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SAFE

TRAFFIC ALERTS FOR PILOTS FOR AIRPORT OPERATIONS

This TS/IRS is part of a project that has received funding from the SESAR Joint Undertaking under grant agreement No 734139 under European Union's Horizon 2020 research and innovation programme.



Abstract

The aim of this document is to detail the Technical System Requirements (functional and non-functional) and the Interface(s) Related Requirements (IRS) specifying the development and the implementation of the Solution PJ03b-05 "Traffic alerts for pilots for airport operations", included in the SESAR project PJ03b "Safer Airports and Flights for Europe". This document also describes how this solution fits within the overall SESAR2020 programme architecture.

This document may be updated as a result of the different developments and validation activities in order to improve the specifications, considering that the final document will be part of the PJ03b-05 V3 Data Pack.

The aim of the Airport Surface Alerts function is to reduce the risk of conflict on the airport surface, both runways and taxiways, by alerting and indicating to the flight crew if the function detects a potential conflict with other traffic (at this stage, only aircraft are addressed, not ground vehicles). The alerts are based on traffic information provided by ADS-B and airport information provided by TAWS.

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1 Executive summary

The objective of this document is to gather the technical requirements used for the development of the platforms which will support the PJ03b-05 validation exercises. The information included in this document is the final V3 TS/IRS based on the Interim TS produced at the beginning of SESAR 2020 Wave 1 program and updated after prototype development and the operational validation performed in both Airbus and Honeywell RTS facilities.

This Technical Specification document considers the OSED/SPR/Interop from SESAR Solution PJ03b-05 as the main input.

This document collects the Technical Requirements divided in Functional and non-Functional Requirements to define and guide the development of the services included in the SESAR Solution PJ03b-05.

This Technical Specification includes a set of requirements as follows:

- Requirements common to all topics,
- For each topic, HMI, Functional, Performance and Safety requirements.

2 Introduction

2.1 Purpose of the document

This document is issued in the frame of project PJ03b-05 “Safer Airports and Flights for Europe” of the SESAR programme.

The objective of the Technical Specification is to identify the general, functional and non-functional requirements including the following topics:

- Environment/Operational Aspects
- HMI (High Level Requirements only as HMI depend on each cockpit philosophy),
- Safety,
- Performance,
- Traffic conflict coverage.

This document also deals with performances to be achieved and commonality/re-use conditions.

2.2 Scope

The scope of this document is the development of the technical requirements to satisfy the expectations of the functionalities described in the OSED/SPR/INTEROP.

The TS/IRS provides a definition of solution architecture and technical specifications with functional and non-functional requirements and implementation options.

2.3 Intended readership

This document is written and edited for the use by SESAR2020 PJ03b-05 partners.

- a) Internal to SESAR 2020 and Sol. PJ.03b-05:
 - a. The project members concerned by future function development and standardization,
 - b. Involved PCIT and EPMB members,
 - c. The P19 and P22 projects.
- b) External to SESAR
 - a. Avionics systems and subsystems designers,
 - b. Avionics equipment suppliers,
 - c. Airlines, Business Aviation, Flight Crew,
 - d. Air Traffic Centre, ATM designers and controllers.

2.4 Background

This TS version is the result of 2 phases of activities:

- Activities conducted in SESAR1 09.14 project where a Functional Requirements Document (FRD) and the Architecture Definition Assumptions (ADA) were produced for 2 groups of alerts for pilots during ground operations (Conformance Monitoring and Traffic Alerts on runway). During this phase, Traffic Alerts on Runway have been dealt with in a complete configuration derived from RTCA-323 based on the assumption of aircraft equipped with CDTI presenting ground traffic on an airport moving map. As this assumption is not widely shared by commercial aircraft, a new concept has been identified that consists in producing only alerts for an immediate reaction not needing to use a CDTI for analysing the situation. This 2nd operational concept was validated with end-users with a 1st function definition.
- Activities conducted in SESAR 2020 Wave 1 Pj03b-05 where the focus has been carried out on “traffic alerts for pilots” in the following 2 configurations (see details in §3.1):
 - On runway with the 2 implementations as identified in SESAR 1. It permitted to go further in depth of the definition by addressing more operational scenarios and complete the architecture.
 - On taxiways – this new function was not worked out in SESAR 1.

An interim version was proposed before the development phase (end of 2017) and validation exercises were performed. This document is the final version updated following the development of concerned prototypes and the validation activities as part of SESAR wave 1.

2.5 Structure of the document

This document includes:

- General description of the operational context (which is further described in the OSED)
- SESAR Solutions Impact on Architecture
- Technical Specifications
 - Functional architecture overview
 - Functional and non-Functional requirements for each function (runway and taxiway)
- Implementation Options
- Assumptions

2.6 Glossary of terms

Term	Definition	Source of the definition
Alerts	• Missed alert: a missed alert is an alert that is not raised when it should. • False alert = Spurious alert: a false alert is an alert raised when it should not, due to system failure. • Nuisance alert: a nuisance alert is an alert that is raised when it should not (inappropriate or unnecessary in the particular context), due to design error. • Erroneous alert: an alert that is generated but with the wrong type or message. • Late alert: an alert that is generated later than expected Time to Alert, but allowing still time to react efficiently (it becomes a missed alert after this time).	AMJ.25-1322
Alerts	Alerts are classified with the following 3 levels (criticality levels): • Level 1 or Advisory: For conditions that require flight crew awareness and may require subsequent flight crew response. • Level 2 or Caution: For conditions that require immediate flight crew awareness and subsequent flight crew response. • Level 3 or Warning: For conditions that require immediate flight crew awareness and immediate flight crew response.	CS.25-1322
Indications	Indications are used to identify to the flight crew a normal operational condition that could become a runway, traffic safety hazard. Indications do not actively attract attention from flight crews but provide enhanced situation relevant information to facilitate flight crew perception of potential safety hazards. Indications are not alerts.	DO-323
Shall	“SHALL” expresses a mandatory requirement.	

Should	“SHOULD” expresses firm recommendation.	
Traffic	At this step of the development of the Airport Surface Alerts function, “traffic” is used in this document only for aircraft other than ownship. It does not include helicopters or ground vehicles.	Assumption for this document
Relevant traffic	Traffic that is viewed from ownship’s current state is “relevant” (or Traffic Display Information level) if that traffic position, orientation, and movement leads or could potentially lead to a runway or taxiway collision or runway incursion within a foreseeable period of time.	DO-317 and DO-323
Relevant runway	When ownship is on ground, the Relevant Runway is the closest runway within a given distance (e.g. 300 meters) of ownship. When ownship is between parallel runways, the Relevant Runway is the runway in the direction of travel. If there is no runway within the given distance of ownship, there is no Relevant Runway. When ownship is in the air, the Relevant Runway is the runway to which the aircraft is on approach. If ownship is not on approach, there is no Relevant Runway.	DO-317
Relevant taxiways	During taxi phase, taxiways where the ownship is taxiing and intersecting taxiways where other aircraft are moving toward the ownship.	Extended definition by analogy with relevant runways

Table 1: Glossary

2.7 Acronyms and Terminology

To be completed

Term	Definition
ADD	Architecture Description Document
ADS-B	Automatic Dependent Surveillance – Broadcast
ADS-R	Automatic Dependent Surveillance – Rebroadcast
AMM	Airport Moving Map
AMU	Audio Monitoring Unit
AN	Availability Note
ATC	Air Traffic Control
ATCo	Air Traffic Controller
ATM	Air Traffic Management
ATM MP	Air Traffic Management Master Plan
ATS	Air Traffic Services
ATSA-SURF	Airborne Traffic Situational Awareness-SURFace
CC	Capability Configuration
CDTI	Cockpit Display of Traffic Information
EATMA	European ATM Architecture
E-ATMS	European Air Traffic Management System
EEIS	Enhanced Electronic Instrument System
EPMB	Extended Project Management Board
FAA	Federal Aviation Administration
FT	Flight Trials / Flight Tests
FTS	Fast Time Simulations
FWS	Flight Warning System

HMI	Human Machine Interface
ICAO	International Civil Aviation Organization
IER	Information Exchange Requirement
INTEROP	Interoperability Requirements
FAA	Federal Aviation Administration
IER	Information Exchange Requirement
INTEROP	Interoperability Requirements
IRS	Interface Requirements Specification
ISRM	Information Services Reference Model
KPA	Key Performance Area
KPI	Key Performance Indicator
LAHSO	Land And Hold Short Operations
LVC	Low Visibility Conditions
LVO	Low Visibility Operations
LVP	Low-Visibility Procedures
OI	Operational Improvement
PCIT	Project Content Integration Team
OSED	Operational Service and Environment Definition
PCIT	Project Content Integration Team
PIRM	Programme Information Reference Model
QoS	Quality of Service
REZ	Runway Engagement Zone
RTO	Rejected Take-Off
RTS	Real Time Simulation
RSI	Runway Status Indication
SDD	Service Description Document
SESAR	Single European Sky ATM Research Programme

SJU	SESAR Joint Undertaking
SoaML	Service Oriented Architecture Modelling Language
SPR	Safety and Performance Requirements
SURF-A	Runway Surface Alerts
SURF-ITA	Runway Surface Indications and Traffic Alerts
SUT	System Under Test
TAWS	Terrain Awareness and Warning System
TCAS	Traffic alert and Collision Avoidance System
TI	Traffic Indication
TIS-B	Traffic Information Services - Broadcast
TRL	Technology Readiness Level
TS	Technical Specification
TWY-A	Taxiway Surface Alerts
TWY-ITA	Taxiway Surface Indications and Traffic Alerts
UC	Use Case
UML	Unified Modelling Language
V&V	Validation and Verification
VALP	Validation Plan
VALR	Validation Report
VALS	Validation Strategy
VLD	Very Large Demonstrator / Demonstration
XSD	XML Schema Definition

Table 2: Acronyms and terminology

3 SESAR Solution Impacts on Architecture

3.1 Target Solution Architecture

3.1.1 SESAR Solution(s) Overview

SESAR Solution ID and Title	Functional Blocks/Role impacted by the SESAR Solution (from EATMA)	Enabler ID (from EATMA)	Enabler (from EATMA)	Title	Enabler coverage
PJ03b-05 Traffic Alerts for pilots for airport operations					•
	Traffic data management	A/C-48a	Air broadcast of aircraft position/vector (ADS-B OUT) compliant with DO260B		• Fully
	Traffic data management	A/C-67	ADS-B IN		• Fully
	HMI	A/C-24 Optional	Airport moving map and own aircraft position display in cockpit.		• Fully
	Traffic data management	A/C-48a	Air broadcast of aircraft position/vector (ADS-B OUT) compliant with DO260B		• Fully
	Traffic data management	A/C-25 Optional	Airborne Traffic Situational Awareness to support surface operations (ATSA-SURF), including reception (ADS-B		• Fully

			in), processing and display	
	ALL	A/C-43a2	Traffic Alerts for Pilots during Taxiway Operations	• Fully

Table 3: SESAR Solution Scope and related Functional Blocks/roles & Enablers

NB: only A/C-43a1 and A/C-43a2 are aircraft enablers developed by the solution. Following enablers are already deployed technologies:

- AC-48a (ADS-B OUT DO-260B)
- A/C 67 (On board receiving of ADS-B IN)
- A/C 24 : Airport Moving Map for the full SURF-ITA option and TWY-ITA.
- A/C-25: Cockpit Display Traffic Information

CTE-S03e (ADS-B transmitter for vehicles) is not used in the solution defined in S2020 as ground vehicles are not considered.

3.1.1.1 Deviations with respect to the SESAR Solution(s) definition

No deviation with respect to the SESAR Solution(s) definition.

3.1.1.2 Relevant Use Cases

There are two groups of relevant use cases: runway use cases and taxiway use cases.

Use cases are described in §3.2.2.4 of D4.1.190_OSED-SPR-INTEROP – part 1.

