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SAFE

TRAFFIC ALERTS FOR PILOTS FOR AIRPORT OPERATIONS

This SESAR PJ.03b-05 V3 SPR-INTEROP/OSED - Part I document 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

This document addresses “Traffic Alerts for Pilots” during ground operations. It covers both traffic alerts on runway and traffic alerts on taxiways.

This document is the Safety and Performance Requirement, Interoperability and Operational Services and Environment Description (SPR/Interop-OSED) for the “Traffic Alert for pilots” element of SESAR operational concept. It describes the operating methods and operational environment, illustrates the concept with some use cases and lists the assumptions and requirement related to the “Traffic Alerts for pilots”.

About traffic Alerts on runways, this SPR-Interop/OSED resumes the similar document written in SESAR 1 at V2 maturity and has been updated following V3 validation exercises for mainline and business aircraft. In continuity with RTCA DO-323 [42], it addresses 2 possible implementations depending on aircraft equipment (with or without ATSA-SURF capability).

The document has been also updated with taxiway traffic alerting part developed under SESAR 9.14 for Business solution, which extends the baseline runway traffic alerts definition of SURF-ITA and brings new extended taxiway traffic alerts features used with acronym SURF-ITA+.

The SPR-INTEROP/OSED Template includes the following parts:

- ***SPR-INTEROP/OSED Template – Part I (this volume)***
- SPR-INTEROP/OSED Template – Part II Safety Assessment Report (SAR)
- SPR-INTEROP/OSED Template – Part III Security Assessment Report (SecAR)
- SPR-INTEROP/OSED Template – Part IV Human Performance Assessment Report (HPAR)
- SPR-INTEROP/OSED Template – Part V Performance Assessment Report (PAR)

The document has been aligned with the latest EATMA MEGA model definition.

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1 Executive Summary

To improve safety of runway and taxiway operations, the SESAR PJ.03b-05 Solution SURF-A/ITA application aims at triggering in the cockpit alerts to inform directly the flight crew in case of risk of collision against any mobile equipped with ADS-B OUT transmitter. Then, the flight crew can be ready to possibly undertake or can undertake any action required to resolve the risk of collision with this mobile during runway and taxiway operations. It is an additional safety net, closer loop with direct alert to the flight crew.

The SESAR PJ.03b-05 Solution with Aircraft Capability Configuration (

Figure 1) is identified as an ADS-B In application within Surveillance / Traffic domain of the CNS model.

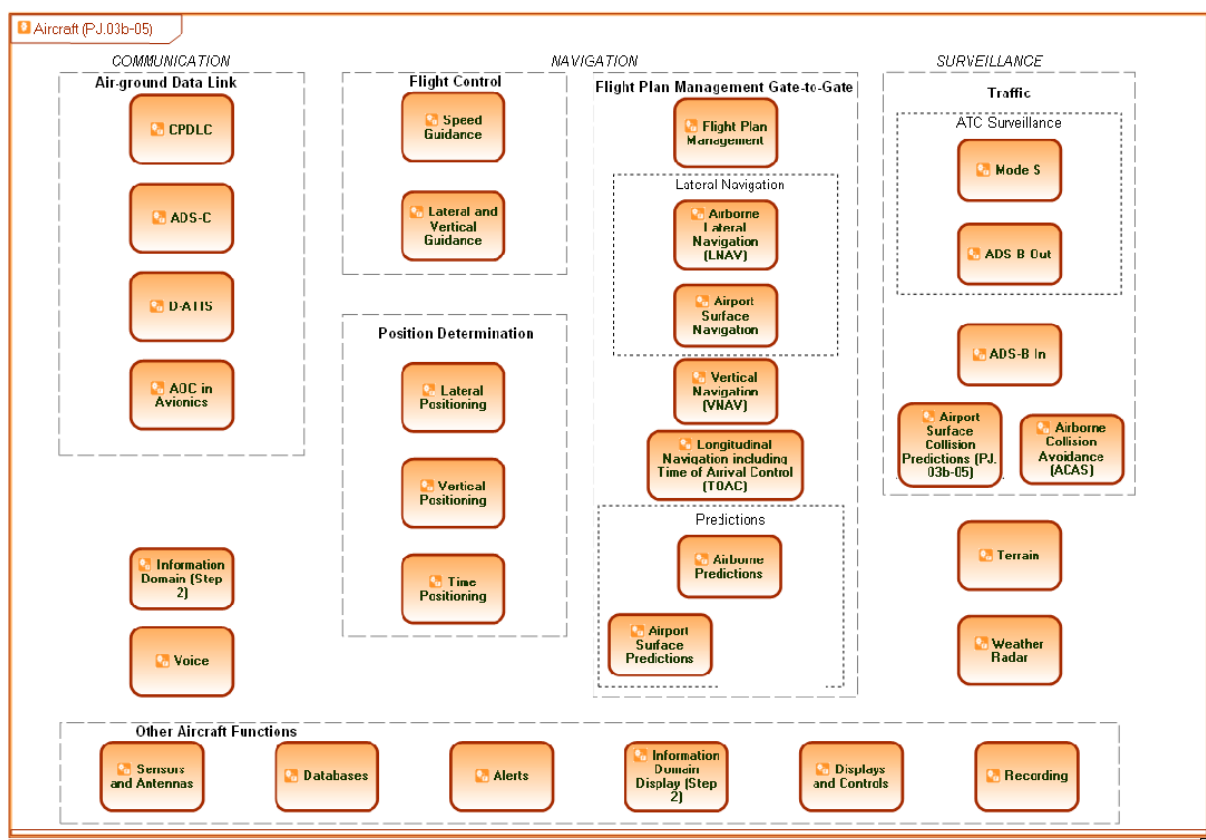


Figure 1 - CNS model of Aircraft (Configuration Capability)

Below Figure 2 - PJ.03b-05 Solution with OI Steps definition

provides definition of the PJ.03b-05 Solution with OI steps.

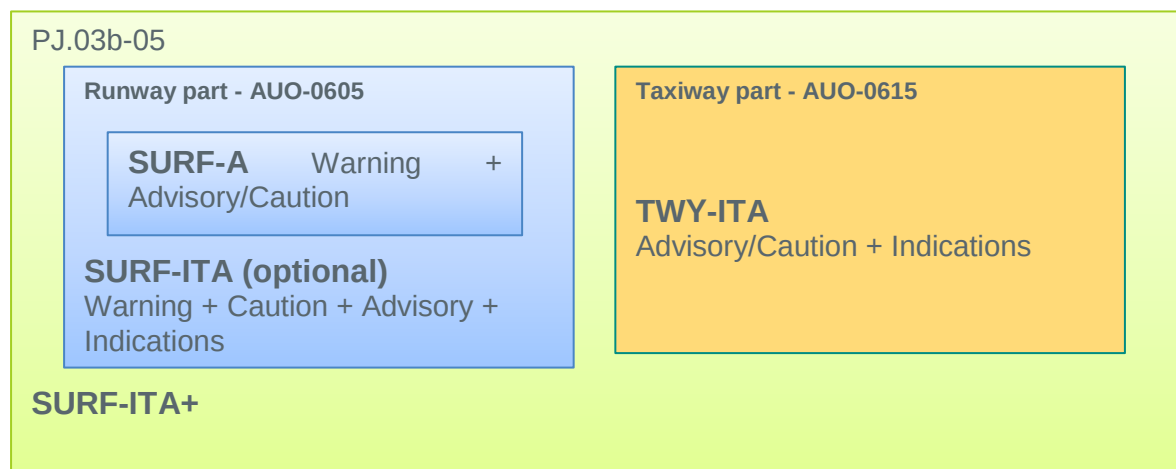


Figure 2 - PJ.03b-05 Solution with OI Steps definition

SURF-A Surface Traffic Alerts on runways for pilots without traffic display and Warning alerts on ground only and with optional caution/advisory in air.

SURF-ITA Surface Traffic Alerts & Indication on runways for pilots with optional display, Advisory, Caution and Warning alerts.

Note: SURF-ITA wording is used in SESAR PJ.03b-05 to distinguish the European version of the application from SURF IA defined in RTCA DO-323[42].

TWY-ITA Surface Traffic Indication & Alerts on taxiways for pilots (Advisory/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-A is the taxiway traffic alerts function without display indication which was not part of the SESAR 1 and 2020 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 and validation activities.

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-A/ITA/TWY-ITA are intended to be used by commercial aircraft (i.e. mainline, regional aircraft and business aircraft) 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.

SURF-A/ITA/TWY-ITA does not change controller 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

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SURF-A/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.

This issue follows validations that have been performed during SESAR 1 project 9.14 for mainline and business aircraft.

1) In RTCA DO-323 [42], the following SURF IA 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 (cf. DO-323 and §2.6 Definition)
- A Caution alert (cf. DO-323 definition).
- A Warning alert (cf. DO-323 definition).

2) In SURF-ITA for runways, the following SURF-ITA levels of information are identified:

a. SURF-A (Basic version) (PJ.03b-05 Solution)

Indication:

- No indication provided.

Alerts:

- A Warning and Advisory/Caution alert – on runways only.

b. SURF-ITA (Optional version) (PJ.03b-05 Solution)

Indication:

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

Alerts:

- An Advisory – on runways only
- A Caution alert – on runways only
- A Warning alert – on runways only.

c. TWY-ITA (PJ.03b-05 Solution)

Indication:

- Traffic Indication on taxiways (TIs)

Alerts:

- An Advisory/Caution alert – on taxiways.

In continuity with RTCA DO-323, this document considers that there may be several ways to implement traffic alerts because:

- All aircraft may not be equipped with ATSA-SURF (or CDTI for ground aircraft on airport moving map),
- Airbus and Honeywell performed validation that considered two possible implementations that are operationally valuable.

A first implementation of SURF-A (basic implementation), evaluated by Airbus considers aircraft that are not equipped with an airport moving map hence no ATSA-SURF or CDTI on ground. So, only a warning alert level on ground is provided to pilots in case of imminent risk of collision with possible Advisory/Caution in air. This was consolidated in V3 validation exercise.

The second implementation of SURF-ITA “Optional” based on ATSA-SURF, evaluated by Honeywell, reflects the full DO-323 [42] concept (warning, caution and advisory indications). This implementation is called “optional” in the document.

An alternative possibility to the full 2nd implementation is considered based on V3 validation performed by Airbus where the caution is changed into an advisory and indications are not used as covered by SURF through Traffic Display on the moving map.

For the clarity of this document, Caution and advisory will be considered in the same way and mentioned as “Advisory/Caution”. About indications, only a minimum set of requirements have been retained if it is chosen to keep them as attention getters to emphasize the basic traffic display.

This document reflects the dual implementation throughout the Use Cases and requirements.

The objective will be to support a harmonized US/Europe application based on one side on the US activities (i.e. RTCA DO-323 and the on-going work) and on the other side on the SESAR activities that can be implemented depending on aircraft current equipage.

DO-323 [42] does not define taxiway traffic alerts requirements, but it is used as a reference document giving the baseline extended with TWY-ITA 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. DO-323 can be purchased on the RTCA website.

2 Introduction

2.1 Purpose of the document

This document is a key deliverable for SESAR PJ.03b-05 SAFE data pack and is composed of several parts.

The OSED (Operational Service and Environment Definition) part I describes the operational concept for the SESAR “Traffic Alert for Pilots” function. It defines the operational services, their environment, use cases, assumptions and requirements.

The OSED is used as the basis for assessing and establishing safety and performance requirements for the related systems further detailed in the Safety and Performance Requirements (SPR) part and interoperability part (INTEROP). The OSED identifies the operational services supported by several entities within the ATM community and includes the operational expectations of the related systems.

The document also provides reference MEGA model diagrams related to overall ATM environment.

2.2 Scope

This SPR-INTEROP/OSED part I details the operational concept of the SESAR2020 solution PJ.03b-05 “Traffic alerts for pilots for airport operations” included in the SESAR2020 project PJ.03b “Airport Safety Nets”.

The project PJ.03b deals with safety support tools for several actors on airport: pilots, controllers and the overall operational interoperability of Airport Safety Nets, considering RMCA, CMAC, CATC, CMAP, SURF. The objectives of the project are to define and validate airport safety support tools for pilots, vehicle drivers and controllers to address safety critical issues (e.g. risk of collision, route deviations, etc.) on the airport movement area. Various kinds of alerts will be provided to controllers, pilots and vehicle drivers and Runway Status Lights (RWSL) will warn pilots and vehicle drivers when it is unsafe to enter, cross, or take-off on a runway.

