputs for the SPR.

4.1 Applicable Documents

This SPR complies with the requirements set out in the following documents:

- [1] Template Toolbox 03.00.00 https://extranet.sesarju.eu/Programme%20Library/SESAR%20Template%20Toolbox.dot
- [2] Requirements and V&V Guidelines 03.00.00 https://extranet.sesarju.eu/Programme%20Library/Requirements%20and%20VV%20Guidelines.doc
- [3] Templates and Toolbox User Manual 03.00.00 https://extranet.sesarju.eu/Programme%20Library/Templates%20and%20Toolbox%20User%20Manual.doc
- [4] EUROCONTROL ATM Lexicon https://extranet.eurocontrol.int/http://atmlexicon.eurocontrol.int/en/index.php/SESAR

4.2 Reference Documents

1

The following documents were used to provide input / guidance / further information / other:

- [5] B4.1 [Initial] Baseline Performance Framework (Edition 0) D12
- [6] AIR NAVIGATION SYSTEM SAFETY ASSESSMENT METHODOLOGY, Ed. 2.0, ref. AF.ET1.ST03.1000-MAN-01-01-C, 30 April 2004
- [7] 04.07.07 D25 Final Operational Service and Environment Definition (OSED), Implementation of Dynamic Capacity Management in a High Density Area, 00.02.00 (19 April 2013)
- [8] SESAR WP04.02 D07 Detailed operational description, Version 00.05.00, 29th October 2012.
- [9] SESAR WP07.02 D07 Detailed operational description, Version 00.01.00, 15th October 2011.
- [10]P04.07.07 D22 Preliminary Safety and Performance Requirements (SPR), Implementation of Dynamic Capacity Management in a High Density Area, 00.01.00,

[11]WPB.01 Integrated Roadmap, DS8

¹ The EUROCAE ED-78A has been used as an initial guidance material. ED-78A is useful, but is not an applicable document, because it mostly addresses the V4-V5 phases, whilst the SESA provide the Sesa provide

Appendix A Assessment / Justifications

A.1 Safety and Performance Assessments

A.1.1 Safety assessment

At the time of defining the safety requirements the SESAR Safety Reference Material was not available so the safety requirements have been defined using the following table which defines the Safety Objective Classes. It should be used when reading the Safety and Performance Requirements. The table is an extract of Air Navigation System Safety Assessment Methodology, Ed. 2.0, ref. AF.ET1.ST03.1000-MAN-01, 30 April 2004 Ref[6]

Table 1. Safety	Qualitative Safety Objective	Quantitative Safety Objective	Comment	Objective Classes
Table 1: Safety	Extremely Rare	5.27x10-8 /h	Shall never happen during the building operational lifetime	Objective Classes
A.1.2	Rare	5.27x10-7 /h	As approximately 10 of such safety objectives have been identified, it means that one single event (severity 2) is accepted to occur once during the building operational lifetime	
	Occasional	5.27x10-6 /h	As approximately 10 of such safety objectives have been identified, it means that one single event (severity 3) is accepted to occur once every 2 years.	
	Likely	5.27x10-4 /h	As approximately 10 of such safety objectives have been identified, it means that it can happen that one single event (severity 4) is accepted to occur once every week.	

Performance assessment

The performance requirements were defined as part of the safety assessment as many of the requirements relate to both safety and performance. Consequently they have been grouped together in Section 3



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A.1.3 Requirements Definition 1

This appendix provides the information, data and process used to derive the Safety and Performance Requirements found in Section 3 of this document. 2

3 The first step was to collate all Operational Requirements from the OSED (Ref. [7] in a table format. Each requirement was then considered by applying standard safety hazard identification guide words against it. Under each guide word,

a Severity number (based on Table 1: Safety Objective Classes from extract of AIR NAVIGATION SYSTEM SAFETY ASSESSMENT METHODOLOGY, Ed. 2.0, ref. AF.ET1.ST03.1000-MAN-01, 30 April 2004 Ref [6]) was applied. Not all 4

guide words were deemed pertinent to all Requirements and hence some were given a Severity of N/A. Some requirements have been given two severity numbers for the same guide word. These have been differentiated as the 5

failure/occurrence identified by the guide words being 'Detected' [D] and 'Undetected' [U]. Detected refers to when a controller (or personnel in charge) identifies the risk in good time and manages it accordingly. Undetected refers to 6

7 when a controller (or personnel in charge) does not identify the risk and allows it to become an issue which needs to be resolved. Each guide word and severity was then converted into a Safety Requirement adjacent to its Operational

8 high level requirement.

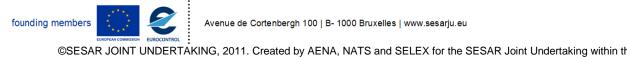
9 Safety Requirements are identified by S and Performance Requirements by P.

10 Note that this appendix contains the raw data as originally defined. In some cases this has been refined after a review and some requirements have been adjusted and some repetition deleted.

OSED REQS										(GUIDE V	VORD	S										
	TO LO	TAL SS	МС	DRE	LE	ESS		WELL AS		TIAL	INCOR	RECT		HER IAN	EA	RLY	LA	TE	BEF	ORE	AF	TER	
	S	Р	S	Р	S	Р	S	Р	S	Ρ	S	Ρ	S	Р	S	Ρ	S	Р	S	Ρ	S	Ρ	
												N	ATS	SCE	ENA	RIO							
The ODIM shall propose OTS track, entry time, exit time, speed and flight level.	5	5	4	4	5	4	N/A	N/A	5	5	D: 5 U:3	4	N/A	N/A	5	5	5	5	5	5	D: 5 U:3	D: 5 U:3	The probabil being propos greater than The probabil clearances fu be no greate
																							The probabil clearances b greater than

The probability of detected incorrect ODIM clearances being proposed shall be no greater than Likely (P)

ODIM shall calculate the fuel burn difference in kilograms that ODIM proposal clearances would result in for each flight.	N/A	5	N/A	5	N/A																	
each flight.																						



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ability of too many ODIM clearances posed for one aircraft shall be no an Likely (S P)

ability of loss of proposed ODIM es for some but not all aircraft shall ater than L kely (P)

ability of undetected incorrect ODIM s being proposed shall be no an Occasional (S)

The probability of undetected arrival ODIM clearances being proposed shall be no greater than Occasional (S P)

In the allocation of clearances, the ODIM shall take into account the relevant flight parameters [aircraft identification, destination, cleared or requested oceanic track (as appropriate), flight planned domestic routing, ETA for NAT, cleared or requested level (as appropriate), speed] that may impact upon the decision algorithms critical to providing required separation and reducing complexity

The accuracy of entry and exit times to/from the OTS shall be specified at a level that is consistent with the required accuracy of the ODIM

Future changes to ODIM requirements shall be analysed for safety impact.

