Consolidated Conformance Monitoring System Requirements

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Abstract

This document includes the technical requirements for the Phase 2 and the Phase 3 functionalities to be provided by project P10.04.02. This document represents an update of P10.04.02 D08; in particular it includes the references, traceability and requirements adjustments from SJU and external reviewers on D08, the alignment with the architecture description delivered by 10.01.07 D120 (TAD) and the enhancement applied in consideration of the TMA operations deliverables (05.07.02: D77 preliminary V2 OSED for Step 1, D78 preliminary V2 SPR for Step 1 and D79 preliminary V2 INTEROP for Step 1), the En-route operations (04.07.02: D28 OSED_4 and D23 SPR MTCD 4) and Free route operation(04.07.02: D37 and D63).

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None.

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00.02.00	25/10/2016	Final	LEONARDO	Version updated after SJU assessment
00.03.00	01/11/2016	Final	LEONARDO	Version updated after operational and technical projects review
00.04.00	10/11/2016	Final	LEONARDO	Version updated after SJU assessment

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10 This deliverable consists of SJU foreground.

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Executive summary

This Technical Specification (TS) document contains the final technical requirements for the Precision Conformance Monitoring to be provided by project P10.04.02 for SESAR Step 1. The document represents the deliverable D044 Conformance Monitoring System Requirements Phase 3.
This document includes:

- the refinement of technical requirements depicted in the deliverable 10.04.02 D08 Conformance Monitoring Requirements Phase 3 on the base of further clarification received from other SESAR projects (like P05.07.02);
- some improvements related to enablers traceability;
- traceability and requirements adjustments and enhancement applied in consideration of the final SPR [7] and OSED [8] provided by P04.07.02;
- traceability and requirements adjustments and enhancements applied in consideration of the final OSED [11], SPR [12] and INTEROP [13] provided by P05.07.02.
- traceability and requirements adjustment and enhancement applied taking into account the OSED [9] and SPR [10] provided by P04.07.02 for Free Route environment

To summarize, in comparison with the previous TS document (D08)

- For P04.07.02 OSED/SPR and P05.07.02 OSED/SPR/INTEROP already covered by D08 TS requirements, traceability was updated;
- Some requirements were added from scratch to fully cover the P04.07.02 OSED/SPR and P05.07.02 OSED/SPR/INTEROP allocated to MONA;
- Some requirements were added to cover OSED/SPR provided by P04.07.02 for free route operations

1 Introduction

This Technical Specification document contains the requirements under which Monitoring Aids functional block has to perform.

The operational contributions considered for this TS document are P04.07.02 and P05.07.02 inputs. The P04.07.02 is an operational project dealing with “Separation Task in En Route Trajectory based environment”. The P05.07.02 instead is an operational project dealing with “Development of 4D Trajectory-Based Operations for separation management using RNAV/PRNAV” focusing also on introduction of MTCD-based tools in TMA airspace.

Consequently this TS document covers both En-Route (including Free routing aspects) and TMA trajectory based environment requirements.

1.1 Purpose of the document

This Technical Specification (TS) document contains system requirements for the Conformance Monitoring for the SESAR Step 1 capability in TMA, En-Route and Free Route Environment. The relationship between the TS document and the other SESAR documents is illustrated in Figure 1.

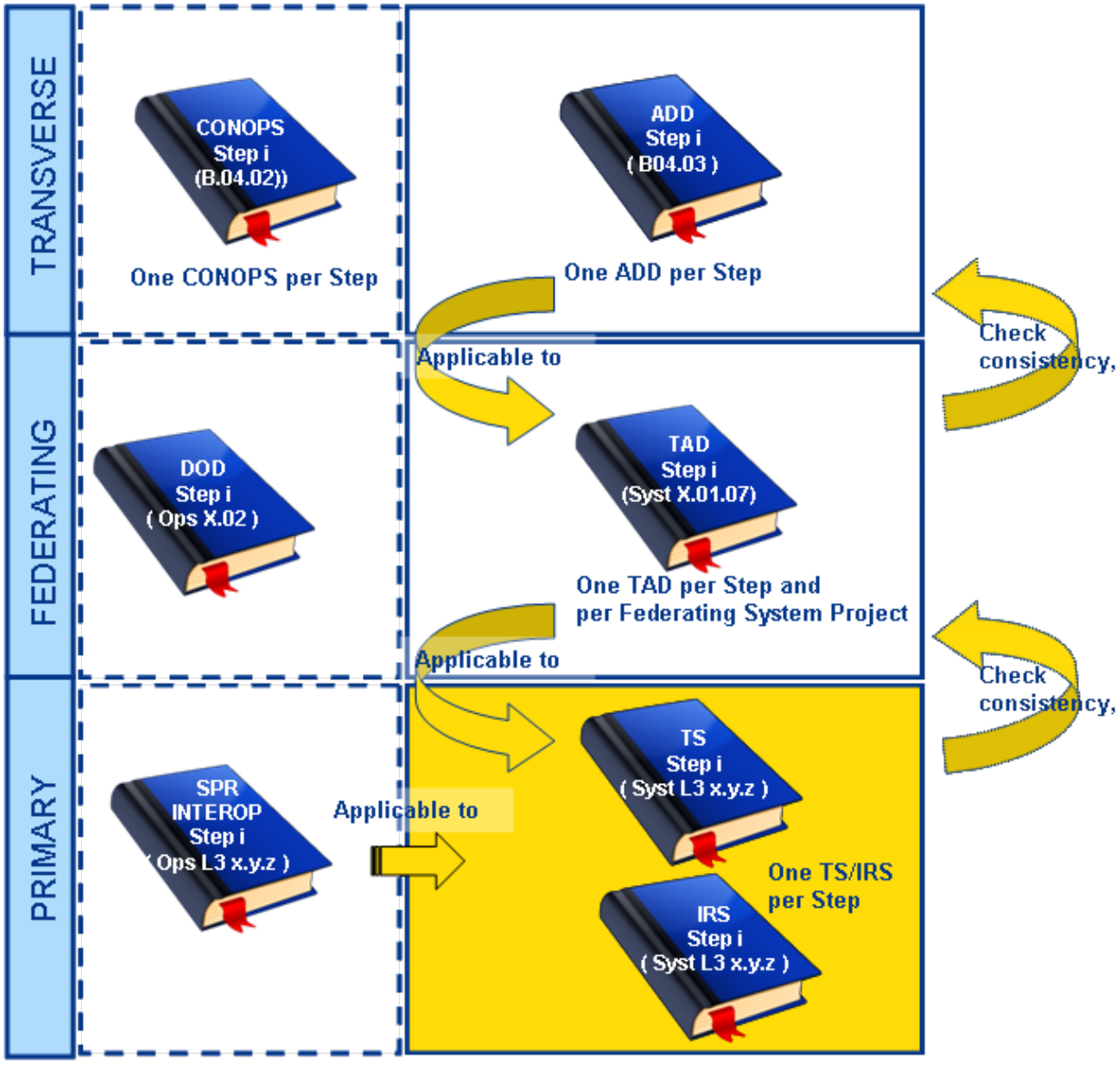


Figure 1: TS document with regards to the other SESAR deliverables

In support of the generation of the 10.04.02 Step 3 functional requirements, operational input was received from the P04.07.02 and P05.07.02 projects. The P10.04.02 project received the deliverables of the Operational Service and Environment Definition (OSED) [8] [9] [11], Safety and Performance Requirements (SPR) [7] [10] [12] and Interoperability Requirements INTEROP [13] for review/comments and implementation. The technical requirements presented in Chapter 3 of this document have been obtained directly from those OSED, SPR and INTEROP.

The 04.07.02 OSED describes a concept of operations made up by the following three services with different maturity levels (see [8] for detailed maturity):

- TRajectory Adjustment through Constraint of Time (TRACT)
- Conflict Detection and Resolution Aid to Planning Controller (CD&R aid to PC)
- Conflict Detection and Resolution Aid to Tactical Controller (CD&R aid to TC)

The 04.07.02 OSED also specifies operational concepts dealing with:

- Monitoring vertical rate
- Monitoring Mode-S parameters against clearances
- Aspects relating to tactical and deviation trajectories

The 04.07.02 SPR documents describe the derived safety objectives and associated requirements for the two, out of the three, services within project P04.07.02. The two services are: CD/R aid to PC and CD/R aid to TC. It is expected that these requirements will form an input to the later stages of the project and to support the growing maturity of these services.

Direct routing (for flights both in cruise and vertically evolving for cross ACC borders and in high & very high complexity environments) and Free routing (for Flights both in cruise and vertically evolving within low to medium complexity environments) aspects are specified in OSED [9] and SPR [10] provided by P04.07.02

The 05.07.02 OSED document details the Preliminary (V2) Operational Concept for Step 1 Separation Management in TMA. It also includes the ”Collaborative Control” thread of the project P05.07.03 that focuses on Controller Team Organisation; specifically Roles and Responsibilities within a Trajectory Based Operation within TMA Airspace.

The 05.07.02 SPR document provides the Safety and Performance Requirements for the Medium Density/Medium Complexity and High Density/High Complexity operational environments, related to the operational Services defined in the SESAR project 05.07.02 OSED document. It also includes a summary of the Safety Assessment from which these requirements have been derived.

The 05.07.02 INTEROP document provides the Interoperability Requirements for air traffic services (ATS) supported by data communications for SESAR Step 1 Separation Management in TMA. This version is based on the OSED V2 and considers the results of the validation exercises (EXE-05.07.02-VP-738, EXE-05.07.02-VP-740, EXE-05.07.02-VP-741 and EXE-05.07.02-VP-743).

The architecture required for Conformance Monitoring makes up high-level functional block "MONitoring Aids" from P10.01.07 deliverable D120 "Technical Architecture Description (TAD) - Cycle 2015" [6]. In this TS document, the functionality is further broken down into the following functional sub-blocks called “Eligibility”, "Lateral Conformance Monitoring", "Vertical Rate Conformance Monitoring", “ CFL Conformance Monitoring”, " Level Bust”, “NoTT Monitoring”, “Potential Coordination Failure”, ”Mode-S DAP Conformance”, “SID and STAR Constraints”, Conformance Monitoring related to Aircraft derived data” as illustrated by Figure 4.

1.2 Intended readership

The intended readership includes:

- All the operational projects linked to the 10.04.02 project (including P04.07.02, P05.07.02 and P05.07.03) for coordination and validation purposes;
- Project in charge to perform validation across several concept functions/elements of En Route operating context (P04.03);
- The ATC System Specification project (P10.01.07);
- Other WP10 projects for information and coordination purposes, including:

- P10.02.01 (The trajectory data are required inputs into the Conformance Monitoring requirements defined in section 3 of this document, hence a common understanding between the two projects is essential in order to achieve both a well-defined ground system concept and a functioning prototype.);

- P10.04.01 (The implementation of Conformance Monitoring requirements in section 3 are dependent from the CD&R requirements, a shared awareness between the two projects ensures that the functionality complements each other as intended.);

- P10.10.02 (Closed) and 10.10.03 (HMI requirements related to the P10.04 02 scope have been included in previous TS document).

- Internal project members.

1.3 Inputs from other projects

The requirement set in this Technical Specification consists of the requirements specified in P10.04.02 D08 ([5]) updated and aligned to 04.07.02 OSED/SPR ([7], [8], [9], [10]) and 05.07.02 OSED/SPR/INTEROP ([11], [12], [13]) needed to support Phase 2 and Phase 3 functionalities.

Another input for this document is D120 Technical Architecture Description (TAD) - Cycle 2015 provided by P10.01.07 [6]; indeed, the architecture required for Conformance Monitoring has been derived from MONitoring Aids Functional Block depicted in this Technical Architecture Description document.

1.4 Structure of the document

This document is structured as follows:

Chapter 1: Introduction

Chapter 2: General Functional Block Description

Chapter 3: Functional block Functional and non-Functional Requirements

Chapter 4: Assumptions

Chapter 5: References

Appendix A: Traceability of TS requirements with P04.07.02 OSED/SPR and P05.07.02 OSED/SPR/INTEROP

Appendix B: Subset of TS requirements linked to HMI functional block

Appendix C: Subset of 04.07.02 OSED and SPR allocated to Functional Block MONA by P10.01.07

Appendix D: Subset of P05.07.02 OSED, SPR and INTEROP allocated to Functional Block MONA by P10.04.02 partners

Appendix E: Traceability of TS requirements to SESAR Solutions

Appendix F: Description of new functionalities developed in the top of FASTI baseline

1.5 Requirements Definitions – General Guidance

All the requirements are provided in Chapter 3 of the document. The main sections are structured in accordance with the SESAR TS Template ([1],[3]) and the Requirements and V&V Guidelines provided by SJU ([2]) :

Section 3.1: Capabilities
Section 3.2: Adaptability
Section 3.3: Performance Characteristics
Section 3.4: Safety & Security
Section 3.5: Maintainability
Section 3.6: Reliability
Section 3.7: Functional block Internal Data Requirements
Section 3.8: Design and Construction Constraints
Section 3.9: Functional block Interface Requirements

The key functional requirements for Conformance Monitoring are provided in "Capabilities" section 3.1 structured as following:

Section 3.1: Capabilities

Section 3.1.1: Functional Requirements
Section 3.1.1.1: Eligibility Requirements
Section 3.1.1.2: Lateral Conformance Requirements
Section 3.1.1.3: Vertical Rate Conformance Requirements
Section 3.1.1.4: CFL Conformance Requirements
Section 3.1.1.5: Level Bust Requirements
Section 3.1.1.6: NoTT Conformance Requirements
Section 3.1.1.7: Potential Coordination Failure Requirements
Section 3.1.1.8: Mode-S DAP Conformance Requirements
Section 3.1.1.9: SID and STAR constraints conformance requirements
Section 3.1.1.10: Conformance monitoring requirements related Aircraft Derived Data

Interface requirements are provided in “Functional block Interface Requirements” section 3.9 structured as following:

Section 3.9: Functional block interface requirements

Section 3.9.1 System Interface Requirements
Section 3.9.1.1: Surveillance Interface Requirements
Section 3.9.1.2: Output Interface Requirements
Section 3.9.1.3: Input Interface Requirements
Section 3.9.2: HMI Requirements

As shown above, very general HMI requirements related to MONitoring Aids have been introduced a dedicated section that was included in the Functional Block Interface Requirements..

Each requirement related to MONitoring Aids Functional Block has been numbered according to the following template:

<Object type>-<Project code>-<Document code>-<Reference code>.<Reference number>

e.g. REQ-10.04.02-TS-nnnn.uuuu

- REQ is the <Object type> (i.e. requirement),
- 10.04.02 is the <Project code> ,
- TS is the <Document code> (i.e. technical specification),

- nnnn is the <Reference code>, sequence of 4 alphanumeric characters,
  - Requirements from Phase 1 contain 0 in the first digit of the reference code
    - REQ-10.04.02-TS-**0**nnn.uuuu
  - Requirements from Phase 2 contain 2 in the first digit of the reference code
    - REQ-10.04.02-TS-**2**nnn.uuuu
  - Requirements from Phase 3 contain 3 in the first digit of the reference code
    - REQ-10.04.02-TS-**3**nnn.uuuu
- uuuu is the <Reference number>, sequence of 4 digits,

Requirements use the following recommended layout

Identifier	
Requirement	
Title	
Status	
Rationale	
Category	
Validation Method	
Verification Method	

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	Enabler code	<Full>
<SATISFIES>	<ATMS Requirement>	INTEROP or SPR Requirement Identifier	<Full>
<ALLOCATED_TO>	<Functional block>	Functional block Identifier	N/A
<APPLIES_TO>	<Operational Focus Area>	Operational Focus Area Identifier	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	Project Identifier	N/A

Table 1: Requirements layout

1.6 Functional block Purpose

The MONitoring Aids functional block, which is the topic of this TS, includes a number of conformance monitoring checks whose aim is improve flight adherence to planned trajectory.

The enablers for the requirements in this technical specification are primarily based on the relevant Operational Improvements from the 04.07.02 OSED/SPR ([7], [8], [9], [10]) and 05.07.02 OSED/SPR/INTEROP ([11], [12], [13]), which are based on the Dataset 16 [4]. The enablers are summarized in the following table:

Relevant Operational Improvement	Enabler
CM-0205: Conflict Detection and Resolution	ER_ATC_157:

in En-Route using trajectory data in Predefined and User Preferred Routes environments	ATC System Support for Medium-Term Conflict Detection and Resolution in Enroute Airspace
CM-0207-A: Automated Ground Based Flight Conformance Monitoring in En Route in Step 1	ER_ATC_91: ATC System Support for Advanced Conformance Monitoring in En Route Airspace[1]
CM-0208-A Automated Flight Conformance Monitoring in the TMA in Step 1	APP_ATC_94: ATC tools in support of RNP (e.g. RNP1, A-RNP, RNP APCH, etc) for Approach/TMA

Table 2: Summary of Enablers for Conformance Monitoring

CM-0205 and CM-0207-A have been split in Dataset 16 [4] under the leadership of P04.02.