This SPR-INTEROP/OSED describes the SURF-ITA (Surface Traffic Indications and Alerts on runways) application and the TWY-ITA (Surface Traffic Indications and Alerts on taxiways) application, which provide alerts to the pilots during runway and taxiway operations (additional safety net, closer loop with direct alert to the pilots). Those applications were initially seen as an enhancement of the ATSA-SURF (if equipped) application (IP1 OI: AUO-0401) which provides the flight crew with a display of the detected surrounding aircraft and ground vehicle position and other information together with the own-ship position overlaid on a map of the airport. In continuity with the existing RTCA DO-323 [42] SURF-IA SPR, this OSED focuses on possible implementations of the concept:

- A SURF-A concept is to produce only warning alerts and advisory/caution; this is for aircraft that are not equipped with an airport moving map and traffic display. This is why it could be embedded on a wide set of aircraft with limited modifications.
- A so-called “optional” implementation SURF-ITA is associated with CDTI display (enhanced eventually with an airport moving map). In this case, it makes it possible to enhance situation awareness in advance and propose anticipated alerts and indications before the warning level is triggered. This is the baseline of DO-323, but it is likely that all aircraft will not be equipped with such a configuration before some time.

The content of this document issue is in-line with the output of former project SESAR 1 09.14 where 2 implementations were studied:

- One for Mainline aircraft: the basic configuration was assessed in simulator with real aircraft equipment. The operational assessment confirmed the operational concept. The aircraft architecture also proved to provide alerts as expected.
- One for Business aircraft: V2 validation has been performed with the optional implementation based on traffic display to provide information in advance of a possible conflict. It also proved to be operationally efficient (ref. [27]).

Note: RTCA has already published an OSD for a similar application (SURF IA: “Enhanced traffic situational awareness on the airport surface with indication and alerts”), which is included in DO-323. SURF-ITA is used in PJ.03b-05 to distinguish the European version of the application from SURF IA. Although SURF IA was the starting point for SESAR work, there are some differences that appeared after the validation exercises. Therefore, the resulting two applications (RTCA and SESAR) are not identical at the completion of PJ.03b-05 work.

As for SURF IA, SURF-A/ITA/TWY-ITA alerts are provided for non-normal operational situations where collision hazard exists or a collision appears imminent. SURF-A/ITA/TWY-ITA enhances the safety by giving non directives alerts by both aural and display means. **Due to IPR issues between the SJU and RTCA, this version of the documents includes some references to DO-323 without duplicating the text. To be able to read and understand this document, it is required to have at the same time access to RTCA DO-323.**

DO-323 can be purchased on the RTCA website: https://my.rtca.org/nc_store

2.3 Intended readership

This document is written and edited for the use by SESAR2020 PJ.03b-05 partners.

- a) Internal to SESAR 2020 and Sol. PJ.03b-05:
 - a. The project members concerned by future function development and standardization,
 - b. PJ.03a-01 project
 - c. Involved PCIT and EPMB members
 - d. 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 SESAR 2020 PJ.03b-05 project is the continuation of SESAR 1 P09.14 project, with main focus on industrial research and validation for final V3 maturity.

The SESAR 1 P9.14 provided V&V activities to set up the technical baseline for this project with deliverables and results within OFA 01.02.01 Airport Safety Nets activities and V2 maturity phases.

Important part of the V3 phase development on this project were inputs from SESAR 2020 PJ28 program. This program provided ADS-B collected data and analyses to support confidence during final algorithms development and compliance with all defined requirements within real time simulation exercises.

2.5 Structure of the document

This section describes the document structure and a brief description of the content of the different chapters:

- §2 provides an explanation of the purpose and scope of this document (*this section*).
- §3 provides the detailed description of the environment for the Operational Service.
- §4 describes the safety, performance and interoperability requirements.

2.6 Glossary of terms

Term	Definition	Source of the definition
AIR-REPORT	A report from an aircraft in flight prepared in conformity with requirements for position, and operational and/or meteorological reporting.	ICAO Annex
Advisory	Alert level 1 that requires crew awareness and potential subsequent crew action as defined per DO323 D-4.	
Alerts	A signal to the crew intended to draw their attention to the existence of an abnormality, system fault or aircraft condition and to identify it.	
Alerts missed/nuisance/false	• Missed alert: a missed alert is an alert that is not raised when it should. • False alert: a false alert is an alert raised when there is no reason (no threat in the case of Surface alerts) but alerts are not supposed to be inhibited • Nuisance alert: a nuisance alert is an alert that is raised in the presence of a danger but at a time when it should be inhibited.	AMJ.25-1322: [Nuisance warnings] are warnings generated by a system which is functioning as designed but which are inappropriate or unnecessary for the particular phase of operation.

ATSA-SURF	Airborne Traffic Situational Awareness (ATSA) for Surface (SURF) Operations	RTCA
Caution	Alert level 2 that requires crew awareness and potential subsequent crew action. Used in Optional version (DO-323 [42]).	
Flight crew	An aircraft cockpit crew including pilot in command and pilot monitoring	
Indication	(cf. DO-323 definition).	
Key Performance Area	Key Performance Areas are a way of categorising performance subjects related to high-level ambitions and expectations. ICAO Global ATM Concept sets out these expectations in general terms for each of the 11 ICAO defined KPAs: Environment, Capacity, Predictability, Punctuality, Cost Effectiveness, Civil-Military Cooperation and Coordination, Flexibility, Resilience, Interoperability, Access and Equity, Participation	ICAO Doc 9883
Mobile	An aircraft or a ground vehicle.	
Ownship	The aircraft on which the application (SURF-A, SURF-ITA, TWY-ITA) is installed	
Pilot	Pilot in command - a person who controls the flight of an aircraft.	
Runway Status Indication (RSI)	(cf. DO-323 definition).	
Runway Status Light	Runway Status Light is a surveillance driven system that manages automatically new airfield lights set to indicate to Flight Crews and Vehicle Drivers when it is unsafe to enter, use or cross a runway. Those new airfield lights can be composed of Runway Entrance Lights (REL), Take-off Hold Lights (THL) and Runway Intersection Lights (RIL).	<i>SESAR 1</i>
SURF IA	Enhanced Traffic Situational Awareness on the Airport Surface with Indications and Alerts. SURF IA is the RTCA application DO-323 [42].	
SURF-A	Surface Traffic Alerts on runways for pilots without display (CDTI) (Warning alerts on ground with optional Caution/advisory)	

SURF-ITA	Surface Traffic Alerts & Indication for pilots with optional display (CDTI) (Advisory/Caution and Warning alerts)	
SURF-ITA+	Surface Traffic Indication & Alerts on runways and taxiways for pilots including both applications SURF-ITA and TWY-ITA.	
Traffic Indication (TI)	(cf. DO-323 definition).	
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 also includes RPAS equipped with ADS-B. It does not include helicopters or ground vehicles.	
TWY-A	Surface Traffic Alerts on taxiways for pilots (Advisory/Caution alerts only, no display traffic indication)	
TWY-ITA	Surface Traffic Indication & Alerts on taxiways for pilots (Advisory/Caution alerts only)	
Warning	Alert level 3 - Immediate recognition and corrective or compensatory action by the crew is required	

Table 1: Glossary of terms

2.7 List of Acronyms

Acronym	Definition
ADS-B	Automatic Dependent Surveillance – Broadcast
ADS-R	Automatic Dependent Surveillance – Rebroadcast
A-SMGCS	Advanced Surface Movement Guidance and Control System
ATC	Air Traffic Control
ATM	Air Traffic Management
ATSA-SURF	Enhanced Traffic Situational Awareness on the Airport Surface
CDTI	Cockpit Display of Traffic Information
CNS	Communication Navigation and Surveillance
CONOPS	Concept of Operations
CR	Change Request
DOD	Detailed Operational Description

EATMA	European ATM Architecture
HMI	Human Machine Interface
HPAR	Human Performance Assessment Report
ICAO	International Civil Aviation Organization
INTEROP	Interoperability Requirements
IPR	Intellectual Property Rights
KPA	Key Performance Area
LAHSO	Land And Hold Short Operations
LVP	Low-Visibility Procedures
NATO	North Atlantic Treaty Organization
NOTAM	Notice To AirMen
OCD	Operational Concept Description
OFA	(Operational Focus Area) SESAR 1 Programmes
OI	Operational Improvement
OPAR	Operational Performance Assessment Report
OR	Operational Requirements
OSD	Operational Service and Environment Definition
OSR	Operational Service Requirement
OSRec	Operational Service Recommendation
PAR	Performance Assessment Report
RAZ	Runway Alerting Zone
RPA	Runway Protection Area
RTO	Rejected Take-Off
RSI	Runway Status Indication
RTCA	Radio Technical Commission for Aeronautics
RVR	Runway Visual Range
RWSL	Runway Status Lights
RWY	Runway
SAC	Safety Criteria
SAR	Safety Assessment Report
SESAR	Single European Sky ATM Research Programme

SESAR Programme	The programme which defines the Research and Development activities and Projects for the SJU.
SJU	SESAR Joint Undertaking
SJU Work Programme	The programme which addresses all activities of the SESAR Joint Undertaking
SMGCS	Surface Movement Guidance and Control Systems
SMR	Surface Movement Radar
SOP	Standard Operating Procedures
SPR	Safety and Performance Requirements
SWIM	System Wide Information Model
TCAS	Traffic alert and Collision Avoidance System
TI	Traffic Indication
TIS-B	Traffic Information Services - Broadcast
TS	Technical Specification
TRZ	Traffic Relevant Zone
TWY	Taxiway
V&V	Validation & Verification
VHF	Very High Frequency
WA	Working Area

Table 2: List of acronyms

3 Operational Service and Environment Definition

Traffic Alerts for pilots for airports operations (PJ.03b-05) refer to enhancing on-board systems in order to detect potential and actual risks of collision with other traffic during runway and taxiway operations, non-compliance with airport configuration (e.g. closed runway, non-compliant taxiway and restricted areas). In all cases, the flight crew are provided with appropriate alerts.

3.1 SESAR Solution PJ.3b-05: a summary

There are two Operational Improvement Steps: AUO-0605 and AUO-0615

AUO-0605: Traffic Alerts for Pilots during Runway Operations

The on-board system detects potential and actual risk of collision with other traffic during runway operations and provides the Flight Crew with the appropriate alert.

AUO-0615: Traffic Alerts for Pilots during Taxiway Operations

The on-board system detects potential and actual risk of collision with other traffic during taxiway operations and provides the Flight Crew with the appropriate alert.

SESAR Solution ID	SESAR Solution Title	OI Steps ID ref. (coming from EATMA)	OI Steps (coming from EATMA)	Title from	OI Coverage	Step
PJ.03b-05	Traffic alerts for pilots for airport operations	AUO-0605	Traffic alerts for pilots during runway operations		Fully	
		AUO-0615	Traffic alerts for pilots during taxiway operations		Fully	

Table 3: SESAR Solution PJ.03b-05 Scope and related OI steps

- PJ.03b-05 Enablers definition

SESAR Solution ID	Contribution to the SESAR Solution short description	OI Steps ref. (from EATMA)	Enablers ref.(from EATMA)	Enabler definition
PJ.03b-05	Runway part	AUO-0605: Traffic Alerts for Pilots	A/C-43a1	Traffic Alerts for Pilots during Runway Operations

Traffic Alerts for pilots for airports operations		during Runway Operations	A/C-48a	Air broadcast of aircraft position/vector (ADS-B OUT) compliant with DO260B
			A/C-67	ADS-B IN
	Taxiway part	AUO-0615: Traffic Alerts for Pilots during Taxiway Operations	A/C-43a2	Traffic Alerts for Pilots during Taxiway Operations
			A/C-48a	Air broadcast of aircraft position/vector (ADS-B OUT) compliant with DO260B
			A/C-67	ADS-B IN

Table 4: SESAR PJ.03b-05 Solution

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
- A/C-25: Cockpit Display Traffic Information

High Level CONOPS Requirement ID	High Level CONOPS Requirement	Reference to relevant CONOPS Sections e.g. Operational Scenario applicable to the SESAR Solution
S03-b5-HLOR-01	The Traffic alerts for pilots for airport operations shall increase airport safety • by ○ detecting potential and actual risk of collision with other traffic during taxiway and runway operations ○ providing the Flight Crew with the appropriate alert • while insuring a compatibility between all traffics (e.g. based on worldwide shared standards)	2.4.3

Table 5: Link to CONOPS

There have been updated Aircraft functional decomposition with new PJ.03b-05 solution including Airport Surface Collision Prediction.

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

No deviation from the initial SESAR solution definition.

3.2 Detailed Operational Environment

The Operational Environment defines the characteristics and properties of the environment in which “Traffic Alerts for Pilots” tool is expected to be used. It includes the type of airspace, traffic density, visibility conditions and in general other conditions that can potentially aggravate the effects of the hazards.

The SURF-A/SURF-ITA is an on board support tool aiming at enhancing flight crew situational awareness of the traffic on the runway area and providing pilots with an additional safety barrier to reduce the risk of runway collisions as well.

The TWY-ITA is an on board support tool aiming at enhancing flight crew situational awareness of the traffic on the taxiway area and providing pilots with an additional safety barrier to reduce the risk of taxiway incursions and collisions with other traffic.

The SURF-ITA+ is an on board support tool aiming at enhancing flight crew situational awareness of the traffic on the **runway and taxiway** area and providing pilots with an additional safety barrier to reduce the risk of runway and taxiway incursions and collisions with other traffic.

