EPISODE 3

Single European Sky Implementation support through Validation

Programme:  Sixth framework programme Priority 1.4 Aeronautics and Space
Project title:  Episode 3
Project N°:  037106
Project Coordinator:  EUROCONTROL Experimental Centre
Deliverable Name:  WP 5.3.1 TMA Expert Group Plan
Deliverable ID:  D5.3.1-01
Version:  2.00

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<th>Version</th>
<th>Date</th>
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<th>Author(s)</th>
<th>Justification - Could be a reference to a review form or a comment sheet</th>
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<td>1.00</td>
<td>13/08/2008</td>
<td>Approved</td>
<td>Claes Rundberg</td>
<td>Creation of the document</td>
</tr>
<tr>
<td>1.01</td>
<td>15/10/2008</td>
<td>DRAFT</td>
<td>Claes Rundberg</td>
<td>Update due to new DOW</td>
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<td>1.02</td>
<td>31/10/2008</td>
<td>DRAFT</td>
<td>Claes Rundberg</td>
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<td>2.00</td>
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EXECUTIVE SUMMARY

In order to support Single European Sky Air Traffic Management Research (SESAR) Development Phase activities, the SESAR Support through Validation (Episode 3) Project is structured around validation exercises to provide and support clarification of some aspects of the SESAR Operational Concept, as well as to deliver some initial results on the SESAR performance targets. To support the preparation of the validation exercises, there is a need for preliminary work covering SESAR concept clarification. Part of this preliminary work is the main focus of the Episode 3 (EP3) Expert Groups. The present document describes the scope, work plan and expected results of the EP3 WP5.3.1 TMA Expert Group. The EP3 WP5.3.1 TMA Expert Group links the SESAR Concept of Operations and the validation exercises. This Expert Group takes place before the EP3 WP5 TMA-related validation exercise, generating inputs for them and thus playing an important role in the validation process and in the achievement of EP3 objectives. The working method consists of a combination of facilitated meetings and questionnaire techniques applied to a group of selected individuals with specific knowledge within the areas of ATM operations and systems, airborne systems and aircraft operations. The primary outputs provided are a more detailed and documented understanding of how a future SESAR concept needs to operate as well as focus areas requiring specific evaluation in subsequent simulation or gaming exercises. The assumptions are corner stones for the validation exercises, as they have to adapt the real airspace and airports within the current ATM system to bring on the new SESAR concept elements. The EP3 WP5.3.1 TMA Expert Group provides assumptions and clarifications related to SESAR Operational Concept TMA working methods, procedures, airspace organisation/sectors, traffic delivery and aircraft performance to support the preparation and modelling of the validation exercises i.e. FTS and Prototyping sessions.
1 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

The purpose of this document is to describe the objective of the EP3 WP5.3.1 TMA Expert Group work, the working methods applied, the work plan, the results expected, and how they will be documented.

1.2 INTENDED AUDIENCE

The intended audience includes:

- **EP3 WPs:**
  - WP 2.2 Clarification and Refinement of SESAR ConOps;
  - WP 2.4.1 Performance Framework;
  - WP 2.4.3 Safety Assessment;
  - WP 4.3.1 En-route Expert Group;
  - WP 5.1 WP Management and Coordination;
  - WP 5.2 Validation Strategy and Support;
  - WP 5.2.2 Operational Concept Refinement;
  - WP 5.3.2 Airport Expert Group;
  - WP 5.3.4 Multi Airport TMA operations in core area of Europe;
  - WP 5.3.5 TMA Trajectory and Separation Management;
  - WP 5.3.6 Prototyping of a Dense TMA;
  - WP 5.4 TMA and Airports Results’ and Analysis and Report;
  - WP 6 Technological Enablers.

- **EP3 WP5.3.1 TMA Expert Group Partners:**
  - AENA;
  - Airbus;
  - DFS;
  - ENAV;
  - ERC;
  - INECO;
  - ISDEFE;
  - LFV;
  - LVNL;
  - NATS;
  - NLR;
  - SICTA;
  - THAV;
  - TR6.
1.3 DOCUMENT STRUCTURE

The structure of this document is aligned with the draft document Guidelines for Expert Group Exercise Plan [1]. This introduction explains the document purpose, structure and provides general background and supportive information. Section 2 explains the exercise scope. Section 3 gives the planning and management of the Expert Group and Section 4 explains the measurements and the reporting. Finally, Section 5 lists the references and applicable documents.

