P04.07.07 Safety and Performance Requirements (SPR)

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Selex ES; AENA; NATS	

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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.

Authoring & Approval

Prepared By - *Authors of the document.*		
Name & Company	Position & Title	Date
[redacted] Selex ES	[redacted]	29/04/2013
[redacted] Selex ES		19/03/2013

Reviewed By - *Reviewers internal to the project.*		
Name & Company	Position & Title	Date
P04.07.07 Reviewers		
[redacted] NATS	[redacted]	30/04/2013
[redacted] Ineco		30/04/2013
[redacted] Crida		20/03/2013

Reviewed By - *Other SESAR projects, Airspace Users, staff association, military, Industrial Support, other organisations.*		
Name & Company	Position & Title	Date
SWP04.02		26/03/2012
SWP07.02		26/03/2012

Approved for submission to the SJU By - *Representatives of the company involved in the project.*		
Name & Company	Position & Title	Date
[redacted] Aena	[redacted]	03/04/2013

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

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Executive summary

This document is the 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].

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.

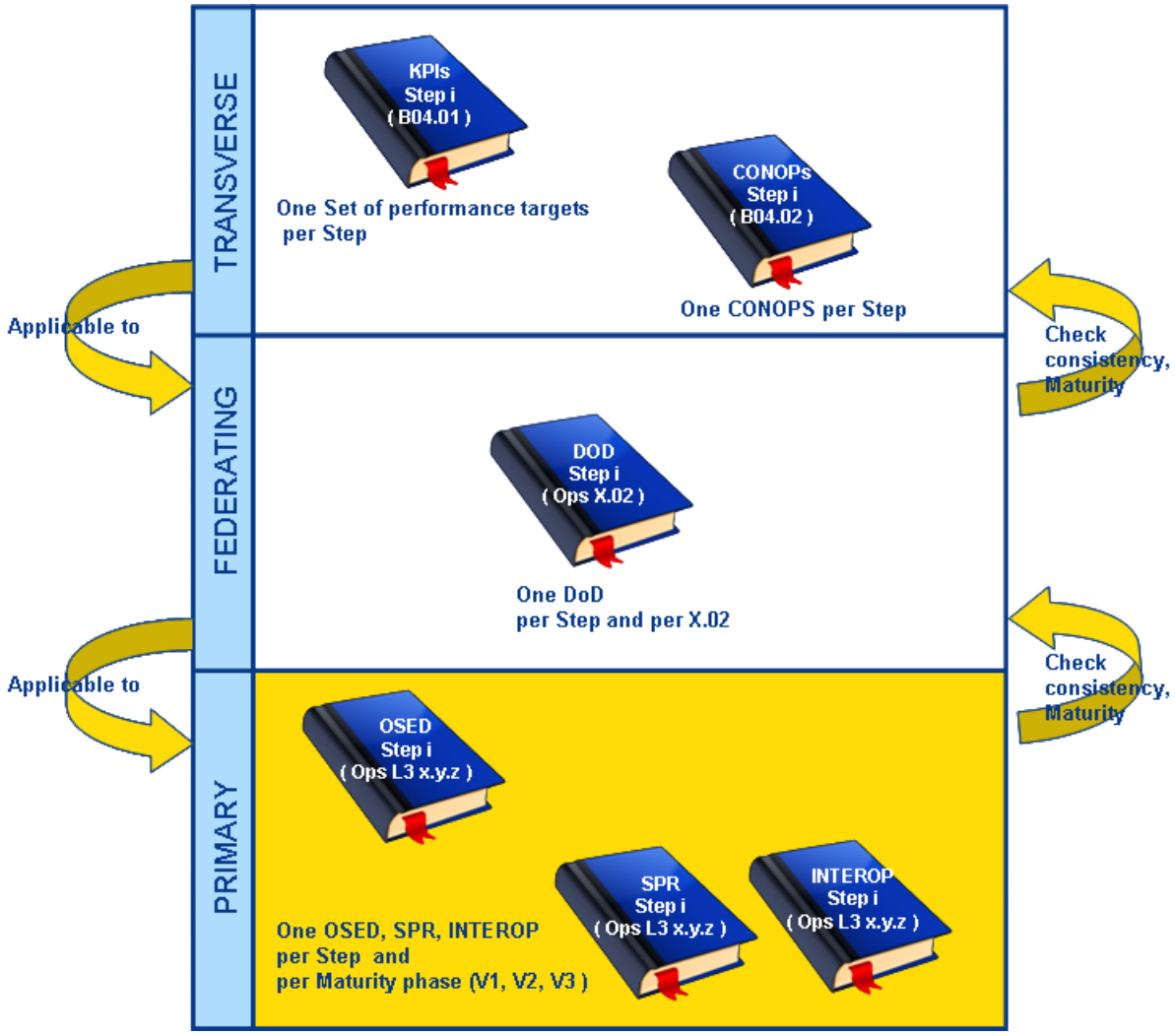

Figure 1: SPR document with regards to other SESAR deliverables

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

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.

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

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
ATM	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
ETA	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
HMI	Human Machine Interface

Term	Definition
iFACTS	Interim Future Area Control Tools Support.
IER	Information Exchange Requirements
KPA	Key Performance Area
NAT	North Atlantic
ODIM	Oceanic Domestic Interface Management
ODIMS	Oceanic Domestic Interface Management System
OFA	Operational Focus Area
OI	Operational Improvement
OR	Operational Requirement
OSED	Operational Service and Environment Definition
OTS	Organised Track Structure
P	Project
REQ	Requirement
SESAR	Single European Sky ATM Research Programme
SIR	System Integrity Requirement
SJU	SESAR Joint Undertaking
SPR	Safety and Performance Requirement
TMA	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

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. Dynamic Capacity Management: 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.

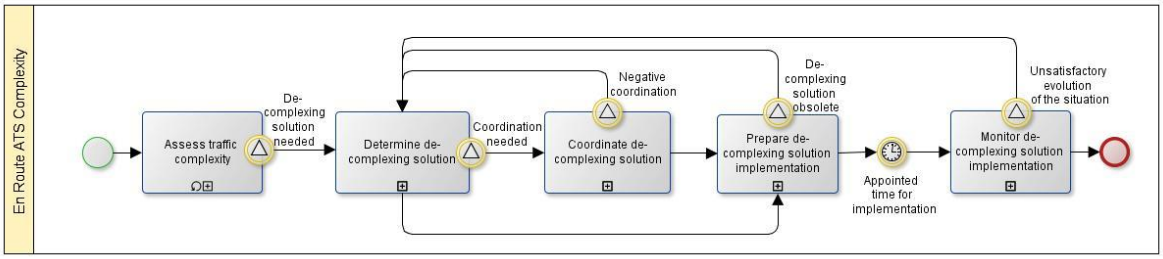

Figure 2: Traffic Complexity Process Diagram

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.

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	REQ-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	REQ-04.07.07-SPR-DCM1.0015