The scope of CM-0205 is now limited to what was validated in SESAR1, so will reach V3 in release 5. The corresponding enabler is ER_ATC_157. A new OI, CM-0209, was created for the part being transferred to SESAR 2020.

Similarly, CM-0207-A is also limited to the SESAR 1 scope, and will also reach V3 as a result of the release 5 exercises. Its enabler is ER_ATC_91 (new), which P10.04.02 technical specification will be linked to. The SESAR 2020 part is in a new OI, CM-0210, which is linked to enabler ER ATC 94. The new enabler ER_ATC_91 is just monitoring aids, and P10.04.02 technical specification for SESAR 1 will link to it. This means changing the link from ER ATC 94.

The scope of CM-0208-A is also in the SESAR2020 scope. Its enabler is APP_ATC_94 which addresses the functionality required in Approach/TMA; the ER ATC 94 is for the corresponding Enroute enhancement. The rationale for creating separate enablers is to accommodate the different timescales for the development of requirements in the two environments.

The Monitoring Aids functional block encompasses the following functions:

- Flight Trajectory deviation and conformance monitoring,
- Tactical Instruction and Clearance conformance monitoring,
- Flight progress monitoring and update,
- Reminder tools: reminder of instructions to be issued,
- Direct and Free Routing monitoring.

The trajectory prediction, included in P04.07.02 OSED/SPR and similarly in P05.07.02 OSED/SPR/INTEROP, are not in scope for this TS document. The computation of trajectories is addressed by SESAR project 10.02.01 and will be available to the MONitoring Aid block as inputs from the Trajectory Prediction & Management functional block. The Conflict Management is addressed by SESAR project 10.04.01.

The MONA functional block does not include the actual HMI or displays either. Hence the detailed visualization requirements are not in the 10.04.02 scope. Anyway some general HMI requirements

[1] ER_ATC_91 is the new enabler defined under the leadership of 10.01.07 and linked to CM-0207-A. In this document the traceability will be modified by tracing the TS requirements to this new enabler.

were included in this TS. Project 10.10.2 reviewed the general HMI requirements included in section 3.9.2 and provided some additional HMI requirements included in the section 3.9.2 as well. The HMI prototypes will be developed based on these closely coordinated requirements.

1.7 Functional block Overview

This Technical Specification describes the ER/APP functional block "Monitoring Aids" that is included in the high level illustration from the Technical Architecture Description - Cycle 2015 [6] and that has been reproduced in the figure below.

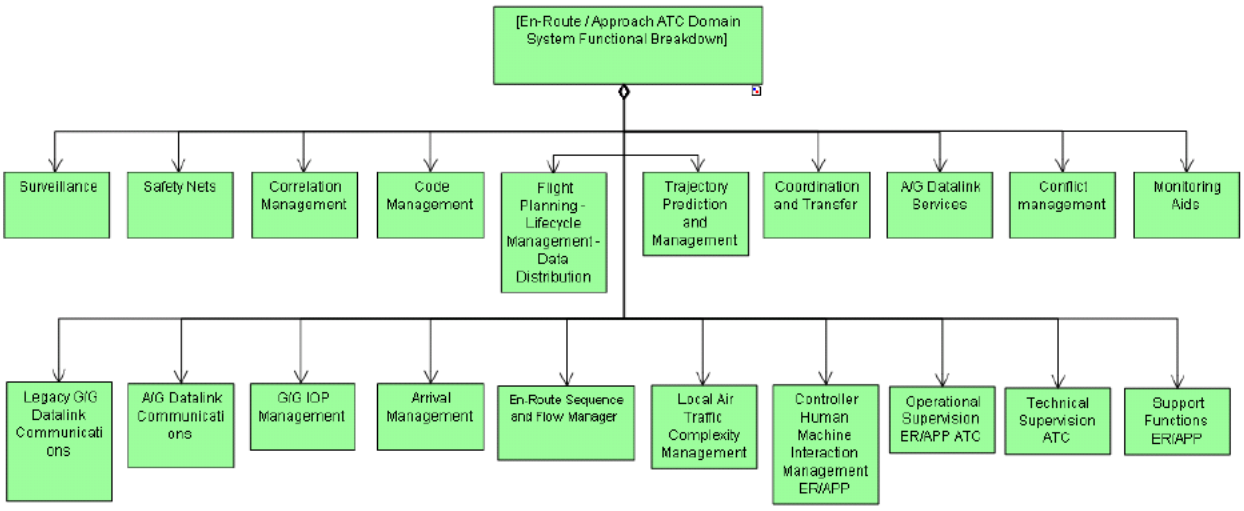


Figure 2: Functional Block Tree Diagram from EATMA

The main purpose of this functional block is to provide MONitoring Aids (MONA) assistance to the ATCO(s).

In particular, Monitoring Aids encompasses the following functions:

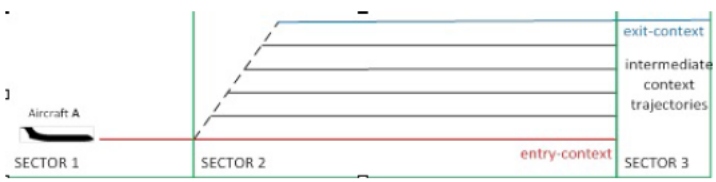
- Flight Trajectory deviation and conformance monitoring,
- Tactical Instruction and Clearance conformance monitoring,
- Flight progress monitoring and update,
- Reminder tools,
- Direct and Free Routing monitoring.

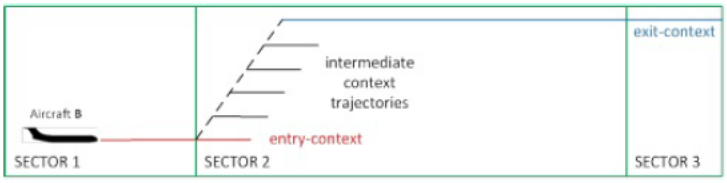
The Monitoring Aids will support ATCOs to detect and minimize trajectory non-conformances.

1.8 Glossary of terms

Term	Definition	Source
Correlation period	The "correlation period" is defined as the time between each tracker update.	10.01.07.D120 ATC System Specification

Term	Definition	Source
Correlated flight	Flight plan with a planned trajectory correlated with a radar track	10.01.07.D120 ATC System Specification
External Sector	A sector outside of the airspace of responsibility assigned to the subject ATM system.	FASTI program
Internal Sector	A sector inside of the airspace of responsibility assigned to the subject ATM system.	FASTI program
Route	The 2D trajectory of an aircraft, expressed as significant points, ATS routes or geographical points.	EATM Glossary
Sector	A part of airspace controlled by a team of controllers, defined, notably, by its geographical co-ordinates and its assigned radio frequency	EATM Glossary
State Vector	A vector describing the state of an object in terms of its position co-ordinates, ground speed, course, accelerations and mode-of-flight	EATM Glossary
System Track	A generic entity representing the surveillance data as transmitted by the surveillance system	EATM Glossary
Trajectory and Flight Related Terms		
Trajectory	The predicted behaviour of an aircraft. Note: the Trajectory is usually modelled as a set of consecutive segments linking waypoints and/or points computed by the aircraft avionics (e.g. FMS) or by the ground system to build the vertical profile and the lateral transitions. Note: Each point is defined by a longitude, latitude, a vertical distance and a time.	4.7.2. D28 OSED Glossary
Tentative Trajectory	Tentative trajectories are created from another trajectory that is in operational use (Tactical, Planning or otherwise). They reflect tentative what-if flight data selected by the controller. If these conditions are then committed the Tentative trajectory and the associated data will be used to establish the new operational trajectory. If the conditions are discarded then it will also be discarded. Note: Tentative trajectories support What-If probing and are created during this process.	4.7.2. D28 OSED Glossary
Speculative Trajectory	A Trajectory that uses flight data other than those currently committed or tentatively selected (during a What-If Probing operation), by the controller. Note: Speculative Trajectories are produced for the purpose of What-Else probing.	4.7.2. D28OSED Glossary
Tactical Trajectory	The Tactical Trajectory is calculated within a short look-ahead time (e.g. up to 15 minutes) during tactical ATC operations (sector planning layer). It therefore reflects an accurate view of the predicted flight evolution, starting from the current flight position (generally, as reported by surveillance), with low uncertainty and high precision. It is kept up to date with all clearances, including tactical instructions. During any open tactical manoeuvres it will also be reflecting those temporary conditions. It is usually determined with a fast update rate (e.g. 5 seconds) and with an optimised Uncertainty calculation; to maximise response and minimise the incidence of false warnings. Note: The Tactical Trajectory supports the tactical ATC operations when the flight follows its normal behaviour	4.7.2. D28 OSED Glossary
[Tactical/Planning] Deviation Trajectory	The Deviation Trajectory provides the predicted profile of the aircraft based on the observed behaviour, extrapolated from the particular deviation from the current clearance (or deviation from coordination	4.7.2. D28 OSED Glossary

Term	Definition	Source
	constraint for Planning Deviation Trajectories). Note: Deviation Trajectories are necessary for situations where non-compliance with a flight's expected tactical or coordinated behaviour is observed, with respect to an applicable tolerance threshold. Deviation Trajectories support Tactical/Planner ATC operations when the flight has deviated from its predicted behaviour. The Tactical Deviation Trajectory is useful for a short prediction horizon (e.g. 3-5 minutes). A Planning Deviation Trajectory follows the cleared route of the flight, irrespective of any coordination constraints (as the flight has been observed to be deviating from these constraints). During periods where a Deviation Trajectory is necessary it may also be used by TC/PC CD&R Aid.	
Subject Flight	A flight that has been explicitly selected by the Controller concerned.	4.7.2. D28 OSED Glossary
Subject Trajectory	The Trajectory of the Subject Flight	4.7.2. D28 OSED Glossary
Environmental Flight	A flight of interest to the Controller which is not the Subject Flight. The Subject Flight will be checked for encounters with all Environmental Flights.	4.7.2. D28 OSED Glossary
Context Flight	A flight that may need to be considered by the Planner ATCO when making coordination choices for the Subject Flight, due to the flights' anticipated vertical and lateral profiles. Context Flights are those Environmental Flights that are involved in a Planning Context Encounter with the Subject Flight. Note: Context Flights may not currently be involved in a Planning Encounter based on their current clearance or existing coordinated levels.	4.7.2. D28 OSED Glossary
Environment Trajectory	The Trajectory of an Environmental Flight	4.7.2. D28 OSED Glossary
Context Trajectory	Context Trajectories represent the expected utilisation of airspace by each flight. Context Trajectories are built for the Subject Flight and Environmental Flights. Note: Context Trajectories are similar to Coordination Trajectories. Each Context Trajectory maintains a single level and follows the lateral profile of the Planned Trajectory. Context Trajectories are built at every standard Flight Level from the entry-context level to the exit-context level. The identification of entry-context and exit-context levels is dictated by the information available in the system at the time of the probe. They represent the lowest and highest level at which the flight is anticipated to occupy in the sector. The Origin and Termination points on Context Trajectories depend on whether the flight is the Subject flight or an Environmental flight and on the flight's anticipated vertical profile. Example of Subject Flight Context Trajectories:  Example of Environmental Flight Context Trajectories:	4.7.2. D28 OSED Glossary

Term	Definition	Source
		
User Preferred Route	A preferred route that is provided by an Airspace User during the flight planning and agreement phase. In Step 1 it may take advantage from Free Route Airspace (FRA) for optimum routings. Note: A User Preferred Route may include published as well as non-published points defined in latitude/longitude or point bearing/distance. Such waypoints are inserted in the FMS for trajectory computation	4.7.2. D28 OSED Glossary
Planning Trajectory Related Terms Since the needs of the PC and TC differ in many respects, the trajectories produced to support the planning and tactical roles are different. Planning Trajectories are used to predict encounters between flights that are of concern to the PC. They take account of the original flight plan, modified by agreed co-ordination constraints and standing agreements, but possibly unconstrained by tactical instructions.		
Planned Trajectory	The Planned Trajectory represents the stable medium to long term behaviour of the aircraft but may be inaccurate over the short term where tactical instructions that will be issued to achieve the longer term plan are not yet known. It takes into account the planned route and requested vertical profile, strategic ATC constraints, Closed Loop Instructions/Clearances, co-ordination conditions and the current state of the aircraft. Assumptions may be made to close Open Loop Instructions/Clearances issued by tactical controllers. It is calculated within the planning look-ahead timeframe, starting from the Area of Interest of the unit concerned, or the aircraft's current position (whichever is later). It is constrained during all phases of flight by boundary crossing targets (e.g. standing agreements between the Units concerned). Note: The Planned Trajectory supports the ATC planning operations. It is used primarily to support data distribution within the system and in the determination of the top of descent point. As such, uncertainty does not need to be calculated for this trajectory. It is also used as the starting point for derivation of more specific local ATC trajectories.	4.7.2. D28 OSED Glossary
Planned Sequence Trajectory	A Trajectory that is derived from the Planned Trajectory as it follows the vertical and lateral profile of the Planned Trajectory, truncated in time to an adaptable parameter (e.g. 25 minutes). Uncertainty is added (although the lateral uncertainty may be zero). Note: The Planned Sequence Trajectory is used for the determination of co-ordination levels and the sector penetration sequence. It is used for both manual coordination and integrated coordination purposes and may be used by the CD&R Aid (with the Planning Separation) for traversals of the sector concerned (CD&R for entry and exit to the sector are covered by the Coordination Trajectory).	4.7.2. D28 OSED Glossary
[Entry/Exit] Coordination	A Trajectory that is derived from the Planned Sequence Trajectory. It follows the lateral profile of the Planned Sequence Trajectory2 but	4.7.2. D28 OSED Glossary

[2] It may be possible for the lateral profile of Coordination Trajectories to be altered from that of the Planning Trajectory to take into account relevant Coordination Constraints applied at the boundary between two sectors.

Term	Definition	Source
Trajectory Or [Entry/Exit] Trajectory	maintains a specific coordination level relevant to the boundary between two sectors. It represents the expected behaviour of the aircraft according to the entry/exit co-ordination conditions. Entry = A Trajectory that is built at levels associated with the sector entry coordination for the flight. Exit = A Trajectory that is built at levels associated with the sector exit coordination for the flight. Note: The Coordination Trajectory: Supports both lateral and vertical boundary co-ordinations; Can have the origin and end truncated (e.g. at sector boundaries); Is necessary for predicting encounters with flights that are co-ordinated with the sector but not yet in communication with that sector. Because it is only needed for boundary crossing conditions it can have a relatively short prediction horizon; typically up to the point where the flight is assumed by the sector concerned.	
TRACT Trajectory	A Trajectory that is derived from the Planned Trajectory. It is similar to the Planned Sequence Trajectory in that it follows the vertical and lateral profile of the Planned Trajectory, truncated in time to an adaptable parameter (which is suitable for the TRACT process) and uncertainty is included. Note: It is used in support of the TRACT CD&R process.	4.7.2. D28 OSED Glossary
Initial Reference Business Trajectory (iRBT for Step 1)	The representation of an airspace user's intention with respect to a given flight, guaranteeing the best outcome for this flight (as seen from the airspace user's perspective), respecting momentary and permanent constraints. The Reference Business Trajectory (RBT) refers to the Business Trajectory during the execution phase of the flight. It is the Business Trajectory which the airspace user agrees to fly and the Air Navigation Service Providers (ANSP) and Airports agree to facilitate (subject to separation provision) Note: The iRBT is the Step 1 attempt to move towards the full SESAR Reference Business Trajectory. It is shared between the Step 1 SWIM subscribers and is updated from down-linked aircraft trajectory updates. The extent to which this update, synchronisation and sharing is possible within Step 1 will depend on progress made by enabling projects. Likewise the extent to which guarantees can be made concerning best outcome will be subject to the same Step 1 development progress and validation.	4.7.2. D28 OSED Glossary
Constraint and Target Related Terms		
CTO	An ATM imposed time constraint over a point. Note: This constraint is sent by the ground system to the aircraft.	4.7.2. D28 OSED Glossary
CTA/RTA	An ATM imposed time constraint on a defined merging point associated with an arrival runway. Note: This constraint is sent by the ground system to the aircraft.	4.7.2. D28 OSED Glossary
Active CTO/CTA/RTA	A CTO or CTA or RTA that is currently taken into account by both, the avionics (e.g. FMS) and the Ground Systems. Note: It is considered to be active from the moment when both the air and the Ground Systems have taken it into account, until the application point of the constraint is over-flown or until it is cancelled in the Air and the Ground systems.	4.7.2. D28 OSED Glossary
Level Block	A level or a range of levels that is blocked off to other traffic, e.g. crossers	4.7.2. D28 OSED Glossary