1.4 BACKGROUND

Episode 3 is charged with beginning the validation of the SESAR operational concept expressed by SESAR Task 2.2 and consolidated in SESAR D3 [4]. 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 Implementation Package IP 2.

The validation process performed by EP3 is based on the E-OCVM [3]. The exercises are as well as targeting initial performance assessment, also supporting SESAR concept clarification, providing some trials of clarifications, exploring alternative validation techniques and gaining important validation experience. The data are collected through a variety of methods and tools and vary in its quality and reliability.

The EP3 WP5.3.1 TMA Expert Group supports the validation process in the areas related to SESAR concept clarification for the purpose of preparing the validation scenarios. One important task is to work in close cooperation with the validation exercises to help in clarification on how the area chosen is representative for the ECAC area. In doing so, it must be said that all terminal areas and airports are unique in terms of traffic structure and load, environment and procedures. Episode 3 is not designing an ECAC representative airport or airspace, real ones are used. But yet conclusions can be drawn for the ECAC area. Although across the area local constraints are different, conclusions and results from local exercises are useful for other parts. So the results must be carefully used giving special attention to how in some aspects they are related to the environment they were derived from. This is one of the tasks to ensure that reporting on results and conclusions drawn are done in a careful way to support SESAR Development Phase in best of ways.

To support the Validation Exercises, there is a need for SESAR concept clarification, requirements development and data preparation activities. Validation exercises produce evidence (preferably measured) about the ability of (some aspect) of the concept to deliver on (some aspect) of the performance targets. The EP3 WP5.3.1 TMA Expert Group works in close liaison with the EP3 WP5 validation exercises. Its key outputs are to provide key assumptions on how the concept will operate, used as input to support the exercises. These agreed assumptions are documented.

The EP3 WP5.3.1 TMA Expert Group supports the three EP3 exercises: WP5.3.4 Multi Airport TMA operations in the core area of Europe, WP5.3.5 TMA Trajectory and Separation Management and WP5.3.6 Prototyping of a Dense TMA.

Furthermore, the EP3 WP5.3.1 TMA Expert Group supports and provides input for EP3 WP6 Technological Enablers, EP3 WP2.4.1 Performance Framework and EP3 WP2.4.3 Safety Aspects.

1.5 GLOSSARY OF TERMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td>AMAN</td>
<td>Arrival Manager</td>
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<tr>
<td>ANSP</td>
<td>Air Navigation Services Provider</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------------</td>
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<tr>
<td>APP</td>
<td>Approach Control</td>
</tr>
<tr>
<td>ASAS</td>
<td>Airborne Separation Application System</td>
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<tr>
<td>ATC</td>
<td>Air Traffic Control</td>
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<tr>
<td>ATCO</td>
<td>Air Traffic Controller</td>
</tr>
<tr>
<td>ATM</td>
<td>Air Traffic Management</td>
</tr>
<tr>
<td>CDA</td>
<td>Continuous Descent Approach</td>
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<tr>
<td>CTA</td>
<td>Controlled Time of Arrival</td>
</tr>
<tr>
<td>CONOPS</td>
<td>Concept of Operations</td>
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<tr>
<td>DCB</td>
<td>Demand Capacity Balancing</td>
</tr>
<tr>
<td>DOD</td>
<td>Detailed Operational Description</td>
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<tr>
<td>EG</td>
<td>Expert Group</td>
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<tr>
<td>E-OCVM</td>
<td>European Operational Concept Validation Methodology</td>
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<tr>
<td>FTS</td>
<td>Fast Time Simulation</td>
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<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
</tr>
<tr>
<td>KPA</td>
<td>Key Performance Area</td>
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<tr>
<td>KPI</td>
<td>Key Performance Indicator</td>
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<tr>
<td>NOP</td>
<td>Network Operations Plan</td>
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<tr>
<td>OI</td>
<td>Operational Improvement</td>
</tr>
<tr>
<td>PBN</td>
<td>Precision Based Navigation</td>
</tr>
<tr>
<td>PTC</td>
<td>Precision Trajectory Clearance</td>
</tr>
<tr>
<td>RBT</td>
<td>Reference Business Trajectory</td>
</tr>
<tr>
<td>SESAR</td>
<td>Single European Sky ATM Research and Development Programme</td>
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<tr>
<td>TMA</td>
<td>Terminal Area</td>
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Table 1: Glossary of Terms

## 2 EXERCISE SCOPE AND JUSTIFICATION

### 2.1 STAKEHOLDERS

From an internal stakeholder point of view, diverse representatives of the European ATM system and air transport industry are involved in the conduct of the EP3 WP5.3.1 TMA Expert Group. This secures a realistic operational feedback and evaluation of the results.