Requirement	The probability of the undetected 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 **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	REQ-04.07.07-SPR-DCM1.0021
Requirement	The probability of the detected 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 **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	REQ-04.07.07-SPR-DCM1.0023		
Requirement	The probability of the detected 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 **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		
Requirement	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	REQ-04.07.07-SPR-DCM1.0028		
Requirement	The probability of the late 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 **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**		

		DCM	

	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
Requirement	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
Requirement	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	REQ-04.07.07-SPR-DCM1.0065
Requirement	The probability of the DCM system calculating an undetected 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	REQ-04.07.07-SPR-DCM1.0070
Requirement	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	REQ-04.07.07-SPR-DCM1.0075
Requirement	The probability of the failure of the DCM system to calculate the predicted demand for some of the operative sectors in all the operational sector configurations 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	The probability of the DCM system proposing a (detected or undetected) less than the optimal configuration from a list of predefined list of all possible sector configurations, based on the workload indicators shall be no greater than **Occasional**

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

	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; or a minimum sector configuration time when no more changes can be done		

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0150		
Requirement	When proposing an optimal solution, the probability of the undetected consideration by the DCM system of more operational restrictions than required 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. Consideration of more than are appropriate could result in a less than optimum configuration affecting performance		

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0155		
Requirement	When proposing an optimal solution, the probability of the undetected consideration by the DCM system of fewer operational restrictions than required 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. Consideration of fewer than are appropriate could result in a less than optimum 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	REQ-04.07.07-SPR-DCM1.0185		
Requirement	The probability of the DCM system to take into account, undetected, less		