3.1.1.3 Applicable standards and regulations

Main references are:

- RTCA DO-323 SPR for SURF-IA
- CS-25.13.22 for the definition of alerts levels

3.1.2 Capability Configurations required for the SESAR Solution

Implementations

The Alerts might occur either:

- On the runway → implementations SURF-A and SURF-ITA
- On the taxiways → implementation TWY-ITA or TWY-A

The following diagram shows the different implementations:

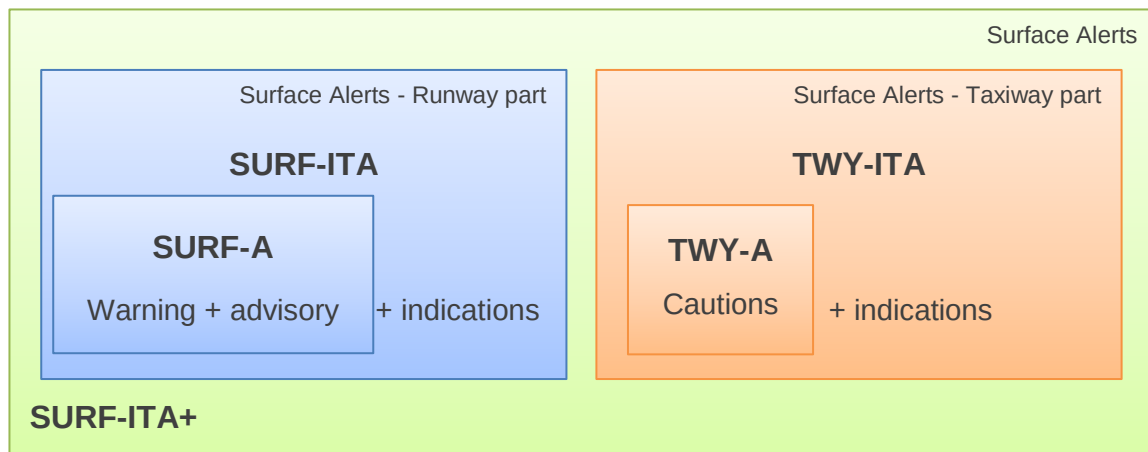


Figure 1: Overview of the implementations of the Surface Alerts solution

The possible implementations are:

SURF-A Surface Traffic Alerts on runways for pilots without traffic display and with Warning and Advisory alerts. It can be implemented as a stand-alone solution.

SURF-ITA Surface Traffic Alerts & Indication on runways for pilots with **optional** display, Advisory and Warning alerts. It includes SURF-A alerts and adds the use of a traffic display for use before conflicts are developed and when the aircraft is on hold.

TWY-A Surface Traffic Alerts on taxiways for pilots (Caution alerts only, no display traffic indication)

TWY-ITA Surface Traffic Indication & Alerts on taxiways for pilots (Caution alerts only with traffic display)

SURF-ITA+ Surface Traffic Indication & Alerts on runways and taxiways for pilots including both applications SURF-ITA and TWY-ITA.

TWY-ITA function will be implemented besides the runway part of Surface Alerts with the same requirements. Transition between runway and taxiway functions is defined by the Runway Engagement Zone.

TWY-A is the taxiway traffic alerts function without display indication which was not part of the SESAR 1 scope and validation activities. This function is open for possible future implementation with necessary validation and complementary activities to be completed. The TWY-A function is not included further in this document.

SURF-ITA+ is the optional version of SURF-ITA for runways extended with new taxiway traffic alerts algorithms (TWY-ITA) and its features. This extends its operational applicability with airport taxiway system. It improves safety of airport operations including runway operations and taxiway operations.

SURF-ITA/TWY-ITA are intended to be used by commercial aircraft (i.e. mainline, regional aircraft and business jets) at controlled and uncontrolled airports, from relatively simple aerodrome layouts and low-density operations, to highly complex runway and taxiway layouts supporting super-high traffic densities.

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3.2 Changes imposed by the SESAR Solution on the baseline Architecture

N/A

4 Technical Specifications

4.1 Functional architecture overview

4.1.1 Resource Connectivity Model

The following schematic provides a view of functional blocks on aircraft and main information flow.

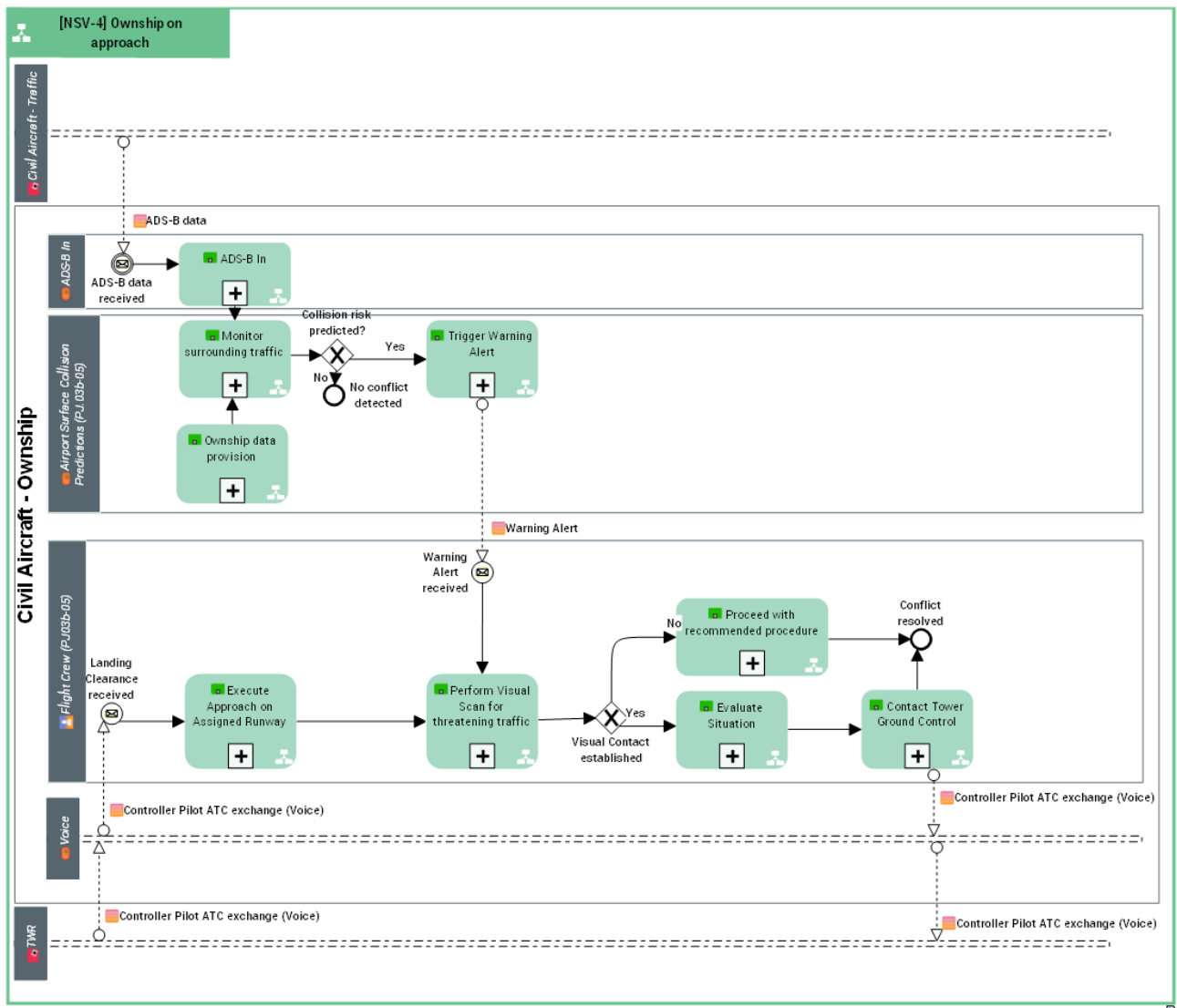


Figure 2: Functional breakdown for Traffic alerts

Note: this model illustrates the functional breakdown for the use case - ownship on approach. Functional breakdown is similar for other use cases considered with this solution (refer to D4.1.190 OSED – SPR – INTEROP for list of uses cases).

4.1.2 Resource Orchestration view

Resource orchestration is the same for mainline and business solution, for runways and taxiways.

This section develops a description of functional blocks in association with figure 2. These blocks do not represent a specific system but a function.

The overall Traffic Alerts function, at ATM level, is composed of the following actors:

Traffic transmitting ADS-B Out data to other aircraft;
Aircraft/Ownship
Crew

4.1.2.1 Traffic data management - ADS-B IN

This functional block aims at detecting which surrounding traffic should be taken into account as first inputs for traffic conflict detection.

It covers the following items:

Reception of all ADS-B traffic information coming from surrounding aircraft equipped with ADS-B Out;
Check quality criteria concerning ADS-B information received (integrity, accuracy)
Sorting of ADS-B traffic data that can be used (those that verify quality criteria)

Note: Architecture for traffic alerts is based on the use of ADS-B data but can be extended to other sources like TIS-B or ADS-R.

4.1.2.2 Ownship data: Navigation data

This functional block aims at providing ownship navigation data.

It covers the following item:

Retrieval of ownship navigation data used as criteria (position, speed, altitude, heading / track)
Optionally: check ownship navigation data quality to qualify other aircraft data.

4.1.2.3 Ownship data: Airport data

This functional block aims at providing airport runway information.

It covers the following items:

Detection of airport concerned
Provide airport runway/taxiway information useful for Traffic Alerts computation. E.g.: runway position, runway threshold positions.

4.1.2.4 Monitor surrounding traffic

This functional block aims at detecting the possible traffic conflicts and attributes the level of alerts according to the situation.

It covers the following items:

Detect the flight phase/Use Case concerned for both ownship and intruder (UC 1 to 5 like ownship on approach, or ownship at T/O) [Optional feature]
Detect relevant runways and taxiways (according to ownship position)
Detect relevant traffic (in proximity of relevant runways)

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According to alert criteria, determine the risk of collision with each relevant traffic and associate the appropriate alert if needed

4.1.2.5 Trigger Warning Alert

This functional block aims at prioritizing SURF-A/SURF-ITA alerts to be triggered in the cockpit.

It covers the following items:

Receive information about other system alerts

Provide a level of priority between traffic alert and other system alerts

Provide a level of priority on traffic alerts (in case of simultaneous traffic alerts)

HMI for 'display' and 'audio'

It aims at providing HMI cues in the cockpit in order to let flight crew aware about traffic conflict.

It covers the following items:

	SURF-A	SURF-ITA	TWY-A	TWY-ITA
Transmit audio alert messages	Yes	Yes	Yes	Yes
Display alert messages and manage message priority	Yes	Yes	Yes	Yes
Display the relevant traffic on airport map Indications (TI/RSI).		Yes		Yes

4.1.3 Infrastructure connectivity model

- (1) Airport: Receives ADS-B Out information
- (2) Aircraft: SURF-ITA, TWY-ITA functions to Crew
- (3) ATC Optional: Crew can optionally contact ATC for resolution

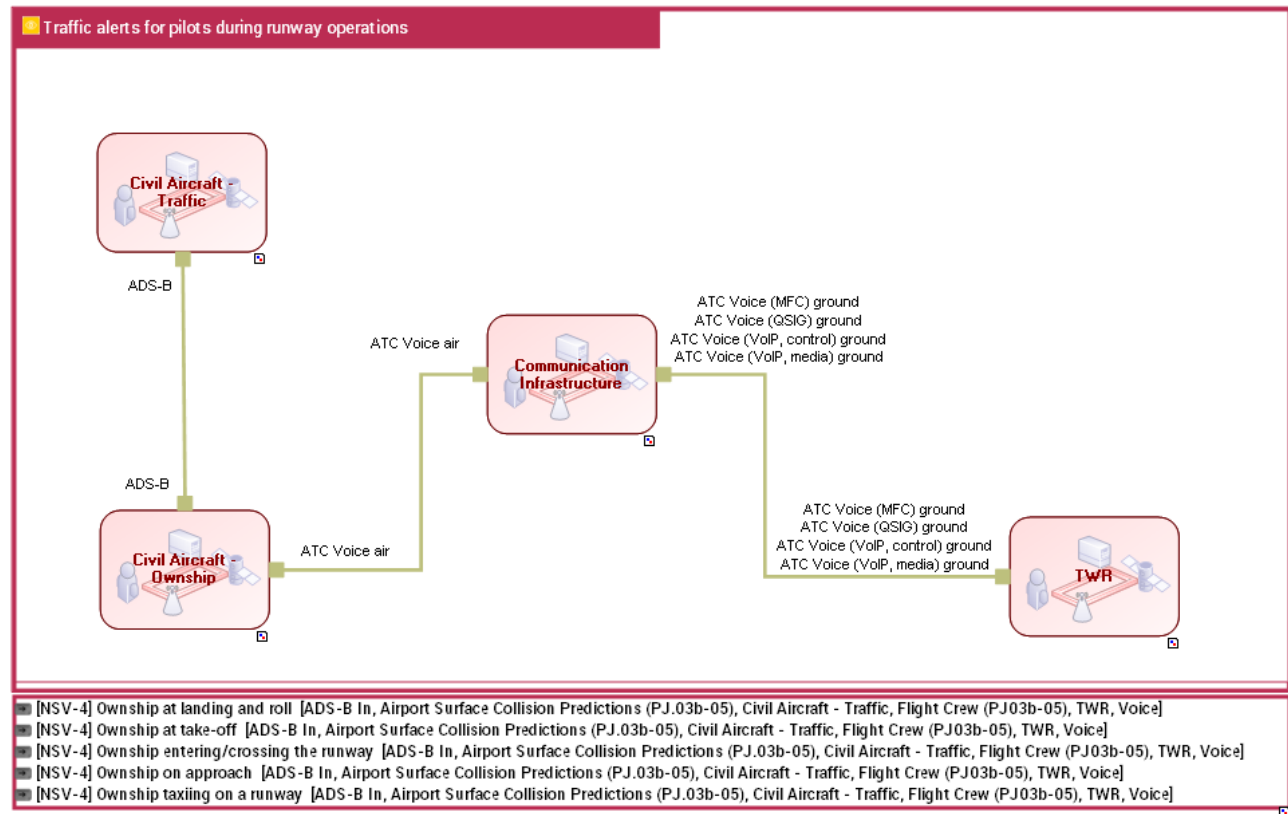


Figure 3: Infrastructure connectivity model

4.1.4 Service view

4.1.4.1 Service description

There is no service provided by the solution. The intended function is to provide audio and visual indication (attention getter) to the aircraft crew.