The validation exercises within EP3 WP5 receiving inputs from the Expert Group are:

- WP5.3.4 Multi Airport TMA (led by NLR);
- WP5.3.5 TMA Trajectory and Separation Management (led by AENA);
- WP5.3.6 Prototyping of a Dense TMA (led by ERC) (4 prototyping sessions).

Furthermore, the EP3 WP5.3.1 TMA Expert Group is the link between the exercises and the EP3 WP5.2.2 Operational Concept Development, which needs input from the exercises to its work.
The EP3 WP5.3.1 TMA Expert Group closely coordinates with the other Episode 3 Expert Groups of WP3 and WP4 on common issues. The EP3 WP5.3.2 Airport Expert Group and the EP3 WP5.3.1 TMA Expert Group works in close cooperation to ensure common matters are not addressed differently, and that assumptions and answers of the two groups are discussed and aligned. If different views and standpoints come up, this has to be dealt with and if no agreement can be found it is documented.

2.2 OUTLINE OF THE TMA CONCEPT

In Europe high complexity operations routinely occurs in terminal areas. The particular challenge for terminal area operations is to increase the overall capacity such that closely located airports can operate at maximum capacity and a reasonable level of over-flying traffic can be accommodated.

The main operational concept elements in line with the SESAR Detailed Operational Description E5 - Arrival/Departure [2], addressed by EP3 WP5, are:

- Trajectory Management;
- Continuous Descent Approach (CDA);
- Precision Based Navigation (PBN);
- Advanced Arrival Management applications;
- Medium Term Conflict Detection applications;
- Integrated Arrival / Departure Management applications;
- Controlled Time of Arrival applications (CTA);
- 2D Precision Trajectory Clearances (PTC);
- 3D Precision Trajectory Clearances (PTC);
- Automation in ATC.

The Lines of Change and Operational Improvements covered by EP3 WP5 TMA exercises are:

<table>
<thead>
<tr>
<th>Line of Change</th>
<th>OI step ID and title</th>
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<tr>
<td>L01-05 Airspace User Data to Improve Ground Tools Performance</td>
<td>IS-0303 Use of Predicted Trajectory (PT) to Enhance ATM Ground System Performance through TMR</td>
</tr>
<tr>
<td>L02-07 Enhancing Terminal Airspace</td>
<td>AOM-0601 Terminal Airspace Organisation Adapted through Use of Best Practice, PRNAV and FUA Where Suitable</td>
</tr>
<tr>
<td>L02-07 Enhancing Terminal Airspace</td>
<td>AOM-0602 Enhance Terminal Route Design Using P-RNAV Capability</td>
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<td>L02-08 Optimising Climb/Descend</td>
<td>AOM-0701 Continuous Descent Approach (CDA)</td>
</tr>
<tr>
<td>L02-08 Optimising Climb/Descend</td>
<td>AOM-0702 Advanced Continuous Descent Approach (ACDA)</td>
</tr>
<tr>
<td>L03-01 Collaborative Layered Planning Supported by Network Operations Plan</td>
<td>DCB-0103 SWIM enabled NOP</td>
</tr>
<tr>
<td>L06-03 ATC Automation in the Context of Terminal Area Operations</td>
<td>CM-0405 Automated Assistance to ATC Planning for Preventing Conflicts in Terminal Area Operation</td>
</tr>
<tr>
<td>L07-01 Arrival Traffic Synchronisation</td>
<td>TS-0102 Arrival Management Support Improvements (incl. CDA, P-RNAV)</td>
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<td>TS-0103 Controlled Time of Arrival (CTA) through Use of Datalink</td>
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<td>TS-0303 Arrival Management into Multiple Airports</td>
</tr>
<tr>
<td>L07-01 Arrival Traffic Synchronisation</td>
<td>TS-0305 Arrival Management Extended to En Route Airspace</td>
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2.3 EXPERT GROUP OBJECTIVES

The main objective of the EP3 WP5.3.1 TMA Expert Group is to support the validation exercises in an iterative way by providing key answers to questions provided by each exercise leader, and make assumptions on how the SESAR concept will operate. The EP3 WP5.3.1 TMA Expert Group also, as in the case of EP3 WP5.3.6 Prototyping of a Dense TMA, provides support in setting priorities for subsequent validation sessions.