	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		
Requirement	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	REQ-04.07.07-SPR-DCM1.0205		
Requirement	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 early for its demand prediction		

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0210		
Requirement	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		
Requirement	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	REQ-04.07.07-SPR-DCM1.0245		
Requirement	The probability that the DCM system receives undetected a list of fewer than all possible operational sector configurations (pre-defined) shall be no greater 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		

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	REQ-04.07.07-SPR-DCM1.0300		
Requirement	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**		
	To optimise the DCM, limitations of configuration such as availability of voice and data communications shall be taken into account		

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM1.0305		
Requirement	The probability of the failure of the DCM system to perform data acquisition automatically 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	REQ-04.07.07-SPR-DCM1.0315		
Requirement	The probability of the detected failure of the DCM system to perform acquired 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>
Rationale	Current safety of permanent restricted airspace must not be compromised if such airspace becomes subject to opening and closing
Category	<Safety>
Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	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

	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		
Requirement	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	The probability of the DCM system showing more values than actual per time interval in the tables for the predicted demand per sector, shall be no greater than **Likely**		

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM2.0031		
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	REQ-04.07.07-SPR-DCM2.0040		
Requirement	The probability of a failure of the DCM system causing the implantation of a detected incorrect sector configuration from the system HMI shall be no greater than **Likely**		

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM2.0045		
Requirement	The probability of a failure of the DCM system causing the implantation of a partially incorrect sector configuration from the system HMI which is detected shall be no greater than **Likely**		

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM2.0050		
Requirement	The probability of a failure of the DCM system causing the implantation of a partially incorrect sector configuration from the system HMI which is undetected 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,		

	warnings and system messages shall be no greater than **Likely**

		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-DCM2.0060		
Requirement	The probability that the DCM system displays more errors, warnings and system messages than actual shall be no greater than **Likely**		

		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	The probability that the DCM system displays errors, warnings and system messages in the incorrect priority shall be no greater than **Likely**		

		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 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 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**		

		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	REQ-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	
		OFA05.03.04	
Identifier	REQ-04.07.07-SPR-ODIM.0220		
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		

	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 ODIM

		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	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	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>
Rationale	It is assumed that current mitigation against intrusion into restricted airspace will be maintained
Category	<Safety>

Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	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.
Title	Up-to-date sectorisation times and position boundaries.
Status	<In Progress>
Rationale	Latest times and positions are required for proposed clearances to be valid
Category	<Safety>
Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	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>
Rationale	Whenever a change is suggested it must always be assessed for safety
Category	<Safety>
Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
		OFA05.03.04	
<SATISFIES>	<ATMS Requirement>	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.

Title	Future Changes for ODIM
Status	<In Progress>
Rationale	Whenever a change is suggested it must always be assessed for safety
Category	<Safety>
Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
		OFA05.03.04	
<SATISFIES>	<ATMS Requirement>	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>
Rationale	Previous safe clearances may be compromised when new clearances are issued if previous clearances are not rechecked
Category	<Safety>
Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	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>
Rationale	HLDR cannot work without support from other tools
Category	<Safety>
Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
		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

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

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
		OFA05.03.04	
<SATISFIES>	<ATMS Requirement>	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>
Rationale	Existing safety benefits will not be compromised
Category	<Safety>
Validation Method	
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-04.07.07-OSED-HLDR-0065	<Full>

3.4 Information Exchange Requirements (IER)

Not applicable

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

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

.[1]

[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 SESAR R&D programme is focussed on development (V1-V2-V3, and because of its partial compliance with safety regulatory requirements).*

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 Objective Classes

Qualitative Safety Objective	Quantitative Safety Objective	Comment
Extremely Rare	5.27x10-8 /h	Shall never happen during the building operational lifetime
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.

A.1.2 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

A.1.3 Requirements Definition

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

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 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 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 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 high level requirement.