Term	Definition	Source
Target Time of Arrival	An Arrival Time which is not a constraint but a progressively refined planning time that is used to coordinate between arrival and departure management applications. It is an ATM computed time.	4.7.2. D28 OSED Glossary
Clearance and Instruction Related Terms		
Open loop Instruction/Clearance	An ATC clearance or instruction where a full trajectory extrapolation beyond the point or segment(s) affected is not possible using the normal prediction process, i.e. without special measures to assert a closure condition (e.g. time limit on headings and most probable point of return to original routing). Open loop instructions/clearances can be cancelled by a Closed-loop instruction/clearance . Note: Most tactical instructions/clearances take this form; they include heading (including track offset), level, and speed restrictions and exceptionally could also cover rates of climb or descent.	4.7.2. D28 OSED Glossary
Closed loop Instruction/Clearance	An ATC clearance or instruction where a full trajectory extrapolation beyond the point or segment(s) affected is possible using the normal prediction process. Note: A typical example is a direct route from one point to another on the original route.	4.7.2. D28 OSED Glossary
NFL, SFL	The NFL is the cleared level that the aircraft will have when it will arrive in the sector. The NFL is given by the upstream sector. The NFL is equal to the TFL of the upstream sector. The SFL is the second level that permits to determine the interval of flight levels in which the aircraft will arrive in the sector. So when arriving in the sector the aircraft will be between the SFL and the NFL.	4.7.2. D28 OSED Glossary

344

345 ## 1.9 Acronyms and Terminology

346

Term	Definition
2D, 3D, 4D	*Two Dimensional, Three Dimensional, Four Dimensional*
4D TM	*Four dimensional Trajectory Management*
4DTRAD	*Four Dimensional TRAjectory Data link*
A/C	*Aircraft*
ACC	*Area Control Centre*
ADD	*Architecture Definition Document*
ADEP	*Aerodrome of Departure*
ADES	*Aerodrome of Destination*
ADS-B	*Automatic Dependent Surveillance-Broadcast*
ADS-C	*Automatic Dependent Surveillance-Contract*

Term	Definition
AFL	*Actual Flight Level*
AMAN	*Arrival MANager*
ANSP	*Air Navigation Service Provider*
APP	*Approach*
ATC	*Air Traffic Control*
ATCO	*Air Traffic Controller*
ATIS	*Automatic Terminal Information Service*
ATM	*Air Traffic Management*
ATS	*Air Traffic Services*
ATSU	*Air Traffic Services Unit*
CCD	*Continuous Climb Departure*
CDA	*Continuous Descent Approach*
CD	*Conflict Detection*
CD/R	*Conflict Detection and Resolution*
CDO	*Continuous Descent Operations*
CFL	*Cleared (Current) Flight Level*
CFMU	*Central Flow Management Unit*
CHMI	*Controller Human Machine Interface Management*
CNS	*Communications, Navigation and Surveillance*
COP	*Coordination Point*
CPDLC	*Controller Pilot Data Link Communication*
CTA	*Control Time of Arrival*
CTO	*Control Time Over*
CWP	*Controller Working Position*
DAP	*Downlink Aircraft Parameter*
DER	*Departure End of the Runway*

Term	Definition
DFS	*Deutsche Flugsicherung GmbH (German ANSP)*
DMAN	*Departure MANager*
DOD	*Detailed Operational Description*
DRA	*Direct-Route Airspace*
DSNA	*Direction des Services de la Navigation Aérienne (Directorate Air Navigation Services) (French ANSP)*
EATMA	*European ATM Architecture*
EPP	*Extended Projected Profile*
ER	*En Route*
ERATO	*En Route Air Trafic Organizer*
ETA	*Estimated Time of Arrival*
ETFMS	*Enhanced Tactical Flow Management System*
ETO	*Estimated Time Over*
EUROCAE	*EURopean Organization for Civil Aviation Equipment*
FASTI	*First ATC Support Tools Implementation (programme)*
FDMP	*Flight Data Manager Publisher*
FDPS	*Flight Data Processing System*
FIR	*Flight Information Region*
FIS	*Flight Information Service*
FL	*Flight Level*
FMS	*Flight Management System*
FP	*Flight Plan*
FRA	*Free-Route Airspace*
FTS	*Fast Time Simulation*
GA	*General Aviation*
GAT	*General Air Traffic*

Term	Definition
HMI	*Human-Machine Interface*
i4D TM	*Initial 4-Dimensional (Trajectory Management)*
IAS	*Indicated Air Speed*
IBP	*Industry-Based Prototypes*
ICAO	*International Civil Aviation Organisation*
IFR	*Instrument Flight Rules*
INTEROP	*Interoperability Requirements*
IOP	*Interoperability*
iRBT	*Initial Reference Business Trajectory*
IRS	*Interface Requirements Specification*
ITEC	*Interoperability Through European Collaboration*
MONA	*MONitoring Aids*
MSA	*Minimum Sector Altitude*
MSP	*Multi Sector Planning*
MTCD	*Medium-Term Conflict Detection*
NATS	*National Air Traffic Services (UK ANSP)*
NFL	*eNtry Flight Level*
NoTT	*No Tactical Trajectory*
OAT	*Operational Air Traffic*
OI	*Operational Improvement*
OSED	*Operational Service(s) Environmental Description*
P04.07.02	*Project 04.07.02. Separation Task in En Route Trajectory based environment*
PC	*Planning Controller*
PIR	*Project Initiation Report*
RBT	*Reference Business Trajectory*
RNP	*Required Navigation Performance*

Term	Definition
RTA	*Requested Time of Arrival*
RTS	*Real Time Simulation*
RVSM	*Reduced Vertical Separation Minimum*
SDPDS	*Surveillance Data Processing and Distribution System*
SESAR	*Single European Sky ATM Research Programme*
SFL	*Supplementary Flight Level*
SID	*Standard Instrument Departure*
SJU	*SESAR Joint Undertaking (Agency of the European Commission)*
SPR	*Safety Performance Requirement*
STAR	*STandard instrument ARrival*
SUR	*Surveillance Data Processing and Distribution System*
TAD	*Technical Architecture Description*
TC	*Tactical Controller*
TRACT	*TRajectory Adjustment through Constraint of Time*
TCT	*Tactical Controller Tool*
TMA	*Terminal Manoeuvring Area*
TOAC	*Time Of Arrival Control*
TOC	*Top Of Climb*
TOD	*Top Of Descent*
TP	*Trajectory Prediction*
TP&M	*Trajectory Prediction and Management*
TS	*Technical Specification*
UAC	*Upper Airspace Control*
UIR	*Upper Flight Information Region*
V&V	*Validation and Verification*
VFR	*Visual Flight Rules*

Term	Definition
VSP	*Variable System Parameter*
XFL	*Exit Flight Level*
WP	*Work Package*

2 General Functional block Description

2.1 Context

The following figure gives an overview of the role of the Monitoring Aids Functional Block.

The information about each functional sub-block is detailed in section 2.6.1.

The Functional Blocks other than those in interface with MONA Functional Block are shown here for information.

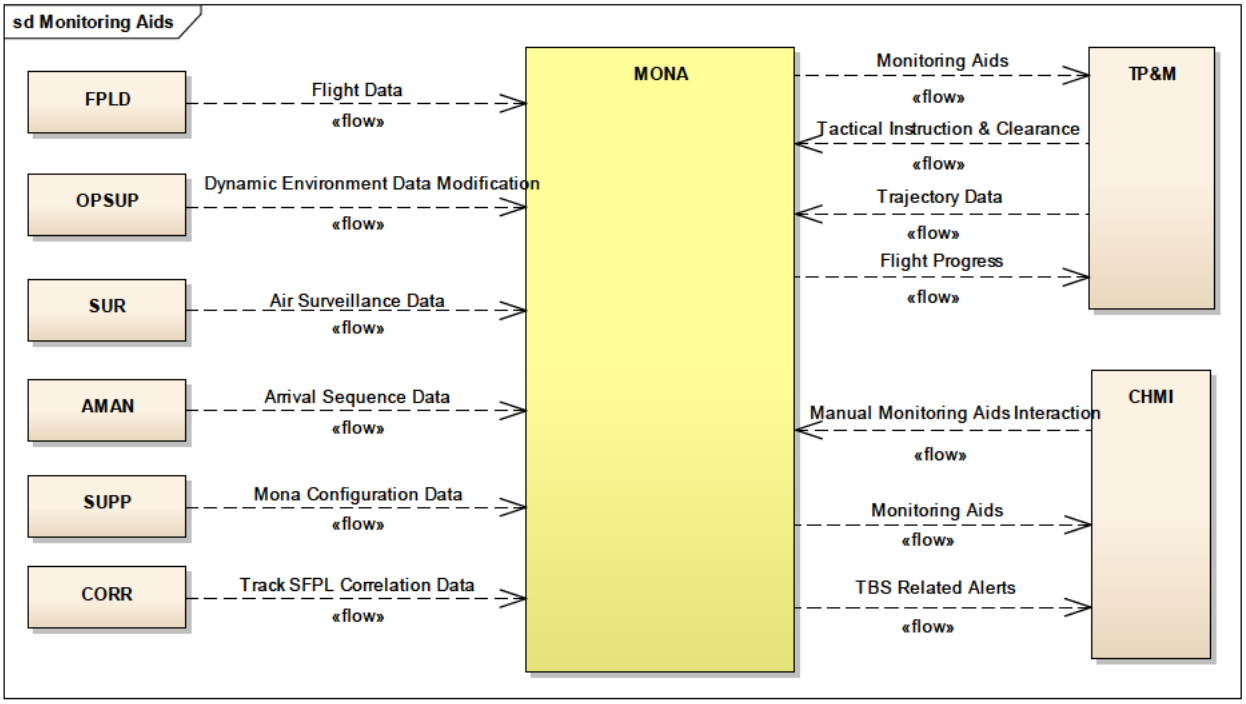


Figure 3: Monitoring Aids (MONA) Functional Block

As specified in 10.1.7 deliverable D120 “Technical Architecture Description - Cycle 2015 [6], the Monitoring Aids functional block encompasses the following functions:

- Flight Trajectory deviation and conformance monitoring: detects if a controlled aircraft deviates from its planned trajectory, notifying deviation warnings to the concerned sectors.
- Tactical Instruction and Clearance conformance monitoring: detects if a controlled aircraft deviates from the issued clearance/instruction and notifies the current executive controller.
- Flight progress monitoring and update: this function keeps the trajectory updated along the progress of the flight. It also detects certain events such as take-off, missed approach and landing.
- Reminder tools: reminder of instructions to be issued,
- Direct and Free Routing monitoring: detects if a controlled aircraft deviates from its planned trajectory in a Free Route Environment (DRA/FRA), where it is hard to spot if a turn is due to a user preferred planned route or to an unexpected manoeuver.

2.2 Functional block Modes and States

N/A.

2.3 Major Functional block Capabilities

The requirements have been grouped according the following breakdown structure.

Functional requirements:

- Eligibility,
- Lateral conformance,
- Vertical Rate conformance,
- CFL conformance,
- Level Bust,
- NoTT monitoring,
- Potential Coordination Failure,
- Mode-S DAP conformance,
- SID and STAR constraints conformance,
- Conformance monitoring requirements related to Aircraft Derived Data

Interface requirements:

- Surveillance
- Output
- Input
- HMI requirements

2.4 User Characteristics

ANSP / ATS Unit ACC, APP (Civ., Mil.)	Air Traffic Controller • Executive Controller • Planning Controller	X
ANSP / ATS Unit ACC, APP (Civ., Mil.)	ATS Supervisor	X

Table 3: User Characteristics

User Characteristics

The principle users of the Conformance Monitoring system are air traffic controllers. The system may initially be used by both Executive and Planning Controllers. The Executive controller uses Conformance Monitoring as a warning system of non-conformance with ATC instructions. In some systems, the non-conformance with ATC instructions is detected through non-conformance with the tactical trajectory. He can then adopt a tactical action (e.g. instruction to the pilot) to avoid the conflict before the start of safety net. The planner controller usually uses Conformance Monitoring to update mid-term strategy for traffic regulation / coordination.

Conformance Monitoring will be useful either in Approach or in En-Route.

We consider that the specified Conformance Monitoring is not intended for ground or runway controllers (see Airport SESAR projects for these phases of flight).

Technical staff in charge of maintenance, supervision, offline parameterization, should be able to monitor the Conformance Monitoring system by a basic graphical interface or a command line interface.

User Expectations

From the air traffic controllers' point of view some important expectations towards the monitoring system are assumed to be the following (to be refined after input from ops projects and validation feedback)

- The main purpose is to relieve monitoring workload and free mental resources of the controller for other tasks or more traffic.
- In order to relieve the monitoring load of the controller and make him rely on the system:
  - The system has to be reliable (if it is not reliable, controller has to keep monitoring himself)
  - It has to be clear whether the system is correctly monitoring a flight or not (if it is unclear *whether* the system is doing the job, controller himself has to keep monitoring)
  - It has to be clear with regard to which profile the system is monitoring (if it is not clear with regard to which profile the system is monitoring the controller cannot make good use of surrounding airspace)
  - The system logic should be transparent. It should be clear why a warning is presented or not. (if a warning is presented, controllers have to take corrective actions and potentially instruct/explain to pilots, they can only do so when they understand what went wrong)
  - The system should represent an understanding of "conformance/non-conformance" which is shared to a reasonable extent by the controller.
  - The system should minimize false/nuisance warnings. (However, due to the safety criticality of the system, when the controller relies on the system to do some monitoring, it may be better to have some false warnings than missed ones).

2.5 Operational Scenarios

Operational scenarios that illustrate the use of the Conformance Monitoring functionality are included in Chapter 5 of the P04.07.02-D28, OSED_4 [8] and 04.07.02-D37 Free Route OSED [9]. The general description of how Conformance Monitoring will be performed in TMA is included in the new SESAR operating Method (Chapter 3.2 of the P05.07.02-D77 Preliminary V2 OSED for Step 1 [11]), also the use cases for different density and complexity environments are depicted in Chapter 5 of the same document.

2.6 Functional

2.6.1 Functional decomposition

The functional view of how the MONA functional block participates in realising the operational needs has already been introduced in section 2.1.

As detailed in the Figure 3, the Precision Conformance Monitoring System has interfaces with the following key external systems and actors:

- Surveillance Data Processing and Distribution System (SUR) – This part of ATM systems provides an airspace situational awareness to user (air traffic controllers, ATM systems…).

- Trajectory Management and Flight Data Processing / Trajectory Management (TP&M) – This part of ATM systems provides flight plan (planned route) for each controlled aircraft (via CFMU, operator…) to user (ATM systems).

- Air Traffic Controllers (CHMI) – Some information are displayed at controller work positions via HMI (warning of non-conformance, kind of deviations…). The operator can then amend its control situation (new clearance, route…) through the HMI system.

A detailed overview of the other interfaces is available on Technical Specification - ATC System Baseline documentations delivered by P10.01.07 [6]

The Figure 4 shows instead the functional decomposition for Conformance Monitoring according to Major Functional block Capabilities

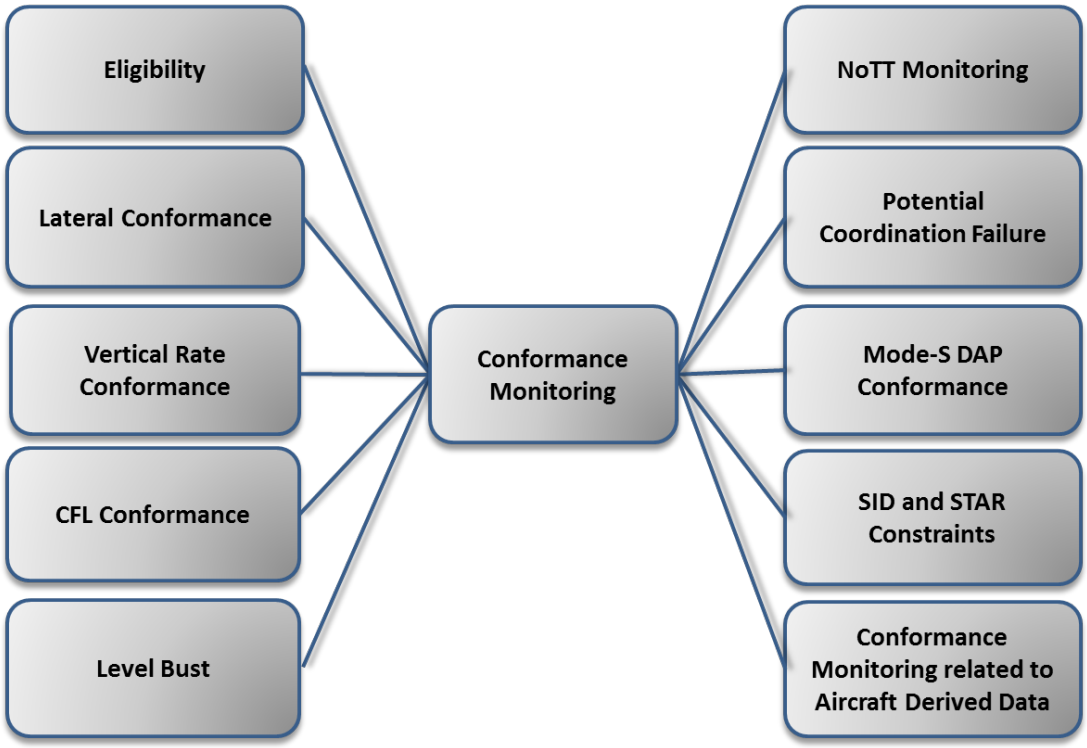


Figure 4: Conformance Monitoring Functional Breakdown

Eligibility – this function is responsible for determining the eligibility of flights for Conformance Monitoring. The function may also offer the ability to exclude specific flights from monitoring.