Figure 3 and Figure 4 provide definition with Operational View (MEGA tool diagram based on NATO Architecture Framework) for runway and taxiway operations.

There are three Nodes for Flight Deck of Traffic/ Ownship and Aerodrome ATS with identified information elements and information exchange.

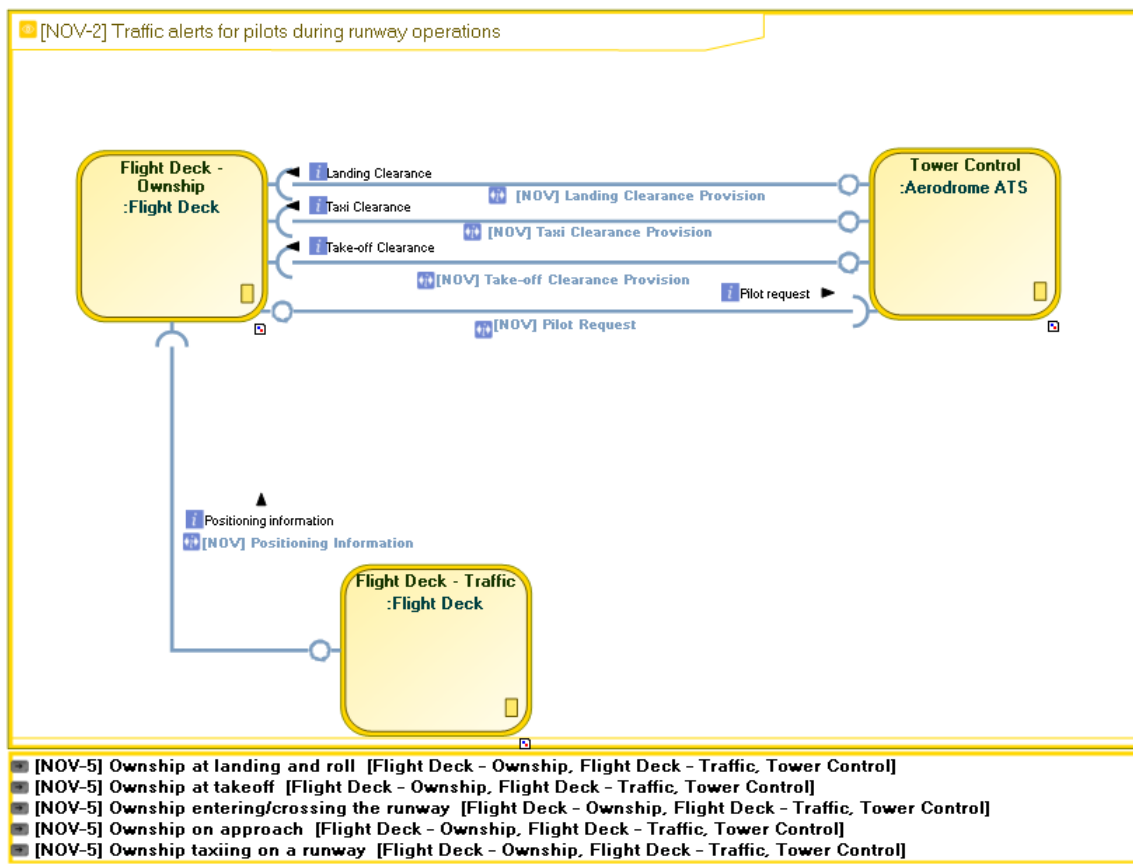


Figure 3: [NOV-2] Traffic alerts for pilots during runway operations – Operational View (MEGA Tool)

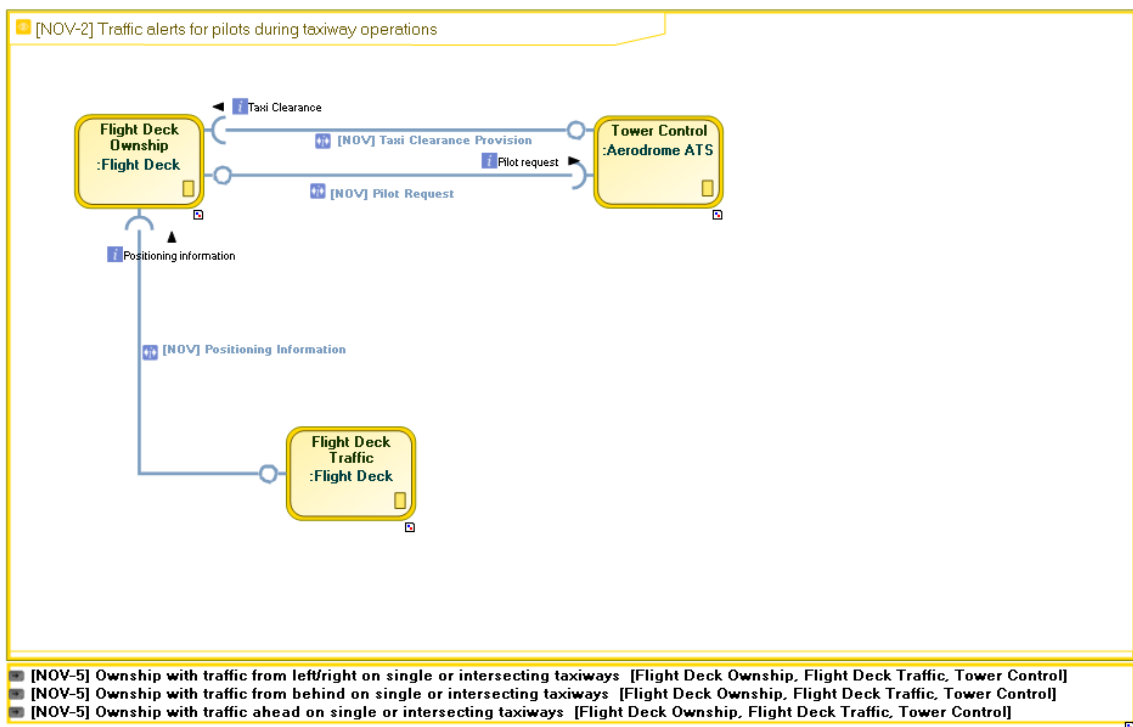


Figure 4: [NOV-2] Traffic alerts for pilots during taxiway operations – Operational View (MEGA Tool)

3.2.1 Operational Characteristics

3.2.1.1 Runway area

Runway operations shall encompass also final approach operations. SURF-A/ITA shall also work for airborne traffic on approach.

The Application coverage volume identified for SURF-ITA would be a subset of the one defined in RTCA DO-323 [42] because it is considered that using ATSA-SURF at a certain distance from the runway is a kind of indication helping to know that there is a mobile on runway.

Application Coverage Volume DO-323 definition: Area for ownship on the ground within 1500 feet of runway centreline and in the air within 3NM of the runway and below 1000ft above ground within which SURF IA is active.

For instance, on approach, an alert could be triggered at around 30 s from the runway threshold which is at a height below 1000 ft above ground or well within 3 NM.

This OSD addresses both controlled and uncontrolled airports.

3.2.1.2 Taxiway area

The application coverage of taxiway area is defined as the airport surface area from the Runway Alerting Zone (RAZ) till the apron/gate area on controlled and uncontrolled airports.

3.2.1.3 Traffic characteristics

For the scope of PJ.03b-05, we consider as ownship an aircraft performing SURF-A/ITA/TWY-ITA applications, an ADS-B IN equipped mainline, regional aircraft and business aircraft which can operate at controlled and uncontrolled airports.

It is not intended for use on military aircraft, general aviation aircraft and helicopters at this phase of development, but military aircraft and general aviation aircraft can be alerting traffic if they are properly equipped and eligible. Ground vehicles are out of the scope of this OSD. Currently, ground vehicles are not supposed to be equipped with equipment comparable with aircraft (certification, data quality).

3.2.1.4 Traffic Density

SURF-A/ITA/TWY-ITA Alerts are intended to be provided in every condition of airport traffic density operating on a taxiway and a runway i.e. considering the flow of aircraft at landing, taking-off, taxiing and crossing the runway. The function should not interrupt this flow as long as safety conditions are not impacted.

3.2.1.5 Visibility conditions

SURF-A/ITA/TWY-ITA Alerts are intended to be used in all visibility conditions classified as follows (1 through 4):

- Visibility condition 1: Visibility sufficient for the pilot to taxi/to land and to avoid collision with other traffic on taxiways or runway(s) and at intersections by visual reference, and for personnel of control units to exercise control over all traffic on the basis of visual surveillance.
- Visibility condition 2: Visibility sufficient for the pilot to taxi/to land and to avoid collision with other traffic on taxiways or runway(s) and at intersections by visual reference, but insufficient

for personnel of control units to exercise control over all traffic on the basis of visual surveillance

- Visibility condition 3: Visibility sufficient for the pilot to taxi/to land but insufficient for the pilot to avoid collision with other traffic on taxiways or runway(s) and at intersections by visual reference with other traffic, and insufficient for personnel of control units to exercise control over all traffic on the basis of visual surveillance.
- Visibility condition 4: Visibility insufficient for the pilot to taxi by visual guidance only and insufficient for personnel of control units.

The traffic density and the visibility conditions lead to twelve combinations but some are not realistic e.g. high traffic in visibility condition 4 and some are not very stringent (e.g. low traffic in visibility condition 1). Table 6 depicts all possible combination with most relevant scenarios with a dark grey background; less realistic scenarios with a light grey background and non-realistic scenarios with a white background.

	Vis Con 1	Vis Con 2	Vis Con 3	Vis Con 4
Low Traffic				
Medium Traffic				
High Traffic				

Table 6: Paired Visibility and Traffic Conditions

3.2.2 Roles and Responsibilities

3.2.2.1 Controllers

Controller responsibilities are unchanged by the implementation of the SURF-A/ITA/TWY-ITA application. The alerts provided to the flight crews are supplemental to the ATC services they receive and provide a potential safety net should either ATC or flight crew errors occur.

3.2.2.2 Flight crews

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-A/ITA/TWY-ITA implementation. However, in case a risk of incursion or collision on runway/taxiway appears, the new SURF-A/ITA/TWY-ITA function works as a safety net i.e. it comes in addition of current barriers by presenting specific information to support the flight crew in managing the situation. For the crew, it does not supersede any existing procedure and prescribed task like expecting clearance, monitoring traffic visually using the out-the-window scan. This will be associated with procedures that include crew actions: check traffic operating on runway or about to operate on runway, stop, go-around, and traffic operating on taxiway and to contact ATC. These actions are not new, so do not request specific skills.

In addition, as it deals with a new function:

- From a human factor's standpoint, it was demonstrated within V3 phase that the function does not involve inadequate errors or reactions from the crew that can be counterproductive, so, its implementation does create any risk.
- Training is necessary to make pilots aware of the function specificity and the expected reaction; the function is designed in such a way it follows current cockpit principles and minimizes training needs.

3.2.3 Technical Characteristics

To be taken into account in the triggering of alerts, the aircraft operating on the runway and taxiway area must be equipped with certified ADS-B systems.

Quality of current data (including availability, accuracy, and integrity) is needed from both ownship and other mobiles. This has an impact on the detection rate.

SURF-A/ITA/TWY-ITA will use an electronic map database containing at minimum the information about the airport runways that is required by SURF-A/ITA/TWY-ITA.

If minimum requirements are not met, it may have a negative impact on the conflict detection rate (actual conflict detected) and applicability of the SURF-A/ITA/TWY-ITA.

The system must be specified to minimise the rate of nuisance/false or untimely alerts (potentially causing unnecessary manoeuvres) taking into account the various possible situations in which alerts can be triggered.

3.2.4 Applicable standards and regulations

3.2.4.1 Applicable standards and regulations for SURF-ITA

- RTCA DO-323

Founding Members

- CS 25-1322
- EUROCAE ED-102A / RTCA DO-260B

3.2.4.2 Applicable standards and regulations for TWY-ITA

- CS 25-1322,
- RTCA DO-323,
- EUROCAE ED-102A / RTCA DO-260B

3.3 Detailed Operating Method

3.3.1 Previous Operating Method

Airport surface operations include the movement of aircraft and ground vehicles, such as snow clearing vehicles, fuel trucks and baggage wagons on aprons, taxiways and runways. During current operations at controlled airports, flight crews navigate on the airport surface via their ATC assigned route by use of a paper or electronic map and airport visual aids. Aircraft receive taxi clearances after leaving its stand, following arrival and after exiting the runway.

Airport surface operations by the flight crew and management of airport traffic by the airport control tower are based on both the flight crew and controller's out the window visual scan. Out the window visual aids and information include pavement lines and markings, lights and signs, as well as other aircraft and ground vehicles. Information about other mobiles (i.e. aircraft or ground vehicle) is also obtained from listening of the radio communications between the controller and the other pilots and vehicle drivers. It helps gathering information on other mobile location and movements, by listening to other clearances, particularly on runway areas.