Following implementation of the ODIM any improvements, expansions or variations in its use proposed by controllers and considered for introduction shall be assessed for safety impact.

The introduction of DCM shall ensure that controller workload is not increased by resectorisation.

Edition 00.02.00

Project Number 04.07.07

D26 - Safety and Performan	ce Rec	quiren	nents (SPR) 1	Fempla	te											.untion	00.02.	00				
OSED REQS										(GUIDE V	VORD	S										
	TO LO		МС	ORE	LE	SS		VELL NS		RTIAL DSS	INCOF	RECT		HER IAN	EA	RLY	LA	TE	BEF	ORE	AF	TER	
	S	P	S	Р	S	Р	S	P	S	P	S	Ρ	S	Р	S	Ρ	S	Р	S	Р	S	Ρ	
ODIM shall be able to receive current flight plan data and details of clearances already issued	5	4	5	4	D: 5 U:3	4	N/A	N/A	D: 5 U:3	4	D: 5 U:3	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The proba ability to r and detail shall be n
																							The proba much curr of clearan greater th
																							The proba receipt of and detail for some l greater th
																							The proba receipt of and detail for some l greater th
																							The proba receipt of or details shall be n
																							The proba receipt of plan data already is Likely (P)
																							The proba ODIM cur details of shall be n
ODIM shall take aircraft level in relation to its destination into account when optimising oceanic clearances	5	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D: 5 U:3	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The proba ODIM curr details of o shall be no The proba to take into relation to optimising no greater
																							The proba

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SIRs

bability of ODIM losing the receive current flight plan data ails of clearances already issued no greater than Likely (P)

bability of ODIM receiving too urrent flight plan data and detail ances already issued shall be no than Likely (P)

bability of undetected loss of of ODIM current flight plan data ails of clearances already issued e but not all aircraft shall be no than Occasional (S)

bability of detected loss of of ODIM current flight plan data ails of clearances already issued e but not all aircraft shall be no than Likely (P)

bability of undetected loss of of ODIM current flight plan data Is of clearances already issued no greater than Occasional (S)

bability of detected loss of of the ODIM either current flight ta or details of clearances issued shall be no greater than

bability of undetected incorrect urrent flight plan data and/or of clearances already issued no greater than Occasional (S)

bability of detected incorrect urrent flight plan data and/or of clearances already issued no greater than Occasional (P) bability of failure of the ODIM nto account the aircraft level in to its destination when ing oceanic clearances shall be ter than Likely (P)

The probability of undetected incorrect aircraft level data in relation to its destination being taken into account in the ODIM when optimising oceanic clearances shall be no greater than Occasional (S)

SPRs

The tool shall check flight plan data for consistency

The tool shall identify inconsistent data

Data exchanged between tools, processes and their respective interfaces shall be to the highest required integrity

The performance of the ODIM shall not be degraded by the number of flight plans being considered for the optimisation of clearances.

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OSED REQS											GUIDE V		5										
	TOTAL MORE LESS LOSS S P S P S P							NELL AS		RTIAL DSS	INCOR	RECT		HER IAN	EAF	RLY	LA	TE	BEF	ORE	AF	TER	
	S	Р	S	Р		Ρ	S	Р	S	Ρ	S	Ρ	S	Р	S	Р	S	Ρ	S	Р	S	Р	
ODIM shall take number of aircraft absolute rate into account when optimising oceanic clearances	5	4	D: 5 U:3	5	5	3	N/A	N/A	N/A	N/A	D: 5 U:3	5	N/A	N/A	D: 5 U:3	5	D: 5 U:3	5	N/A	N/A	N/A	N/A	The probabil take into acc rate when of clearances s Likely (P)
																							The probabil account an u actual aircra optimising of no greater th
																							The probabil account an u actual aircra optimising of no greater th
																							The probabil aircraft abso account in th oceanic clea than Occasie
																							The probabil being taken ODIM and n optimising of no greater th
ODIM shall take number of aircraft relative rate into account when optimising oceanic clearances	5	4	D: 5 U:3	5	5	3	N/A	N/A	N/A	N/A	D: 5 U:3	5	N/A	N/A	D: 5 U:3	5	D: 5 U:3	5	N/A	N/A	N/A	N/A	The probabil being taken ODIM and n optimising of no greater th The probabil take into acc rate when op clearances s Likely (P)
																							The probabil account an u actual aircra optimising of no greater th
																							The probabil account an u actual aircra optimising of no greater th
																							The probabil aircraft relati account in th

bability of undetected incorrect relative rate being taken into account in the ODIM when optimising oceanic clearances shall be no greater than Occasional (S)

The probability of aircraft relative rate being taken into account too soon in the ODIM and not being detected when



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bability of failure of the ODIM to account the aircraft absolute en optimising oceanic ces shall be no greater than

bability of the ODIM taking into an undetected higher than aircraft absolute rate when ing oceanic clearances shall be tter than Occasional (S)

bability of the ODIM taking into t an undetected lower than aircraft absolute rate when ing oceanic clearances shall be tter than Occasional (P)

bability of undetected incorrect absolute rate being taken into in the ODIM when optimising clearances shall be no greater ccasional (S)

bability of aircraft absolute rate aken into account too soon in the and not being detected when ing oceanic clearances shall be ter than Occasional (S)

bability of aircraft absolute rate aken into account too late in the and not being detected when ing oceanic clearances shall be ter than Occasional (S) bability of failure of the ODIM to account the aircraft relative en optimising oceanic ces shall be no greater than

bability of the ODIM taking into an undetected higher than aircraft relative rate when ing oceanic clearances shall be tter than Occasional (S)

bability of the ODIM taking into an undetected lower than aircraft relative rate when ing oceanic clearances shall be tter than Occasional (P)