Lateral Conformance Monitoring – this function provides warnings when a monitored flight does not conform with lateral clearances and instructions (e.g. route and headings) The warnings are removed when the lateral deviation is no longer present.

Vertical Rate Conformance Monitoring – this function provides a warning actual rate differs from the cleared vertical rate by more than a parameter. The warnings are removed when the vertical rate deviation is no longer present.

CFL Conformance Monitoring– this function provides a warning when the aircraft does not move towards the CFL, or when the AFL of a levelled aircraft differs from the CFL by more than a threshold. The warnings are removed when the CFL deviation is no longer present.

Level Bust Monitoring - this function provides a warning when the actual vertical rate exceeds a rate threshold so that the aircraft is predicted to exceed the CFL. The warnings are removed when the Level Bust deviation is no longer present.

NoTT Monitoring – this function provides a warning when there is no tactical or deviation trajectory provided for a flight (and consequently there are not valid flight data available to be monitored).

Potential Coordination Failure Monitoring – this function provides a coordination failure warning when difference between the planned entry/exit condition and the coordinated entry/exit condition differs by more than a VSP threshold.

485 **Mode-S DAP Conformance Monitoring** – this function provides warning when Mode-S selected
486 altitude differs from CFL. The warning is removed as soon as the Mode-S selected altitude becomes
487 equal to CFL.

488 **SID and STAR Constraints Conformance Monitoring** – this function provides warning when flying
489 on a SID or on a STAR at a waypoint configurable vertical constraints are violated.

490 **Conformance Monitoring related to Aircraft Derived Data** – this function provides warning when
491 CTA vs RTA deviation or ATA vs ETA deviation are detected and when there is a mismatch with the
492 aircraft derived information (e.g. actual IAS provided by aircraft via ADS).

493 2.6.2 Functional analysis

494 See 2.6.1

495 2.7 Service View

496 N/A

3 Functional block Functional and non-Functional Requirements

3.1 Capabilities

The following structure was shown in section 2.3. This chapter itemises the requirements associated with each system capability in the list below.

Functional requirements:

- Eligibility
- Lateral conformance
- Vertical Rate conformance
- CFL conformance
- Level Bust
- NoTT conformance
- Potential Coordination Failure
- Mode-S DAP conformance
- SID and STAR constraints conformance
- Conformance monitoring requirements related to Aircraft Derived Data

Interface requirements:

- Surveillance
- Output
- Input
- HMI requirements

3.1.1 Functional Requirements

This section presents the functional requirements defined for Phase 2 and Phase 3.

3.1.1.1 Eligibility Requirements

3.1.1.1.1 Flights Trajectory Eligibility

[REQ]

Identifier	REQ-10.04.02-TS-0001.0010
Requirement	All correlated flights with a planned or a tactical trajectory shall be eligible for Conformance Monitoring.

Title	Eligibility for conformance monitoring
Status	<Validated >
Rationale	Flight plan correlated with an ADS-C track, will be eligible too. Planned trajectories modified upon controller clearances will be eligible too. The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1200	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2003	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2004	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2010	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1020	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FR00.0312	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRTA.1002	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-DR00.0310	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0001	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

3.1.1.1.2 Conformance Monitoring Processing

[REQ]

Identifier	REQ-10.04.02-TS-0001.0022
Requirement	For a flight eligible for conformance monitoring, the conformance monitoring function shall compare track state vector of an aircraft with FP clearance data when track data or FP clearance data are updated.
Title	Continuous monitoring of track data and clearance data
Status	<Validated >
Rationale	Track state vector is track data provided periodically by the surveillance. In the event that the track data is not received for a time parameter (associated to the track distribution period), the flight is considered as not-correlated (due to track lost) so it is not subject to conformance monitoring. The FP clearance data is provided as a trajectory or as an horizontal and a vertical clearance. Both data defines two 4D positions to be compared to obtain a conformance status. The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

531 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
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<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

532

533 [REQ]

Identifier	REQ-10.04.02-TS-0001.0026
Requirement	When flight is following a SID at or below 120 meters above DER (runway), the conformance monitoring shall not detect any warning.
Title	Conformance Monitoring at or below 120 meters above DER
Status	<In Progress>
Rationale	The inhibition of Conformance Monitoring in the area at or below 120 meters above DER (Departure End of the Runway) will be performed through geographical filters off line configured. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

534

535 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2011	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

536

537 [REQ]

Identifier	REQ-10.04.02-TS-0001.0027
Requirement	When a flight is flying a SID between 120 m height above DER and MSA or simply above MSA, the conformance monitoring shall detect warning according to a dedicated vertical tolerance.
Title	Conformance Monitoring warnings according to a dedicated vertical tolerance
Status	<In Progress>
Rationale	In case of flight above DER and MSA: • Waypoint with a vertical constraint of “at ”, the vertical tolerance for providing a warning shall be ± 100 ft; • Waypoint with a vertical constraint of “at or above”, the vertical tolerance for providing a warning shall be - 100 ft; • Waypoint with a vertical constraint of “at or below ”, the vertical tolerance for providing a warning shall be + 100 ft. In case of flight above MSA :

	• Waypoint with a vertical constraint of “at ”, the vertical tolerance for providing a warning shall be ± 150 ft; • Waypoint with a vertical constraint of “at or above”, the vertical tolerance for providing a warning shall be - 150 ft; • Waypoint with a vertical constraint of “at or below ”, the vertical tolerance for providing a warning shall be + 150 ft. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

538
539 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2017	<Partial>
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<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

540
541

542 3.1.1.2 Lateral Conformance Requirements

543
544 [REQ]

Identifier	REQ-10.04.02-TS-0001.0023
Requirement	Upon a NoTT deviation detection, the Conformance Monitoring shall discard any Route Deviation detection until NoTT deviation is removed.
Title	Conformance monitoring discarding due to NoTT deviation detection
Status	<Validated >
Rationale	Route Deviation is discarded since no route information are available to check conformance. The requirement has been validated in EXE-04.07.02-VP-501 and EXE-04.07.02-VP-741.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

545
546 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.4037	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.2004	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

547
548
549

550 [REQ]

Identifier	REQ-10.04.02-TS-0001.0030
Requirement	When the track is outside of the flight path and the track is also outside the radius around a waypoint of the flight route, the Conformance Monitoring function shall detect a route deviation.
Title	Route Deviation Detection for a flight plan.
Status	<Validated >
Rationale	Track will be identified as outside of the flight path, if the distance between the horizontal position of the track and its perpendicular projection on the planned trajectory or tactical trajectory is bigger than a distance parameter. Thresholds for distance between the horizontal position of the track and its perpendicular projection on the (planned or tactical) trajectory and threshold for radius around the waypoint can be defined as different parameters. This requirements specifies the case when no heading clearance is on going; in case there is a heading clearance applied to a flight, the conformance monitoring detects a route deviation if the flight heading does not comply the cleared one. Conformance Monitoring will check route deviation at a rate of at least once per a VSP configurable time. The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

551
552
553 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1200	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRTA.0101	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FR00.0312	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-DR00.0310	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

554
555
556
557 [REQ]

Identifier	REQ-10.04.02-TS-0001.0050
Requirement	Upon controller entry, to a flight in lateral deviation, of a new assigned route, heading with which the system track is in conformance, the conformance monitoring shall remove the lateral deviation warning.
Title	Removal of lateral deviation warning after new route assigned from the controller
Status	<Validated >
Rationale	Note: baseline requirement, included because explicitly necessary for prototype functionality The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial>

	<Real Time Simulation>
Verification Method	<Test>

558
559 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRTA.0101	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

560
561
562 [REQ]

Identifier	REQ-10.04.02-TS-0001.0051
Requirement	For a flight with a Route Deviation, the Conformance Monitoring shall remove the route deviation if the track is inside the flight path.
Title	Route Deviation Removal.
Status	<Validated >
Rationale	In this case Route Deviation is removed due to the track returning inside the flight path (without any new clearance coming from the controller) The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

563
564 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRTA.0101	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FR00.0312	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRTA.1002	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-DR00.0310	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

565
566 [REQ]

Identifier	REQ-10.04.02-TS-0001.0450
Requirement	The Conformance Monitoring shall accept dedicated lateral threshold values to apply for flights approved for particular PBN application.
Title	Lateral tolerance considering PBN
Status	<In Progress>
Rationale	PBN applications are referred to instrument flight procedures (SID, STAR, IAP). It will be possible to implement a set of procedures (i.e STARs) within a TMA which not all of them require same PBN specification (e.g.one STAR may

	requires RNAV1 and another RNP2), The conformance monitoring should accept different accuracy threshold depending on the accuracy of the required specification. Obviously within the TMA can fly PBN and Non PBN aircraft approved. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2018	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2024	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

3.1.1.3 Vertical Rate Conformance Requirements

[REQ]

Identifier	REQ-10.04.02-TS-0001.0141
Requirement	For a flight in vertical manoeuvre to a not reached CFL, the Conformance Monitoring function shall detect a vertical rate deviation if the following conditions are fulfilled: a) No CFL deviation or level bust is detected, and b) vertical latency time after a new vertical clearance has been elapsed, and c) the new CFL is not reached, and d) actual vertical rate is lower than the minimum vertical rate into the direction to CFL, or actual rate differs from the cleared vertical rate by more than a parameter.
Title	Vertical Rate Deviation Detection
Status	<Validated >
Rationale	A CFL is reached when the difference between AFL and CFL is lower than a threshold. The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3021	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3126	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

576 [REQ]

Identifier	REQ-10.04.02-TS-0001.0142
Requirement	For a flight with a Vertical Rate Deviation, the Conformance Monitoring shall discard the Vertical Rate Deviation, if any of the following conditions is fulfilled: a) CFL is reached (difference between AFL and CFL is lower than a threshold) b) actual vertical rate is higher than the minimum vertical rate into the direction of the CFL, and actual rate differs from the cleared vertical rate less than a parameter
Title	Vertical Rate Deviation removal due to flight.
Status	<Validated >
Rationale	As a summary, a Vertical Deviation is removed when it is no longer detected, so the detection conditions are no longer fulfilled. Consequently, conditions to discard a Vertical Rate Deviation are the negative case of the Vertical Rate Deviation Detection conditions. The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

577

578 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2006	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

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580 ### 3.1.1.4 CFL Conformance Requirements

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582 [REQ]

Identifier	REQ-10.04.02-TS-0001.0151
Requirement	For a CFL previously reached, the Conformance Monitoring shall detect a CFL deviation if the AFL differs from the CFL by more of a threshold.
Title	CFL Deviation Detection for CFL Reached
Status	<Validated >
Rationale	A CFL is reached from the moment when the difference between AFL and CFL is lower than a threshold. The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

583

584 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3022	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2006	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3126	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

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588 [REQ]

Identifier	REQ-10.04.02-TS-0001.0152
Requirement	For a CFL not reached, the Conformance Monitoring shall detect a CFL deviation if current AFL is outside a band level between the previous AFL and the CFL.
Title	CFL Deviation Detection for CFL Not Reached
Status	<Validated >
Rationale	A CFL is not reached from the moment that it is input to the moment when the difference between AFL and CFL is lower than a threshold. The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

589
590 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3022	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3126	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

591
592
593 [REQ]

Identifier	REQ-10.04.02-TS-0001.0153
Requirement	For a flight with a CFL Deviation, if the AFL differs from the CFL by less than a threshold, the Conformance Monitoring shall discard the CFL Deviation.
Title	CFL Deviation removal due to flight return to cleared level.
Status	<Validated >
Rationale	The CFL Deviation may be removed due to a new CFL (CFL is updated) or due to the flight returning to current CFL (AFL is updated). Both cases are included in this requirement. The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

594
595 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2006	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

596

597 3.1.1.5 Level Bust Requirements

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599 [REQ]

Identifier	REQ-10.04.02-TS-0001.0181
Requirement	For a flight in vertical manoeuvre close to the CFL, the Conformance Monitoring shall detect a Level Bust deviation if the actual vertical rate exceeds a rate threshold and no CFL Deviation is detected.
Title	Level Bust Deviation Detection
Status	<Validated >
Rationale	A flight is considered in a vertical manoeuvre close to the CFL, when the difference between AFL and CFL is lower than an additional threshold. This threshold is independent of the reached CFL defined in other requirements. The requirement has been validated in EXE-04.07.02-VP-501 and EXE-04.07.02-VP-741.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

600

601 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3023	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3126	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

602
603
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605 [REQ]

Identifier	REQ-10.04.02-TS-0001.0182
Requirement	For a flight with a Level Bust Deviation, if actual vertical rate is less than an threshold, the Conformance Monitoring shall discard the Level Bust Deviation.
Title	Level Bust Deviation removal due to vertical rate correction.
Status	<Validated >
Rationale	As a summary, a Level Bust Deviation is removed when it is no longer detected, so the detection conditions are no longer fulfilled. Consequently, conditions to discard a Level Bust Deviation are the negative case of the Level Bust Deviation Detection conditions. The requirement has been validated in EXE-04.07.02-VP-501 and EXE-04.07.02-VP-741.
Category	<Functional>

Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

606
607 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2006	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

608

609 ### 3.1.1.6 NoTT Conformance Requirements

610
611 [REQ]

Identifier	REQ-10.04.02-TS-0001.0191
Requirement	The Conformance Monitoring shall detect a NoTT Deviation if a) no valid route information is available for a flight; or b) the aircraft is beyond or before its cleared (filed) route.
Title	NoTT Deviation Detection
Status	<Validated >
Rationale	In case of NoTT deviation, tactical trajectory cannot be calculated because of missing input data. A flight does not have valid flight data for monitoring when no tactical or deviation trajectory is available. If any of them is calculated, the NoTT deviation is not detected. The requirement has been validated in EXE-04.07.02-VP-501.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

612
613 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3024	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.2004	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

614
615
616
617 [REQ]

Identifier	REQ-10.04.02-TS-0001.0194
Requirement	For a flight with a NoTT deviation detected, the Conformance Monitoring shall discard the NoTT Deviation previously detected, if the flight has a Tactical Trajectory or a Deviation Trajectory, and the flight is inside the cleared (filed) route.
Title	NoTT Deviation removal

Status	<In Progress>
Rationale	The conditions for NoTT Deviation removal are the opposite (in a logical sense) of the conditions NoTT Deviation detection. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

3.1.1.7 Potential Coordination Failure Requirements

[REQ]

Identifier	REQ-10.04.02-TS-0001.0170
Requirement	The conformance monitoring shall detect an entry/exit coordination failure when the difference between the planned entry/exit condition and the coordinated entry/exit condition differs by more than a VSP time or level threshold.
Title	Coordination conditions failure warning
Status	<Validated >
Rationale	Entry/exit condition (e.g. COP XFL) The requirement has been validated in EXE-04.07.02-VP-501 and EXE-04.07.02-VP-741.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR2.1240	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0001.0175
Requirement	When an entry and/or exit coordination failure is detected, the conformance monitoring shall issue the warning to the exit sector CWP and/or entry sector CWP.
Title	Entry/Exit coordination failure

Status	<Validated >
Rationale	The entry/exit coordination failure warning will have to be distributed and displayed to the CWP associated to the interested entry/exit sectors. The requirement has been validated in EXE-04.07.02-VP-501 and EXE-04.07.02-VP-741.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR2.1240	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR2.1250	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

3.1.1.8 Mode-S DAP Conformance Requirements

[REQ]

Identifier	REQ-10.04.02-TS-0001.0161
Requirement	Upon a latency time after a new vertical clearance has been elapsed, if the Mode S Selected Altitude differs to CFL, the Conformance Monitoring function shall detect a Mode S Altitude Deviation.
Title	Mode S Selected Altitude Deviation Detection with clearance latency.
Status	<Validated >
Rationale	In order to avoid that Mode S Selected Altitude Deviation is raised every time a new CFL is input, a time latency condition is added. The requirement has been validated in EXE-04.07.02-VP-501 and EXE-04.07.02-VP-741.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1220	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0001.0163
Requirement	For a flight with a Mode S Altitude Deviation, if the Mode S Selected Altitude is equal to CFL, the Conformance Monitoring shall remove the Mode S Altitude Deviation.
Title	Mode S Selected Altitude Deviation removal
Status	<Validated >
Rationale	Deviation removal condition may be achieved due to a CFL updated or due to

	a Mode S Selected Altitude, both cases will achieve the deviation removal. The requirement has been validated in EXE-04.07.02-VP-741.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0001.0165
Requirement	Upon a latency time after a Mode S Selected Altitude update has been elapsed, if the Mode S Selected Altitude differs to CFL, the Conformance Monitoring function shall detect a Mode S Altitude Deviation.
Title	Mode S Selected Altitude Deviation Detection with pilot latency.
Status	<Validated >
Rationale	In order to avoid nuisance Mode S Selected Altitude Deviation if the pilot enters the new clearance faster than the controller, a time latency condition is added. The requirement has been validated in EXE-04.07.02-VP-501 and EXE-04.07.02-VP-741.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1220	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