Various surveillance systems intended to improve airport surface safety at major airport have been installed based on ICAO's Surface Movement Guidance and Control Systems (SMGCS), including Surface Movement Radar (SMR). More recently, advanced multi-lateration based systems have improved ground surveillance of the airport surface. These systems provide the controller with a supplement means to monitor aircraft and vehicle position and movement and therefore provide increased safety at airports, especially at night and in low visibility conditions, by allowing aircraft movements to be monitored from the control tower. However, even where SMR or multi-lateration systems are available to the controller, flight crews and ground vehicle drivers still have to rely on visual observations to maintain adequate traffic awareness (for Visibility Conditions 1 and 2).

Regarding runway operations, before take-off and landing, the flight crew has to ensure that the runway and the final approach is free of traffic, a procedure which is difficult especially at night time and in adverse weather conditions (e.g., low visibility conditions or cloud base). Besides, to be able to safely enter a runway, an aircraft or a vehicle must be first authorized by the airport control tower.

Visibility conditions affect the flight crew's ability to acquire and identify other traffic during taxi, take off, and final approach and landing. Visibility conditions also affect the controller's ability to observe and control traffic. ICAO Doc 4444 (PANS-ATM)[40] [40] and Doc 9476 (SMGCS manual) [39] define a set of Low-Visibility Procedures (LVP) for a range of visual conditions that identify limitations in controller and flight crew ability to support surface operations; surface operations are further developed in ICAO Doc 9830 (A-SMGCS Manual) [38].

At controlled airports, VHF voice communication is the principal method for communicating instructions for controlling aircraft and ground vehicle movements on the airport surface. At very large airports, multiple VHF channels are used to control traffic on different parts of the airport, and to segregate departure clearances from taxi instructions.

To enhance safety, some safety support tools are already implemented, mainly at large airports. A-SMGCS system is one of this tools and it generates alerts to the controller in case of conflicts / infringements on runway caused by aircraft or vehicles.

On the aircraft side, if aircraft is equipped (optional), a new system allowing display to the flight crew the detected surrounding aircraft and ground vehicle position and other information together with the ownship position overlaid on a map of the airport is starting to be implemented. This surface traffic display is in a way similar to the A-SMGCS surveillance for controllers and provides supplementary information to the out the window information.

3.3.2 New SESAR Operating Method

3.3.2.1 Operations related to alerts for conflicts on runway (SURF-A/ITA)

Depending on aircraft equipage (optional), ATSA-SURF and associated CDTI are available when the Traffic Alerts are implemented and provide traffic situation awareness about aircraft on runway and close proximity of the ownship on pilot's request.

SURF-ITA (i.e. Indications and Traffic Alerts for pilots at the airport surface) aims at further enhancing safety of runway operations by drawing the attention of the flight crews (as they mainly look out the window during the airport surface operations) in case of a risk of collision with an aircraft or a ground vehicle on a runway.

In (DO-323 [42]) and SURF-ITA the following levels are defined:

- SURF-ITA indications (TI: Traffic Indication, RSI: Runway Status Indication).
- SURF-ITA alerts (Advisory, Caution and Warning).

In SESAR, the following levels of information have been considered:

- Overall information level: If aircraft equipped (optional), ATSA-SURF traffic display of aircraft on the airport moving map. It is assumed that ATSA-SURF is already a 1st step to support crews for traffic situation awareness on runway and detect possible conflicts in advance.
- Alerts as defined in CS25-1322 [43] with 3 possible levels:
 - Advisory
 - Caution
 - Warning

Two different evaluations have been performed by Airbus and Honeywell.

- A 1st concept that was the subject of Airbus evaluations V3: the cockpit integration is considered as follows (named "basic" implementation without ATSA-Surf): alert level "warning" and Advisory as defined in CS25-1322 and in DO-323 (Same definition)

- A full implementation (with ATSA-Surf) of DO-323 is possible and done in Honeywell implementation. Additional characteristics and requirements are marked “Optional”

3.3.2.2 Operations related to alerts for conflicts on taxiway (TWY-ITA)

In the RTCA DO-323 [42] the taxiway part of traffic alerts and indication is not covered.

Depending on aircraft equipage (optional), ATSA-SURF and associated CDTI are available when the Traffic Alerts are implemented and provide traffic situation awareness about aircraft on taxiways in close proximity of the ownship on pilot's request.

TWY-ITA (i.e. Indications and Traffic Alerts for pilots at the airport surface) aims at further enhancing safety of taxiway operations by drawing the attention of the flight crews (as they mainly look out the window during the airport surface operations) in case of a risk of collision with an aircraft or a ground vehicle on taxiway.

Based on validation about business aircraft see below levels on taxiways for TWY-ITA:

- TWY-ITA indications (TI: Traffic Indication)
- TWY-ITA alerts (Advisory/Caution alerts only)

In the SESAR, the alerting level is in compliance with **CS25-1322** following from low energy taxiway operations and collision avoidance with possible impacts. That has been evaluated in reference to spurious alerts requirement following from the SAR (SPR part II) for taxiways.

SURF-A/ITA/TWY-ITA will utilize surveillance data that are available at sufficient quality and reliability from air-to-air ADS-B.

Note: In the United States, ground-to-air surveillance services, i.e. Traffic Information Services - Broadcast (TIS-B) and Automatic Dependent Surveillance – Rebroadcast (ADS-R), will also be implemented to address the partial ADS-B equipage of traffic and the interoperability between the two ADS-B technologies implemented in their airspace

SURF-A/ITA/TWY-ITA are expected to be utilized by commercial aircraft, i.e. mainline, regional aircraft and business aircraft at controlled and uncontrolled airports. Uncontrolled airports can be used by business aircraft. It is not intended for use on military and general aviation aircraft, helicopters or vehicles. However, military and general aviation aircraft, vehicles and helicopters may act as an intruder and trigger SURF-A/ITA/TWY-ITA alerts.

Note: DO-323 scope includes the use of SURF IA by all types of airplanes operating in the NAS or internationally (including military, general aviation, commercial carriers) at both controlled and uncontrolled airport.

Validations activities only deal with aircraft as ownship and intruder. Vehicles are out of the scope in this OSD.

For aircraft equipped with dedicated traffic information display/ATSA-SURF, the SURF-ITA/TWY-ITA requirements related to the display of traffic are built upon those from SURF [RTCA DO-322] [41]/(ATSA-SURF). This aims at facilitating the integration of both applications from a system perspective and also from an operational use perspective.

For a description of the operating method, refer to sections A.2.1, A2.1.1 and A.2.1.2 of RTCA DO-323.

3.3.2.3 Flight crew procedures

In general, when the alerts system is implemented, existing procedures and practices are not modified e.g. briefings, contact controllers and follow instructions, look out the window during taxi.

If ATSA-SURF is not implemented, only Warning alerts can be implemented: in the case of a warning alert, the pilot is expected to take immediate action necessary to avoid a collision (for example, initiate a go-around)

If ATSA-SURF is implemented: It is considered that the CDTI (ATSA-SURF) already provides traffic awareness by displaying on the display information about the traffic on the airport surface with a focus on runway and taxiway for equipped aircraft (optional). It is to be used at pilot's discretion at the same time as they are looking at the airport moving map to increase their traffic awareness. It is an enabler to present indications to pilot and support advisories/caution level alerts. So, the use of CDTI SURF (ATSA-SURF) is for monitoring the situation only. In the event of a warning, it is required the display to be consistent with the alert (red colour to be used) but there is no time to spend head down and look at the display. The situation is the same as ATSA-SURF not implemented. It does not replace existing procedures, particularly waiting for being cleared to have access to a runway, looking out the window first.

In any cases, the role of a warning alert is to inform pilots of an imminent risk of collision they may miss due to specific conditions: increased workload, low visibility, late clearance, misunderstood or missed clearance, etc... In the case of a warning alert, the crew has no time to look at or interpret the situation on the moving map: an immediate reaction to the alert is expected.

3.3.2.3.1 Runway traffic alerts referring to CS25-1322 are used as follows:

Advisory/Caution: The situation can still be considered as normal but the current trend is that, if nothing changes, there is a possible risk of collision. In this case, an advisory or a caution level is triggered in order to require flight crew awareness. It is based on visual cues to be visible even if the airport moving map with CDTI SURF (ATSA-SURF) is not displayed. It may require subsequent flight crew response depending on the context that can be:

- Continue if it is assessed that there is still time to see how the situation evolves (The crew can call ATC for confirmation)
- Go-around if ownship is in approach and there is a mobile still on runway as the ownship is about to land
- Stop, if the ownship is on the runway before take-off

Warning: When there is a current risk of collision, a warning level (see also 3.2.2.2 SURF-A/ITA Alerts) is triggered in order to require immediate flight crew attention and immediate flight crew response.

- If ownship is just starting to take-off, and a mobile enters on the runway ahead the ownship, it may be necessary to abort the take-off.

Caution/Advisory level is optional. Normally, it is used for "immediate" awareness and is followed by a warning if no corrective action has been made. Potential impact on SOP is limited because alerts esp. warnings occur when current procedures have failed to anticipate such a situation.

To enhance situation awareness and outside alert conditions, in the optional implementation, it is also possible to add indications called RSI (Runway Status indication when the runway is already occupied) and TI (if an aircraft is operating on/to the runway at high speed).

3.3.2.3.2 Taxiways traffic alerts referring to CS25-1322 are used as follows:

Advisory/Caution (optional, only for aircraft equipped with CDTI / ATSA-SURF): The situation can still be considered as normal but the current trend is that, if nothing changes, there is a possible risk of collision. In this case, a caution level is triggered in order to require flight crew awareness. It is based on visual cues to be visible even if the airport moving map with ATSA-SURF is not displayed. It may require subsequent flight crew response depending on the context that can be:

- Evaluate situation with visual contact, continue if it is assessed that there is still time to see how the situation evolves, adjust speed (The crew can call ATC for confirmation)
- Stop, if there is not possible visual contact or the situation is evaluated as possible threat (The crew can call ATC for confirmation).

Warning: Is not applied for taxiway operations.

3.3.2.4 Use Cases

This section provides a description of significant Use Cases centred on the ownship equipped with the SURF-A/ITA function. They are described as follows:

- General conditions,
 - Principle of the use case
- Pre-conditions,
 - Ownship context
 - Other mobile context
 - Environment conditions like reduced visibility (conditions 2 to 3)
- Post-conditions,
 - Normally, it is alert (advisory/caution and/or warning) triggering provided to enhance flight crew awareness
- Operating method. It provides the expected sequence of events like
 - Controller action (e.g. provision of clearance)
 - Alert levels: advisory and/or Warning
 - Flight crew action

In the end of some use cases, hints for derived use cases are added.

3.3.2.4.1 Runway Use Cases

Pink aircraft is the ownship and the red one is the intruder.

Both implementations are reviewed in each use cases: basic (Warning) and optional.

In the “optional”, a focus is on the preliminary alert “Caution” or “Advisory” which is associated with information on a CDTI (ATSA-SURF). Indications that are proposed in RTCA DO-323 [42] are also presented as additional information to support anticipation of conflict but are not alerts and not associated with a specific procedure.

3.3.2.4.1.1 Use Case 1: Ownship on approach

Note: this refers to A.3.1 scenario from DO-323.

General Conditions

Ownship is performing the final approach and an aircraft has misinterpreted a clearance, enters on the runway and is in position for take-off.

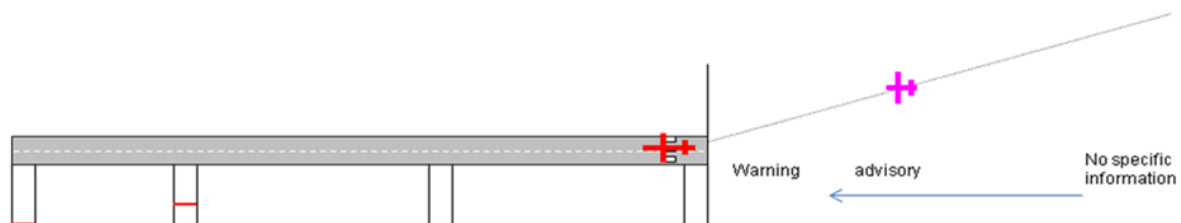


Figure 5: Use Case 1 overview

Similar use cases would be valid:

- If a mobile is cleared by mistake to enter on the runway.

Pre-Conditions

Ownship is equipped with ADS-B In and can receive current information about position, ground speed, heading/track from on-ground mobiles. Other aircraft/mobiles are equipped with ADS-B out.

Post-Conditions

The flight crew receives a series of information which is more or less extended depending on the implementation:

- Implementation without traffic display/ATSA-SURF: Advisory/Caution above 200ft then warning because a risk of collision is detected
- (Optional) Implementation with traffic display/ATSA-SURF:
 - Indications,
 - Alerts (Advisory/Caution above 200ft then warning).