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OSED REQS	тот	- ~ 1	М	ORE			461	WELL			GUIDE V INCOF					RLY		тс	DEE		۸ ۲	TER	
	LO	SS				SS	A	AS		SS			TH					TE		ORE			
	S	Ρ	S	Ρ	S	Р	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	optimising o no greater th
																							The probabi being taken ODIM and n optimising o no greater th
ODIM shall take the number of routes to destination into account when optimising	5	4	5	3	D: 5 U:3	5	N/A	N/A	5	3	D: 5 U:3	5	N/A	N/A	The probabi take into acc to destinatio								
oceanic clearances																							clearances Likely (P)
																							The probabi account a hi routes to de oceanic clea than Occasi
																							The probabi account an actual numb when optimi shall be no g
																							The probabi number of ro taken into ac optimising o no greater th
ODIM shall display proposed clearances on a standalone display	5	4	N/A	N/A	N/A	N/A	N/A	N/A	5	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The probabi number of ro taken into a optimising o no greater th The probabi display prop standalone o than Likely (
	:																						The probabi display som standalone

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oceanic clearances shall be than Occasional (S)

ability of aircraft relative rate en into account too late in the d not being detected when oceanic clearances shall be than Occasional (S)

ability of failure of the ODIM to account the number of routes ation when optimising oceanic es shall be no greater than

ability of the ODIM taking into a higher than actual number of destination when optimising clearances shall be no greater asional (P)

ability of the ODIM taking into an undetected lower than mber of routes to destination imising oceanic clearances no greater than Occasional (S)

ability of the partial loss of the f routes to destination being account in the ODIM when oceanic clearances shall be than Occasional (P)

ability of undetected incorrect f routes to destination being account in the ODIM when oceanic clearances shall be r than Occasional (S) ability of failure of the ODIM to roposed clearances on a ne display shall be no greater ly (P)

ability of failure of the ODIM to ome proposed clearances on a standalone display shall be no greater

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Project Number 04.07.07 D26 - Safety and Performance Requirements (SPR) Template

OSED REQS	тот	- ^ 1	MC	DRE		SS		VELL			INCO			HER		RLY	1.4	те	DEE	ODE	۸ с .	ΓER	
	LO		IVIC		LC	33		S		SS SS					EAI		LA	IE	DEF	ORE	АГ	IER	
	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	than Likely
ODIM shall send proposed clearances in a form capable of being integrated into SAATS/GAATS	4	4	N/A	N/A	sam e as part ial	sam e as part ial	N/A	N/A	4	4	D4 U4	D4 U4	N/A	N/A	N/A	N/A	sam e as loss						The probab exchange (in a format wih SAATS than Likely
					loss	loss																	The probab clearances that is only integrated v no greater t
																							The probab proposed cl a format un integrated v no greater t
The ODIM optimisation			N/A	5			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The probab proposed cl a format wh integrated v no greater t
process shall balance performance against accuracy and currency of flight plan information.																							
The tool shall plan routes, clearances and altitude distributions in order to minimise the need to descend aircraft past overflying aircraft and consequently the need for tactical deconfliction																							
The tool shall ensure that Proposed Clearances are issued within a time frame defined by the OSED.	4	4	N/A	N/A	N/A	N/A	N/A	N/A	4	4	N/A	N/A	N/A	N/A	N/A	N/A	4	4	N/A	N/A	N/A	N/A	The probab ensure that issued with the OSED s Likely (S P)
																							The probab ODIM to en Proposed C a time fram be no great

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SIRs

SPRs

ely (P)

bability of being unable to e ODIM proposed clearances nat capable of being integrated TS/GAATS shall be no greater ely (SP)

ability of ODIM proposed es being proposed in a format ly partially capable of being d with SAATS/GAATS shall be er than Likely (S P)

ability of detected ODIM clearances being provided in unable to be capable of being ed with SAATS/GAATS shall be er than Likely (S P)

bability of undetected ODIM clearances being provided in which is unable to be ed with SAATS/GAATS shall be er than Occasional (S)

Tools, processes and their respective interfaces shall use consistent units of measurement for data exchange

Data exchanged between tools, processes and their respective interfaces shall be to the highest required integrity

The ODIM shall define its window of consideration based upon all possible flight related parameters.

The optimisation for all relevant flights shall be reconfirmed whenever changes are made to Flight Plans and Oceanic Clearances. Procedures for use of ODIM shall be assessed for their safety impact

bability of failure of the ODIM to hat Proposed Clearances are vithin a time frame defined by D shall be no greater than 5 P)

bability of the failure of the ensure that some but not all Clearances are issued within ame defined by the OSED shall eater than Likely (S P)

Edition 00.02.00

OSED REQS												NORDS	5										
	TO LO		МС	ORE	LE	SS		VELL \S	PAR LO	TIAL		RRECT	ОТ	HER IAN	EA	RLY	LA	TE	BEF	ORE	AF	TER	
	S	Р	S	Р	S	Ρ	S	Р	S	Р	S	Р	S	Р	S	Р	S	Ρ	S	Р	S	Ρ	
There shall be a mechanism for managing multiple Clearance Requests	4	3	N/A	N/A	4	3	N/A	N/A	4	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The proba to manage shall be no
																							The proba manage fe Requests greater tha
The receipt of multiple clearance requests shall not result in unecessary delay to the issue of proposed clearances	N/A	3	N/A	N/A	N/A	3	N/A	N/A	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The proba to manage Clearance no greater The proba multiple cl ODIM not to the issu shall be no
																							The proba multiple cl ODIM res the issue of shall be no
																							The proba some of th by the OD delay to th clearances Occasiona
The HLDR design shall enable users to fly their preferred trajectories to the greatest extent possible																							Condition
The HLDR concept will be applied above an agreed Divisional Flight Level.																							
The HLDR concept shall take account of military needs. The HLDR concept shall take account of airline operator routing needs.																							
The HLDR concept shall take account of the interface with neighbouring ANSPs.																							



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bability of the mechanism failing age multiple Clearance Requests no greater than Occasional (P)

bability of the mechanism to fewer multiple Clearance sts than required shall be no than Occasional (P)

bability of the mechanism failing age some of the multiple nce Requests required shall be ter than Occasional (P) bability of failure to receive e clearance requests by the not to result in unecessary delay ssue of proposed clearances e no greater than Occasional (P)

bability that the receipt of e clearance requests by the results in unecessary delay to le of some proposed clearances e no greater than Occasional (P)

bability that the failure to receive f the multiple clearance requests ODIM that results in unecessary the issue of some proposed ces shall be no greater than onal (P)

SPRs

The mechanism for managing multiple Clearance Requests shall not reduce the window of consideration.

Following implementation of the ODIM any improvements, expansions or variations in its use proposed by controllers and considered for introduction shall be assessed for safety impact.