3.1.1.9 SID and STAR constraints conformance requirements

[REQ]

Identifier	REQ-10.04.02-TS-0001.0024
Requirement	For a flight cleared to IAF, the Conformance Monitoring shall detect a vertical deviation, if the AFL is lower than the vertical constraint associated to the IAF more than an adapted parameter.
Title	Vertical deviation when AFL is lower than the vertical constraint
Status	<In Progress>
Rationale	A flight cleared direct to IAF should not descend below the level defined for the IAF. Implementation not requested in any validation exercise supported by P10.04.02

Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2010	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0001.0400
Requirement	For a "at or above" vertical constraint associated to an STAR waypoint, the Conformance Monitoring shall detect a STAR constraint deviation, if the track is inside the radius around the STAR waypoint, the STAR waypoint is not overflown and the AFL is lower than the vertical constraint in more than an adapted parameter.
Title	STAR constraint at or above
Status	<In Progress>
Rationale	This monitoring is to detect if the flight is not going to fulfil the vertical constraint. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2009	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

3.1.1.10 Conformance monitoring requirements related to Aircraft Derived Data

[REQ]

Identifier	REQ-10.04.02-TS-0001.0180
Requirement	All detected deviations shall be available to be displayed as non-conformance warnings in the respective position sector.
Title	Displaying availability of non-conformance warnings.
Status	<Validated >
Rationale	All detected deviations has to be available to be displayed, that does not mean than all detected deviation has to be displayed (may be configured, adapted, or manually inhibited). The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial>

	<Real Time Simulation>
Verification Method	<Test>

661

662 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1190	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

663

664 [REQ]

Identifier	REQ-10.04.02-TS-0001.0190
Requirement	The type of the detected deviation shall be available for presentation for a displayed non-conformance warning to the respective position sector.
Title	Availability of type of trajectory deviation for non-conformance warning.
Status	<Validated >
Rationale	The precise non-conformance warnings to be defined and which deviations generate each warning display are implementation. The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

665

666 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1190	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

667

668 [REQ]

Identifier	REQ-10.04.02-TS-0001.0230
Requirement	Whenever conformance monitoring warning is provided, it shall be made available for presentation to the respective position sector, until it is removed by the Conformance Monitoring function.
Title	Presentation and removal of conformance warning
Status	<Validated >
Rationale	The non-conformance warning to be distributed, displayed and removed to the interested position sector The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

669

670 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

671

672 [REQ]

Identifier	REQ-10.04.02-TS-0003.0240
Requirement	When a CTA vs RTA deviation is detected, the conformance monitoring shall provide a lighting warning to the CWP
Title	Presentation of CTA vs RTA deviation
Status	<In Progress>
Rationale	The non-conformance warning to be distributed, displayed and removed to the interested position sector. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

673

674 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2019	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0003.2031	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

675

676 [REQ]

Identifier	REQ-10.04.02-TS-0001.0410
Requirement	When CTA and RTA information are available, the conformance monitoring shall generate a warning when, over a configurable waypoint, aircraft CTA differs from RTA more than a configurable time parameter, at each correlation period cycle.
Title	CTA vs RTA deviation
Status	<In Progress>
Rationale	The conformance monitoring should consider also the information which come from the aircraft which should be used for improving Conformance functionality, The tolerance to raise this warning is constrained by the correlation period, but the correlation period can be synchronized on sensor (generally 4 seconds in approach), periodic (each x seconds) or aperiodic(each update of track). Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

677

678 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2019	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0003.2031	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

679

680 [REQ]

Identifier	REQ-10.04.02-TS-0001.0430
Requirement	When Aircraft Derived Data are available, the conformance monitoring should detect a IAS deviation warning if the actual IAS (provided by the aircraft) differs from cleared IAS.
Title	Actual IAS vs Cleared IAS deviation
Status	<In Progress>
Rationale	Actual IAS will be provided by aircraft via ADS. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

681

682 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2022	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

683

684 [REQ]

Identifier	REQ-10.04.02-TS-0001.0460
Requirement	When Aircraft Derived Data or EPP data are available, the conformance monitoring shall compare the future positions to the reference trajectory and in

	case of deviation issue a warning indicating " in "XXX" minutes, "Flight ID" shall be deviated from the latest clearance.
Title	Aircraft Derived Data or EPP usage
Status	<In Progress>
Rationale	It is expected that conformance monitoring tool not just comparing present position against reference trajectory, but also future positions. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2025	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2021	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

3.2 Adaptability

No adaptability system requirements can be derived at this time. This section can be revised when more information becomes available.

3.3 Performance Characteristics

[REQ]

Identifier	REQ-10.04.02-TS-0001.0470
Requirement	The conformance monitoring shall be able to manage at least 200 flights per control area (TMA or ACC).
Title	Conformance monitoring capacity
Status	<Validated >
Rationale	The number of managed flights per control area includes flights under control (in live status) or within the look ahead time per each control area. Capacity for future flights (not within the look ahead time) or additional control areas are outside this number. The requirement has been validated in EXE-04.07.02-VP-741.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR1.3020	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

3.4 Safety & Security

The requirements included in this section have been derived from the latest available P04.07.02 D30 Preliminary Safety and Performance Requirements for MTCD/TCT_4. This section will be revised when some more information becomes available.

[REQ]

Identifier	REQ-10.04.02-TS-0002.0100
Requirement	The probability of Loss of TC-Aid shall be no more than 3.33E-07 per flight hour.
Title	Acceptability of Loss of TC-Aid
Status	<In Progress>
Rationale	Safety requirement is defined in relation to the safety objectives derived from the Failure Case Analysis workshop (P04.07.02 Task 93). Implementation not requested in any validation exercise supported by P10.04.02
Category	<Safety>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Analysis>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER ATC 157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.2030	<Full>
<ALLOCATED TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES TO>	<Operational Focus Area>	OFA03.03.02	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0002.0200
Requirement	The probability of Delay of the TC-Aid shall be no more than 3.33E-07 per flight hour.
Title	Acceptability of Delay of TC-Aid
Status	<In Progress>
Rationale	Safety requirement is defined in relation to the safety objectives derived from the Failure Case Analysis workshop (P04.07.02 Task 93). Implementation not requested in any validation exercise supported by P10.04.02
Category	<Safety>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Analysis>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER ATC 157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.2070	<Full>
<ALLOCATED TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES TO>	<Operational Focus Area>	OFA03.03.02	N/A
<ALLOCATED TO>	<Project>	10.04.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0002.0300
Requirement	The probability of Corruption (Undetected) of the TC-Aid shall be no more than 3.33E-07 per flight hour.

Title	Acceptability of Corruption (Undetected) of TC-Aid
Status	<In Progress>
Rationale	Safety requirement is defined in relation to the safety objectives derived from the Failure Case Analysis workshop (P04.07.02 Task 93). Implementation not requested in any validation exercise supported by P10.04.02
Category	<Safety>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Analysis>

709

710 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.2110	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

711

712 [REQ]

Identifier	REQ-10.04.02-TS-0002.0400
Requirement	The probability of Corruption (Detected) of the TC-Aid shall be no more than 1.00E-05 per flight hour
Title	Acceptability of Corruption (Detected) of TC-Aid
Status	<In Progress>
Rationale	Safety requirement is defined in relation to the safety objectives derived from the Failure Case Analysis workshop (P04.07.02 Task 93). Implementation not requested in any validation exercise supported by P10.04.02
Category	<Safety>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Analysis>

713

714 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.2140	<Full>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

715

716 [REQ]

Identifier	REQ-10.04.02-TS-0002.0500
Requirement	The frequency of occurrence of detected corruption of input data from Trajectory Deviation Detection function shall not be greater than 0.4x10-7(/flt hr)
Title	Frequency of detected corruption of input data
Status	<In Progress>
Rationale	Safety requirement for 4D Trajectory-Based Operations for separation management using RNAV/PRNAV. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Safety>
Validation Method	<Live Trial> <Real Time Simulation>

Verification Method	<Analysis>

717
718 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR1.2030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR1.2080	<Partial >
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

719

720 [REQ]

Identifier	REQ-10.04.02-TS-0002.0600
Requirement	The frequency of occurrence of undetected corruption of input data from Trajectory Deviation Detection function shall not be greater than 0.4x10-7(/flt hr)
Title	Frequency of undetected corruption of input data
Status	<In Progress>
Rationale	Safety requirement for 4D Trajectory-Based Operations for separation management using RNAV/PRNAV. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Safety>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Analysis>

721
722 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR1.2030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR1.2080	<Partial >
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

723

724 3.5 Maintainability

725 Requirements related to Maintainability have not been derived from 04.07.02 OSED. This section will
726 be revised when some more information will be available.

727 3.6 Reliability

728 Requirements related to Reliability have not been derived from 04.07.02 OSED. This section will be
729 revised when some more information will be available.

730 3.7 Functional block Internal Data Requirements

731 These requirements are internal to the design of the prototypes and will be detailed when 04.07.02
732 performance requirements will be available.

733 3.8 Design and Construction Constraints

734 In line with the 10.1.7 ATC system specification, the following approach will be used.

The System shall be designed as a modular and open architecture based on defined and established industry standards.

The software design shall adopt a hierarchy scheme in form of a set of application software layers that are at different abstraction levels.

It shall be possible to integrate further additional components that may be defined in subsequent development steps.

3.9 Functional block Interface Requirements

This section contains the specification of requirements for interfaces among different functional blocks.

In particular it contains system interface requirements distributed in Surveillance, Output and Input Interface requirements.

This section includes also HMI requirements which introduces high level specifications related to interface among MONA and CHMI functional blocks.

3.9.1 System Interface Requirements

The sections below present the interface requirements identified for the Monitoring Aid functional block.

3.9.1.1 Surveillance Interface Requirements

[REQ]

Identifier	REQ-10.04.02-TS-0001.0320
Requirement	The Conformance Monitoring shall process Track Information; received Track Information has to be QNH corrected in order to be compared with vertical clearances
Title	Processing of track information
Status	<Validated >
Rationale	The minimum surveillance information used for each received track by Conformance Monitoring are Track position (Latitude/longitude, Altitude) Track associated time: last update The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.2005	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0001	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0006	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0007	<Partial >
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

3.9.1.2 Output Interface Requirements

[REQ]

Identifier	REQ-10.04.02-TS-0001.0330
Requirement	The Conformance Monitoring shall at least produce the following Deviation Detection data items in case of a non-conformance warning: • Type of non-conformance • Non-conformance measure • Time of non-conformance
Title	Data items from a non-conformance warning
Status	<Validated >
Rationale	Type of non-conformance (e.g. lateral conformance, vertical rate conformance), Non-Conformance Measure (e.g. lateral left deviation, lateral right deviation), Time of non-conformance (when the non-conformance starts) The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1190	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1150	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0002	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0003	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

760
761 [REQ]

Identifier	REQ-10.04.02-TS-0001.0340
Requirement	Upon detection of a NoTT Deviation, a Route Deviation, a Speed Deviation, a CFL Deviation, a Vertical Deviation or a Level Bust Deviation for a flight, Conformance Monitoring shall report the deviation detected in order to trigger the deviation trajectory calculation for the flight.
Title	Conditions for Deviation Trajectory calculation trigger
Status	<Validated >
Rationale	Any deviation will trigger the Deviation Trajectory instead the Tactical Trajectory calculation. This trigger will include whose deviations are detected in order to be applied in the deviation trajectory calculation. The requirement has been validated in EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

762
763 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1120	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1130	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1140	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1150	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1160	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1170	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR2.1140	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1150	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1160	<Full >
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0003	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

764
765 [REQ]

Identifier	REQ-10.04.02-TS-0001.0341
Requirement	If all deviations for a flight are removed, the Conformance Monitoring shall report the absence of deviations to the TP&M for triggering the tactical trajectory calculation for the flight.
Title	Tactical Trajectory Calculation Trigger due to absence of deviation
Status	<Validated >
Rationale	Conformance monitoring will report the absence of vertical and/or lateral deviation (both or any of them) to TP&M in order to calculate the tactical trajectory. The requirement has been validated in EXE-04.07.02-VP-501 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

766

767 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1180	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1160	<Full >
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

768

769 ### 3.9.1.3 Input Interface Requirements

770

771 [REQ]

Identifier	REQ-10.04.02-TS-0001.0310
Requirement	The Conformance Monitoring shall receive and use the planned trajectory (and every update of it) and controller clearances data for a flight as long as a system flight plan is available.
Title	Processing of planned trajectory and controller clearances data
Status	<Validated >
Rationale	The trajectory information used by Conformance Monitoring is implementation detail. For example list of points with: ▪ Latitude/Longitude ▪ Level ▪ Time ▪ Velocity: horizontal, vertical ▪ Associated constraints, if any The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

772

773 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2004	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2023	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1200	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR2.1140	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1140	<Full >
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0004	<Full >
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0005	<Full >
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

774

775 [REQ]

Identifier	REQ-10.04.02-TS-0001.0350
Requirement	The Conformance Monitoring shall accept vertical and lateral threshold values.

Title	Threshold inputs.
Status	<Validated >
Rationale	Vertical and lateral threshold represents threshold inputs taken into account to compute deviation The requirement has been validated in EXE-04.07.02-VP-501, EXE-04.07.02-VP-741 and EXE-04.03-VP-798.
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

776

777 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3021	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

778

779 [REQ]

Identifier	REQ-10.04.02-TS-0001.0360
Requirement	The Conformance Monitoring shall accept acknowledgements from the HMI in response to deviation detections.
Title	Acknowledgement inputs.
Status	<In Progress>
Rationale	Acknowledgments from HMI will allow to give an indication that a kind of response has been given to a detected deviation. Implementation not requested in any validation exercise supported by P10.04.02
Category	<Functional>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

780

781 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0005	<Partial>
<ALLOCATED_TO>	<Functional block>	Monitoring Aids (MONA)	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

782

783 3.9.2 HMI Requirements

784 This section shows general HMI requirements related with MONitoring Aids which have been
785 identified.

786 [REQ]

Identifier	REQ-10.04.02-TS-0002.0240
Requirement	The CWP shall allow the controller to assign a new route or heading with which the system track is in conformance in order to remove the deviation

	warning for a flight in lateral deviation
Title	Lateral deviation warning removal
Status	<Validated >
Rationale	Related to REQ-10.04.02-TS-0001.0050. If a flight in lateral deviation becomes in conformance with a new route assignment, the lateral deviation warning shall be removed by the conformance monitoring system (and, consequently, not displayed anymore). The requirement has been validated in EXE-04.07.02-VP-741.
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

787

788 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1140	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1150	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0005	<Partial>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

789
790
791 [REQ]

Identifier	REQ-10.04.02-TS-0002.0250
Requirement	The CWP shall display a warning to the exit and entry sector of a flight when a coordination failure is detected.
Title	Display of an Entry/Exit coordination failure
Status	<Validated >
Rationale	Related to REQ-10.04.02-TS-0001.0175. The entry/exit coordination failure warning will have to be distributed and displayed to the CWP associated to the interested entry/exit sectors. The requirement has been validated in EXE-04.07.02-VP-741.
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

792
793 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR2.1240	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR2.1250	<Full>
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

794
795
796 [REQ]

Identifier	REQ-10.04.02-TS-0002.0260
Requirement	The CWP shall allow the Controller to acknowledge in response to deviation detections.
Title	Controller acknowledge to deviations
Status	<In Progress>

Rationale	Acknowledgments from HMI will allow to give an indication that a kind of response has been given to a detected deviation. Related to REQ-10.04.02-TS-0001.0360. Implementation not requested in any validation exercise supported by P10.04.02
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

797
798 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0005	<Partial>
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER ATC 157	<Full>
<ALLOCATED TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A
<APPLIES TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES TO>	<Operational Focus Area>	OFA03.03.02	N/A

799
800
801 [REQ]

Identifier	REQ-10.04.02-TS-0002.0270
Requirement	The CWP shall display non-conformance warnings to the controller when deviations are detected.
Title	Display of the non-conformance warnings due to deviations
Status	<Validated >
Rationale	All detected deviations has to be available to be displayed, that does not necessarily mean that all detected deviations have to be displayed (they may be configured, adapted, or manually inhibited). Related to REQ-10.04.02-TS-0001.0180. The requirement has been validated in EXE-04.07.02-VP-741.
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

802
803 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1190	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0002	<Full>
<SATISFIES>	<Enabler>	ER ATC 91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<ALLOCATED TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED TO>	<Project>	10.04.02	N/A
<APPLIES TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

804
805
806 [REQ]

Identifier	REQ-10.04.02-TS-0002.0280
Requirement	The CWP shall display the type of deviation detected for a non-conformance warning.
Title	Display of the type of deviation in a non-conformance warning
Status	<Validated >
Rationale	The precise non-conformance warnings to be defined and the related HMI customizations are implementation dependent. Related to REQ-10.04.02-TS-0001.0190. The requirement has been validated in EXE-04.07.02-VP-741.
Category	<HMI>

Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

807
808 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1190	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1030	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0002	<Full>
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

809
810
811 [REQ]