4.1.4.1.1 Overall architecture view

The example of target aircraft architecture for Alerts on Runway is below (Step 2 is similar to “Optional”) with an example based on Airbus systems:

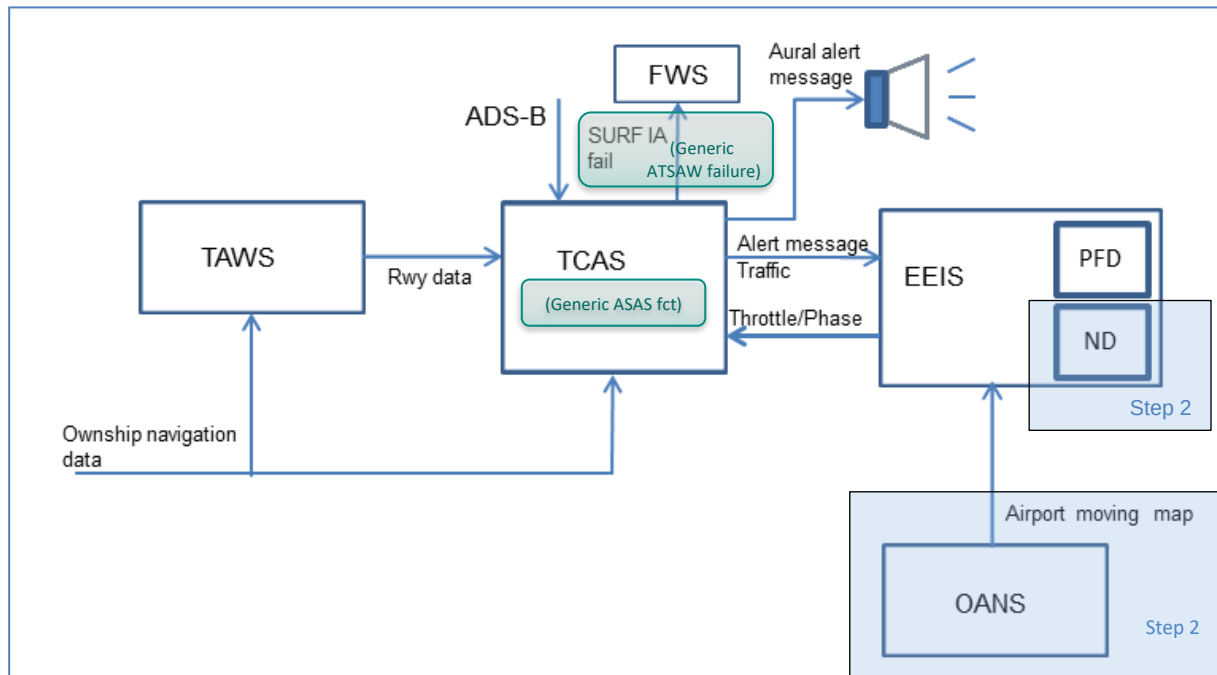


Figure 4: Architecture view for Traffic alerts on runway

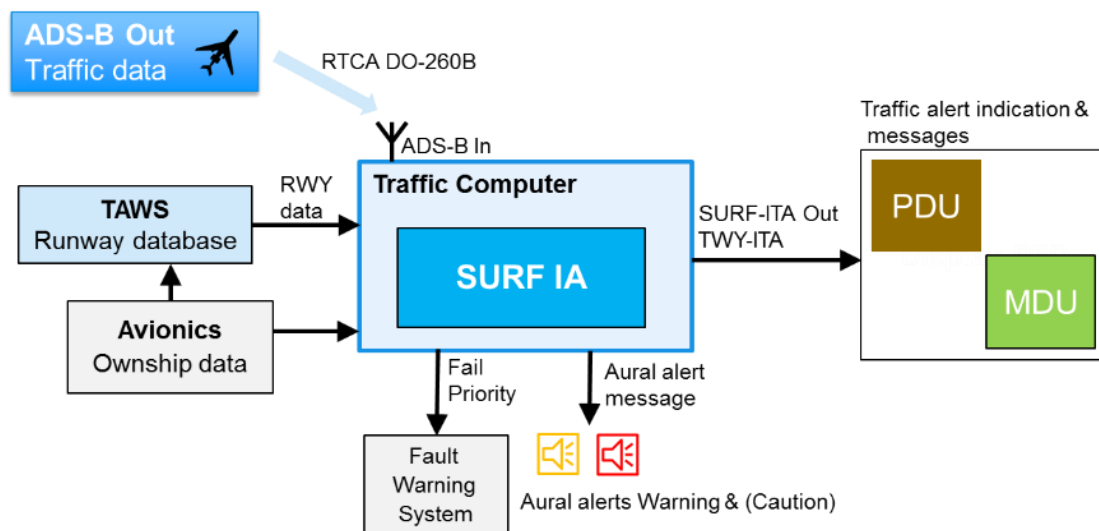


Figure 5: Architecture view (business) SURF-ITA and TWY-ITA

4.1.4.1.2 Concerned Systems

The architecture traffic alerts function relies on systems that are or will be implemented on-board Airbus Single Aisle aircraft family (A318/A319/A320/A321) and Dassault Falcon family as envisaged for V3 trials:

TAWS (Terrain Awareness and Warning System)

TCAS (Traffic Collision Avoidance System)

EEIS (Enhanced Electronic Instrument System)

Dedicated to display alert messages and traffic information.

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Note: a specific display could be used for Traffic display during V3 trials.

FWS (Flight Warning System),
AMU (Audio Monitoring Unit)

Dedicated to emit aural alerts coming from different systems.

4.1.4.1.3 Assumptions and decisions

The following assumptions are proposed to start the analysis and architecture definition. They are based on the current role of each existing system:

- Assumption 1: TCAS/Traffic Computer; contains detection algorithms.
- Assumption 2: TCAS/Traffic Computer; needs runway information.
- Assumption 3: No major impact on TAWS that will only provide runway data to TCAS.
- Assumption 4: EEIS; in charge of

Alert text display

Traffic display management if the option with Traffic display is available on-board:

- Receive intruder data,
- Manage display
 - Display the relevant intruder (symbolology)
 - Identify if aircraft is within the displayed range

4.1.4.1.4 Allocation

This section provides the links between functions and systems.

4.1.4.1.4.1 TAWS

Functional block allocated to TAWS is the following one:

Airport runway data management (cf. 4.1.1)

TAWS provides TCAS with runway data for the concerned airport where the ownship is operating.

4.1.4.1.4.2 TCAS

Functional blocks allocated to TCAS are the following ones:

Traffic data management (c.f. 4.1.2.1)

Traffic conflict detection (c.f. 4.1.2.4)

Part of “Alerts management (c.f. 4.1.2.5)”. TCAS computes an internal priority level between different traffic alerts. Cross-system alert management” is supported by FWS.

TCAS/Traffic Computer contains algorithms that detect aircraft candidates that have potential conflicts and then triggers alerts.

It is applicable in the following use cases as described in OSED [2] [3] and resumed in FRD [1]:

When ownship is airborne on final approach,

When ownship is on the airport surface,

It also detects when the alert conditions are no longer valid.

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4.1.4.1.4.3 EEIS

Display Systems supports the functional block HMI for 'Display' and 'Audio' (c.f. 4.1.2.6)

It contributes for the Display part:

Display alert messages on PFD

Manage traffic Display:

4.1.4.1.4.4 AMU

AMU supports audio part of the Functional block HMI for 'Display' and 'Audio' (c.f. 4.1.2.6).

AMU emits the aural audio message.

4.1.4.1.4.5 FWS

Flight Warning System (FWS) only interfaces for alert priority management and announcement of ON/OFF status.

4.1.4.1.4.6 Summary of functional breakdown

Function	System Allocation
<i>Traffic data management</i>	TCAS
<i>Ownship Navigation data management</i>	TCAS, TAWS
<i>Airport/Runway data management</i>	TAWS, TCAS
<i>Traffic conflict detection</i>	TCAS
<i>Alert management</i>	TCAS
<i>HMI for 'display' and 'audio'</i>	TCAS (outputs), EEIS, AMU

4.1.4.2 Service Provisioning

Not applicable.

Service Realization

Not applicable.

4.2 Functional and non-Functional Requirements

4.2.1 Traffic alerts function SURF-A/ITA

Here are the different levels that can be considered:

- **Traffic Display Information level**
 - For pilots' awareness about the overall traffic situation on the airport with a focus on the runway to be used
- **Indications (TI, RSI) level** for normal traffic condition that could become a traffic safety hazard. Indications do not actively attract attention from flight crews but provide enhanced situation relevant information to facilitate flight crew perception of potential safety hazards. Indications are not alerts.
- **Traffic Alerts level including:**
 - Advisory alert level for traffic conflict conditions that require flight crew awareness and may require subsequent flight crew response.
 - Caution alert level for traffic conflict conditions that require immediate flight crew awareness and subsequent flight crew response.
 - Warning alert level for traffic conflict conditions that require immediate flight crew awareness and immediate flight crew response.

4.2.1.1 HMI requirements SURF-A/ITA

[REQ]

Identifier	REQ-03B.05-V3-TS-001-01
Requirement	SURF-A/SURF-ITA function HMI shall be consistent with cockpit alerting and display conventions.
Status	<validated>
Rationale	To be sure that the HMI respects the HMI cockpit rules.
Additional information	Display convention like document CS-25 13-22 and FAA document AC 25.1322-1.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A

<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Functional block>	Audio Alerts	
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-002-01</i>
Requirement	SURF-A/SURF-ITA function shall trigger cockpit effects matching the associated level of alert and appropriate presentation medium (auditory: tones and voiced alerts; moving map visual indications, and textual indications).
Status	<validated>
Rationale	To have cockpit consistency and fulfil certification requirements (e.g. document CS-25 13-22 and FAA document AC 25.1322-1.)
Additional information	Cockpit effects include both aural (mandatory in warning and caution situations) and visual effects. The visual effects may be an indication on the Moving Map or PFD. SURF-A/SURF-ITA function can use the following levels of indications and alerts: Indication level (visual indications) Advisory alert level Caution alert level Warning alert level
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0033	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0034	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0043	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0043	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0030	<Full>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0021	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0006a	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0006b	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0006c	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0039	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-004-01</i>
Requirement	SURF-A/SURF-ITA function shall be capable of managing multiple alerts at the same time.
Status	<validated>
Rationale	To facilitate the detection of simultaneous alerts and to manage simultaneously aural and displayed alerts. In case several aircraft cause an alert, a priority will be given to the nearest risk of collision.
Additional information	For example, to provide one aural alert and one message on ND/PFD/others displays at a time.
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0037	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0008	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-005-01</i>
Requirement	SURF-A/SURF-ITA function shall be capable of managing the priority between the different alerts.
Status	<validated>
Rationale	To alert the flight crew firstly with the highest priority alert.
Additional information	In particular, for the audio alerts.
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0037	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-007-01</i>
Requirement	SURF-A/SURF-ITA function shall be usable by single-pilot or dual-pilot aircraft as safety net
Status	<validated>
Rationale	Because the flight crew number will depend on the company and aircraft constraints (i.e. Business jets can be flown by only one pilot contrary to commercial aircraft that need to have two flight crew members at a time).
Additional information	RTCA/DO-323 SPR.9
Category	Functional; HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0025	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-009-01</i>
Requirement	SURF-A/SURF-ITA function shall use up-to-date airport data.
Status	<deleted>
Rationale	In order to avoid having nuisance alerts because of out-of-date airport database.
Additional information	Deleted because performance requirements should cover this requirement.
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-010-01</i>
Requirement	SURF-A/SURF-ITA function shall be activated by default for airport operations.
Status	<validated>
Rationale	There is no means to verify (or impose) that it will remain activated for all flights in operational real life, pilots having the capability to switch-it off at discretion (cf. REQ-03B.05-V3-TS-068).

Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0091	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	REQ-03B.05-V3-TS-011-01
Requirement	SURF-A/SURF-ITA function shall inform the maintenance system of the unavailability of the function or part of the function.
Status	<validated>
Rationale	Changed relatively to REQ-06.07.01-OSED-ITAP.0029. It is the system and not the crew who is informed.
Additional information	
Category	Functional; HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0029	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01.	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-012-01</i>
Requirement	SURF-A/SURF-ITA function shall provide the flight crew with indication, alert cues, textual indications, and/or auditory alerts as long as the hazardous situation is detected.
Status	<validated>
Rationale	To be sure that the flight crew is alerted if the hazardous situation continues.
Additional information	Depending on the context and the level of alert, some or all these HMI cues may be displayed. It could be which could be graphical indications of the traffic conflict on the moving map, depending of implementation.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0012	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0013	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0014	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0023	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0001	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0006	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-085-01</i>
Requirement	(Optional) Traffic information shall be displayed on adequate display unit.
Status	<validated>
Rationale	To be sure that the flight crew will detect easily the traffic information.

Additional information	
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0013	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-086-01</i>
Requirement	(Optional) SURF-ITA function shall be designed to limit cluttering by adjusting the following limits for traffic display: a maximum number of displayed airborne traffic (M0) AND a maximum number of displayed ground traffic (M1)
Status	<validated>
Rationale	In order to avoid cluttering of the display and in order to focus only on the most important traffic.
Additional information	M0 and M1 are defined by the A/C manufacturer (in case these maximum numbers should be adapted or changed).
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0001	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0010	<Full>

<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-058-01</i>
Requirement	(Optional) SURF-ITA function shall display at least a traffic symbol on the airport moving map (traffic position and direction) for a traffic considered as relevant (with Traffic Display Information level).
Status	<validated>
Rationale	In order to provide flight crew traffic awareness on relevant traffic. In order to ease anticipation of a potential conflicting situation.
Additional information	
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0023	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0001	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-087-01</i>
Requirement	(Optional) SURF-ITA function shall display at least the following cues for each alert level: Intruder traffic symbol on airport moving map AND Complementary information about intruder triggering the alert
Status	<validated>

Rationale	In order to provide flight crew with enough information to understand the conflict situation.
Additional information	Complementary information can be for example additional traffic information (traffic label) and a PFD message (SURF-A implementation) depending on aircraft implementation.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0021	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-061-01</i>
Requirement	(Optional) As long as there are several traffic alerts and conflicting traffic alert cues, SURF-ITA function shall display in priority cues of the most critical alert.
Status	<validated>
Rationale	In order that flight crew detects the most critical alert.
Additional information	
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-003-01</i>
Requirement	(Optional) SURF-ITA function shall provide indications and alerts adapted to the display configuration (range/mode/background information).
Status	<validated>
Rationale	To be sure that the alert visual information is provided to pilots whatever the display selection.
Additional information	It means that whatever the display configuration used, flight crew should still be able to view indications and alerts.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0028	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-006-01</i>
Requirement	(Optional) SURF-ITA function shall provide means to identify the cause of the traffic conflict at any range in case a traffic alert is triggered.
Status	<validated>
Rationale	The alert works whatever the display selection.
Additional information	It means that whatever the range selected by the flight crew, flight crew should be able to view the cause of the traffic conflict. An “out-of-range” feedback may be provided in case intruder causing the conflict is out of the range.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0021	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0028	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-062-01</i>
Requirement	SURF-A/SURF-ITA function HMI shall indicate to flight crew when the conflict alert is no more active.
Status	<validated>
Rationale	In order to let flight crew aware about the end of the conflicting situation.
Additional information	
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-064-01</i>
Requirement	(Optional) SURF-ITA function shall display ground traffic and airborne traffic differently.
Status	<validated>
Rationale	In order to let the flight crew well aware if the traffic is on ground or airborne (especially for a traffic taking-off or landing).

Additional information	For Traffic Display Information level, ground traffic can be displayed with tan/brown color and airborne traffic can be displayed with white or blue color (as recommended by RTCA DO-317).
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0026	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0027	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-066-01</i>
Requirement	(Optional) SURF-ITA function shall display an alerting traffic with airport traffic alert cues even if this traffic is already displayed by TCAS function (RA, TA, Other, Proximate).
Status	<validated>
Rationale	In order to display all traffic the same way even traffic already displayed by TCAS.
Additional information	For example when ownship is crossing stop-bar while a traffic is on final approach, this traffic on approach could be first displayed by TCAS and then displayed by airport traffic alert (if generating an alert).
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>

<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>
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[REQ]

Identifier	<i>REQ-03B.05-V3-TS-067-01</i>
Requirement	(Optional) SURF-ITA function shall display airborne relevant traffic for Traffic Display Information taking into account TCAS information if this traffic is already displayed by TCAS (RA, TA, Other, Proximate).
Status	<validated>
Rationale	In order to have consistency with existing TCAS feedbacks.
Additional information	For example, for an airborne relevant traffic that has “Other Traffic” (OT TCAS status), the traffic symbol could include an empty diamond showing that it is an “OT” traffic.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-092-01</i>
Requirement	(Optional) All ground traffic displayed by the SURF-ITA function shall be inside the movement area of the AMM.
Status	<deleted>
Rationale	Ground traffic outside the movement area will decrease situational awareness.
Additional information	Deleted because no added value
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>		N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.1.2 Functional requirements SURF- A/ITANote:

In this section, 2 cases with sub-cases are considered (operational descriptions can be found in SPR/OSED):

Ownship is on approach with the runway safety area occupied by another traffic,
Ownship is on the ground around or on the runway with the runway safety area occupied or not by another traffic approaching or departing. This covers both ownship at take-off and taxiing on runway.

4.2.1.2.1 Transverse Functional requirements SURF- A/ITA

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-007-01</i>
Requirement	SURF-A/SURF-ITA function shall use airport data compliant to EUROCAE ED-99/ RTCA DO-272.
Status	<deleted>
Rationale	ED-99 capture rules will ensure the compliance with Authoritative data source (AIP), interoperability between aircraft and interoperability between aircraft systems and ATC systems.
Additional information	Requirement deleted because redundant with <i>REQ-03B.05-V3-TS-007-039</i>
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>		N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-068-01</i>
Requirement	SURF-A/SURF-ITA function should let the possibility for Traffic Alerts to have a manual deactivation means for the whole Traffic Alerts sub-function.
Status	<validated>
Rationale	In order to deactivate the function in some particular situations.
Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0009	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-013-01</i>
Requirement	SURF-A/SURF-ITA function shall detect possible conflicts with aircraft that are within a runway engagement area around the runway inside CAT I stop bars.
Status	<validated>
Rationale	In order to filter relevant traffic for alert and reduce spurious alerts.
Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0007	<Full>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0053	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-069-01</i>
Requirement	(Optional) SURF-ITA function shall sort the relevant traffic for Traffic Display by order of priority for display.
Status	<deleted>
Rationale	Because the number of traffic displayed will be limited and it is consistent to sort traffic with priority order.
Additional information	Deleted because redundant with the next one reqt 081
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	N/A	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-081-01</i>
Requirement	(Optional) SURF-ITA function shall display the relevant traffic for Traffic Display with priority to most critical traffic.
Status	<validated>
Rationale	Because the number of traffic displayed will be limited and it is consistent to display most critical traffic.

Additional information	For example, the criteria “distance to runway” or “distance to ownship” could be used to detect most critical traffic.
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0010	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	REQ-03B.05-V3-TS-009-01
Requirement	The alert resulting of conflict / infringement detection shall enable an appropriate remedial action.
Status	<validated>
Rationale	To provide timely alerts to have enough time to solve the problem.
Additional information	The time frame takes into account a crew and aircraft reaction time.
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0053	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0023	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0024	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0025	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0026	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0027	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0028	<Full>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0053	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.1.2.2 Use case “ownship on approach” SURF- A/ITA

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-089-01</i>
Requirement	SURF-A/SURF-ITA function shall provide an advisory then a warning level alert when the ownship is on approach and traffic are expected to be in the runway engagement area at ownship landing.
Status	<validated>
Rationale	The warning alert is used when the conflict requires the ownship to make an immediate recovery action (go-around)
Additional information	The transition from advisory to warning level is based on a height criteria.
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0013	
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0014	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0015	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0021	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0022	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0026	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0053	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

4.2.1.2.3 Use cases “ownership on ground or close to the runway” SURF- A/ITA

[REQ]

Identifier	REQ-03B.05-V3-TS-090-01
Requirement	Airport Surface Alert function shall trigger an alert when the ownship and traffic are both using the same runway and a risk of conflict is detected.
Status	<validated>
Rationale	To alert the flight crew of a potential conflict with another aircraft.
Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0019	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0016	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0018	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0019	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0023	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0024	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0025	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0027	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0053	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Founding Members

Identifier	REQ-03B.05-V3-TS-057-02
Requirement	When ownship speed is above a fixed speed during take-off, SURF-A/SURF-ITA function shall inhibit traffic alerts.
Status	<validated>
Rationale	During take-off, above a fixed speed, the flight crew should not be distracted by an alert.
Additional information	During V3 validation 100 kts has been validated.
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0009	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.1.3 Performance requirements SURF- A/ITA

The performance requirements for traffic indications and alerting are primarily based on the performance requirements developed in RTCA/DO-323 “Safety, Performance and Interoperability Requirements Document for Enhanced Traffic Situational Awareness on the Airport Surface with Indications and Alerts (SURF IA)” and resumed in OSED/SPR.

RTCA/DO-323 did not include advisory traffic alerts. However, it is proposed for a mainline implementation (not envisaged in the frame of PJ03b-05) to replace Caution by Advisories (no audio alerts). Requirements from RTCA/DO-323 were reworded to include advisory traffic alerts as appropriate. When the general term alerts is used in the following performance requirements, assume that it includes advisory, caution and warning alerts.

SESAR PJ03b-05	RTCA/DO-323
Indication or Informative	Indication
Caution (Advisory) Alert	Caution Alert
Warning Alert	Warning Alert

Table 4: Alert Terminology for SESAR PJ03b-05 and RTCA/DO 323

4.2.1.3.1 Airport Map Data SURF- A/ITA

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-039-01</i>
Requirement	Airport map data shall comply Medium level of Data Quality Requirements defined in EUROCAE ED-99 / RTCA DO-272
Status	<validated>
Rationale	Airport map data used to generate traffic indications and alerts must have an accuracy defined. This accuracy is consistent with existing airport map database requirements and was used in the operational performance analysis in RTCA/DO-323.
Additional information	
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0015	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0013	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0014	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0031	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-070-01</i>
Requirement	When an SURF-A/SURF-ITA function has a direct link with the use and/or the display of an airport moving map, ARINC 816 format <u>should</u> be used for airport related parameters
Status	<deleted>

Rationale	ARINC 816 will allow the use of a common data set (AMDB) between aircraft systems (e.g.: AMM, Conf Monitoring, BTV, ROPS) and ensure the consistency of the functions.
Additional information	Redundant with the previous reqt TS-039.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>		N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.1.3.2 Ownship position requirements

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-040-01</i>
Requirement	For traffic indications and alerts, the horizontal position accuracy for ownship on the surface shall be equal to or better than the values given in RTCA/DO-323 SPR.59/Table 3-5.
Status	<validated>
Rationale	Ownship horizontal position accuracy requirements are needed to limit nuisance indications and alerts. It is possible to use less accurate horizontal position data if the allowable nuisance rates are met. For example, certain alerting algorithms may delay an indication or alert when ownship has less accurate data to keep nuisance rates low.
Additional information	Considered in RTCA/DO-323 SPR.59: distance from the hold line to the edge of the runway shoulder, distance between a parallel taxiway centerline and runway centerline minus the width of the runway.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-041-01</i>
Requirement	To provide traffic indications or alerts when ownship is on approach to a single runway or parallel runways separated by 760 m or greater, the airborne ownship horizontal position accuracy with a probability better than 95% shall be according to RTCA/DO-323 SPR.60/Table 3-5 with meeting the acceptable nuisance rates defined in RTCA/DO-323 B-15.
Status	<validated>
Rationale	Ownship horizontal position accuracy requirements are needed to limit nuisance indications and alerts. It is possible to use less accurate horizontal position data if the allowable nuisance rates are met. For example, certain traffic alerting algorithms may delay an indication or alert when ownship with less accurate data to keep nuisance rates low.
Additional information	RTCA/DO-323 SPR.60.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-042-01</i>
Requirement	To provide traffic indications or alerts, the geometric altitude for ownship shall meet vertical accuracy requirement at 95% as per RTCA/DO-323 SPR.61. if geometric altitude is used.
Status	<validated>
Rationale	Geometric altitude can be used to determine whether ownship is airborne or on the airport surface. An ownship geometric altitude accuracy requirement is needed to limit nuisance indications and alerts since indications and alerts when airborne and when on the airport surface may be different.
Additional information	RTCA/DO-323 SPR.61.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-043-01</i>
Requirement	In cases where ownship velocity is used for traffic indications or alerts, the velocity accuracy for ownship shall meet the requirement at 95% as per RTCA/DO-323 SPR.55..
Status	<validated>
Rationale	An ownship velocity accuracy requirement is needed to limit nuisance indications and alerts.
Additional information	Considered in RTCA/DO-323 SPR.55.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	REQ-03B.05-V3-TS-044-01
Requirement	For traffic indications or alerts where ownship directionality is required, ownship directionality shall meet the requirement at 95% probability given in RTCA/DO-323 SPR.56.
Status	<validated>
Rationale	An ownship directionality requirement is needed to limit nuisance indications and alerts.
Additional information	Considered in RTCA/DO-323 SPR.56.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	REQ-03B.05-V3-TS-045-01
Requirement	For the traffic indication and alerting system to provide traffic indications, advisory alerts or caution alerts, the probability that the horizontal position for ownship is erroneous shall meet the requirement provided in RTCA/DO-323 SPR.66 and RTCA/DO-323 Table 3-8.