The definition of preferred trajectories shall ensure that airspace complexity is reduced with associated reduction in controller workload

Data exchanged between tools, processes and their respective interfaces shall be synchronised

Data exchanged between tools, processes and their respective interfaces shall be to the same required accuracy

Data exchanged between tools, processes and their respective interfaces shall be to the highest required integrity

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Edition 00.02.00

OSED REQS										(NORDS										
		TAL	MC	DRE	LE	SS	AS	NELL	PAR		INCO	RRECT		HER	EA	RLY	LA	TE	BEF	ORE	AF	ΓER
	LO	SS					A	NS	LO	SS			TH	AN								
	S	Р	S	Р	S	Р	S	Р	S	Р	S	Р	S	Р	S	Р	S	Р	S	Ρ	S	Р

The HLDR concept shall not generate increased operational resource cost.

The HLDR concept shall be flexible enough to provide ATC capacity to meet major demand flows.

The HLDR concept shall be flexible with regards to variable DFL

The HLDR concept shall avoid funnelling traffic flows as much as possible by enabling traffic dispersal.

The HLDR concept shall be compatible with envisaged ANSP tools and systems.

The HLDR concept shall not adversely affect the accuracy of network management demand tools including TLPD and CFMU.

The HLDR concept shall take into account the transition of aircraft between high level sectors and underlying airspace structures

The HLDR concept shall optimise level allocation and not be constrained by unidirectional flight levels.



SIRs

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Safety Mitigations, including procedures, shall be sufficiently robust to support the overall required reduction in hazard occurrence

The HLDR SHALL BE SUPPORTED BY IFACTS and other tools.

Procedures for the movement of aircraft between 'free route' type airspace and the traditional ATS route structure below shall be assessed for safety impact. In assigning flight level allocations, the safety benefit that was provided through the adoption of east and westbound routes shall be protected

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Project Number 04.07.07 D26 - Safety and Performance Requirements (SPR) Template

OSED REQS										C	JUIDE V	VORDS	5										
	TO LO		МС	DRE	LE	SS		VELL \S	PAR LO		INCOF	RECT		HER IAN	EA	RLY	LA	TE	BEF	ORE	AF	TER	
	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Р	S	Ρ	S	Ρ	S	Ρ	
												AE	ENA	SCI	ENA	RIO							
The System shall calculate and display the expected demand indicators per sector and per time interval for a given operational environment (sector configuration)	4	4	N/A	N/A	N/A	N/A	N/A	N/A	4	4	D:4 U:3	3	N/A	N/A	N/A	N/A	4	4	N/A	N/A	N/A	N/A	The p Syste expect and p opera config Likely
																							There

The probability of the System calculating and displaying only some of the expected demand indicators per sector and per time interval for a given operational environment (sector configuration) shall be no greater than Likely (S P)

The probability of the detected or undetected incorrect calculation or display of the expected demand indicators per sector and per time interval for a given operational environment (sector configuration) by the System shall be no greater than Occasional (P) The probability of the detected incorrect

The probability of the detected incorrect calculation of display of the expected demand indicators per sector and per time interval for a given operational environment (sector configuration) by the System shall be no greater than Likely (S)

The probability of the late calculation of display of the expected demand indicators per sector and per time interval for a given operational environment (sector configuration) by the System shall be no greater than Likely (S P)



SIRs

ne probability of the failure of the ystem to calculate and display the spected demand indicators per sector nd per time interval for a given perational environment (sector onfiguration) shall be no greater than kely (S P)

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OSED REQS										C	SUIDE V	VORDS	S										
	TOT LO		МС	DRE	LE	SS		WELL AS	PAR LO		INCOF	RECT		HER HAN	EA	RLY	LA	ΓE	BEF	ORE	AF	TER	
	S	Ρ	S	Ρ	S	Р	S	Р	S	Ρ	S	Ρ	S	Р	S	Р	S	Ρ	S	Ρ	S	Ρ	
The predicted demand indicators shall be compared against the maximum reference level configured as acceptable for each of the sectors	4	4	N/A	N/A	N/A	N/A	N/A	N/A	4	4	D: 4 U:3	4	N/A	N/A	N/A	N/A	4	4	N/A	N/A	N/A	N/A	The proba predicted of compared reference acceptable be no grea
																							The proba predicted of compared reference acceptable be no grea
																							The proba undetecte

Some (if not all) demand indicators shall be calculated in terms of occupancy.



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SPRs

bability of the failure of the ed demand indicators to be ed against the maximum ce level configured as able for each of the sectors shall reater than Likely (S P)

bability of only some of the ed demand indicators being ed against the maximum ce level configured as able for each of the sectors shall reater than Likely (S P)

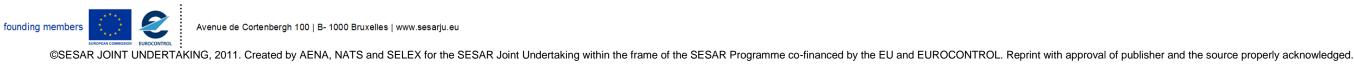
bability of the detected or cted incorrectly predicted demand indicators being compared against the maximum reference level configured as acceptable for each of the sectors shall be no greater than Occasional (P)

The probability of the detected incorrectly predicted demand indicators being compared against the maximum reference level configured as acceptable for each of the sectors shall be no greater than Likely (S)

The probability of the predicted demand indicators being compared late against the maximum reference level configured as acceptable for each of the sectors shall be no greater than Likely (S P)

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•			•	· · · ·																			
OSED REQS										(WORDS	5										
	TOT LOS		MO	RE	LE	SS		WELL AS	PAR LO			RRECT	от	HER HAN	EAR	LY	LA	ГΕ	BEF	ORE	AF	TER	
	S	P	S	Р	S	Р	S	P	s	P	S	Р	S	P	S	Р	S	Р	S	Р	S	Р	
The system shall calculate the predicted demand for each operative sector in all the operational sector configurations available.	4	4	5	3		D: 3 U:4	N/A	N/A	4	4	D: 4 U:3	3		N/A	4	4	4	4					The prob system to demand the opera available (S P)
																							The prob a greater each ope operatior available Occasior
																							The prob an undet demand the opera available Occasior
																							The prob a detected for each operation available Occasion
																							The prob system to predicted sector in configura greater to
																							The prob an undet demand the opera available Occasion
																							The prob an incorr operative sector co no greate
																							The prob an earlie each ope operatior available (S P)
																							The prob a later th operative sector co no greate