Operating method

The ownship is authorized for landing during this phase (not on a specific point).

a) Implementation without traffic display/ATSA-SURF

The crew is not aware of the aircraft on the runway e.g. low visibility conditions.

They are possibly waiting for a late clearance and continue the approach.

At a given point, the system estimates that conditions leads to a certain collision and it is time to go-around, so an Advisory then a Warning alert is triggered if the ownship is above 200ft, and only a Warning if the ownship is below 200ft. At that stage, a go-around should be initiated under pilot's decision early enough to avoid vertically the mobile on ground.

b) Optional: Implementation with traffic display/ATSA-SURF

Note: in this final approach phase, pilots are not expected to focus their attention head down to ATSA-SURF, even if it may be a source of secondary information.

Assuming one pilot has displayed CDTI for on-ground traffic as the ownship is approaching the runway, if the mobile on ground does not move, the sequence of information levels provided to the flight crew by the SURF-ITA function is:

- Traffic on runway is displayed but there is no specific information about the mobile on runway threshold,
- Intermediate phase: TI and RSI

The ownship is still far enough from the runway and the presence of aircraft can still be considered as normal and under control by ATC, indications are provided to highlight the aircraft on runway threshold and mention that the runway is occupied.

If nothing has changed and the mobile is still on runway, an advisory/caution is triggered while the ownship is above 200ft, then a warning when the ownship descends below 200ft (at that stage, a go-around should be initiated under pilot's decision early enough to avoid vertically the mobile on ground).

Derived Use Cases

- The other mobile is on the runway and has a low speed or is stopped.
- The other mobile starts moving to the runway after holding on a stop bar. Given the low visibility conditions, it cannot be seen before landing. As both mobiles are approaching the runway on respective sides and predicted trajectories can lead to a collision, an advisory/caution (optional), and then a Warning is triggered for the ownship.

Derived use cases without need of alert

- If the aircraft is crossing the runway or has landed before and is vacating (out of the runway but still in the Surf-ITA engagement area) or is taking off (speed over V1), what happens frequently, it is considered that it is going to clear the runway soon and no alert is triggered in order not to create disturbance like a go-around.

MEGA tool definition

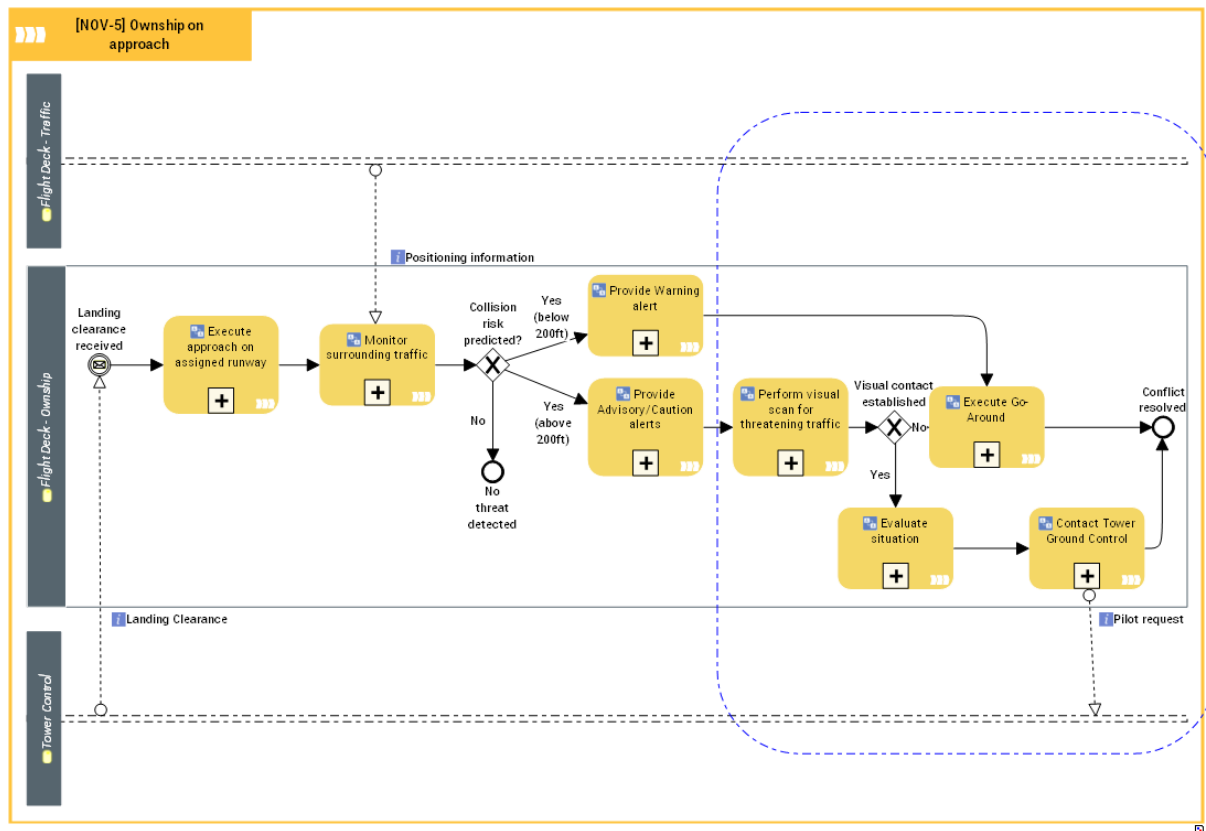


Figure 6: [NOV-5] Ownship on approach

3.3.2.4.1.2 Use Case 2: Ownship at landing and roll

Note: this refers to the A.3.4 scenario from DO-323.

This scenario is connected to the previous one.

General Conditions

The ownship has performed the final approach. As it has just landed, another aircraft is approaching the runway.

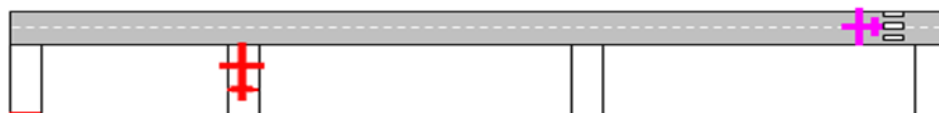


Figure 7: Use Case 2 overview

Pre-Conditions

Ownship is equipped with ADS-B In and can receive current information about position, ground speed, heading/track of on-ground aircraft. Other aircraft/mobiles are equipped with ADS-B out. Intruder's speed can lead to collision with ownship.

Post-Conditions

The flight crew receives a series of information which is more or less extended depending on the implementation:

- Implementation without traffic display/ATSA-SURF: warning if distances and timing are such that a collision is predicted
- (Optional) Implementation with traffic display/ATSA-SURF:
 - Indications,
 - Alerts (advisory/caution then Warning).

Operating method

During the final approach, the ownship has been cleared for landing and the runway is clear. Then, the ownship is landing and still at a high speed but set in configuration for reducing speed (ground spoilers are deployed, reverse engaged). The crew has selected a braking option adapted to the expected landing distance.

A mobile enters on the runway ahead the aircraft.

a) Implementation without traffic display/ATSA-SURF

In this unexpected situation, a Warning (if distances and timing are such that a collision is predicted, otherwise Advisory/Caution) is triggered. The aircraft configuration prevents from any go-around (if just at touch-down) and the flight crew uses means for maximum braking.

b) Optional: Implementation with traffic display/ATSA-SURF

Note: in this final approach phase, pilots are not expected to focus their attention head down to ATSA-SURF, even if it may be a source of secondary information.

Assuming one pilot has displayed CDTI for on-ground traffic as the ownship is approaching the runway, this pilot may see that one aircraft is approaching the holding point.

A caution is triggered while the ownship is still on final and if the ownship continue his approach a warning is triggered during the deceleration and the flight crew uses means for maximum braking.

Derived Use Cases without alert

- In case other mobile is or enters the runway behind the ownship no alert is triggered for the ownship.

MEGA tool definition

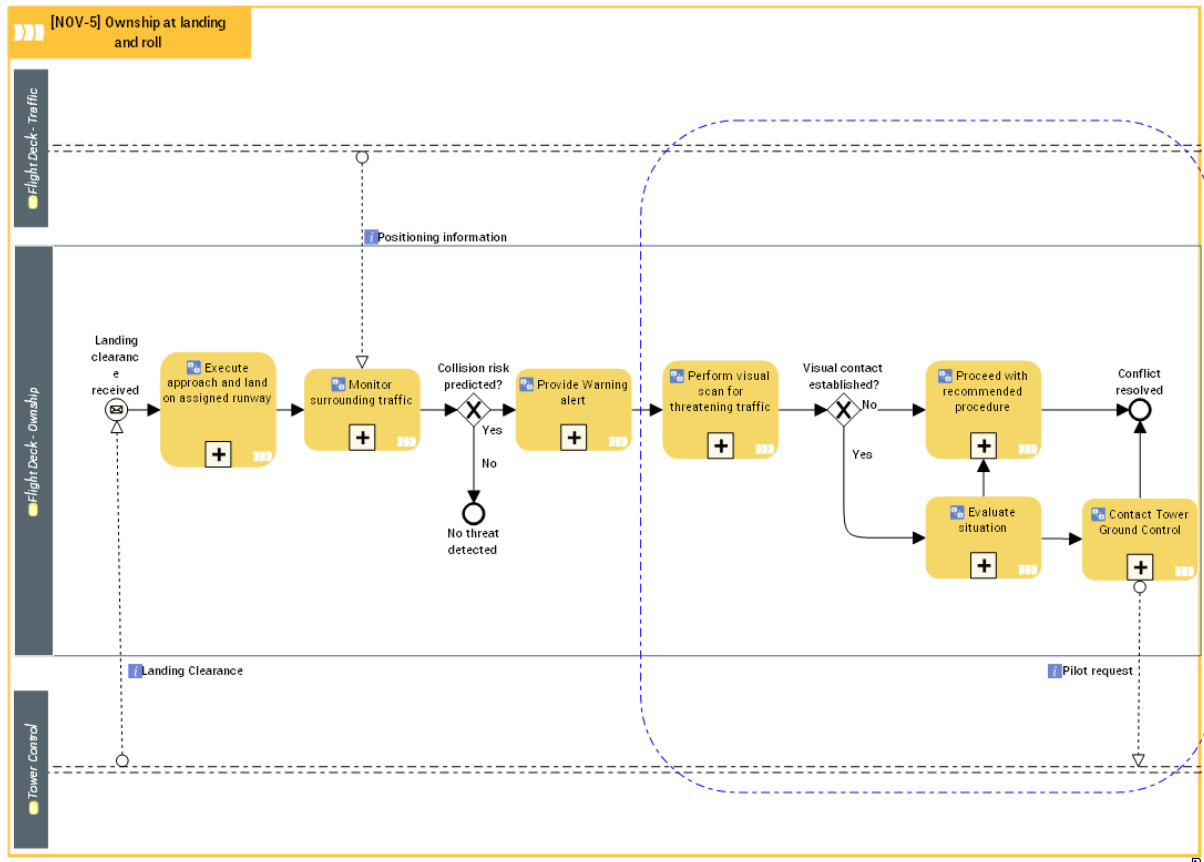


Figure 8: [NOV-5] Ownship at landing and roll

3.3.2.4.1.3 Use Case 3: Ownship entering/crossing the runway

Note: this refers to the A.3.2 scenario from DO-323. In DO-323 only the case where other aircraft is holding on or taking off is considered.

General Conditions

Ownship intends to enter or cross the runway by error of the crew or the controller.

Another mobile is on the runway going towards the ownship. It includes the cases where the other mobile is an aircraft landing or taking off.

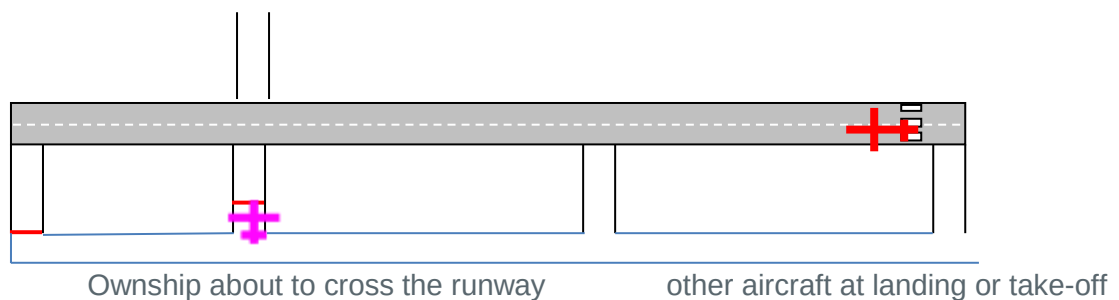


Figure 9: Use Case 3 overview

Pre-Conditions

Ownship is equipped with ADS-B In and can receive current information about position, ground speed, heading/track of on-ground aircraft. Other aircraft/mobiles are equipped with ADS-B out.

Post-Conditions

The flight crew receives a warning alert when they move too close to the runway where another mobile is landing or taking off.