Status	<validated>
Rationale	An ownship horizontal position integrity requirement is needed to limit nuisance indications and alerts.
Additional information	Considered in RTCA/DO-323 SPR.66 and RTCA/DO-323 Table 3-8.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0033	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-046-01</i>
Requirement	For the traffic indication and alerting system to provide warning traffic alerts, the probability that the horizontal position for ownship is erroneous shall meet the requirement provided RTCA/DO-323 SPR.66 and RTCA/DO-323 Table 3-8.
Status	<validated>
Rationale	An ownship horizontal position integrity requirement is needed to limit nuisance indications and alerts.
Additional information	Considered in RTCA/DO-323 SPR.66 and RTCA/DO-323 Table 3-8.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.1.3.3 Traffic requirements

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-047-01</i>
Requirement	The horizontal position accuracy for surface traffic aircraft to be considered shall be equal to or better than the values in RTCA/DO-323 SPR.59/table 3-5 as well as meeting the acceptable nuisance rates defined in RTCA/DO-323 table B-10.
Status	<validated>
Rationale	Traffic horizontal position accuracy requirements are needed to limit nuisance indications and alerts. It is possible to use less accurate horizontal position data if the allowable nuisance rates are met. For example, certain traffic alerting algorithms may delay an indication or alert on a target with less accurate data to keep nuisance rates low.
Additional information	Considered in RTCA/DO-323 SPR.59.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-048-01</i>
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Requirement	To provide traffic indications or alerts for airborne traffic on approach to a single runway or parallel runways separated by 760 m or greater, airborne traffic horizontal position accuracy with a probability better than 95% shall be as per RTCA/DO-323 SPR.60/Table 3-5 with meeting the acceptable nuisance rates defined in RTCA/DO-323 B-15.
Status	<validated>
Rationale	Traffic horizontal position accuracy requirements are needed to limit nuisance indications and alerts. It is possible to use less accurate horizontal position data if the allowable nuisance rates are met. For example, certain traffic alerting algorithms may delay an indication or alert on a target with less accurate data to keep nuisance rates low.
Additional information	RTCA/DO-323 SPR.60.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-049-01</i>
Requirement	To provide traffic indications or alerts for a traffic aircraft, the geometric altitude for that traffic aircraft shall meet vertical accuracy requirement at 95% as per RTCA/DO-323 SPR.61. if geometric altitude is used.
Status	<validated>
Rationale	Geometric altitude can be used to determine whether traffic is airborne or on the airport surface. A traffic geometric altitude accuracy requirement is needed to limit nuisance indications and alerts since indications and alerts when traffic is airborne or on the airport surface may be different.
Additional information	RTCA/DO-323 SPR.61. Note: The geometric altitude in this case means ADS-B GPS altitude

Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0035	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-050-01</i>
Requirement	In cases where traffic velocity is used for traffic indications or alerts, the velocity accuracy for traffic to qualify for traffic indications or alerts shall meet the requirement at 95% as per RTCA/DO-323 SPR.55 and 62.
Status	<validated>
Rationale	A traffic velocity accuracy requirement is needed to limit nuisance indications and alerts.
Additional information	RTCA/DO-323 SPR.62.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0035	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-052-01</i>
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Requirement	For the traffic indication and alerting system to provide informative, advisory or caution traffic alerts, the probability that the horizontal position for traffic is erroneous shall meet the requirement provided in RTCA/DO-323 SPR.64 and RTCA/DO-323 Table 3-8.
Status	<validated>
Rationale	A traffic horizontal position integrity requirement is needed to limit nuisance indications and alerts.
Additional information	Considered in RTCA/DO-323 SPR.64 and RTCA/DO-323 Table 3-8.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0035	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-053-01</i>
Requirement	For the traffic indication and alerting system to provide warning traffic alerts, the probability that the horizontal position for traffic is erroneous shall meet the requirement provided in RTCA/DO-323 SPR.66 and RTCA/DO-323 Table 3-8.
Status	<validated>
Rationale	A traffic horizontal position integrity requirement is needed to limit nuisance indications and alerts.
Additional information	Considered in RTCA/DO-323 SPR.64 and RTCA/DO-323 Table 3-8.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0035	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.1.3.4 Traffic Latency SURF- A/ITA

The latency requirements for the traffic alerting system are driven by the latency requirements for ATSA-SURF. Requirements for ATSA-SURF are specified in RTCA/DO- 322 Safety, Performance and Interoperability Requirements Document for ATSA-SURF Application [10]. In addition, a new version of RTCA/DO-317 “Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications System (ASAS)” is being developed that will include ATSA-SURF. It will be designated RTCA/DO-317A and is expected to be completed late in 2011. The current draft version of RTCA/DO-317A is Minimum Operational Performance Standards (MOPS) For Aircraft Surveillance Applications (ASA) System Draft 4.00 working version as of 6/10/2011 [9].

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-054-01</i>
Requirement	(Optional) The total latency of the traffic indication and alerting system from the receipt of the traffic position and velocity to display to the flight crew shall meet the maximum latency requirements specified in RTCA/DO-317A Table 2-2 for SURF ref. [45].
Status	<validated>
Rationale	Total latency requirements are needed to ensure timely display of traffic information.
Additional information	Considered in RTCA/DO-323 SPR.18.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0012	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-055-01</i>
Requirement	The uncompensated latency of the traffic position from the receipt of the surveillance information to display to the flight crew for traffic indications and alerts shall meet the requirements specified in RTCA/DO-322, Section B.5.2.1.2.
Status	<validated>
Rationale	Uncompensated latency requirements are needed for accurate display of traffic position.
Additional information	Considered in RTCA/DO-323 SPR.19.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0013	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-056-01</i>
Requirement	The maximum allowable data age of the traffic position and velocity for traffic indications and alerts shall meet the “Maximum Age Until Data Dropped” requirement in RTCA/DO-317A, Table 2-2 for SURF ref. [45].
Status	<validated>
Rationale	Maximum data age requirements are needed to limit nuisance traffic indications and alerts aren’t provided.
Additional information	Considered in RTCA/DO-323 SPR.20.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	RTCA/DO-317A, Table 2-2 for SURF ref. [45]	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.1.4 Safety requirements SURF- A/ITA

The safety requirements for traffic indications and alerts are primarily based on the safety requirements developed in RTCA/DO-323 “Safety, Performance and Interoperability Requirements Document for Enhanced Traffic Situational Awareness on the Airport Surface with Indications and Alerts (SURF IA)” and resumed in OSED/SPR.

RTCA/DO-323 uses slightly different terminology with respect to traffic alerts than this document (see 4). Requirements from RTCA/DO-323 were reworded to include advisory traffic alerts as appropriate. When the general term alerts is used in the following safety requirements, assume that it includes advisory, caution and warning alerts.

Any safety requirements related to Land and Hold Short operations (LAHSO) were not included, since those operations are out of scope for SESAR 9.14 (RTCA/DO-323 SPR.73). They will be considered in a future step.

Traceability with SPR is not done for this section. Rationale is that the quantitative part of SESAR SPR Traffic Alerts for Pilots – Interim Report [ref. 19] is not achieved; it is expected to be resumed when SRM methodology is clarified. Meanwhile, requirements from RTCA DO323 are used as a reference.

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-028-01</i>
Requirement	The traffic indication and alerting equipment shall not possess any single point failure or common cause failure that leads to a catastrophic outcome.
Status	<deleted>
Rationale	To be sure that this function will not increase the safety risks.
Additional information	RTCA/DO-323 SPR.74. Deleted as judged irrelevant following the OHA published in SAR.
Category	Safety
Verification Method	Test

[REQ Trace]

Founding Members

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	N/A	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-029-01</i>
Requirement	The traffic indication and alerting equipment shall not possess any undetectable latent failure that, when combined with any single point failure or common cause failure, leads to a catastrophic outcome.
Status	<deleted>
Rationale	To be sure that this function will not increase the safety risks.
Additional information	RTCA/DO-323 SPR.76. Deleted as judged irrelevant following the OHA published in SAR.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	N/A	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-030-01</i>
Requirement	Equipment implementing traffic indications or alerts that is capable of outputting erroneous or false indications or alerts shall be developed and certified to Design Assurance Level C or better.
Status	<validated>
Rationale	To ensure that implementing this function does not generate risks. It matches the OHA.
Additional information	Also meets RTCA/DO-323 SPR.68.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0034	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-031-01</i>
Requirement	The probability of the traffic indication and alerting system displaying a false traffic indication or traffic alert shall be as per RTCA/DO-323 SPR.69.
Status	<validated>
Rationale	False alerts could cause an adverse pilot response where no traffic hazard exists. The operational safety analysis in RTCA/DO-323 determined that this nuisance rate is safe.
Additional information	RTCA/DO-323 SPR.69. Note: An operation is defined as one gate to gate sequence.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0037	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-032-01</i>
Requirement	The probability of the traffic indication and alerting system displaying a nuisance traffic indication or advisory traffic alert shall be as per RTCA/DO-323 SPR.70/SR.12.
Status	<validated>

Rationale	Nuisance alerts could cause an adverse pilot response where no traffic hazard exists. The operational safety analysis in RTCA/DO-323 determined that this nuisance rate is acceptable.
Additional information	Considered in RTCA/DO-323 SPR.70/SR.12. The original requirement applies to indications.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-033-01</i>
Requirement	The probability of the traffic alert system displaying a nuisance caution or warning traffic alert shall be as per RTCA/DO-323 SPR.71/SR.13.
Status	<validated>
Rationale	Nuisance alerts could cause an adverse pilot response where no traffic hazard exists. The operational safety analysis in RTCA/DO-323 determined that this nuisance rate is safe.
Additional information	Considered in RTCA/DO-323 SPR.71/SR.13. The requirement was reworded to specifically state that the alerts that the requirement applies to are caution alerts and warning alerts.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-034-01</i>
Requirement	The integrity of the airport map or runway data used to generate traffic indications and alerts shall be commensurate with a design assurance level of C or better as per RTCA/DO-323 SPR.47 and RTCA/DO-323 SPR.48.
Status	<validated>
Rationale	Airport map data used to generate alerts must have an integrity level that prevents excessive false or nuisance alerts.
Additional information	Considered in RTCA/DO-323 SPR.47 and RTCA/DO-323 SPR.48.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-035-01</i>
Requirement	The traffic indication and alerting system shall make the effectivity date for the airport map or runway data available.
Status	<validated>
Rationale	One need to know it and it is subject to updates as AIP as changing.
Additional information	Considered in RTCA/DO-323 SPR.49.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-036-01</i>
Requirement	To be eligible for traffic indications and alerts, the target traffic/vehicle shall have a Design Assurance Level C or better for the system that provides surveillance information that is used for alerts RTCA/DO-323 SPR.75.
Status	<validated>
Rationale	The surveillance information from targets must meet a design assurance level to limit false or nuisance alerts.
Additional information	Considered in RTCA/DO-323 SPR.75.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0034	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-037-01</i>
Requirement	The traffic alert suppression system shall have a probability of undetected loss of suppression as combined from RTCA/DO-323 SPR.22 and RTCA/DO-323 SPR.24..
Status	<validated>
Rationale	Safety requirement for the alert suppression system to ensure that it is unlikely that the flight crew will be distracted by an alert at speeds above sized speed.