SIRs

SPRs

robability of the failure of the the m to calculate the predicted nd for each operative sector in all perational sector configurations ble shall be no greater than Likely

robability of the system calculating ter than predicted demand for operative sector in all the tional sector configurations ble shall be no greater than ional (P)

robability of the system calculating detected less than predicted nd for each operative sector in all perational sector configurations ble shall be no greater than ional (S)

robability of the system calculating ected less than predicted demand ch operative sector in all the tional sector configurations ble shall be no greater than ional (P)

robability of the failure of the the m to calculate some of the ted demand for each operative in all the operational sector urations available shall be no er than Likely (S P)

robability of the system calculating detected incorrect predicted nd for each operative sector in all perational sector configurations ble shall be no greater than ional (S)

robability of the system calculating orrect predicted demand for each tive sector in all the operational configurations available shall be ater than Occasional (P)

robability of the system calculating lier than predicted demand for operative sector in all the ional sector configurations ble shall be no greater than Likely

robability of the system calculating than predicted demand for each tive sector in all the operational configurations available shall be ater than Likely (S P)

Edition 00.02.00

OSED REQS										C	GUIDE	WORDS	5										
	TOT LO:		MO	RE	LE	SS		NELL AS	PAR LO		INCO	RRECT		HER HAN	EAR	LY	LA	TE	BEF	ORE	AF	TER	
	S	Ρ	S	Р	S	Р	S	Р	S	Р	S	Р	S	Р	S	Ρ	S	Р	S	Ρ	S	Р	
The system shall be able to propose the optimal configurations from a list of predefined list of all possible sector configurations, based of the workload indicators.	4	4	5	3	D: 4 U:3	D: 3 U:4	N/A	N/A	4	4	D: 4 U:3	D: 3 U:3	N/A	N/A	4	4	4	4	N/A	N/A	N/A	N/A	The prol system t configur list of all based o be no gr
																							The prol a greate from a li possible the work greater t
																							The prol a less th from a li possible the work greater t
																							The prol a detect configur list of all based o be no gr
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																							The prol an unde configur list of all based o available Occasio
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																							The prol an earlie configur list of all based o available (S P)
																							The prol a later th configur

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SIRs

probability of the failure of the the m to propose the optimal gurations from a list of predefined all possible sector configurations, d of the workload indicators shall greater than Likely (S P)

probability of the system proposing ater than optimal configuration a list of predefined list of all ble sector configurations, based of orkload indicators shall be no er than Occasional (P)

probability of the system proposing than the optimal configuration a list of predefined list of all ble sector configurations, based of orkload indicators shall be no er than Occasional (S)

probability of the system proposing ected less than the optimal guration from a list of predefined all possible sector configurations, of the workload indicators shall greater than Occasional (P)

probability of the system to propose tial optimal configuration from a list defined list of all possible sector gurations, based of the workload ators available shall be no greater Likely (S P)

probability of the system proposing detected incorrect optimal guration from a list of predefined all possible sector configurations, d of the workload indicators able shall be no greater than sional (S)

robability of the system proposing correct predicted optimal guration from a list of predefined all possible sector configurations, l of the workload indicators able shall be no greater than sional (P)

probability of the system proposing rlier than predicted optimal guration from a list of predefined all possible sector configurations, l of the workload indicators bleshall be no greater than Likely

probability of the system proposing r than predicted optimal configuration from a list of predefined

Project Number 04.07.07 **D2**

Edition 00 02 00

Project Number 04.07.07 D26 - Safety and Performar	nce Re	quiren	nents (SPR) 1	Fempla	ite										E	Edition	00.02.	.00				
OSED REQS										(WORDS	3										
		TAL SS	MC	ORE	LE	SS		NELL AS		RTIAL DSS	INCO	RRECT		HER HAN	EA	RLY	LA	ΤE	BEF	ORE	AF	TER	
	S	P P	S	Ρ	S	Ρ	S	45 P	S	P	S	Ρ	S	P	S	Ρ	S	Ρ	S	Ρ	S	Ρ	list of all pos based of the availablesha (S P)
The system shall provide output with the sufficient level of granularity When proposing an optimal solution, the system shall be able to consider operational restrictions (i.e, no more than a fixed number of configurations changes in a time interval, or a minimum sector configuration time when no more changes can	D: 4 U:3	N/A	N/A	D: 4 U:3	D: 4 U:3	D: 4 U:3	D: 4 U:3	N/A	N/A	D: 4 U:3	D: 4 U:3	D: 4 U:3	D: 4 U:3	N/A	N/A	N/A	N/A	When proporting probabilities of the probabilities of the system operational than a fixed changes in a minimum set when no more shall be no shall be n					



be done)

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SIRs

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possible sector configurations, the workload indicators shall be no greater than Likely

oposing an optimal solution, bility of the undetected failure stem to be able to consider al restrictions (i.e, no more ed number of configurations in a time interval, or a sector configuration time more changes can be done) shall be no greater than Occasional

When proposing an optimal solution, the probability of the undetected consideration of the system of more operational restrictions than required (i.e, no more than a fixed number of configurations changes in a time interval, or a minimum sector configuration time when no more changes can be done) shall be no greater than Occasional (SP)

(SP)

When proposing an optimal solution, the probability of the undetected consideration of the system of fewer operational restrictions than required (i.e, no more than a fixed number of configurations changes in a time interval, or a minimum sector configuration time when no more changes can be done) shall be no greater than Occasional (SP)

Edition 00.02.00

Project Number 04.07.07 D26 - Safety and Performance Requirements (SPR) Template

FTER	AF	ORE	BEF		LA		EAR	HER IAN	RECT	GUIDE \ INCOF	TIAL	PAR LO	S WI AS	SS		RE	MO	TOTAL LOSS	D REQS
	S	Ρ	S	Ρ	S	Ρ	S		Ρ	S		LOS	AS	Ρ	S	Ρ	S	LOSS S P	



SIRs

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poposing an optimal solution, ability of the undetected failure stem to be able to consider erational restrictions (i.e, no n a fixed number of tions changes in a time or a minimum sector tion time when no more can be done) shall be no nan Occasional (SP)

oposing an optimal solution, ability of the undetected consideration by the system of hal restrictions (i.e, no more ked number of configurations in a time interval, or a sector configuration time more changes can be done) no greater than Occasional

poposing an optimal solution, ability of the undetected ation by the system of nal restrictions later than (i.e, no more than a fixed of configurations changes in a rval, or a minimum sector tion time when no more can be done) shall be no nan Occasional (SP)

poposing an optimal solution, ability of the undetected ation by the system of nal restrictions earlier than (i.e, no more than a fixed of configurations changes in a rval, or a minimum sector tion time when no more can be done) shall be no nan Occasional (SP)