Another objective is to support the SESAR concept refinement and development of operational scenarios. The EP3 WP5.3.1 TMA Expert Group works closely with EP3 WP5.2.2 to support these tasks.

The EP3 WP6 Technological Enablers, led by Airbus, carries out technical validation with the aim to demonstrate industry readiness to meet the future requirements on ground and in airborne systems. The work package also refines operational scenarios, different from the ones mentioned above and used for technological validation purposes. EP3 WP5.3.1 TMA Expert Group supports WP6 in reviewing these operational scenarios.

The EP3 WP5.3.1 TMA Expert Group supports EP3 WP2.4.3 Safety Assessment in SESAR concept safety assessment. The work package leader provides a list of OIs on which expert opinion of safety aspects are required to carry out the task. This is done in a special workshop activity.

2.4 EXPECTED RESULTS

The EP3 WP5.3.1 TMA Expert Group works in close cooperation and dialogue with each exercise/work package leader. The following results can be expected from the work:

• Description and definition of SESAR concept assumptions and hypotheses to be used for modelling of the validations exercises,

• Answers to questions provided by exercise leaders on SESAR concept issues e.g. ATC methods and procedures, ground / airborne systems, aircraft operations;

• Assessment of the metrics proposed by exercise leaders;

• Assessment on how subsequent exercise sessions are to be carried out in an efficient way by prioritising ‘hot topics’ and key elements of the SESAR concept;

• Clarification and judgement on how other Airports and TMAs of the ECAC area could benefit from the OIs and other potential benefits that could be expected from the validation results.

2.5 TOOLS AND TECHNIQUES USED TO CONDUCT THE EXPERT GROUP

The EP3 WP5.3.1 TMA Expert Group uses different methods in fulfilling the support task:

• Questions / Assumptions Spreadsheet – the spreadsheet is used to compile questions and related answers, as well as the assumptions agreed by the experts. It is also noted how the answers are built, who answered i.e. one or two experts or is it a conclusion from a meeting, is there objection or disagreement around the answers, etc. The spreadsheet are used as a basis for the final reporting of EP3 WP5.3.1 TMA Expert Group and WP5;

Table 2: List of Operational improvements

<table>
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<th>CM-0601 Precision Trajectory Clearances (PTC)-2D based on pre-defined 2D routes</th>
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<tr>
<td>L08-02 Precision Trajectory Operations</td>
<td>CM-0602 Precision Trajectory Clearances (PTC)-3D based on pre-defined 3D routes</td>
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• Joint Exercise / Expert group meetings – In these meetings the related Exercise team and the Expert Group meet and discuss the questions prepared by the exercise, and also discuss the SESAR operational concept elements that have to be modelled and used in each exercise. Although we are looking at SESAR ECAC wide global concept applications, each exercise is using real airport and airspace environments. The meeting is a forum where the concept is worked through and should be confirmed and agreed that it is aligned with the SESAR ConOps [7]

• Questionnaire - this is be used in special circumstances when the experts have to give a written answer or a comment to an assumption. It is clear that not all partners will and can attend all meetings and therefore the questionnaire technique is a good complement to Expert group meetings;

• Storyboard – A storyboard is a technique of documenting and presenting the SESAR operational concept being validated in a simple, sequential and visualised way. The aim is to spread and present the elements of the concept being discussed to a larger audience in a simple and easy way;

• Tele-conference is a useful technique complementing or replacing meetings;

• Mailing communication – between Expert Group meetings, this is a quick way of communicating on the different topics with experts who cannot attend a meeting;

The support is carried through differently for the three validation exercises in terms of scope, meetings and timings. This is detailed in Section3.1.

Question and answer activities, using questionnaire techniques as basis, are ran in parallel to meetings to allow for continuous support in the preparation and planning phases of the exercises. The Exercise Leader may ask for support on SESAR conceptual clarification, simulator settings and parameterisation issues, operational procedures, etc. Questionnaires may also be used for experts to comment and give their views on proposed conclusions or solutions. Expert Group meetings are used as a tool to carry out some of the tasks of the EP3 WP5.3.1 TMA Expert Group. Issues like specific SESAR conceptual areas or elements that have to be clarified are addressed, and issues not yet addressed in the DOD are clarified and agreed. The results are documented in ‘assumptions’ made by the EP3 WP5.3.1 TMA Expert Group in close cooperation with the work package / exercise leaders. The partners of the EP3 WP5.3.1 TMA Expert Group have the possibility to have a say and comment on each assumption. Preferably there is a full agreement in the group on the produced assumptions. If agreement cannot be reached then this is documented in the spreadsheet where the comments and assumptions are compiled and described as mentioned above. It is foreseen that not all experts have to or can attend all meetings.

