

	<p>Episode 3</p> <p>D2.3-02 - System Level Validation Requirements for the EP3 Performance Framework</p>	<p><i>Version : 1.01</i></p>
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EPISODE 3

Single European Sky Implementation support through Validation



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Episode 3

**D2.3-02 - System Level Validation Requirements for the
EP3 Performance Framework**

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1 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

This document delivers requirements, identified in EP3/WP2.3.2, as input to the Performance Framework to be developed in EP3/WP2.4.1.2.

These requirements are considered necessary to allow conduct of an **effective performance-based validation** of the SESAR operational concept (as expressed in SESAR D3) and enable the integration and construction of a **System Level View** of the concept's ability to meet performance targets in 2020.

This document complies with the Annex 1 ("Description of Work") of the European Commission Contract of Episode 3 [1].

1.2 INTENDED AUDIENCE

This document is delivered through the Validation Management Cell for approval of its content, correctness and alignment with the E-OCVM based validation approach.

It is delivered to WP2.4.1.2 (Performance Framework) as a technical input.

It may be of interest to others concerned with the establishment of appropriate validation practices for the SESAR Concept of Operations [2].

1.3 DOCUMENT STRUCTURE

Following Section 1 (Executive Summary), this Introduction (Section 2) explains the document's purpose, structure and provides general background and supportive information. Section 3 (Validation Approach) provides a very brief introduction to the overall validation approach in Episode 3, the structure of the validation framework and the particular role and contribution of the performance framework in validation. Section 4 lists the currently recognised system level validation requirements to be supported by the performance framework.

1.4 BACKGROUND

Episode 3 is charged with beginning the validation of the operational concept expressed by SESAR Task 2.2 and consolidated in SESAR D3 [3]. The initial emphasis is on obtaining a system level assessment of the concept's ability to deliver the defined performance benefits in the 2020 time horizon corresponding to ATM Capability Level 2/3 and the Operational Improvement Step IP 2.

Traditionally most system improvements and the corresponding validation processes, for ATM have operated on a local level¹ under the responsibility of individual ANSP. It is only since the inauguration of the PRC and PRU that systematic performance monitoring at more global system level has been established on a wider basis.

Now, SESAR and its operational concept attempt to introduce mechanisms which will allow performance optimisation at more global, system-wide levels, balancing more complex and diverse stakeholder requirements. The key task for Episode 3 is to identify and implement an approach to validation capable of meeting this challenging new situation.

¹ More recently there have been a number of European wide initiatives to improve system capability, RVSM, 8.33Mhz, etc.



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While different WP within Episode 3 address particular operational segments, WP2 is specifically tasked with the construction of a **System Level View** in order to support an effective assessment of the concept's ability to meet required targets. All results from the other WP segments are integrated within WP2 prior to delivery of consolidated project results.

More specifically, EP3/WP2.3 is charged with the development and implementation of a suitable validation process based on the E-OCVM [4]. This includes definition and development of the **Validation Strategy** and the **Validation Framework**.

EP3/WP2.4 is charged with the task of providing the initial **ECAC-Wide Performance Assessment**. This, in turn, includes definition and development of a suitable **Performance Framework**. The chosen validation approach and the relationship between validation and performance frameworks is described more fully in the following Section.

1.5 GLOSSARY OF TERMS

Term	Definition
ANSP	Air Navigation Service Provider
ECAC	European Civil Aviation Conference
E-OCVM	European operational Concept Validation methodology
EVI	European Validation Infrastructure
G2G	Gate-to-Gate
KIM	Key Intermediate Metric
KPA	Key Performance Area
KPI	Key Performance Indicator
OI	Operational Improvement
PRC	Performance Review Commission
PRU	Performance Review Unit
RVSM	Reduced Vertical Separation Minima
SESAR	Single European Sky Air Traffic Management Research and Development Programme
VDR	Validation Data Repository

2 VALIDATION APPROACH

2.1 OBJECTIVES

The high level validation objective of Episode 3 is to gather evidence concerning the ability of the SESAR operational concept to achieve the performance targets identified in SESAR D2. The time horizon is 2020. The scope is ECAC wide.

2.2 METHODOLOGY

The E-OCVM [4] describes an approach to ATM Concept validation. However, to date the E-OCVM has not been applied to validation of a concept on the scale and complexity of SESAR. Such a system level validation assessment must be constructed from data derived from a wide range of different validation activities, integrating many different levels of system description, e.g. network to sector execution, different operational, segments and contexts, different planning horizons, e.g. from months ahead to real time execution, etc The data will be collected through a variety of methods and tools and will vary in its quality and reliability.



Previous experience (G2G) has shown that it is not possible to simply integrate such results following the completion of validation activities. If there is to be the possibility of success, the process of performing systematic validation and the integration of results must be actively planned and managed from the beginning of the whole validation activity.

The management of this Validation Process is coordinated by EP3/WP2.3, which is responsible for ensuring, the effective application of the E-OCVM, the consolidation of the Episode 3 Validation Strategy, and establishing a Validation Framework which will allow the, integration of the validation results and the construction of the necessary system level view.

A certain number of key points have been identified within EP3/WP2.3.2 as necessary enablers for integration.