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

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 WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
NATS SCENARIO																								
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 probability of too many ODIM clearances being proposed for one aircraft shall be no greater than Likely (S P) The probability of loss of proposed ODIM clearances for some but not all aircraft shall be no greater than L kely (P) The probability of undetected incorrect ODIM clearances being proposed shall be no greater than Occasional (S) The probability of detected incorrect ODIM clearances being proposed shall be no greater than Likely (P) 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.*
ODIM shall calculate the fuel burn difference in kilograms that ODIM proposal clearances would result in for each flight.	N/A	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

OSED REQS	GUIDE WORDS																						SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
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 probability of ODIM losing the ability to receive current flight plan data and details of clearances already issued shall be no greater than Likely (P) The probability of ODIM receiving too much current flight plan data and detail of clearances already issued shall be no greater than Likely (P) The probability of undetected 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 Occasional (S) 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 (P) The probability of undetected loss of receipt of ODIM current flight plan data or details of clearances already issued shall be no greater than Occasional (S) The probability of detected loss of receipt of the ODIM either current flight plan data or details of clearances already issued shall be no greater than Likely (P) The probability of undetected incorrect ODIM current flight plan data and/or details of clearances already issued shall be no greater than Occasional (S) The probability of detected incorrect ODIM current flight plan data and/or details of clearances already issued shall be no greater than Occasional (P)	*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.*
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 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 (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)	

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER		
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	
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 probability of failure of the ODIM to take into account the aircraft absolute rate when optimising oceanic clearances shall be no greater than Likely (P) The probability of the ODIM taking into account an undetected higher than actual aircraft absolute rate when optimising oceanic clearances shall be no greater than Occasional (S) The probability of the ODIM taking into account an undetected lower than actual aircraft absolute rate when optimising oceanic clearances shall be no greater than Occasional (P) The probability of undetected incorrect aircraft absolute rate being taken into account in the ODIM when optimising oceanic clearances shall be no greater than Occasional (S) The probability of aircraft absolute rate being taken into account too soon in the ODIM and not being detected when optimising oceanic clearances shall be no greater than Occasional (S) The probability of aircraft absolute rate being taken into account too late in the ODIM and not being detected when optimising oceanic clearances shall be no greater than Occasional (S)	
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 probability of failure of the ODIM to take into account the aircraft relative rate when optimising oceanic clearances shall be no greater than Likely (P) The probability of the ODIM taking into account an undetected higher than actual aircraft relative rate when optimising oceanic clearances shall be no greater than Occasional (S) The probability of the ODIM taking into account an undetected lower than actual aircraft relative rate when optimising oceanic clearances shall be no greater than Occasional (P) The probability of undetected incorrect aircraft 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	

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
																							optimising oceanic clearances shall be no greater than Occasional (S) The probability of aircraft relative rate being taken into account too late in the ODIM and not being detected when optimising oceanic clearances shall be no greater than Occasional (S)	
ODIM shall take the number of routes to destination into account when optimising oceanic clearances	5	4	5	3	D: 5 U:3	5	N/A	N/A	5	3	D: 5 U:3	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The probability of failure of the ODIM to take into account the number of routes to destination when optimising oceanic clearances shall be no greater than Likely (P) The probability of the ODIM taking into account a higher than actual number of routes to destination when optimising oceanic clearances shall be no greater than Occasional (P) The probability of the ODIM taking into account an undetected lower than actual number of routes to destination when optimising oceanic clearances shall be no greater than Occasional (S) The probability of the partial loss of the number of routes to destination being taken into account in the ODIM when optimising oceanic clearances shall be no greater than Occasional (P) The probability of undetected incorrect number of routes to destination being taken into account in the ODIM when optimising oceanic clearances shall be no greater than Occasional (S)	
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 probability of failure of the ODIM to display proposed clearances on a standalone display shall be no greater than Likely (P) The probability of failure of the ODIM to display some proposed clearances on a standalone display shall be no greater	

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
ODIM shall send proposed clearances in a form capable of being integrated into SAATS/GAATS	4	4	N/A	N/A	same as partial loss	same as partial loss	N/A	N/A	4	4	D4 U4	D4 U4	N/A	N/A	N/A	N/A	same as loss						The probability of being unable to exchange ODIM proposed clearances in a format capable of being integrated wih SAATS/GAATS shall be no greater than Likely (S P) The probability of ODIM proposed clearances being proposed in a format that is only partially capable of being integrated with SAATS/GAATS shall be no greater than Likely (S P) The probability of detected ODIM proposed clearances being provided in a format unable to be capable of being integrated with SAATS/GAATS shall be no greater than Likely (S P) The probability of undetected ODIM proposed clearances being provided in a format which is unable to be integrated with SAATS/GAATS shall be no greater 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 optimisation 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			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 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*
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 probability of failure of the ODIM to ensure that Proposed Clearances are issued within a time frame defined by the OSED shall be no greater than Likely (S P) The probability of the failure of the ODIM to ensure that some but not all Proposed Clearances are issued within a time frame defined by the OSED shall be no greater than Likely (S P)	