Note: In DO-323 for this UC a RSI is also envisaged to be displayed before crossing runway holdline:

	<i>Before crossing runway holdline</i>	<i>After crossing runway holdline</i>
<i>DO-323</i>	<i>RSI</i>	<i>Warning</i>
<i>Results following V3 trials SURF-A</i>	<i>N/A</i>	<i>Warning</i>
<i>Results following V3 trials SURF-ITA</i>	<i>RSI, advisory</i>	<i>Caution, Warning</i>

Operating method

Ownship is on hold behind the stop bar before the runway. The flight crew has displayed the moving map during the taxi operation.

Visibility is not sufficient to see that a mobile is already on the runway. Ownship resumes taxiing and starts crossing the runway thinking they have received the appropriate clearance.

The flight crew being focussed on outside situation and because of low visibility, does not notice the other aircraft started to roll for take-off.

a) Implementation without traffic display/ATSA-SURF

As soon as traffic's take off is detected, a warning is triggered to inform crew that a traffic is operating the runway at high speed.

For a landing aircraft, a warning alert is triggered to catch flight crew's attention and trigger an immediate action if a collision is predicted on the runway. If no collision is predicted but the same portion of the runway is used within 30s look-ahead horizon, an Advisory is issued (TBC) to inform crew that they may continue only if visual contact and accurate monitoring of traffic behaviour is achievable.

The flight crew stops (before runway entry) or expedites crossing the runway immediately.

b) Optional: Implementation with traffic display/ATSA-SURF

The crew can see other mobile on CDTI and may see that one aircraft is taking off or landing on the runway.

A Caution or warning alert is triggered to catch flight crew's attention.

The flight crew stops (before runway entry) or expedite crossing the runway immediately.

Derived Use Cases without alert

- In case the other mobile is going away from ownship, no alert is triggered.

MEGA tool definition

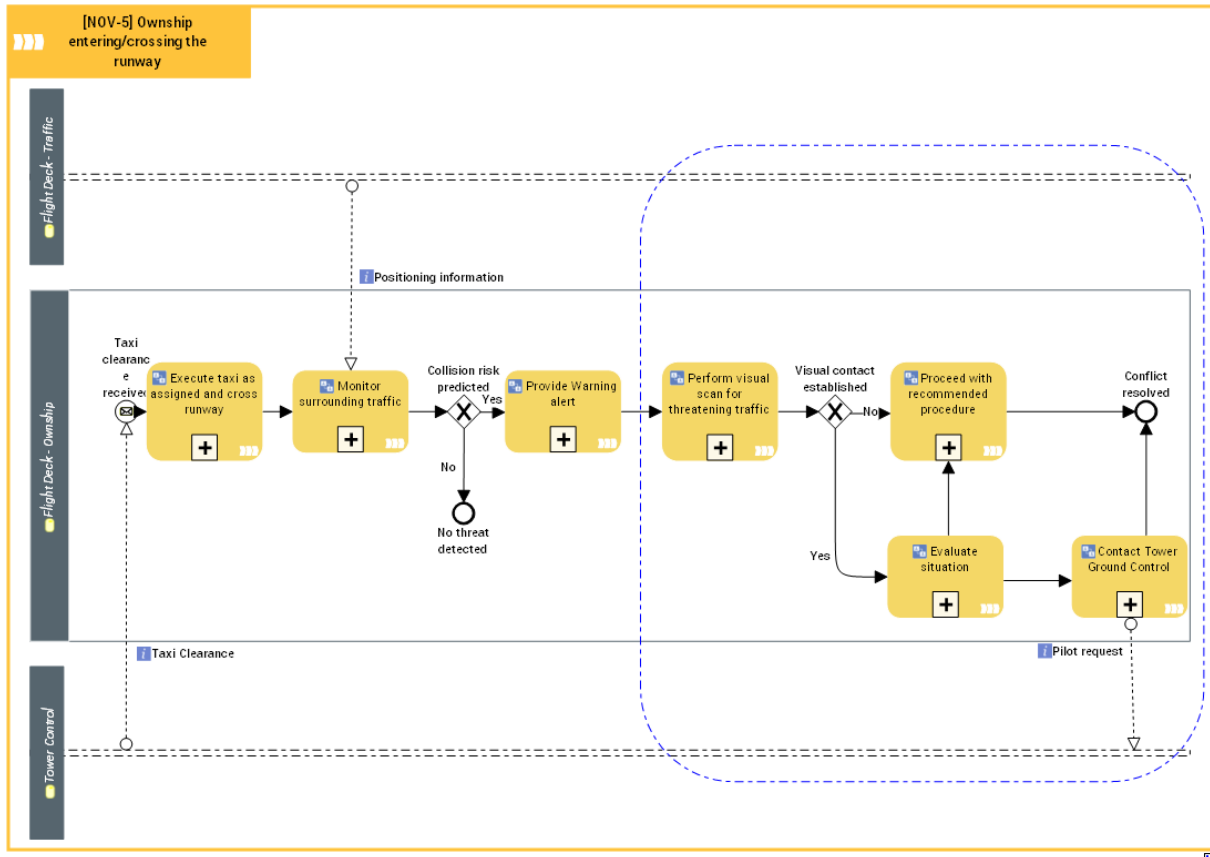


Figure 10: [NOV-5] Ownship entering/crossing the runway

3.3.2.4.1.4 Use Case 4: Ownship at take-off

Note: this refers to the A.3.3 scenario from DO-323.

General Conditions

Ownship is in position on runway for take-off. Another mobile (i.e. aircraft or vehicle) crosses the runway.

Visibility may be reduced (out of the window scan may be not sufficient).

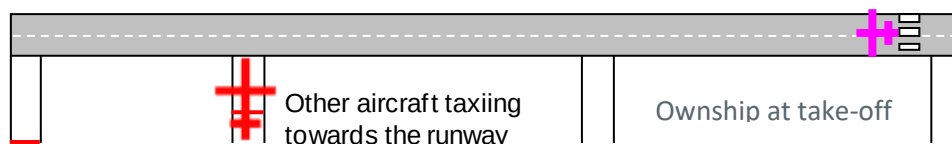


Figure 11: Use Case 4 overview

Pre-Conditions

Ownship is equipped with ADS-B In and can receive current information about position, ground speed, heading/track of on-ground mobile. Other aircraft/mobiles are equipped with ABS-B out.

Post-Conditions

The flight crew receives a series of information which is more or less extended depending on the implementation:

- Implementation without traffic display/ATSA-SURF: warning because a risk of collision is detected
- (Optional) Implementation with traffic display/ATSA-SURF:
 - Indications,
 - Alerts (caution or advisory then Warning).

Operating method

Ownship was authorized to align on the runway and the flight crew is waiting for the take-off clearance.

Visibility is not sufficient to detect visually a mobile moving towards the taxiway.

Meanwhile, another mobile on a taxiway is entering or crossing the runway, cleared or not by the controller.

a) Implementation without traffic display/ATSA-SURF

A warning is triggered when the other mobile is ahead of the ownship and ownship is in take-off configuration. The flight crew will decide to brake and abort the take-off. The alert is not triggered if the speed is higher than a given speed (between 80kt-100kt) in order to avoid high energy aborted take-off.

b) Optional: Implementation with traffic display/ATSA-SURF

As the other mobile passed the stop bar and is moving, a caution/advisory is triggered on the moving map to catch the attention of the flight crew on this specific mobile.

A warning is triggered when the other mobile is ahead of the ownship and ownship is in take-off configuration. The flight crew will decide to brake and abort the take-off. The alert is not triggered if the speed is higher than a given speed (between 80kt-100kt) in order to avoid high energy aborted take-off.

Note: by Take-off configuration, it is to understand Take-off thrust (FLEX or TOGA or Derated Take-off (DTO)).

Note: in DO-323 RSI is used to catch flight crew attention instead of an advisory alert.

MEGA tool definition

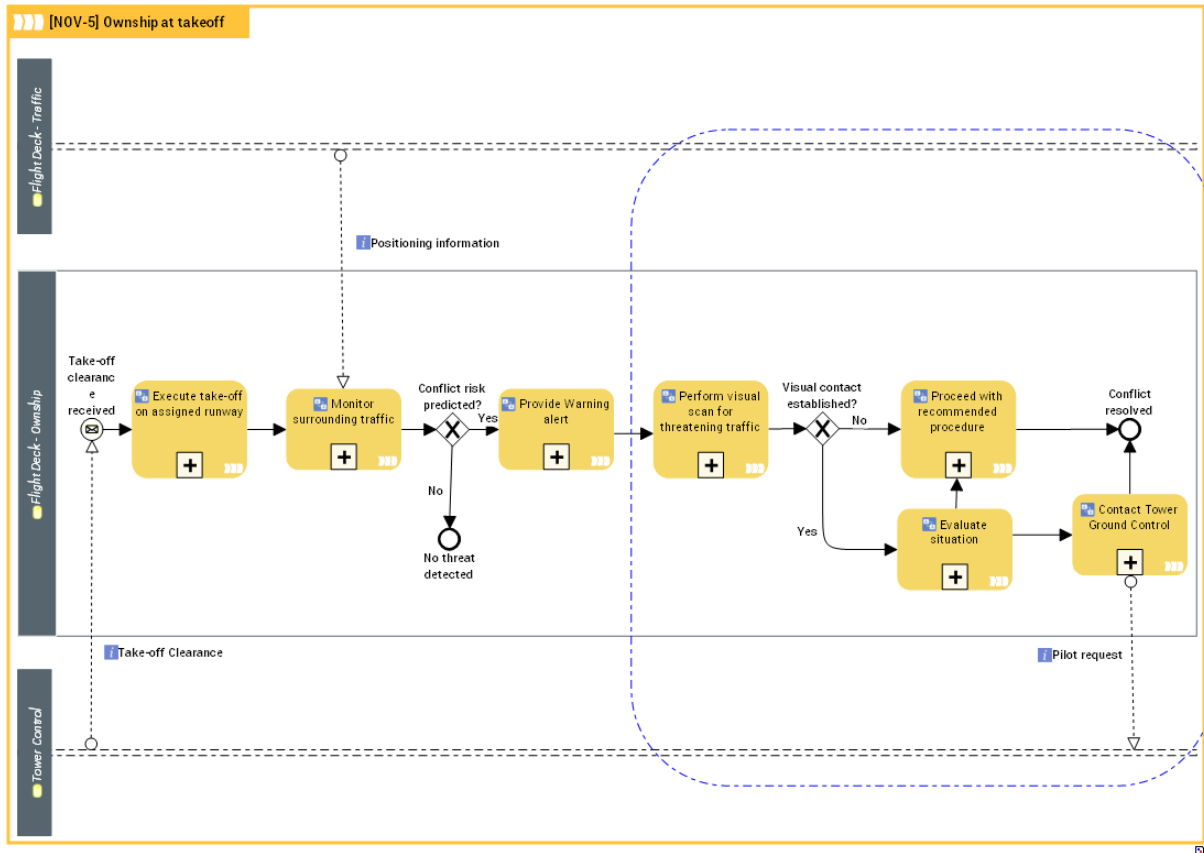


Figure 12: [NOV-5] Ownship at take-off

3.3.2.4.1.5 Use Case 5: Ownship taxiing on a runway

Note: this refers to the A.3.5 scenario from DO-323.

General Conditions

Ownship enters and taxis on the runway due to an error because of an early turn. Another aircraft is on approach.

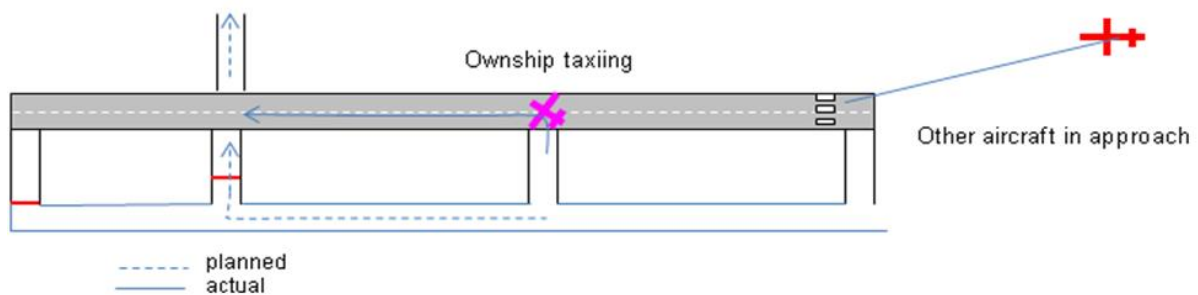


Figure 13: Use Case 5 overview

Pre-Conditions

Founding Members

Ownship is equipped with ADS-B In and can receive current information about position, ground speed, heading/track of on-ground mobile. Other aircraft/mobiles are equipped with ADS-B out.

Post-Conditions

The flight crew receives a series of information which is more or less extended depending on the implementation:

- Implementation without traffic display/ATSA-SURF: warning because a risk of collision is detected
- (Optional) Implementation with traffic display/ATSA-SURF:
 - Indications,
 - Alerts (caution or advisory then Warning).