The meetings must be focused, and agenda items must be covered. Preparation of the relevant information is critical to ensure the experts understand the issues and can provide feedback. The meetings are structured with presentations to inform experts and allow debate on subjects on the agenda in a group environment. The Agenda items are agreed in advance between exercise leaders and the EP3 WP5.3.1 TMA Expert Group leader.

Good facilitation of meetings is important to ensure qualitative and valid conclusions, agreements on answers and assumptions. Correct facilitation helps to eliminate the following risks:

• The lack of information that has the group is at least as great as the lack of information of each expert. It is assumed that the lack of information of one expert should be resolved with the information provided by the others, but this cannot be assured;

• The pressure that the group makes over a member can force this one to accept the group point of view even when it could be erroneous and be in conflict with the member former point of view;

• The group is usually focused on getting an agreement instead of getting good results;
The most cited argument is often been the finally selected, even if it doesn’t solve the question or is contradictory to other agreed arguments;

A member with good communication, charisma and leadership skills can easily influence the whole Expert Group.

2.6 OVERVIEW OF INTERACTIONS, RELATIONSHIPS OR DEPENDENCIES

The diagram below is an attempt to show in a descriptive way the relationship between the EP3 WP5 activities. The EP3 WP5.3.1 TMA Expert Group works in close liaison with the work package leaders to find an efficient working method for the individual support required.

The EP3 WP5.3.1 TMA Expert Group plays an important role by being the link of SESAR conceptual matters between the EP3 TMA exercises 5.3.4, 5.3.5 and 5.3.6 and the WP5.2.2 Operational Concept Refinement. The EP3 WP5.3.1 TMA Expert Group supports the exercise leaders during the preparation phase in defining the validation scenarios, and making assumptions and hypotheses on operational matters to be used for modelling of the exercises.

An important task of the EP3 WP5.3.1 TMA Expert Group is to ensure alignment with SESAR ConOps within and between the EP3 TMA exercises.

Once exercises have been carried through and results obtained, the EP3 WP5.3.1 TMA Expert Group supports in integrating the results and report back to the EP3 WP5.2 Validation and Operational Support, and thus the WP5.2.2 Operational Concept Refinement. The EP3 WP5.3.1 TMA Expert Group provides results and conclusions to be presented in the EP3 WP5.4 Consolidated Report. The group also supports the consolidated report by taking on a bridging role within EP3 WP5 to ensure comprehensive and correct integration of results from the different WP5 exercises.

The EP3 WP5.3.1 TMA Expert Group coordinates closely with other EP3 expert groups to ensure that SESAR conceptual matters on the borderlines between en-route, TMA and airport are correctly addressed, and that conflicting assumptions and hypotheses on the same or similar concept matters are not provided by the different expert groups.
Figure 1 Interaction between the EP3 WP5 activities

2.7 ASSUMPTIONS

The Expert Group work is based on the needs and requirements provided by the leaders of EP3 WP5.3.4, WP5.3.5, WP5.3.6, WP6 and WP2.4.3.

3 PLANNING AND MANAGEMENT

3.1 ACTIVITIES TO BE UNDERTAKEN

As mentioned in section 2.5 above, the EP3 WP5.3.1 TMA Expert Group work is carried through by facilitated meetings and questionnaires techniques. The support to the work packages and the techniques used are different depending on the scope of their respective activities.

3.1.1 Support to EP3 WP5.2.2 Operational Concept Refinement

EP3 WP5.2.2 Operational Concept Refinement reviews the Airport and TMA detailed Operational Descriptions. It also provides further details in the form of new operational scenarios. The EP3 WP5.3.1 TMA Expert Group supports in reviewing the operational scenarios. The result of SESAR concept refinement helps the development of sections 4, 7 and 8 of the E5 DOD Conflict Management in Arrival Departure operations [2].
The EP3 WP5.3.1 TMA Expert Group supports the development of the operational scenarios by providing the comments of the experts about them collected during the Expert Group meetings. In these meetings, the experts provide judgement and assessment on SESAR conceptual issues linked to the operational scenarios addressed by the validation exercises. Moreover, the discussions deepen in the operational scenarios applied on a specific TMA environment, providing clarification and expert support for the development of the validation scenarios needed by the exercises. The notes from the meetings, answers and storyboards are useful for supporting the development/clarifying both the operational scenarios and the validation scenarios. EP3 WP5.2.2 is welcome to attend the meetings.