Edition 00.02.00

OSED REQS										C		WORDS	5										
	TOT LOS		MC	DRE		SS		NELL AS		TIAL SS	INCO	RRECT		HER AN	EA	RLY	LÆ	ΑΤΕ	BEF	ORE	AF	TER	
	S	Ρ	S	Р	S	Р	S	Р	S	Р	S	Р	S	Р	S	Ρ	S	Р	S	Ρ	S	Ρ	
The system shall take into account for its demand prediction both historical traffic data and actual system data (that available in advance)	4	4	N/A	N/A	D: 4 U:3	D: 4 U:3	N/A	N/A	D: 4 U:3	D: 4 U:3	D: 4 U:3	D: 4 U:3	N/A	N/A	D: 4 U:3	D: 4 U:3	D: 4 U:3	D: 4 U:3	N/A	N/A	N/A	N/A	The pr system deman data ar availab greater
																							The pr detect its dem traffic c availab greater
																							The pr failure accour historic data (th no grea
																							The pr detect its dem historic data (th no grea
																							The product of the detect late its historic data (the no greater of the data)
																							The products of the detect early it historic data (the no greater)

SIRs

e probability of the failure of the em to take into account for its and prediction both historical traffic and actual system data (that lable in advance) shall be no ater than Likely (S P)

e probability of the system not to act that it has taken into account for emand prediction less historical ic data and actual system data (that lable in advance) shall be no ater than Occasional (S P)

probability of the undetected re of the system to take into point for its demand prediction some prical traffic data or actual system (that available in advance) shall be reater than Occasional (S P)

probability of the system not to ct that it has taken into account for emand prediction incorrect orical traffic data and actual system (that available in advance) shall be reater than Occasional (S P)

probability of the system not to ct that it has taken into account too its demand prediction undetected orical traffic data and actual system (that available in advance) shall be reater than Occasional (S P)

probability of the system not to ct that it has taken into account too / its demand prediction undetected prical traffic data and actual system (that available in advance) shall be reater than Occasional (S P)

SPRs

The tool shall ensure that whenever a Proposed Clearance is generated the latest data is used

Edition 00.02.00

OSED REQS										(NORDS	6										
	TOT LOS		МС	ORE	LE	SS		WELL NS		TIAL SSS	INCO	RRECT		HER IAN	EA	RLY	LA	TE	BEF	ORE	AF	TER	
	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Р	
The system shall be able to define different mixes of historical data and actual system data (configurable)	4	4	N/A	N/A	D: 4 U:3	D: 4 U:3	N/A	N/A	D: 4 U:3	D: 4 U:3	D: 4 U:3	D: 4 U:3	N/A	N/A	D: 4 U:3	D: 4 U:3	D: 4 U:3	D: 4 U:3	N/A	N/A	N/A	N/A	The pro system t mixes of system o greater t
																							The pro detect th historica (configu Occasio
																							The pro system t historica (configu Occasio
																							The pro detect th mix of hi data (co than Oce
																							The prob detect th of histori data (co greater t
																							The prob detect th of histori data (co greater t
The system shall be able to work with only one of the two sources of information available.																							
The system shall be able to predict demand with a configurable advance, according to the available information.	5	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D: 5 U:4	D: 5 U:4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The prob demand configur available than Like
The system shall be able to provide a what-if demand calculation for every possible pre-defined sector configuration, after manual selection of it.	5	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D: 5 U:4	D: 5 U:4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	



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SIRs

probability of the failure of the m to be able to define different s of historical data and actual m data (configurable) shall be no er than Likely (S P)

probability of the system not to that it has defined a lesser mix of ical data and actual system data gurable)) shall be no greater than sional (S P)

probability of the failure of the m to detec a partial loss of mix of ical data and actual system data gurable)) shall be no greater than sional (S P)

probability of the system not to that it has defined an incorect historical data and actual system configurable) shall be no greater Occasional (S P)

robability of the system not to that it has defined different mixes torical data and actual system configurable) too late shall be no er than Occasional (S P)

robability of the system not to that it has defined different mixes torical data and actual system (configurable) too early shall be no er than Occasional (S P)

> The system shall detect and alert when its using only one source of information

robability of the system predicting ind with an undetected incorrect gurable advance, according to the ble information shall be no greater _ikely (S P)

SPRs

The tool shall identify inconsistent data

Edition 00.02.00

OSED REQS												VORDS											
		TAL SS		DRE		SS	A	VELL \S	PAR LO	SS	INCO		TH	HER AN	EAF		LA		BEF	ORE		ΓER	
The system shall be capable of receiving the list of possible operational sector configurations (pre-defined)	S 5	P 5	S N/A	P N/A	S D: 5 U:4	P D: 5 U:4	S N/A	P N/A	S D: 5 U:4	P D: 5 U:4	S D: 5 U:4	P D: 5 U:4	S N/A	P N/A	S N/A	P N/A	S N/A	P N/A	S N/A	P N/A	S N/A	P N/A	The probab detect that than all pos configuratic greater than
																							The probab detect that of possible configuratio greater thar
Individual sector capacities (thresholds) shall be configurable manually, as a reaction to some sector operations restrictions (i.e., weather, military,)	D: 4 U:3	D: 4 U:3	N/A	N/A	D: 4 U:3	D: 4 U:3	N/A	N/A	D: 4 U:3	D: 4 U:3	D: 4 U:3	D: 4 U:3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The probab detect that i list of possil configuratio greater than The probab failure of th manually in (thresholds) sector oper weather, mi than Occas
																							The probab detect that is capacities (configured some secto weather, mit than Occas
																							The probab partial failur manually in (thresholds) sector oper weather, mi than Occas
The system shall be able to provide several proposals of sectorizations plan, according to the time advance considered	5	4	5	5	5	4	N/A	N/A	5	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The probab incorrect mass system of in (thresholds) sector oper weather, mit than Occas The probab system to p sectorizatio time advance greater than
																							The probab fewer propo according tr considered Likely (P)
																							The probab