Operating method

Ownship flight crew intended to cross the runway but actually enters on the runway from a wrong taxiway due to a too early turn.

Runway is vacant. Another aircraft is on approach but is far enough to be considered as intruder (e.g. at more than one minute before landing).

Ownship enters on the runway and needs to taxi on the runway to reach the next exit and resume its taxi route.

a) Implementation without traffic display/ATSA-SURF

The flight crew is not aware of the situation.

As soon as a catchup collision is predicted, the ownship gets a warning alert if intruder is below 200 feet and an advisory otherwise; but cannot easily avoid the conflict (no immediate exit available). Flight crew needs to call ATC for traffic avoidance (intruder going around). This must be done immediately.

b) Optional: Implementation with traffic display/ATSA-SURF

The flight crew is not aware of the situation. At least one pilot is using the moving map in a short range, so the arriving aircraft is not visible.

While the ownship is taxiing on the runway an advisory/RSI indication and then caution alert is triggered. Flight crew needs to call ATC for traffic avoidance (intruder going around). This must be done immediately before a warning alert is triggered.

MEGA tool definition

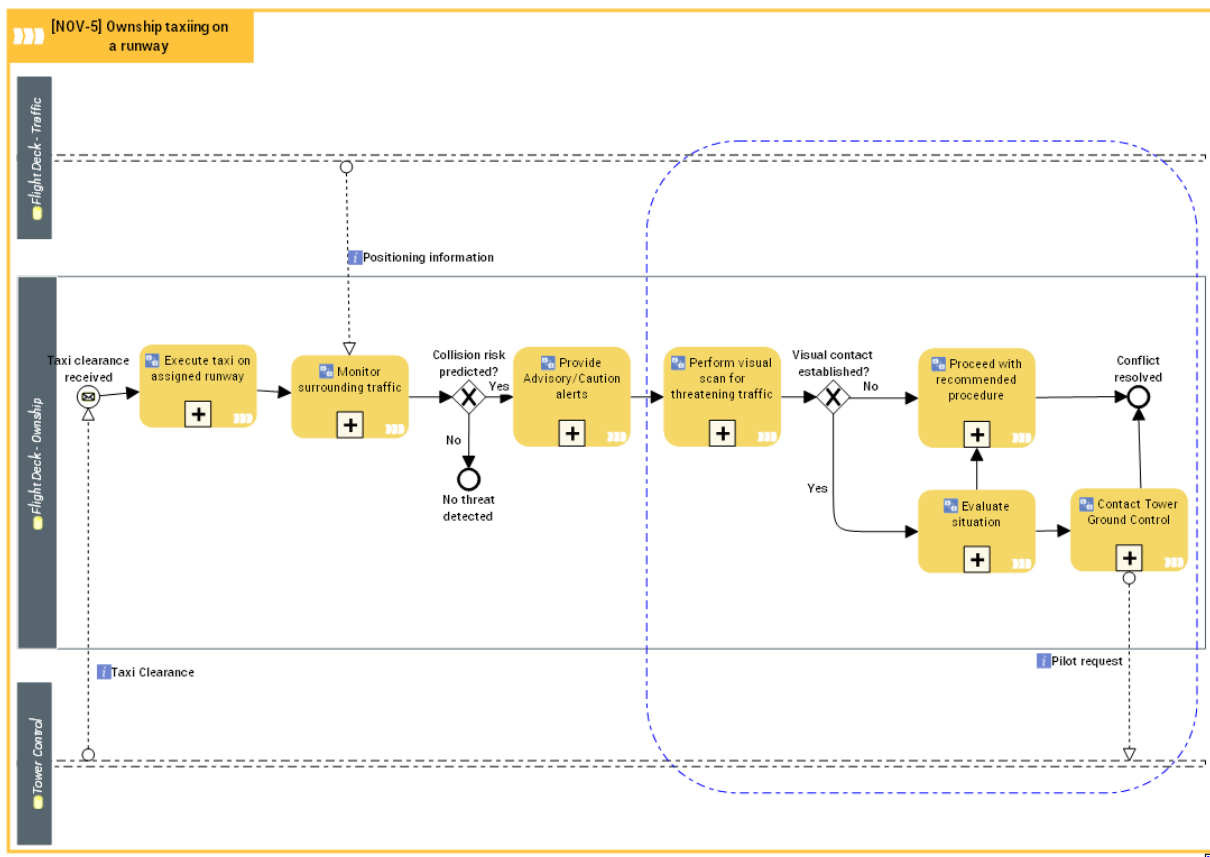


Figure 14: [NOV-5] Ownship taxiing on runway

3.3.2.4.2 Taxiway Use Cases

Operations related to traffic alerts for conflicts on taxiways are newly added to the taxiway part with acronym TWY-ITA.

All scenarios of Use Cases assume ownship and traffic on ground within taxiway system of airport surface.

The use cases does not assume there is a taxiway layout available at this phase of development and scope of V3 validation.

3.3.2.4.2.1 Use Case 1: Ownship with traffic ahead on single or intersecting taxiways

General Conditions

The ownship is taxiing or not moving on taxiway heading against the traffic within a defined sector ahead the ownship. Traffic is taxiing or not moving.

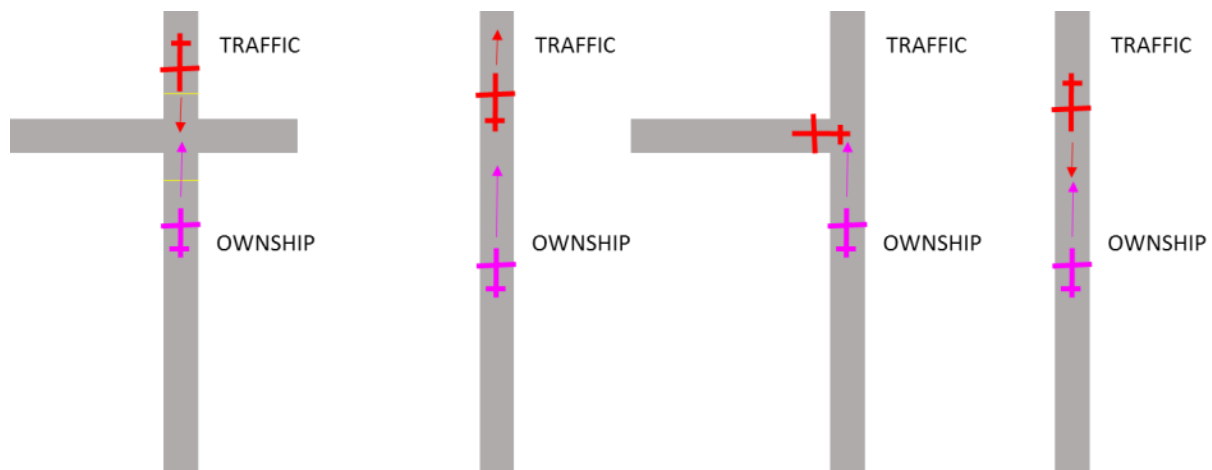


Figure 15: Taxiway Use Cases 1 overview

Pre-Conditions

Ownship is equipped with ADS-B In and can receive current information about position, ground speed, heading/track of on-ground aircraft. Other aircraft/mobiles are equipped with ADS-B out.

Post-Conditions

The flight crew receives a series of information which is more or less extended depending on the implementation:

- Implementation without traffic display/ATSA-SURF:
- (Optional) Implementation with traffic display/ATSA-SURF:
 - Indications,
 - Alerts (advisory/caution only).

Operating method

During the taxiing, the ownship has been cleared to taxi on assigned taxiway with expected taxi speed approximately up to 40kts.

The traffic is approaching ownship ahead or is not moving on ownship cleared taxiway.

Implementation (Optional) with traffic display/ATSA-SURF

Assuming one pilot has displayed CDTI for on-ground traffic as the ownship is taxiing on airport surface. This pilot may see traffic in close proximity as possible threat and that some aircraft is approaching ahead.

An advisory/**caution alert** is triggered for defined closure time to collision and the flight crew do a visual scan for threatening traffic.

- In case the crew is missing visual contact they stop and/or contact ATC.
- In case the crew have visual contact, they evaluate situation and/or adjust speed and/or other planned action resolving the situation and/or call ATC.

Derived Use Cases without alert

- In case the ownship starts turning outward from traffic, no alert is triggered.
- If the closure rate or ground speed of both ownship and traffic is below defined minimum speed, no alert is triggered.

MEGA tool definition

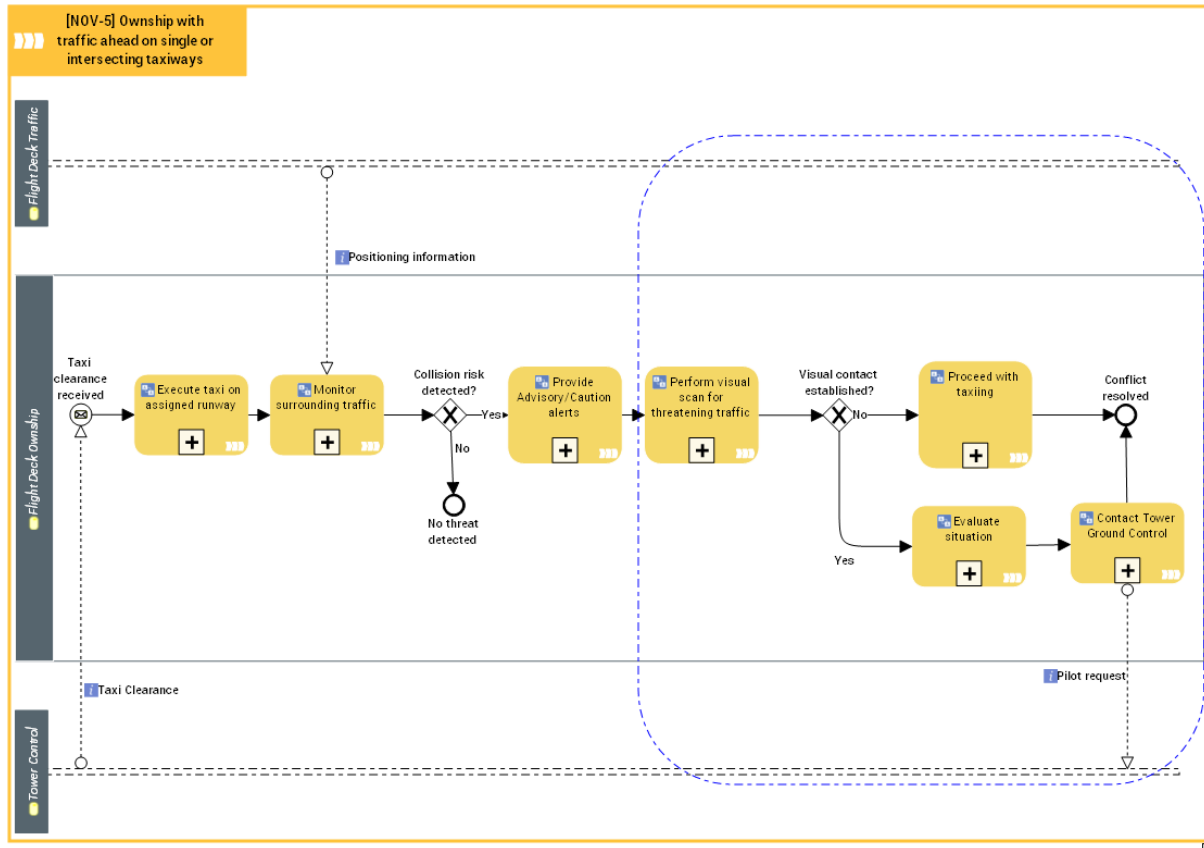


Figure 16: [NOV-5] Ownship with traffic ahead on single or intersecting taxiways

3.3.2.4.2.2 Use Case 2: Ownship with traffic from left/right on single or intersecting taxiways

General Conditions

The ownship is taxiing or not moving on taxiway, the traffic is approaching from left or right defined sector.