Additional information	Considered in RTCA/DO-323 SPR.22 and RTCA/DO-323 SPR.24. Requirements from RTCA/DO-323 were combined.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-038-01</i>
Requirement	The traffic alert suppression system shall be certified to Design Assurance Level C or better as per RTCA/DO-323 SPR.72.
Status	<validated>
Rationale	Safety requirement for the alert suppression system to ensure that it is unlikely that the flight crew will be distracted by an alert at speeds greater than sized speed.
Additional information	Considered in RTCA/DO-323 SPR.72.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0034	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.2 Traffic alerts function for TWY-ITA

Here are the different levels that can be considered:

- **Traffic Display Information level**
 - For pilots' awareness about the overall traffic situation on the airport with a focus on the taxiway to be used
- **Indications (TI) level** for normal traffic condition that could become a traffic safety hazard. Indications do not actively attract attention from flight crews but provide enhanced situation relevant information to facilitate flight crew perception of potential safety hazards. Indications are not alerts.
- **Traffic Alerts level including:**
 - Advisory alert level for traffic conflict conditions that require flight crew awareness and may require subsequent flight crew response.
 - Caution alert level for traffic conflict conditions that require immediate flight crew awareness and subsequent flight crew response.

All the following requirements are similar to runway ones. They are identified with _T at the end of the identifier.

4.2.2.1 HMI requirements TWY-ITA

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -101-02</i>
Requirement	Airport Surface Alerts function HMI shall be consistent with cockpit alerting and display conventions.
Status	<validated>
Rationale	To be sure that the HMI respects the HMI cockpit rules.
Additional information	Display convention like document CS-25 13-22 and FAA document AC 25.1322-1.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -102-02</i>
Requirement	Airport Surface Alerts function shall trigger cockpit effects matching the associated level of alert and appropriate presentation medium (auditory: tones and voiced alerts, moving map visual indications, and textual indications).
Status	<validated>
Rationale	To have cockpit consistency and fulfil certification requirements (e.g. document CS-25 13-22 and FAA document AC 25.1322-1.)
Additional information	Cockpit effects include both aural (mandatory in caution situations) and visual effects. The visual effects may be an indication on the Moving Map or PFD. Airport Surface Alerts function can use the following levels of indications and alerts: Indication level (visual indications) Advisory alert level Caution alert level
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0006	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0039	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -104-03</i>
Requirement	Airport Surface Alerts function shall be capable of managing several alerts at the same time.
Status	<validated>

Rationale	To facilitate the detection of simultaneous alerts and to manage simultaneously aural and displayed alerts. In case several aircraft cause an alert, a priority will be given to the nearest risk of collision.
Additional information	For example, to provide one aural alert and one message on ND/PFD/others displays at a time.
Category	Functional; HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1008	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-105-01</i>
Requirement	Airport Surface Alerts function shall be capable of managing the priority between the different alerts.
Status	<validated>
Rationale	To alert the flight crew firstly with the highest priority alert.
Additional information	In particular, for the audio alerts.
Category	Functional; HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0037	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -107-01</i>
Requirement	Airport Surface Alerts function shall be usable by single-pilot or dual-pilot aircraft as safety net
Status	<validated>
Rationale	Because the flight crew number will depend on the company and aircraft constraints (i.e. Business jets can be flown by only one pilot contrary to commercial aircraft that need to have two flight crew members at a time). As safety net the function cannot be used for navigation. It also means that the procedures are unchanged when the function does not provide any alert.
Additional information	RTCA/DO-323 SPR.9
Category	Functional; HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0025	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -108-01</i>
Requirement	Airport Surface Alerts function should be designed to avoid extra workload for the flight crew.
Status	<validated>
Rationale	In order to not introduce more disturbance than help for flight crew tasks.
Additional information	
Category	Functional; HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	REQ-03B.05-V3-TS -109-01
Requirement	Airport Surface Alerts function shall use up-to-date airport data.
Status	<deleted>
Rationale	In order to avoid having nuisance alerts because of out-of-date airport database.
Additional information	Considered in RTCA/DO-323 ASSUMP-OSED.15. Here are the minimum airport data that would be used: Airport Traffic Alerts function would use minimum runway data (threshold runway position, the length, the width and the threshold runway elevation). DELETED because not functional. Also covered by performance requirements
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	REQ-03B.05-V3-TS -110-01
Requirement	SURF-A/SURF-ITA function shall be activated by default for airport operations.
Status	<validated>

Rationale	There is no means to verify (or impose) that it will remain activated for all flights in operational real life, pilots having the capability to switch-it off at discretion (cf. REQ-03B.05-V3-TS-068).
Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0009	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -111-01</i>
Requirement	Airport Surface Alerts function shall inform the maintenance system of the unavailability of the Airport Surface Alerts function or part of the function.
Status	<validated>
Rationale	So as to keep the function available again.
Additional information	
Category	Functional; HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	No link to OSED/SPR	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-CMAP.0005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -112-01</i>
Requirement	Airport Surface Alerts function shall provide a means for the crew to manually activate/deactivate the function on crew decision.
Status	<validated>
Rationale	In addition to the automatic enabling/disabling, the flight crew should have the possibility to enable/disable TWY-ITA manually in specific situation when nuisance alerts are triggered. The need for manual disabling is to be confirmed.
Additional information	
Category	Functional; HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1009	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -103-01</i>
Requirement	TWY-ITA function shall provide the flight crew with indication and alert cues (which could be graphical indications of the traffic conflict on the moving map, depending of implementation), textual indications, and/or auditory alerts as long as the hazardous situation is detected.
Status	<validated>
Rationale	To be sure that the flight crew is alerted if the hazardous situation continues.
Additional information	Depending on the context and the level of alert, some or all these HMI cues may be displayed.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1001	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1003	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1006	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -185-01</i>
Requirement	Traffic information shall be displayed on adequate display unit.
Status	<validated>
Rationale	To be sure that the flight crew will detect easily the traffic information.
Additional information	
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1002	Full
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1003	Full
<ALLOCATED_TO>	<Functional block>	Display Unit	Full
<ALLOCATED_TO>	<Project>	PJ03b-05	Full

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -186-01</i>
Requirement	TWY-ITA function shall define the following limits for traffic display: a maximum number of displayed airborne traffic (M0) a maximum number of displayed ground traffic (M1)
Status	<validated>

Rationale	In order to avoid cluttering of the display and in order to focus only on the most important traffic.
Additional information	M0 and M1 could be configurable in case these maximum numbers should be adapted or changed.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1001	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -158-01</i>
Requirement	TWY-ITA function shall display at least a traffic symbol on the airport moving map (traffic position and direction) for a traffic considered with Traffic Display Information level.
Status	<validated>
Rationale	In order to provide flight crew traffic awareness on relevant traffic. In order to ease anticipation of a potential conflicting situation.
Additional information	
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1002	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1003	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -187-01</i>
Requirement	TWY-ITA function shall display at least the following cues for each alert level: Intruder traffic symbol on airport moving map Complementary information about intruder triggering the alert
Status	<validated>
Rationale	In order to provide flight crew with enough information to understand the conflict situation.
Additional information	Complementary information can be for example additional traffic information (traffic label) and a PFD message depending on aircraft implementation.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0010	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -161-01</i>
Requirement	As long as there are several traffic alerts and conflicting traffic alert cues, TWY-ITA function shall display in priority cues of the earliest time-critical alert.
Status	<validated>
Rationale	In order that flight crew detects the most critical alert.
Additional information	
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0008	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -102-02</i>
Requirement	TWY-ITA function shall provide indications and alerts adapted to the display configuration (range/mode/background information).
Status	<validated>
Rationale	To be sure that the alert visual information is provided to pilots whatever the display selection.
Additional information	It means that whatever the display configuration used, flight crew should still be able to view Airport Surface Alerts indications and alerts.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1002	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1010	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -103-02</i>
Requirement	TWY-ITA function shall provide means to identify the cause of the traffic conflict at any range in case a traffic alert is triggered.
Status	<validated>
Rationale	The alert works whatever the display selection.

Additional information	It means that whatever the range selected by the flight crew, flight crew should be able to view the cause of the traffic conflict. An “out-of-range” feedback may be provided in case intruder causing the conflict is out of the range.
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	REQ-03B.05-V3-TS -162-01
Requirement	TWY-ITA function HMI shall indicate to flight crew when the conflict alert is no more active.
Status	<validated>
Rationale	In order to let flight crew aware about the end of the conflicting situation.
Additional information	
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1002	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>FRD-ALERTS-GTA-164-01</i>
Requirement	TWY-ITA function shall display ground traffic and airborne traffic differently.
Status	<validated>
Rationale	In order to let the flight crew well aware if the traffic is on ground or airborne.
Additional information	For Traffic Display Information level, ground traffic can be displayed with tan/brown color and airborne traffic can be displayed with white or blue color (as recommended by RTCA DO-317).
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1001	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-166-01</i>
Requirement	TWY-ITA function shall display an alerting traffic with airport traffic alert cues even if this traffic is already displayed by TCAS function (RA, TA, Other, Proximate) if applicable on taxiways.
Status	<validated>
Rationale	In order to display all traffic the same way even traffic already displayed by TCAS.
Additional information	For example when ownship is crossing stop-bar while a traffic is on final approach, this traffic on approach could be first displayed by TCAS and then displayed by airport traffic alert (if generating an alert).
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1012	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1014	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1001	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-167-01</i>
Requirement	TWY-ITA function shall display airborne relevant traffic for Traffic Display Information taking into account TCAS feedbacks and the new system (if it's not the TCAS) if this traffic is already displayed by TCAS (RA, TA, Other, Proximate).
Status	<Deleted>
Rationale	In order to have consistency with existing TCAS feedbacks.
Additional information	For example, for an airborne relevant traffic that has "Other Traffic" (OT TCAS status), the traffic symbol could include an empty diamond showing that it is an "OT" traffic. Deleted because too close to reqt 166
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0010	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>FRD-ALERTS-GTA-192-01</i>
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Requirement	All ground traffic displayed by the Airport Surface Alerts function shall be inside the movement area of the AMM.
Status	<deleted>
Rationale	Ground traffic outside the movement area will decrease situational awareness.
Additional information	Deleted because obvious
Category	HMI
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.2.2 Functional requirements TWY-ITA

Important note:

In this issue, most of the requirements specifying triggering condition following from runway requirements and do not include low level requirements.

Use case illustrations have been kept to provide some examples of situations that will be covered.

In this part, the focus is set on the traffic conflict on taxiway, with use case below:

Ownship is on the ground on the taxiway system out of the runway safety area with ground conflicting traffic.

4.2.2.2.1 Transverse Functional requirements TWY-ITA

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -107-01</i>
Requirement	TWY-ITA function shall use airport data compliant to EUROCAE ED-99 RTCA DO-272.
Status	<validated>
Rationale	ED-99 capture rules will ensure the compliance with Authoritative data source (AIP), interoperability between aircraft and interoperability between aircraft systems and ATC systems.

Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -168-01</i>
Requirement	TWY-ITA function should let the possibility for Traffic Alerts to have a manual deactivation means for the whole Traffic Alerts sub-function.
Status	<validated>
Rationale	In order to deactivate the function in some particular situations.
Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1009	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -113-01</i>
Requirement	TWY-ITA function shall detect possible conflict with aircraft that are out of the runway engagement zone and within traffic relevant zone close to ownship.
Status	<validated>
Rationale	In order to filter relevant traffic for alert. To anticipate the maximum of hazardous situation and reduce useless alerts.
Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1010	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -169-01</i>
Requirement	TWY-ITA function shall sort the relevant traffic for Traffic Display by order of priority for display.
Status	<validated>
Rationale	Because the number of traffic displayed will be limited and it is consistent to sort traffic with priority order.
Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1001	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -181-01</i>
Requirement	TWY-ITA function shall display the relevant traffic for Traffic Display with priority to most critical traffic.
Status	<validated>
Rationale	Because the number of traffic displayed will be limited and it is consistent to display most critical traffic.
Additional information	For example, the criteria “distance to runway” or “distance to ownship” could be used to detect most critical traffic.
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1008	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -109-01</i>
Requirement	The alert resulting of conflict / infringement detection shall enable an appropriate remedial action.
Status	<validated>
Rationale	To provide timely alerts to have enough time to solve the problem.
Additional information	The time frame takes into account a crew and aircraft reaction time.

Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1010	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.2.2 Use cases when ownship is on ground out of the REZ

[REQ]

Identifier	<i>FRD-ALERTS-V3-TS-190-01</i>
Requirement	Airport Surface Alert function shall trigger an alert when conflict is detected for the ownship and traffic.
Status	<validated>
Rationale	To alert the flight crew of a potential conflict with another aircraft.
Additional information	
Category	Functional
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1010A	<Full>
ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.2.3 Performance requirements TWY-ITA

The performance requirements for traffic indications and alerting have not been defined within performance requirements developed in RTCA/DO-323 “Safety, Performance and Interoperability Requirements Document for Enhanced Traffic Situational Awareness on the Airport Surface with Indications and Alerts (SURF IA)”.

SESAR PJ.03b-05	RTCA/DO-323
Indication or Advisory	Indication
Caution Alert	Caution Alert
N/A	Warning Alert

Table 4: Alert Terminology for / PJ.03b-05 and RTCA/DO 323

4.2.2.3.1 Airport Map Data TWY-ITA

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -139-01</i>
Requirement	Airport map data should comply Medium level of Data Quality Requirements defined in EUROCAE ED-99 / RTCA DO-272 / DO-200
Status	<validated>
Rationale	Airport map data used to generate traffic indications and alerts must have an accuracy defined. This accuracy is consistent with existing airport map database requirements and was used in the operational performance analysis in RTCA/DO-323.
Additional information	Considered in RTCA/DO-323 SPR.50.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1014	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1034	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.2.3.2 Ownship TWY-ITA

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -140-01</i>
Requirement	For traffic indications and alerts, the horizontal position accuracy for ownship on the surface shall be equal to or better than the values NACp 9 .
Status	<validated>
Rationale	Ownship horizontal position accuracy requirements are needed to limit nuisance indications and alerts. It is possible to use less accurate horizontal position data if the allowable nuisance rates are met. For example, certain alerting algorithms may delay an indication or alert when ownship has less accurate data to keep nuisance rates low. In line with MOPS version 2.
Additional information	It has been proved accuracy parameters does not reflect real accuracy of the traffic. An alternative qualification with ownship parameters would be acceptable.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -143-01</i>
Requirement	In cases where ownship velocity is used for traffic indications or alerts, the velocity accuracy for ownship shall be as per RTCA/DO-323 SPR.55 with 95% probability.
Status	<validated>
Rationale	An ownship velocity accuracy requirement is needed to limit nuisance indications and alerts.
Additional information	Considered in RTCA/DO-323 SPR.55.

Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -144-01</i>
Requirement	For traffic indications or alerts where ownship directionality is required, ownship directionality shall be as per RTCA/DO-323 SPR.56 requirement with 95% probability.
Status	<validated>
Rationale	An ownship directionality requirement is needed to limit nuisance indications and alerts.
Additional information	Considered in RTCA/DO-323 SPR.56.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -145-01</i>
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Requirement	For the traffic indication and alerting system to provide traffic indications, and caution alerts, the probability that the horizontal position for ownship is erroneous shall be as per RTCA/DO-323 SPR.66 and RTCA/DO-323 Table 3-8.
Status	<validated>
Rationale	An ownship horizontal position integrity requirement is needed to limit nuisance indications and alerts.
Additional information	
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1034	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.2.3.3 Traffic TWY-ITA

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -147-01</i>
Requirement	The horizontal position accuracy for surface traffic aircraft shall be equal to or better than the NACp 9 value.
Status	<validated>
Rationale	Traffic horizontal position accuracy requirements are needed to limit nuisance indications and alerts. It is possible to use less accurate horizontal position data if the allowable nuisance rates are met. For example, certain traffic alerting algorithms may delay an indication or alert on a target with less accurate data to keep nuisance rates low.
Additional information	Based on analysis of real environment D4.1.010 and FTS
Category	Performance
Verification Method	Test



[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -150-01</i>
Requirement	In cases where traffic velocity is used for traffic indications or alerts, the velocity accuracy for traffic to qualify for traffic indications or alerts shall comply with RTCA/DO-323 SPR.62 at 95%.
Status	<validated>
Rationale	A traffic velocity accuracy requirement is needed to limit nuisance indications and alerts.
Additional information	
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -152-01</i>
Requirement	For the traffic indication and alerting system to provide informative, advisory or caution traffic alerts, the probability that the horizontal position for traffic is erroneous shall comply with RTCA/DO-323 SPR.64 and RTCA/DO-323 Table 3-8.
Status	<validated>

Rationale	A traffic horizontal position integrity requirement is needed to limit nuisance indications and alerts.
Additional information	
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	<Full>
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>

4.2.2.3.4 Traffic Latency TWY-ITA

The latency requirements for the traffic alerting system are driven by the latency requirements for ATSA-SURF. Requirements for ATSA-SURF are specified in RTCA/DO-322 Safety, Performance and Interoperability Requirements Document for ATSA-SURF Application [10]. In addition, a new version of RTCA/DO-317 “Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications System (ASAS)” is being developed that will include ATSA-SURF. It will be designated RTCA/DO-317A and is expected to be completed late in 2011. The current draft version of RTCA/DO-317A is Minimum Operational Performance Standards (MOPS) For Aircraft Surveillance Applications (ASA) System Draft 4.00 working version as of 6/10/2011 [9].

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -154-01</i>
Requirement	The total latency of the traffic indication and alerting system from the receipt of the traffic position and velocity to display to the flight crew shall meet the maximum latency requirements specified in RTCA/DO-317A Table 2-2 for SURF ref. [45].
Status	<validated>
Rationale	Total latency requirements are needed to ensure timely display of traffic information.
Additional information	Considered in RTCA/DO-323 SPR.18.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1012	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -155-01</i>
Requirement	The uncompensated latency of the traffic position from the receipt of the surveillance information to display to the flight crew for traffic indications and alerts shall meet the requirements specified in RTCA/DO-322, Section B.5.2.1.2.
Status	<validated>
Rationale	Uncompensated latency requirements are needed for accurate display of traffic position.
Additional information	Considered in RTCA/DO-323 SPR.19.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1013	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -156-01</i>
Requirement	The maximum allowable data age of the traffic position and velocity for traffic indications and alerts shall meet the “Maximum Age Until Data Dropped” requirement in RTCA/DO-317A, Table 2-2 ref. [45].
Status	<validated>
Rationale	Maximum data age requirements are needed to limit nuisance traffic indications and alerts aren’t provided.
Additional information	Considered in RTCA/DO-323 SPR.20.
Category	Performance
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1005	<Full>
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.2.4 Safety requirements TWY-ITA

The safety requirements for traffic indications and alerts are primarily based on the safety requirements developed in SAR SPR part II deliverable as there is no previous analysis from RTCA DO-323.

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -128-01</i>
Requirement	The traffic indication and alerting equipment shall not possess any single point failure or common cause failure that leads to a catastrophic outcome.
Status	<deleted>
Rationale	To be sure that this function will not increase the safety risks.
Additional information	RTCA/DO-323 SPR.74. Deleted because no cause can lead to a catastrophic outcome

Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -129-01</i>
Requirement	The traffic indication and alerting equipment shall not possess any undetectable latent failure that, when combined with any single point failure or common cause failure, leads to a catastrophic outcome.
Status	<deleted>
Rationale	To be sure that this function will not increase the safety risks.
Additional information	RTCA/DO-323 SPR.76. Deleted because no cause can lead to a catastrophic outcome
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -130-01</i>
Requirement	Equipment implementing traffic indications or alerts that is capable of outputting erroneous or false indications or alerts shall be developed and certified to Design Assurance Level D or better.
Status	<validated>

Rationale	To be sure that this function will not increase the safety risks.
Additional information	RTCA/DO-323 SPR.68.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1034	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	REQ-03B.05-V3-TS -131-01
Requirement	The probability of the traffic indication and alerting system displaying a false traffic indication or traffic alert shall comply with RTCA/DO-323 SPR.69 requirement.
Status	<validated>
Rationale	False alerts could cause an adverse pilot response where no traffic hazard exists. The operational safety analysis in RTCA/DO-323 determined that this nuisance rate is safe.
Additional information	RTCA/DO-323 SPR.69. Figure similar to SURF-ITA resumed. Note: An operation is defined as one gate to gate sequence.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0037	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A



[REQ]

Identifier	<i>REQ-03B.05-V3-TS -132-01</i>
Requirement	The probability of the traffic indication and alerting system displaying a nuisance traffic indication or advisory traffic alert shall be in RTCA/DO-323 SPR.70/SR.12.
Status	<validated>
Rationale	Nuisance alerts could cause an adverse pilot response where no traffic hazard exists. The operational safety analysis in RTCA/DO-323 determined that this nuisance rate is safe.
Additional information	Considered in RTCA/DO-323 SPR.70/SR.12. The original requirement applies to indications.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -133-01</i>
Requirement	The probability of the traffic alert system displaying a nuisance caution traffic alert shall comply with RTCA/DO-323 SPR.71/SR.13 requirement.
Status	<validated>
Rationale	Nuisance alerts could cause an adverse pilot response where no traffic hazard exists. The operational safety analysis in RTCA/DO-323 determined that this nuisance rate is safe.
Additional information	Considered in RTCA/DO-323 SPR.71/SR.13. The requirement was reworded to specifically state that the alerts that the requirement applies to are caution alerts and warning alerts.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -134-01</i>
Requirement	The integrity of the airport map or runway data used to generate traffic indications and alerts shall be commensurate with a design assurance level of C or better.
Status	<validated>
Rationale	Airport map data used to generate alerts must have an integrity level that prevents excessive false or nuisance alerts.
Additional information	Considered in RTCA/DO-323 SPR.47 and RTCA/DO-323 SPR.48.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1034	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -135-01</i>
Requirement	The traffic indication and alerting system shall indicate the effectivity date for the airport map or runway data.
Status	<validated>
Rationale	To determine the freshness data airport map or runway.

Additional information	Considered in RTCA/DO-323 SPR.49 but modified to extend the information to other actors than flight crew.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	REQ-03B.05-V3-TS -136-01
Requirement	To be eligible for traffic indications and alerts, the target traffic/vehicle shall have a Design Assurance Level C or better for the system that provides surveillance information that is used for alerts.
Status	<validated>
Rationale	The surveillance information from targets must meet a design assurance level to limit false or nuisance alerts.
Additional information	Considered in RTCA/DO-323 SPR.75.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1034	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -137-01</i>
Requirement	The traffic alert suppression system shall have a probability of undetected loss of suppression complying with RTCA/DO-323 SPR.22 and RTCA/DO-323 SPR.24 requirements.
Status	<validated>
Rationale	Safety requirement for the alert suppression system to ensure that it is unlikely that the flight crew will be distracted by an alert at speeds above sized speed.
Additional information	Considered in Requirements from RTCA/DO-323 were combined, since SESAR PJ.03b-05 does not consider alerts and indications separately, but considers indications to be an informative type of alert.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	Not derived from SPR/INTEROP	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS -138-01</i>
Requirement	The traffic alert suppression system shall be certified to Design Assurance Level C or better.
Status	<validated>
Rationale	Safety requirement for the alert suppression system to ensure that it is unlikely that the flight crew will be distracted by an alert at speeds greater than sized speed.
Additional information	Considered in RTCA/DO-323 SPR.72.
Category	Safety
Verification Method	Test

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1034	N/A
<ALLOCATED_TO>	<Functional block>	Display Unit	N/A
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A

4.2.3 IRS Requirements

The following requirements are directly taken from SPR/OSED part I because, at aircraft level, the alert functions only needs ADS-B information. Other information is internal to the aircraft and already available.

This information is common to both Runway Alerts and Taxiway Alerts.