Identifier	REQ-10.04.02-TS-0002.0290
Requirement	The CWP shall display a conformance monitoring warning until it is removed by the Conformance Monitoring Function.
Title	Display and remove the monitoring warning.
Status	<Validated >
Rationale	The non-conformance warning to be distributed, displayed and removed to the interested position sectors. Related to REQ-10.04.02-TS-0001.0230. The requirement has been validated in EXE-04.07.02-VP-741.
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

812
813 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0002	<Full>
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

814
815
816 [REQ]

Identifier	REQ-10.04.02-TS-0002.0310
Requirement	The CWP shall display non-conformance warnings to the controller when deviations are detected by the TC-Aid.
Title	Display of a warning if the TC-Aid detects deviations
Status	<In Progress>
Rationale	Warnings regarding deviations detected by the TC-Aid help to increase Controller awareness. Implementation not requested in any validation exercise supported by P10.04.02
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

817
818 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1190	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0002	<Full>
<SATISFIES>	<Enabler>	ER ATC 91	<Full>
<SATISFIES>	<Enabler>	ER ATC 157	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED TO>	<Project>	10.04.02	N/A
<APPLIES TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0002.0320
Requirement	The CWP shall remove the display of the warning to the controller if a deviation detected by the TC-Aid no longer exists
Title	Removal of the warning in case of a deviation no longer exists
Status	<In Progress>
Rationale	In order not to disturb the Controller with already not-existing deviations, warnings notifying them should be removed from the CWP. Implementation not requested in any validation exercise supported by P10.04.02
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR1.1210	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0002	<Full>
<SATISFIES>	<Enabler>	ER ATC 91	<Full>
<SATISFIES>	<Enabler>	ER ATC 157	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED TO>	<Project>	10.04.02	N/A
<APPLIES TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0002.0350
Requirement	The CWP shall display the following deviations between actual track data and controller clearance data: a) Route deviation (ROUTE); b) Vertical rate deviation (RATE); c) Cleared flight level deviation (CFL); d) No valid Flight Plan data
Title	Display deviations between actual track and controller clearance.
Status	<Validated >
Rationale	The controller should be aware of the deviations above described detected between the radar track and its clearances. The requirement has been validated in EXE-04.07.02-VP-741.
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1150	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-INTEROP-0030.0003	<Partial>

<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0002.0360
Requirement	The CWP shall display deviation warnings for aircraft depending on sector frequency status and actual position.
Title	Display of deviation warnings based on frequency and actual position
Status	<In Progress>
Rationale	Controller has to be informed with warnings about the deviations that occur if the flight is under control of the ATSU and the position of the flight to avoid overlapping with other sectors CWPs. Implementation not requested in any validation exercise supported by P10.04.02
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3019	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1040	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-SPR-CDR2.1090	<Partial >
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0002.0370
Requirement	The CWP shall display a warning to the controller when any deviation from coordination conditions detected by the PC-Aid
Title	Display of a warning when PC-Aid detects deviations from coordination.
Status	<Validated >
Rationale	Controller should be alerted when deviations found by the PC-Aid in the coordination conditions, The requirement has been validated in EXE-04.07.02-VP-741.
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR2.1240	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-CDR2.1250	<Full>
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0002.0380
Requirement	The CWP shall display a warning after reception of Mode S DAP if a deviation is detected between controller clearance and Mode S DAP.
Title	Display of a warning if deviations between clearance and received Mode S DAP
Status	<Validated >
Rationale	Controller should be aware of the incongruence between different sources of information, including the clearances and the Mode S DAP. The requirement has been validated in EXE-04.07.02-VP-741.
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3026	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0002.0390
Requirement	The CWP shall display warning after a new controller clearance if a deviation is detected between controller clearance and Mode S DAP.
Title	Display of a warning if deviations between new clearance and Mode S DAP
Status	<Validated >
Rationale	Controller should be aware of the incongruence between different sources of information, including the clearances and the Mode S DAP. The requirement has been validated in EXE-04.07.02-VP-741.
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-OSED-0001.3026	<Full>
<SATISFIES>	<Enabler>	ER_ATC_91	<Full>
<SATISFIES>	<Enabler>	ER_ATC_157	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A

[REQ]

Identifier	REQ-10.04.02-TS-0003.0480
Requirement	The CWP shall display a deviation between cleared IAS and detected IAS.
Title	Display of a warning if deviations between cleared IAS and detected IAS
Status	<In Progress>
Rationale	Actual IAS will be provided by aircraft via ADS. Related to REQ-10.04.02-TS-0001.0430 Implementation not requested in any validation exercise supported by

	P10.04.02
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

852
853 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2022	<Partial>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

854
855 [REQ]

Identifier	REQ-10.04.02-TS-0003.0490
Requirement	The CWP shall display warning indicating minutes and Flight ID when there is a deviation between the future positions and the reference trajectory
Title	Display of a warning if deviations between the future positions and the reference trajectory
Status	<In Progress>
Rationale	It is expected that the conformance monitoring tool does not just compare present position against reference trajectory, but also future positions Related to REQ-10.04.02-TS-0001.0460 Implementation not requested in any validation exercise supported by P10.04.02
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

856
857 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2025	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2021	<Full>
<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

858
859 [REQ]

Identifier	REQ-10.04.02-TS-0003.0500
Requirement	The CWP shall display a warning when a CTA vs RTA deviation is detected
Title	Display of CTA vs RTA deviation warning
Status	<In Progress>
Rationale	The non-conformance warning is to be distributed, displayed and removed to the interested position sector. Related to REQ-10.04.02-TS-0003.0240 Implementation not requested in any validation exercise supported by P10.04.02
Category	<HMI>
Validation Method	<Live Trial> <Real Time Simulation>
Verification Method	<Test>

860
861 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<Enabler>	APP_ATC_94	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-05.07.02-OSED-MCMO.2019	<Partial>

<ALLOCATED_TO>	<Functional block>	Controller HMI Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.03.02	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A
<ALLOCATED_TO>	<Project>	10.04.02	N/A

4 References

[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] B.01.D84 - Integrated Roadmap DS16 Release Note, 00.01.00, 25/05/2016

[5] P10.04.02-D08, Conformance Monitoring System Requirements Phase 3, Edition 00.01.00

[6] P10.01.07-D120, Technical Architecture Description - Cycle 2015, Edition 00.01.00

[7] P04.07.02-D23, Final MTCD/TCT Safety and Performance Requirements_4, Edition 00.03.04

[8] P04.07.02-D28, OSED_4, Edition 00.04.00

[9] P04.07.02-D37, Free Route Operational Service and Environment Definition (OSED) for Step 1 - Iteration 2, Edition 00.02.00

[10]P04.07.02-D63, Free Route Safety and Performance Requirements (SPR) for Step 1, Edition 00.00.06

[11]P05.07.02-D77, Preliminary V2 OSED for Step 1, Edition 00.01.00

[12] P05.07.02-D78, Preliminary (V2) SPR for Step 1, Edition 00.01.00

[13] P05.07.02-D79, Preliminary (V2) INTEROP for Step 1, Edition 00.01.00

4.1 Use of copyright / patent material /classified material

No copyright material is being used as part of this specification.

4.1.1 Classified Material

No classified material is being used as part of this specification.

Appendix A Traceability of TS requirements with P04.07.02 OSED/SPR and P05.07.02 OSED/SPR/INTEROP

The following table depicts the traceability of TS requirements with P04.07.02 OSED (D28), P04.07.02 SPR (D23) and P05.07.02 OSED/SPR/INTEROP (D77,D78, D79). See References section for references details.

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
REQ-10.04.02-TS-0001.0010	Eligibility for conformance monitoring	MONA	REQ-04.07.02-OSED-0001.2005 REQ-04.07.02-SPR-CDR1.1200 REQ-05.07.02-OSED-MCMO.2003 REQ-05.07.02-OSED-MCMO.2004 REQ-05.07.02-OSED-MCMO.2010 REQ-05.07.02-OSED-MCMO.2002 REQ-05.07.02-OSED-MCMO.2011 REQ-05.07.02-SPR-CDR2.1020 REQ-05.07.02-INTEROP-0030.0001	Monitor input data Continuous monitoring CMON – Reference trajectory CMON – last clearance is part of reference trajectory CMON – direct to IAF – MSA CMON – ADS-B/C data CMON – SID below 120 m above DER – no notification Tactical Trajectory Deviation detects deviations Eligible FPs for CMON tool MONA in Free Routing Airspace Trajectory adherence monitoring in FRA

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			REQ-04.07.02-OSED-FR04.0250 REQ-04.07.02-SPR-FRTA.0101 REQ-04.07.02-SPR-FR00.0312 REQ-04.07.02-SPR-FRTA.1002 REQ-04.07.02-SPR-DR00.0310	Maximum frequency of occurrence of loss of route adherence monitoring tool in FRA Continuity of MONA tool for trajectory adherence monitoring in FRA Maximum frequency of occurrence of a loss of route adherence monitoring tool in direct routing environment
REQ-10.04.02-TS-0001.0022	Continuous monitoring of track data and clearance data	MONA	REQ-04.07.02-OSED-0001.2005 REQ-04.07.02-SPR-CDR1.1200 REQ-05.07.02-OSED-MCMO.2001 REQ-05.07.02-OSED-MCMO.2003	Monitor input data Continuous monitoring CMON – Radar data primary source CMON – Reference trajectory CMON – last clearance is part of

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			REQ-05.07.02-OSED-MCMO.2004 REQ-05.07.02-OSED-MCMO.2002 REQ-05.07.02-SPR-CDR2.1020 REQ-04.07.02-OSED-FR04.0250 REQ-04.07.02-SPR-FRTA.0101 REQ-04.07.02-SPR-FRTA.1002	reference trajectory CMON – ADS-B/C data Tactical Trajectory Deviation detects deviations MONA in Free Routing Airspace Trajectory adherence monitoring in FRA Continuity of MONA tool for trajectory adherence monitoring in FRA
REQ-10.04.02-TS-0001.0023	Conformance monitoring discarding due to NoTT deviation detection	MONA	REQ-04.07.02-OSED-0001.4037 REQ-04.07.02-OSED-0001.2004	Discard a route deviation Conditions for a lateral Deviation
REQ-10.04.02-TS-0001.0024	Vertical deviation when AFL is lower than the vertical constraint	MONA	REQ-05.07.02-OSED-MCMO.2010	CMON – direct to IAF - MSA

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
REQ-10.04.02-TS-0001.0026	Conformance Monitoring at or below 120 meters above DER	MONA	REQ-05.07.02-OSED-MCMO.2011	CMON – SID below 120 m above DER – no notification
REQ-10.04.02-TS-0001.0027	Conformance Monitoring warnings according to a dedicated vertical tolerance	MONA	REQ-05.07.02-OSED-MCMO.2012 REQ-05.07.02-OSED-MCMO.2013 REQ-05.07.02-OSED-MCMO.2014 REQ-05.07.02-OSED-MCMO.2015 REQ-05.07.02-OSED-MCMO.2016 REQ-05.07.02-OSED-MCMO.2017	CMON – SID 120 m above DER below MSA . at CMON – SID 120 m above DER below MSA . at or above CMON – SID 120 m above DER below MSA . at or below CMON – SID above MSA . at CMON – SID above MSA . at or above CMON – SID above MSA . at or above
REQ-10.04.02-TS-0001.0030	Route Deviation Detection for a flight plan	MONA	REQ-04.07.02-OSED-0001.3020 REQ-04.07.02-SPR-CDR1.1200 REQ-05.07.02-OSED-MCMO.2005 REQ-04.07.02-OSED-0001.2004	Detection of a route deviation Continuous monitoring CMON – Lateral deviation notification Conditions for a lateral Deviation

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			REQ-04.07.02-OSED-FR04.0250 REQ-04.07.02-SPR-FRTA.0101 REQ-04.07.02-SPR-FR00.0312 REQ-04.07.02-SPR-DR00.0310	MONA in Free Routing Airspace Trajectory adherence monitoring in FRA Maximum frequency of occurrence of loss of route adherence monitoring tool in FRA Maximum frequency of occurrence of a loss of route adherence monitoring tool in direct routing environment
REQ-10.04.02-TS-0001.0050	Removal of lateral deviation warning after new route assigned from the controller	MONA	REQ-04.07.02-SPR-CDR1.1210 REQ-05.07.02-OSED-MCMO.2005 REQ-04.07.02-OSED-FR04.0250 REQ-04.07.02-	Remove deviation tag CMON – Lateral deviation notification MONA in Free Routing Airspace Trajectory adherence monitoring in FRA

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			SPR-FRTA.0101	
REQ-10.04.02-TS-0001.0051	Route Deviation Removal	MONA	REQ-04.07.02-SPR-CDR1.1210 REQ-05.07.02-OSED-MCMO.2005 REQ-04.07.02-OSED-0001.2004 REQ-04.07.02-OSED-FR04.0250 REQ-04.07.02-SPR-FRTA.0101 REQ-04.07.02-SPR-FR00.0312 REQ-04.07.02-SPR-FRTA.1002	Remove deviation tag CMON – Lateral deviation notification Conditions for a lateral Deviation MONA in Free Routing Airspace Trajectory adherence monitoring in FRA Maximum frequency of occurrence of loss of route adherence monitoring tool in FRA Continuity of MONA tool for trajectory adherence monitoring in FRA Maximum frequency of occurrence of a loss of route adherence monitoring tool in direct routing environment

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			REQ-04.07.02-SPR-DR00.0310	
REQ-10.04.02-TS-0001.0450	Lateral tolerance considering PBN	MONA	REQ-05.07.02-OSED-MCMO.2018 REQ-05.07.02-OSED-MCMO.2024	CMON –lateral 2 sigma CMON – Lateral tolerance considering PBN
REQ-10.04.02-TS-0001.0141	Vertical Rate Deviation Detection	MONA	REQ-04.07.02-OSED-0001.3021 REQ-05.07.02-OSED-MCMO.2006 REQ-04.07.02-OSED-0001.3126	Detection of a cleared rate deviation CMON – vertical deviation notification Conditions for a vertical Deviation
REQ-10.04.02-TS-0001.0142	Vertical Rate Deviation removal due to flight.	MONA	REQ-04.07.02-SPR-CDR1.1210 REQ-05.07.02-OSED-MCMO.2006 REQ-04.07.02-OSED-0001.3126	Remove deviation tag CMON – vertical deviation notification Conditions for a vertical Deviation
REQ-10.04.02-TS-0001.0151	CFL Deviation Detection for CFL Reached	MONA	REQ-04.07.02-OSED-0001.3022 REQ-05.07.02-OSED-MCMO.2006 REQ-04.07.02-OSED-0001.3126	Detection of a CFL deviation CMON – vertical deviation notification Conditions for a vertical Deviation
REQ-10.04.02-TS-0001.0152	CFL Deviation Detection for CFL Not Reached	MONA	REQ-04.07.02-OSED-0001.3022 REQ-05.07.02-OSED-MCMO.2006	Detection of a CFL deviation CMON – vertical deviation notification

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			REQ-04.07.02-OSED-0001.3126	Conditions for a vertical Deviation
REQ-10.04.02-TS-0001.0153	CFL Deviation removal due to flight return to cleared level.	MONA	REQ-04.07.02-SPR-CDR1.1210 REQ-05.07.02-OSED-MCMO.2006 REQ-04.07.02-OSED-0001.3126	Remove deviation tag CMON – vertical deviation notification Conditions for a vertical Deviation
REQ-10.04.02-TS-0001.0161	Mode S Selected Altitude Deviation Detection with clearance latency	MONA	REQ-04.07.02-OSED-0001.3026 REQ-04.07.02-SPR-CDR1.1220	Adherence of downlink parameters to clearances Mode S parameters
REQ-10.04.02-TS-0001.0163	Mode S Selected Altitude Deviation removal	MONA	REQ-04.07.02-OSED-0001.3026 REQ-04.07.02-SPR-CDR1.1210	Adherence of downlink parameters to clearances Remove deviation tag
REQ-10.04.02-TS-0001.0165	Mode S Selected Altitude Deviation Detection with pilot latency.	MONA	REQ-04.07.02-OSED-0001.3026 REQ-04.07.02-SPR-CDR1.1220	Adherence of downlink parameters to clearances Mode S parameters
REQ-10.04.02-TS-0001.0181	Level Bust Deviation Detection	MONA	REQ-04.07.02-OSED-0001.3023 REQ-05.07.02-OSED-MCMO.2006 REQ-04.07.02-OSED-0001.3126	Detection of a Level Bust CMON – vertical deviation notification Conditions for a vertical Deviation
REQ-10.04.02-TS-	Level Bust Deviation removal due to vertical	MONA	REQ-04.07.02-SPR-CDR1.1210	Remove deviation tag CMON – vertical