Firstly, it will be necessary for those involved in the concept validation, in all WP, to have a good understanding of the operational concept, it's scope and the conditions under which it must be assessed.

Secondly, there should be a common approach to the identification of validation issues and the conduct of validation exercises.

Thirdly, there should be a common framework for the measurement of performance a common understanding of the key parameters of system performance and a systematic approach to how data is collected and interpreted (explicit shared assumptions). In particular, the performance framework structures the traceability between the measures employed and the data collected in validation activities and the system level assessment in terms of the SESAR KPA.

2.3 VALIDATION FRAMEWORK

WP2.3.3 proposes to deliver a validation framework made up of 3 main elements:

- A Performance Framework based on SESAR D2 [5]. This will be provided as a deliverable by EP3/WP2.4.1 and following the requirements in the present document will be based on SESAR KPA, Focus Areas, KPI, Operational Segments and Key Intermediate Metrics (KIM).
- A set of scenarios which define the range of Operational Conditions to which the SESAR CONOPS is applicable and for which it must be validated. The identification and means of expression of these scenarios is currently being established. (EP3/WP2.2)
- A set of measurement strategies & practices, calibration references and techniques². Following the principles of the E-OCVM [4] these will guide the way in which issues should be identified, studies designed, measures taken and data processed in order to achieve effective validation integration. These strategies establish the link between exercise measures and assessment metrics & SESAR KPI.

2.4 VALIDATION INFRASTRUCTURE

The Validation Framework is complemented by, and relies upon, an appropriate Validation Infrastructure. The validation Infrastructure includes:

- the technical platforms, analytical models, fast and real time simulators used to conduct validation studies and collect validation results (c.f. EVI [8], SESAR 2.3.2)
- methods and tools used for measurement and subsequent analysis

² These will support the EP3/WPX.3.1 in the development of detailed validation activities through step 2 of the E-OCVM. EP3/WP2.3.4 will produce guidelines and material to complement this support.



- the information management systems and tools used to track, concept development, validation results, validation maturity (e.g.. ATM Process Model, Validation Data Repository,etc.)

3 SYSTEM LEVEL VALIDATION REQUIREMENTS ON THE PERFORMANCE FRAMEWORK

3.1 TERMINOLOGY

In the text which follows:

- SHALL indicates a mandatory requirement – must be met;
- SHOULD indicates a highly desirable requirement – any exception should be clearly justified;
- COULD indicates an optional requirement which may be employed if suitable qualifying conditions apply.

3.2 REQUIREMENTS RELATING TO SESAR D2 PERFORMANCE FRAMEWORK AND TARGETS

The following Requirements are identified.

VR-PF-1. The Performance Framework SHALL describe the KPA, Focus Areas, KPI and Key Intermediate Metrics (KIM) which shall be used in Episode 3 to assess the ability of the SESAR Operational Concept to meet the 2020 performance targets.

VR-PF-2. The Performance Framework KPA, Focus Areas and KPI shall be derived directly from the KPA, Focus Areas and KPI identified in SESAR D2 [5], [6].

VR-PF-3. The Performance Framework SHALL cover all the operational segments considered for SESAR

VR-PF-4. The Performance Framework SHALL identify and allocate target levels to KPA and KPI based on the SESAR target levels of D2

VR-PF-5. The performance framework SHALL support the traceability between the measurements undertaken in validation exercises and the System Level Validation. However, identification of the necessary links is the responsibility of those planning and managing validation exercises

VR-PF-6. The initial delivery of the Performance Framework SHALL already embody the structure necessary to support tracking of performance on the CAPACITY, COST-EFFECTIVENESS, EFFICIENCY, FLEXIBILITY, PREDICTABILITY KPA.

VR-PF-7. The Initial delivery of the Performance Framework SHALL catalogue any already identified and clearly defined Key Intermediate Metrics (KIM) which are considered appropriate to measure the performance of mechanisms contributing to the delivery of performance on the subject KPA & KPI. The best sources currently identified are the work carried out by the SESAR 2.3.1 Performance Assessment Taskforce, the D2 deliverable, and the Performance Booklet of D4.

(This catalogue is to be considered as a starting point for an iterative (and traceable) refinement process to establish a stable Catalogue of Performance Measures for the SESAR concept)

VR-PF-8. The initial delivery of the Performance Framework SHALL be extensible to support the SAFETY and ENVIRONMENTAL KPA, their associated KPI and allocated target levels

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4 REFERENCES AND APPLICABLE DOCUMENTS

Ref.	Document	Name	Applicability
[1]	Episode3 Contract	TBC	Applicable
[2]	SESAR Concept of Operations	DLT-0612-222-01-00	Applicable
[3]	SESAR D3	DLM-0612-001-02-00a	Applicable
[4]	E-OCVM V2.0	European Operational Concept Validation Methodology	Applicable
[5]	SESAR D2	DLM-0607-001-02-00	Applicable
[6]	SESAR 2.1.2/D2 Strategic Objectives Definition	DLT-0607-212-01-02	Applicable
[7]	European Validation Infrastructure	EATRADA White Paper	Applicable
[8]	SESAR Performance Objectives and Targets	RPT-0708-001-00-02	Applicable



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