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SIRs

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bability that the system does not hat is has received a list of fewer possible operational sector rations (pre-defined) shall be no than Likely (S P)

bability that the system does not hat is has received a partial list ible operational sector rations (pre-defined) shall be no than Likely (S P)

bability that the system does not hat is has received an incorrect ossible operational sector rations (pre-defined) shall be no than Likely (S P) bability of the undetected of the system to configure ly individual sector capacities olds) as a reaction to some operations restrictions (i.e., , military, ...) shall be no greater casional (S P)

bability of the system not to hat fewer individual sector ies (thresholds) can be red manually, as a reaction to ector operations restrictions (i.e., , military, ...) shall be no greater casional (S P)

bability of the undetected ailure of the system to configure ly individual sector capacities olds) as a reaction to some operations restrictions (i.e., , military, ...) shall be no greater ccasional (SP)

bability of the undetected ct manual configuration of the of individual sector capacities olds) as a reaction to some operations restrictions (i.e., , military, ...) shall be no greater casional (S P)

bability of the failure of the to provide several proposals of ations plan, according to the vance considered shall be no than Likely (P)

bability of the system providing roposals of sectorizations plan, ng to the time advance red shall be no greater than

bability of the system providing me proposals of sectorizations

D4

Edition 00.02.00

OSED REQS											GUIDE	WORDS											
		TAL DSS	MC				NELL AS		TIAL SS	INCO	RRECT		HER IAN	EA	RLY	LA	TE	BEF	ORE	AF	TER		
	S	Ρ	S	Ρ	S	Р	S	Р	S	Р	S	Р	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Р	
																							plan, acc

according to the time advance considered shall be no greater than Likely (P)

account the network effects locally or at a sub-regional level	U3								loss													take into acco recommenda network effec regional level limitation of c data channels no greater tha
																						The probabili take into acco recommenda network effect regional level limitation of c data channels be no greater
The system shall allow to increase the level of information displayed to a maximum																						be no greater
The system shall perform data acquisition automatically from all the available sources	5	2	∮n/a	n/a	n/a	n/a	n/a	n/a	same as loss	n/a	The probabili system to per automatically sources shall (P)											

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The system shall take into

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SPRs

The probability that the system fails to iccount in making ndations for sectorisations the ffects locally or at a subevel, i.e.does not recognise of configuration of comms and nels and is decteted, shall be than likely (S P)

> bility that the system fails to ccount in making ndations for sectorisations the ffects locally or at a subvel, i.e.does not recognise f configuration of comms and nels and is undecteted, shall ater than Occasional (S)

bility of the failure of the perform data acquisition ally from all the available nall be not greater than Likely The status of configuration capability status shall be made available to the controller

Edition 00.02.00

OSED REQS											GUIDE	WORD	S										
		TAL DSS	N	ORE	LE	ESS		WELL AS		RTIAL DSS	INCO	RRECT		HER HAN	EA	RLY	L	ATE	BEF	ORE	AF	TER	
	s	P	S	Р	S	Р	S	P	S	P	S	Р	S	P	S	Р	S	Р	S	Р	S	Р	
The system shall perform acquired data storage automatically with no user intervention	D4 U3	D4 U3	n/a	n/a	n/a	n/a	n/a	n/a	sam loss	e as	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	The probab of the syste storage aut greater tha
The system shall display graphically the predicted demand for each sector of a selected sector configuration incl the declared capacity	5	2	↓ n/a	n/a	n/a	n/a	n/a	n/a	D5 U3	D4 U3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	The probab the system storage aut greater that The probab display grap demand an greater that
value as a line																							The probab displays gra demand an only some s than Likely(
																							The probab graphically demand an only some s detected sh Likely(P)
The system shall be able to provide the predicted demand for each sector as tables, showing the values per time intervals	5	2	4 5	5 4	5	4	n/a	n/a	D5 U3	D4 U3	D5 U3	D4 U3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	The probab graphically demand an only some s undetected Occasional The probab be able to p demand for showing the shall be no
																							The probab predicted de tables, show per time inte interval is lo than Likely
																							The probab predicted de tables, show actual per ti

than Likely (P) The probability that the system provides the predicted demand for each sector as tables, showing the only partial values per time intervals and that this is detected shall be no greater than Likely (P)

The probability that the system provides the predicted demand for each



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SPRs

obability of the undetected failure system to perform acquired data e automatically shall be not r than Occasional (S P)

obability of the detected failure of stem to perform acquired data e automatically shall be not than Likely(S P) robability that the system fails to graphically the predicted nd and capacity shall be no r than Likely (P)

obability that the system partially ys graphically the predicted nd and capacity, i.e. dispalying ome sectors shall be no greater ikely(P)

robability that the system displays cally only a partial predicted nd and capacity, i.e. dispalying ome sectors and that this is ed shall be no greater than

obability that the system displays cally only a partial predicted nd and capacity, i.e. dispalying ome sectors and that this is ected shall be no greater than ional (S P)

robability of failure of system to be e to provide the predicted nd for each sector as tables, ng the values per time intervals e no greater than Likely (P)

obability of system providing the ted demand for each sector as showing more values than actual ne intervals, or that the time I is longer shall be no greater ikely (P)

obability of system providing the ted demand for each sector as showing fewer values than actual per time intervals, or that the time interval is shorter shall be no greater

Project Number 04.07.07

Edition 00.02.00

Project Number 04.07.07 D26 - Safety and Performar	nce Re	quiren	nents ((SPR) 1	Templa	ate										I	Edition	00.02	.00				
OSED REQS												WORD											
		TAL DSS	M	ORE	LE	ESS		WELL AS		RTIAL DSS	INCC	RRECT		ΓHER HAN	EA	RLY	L	ATE	BEF	FORE	AF	TER	
	S	Ρ	S	Ρ	S	Ρ	S	Ρ	S	Р	S	Ρ	S	Ρ	S	Р	S	Р	S	Р	S	Ρ	
																							sector as ta partial valu this is unde than Occas
The system shall be able both in the FMP position and in the ATC supervisor position	5	4	N/a	N/a	N/a	N/a	N/a	N/a	5	4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	The probat unable to b position an position, or
The calculation of the optimal sector configuration shall be short -(i.e.no more than 3mins)	n/a	n/a	5	5	5	5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	no greater
the system shall avoid the possibility of implantation of a sector configuration from the system HMI	5	4	n/a	n/a	n/a	n/a	n/a	n/a	D5 U3	D4 U3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	The probab system cau incorrect se system HM Likely (P)
																							The probat system cas partially inc from the sy detected sh

The probability of the failure of the system causing the implantation of a partially incorrect sector configuration from the system HMI and that it is undetected shall be no greater than Occasional (S P)



SIRs

SPRs

tables, showing the only lues per time intervals and that ndetected shall be no greater casional (S P)

bability of the system being be provided both in the FMP and in the ATC supervisor , or in just one position shall be er than Likely (P)

bability of the failure of the causing the implantation of an t sector configuration from the HMI shall be no greater than

bability of the failure of the casuing the implantation of a incorrect sector configuration detected shall be no greater than Likely (P) system HMI and that it is