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
0001.0182	rate correction.		REQ-05.07.02-OSED-MCMO.2006 REQ-04.07.02-OSED-0001.3126	deviation notification Conditions for a vertical Deviation
REQ-10.04.02-TS-0001.0191	NoTT Deviation Detection	MONA	REQ-04.07.02-OSED-0001.3024 REQ-04.07.02-OSED-0001.2004	Detection of unavailability of a Flight Plan Conditions for a lateral Deviation
REQ-10.04.02-TS-0001.0194	NoTT Deviation removal	MONA	REQ-04.07.02-SPR-CDR1.1210	Remove deviation tag
REQ-10.04.02-TS-0001.0170	Coordination conditions failure warning	MONA	REQ-04.07.02-OSED-0002.4017 REQ-04.07.02-OSED-0002.3053 REQ-04.07.02-SPR-CDR2.1240 REQ-04.07.02-OSED-0002.2014	Detection of deviations from entry/exit conditions Monitoring of deviations wrt the entry/exit conditions Deviating from the flight level constraint Monitoring of achievable entry/exit conditions
REQ-10.04.02-TS-0001.0175	Entry/Exit coordination failure	MONA/HMI	REQ-04.07.02-OSED-0002.4017 REQ-04.07.02-OSED-0002.3053 REQ-04.07.02-SPR-CDR2.1240 REQ-04.07.02-SPR-CDR2.1250	Detection of deviations from entry/exit conditions Monitoring of deviations wrt the entry/exit conditions Deviating from the flight level constraint Spurious alerts Monitoring of

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			REQ-04.07.02-OSED-0002.2014	achievable entry/exit conditions
REQ-10.04.02-TS-0001.0400	STAR constraint at or above	MONA	REQ-05.07.02-OSED-MCMO.2007 REQ-05.07.02-OSED-MCMO.2008 REQ-05.07.02-OSED-MCMO.2009	CMON – STAR constraint at or above CMON – STAR constraint at CMON – STAR constraint at or below
REQ-10.04.02-TS-0001.0410	CTA vs RTA deviation	MONA	REQ-05.07.02-OSED-MCMO.2019 REQ-05.07.02-OSED-MCMO.2020 REQ-04.07.02-OSED-0003.2031	CMON – CTA vs RTA deviation CMON – time tolerance Warning on false CTO implementation
REQ-10.04.02-TS-0001.0430	Actual IAS vs Cleared IAS deviation	MONA	REQ-05.07.02-OSED-MCMO.2022	CMON – Actual IAS vs Cleared IAS deviation
REQ-10.04.02-TS-0001.0460	Aircraft Derived Data or EPP usage	MONA	REQ-05.07.02-OSED-MCMO.2025 REQ-05.07.02-OSED-MCMO.2021	CMON – Aircraft Derived Data or EPP usage CMON – ATA vs ETA deviation
REQ-10.04.02-TS-0001.0470	Conformance monitoring capacity	MONA	REQ-05.07.02-SPR-CDR1.3020	Minimum flight plans
REQ-10.04.02-TS-0001.0320	Processing of track information	MONA	REQ-04.07.02-OSED-0001.2005 REQ-05.07.02-OSED-MCMO.2001 REQ-05.07.02-INTEROP-0030.0001 REQ-05.07.02-INTEROP-0030.0006	Monitor input data CMON – Radar data primary source Eligible FPs for CMON tool Interoperability of Conformance Monitoring with Surveillance data Interoperability of

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			REQ-05.07.02-INTEROP-0030.0007	Conformance Monitoring with data entered by the ATC Operational Supervisor
REQ-10.04.02-TS-0001.0330	Data items from a non-conformance warning	MONA	REQ-04.07.02-SPR-CDR1.1190 REQ-05.07.02-SPR-CDR2.1150 REQ-05.07.02-INTEROP-0030.0002 REQ-05.07.02-INTEROP-0030.0003	HMI alert Tactical Trajectory Deviation provides details about deviation Interoperability between Conformance Monitoring & the Controller. Interoperability between Conformance Monitoring & the Trajectory Prediction Service (Deviation Trajectory Request)

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
REQ-10.04.02-TS-0001.0340	Conditions for Deviation Trajectory calculation trigger	MONA	REQ-04.07.02-OSED-0001.2004 REQ-04.07.02-OSED-0001.3010 REQ-04.07.02-OSED-0001.3011 REQ-04.07.02-SPR-CDR1.1120 REQ-04.07.02-SPR-CDR1.1130 REQ-04.07.02-SPR-CDR1.1140 REQ-04.07.02-SPR-CDR1.1150 REQ-04.07.02-SPR-CDR1.1160 REQ-04.07.02-SPR-CDR1.1170 REQ-05.07.02-SPR-CDR2.1150 REQ-05.07.02-SPR-CDR2.1160	Conditions for a Deviation Trajectory Predict the lateral trajectory after a lateral deviation Predict the vertical trajectory after a rate deviation Route deviation Lateral deviation Vertical rate deviation CFL deviation Speed deviation No valid flight plan data Tactical Trajectory Deviation provides details about deviation Alternative Trajectory Assessment info from Trajectory Deviation Interoperability between Conformance Monitoring & the Trajectory Prediction Service (Deviation Trajectory Request)

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			REQ-05.07.02-INTEROP-0030.0003	
REQ-10.04.02-TS-0001.0341	Tactical Trajectory Calculation Trigger due to absence of deviation	MONA	REQ-04.07.02-OSED-0001.3093 REQ-04.07.02-SPR-CDR1.1180 REQ-05.07.02-SPR-CDR2.1160	Conditions to predict the lateral trajectory Tactical and deviation trajectories Alternative Trajectory Assessment info from Trajectory Deviation
REQ-10.04.02-TS-0001.0350	Threshold inputs.	MONA	REQ-04.07.02-OSED-0001.3020 REQ-04.07.02-OSED-0001.3021	Detection of a route deviation Detection of a cleared rate deviation
REQ-10.04.02-TS-0001.0310	Processing of planned trajectory and controller clearances data	MONA	REQ-04.07.02-OSED-0001.2005 REQ-04.07.02-SPR-CDR1.1200 REQ-05.07.02-SPR-CDR2.1140 REQ-05.07.02-OSED-MCMO.2004 REQ-05.07.02-OSED-MCMO.2023 REQ-05.07.02-SPR-CDR2.1140 REQ-05.07.02-INTEROP-0030.0001 REQ-05.07.02-	Monitor input data Continuous monitoring CMON – last clearance is part of reference trajectory CMON – Path terminators compatibility Tactical Trajectory Deviation updated with new trajectory Eligible FPs for CMON tool Interoperability between Conformance

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			INTEROP-0030.0004 REQ-05.07.02-INTEROP-0030.0005	Monitoring & the Trajectory Prediction Service (Trajectory Data) Interoperability of Conformance Monitoring with Flight Data
REQ-10.04.02-TS-0001.0360	Acknowledgement inputs.	MONA/HMI	REQ-05.07.02-INTEROP-0030.0005	Interoperability of Conformance Monitoring with Flight Data
REQ-10.04.02-TS-0001.0180	Displaying availability of non-conformance warnings.	MONA/HMI	REQ-04.07.02-OSED-0001.3019 REQ-04.07.02-SPR-CDR1.1190 REQ-05.07.02-OSED-MCMO.2005 REQ-05.07.02-OSED-MCMO.2006	Conditions for displaying a deviation warning HMI alert CMON – Lateral deviation notification CMON – vertical deviation notification
REQ-10.04.02-TS-0001.0190	Availability of type of trajectory deviation for non-conformance warning.	MONA/HMI	REQ-04.07.02-OSED-0001.3019 REQ-04.07.02-SPR-CDR1.1190	Conditions for displaying a deviation warning HMI alert
REQ-10.04.02-TS-0001.0230	Presentation and removal of conformance warning	MONA/HMI	REQ-04.07.02-OSED-0001.3019 REQ-04.07.02-SPR-CDR1.1210 REQ-05.07.02-OSED-MCMO.2005 REQ-05.07.02-OSED-MCMO.2006	Conditions for displaying a deviation warning Remove deviation tag CMON – Lateral deviation notification CMON – vertical deviation notification

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
REQ-10.04.02-TS-0003.0240	Presentation of CTA vs RTA deviation	MONA	REQ-05.07.02-OSED-MCMO.2019 REQ-04.07.02-OSED-0003.2031	CMON – CTA vs RTA deviation Warning on false CTO implementation
REQ-10.04.02-TS-0002.0100	Acceptability of Loss of TC-Aid	MONA	REQ-04.07.02-SPR-CDR1.2030	Loss of TC Aid
REQ-10.04.02-TS-0002.0200	Acceptability of Delay of TC-Aid	MONA	REQ-04.07.02-SPR-CDR1.2070	Delay of TC Aid
REQ-10.04.02-TS-0002.0300	Acceptability of Corruption (Undetected) of TC-Aid	MONA	REQ-04.07.02-SPR-CDR1.2110	Corruption of TC Aid
REQ-10.04.02-TS-0002.0400	Acceptability of Corruption (Detected) of TC-Aid	MONA	REQ-04.07.02-SPR-CDR1.2140	Corruption of TC Aid
REQ-10.04.02-TS-0002.0240 (10.10.02 contribution)	Controller removing the lateral deviation warning when assessed.	MONA/HMI	REQ-04.07.02-SPR-CDR1.1210 REQ-05.07.02-SPR-CDR2.1140 REQ-05.07.02-SPR-CDR2.1150 REQ-05.07.02-INTEROP-0030.0005	Remove deviation tag Tactical Trajectory Deviation updated with new trajectory Tactical Trajectory Deviation provides details about deviation Interoperability of Conformance Monitoring with Flight Data
REQ-10.04.02-TS-0002.0250 (10.10.02 contribution)	Display of an Entry/Exit coordination failure	MONA/HMI	REQ-04.07.02-OSED-0002.4017 REQ-04.07.02-	Detection of deviations from entry/exit conditions Monitoring of deviations wrt the entry/exit conditions

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			OSED-0002.3053 REQ-04.07.02-SPR-CDR2.1240 REQ-04.07.02-SPR-CDR2.1250 REQ-05.07.02-SPR-CDR2.1150 REQ-04.07.02-OSED-0002.2014	Deviating from the flight level constraint Spurious alerts Tactical Trajectory Deviation provides details about deviation Monitoring of achievable entry/exit conditions
REQ-10.04.02-TS-0002.0260 (10.10.02 contribution)	Controller acknowledge to deviations	MONA/HMI	REQ-05.07.02-INTEROP-0030.0005	Interoperability of Conformance Monitoring with Flight Data
REQ-10.04.02-TS-0002.0270 (10.10.02 contribution)	Display of the non-conformance warnings due to deviations	MONA/HMI	REQ-04.07.02-OSED-0001.3019 REQ-04.07.02-SPR-CDR1.1190 REQ-05.07.02-SPR-CDR2.1030 REQ-05.07.02-INTEROP-0030.0002	Conditions for displaying a deviation warning HMI alert Tactical Trajectory Deviation shows deviation alerts Interoperability between Conformance Monitoring & the Controller.
REQ-10.04.02-TS-0002.0280	Display of the type of deviation in a non-conformance	MONA/HMI	REQ-04.07.02-OSED-0001.3019	Conditions for displaying a deviation warning

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
(10.10.02 contribution)	warning		REQ-04.07.02-SPR-CDR1.1190 REQ-05.07.02-SPR-CDR2.1030 REQ-05.07.02-INTEROP-0030.0002	HMI alert Tactical Trajectory Deviation shows deviation alerts Interoperability between Conformance Monitoring & the Controller.
REQ-10.04.02-TS-0002.0290 (10.10.02 contribution)	Display and remove the monitoring warning.	MONA/HMI	REQ-04.07.02-OSED-0001.3019 REQ-04.07.02-SPR-CDR1.1210 REQ-05.07.02-SPR-CDR2.1030 REQ-05.07.02-INTEROP-0030.0002	Conditions for displaying a deviation warning Remove deviation tag Tactical Trajectory Deviation shows deviation alerts Interoperability between Conformance Monitoring & the Controller.
REQ-10.04.02-TS-0002.0310 (10.10.02 contribution)	Display of a warning if the TC-Aid detects deviations	MONA/HMI	REQ-04.07.02-SPR-CDR1.1190 REQ-05.07.02-SPR-CDR2.1030 REQ-05.07.02-INTEROP-0030.0002	HMI alert Tactical Trajectory Deviation shows deviation alerts Interoperability between Conformance Monitoring & the Controller.
REQ-10.04.02-TS-0002.0320 (10.10.02 contribution)	Removal of the warning in case of a deviation no longer exists	MONA/HMI	REQ-04.07.02-SPR-CDR1.1210 REQ-05.07.02-SPR-CDR2.1030	Remove deviation tag Tactical Trajectory Deviation shows deviation alerts Interoperability between Conformance Monitoring & the Controller.

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
			REQ-05.07.02-INTEROP-0030.0002	
REQ-10.04.02-TS-0002.0350 (10.10.02 contribution)	Display deviations between actual track and controller clearance.	MONA/HMI	REQ-05.07.02-INTEROP-0030.0003	Interoperability between Conformance Monitoring & the Trajectory Prediction Service (Deviation Trajectory Request)
REQ-10.04.02-TS-0002.0360 (10.10.02 contribution)	Display of deviation warnings based on frequency and actual position	MONA/HMI	REQ-04.07.02-OSED-0001.3019 REQ-05.07.02-SPR-CDR2.1040 REQ-05.07.02-SPR-CDR2.1090	Conditions for displaying a deviation warning Tactical Trajectory Deviation Detection notifies only certain deviations Tactical Trajectory Deviation reflects sectors
REQ-10.04.02-TS-0002.0370 (10.10.02 contribution)	Display of a warning when PC-Aid detects deviations from coordination.	MONA/HMI	REQ-04.07.02-OSED-0002.4017 REQ-04.07.02-SPR-CDR2.1240 REQ-04.07.02-SPR-CDR2.1250	Detection of deviations from entry/exit conditions Deviating from the flight level constraint Spurious alerts
REQ-10.04.02-TS-0002.0380 (10.10.02 contribution)	Display of a warning if deviations between clearance and received Mode S DAP	MONA/HMI	REQ-04.07.02-OSED-0001.3026	Adherence of downlink parameters to clearances
REQ-10.04.02-TS-0002.0390 (10.10.02 contribution)	Display of a warning if deviations between new clearance and Mode S DAP	MONA/HMI	REQ-04.07.02-OSED-0001.3026	Adherence of downlink parameters to clearances
REQ-10.04.02-TS-0003.0480 (10.10.02 contribution)	Display of a warning if deviations between cleared IAS and detected IAS	MONA/HMI	REQ-05.07.02-OSED-MCMO.2022	CMON – Actual IAS vs Cleared IAS deviation

TS Requirement			Related requirement	
Identifier	Title	Subsystem element that the requirement is allocated to	Identifier	Title
REQ-10.04.02-TS-0003.0490 (10.10.02 contribution)	Display of a warning if deviations between the future positions and the reference trajectory	MONA/HMI	REQ-05.07.02-OSED-MCMO.2025 REQ-05.07.02-OSED-MCMO.2021	CMON – Aircraft Derived Data or EPP usage CMON – ATA vs ETA deviation
REQ-10.04.02-TS-0003.0500 (10.10.02 contribution)	Display of CTA vs RTA deviation warning	MONA/HMI	REQ-05.07.02-OSED-MCMO.2019	CMON – CTA vs RTA deviation
REQ-10.04.02-TS-0002.0500	Frequency of detected corruption of input data	MONA	REQ-05.07.02-SPR-CDR1.2030 REQ-05.07.02-SPR-CDR1.2080	Detected corruption of the new trajectory Corrupted data in the deviation trajectory function
REQ-10.04.02-TS-0002.0600	Frequency of undetected corruption of input data	MONA	REQ-05.07.02-SPR-CDR1.2030 REQ-05.07.02-SPR-CDR1.2080	Detected corruption of the new trajectory Corrupted data in the deviation trajectory function

893 **Table 4: TS requirements traceability**
894

Appendix B Subset of TS requirements linked to HMI functional block

The following table depicts a subset of TS requirements linked to HMI functional block.

Identifier	Title	TS requirements written in close collaboration with P10.10.02 project
REQ-10.04.02-TS-0001.0175	Entry/Exit coordination failure	No
REQ-10.04.02-TS-0001.0360	Acknowledgement inputs.	No
REQ-10.04.02-TS-0001.0180	Displaying availability of non-conformance warnings.	No
REQ-10.04.02-TS-0001.0190	Availability of type of trajectory deviation for non-conformance warning.	No
REQ-10.04.02-TS-0001.0230	Presentation and removal of conformance warning	No
REQ-10.04.02-TS-0002.0240	Controller removing the lateral deviation warning when assessed.	Yes
REQ-10.04.02-TS-0002.0250	Display of an Entry/Exit coordination failure	Yes
REQ-10.04.02-TS-0002.0260	Controller acknowledge to deviations	Yes
REQ-10.04.02-TS-0002.0270	Display of the non-conformance warnings due to deviations	Yes
REQ-10.04.02-TS-0002.0280	Display of the type of deviation in a non-conformance warning	Yes
REQ-10.04.02-TS-0002.0290	Display and remove the monitoring warning.	Yes
REQ-10.04.02-TS-0002.0310	Display of a warning if the TC-Aid detects deviations	Yes
REQ-10.04.02-TS-0002.0320	Removal of the warning in case of a deviation no longer exists	Yes
REQ-10.04.02-TS-0002.0350	Display deviations between actual track and controller clearance.	Yes

Identifier	Title	TS requirements written in close collaboration with P10.10.02 project
REQ-10.04.02-TS-0002.0360	Display of deviation warnings based on frequency and actual position	Yes
REQ-10.04.02-TS-0002.0370	Display of a warning when PC-Aid detects deviations from coordination	Yes
REQ-10.04.02-TS-0002.0380	Display of a warning if deviations between clearance and received Mode S DAP	Yes
REQ-10.04.02-TS-0002.0390	Display of a warning if deviations between new clearance and Mode S DAP	Yes
REQ-10.04.02-TS-0003.0480	Display of a warning if deviations between cleared IAS and detected IAS	Yes
REQ-10.04.02-TS-0003.0490	Display of a warning if deviations between the future positions and the reference trajectory	Yes
REQ-10.04.02-TS-0003.0500	Display of CTA vs RTA deviation warning	Yes

898 **Table 5: Subset of TS requirements linked to HMI functional block**
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Appendix C Subset of 04.07.02 OSED and SPR allocated to Functional Block MONA by P10.01.07

Subset of P04.07.02 OSED (D28) and SPR (D23) allocated to Functional Block MONA by P10.01.07 on D120 [6].