The operational scenarios developed by EP3 WP5.2.2 are:

- Clear the next portion of the RBT and solve conflicts by revising the RBT at ground initiative using PTC-2D or PTC-3D in the Terminal Area;
- Controller tools (TMA support tools for Execution phases);
- High density TMA Arrival - Flying CDA merging;
- 3D Departure & Arrival Routes (3D cones or Tubes).

**3.1.2 Support to EP3 WP5.3.4 Multi Airport TMA operations in core area of Europe**

The EP3 WP5.3.4 Multi Airport TMA examines Arrival and Trajectory Management with Continuous Descent Approaches. The objective of this fast-time exercise is to validate that the ATM capability of ETMA/TMA airspace in a multi hub-airport environment (Schiphol and Düsseldorf area) is sufficient to cope with increased demand in each airport.

The EP3 WP5.3.1 TMA Expert Group provides support in an iterative way by providing key answers to questions and assumptions. Meetings are held. Questionnaires may be used. Assumptions on how to break down the SESAR Concept of Operations into a feasible and realistic ‘ATM system’ to be applied in the exercise are defined. The storyboard technique is used to present the exercise scenario and concept.

Working methods, procedures, airspace organisation/sectors, traffic delivery and aircraft performance are issues that have to be addressed by the EP3 WP5.3.1 TMA Expert Group. Assumptions and answers are carefully documented and reviewed by Expert Group partners.

The EP3 WP5.3.1 TMA Expert Group pays attention to the issue of what benefits and solutions of this exercise are applicable for other congested TMAs of the ECAC area.

**3.1.3 Support to EP3 WP5.3.5 TMA Trajectory and Separation Management**

The EP3 WP5.3.TMA Trajectory and Separation Management analyses the possible improvement of Trajectory and Separation Management in a complex TMA due to the introduction of the following SESAR concepts:

- An alternative complex 2D and 3D route structure, both in Departures and Arrivals;
- Alternative 3D P-RNAV structures in Arrivals;
- 2D and 3D Precision Trajectory Clearances (PTC) in Arrivals and Departures.

This exercise also analyses the transition between airspace where User Preferred Trajectories are in operation and airspace where the traffic levels require the Pre-Defined Route structure to be imposed on the trajectories.

The activities and working methods to support don’t differ from the ones described above, including holding meetings, using questionnaires and defining assumptions. The storyboard technique is used to present the exercise scenario and concept.
As above, special attention is paid to issue of what benefits and solutions of this exercise are applicable for our congested TMAs of the ECAC area.

### 3.1.4 Support to EP3 WP5.3.6 Prototyping of a Dense TMA

The EP3 WP5.3.6 experiment (4 prototyping sessions) primarily aims at refining roles, procedures and working methods of the controllers, and assessing the impact, in terms of operability from the ground standpoint, of aircraft adhering to a RBT with CTA while achieving a CDA.

The EP3 WP5.3.6 TMA Prototyping sessions are a compromise between sufficient realism and a flexible and iterative approach in close co-operation with the EP3 WP5.3.1 TMA Expert Group. Prototyping sessions are an intermediate step of validation between Expert Groups, gaming exercises and full scale fast-time and real-time simulations. They enable an iterative approach: specific aspects of the SESAR concept can be assessed separately (possibly in a simplified environment), and then gradually integrated when sufficient maturity is reached.

The EP3 WP5.3.1 TMA Expert Group supports in setting priorities for subsequent validation sessions. This is managed through expert meetings in which identification and updates of validation issues of specific SESAR conceptual areas or elements are addressed.

Also for this exercise attention is paid to the issue of how the solutions and results can be useful and beneficial for other dense TMAs of the ECAC area.

### 3.1.5 Support to EP3 WP2.4.3 Safety Assessment

The EP3 WP5.3.1 TMA Expert Group supports by providing expert opinion on safety impacts of a set of Operational Improvements (OIs). The selection of OIs is done in close cooperation with the EP3 WP2.3.4 Leader.

Issues like equipment functionality, controller tasks, human factors issues, effects on adjacent airspace or operations or systems, response to abnormal situations and operations of reversionary modes are addressed.

It is foreseen that this task is carried through by a special EP3 WP5.3.1 TMA Expert Group meeting focusing on safety. Questionnaire techniques and tele-conferences are also possible.