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-200-01</i>
Requirement	ADS-B/TIS-B/ADS-R data shall meet minimum performance requirements specified in the SPR section for Traffic Alerts for Pilots to be qualified for SURF-A/ITA application.
Title	Performance requirements
Status	<Validated>
Rationale	Any traffic information received by own-ship shall meet certain surveillance quality indicators (accuracy, integrity, etc...) to be SURF-A/ITA qualified. Quality indicators for SURF-IA application were identified in DO-323 § 4.3.7. Quality indicators for SURF-A/ITA application will be identified.
Category	<Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1007	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1008	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1035	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0002	<Full>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1002	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	Lateral positioning	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	REQ-03B.05-V3-TS-201-01
Requirement	The SURF-A/ITA system shall receive data according to relevant standards (EUROCAE/RTCA) for each surrounding traffic containing: ● identity (24-bit address) ● horizontal position ● vertical position ● quality indicators ● ground indication ● horizontal velocity ● vertical rate (when airborne) ● heading (when on ground)/track (when airborne) ● aircraft type (if available) ● emitter category (if available)
Title	Basic Information content
Status	<Validated>
Rationale	Providing flight crew with alerts and if the implementation is possible, situational awareness during runway operations.
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1007	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0003	<Full>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1003	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	ADS-B In	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	Change reference	N/A

[REQ]

Identifier	REQ-03B.05-V3-TS-202-01
Requirement	Traffic information transmitted to ownship domain shall provide information about an aircraft reference point.
Title	Aircraft reference point information (aircraft on ground only).
Status	<Validated>
Rationale	To be able to indicate the location of the nose of the aircraft, the GPS antenna offset may be used if available. This datum provides knowledge of the reference point of position information from the aircraft, normally not known. It avoids biases in aircraft position generating undue or missed alerts. Such information cannot be provided by TIS-B systems that have no access to this information.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0004	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1004	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	ADS-B In	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-203-01</i>
Requirement	Traffic information transmitted to ownship domain shall provide available information about the aircraft size.
Title	Reference point information (aircraft on ground only).
Status	<Validated>
Rationale	To be able to indicate the location of the nose of the aircraft, the GPS antenna offset may be used if available. This datum provides knowledge of the reference point of position information from the aircraft, normally not known. It avoids biases in aircraft position generating undue or missed alerts. Such information cannot be provided by ADS-R systems that have no access to this information.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0005	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1005	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	ADS-B In	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-204-01</i>
Requirement	The SURF-A/ITA system shall be able to receive information from the following sources : ● ADS-B surveillance data transmitted by ADS-B equipped mobiles, ● TIS-B surveillance data by TIS-B ground station, ● ADS-R surveillance data by ADS-R ground station.
Title	Source of information
Status	<Validated>
Rationale	To provide ownship with traffic information. The main expected source is ADS-B directly emitted by other aircraft. It can be completed by additional ground sources if mobiles are not visible from ownship or not equipped with ADS-B OUT capability.
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0004	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1004	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1008	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0006	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1006	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	ADS-B In	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-205-01</i>
Requirement	The SURF-A/ITA system shall receive the ownship data position from the on-board navigation system with appropriate performance.
Title	Ownship navigation data
Status	<Validated>
Rationale	To provide SURF-A/ITA with ownship data (position, speed, track), a receiver (e.g. GNSS) is required to reach the expected eligibility and performance.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0007	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1007	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	Lateral positioning	N/A
<ALLOCATED_TO>	<Functional block>	Vertical positioning	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-206-01</i>
Requirement	SURF-A/ITA equipment shall provide its availability status to the crew.
Title	SURF-A/ITA status
Status	<Validated>
Rationale	Flight crew shall be aware when SURF-A/ITA is enabled, disabled or when a malfunction is detected that can create nuisance alerts. If necessary, the crew can disable SURF-ITA.
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0008	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1008	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	Alerts Control & Display	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	<i>REQ-03B.05-V3-TS-207-01</i>
Requirement	The TIS-B ground station, if any, shall transmit ADS-B data according to relevant standards (EUROCAE/RTCA) for the whole airport traffic containing: ● identity (24-bit address) ● horizontal position ● vertical position ● quality indicators ● ground indication ● horizontal velocity ● vertical rate ● heading / track when airborne ● aircraft type (if available) ● emitter category (if available)
Title	TIS-B data
Status	<Validated>
Rationale	Providing ownship with the needed information for the SURF-A/ITA system
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1008	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1015	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1008	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0009	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1009	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	ADS-B Out	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	REQ-03B.05-V3-TS-208-01
Requirement	The ADS-R ground station, if any, shall transmit ADS-B data according to relevant standards (EUROCAE/RTCA) for the whole airport traffic containing: ● identity (24-bit address) ● horizontal position ● vertical position ● quality indicators ● ground indication ● horizontal velocity ● vertical rate ● heading / track when airborne ● aircraft type (if available) ● emitter category (if available)
Title	ADS-R data
Status	<Validated>
Rationale	Providing ownship with the needed information for the SURF-A/ITA system
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.1008	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1008	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1010	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	ADS-B Out	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	REQ-03B.05-V3-TS-209-01
Requirement	The ownship and surrounding traffic, if ADS-B equipped, shall transmit their own ADS-B data according to relevant standards (EUROCAE/RTCA) containing: ● identity (24-bit address) ● horizontal position ● vertical position ● quality indicators ● ground indication ● horizontal velocity ● vertical rate ● heading / track when airborne ● aircraft type (if available) ● emitter category (if available) ● Antenna position ● Aircraft size
Title	ADS-B data
Status	<Validated>
Rationale	Providing own-ship with the needed information for the SURF-A/ITA system
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ03b-05	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.0011	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-INTEROP-ITAP.1011	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	<Full>
<ALLOCATED_TO>	<Functional block>	ADS-B Out	<Full>
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	<Full>

5 Implementation Options

The definition and scope of SURF-A/ITA, TWY-A/TWY-ITA & SURF-ITA+ is provided in §3.2.

None of these function implementations changes pilots/controllers procedures and responsibilities. The flight crew's roles and responsibilities with respect to conducting aerodrome surface operations and maintaining traffic awareness for safety and collision avoidance will not change because of the SURF-ITA/TWY-ITA implementation i.e. the flight crew is still required to monitor the traffic visually using the out-the-window scan. However, in case a risk of collision on runway or taxiway appears, specific information will come up to support the flight crew in managing the situation.

It is considered that the maturity is V3 i.e. that alert concepts have been validated. Moreover, real prototypes have been used to demonstrate the airborne architecture works quite well. The quality of ADS-B data sent by aircraft has been checked. The first Real Time tests on aircraft have been done.

a) In RTCA DO-323 [42], the following indications and alerts levels of information are identified:

Indication:

Traffic Indication on runways (TIs) (cf. DO-323 definition).

Runway Status Indication (RSIs) (cf. DO-323 definition).

Alerts:

An Advisory alert (cf. DO-323 definition).

A Warning alert (cf. DO-323 definition).

b) In SURF-ITA for runways, the following SURF-ITA implementations are reminded i.e.:

a. SURF-A (Basic version) – for general use by commercial aircraft

Most aircraft in commercial aviation are not equipped with Airport Moving Map and a CDTI for ground aircraft display. This solution permits an easy and quick deployment and an efficient tool to reduce risks of collision on runways.

Indication:

- No indication provided.

Alerts:

A Warning alert – on runways only.

b. SURF-ITA (Optional version) – for use by aircraft when equipped with Airport Moving Map

Indication:

Traffic Indication on runways (TIs)

Runway Status Indication (RSIs) (cf. DO-323 definition).

Alerts:

A Caution alert – on runways only.

A Warning alert – on runways only.

c. TWY-A

Not validated at this phase of development.

Indication:

- No indication provided.

Alerts:

A Caution alert – on taxiways only.

d. TWY-ITA

Indication:

Traffic Indication on taxiways (TIs)

Alerts:

A Caution alert – on taxiways.

Due to IPR issues between the SJU and RTCA, this document includes some references to DO-323 without copying the original text. To be able to read and understand this SPR/Interop/OSED, it is required to have at the same time access to DO-323. Requirements retained from DO-323 are written in full text on matrix in section 6.2 to ease traceability between OSED and DO-323. DO-323 can be purchased on the RTCA website.

Configurations

Two configurations are defined:

- Mainline aircraft configuration
- Business aircraft configuration

The following table gives the implementation in function of the configuration:

Configuration	SURF-A	SURF-ITA	TWY-A	TWY-ITA
Mainline	Implemented			
Business	Implemented	Implemented	Not implemented	Implemented

Table 8: Implementations in function of the configuration

6 Assumptions

Assumptions are described in §4.1 of D4.1.190_OSED-SPR-INTEROP – part 1.

7 References and Applicable Documents

7.1 Applicable Documents

Content Integration

- [1] B.04.01 D138 EATMA Guidance Material
- [2] EATMA Community pages
- [3] SESAR ATM Lexicon

Content Development

- [4] B4.2 D106 Transition Concept of Operations SESAR 2020

System and Service Development

- [5] 08.01.01 D52: SWIM Foundation v2
- [6] 08.01.01 D49: SWIM Compliance Criteria
- [7] 08.01.03 D47: AIRM v4.1.0
- [8] 08.03.10 D45: ISRM Foundation v00.08.00
- [9] B.04.03 D102 SESAR Working Method on Services
- [10] B.04.03 D128 ADD SESAR1
- [11] B.04.05 Common Service Foundation Method

Performance Management

- [12] B.04.01 D108 SESAR 2020 Transition Performance Framework
- [13] B.04.01 D42 SESAR2020 Transition Validation
- [14] B.05 D86 Guidance on KPIs and Data Collection support to SESAR 2020 transition.
- [15] 16.06.06-D68 Part 1 –SESAR Cost Benefit Analysis – Integrated Model
- [16] 16.06.06-D51-SESAR_1 Business Case Consolidated_Deliverable-00.01.00 and CBA
- [17] Method to assess cost of European ATM improvements and technologies, EUROCONTROL (2014)
- [18] ATM Cost Breakdown Structure_ed02_2014
- [19] Standard Inputs for EUROCONTROL Cost Benefit Analyses

[20]16.06.06_D26-08 ATM CBA Quality Checklist

[21]16.06.06_D26_04_Guidelines_for_Producing_Benefit_and_Impact_Mechanisms

Validation

[22]03.00 D16 WP3 Engineering methodology

[23]Transition VALS SESAR 2020 - Consolidated deliverable with contribution from Operational Federating Projects

[24]European Operational Concept Validation Methodology (E-OCVM) - 3.0 [February 2010]

System Engineering

[25] SESAR 2020 Requirements and Validation Guidelines

Safety

[26]SESAR, Safety Reference Material, Edition 4.0, April 2016

[27]SESAR, Guidance to Apply the Safety Reference Material, Edition 3.0, April 2016

[28]SESAR, Final Guidance Material to Execute Proof of Concept, Ed00.04.00, August 2015

[29]SESAR, Resilience Engineering Guidance, May 2016

Human Performance

[30]16.06.05 D 27 HP Reference Material D27

[31]16.04.02 D04 e-HP Repository - Release note

Environment Assessment

[32]SESAR, Environment Reference Material, alias, “Environmental impact assessment as part of the global SESAR validation”, Project 16.06.03, Deliverable D26, 2014.

[33]ICAO CAEP – “Guidance on Environmental Assessment of Proposed Air Traffic Management Operational Changes” document, Doc 10031.

Security

[34]16.06.02 D103 SESAR Security Ref Material Level

[35]16.06.02 D137 Minimum Set of Security Controls (MSSCs).

[36]16.06.02 D131 Security Database Application (CTRL_S)

7.2 Reference Documents

[37]ED-78A GUIDELINES FOR APPROVAL OF THE PROVISION AND USE OF AIR TRAFFIC SERVICES SUPPORTED BY DATA COMMUNICATIONS.

- [38] ICAO Document 9830, “Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual,” 1st Edition, 2004
- [39] ICAO Document 9476, “Manual of Surface Movement Guidance and Control Systems (SMGCS),” 1st Edition, 1986
- [40] ICAO, Document 4444, Procedures for Air Navigation Services, “Air Traffic Management,” Fifteenth edition, 2007
- [41] RTCA DO-322 / EUROCAE ED-165, “Safety, Performance and Interoperability Requirements document for ATSA-SURF application”, December 2010
- [42] RTCA DO-323, “Safety, Performance And Interoperability Requirements Document For Enhanced Traffic Situational Awareness On The Airport Surface With Indications And Alerts (SURF IA)”, December 2010
- [43] FAA AC 25.1322-1, “Flight crew alerting”, 13 December 2010
- [44] DA4.1.030, SESAR PJ.03b-05 SPR-INTEROP/OSED V3 – Part I, 09 September 2017
- [45] RTCA DO-317A - MINIMUM OPERATIONAL PERFORMANCE STANDARDS (MOPS) FOR AIRCRAFT SURVEILLANCE APPLICATIONS (ASA) SYSTEM

Project PJ.03b Members



Project PJ.03b Active Organizations

ADP	ENAV	LPS SR
AIRBUS SAS	EUROCONTROL	MICROSTEP-MIS
AIRBUS OPS	FREQUENTIS	NLR
ANS CR	HONEYWELL SAS	PANSA
BULATSA	HONEYWELL Inc.	TECHNO SKY
DASSAULT	HONEYWELL Sro	THALES LAS
DFS	INDRA	THALES AVIONICS
DLR	INDRA NAVIA	R-SYS
DSNA	INTEGRA	UNIWARSAW
EDISOFT	LEONARDO	UNIZA

End of the document