OSED REQS	GUIDE WORDS																						SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
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 probability of the mechanism failing to manage multiple Clearance Requests shall be no greater than Occasional (P) The probability of the mechanism to manage fewer multiple Clearance Requests than required shall be no greater than Occasional (P) The probability of the mechanism failing to manage some of the multiple Clearance Requests required shall be no greater than Occasional (P)	*The mechanism for managing multiple Clearance Requests shall not reduce the window of consideration.*
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 probability of failure to receive multiple clearance requests by the ODIM not to result in unecessary delay to the issue of proposed clearances shall be no greater than Occasional (P) The probability that the receipt of multiple clearance requests by the ODIM results in unecessary delay to the issue of some proposed clearances shall be no greater than Occasional (P) The probability that the failure to receive some of the multiple clearance requests by the ODIM that results in unecessary delay to the issue of some proposed clearances shall be no greater than Occasional (P)	*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 HLDR design shall enable users to fly their preferred trajectories to the greatest extent possible 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.																								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*

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
																								Safety Mitigations, including procedures, shall be sufficiently robust to support the overall required reduction in hazard occurrence
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 SHALL BE SUPPORTED BY iFACTS and other tools.	
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																							Procedures for the movement of aircraft between ‘free route’ type airspace and the traditional ATS route structure below shall be assessed for safety impact.	
The HLDR concept shall optimise level allocation and not be constrained by uni-directional flight levels.																							In assigning flight level allocations, the safety benefit that was provided through the adoption of east and westbound routes shall be protected	

OSED REQS	GUIDE WORDS																						SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
AENA SCENARIO																								
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 probability of the failure of the System to calculate and display 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 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 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)	

OSED REQS	GUIDE WORDS																						SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
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 probability of the failure of the 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 (S P) The probability of only 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 (S P) The probability of the detected or undetected 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)	
Some (if not all) demand indicators shall be calculated in terms of occupancy.																								

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
The system shall calculate the predicted demand for each operative sector in all the operational sector configurations available.	4	4	5	3	D: 4 U:3	D: 3 U:4	N/A	N/A	4	4	D: 4 U:3	3	N/A	N/A	4	4	4	4	N/A	N/A	N/A	N/A	The probability of the failure of the the system to calculate the predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Likely (S P) The probability of the system calculating a greater than predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Occasional (P) The probability of the system calculating an undetected less than predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Occasional (S) The probability of the system calculating a detected less than predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Occasional (P) The probability of the failure of the the system to calculate some of the predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Likely (S P) The probability of the system calculating an undetected incorrect predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Occasional (S) The probability of the system calculating an incorrect predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Occasional (P) The probability of the system calculating an earlier than predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Likely (S P) The probability of the system calculating a later than predicted demand for each operative sector in all the operational sector configurations available shall be no greater than Likely (S P)	

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER		
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	
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 probability of the failure of the the system to propose the optimal configurations from a list of predefined list of all possible sector configurations, based of the workload indicators shall be no greater than Likely (S P) The probability of the system proposing a greater than optimal configuration from a list of predefined list of all possible sector configurations, based of the workload indicators shall be no greater than Occasional (P) The probability of the system proposing a less than the optimal configuration from a list of predefined list of all possible sector configurations, based of the workload indicators shall be no greater than Occasional (S) The probability of the system proposing a detected less than the optimal configuration from a list of predefined list of all possible sector configurations, based of the workload indicators shall be no greater than Occasional (P) The probability of the system to propose a partial optimal configuration from a list of predefined list of all possible sector configurations, based of the workload indicators available shall be no greater than Likely (S P) The probability of the system proposing an undetected incorrect optimal configuration from a list of predefined list of all possible sector configurations, based of the workload indicators available shall be no greater than Occasional (S) The probability of the system proposing an incorrect predicted optimal configuration from a list of predefined list of all possible sector configurations, based of the workload indicators available shall be no greater than Occasional (P) The probability of the system proposing an earlier than predicted optimal configuration from a list of predefined list of all possible sector configurations, based of the workload indicators availableshall be no greater than Likely (S P) The probability of the system proposing a later than predicted optimal configuration from a list of predefined	