OSED Deliverable	OSED Requirement Identifier	OSED Requirement Title	OSED Requirement Text	Functional Block
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0001.2005	Monitor input data	The "TC aid" shall continuously monitor actual track data and controller clearance data.	MONA
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0001.3019	Conditions for displaying a deviation warning	The deviation warnings shall be displayed for aircraft depending on sector frequency status and actual position.	MONA
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0001.3020	Detection of a route deviation	The "TC aid" shall detect route deviations a) if the actual track position differs from the cleared flight path by more than a parameter, or b) if the actual track position is outside a radius around a waypoint.	MONA
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0001.3021	Detection of a cleared rate deviation	The "TC-aid" shall detect vertical rate deviations if a) no CFL deviation or a level bust is detected at the same time, and b) vertical latency time after a new vertical clearance has been entered, and c) the difference between AFL and CFL exceeds a threshold, and d) no minimum actual rate is detected into the direction of the CFL or the actual rate differs from the cleared vertical rate by more than a parameter	MONA
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0001.3022	Detection of a CFL deviation	The "TC aid" shall detect a Cleared Flight Level (CFL) deviation if the difference between AFL and CFL exceeds a threshold.	MONA
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0001.3023	Detection of a Level Bust	The "TC aid" shall detect a Level Bust if the actual vertical rate for climb and/or descent close to the CFL exceeds a threshold.	MONA
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0001.3024	Detection of unavailability of a Flight Plan	The "TC aid" shall detect a NoTT deviation if a) no valid flight plan data (route information) is available for a flight; b) the aircraft is beyond or before its cleared (filed) route.	MONA
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0001.4037	Discard a route deviation	The system shall discard a route deviation if a NoTT status has been detected.	MONA
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0001.3026	Adherence of downlink parameters to clearances	The "TC aid" shall detect deviations between controller clearance data and Mode S DAP.	MONA
04.07.02-OSED-D19-02.00.00-REQ	REQ-04.07.02-OSED-0002.4017	Detection of deviations from entry/exit conditions	The "PC aid" shall alert the controller to any deviations from coordination conditions.	MONA

Table 6: P04.07.02 OSED allocated to P10.04.02

906 Subset of P04.07.02 SPR (D23) allocated to Functional Block MONA proposed by P10.04.02
907 partners and confirmed by P10.01.07 and finally adjusted after deliverable D23.

SPR Requirement Identifier	SPR Requirement Title	SPR Requirement Text	Functional Block
REQ-04.07.02-SPR-CDR1.1120	Route deviation	The TC Aid shall create a deviation trajectory if Flight Path Monitoring detects a Route deviation.	MONA
REQ-04.07.02-SPR-CDR1.1130	Lateral deviation	The TC Aid shall create a deviation trajectory if Flight Path Monitoring detects a Lateral deviation.	MONA
REQ-04.07.02-SPR-CDR1.1140	Vertical rate deviation	The TC Aid shall create a deviation trajectory if Flight Path Monitoring detects a Vertical Rate Deviation.	MONA
REQ-04.07.02-SPR-CDR1.1150	CFL deviation	The TC Aid shall create a deviation trajectory if Flight Path Monitoring detects a CFL deviation.	MONA
REQ-04.07.02-SPR-CDR1.1160	Speed deviation	The TC Aid shall create a deviation trajectory if Flight Path Monitoring detects a Speed Deviation.	MONA
REQ-04.07.02-SPR-CDR1.1170	No valid flight plan data	The TC Aid shall create a deviation trajectory if Flight Path Monitoring detects that there is no valid flight plan data available.	MONA
REQ-04.07.02-SPR-CDR1.1180	Tactical and deviation trajectories	The calculated trajectory shall be a Tactical Trajectory if valid flight plan data is available and if no deviation, as detected by Flight Path Monitoring occurred. Otherwise it is referred to as a deviation trajectory.	MONA
REQ-04.07.02-SPR-CDR1.1190	HMI alert	The TC Aid shall alert the controller to any deviations via HMI on the radar display.	MONA
REQ-04.07.02-SPR-CDR1.1200	Continuous monitoring	The TC Aid shall continuously monitor actual track data and controller clearance data.	MONA
REQ-04.07.02-SPR-CDR1.1210	Remove deviation tag	The TC Aid shall detect if a deviation no longer exists and remove the display of the alert to the controller.	MONA
REQ-04.07.02-SPR-CDR1.1220	Mode S parameters	The TC Aid shall detect deviations between controller clearance data and Mode S downlinked airborne parameters.	MONA
REQ-04.07.02-SPR-CDR1.2030	Loss of TC Aid	The probability of Loss of TC Aid shall be no more than 3.33E-07 per flight hour.	MONA
REQ-04.07.02-SPR-CDR1.2070	Delay of TC Aid	The probability of Delay of the TC Aid shall be no more than 3.33E-07 per flight hour.	MONA
REQ-04.07.02-SPR-CDR1.2110	Corruption of TC Aid (undetected)	The probability of Corruption (undetected) of the TC Aid shall be no more than 3.33E-07 per flight hour.	MONA

SPR Requirement Identifier	SPR Requirement Title	SPR Requirement Text	Functional Block
REQ-04.07.02-SPR-CDR1.2140	Corruption of TC Aid (detected)	The probability of Corruption (Detected) of the TC Aid shall be no more than 1.00E-05 per flight hour.	MONA
REQ-04.07.02-SPR-CDR2.1240	Deviating from the flight level constraint	The PC Aid shall alert the controller if the flight is deviating from the applied coordination constraints.	MONA
REQ-04.07.02-SPR-CDR2.1250	Spurious alerts	The deviation alerts associated with coordination constraints shall be triggered at times/events appropriate to the controller role.	MONA

908 **Table 7: P04.07.02 SPR allocated to P10.04.02**

Appendix D Subset of P05.07.02 OSED, SPR and INTEROP allocated to Functional Block MONA by P10.04.02 partners

Subset of P05.07.02 D77 Preliminary V2 OSED for Step 1 allocated to Functional Block MONA assumed by P10.04.02 partners .

OSED Identifier	OSED Title	OSED Requirement	Functional Block
REQ-05.07.02-OSED-MCMO.2001	CMON – Radar data primary source	Radar data shall be the primary source of information for obtaining aircraft current position for conformance monitoring purposes	MONA
REQ-05.07.02-OSED-MCMO.2003	CMON – Reference trajectory	For conformance monitoring purposes, the reference trajectory shall be the ground predicted trajectory	MONA
REQ-05.07.02-OSED-MCMO.2004	CMON – last clearance is part of reference trajectory	For conformance monitoring purposes, the ground predicted trajectory shall be updated continuously with the last clearance/instruction provided by ATC.	MONA
REQ-05.07.02-OSED-MCMO.2005	CMON – Lateral deviation notification	Conformance monitoring tool shall provide a lighting warning on the CWP when an aircraft is deviating its lateral navigation regarding ground predicted trajectory	MONA
REQ-05.07.02-OSED-MCMO.2006	CMON – vertical deviation notification	Conformance monitoring tool shall provide a lighting warning on the CWP when an aircraft does not meet the required vertical constraint regarding ground predicted trajectory	MONA
REQ-05.07.02-OSED-MCMO.2007	CMON – STAR constraint at or above	Flying a STAR, for conformance monitoring purposes, at a waypoint with a vertical constraint of “at or above”, the vertical tolerance for providing a warning shall be -150 ft	MONA
REQ-05.07.02-OSED-MCMO.2008	CMON – STAR constraint at	Flying a STAR, for conformance monitoring purposes, at a Waypoint with a vertical constraint of “at ”, the vertical tolerance for providing a warning shall be ± 150 ft.	MONA
REQ-05.07.02-OSED-MCMO.2009	CMON – STAR constraint at or below	Flying a STAR, for conformance monitoring purposes, at a Waypoint with a vertical constraint of “at or below”, the vertical tolerance for providing a warning shall be + 150 ft	MONA
REQ-05.07.02-OSED-MCMO.2010	CMON – direct to IAF - MSA	In arrival, when the aircraft is cleared “direct to IAF” out of a STAR., the vertical tolerance for providing a warning shall be - 150 ft of Minimum Sector Altitude.	MONA
REQ-05.07.02-OSED-MCMO.2011	CMON – SID below 120 m above DER – no notification	Flying a SID, for conformance monitoring purposes, a warning shall not be provided when aircraft is flying at or below 120 m above DER.	MONA

OSED Identifier	OSED Title	OSED Requirement	Functional Block
REQ-05.07.02-OSED-MCMO.2012	CMON – SID 120 m above DER below MSA . at	Flying a SID, for conformance monitoring purposes, when the aircraft is flying between 120 m height above DER and MSA, at a Waypoint with a vertical constraint of "at ", the vertical tolerance for providing a warning shall be ± 100 ft	MONA
REQ-05.07.02-OSED-MCMO.2013	CMON – SID 120 m above DER below MSA . at or above	Flying a SID, for conformance monitoring purposes, when the aircraft is flying between 120 m height above DER and MSA, at a Waypoint with a vertical constraint of "at or above", the vertical tolerance for providing a warning shall be - 100 ft.	MONA
REQ-05.07.02-OSED-MCMO.2014	CMON – SID 120 m above DER below MSA . at or below	Flying a SID, for conformance monitoring purposes, when the aircraft is flying between 120 m height above DER and MSA, at a Waypoint with a vertical constraint of "at or below ", the vertical tolerance for providing a warning shall be + 100 ft.	MONA
REQ-05.07.02-OSED-MCMO.2015	CMON – SID above MSA . at	Flying a SID, for conformance monitoring purposes, when the aircraft is flying above MSA, at a Waypoint with a vertical constraint of "at ", the vertical tolerance for providing a warning shall be ± 150 ft.	MONA
REQ-05.07.02-OSED-MCMO.2016	CMON – SID above MSA . at or above	Flying a SID, for conformance monitoring purposes, when the aircraft is flying above MSA, at a Waypoint with a vertical constraint of "at or above ", the vertical tolerance for providing a warning shall be - 150 ft.	MONA
REQ-05.07.02-OSED-MCMO.2017	CMON – SID above MSA . at or below	Flying a SID, for conformance monitoring purposes, when the aircraft is flying above MSA, at a Waypoint with a vertical constraint of "at or below", the vertical tolerance for providing a warning shall be + 150 ft.	MONA
REQ-05.07.02-OSED-MCMO.2018	CMON –lateral 2 sigma	For conformance monitoring purposes, the lateral tolerance for providing a warning shall be the accuracy of the PBN specification (±2σ)	MONA
REQ-05.07.02-OSED-MCMO.2019	CMON – CTA vs RTA deviation	Conformance monitoring tool will provide a lighting warning on the CWP when aircraft's CTA does not meet RTA over a particular waypoint	MONA
REQ-05.07.02-OSED-MCMO.2020	CMON – time tolerance	For conformance monitoring purposes, the time tolerance for providing a warning shall be ± X s.	MONA
REQ-05.07.02-OSED-MCMO.2022	CMON – Actual IAS vs Cleared IAS deviation	Conformance monitoring tool shall provide a lighting warning when actual IAS is different to cleared IAS	MONA
REQ-05.07.02-OSED-MCMO.2024	CMON – Lateral tolerance considering PBN	Lateral tolerance which is used for providing a warning by conformance monitoring tool shall be adaptable to PBN specification required for a particular PBN application.	MONA

OSED Identifier	OSED Title	OSED Requirement	Functional Block
REQ-05.07.02-OSED-MCMO.2025	CMON – Aircraft Derived Data or EPP usage	When the available information from aircraft allows, conformance monitoring tool shall provide a tabular warning indicating "in "xxx" minutes, "Flight ID" shall be deviated from latest clearance.	MONA

914 **Table 8: P05.07.02 OSED allocated to P10.04.02**

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916 Subset of P05.07.02 D78 Preliminary (V2) SPR for Step 1 allocated to Functional Block MONA
917 proposed by P10.04.02 partners.

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SPR Identifier	SPR Title	SPR Requirement	Functional Block
REQ-05.07.02-PR-xxxxxxxxxx		Minimum number of Flight Plans shall be 200	MONA
REQ-05.07.02-SPR-CDR2.1140		The PC Aid shall automatically coordinate flights into the sector without reference to the planner controller when the coordination passes the MTCD check.	MONA
REQ-05.07.02-SR_Hz27_2		The frequency of occurrence of detected corruption of input data from Trajectory Deviation Detection function shall not be greater than 0.4x10-7(/flt hr)	MONA
REQ-05.07.02-SR_Hz28_2		The frequency of occurrence of undetected corruption of input data from Trajectory Deviation Detection function shall not be greater than 0.4x10-7(/flt hr)	MONA

919 **Table 9: P05.07.02 SPR allocated to P10.04.02**

Appendix E Requirements traceability to SESAR solution

Solution	Linked SPR (from P04.07.02 D63, D37)	Linked TS
#32: Free route through the use of direct routing	REQ-04.07.02-SPR-DR00.0310 The frequency of occurrence of a loss of route adherence monitoring tool in direct routing environment shall not be greater than 2.00E-03 per sector operational hour	REQ-10.04.02-TS-0001.0051 REQ-10.04.02-TS-0001.0010 REQ-10.04.02-TS-0001.0030
#33: Free route through free routing for flights both in cruise and vertically evolving above a specified flight level	REQ-04.07.02-OSED-FR04.0250 In Free Routing Airspace, the ATCOs shall be supported by a MONA tool to monitor the route adherence	REQ-10.04.02-TS-0001.0051 REQ-10.04.02-TS-0001.0010 REQ-10.04.02-TS-0001.0022 REQ-10.04.02-TS-0001.0030 REQ-10.04.02-TS-0001.0050
	REQ-04.07.02-SPR-FRTA.0101 In Free Routing Airspace, the ATCOs shall be supported by a MONA tool to monitor the trajectory adherence	REQ-10.04.02-TS-0001.0051 REQ-10.04.02-TS-0001.0010 REQ-10.04.02-TS-0001.0022 REQ-10.04.02-TS-0001.0030 REQ-10.04.02-TS-0001.0050
	REQ-04.07.02-SPR-FR00.0312 The frequency of occurrence of loss of route adherence monitoring tool in FRA shall not be greater than 2.00E-03 per sector operational hour	REQ-10.04.02-TS-0001.0051 REQ-10.04.02-TS-0001.0010 REQ-10.04.02-TS-0001.0030
	REQ-04.07.02-SPR-FRTA.1002 In Free Routing Airspace, the MONA shall permanently and continuously check the flight adherence to the cleared trajectory	REQ-10.04.02-TS-0001.0051 REQ-10.04.02-TS-0001.0010 REQ-10.04.02-TS-0001.0022

Table 10 - Traceability to SESAR solutions #32 and #33

All the other requirements not listed in the table above are linked to the Solution #27 *Medium term conflict detection (MTCD) and conformance monitor tools.*

Appendix F Functional improvements on the top of FASTI baseline

Requirements described in this document has as a starting point the FASTI baseline, that was considered at the beginning of the SESAR program the state of the art for the Conformance monitoring functional block.

A description of the new functionalities and features of SESAR Conformance Monitoring as an improvement compared to FASTI and as contribution to Solution #27 are described in the following:

- **heading monitoring**: monitoring of lateral deviation while a heading clearance is provided; A new Alert (**CHAM**) is provided when the flight is not conforming the issued clearance;
- **rate monitoring**: rate change, using of actual vertical rates, is taken into account during an evolving phase when an aircraft is about to start its evolution or is about to reach its cleared FL. The main aim is to minimize false alert by getting a more realistic prediction;
- **Potential coordination failure monitoring;**
- Comparison of **Mode S DAP** with clearance input from controllers;
- Detection of **Level Bust**.

Furthermore, the combination and availability of the tactical decision support tools together with the conformance monitoring tool as a unique integrated system can also be considered as an innovation respect to the initial baseline, whose potential in terms of KPA has been validated in the related validation exercises.

953 **-END OF DOCUMENT-**

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