### 3.1.6 Support to EP3 WP6 Technological Enablers

The EP3 WP6 Technological Enablers carries out technical validation with the aim of demonstrating industry readiness to meet future requirements on ground and airborne systems.

The EP3 WP5.3.1 TMA Expert Group supports by checking and reviewing scenarios prepared by EP3 WP6 to be used in technical validation and thus modelled on the validation platform. The group supports in finding technical performance needed for operational use; especially achievement of operational targets set in the DOD are needed for technical validation purposes. Constraints issues also have to be addressed.

### 3.2 RESOURCES AND RESPONSIBILITIES

#### 3.2.1 Resources – EP3 WP5.3.1 TMA Expert Group

LFV leads the EP3 WP5.3.1 TMA Expert Group which consists of 14 partners:

- AENA;
- Airbus;
- DFS;
To carry through the task of the Expert Group the following expertise is deemed necessary:

- SESAR Operational concept, airspace design and human factors issues.
  
  Expertise provided by AENA, DFS, ENAV, ERC, INECO, ISDEFE, LFV, LVNL, NATS, NLR, SICTA

- Ground and Airborne system matters.
  
  Expertise provided by TR6, Airbus and THAV.

ISDEFE supports in facilitation, reporting and coordination with other Expert Groups within Episode 3.

### 3.2.2 Roles in Expert Group

There are two different roles involved in the execution of the Expert Group, the Expert Group Leader, and the Expert. A summary of main responsibilities of each one is shown below:

- **EP3 WP5.3.1 TMA Expert Group Leader:**
  - ensure good coordination within the Expert Group;
  - receive inputs from the exercise and work package leaders;
  - analyse and process the support requirements and involve relevant expertise;
  - collect answers, and summarise them and extract conclusions;
  - consolidate conclusions with the experts to try defining a clear output;
  - organise the meetings;
  - ensure good coordination with en-route and airport Expert Groups, and;
  - issue the Expert Group report.

- **Expert:**
  - support the process of clarifying and refining SESAR operational conceptual issues;
  - attend meetings (not foreseen that all partners have to or can attend all meetings);
  - Support in answering questions provided by exercise and work package leaders;
  - Review and comment on answers / assumptions made, and;
  - Review and comment on the Expert Group report.
3.3 TRAINING REQUIREMENTS

Experts must have a good overall understanding of the SESAR ConOps. The SESAR Concept of Operations section D [7] is a good starting point for the learning process.

Proper training must be provided before Expert Group meetings and work can commence. For new experts, joining SESAR training material available on the Episode3 website should be studied.

3.4 TIME PLANNING

The following meetings and workshops are planned to support EP3 WPs:

WP5.3.4 8th October 2008 – questions / SESAR conceptual issues addressed.

WP5.3.5 21st-22nd October - questions / SESAR conceptual issues addressed.

WP5.3.5 January-February 2009 – workshop to address the EP3 WP5.3.5 task to analyse the transition between airspace where User Preferred Trajectories are in operation and airspace where the traffic levels require the Pre-Defined Route structure to be imposed on the trajectories.

WP5.3.6 20th November - results from 1st Prototyping Session 1 addressed and discussed. Conclusion and agreement on how the results will be carried over and reflected on next session will be made.

WP2.4.3 January-February 2009 – Two days Safety workshop to address selected OIs and their safety aspects and the experts' opinion on them.

WP5.3.1 31st August 2009 - EP3 WP5.3.1 TMA Expert Group Report with consolidated results to be delivered.

Additional meetings to support exercises and other work packages may be required, but are not yet planned.

3.5 RISKS

The results expected from this Expert Group exercise have some dependencies that could put in risk the quality and validity of its outputs or produce delays in the planned schedule.