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
																							list of all possible sector configurations, based of the workload indicators availableshall be no greater than Likely (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 be done)	D: 4 U:3	D: 4 U:3	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	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 proposing an optimal solution, the probability of the undetected failure of the system to 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 be done) shall be no greater than Occasional (SP) 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) 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)	

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
																							When proposing an optimal solution, the probability of the undetected failure of the system to be able to consider some 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 be done) shall be no greater than Occasional (SP) When proposing an optimal solution, the probability of the undetected incorrect consideration by the system of 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 be done) shall be no greater than Occasional (SP) When proposing an optimal solution, the probability of the undetected consideration by the system of operational restrictions later 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) When proposing an optimal solution, the probability of the undetected consideration by the system of operational restrictions earlier 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)	

OSED REQS	GUIDE WORDS																						SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
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 probability of the failure of the system to take into account for its demand prediction both historical traffic data and actual system data (that available in advance) shall be no greater than Likely (S P) The probability of the system not to detect that it has taken into account for its demand prediction less historical traffic data and actual system data (that available in advance) shall be no greater than Occasional (S P) The probability of the undetected failure of the system to take into account for its demand prediction some historical traffic data or actual system data (that available in advance) shall be no greater than Occasional (S P) The probability of the system not to detect that it has taken into account for its demand prediction incorrect historical traffic data and actual system data (that available in advance) shall be no greater than Occasional (S P) The probability of the system not to detect that it has taken into account too late its demand prediction undetected historical traffic data and actual system data (that available in advance) shall be no greater than Occasional (S P) The probability of the system not to detect that it has taken into account too early its demand prediction undetected historical traffic data and actual system data (that available in advance) shall be no greater than Occasional (S P)	*The tool shall ensure that whenever a Proposed Clearance is generated the latest data is used*

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER		
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	
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 probability of the failure of the system to be able to define different mixes of historical data and actual system data (configurable) shall be no greater than Likely (S P) The probability of the system not to detect that it has defined a lesser mix of historical data and actual system data (configurable)) shall be no greater than Occasional (S P) The probability of the failure of the system to detec a partial loss of mix of historical data and actual system data (configurable)) shall be no greater than Occasional (S P) The probability of the system not to detect that it has defined an incorect mix of historical data and actual system data (configurable) shall be no greater than Occasional (S P) The probability of the system not to detect that it has defined different mixes of historical data and actual system data (configurable) too late shall be no greater than Occasional (S P) The probability of the system not to detect that it has defined different mixes of historical data and actual system data (configurable) too early shall be no greater than Occasional (S P)	*The tool shall identify inconsistent data*
The system shall be able to work with only one of the two sources of information available.																							*The system shall detect and alert when its using only one source of information*
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 probability of the system predicting demand with an undetected incorrect configurable advance, according to the available information shall be no greater than Likely (S P)	
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		

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER		
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	
The system shall be capable of receiving the list of possible operational sector configurations (pre-defined)	5	5	N/A	N/A	D: 5 U:4	D: 5 U:4	N/A	N/A	D: 5 U:4	D: 5 U:4	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 probability that the system does not detect that is has received a list of fewer than all possible operational sector configurations (pre-defined) shall be no greater than Likely (S P) The probability that the system does not detect that is has received a partial list of possible operational sector configurations (pre-defined) shall be no greater than Likely (S P) The probability that the system does not detect that is has received an incorrect list of possible operational sector configurations (pre-defined) shall be no greater than Likely (S P)	
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 probability of the undetected failure of the system to configure manually individual sector capacities (thresholds) as a reaction to some sector operations restrictions (i.e., weather, military, ...) shall be no greater than Occasional (S P) The probability of the system not to detect that fewer individual sector capacities (thresholds) can be configured manually, as a reaction to some sector operations restrictions (i.e., weather, military, ...) shall be no greater than Occasional (S P) The probability of the undetected partial failure of the system to configure manually individual sector capacities (thresholds) as a reaction to some sector operations restrictions (i.e., weather, military, ...) shall be no greater than Occasional (S P) The probability of the undetected incorrect manual configuration of the system of individual sector capacities (thresholds) as a reaction to some sector operations restrictions (i.e., weather, military, ...) shall be no greater than Occasional (S P)	
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 probability of the failure of the system to provide several proposals of sectorizations plan, according to the time advance considered shall be no greater than Likely (P) The probability of the system providing fewer proposals of sectorizations plan, according to the time advance considered shall be no greater than Likely (P) The probability of the system providing only some proposals of sectorizations	