Edition 00.02.00

OSED REQS											GUIDE V	VORDS										
		TAL SS	MC	RE	LE	SS		VELL \S		TIAL SS	INCOF	RECT	OTH TH	HER AN	EAI	RLY	LA	TE	BEF	ORE	AF	TER
	S	Р	S	Р	S	Р	S	Р	S	Ρ	S	Р	S	Р	S	Р	S	Р	S	Р	S	F

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	Project Number 04.07.07 D26 - Safety and Performar	nce Req	uirem	ients (S	PR) 1	Femplat	e											E	dition	00.02.	00				
12	The system shall have an analysis function to compare the actual sector configurations operated against those proposed by the system	5	5	5	5	5	5	5	5		5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	The system must provide recording facilities with a level of granularity compatible with after runs analysis	N/A	5	N/A	5	N/A	5	N/A	5	N/	/Α	5	N/A	5	N/A	5	N/A	5	N/A	5	N/A	5	N/A	5	
13	The system shall be capable of displaying errors, warnings and system messages.	4	4	4	4	4	4	N/A	N/A		4	4	4	4	N/A	N/A	N/A	N/A	4	4	4	4	4	4	The probab capable of o and system greater thar The probab displays mo system mes no greater t The probab displays fev system mes no greater t The probab displays err messages I greater thar The probab displays err messages i be no great
	In the case of errors, a visual indication shall be available. (SPR)																								
	The system shall provide a way to compare indicators in certain periods of time, for different data sources	5	5	5	5	5	5	5	5		5	5	5	5	5	5	5	5	5	5	5	5	5	5	



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bability that the system is not of displaying errors, warnings em messages shall be no nan Likely (S P) bability that the systems more errors, warnings and nessages than actual shall be er than Likely (S P) pability that the systems fewer errors, warnings and nessages than actual shall be er than Likely (S P) bability that the systems errors, warnings and system es later than actual shall be no han Likely (S P) bability that the systems errors, warnings and system es in the incorrect priority shall eater than Likely (S P)

A.2 Assumptions

A.2.1 Assumptions Associated with Requirements

Some requirements in this SPR document are based on assumptions. These are listed below in Table 2:

Requirement ID	Assumption ID	Assumption
REQ-04.07.07-SPR-ODIM.0285	ASP – 04.07.07 – SPR - 0001	It is assumed that current mitigation against intrusion into restricted airspace will be maintained

Table 2: Assumptions Related to Requirements

A.2.2 General Assumptions

Error! Reference source not found. below lists general assumptions:

Assumption ID	Assumption
ASP – 04.07.07 – SPR - 0002	It is assumed that flexible sectorisation does not exceed acceptable levels of controller workload as defined by mathematical modelling and simulations.
ASP – 04.07.07 – SPR – 0003	It is assumed that the impact of free route airspace will not impact negatively upon the safety performance of TLPD and CFMU.
ASP – 04.07.07 – SPR – 0004	It is assumed that safety will be included in the impact assessment of point to point route structures with regard to tracks and great circle routes
ASP – 04.07.07 – SPR – 0005	It is assumed that the Target Level of Safety for the concept will be supported by HLS airspace and Maastricht FRAM including their definition as one airspace block
ASP – 04.07.07 – SPR - 0006	It is assumed that the creation or revision of sectors will take into account the workload associated with co- ordination, such that workload is not negatively impacted
ASP – 04.07.07 – SPR - 0007	It is assumed that the Target Level of Safety for the concept will be supported by all FDPs within the FAB and neighbouring ANSPs
ASP – 04.07.07 – SPR - 0008	It is assumed that safety has been included in the analysis of the effect of extending the AMAN horizon.
ASP – 04.07.07 – SPR – 0009	It is assumed that the failure of the ODIM does not prevent timely allocation of clearances.
ASP – 04.07.07 – SPR – 0010	It is assumed that the controller will be aware of the fact that the ODIM has not provided a clearance of an aircraft.
ASP – 04.07.07 – SPR – 0011	It is assumed that if ODIM provides only partial clearance that it will be treated as a loss for that aircraft and it is not credible to be undetected.
ASP – 04.07.07 – SPR - 0012	It is assumed that early arrival of information does not result in the controller taking any further action
ASP – 04.07.07 – SPR – 0013	It is assumed that there will be an alternative means of proposing clearances in the case of ODIM failure.
ASP – 04.07.07 – SPR - 0014	It is assumed that future changes to ODIM requirements will be analysed for safety impact.
ASP – 04.07.07 – SPR - 0015	It is assumed that an increase in flexibility of controller validation shall not adversely impact safety.
ASP – 04.07.07 – SPR - 0016	it is assumed that the standalone ODIM position shows both proposed and SAATS/GAATS extant clearance as a result of which the acceptance of the proposed clearance decision is made
ASP – 04.07.07 – SPR - 0017	It is assumed that the controllers at Gander OACC will compare requested flight plan data against the ODIM proposed data to ensure that the data has not been plausibly (or otherwise) corrupted
ASP – 04.07.07 – SPR - 0018	It is assumed that by virtue of training and experience the Gander OACC controller will not knowingly issue a clearance that is unsafe (i.e. that will result in loss of separation standard)
ASP – 04.07.07 – SPR - 0019	It is assumed that current mitigation against intrusion into restricted airspace will be maintained In issuing Proposed Clearances the ODIM shall ensure

founding members



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Assumption ID	Assumption
	it uses the current time and position boundaries of restricted airspace
ASP – 04.07.07 – SPR - 0020	It is assumed that flexible sectorisation will not exceed acceptable levels of controller workload as defined by mathematical modelling and simulations.
ASP – 04.07.07 – SPR - 0021	It is assumed that any increase in flexibility of controller validation which may be required will not adversely impact safety
ASP – 04.07.07 – SPR - 0022	It is assumed that flexible sectorisation does not exceed acceptable levels of controller workload as defined by mathematical modelling and simulations.
ASP – 04.07.07 – SPR - 0023	It is assumed that the creation or revised sectors will take into account the workload associated with co- ordination, such that workload is not negatively impacted
ASP – 04.07.07 – SPR - 0024	Network effects are assumed to be the communication or data exchange paths. ie: communications are able to be configured for any sectorisation

Table 3: General Assumptions

A.3 Security risk assessment

Not applicable

A.4 Environment impact assessment

Not applicable

A.5 OPA

Not applicable



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