<p>| Risk 1: | Gaps or inconsistencies in the DODs |
| Description: | There are gaps or inconsistencies in the DODs |
| Impacted Area: | ☒ Own Exercise ☒ Other Exercise ☐ WP |
| Level: | ☐ Low ☒ Medium ☐ High |
| Possibility of occurrence: | ☒ Low ☐ Medium ☐ High |
| Contingency Actions | |
| Mitigation Actions: | The DODs authors should identify the key open questions to be clarified by the experts. |</p>
<table>
<thead>
<tr>
<th>Risk 2:</th>
<th>Knowledge of SESAR Operational Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td>Experts do not have deep knowledge of SESAR Operational Concept.</td>
</tr>
<tr>
<td>Impacted Area:</td>
<td>✓ Own Exercise  □ Other Exercise  □ WP</td>
</tr>
<tr>
<td>Level:</td>
<td>□ Low  ✓ Medium  □ High</td>
</tr>
<tr>
<td>Possibility of occurrence:</td>
<td>✓ Low  □ Medium  □ High</td>
</tr>
<tr>
<td>Contingency Actions:</td>
<td>This risk has been partially mitigated by the first meeting where SESAR ConOps Experts were able to address doubts coming from the Expert Group participants. Training material available on the Episode3 website should be used.</td>
</tr>
<tr>
<td>Responsible party:</td>
<td></td>
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</tbody>
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<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Description:</td>
<td>If different expert opinions arise on a SESAR concept issue and this cannot be resolved by discussions and come to a compromise, this may lead to uncertainty for an exercise leader being supported by the EG, on how to model/build the validation scenario.</td>
</tr>
<tr>
<td>Impacted Area:</td>
<td>✓ Own Exercise  ✓ Other Exercise  □ WP</td>
</tr>
<tr>
<td>Level:</td>
<td>□ Low  ✓ Medium  □ High</td>
</tr>
<tr>
<td>Possibility of occurrence:</td>
<td>✓ Low  □ Medium  □ High</td>
</tr>
<tr>
<td>Contingency Actions:</td>
<td>Require the experts to provide details for the two options, in order that the validation exercise can implement them to analyse what-if possibilities. This can be solved by making a note on the issue that this expert (or more) cannot support the decision or assumption made by the Expert Group.</td>
</tr>
<tr>
<td>Responsible party:</td>
<td>EG Leader</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk 4:</th>
<th>Delays with the questionnaire answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td>Experts should respond within the defined period, some delays produce a big impact in schedule.</td>
</tr>
</tbody>
</table>

Issued by the Episode 3 consortium for the Episode 3 project co-funded by the European Commission and Episode 3 consortium.
4  ANALYSIS AND SPECIFICATION

4.1  MEASUREMENT AND ANALYSIS METHODS

The applied methodology to steer the Expert Group consist of meetings and questionnaire technique. Exercise leaders have possibility to send questions to the Expert Group. Experts may be asked through questions and answers spreadsheet to give their view on proposed solutions or conclusions.

There is not a specific method to collect the information and extract conclusions, but the questionnaires (spreadsheet) support in identifying the clarification solution according to experts’ opinion.

4.2  EXPERT GROUP REPORT

4.2.1 Aim of the Document

The aim of the Expert Group Report is to summarise the performed activity during the Expert Group and to objectively present the key findings. It is not meant to state conclusions about whether or not a SESAR concept is worth pursuing.

The structure for integrating the results of the EP3 WP5.3.1 TMA Expert Group will be in accordance with the following main sections:

- Introduction:
  - Project Background;
  - Scope of experiment;
  - Analysis methodology.

- Results and Discussions:
  - Generally only high level meaningful results;
  - Problems encountered during the activity;
  - As in the analysis contributions, results should be related back to the original criteria and placed in operational context;
  - Integration of results, ensuring consistency between the different exercises;
Identification on the parts of the DODs and Operational Scenarios that need to be changed as a result of the Expert Group deliberations and what changes must be made.

4.2.2 Target Audience
- EP3 WP5.2.2;
- EP3 WP5.3.4;
- EP3 WP5.3.5;
- EP3 WP5.3.6;
- EP3 WP2.4.1;
- EP3 WP2.4.3;

5 REFERENCES AND APPLICABLE DOCUMENTS

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Project</th>
<th>Document</th>
<th>Reference</th>
<th>Applicability</th>
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<tbody>
<tr>
<td>[3]</td>
<td></td>
<td>European Operational Concept Validation Methodology</td>
<td>E-OCVM V2.0</td>
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<td>[4]</td>
<td>SESAR</td>
<td>SESAR D3</td>
<td>DLM-0612-001-02-00a</td>
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<td>[5]</td>
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<td>WP5 Validation Strategy</td>
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<td>[6]</td>
<td>Episode 3</td>
<td>WP2.4.1 Performance Framework</td>
<td>EP3-WP2-D2.0-03-V2.2-WP2.4.1 Performance Framework</td>
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<td>[7]</td>
<td>SESAR</td>
<td>WP2.2.2/D3 SESAR Concept of Operations</td>
<td>DLT-0612-222-01.1-00 Concept of Operations</td>
<td>Applicable</td>
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Table 3: References
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