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
																							plan, according to the time advance considered shall be no greater than Likely (P)	
The system shall take into account the network effects locally or at a sub-regional level	D4 U3	4	N/a	N/a	N/a	N/a	N/a	N/a	as loss	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 probability that the system fails to take into account in making recommendations for sectorisations the network effects locally or at a sub-regional level, i.e.does not recognise limitation of configuration of comms and data channels and is decteted, shall be no greater than likely (S P) The probability that the system fails to take into account in making recommendations for sectorisations the network effects locally or at a sub-regional level, i.e.does not recognise limitation of configuration of comms and data channels and is undecteted, shall be no greater than Occasional (S)	*The status of configuration capability status shall be made available to the controller*
The system shall allow to increase the level of information displayed to a maximum																								
The system shall perform data acquisition automatically from all the available sources	5	4	n/a	n/a	n/a	n/a	n/a	n/a	same as loss	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 probability of the failure of the system to perform data acquisition automatically from all the available sources shall be not greater than Likely (P)	

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER		
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	
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	same as loss		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 probability of the undetected failure of the system to perform acquired data storage automatically shall be not greater than Occasional (S P) The probability of the detected failure of the system to perform acquired data storage automatically shall be not greater than Likely(S P)	
The system shall display graphically the predicted demand for each sector of a selected sector configuration incl the declared capacity value as a line	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 probability that the system fails to display graphically the predicted demand and capacity shall be no greater than Likely (P) The probability that the system partially displays graphically the predicted demand and capacity, i.e. dispalying only some sectors shall be no greater than Likely(P) The probability that the system displays graphically only a partial predicted demand and capacity, i.e. dispalying only some sectors and that this is detected shall be no greater than Likely(P) The probability that the system displays graphically only a partial predicted demand and capacity, i.e. dispalying only some sectors and that this is undetected shall be no greater than Occasional (S P)	
The system shall be able to provide the predicted demand for each sector as tables, showing the values per time intervals	5	4	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 probability of failure of system to be be able to provide the predicted demand for each sector as tables, showing the values per time intervals shall be no greater than Likely (P) The probability of system providing the predicted demand for each sector as tables, showing more values than actual per time intervals, or that the time interval is longer shall be no greater than Likely (P) The probability of system providing the predicted demand for each sector as tables, showing fewer values than actual per time intervals, or that the time interval is shorter shall be no greater 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	

OSED REQS	GUIDE WORDS																				SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
																							sector as tables, showing the only partial values per time intervals and that this is undetected shall be no greater than Occasional (S P)	
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 probability of the system being unable to be provided both in the FMP position and in the ATC supervisor position, or in just one position shall be no greater than Likely (P)	
The calculation of the optimal sector configuration shall be short -(i.e.no more than 3mins)	n/a	n/a		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		
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 probability of the failure of the system causing the implantation of an incorrect sector configuration from the system HMI shall be no greater than Likely (P) The probability of the failure of the system casuing the implantation of a partially incorrect sector configuration from the system HMI and that it is detected shall be no greater than Likely (P) 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)	

OSED REQS	GUIDE WORDS														SIRs	SPRs
	TOTAL LOSS		MORE		LESS		AS WELL AS		PARTIAL LOSS		INCORRECT		OTHER THAN		EARLY		LATE		BEFORE		AFTER			
	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P		
11																								

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/A	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. In the case of errors, a visual indication shall be available. (SPR)	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 probability that the system is not capable of displaying errors, warnings and system messages shall be no greater than Likely (S P) The probability that the systems displays more errors, warnings and system messages than actual shall be no greater than Likely (S P) The probability that the systems displays fewer errors, warnings and system messages than actual shall be no greater than Likely (S P) The probability that the systems displays errors, warnings and system messages later than actual shall be no greater than Likely (S P) The probability that the systems displays errors, warnings and system messages in the incorrect priority shall be no greater than Likely (S P)	
	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		

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

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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