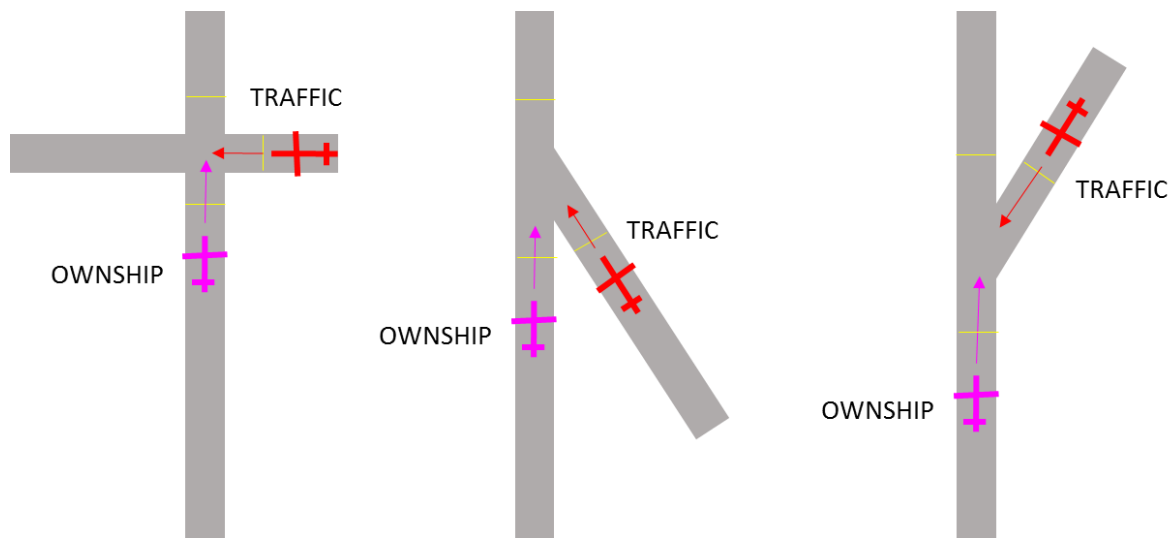


Figure 17: Taxiway Use Cases 2 overview

Pre-Conditions

Ownship is equipped with ADS-B In and can receive current information about position, ground speed, heading of on-ground aircraft. Other aircraft/mobiles are equipped with ADS-B out.

Post-Conditions

The flight crew receives a series of information which is more or less extended depending on the implementation:

- Implementation without traffic display/ATSA-SURF: N/A
- (Optional) Implementation with traffic display/ATSA-SURF:
 - Indications,
 - Alerts (advisory/caution only).

Operating method

During the taxiing, the ownship has been cleared to taxi on assigned taxiway with expected taxi speed.

The traffic is approaching ownship from left/right.

Implementation (Optional) with traffic display/ATSA-SURF

Assuming one pilot has displayed CDTI for on-ground traffic as the ownship is taxiing on airport surface. This pilot may see traffic in close proximity as possible threat and that some aircraft is approaching from left/right.

A advisory/**caution alert** is triggered for defined time to collision and the flight crew do a visual scan for threatening traffic.

- In case the crew is missing visual contact they stop and/or contact ATC.

- In case the crew have visual contact, they evaluate situation and/or adjust speed and/or call ATC and/or other planned action resolving the situation.

Derived Use Cases without alert

- In case the ownship starts turning outward from traffic, no alert is triggered.
- If the closure rate or ground speed of both ownship and traffic is below defined minimum speed, no alert is triggered.

MEGA tool definition

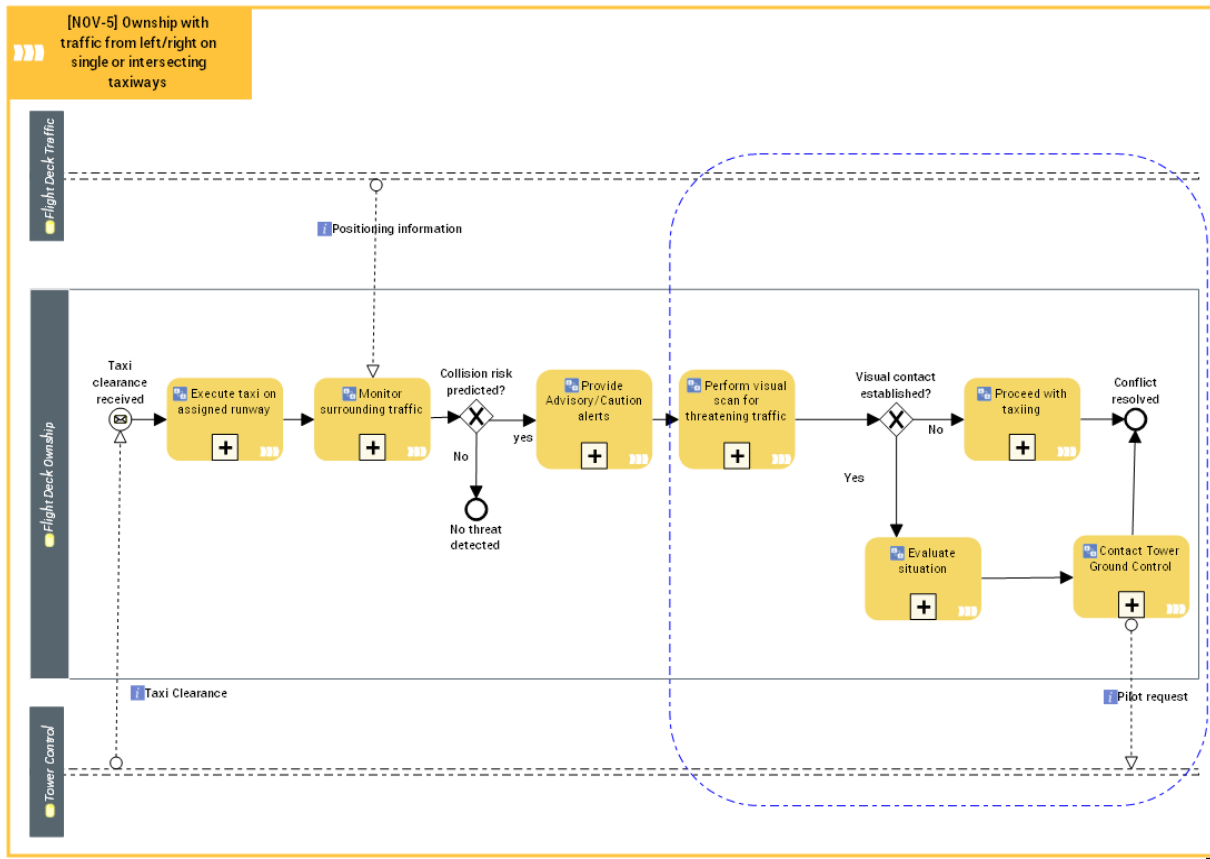


Figure 18: [NOV-5] Ownship with traffic from left/right on single or intersecting taxiways

3.3.2.4.2.3 Use Case 3: Ownship with traffic from behind on single or intersecting taxiways

General Conditions

The ownship is taxiing, queuing or not moving on taxiway, the traffic is approaching from behind defined sector. This case is also including fast runway exit

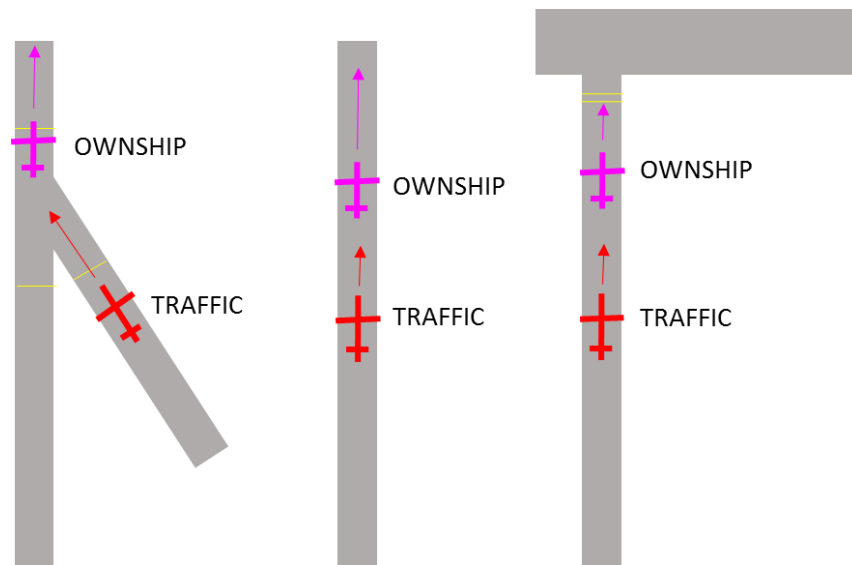


Figure 19: Taxiway Use Case 3 overview

Pre-Conditions

Ownship is equipped with ADS-B In and can receive current information about position, ground speed, heading of on-ground aircraft. Other aircraft/mobiles are equipped with ADS-B out.

Post-Conditions

The flight crew receives a series of information which is more or less extended depending on the implementation:

- Implementation without traffic display (CDTI)/ATSA-SURF: N/A
- (Optional) Implementation with traffic display (CDTI)/ATSA-SURF:
 - Indications,
 - Alerts (advisory/caution only).

Operating method

During the taxiing, the ownship has been cleared to taxi on assigned taxiway with expected taxi speed. There is also specific case for turnback procedure.

The traffic is approaching ownship from behind on taxiway.

Implementation (Optional) with traffic display/ATSA-SURF

Assuming one pilot has displayed CDTI for on-ground traffic as the ownship is taxiing on airport surface. This pilot may see traffic in close proximity as possible threat and that some aircraft is approaching from behind.

An advisory/SURF-A/**caution alert** is triggered for defined time to collision and the flight crew do a visual scan for threatening traffic.

- In case the crew is missing visual contact they should not stop unless they are on stop bar or any other higher ATC priority is in place and/or contact ATC.
- In case the crew have visual contact, they evaluate situation and/or adjust speed and/or call ATC and/or other planned action resolving the situation.

Derived Use Cases without alert

- In case the ownship starts turning, no alert is triggered.
- If the closure rate or ground speed of both ownship and traffic is below defined minimum speed, no alert is triggered.

MEGA tool definition

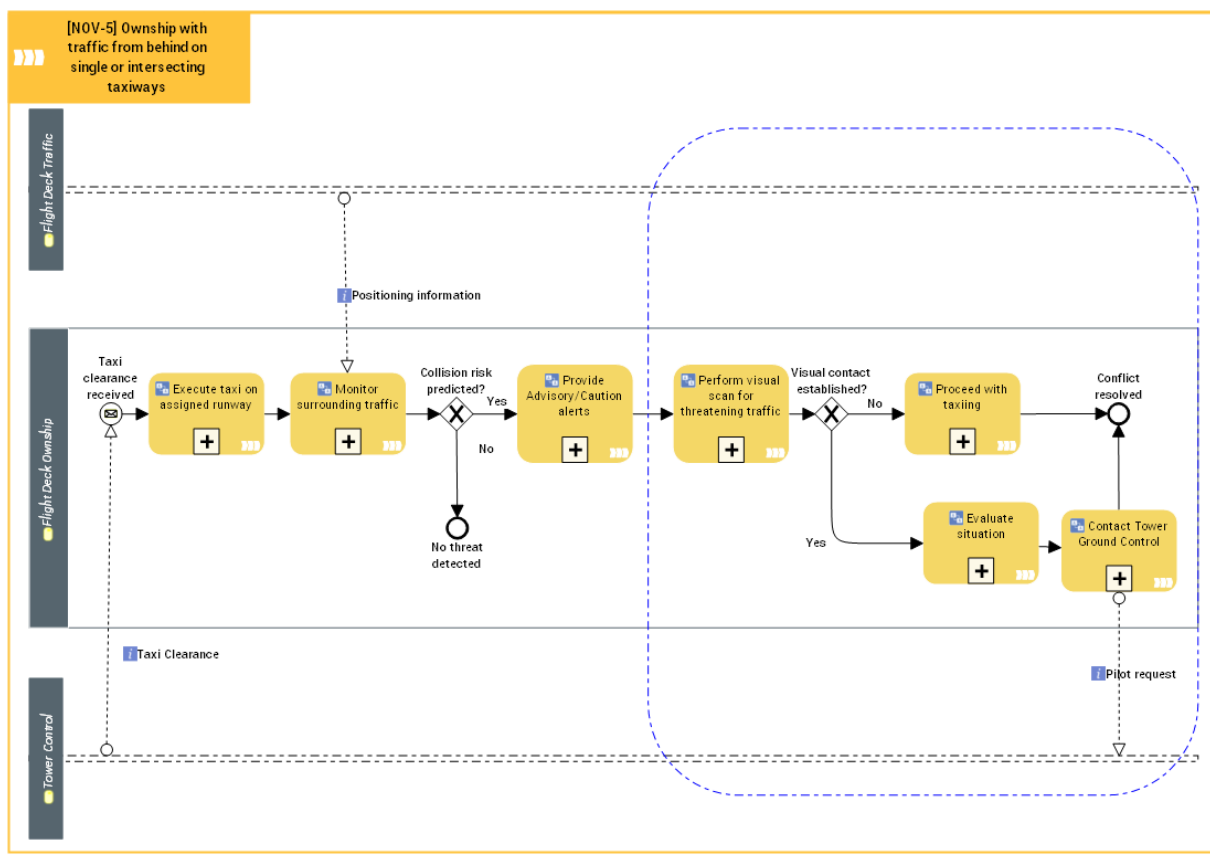


Figure 20: [NOV-5] Ownship with traffic from behind on single or intersecting taxiways

3.3.3 Differences between new and previous Operating Methods

Difference for operations on runways

The new operating method relies on the previous one, which remains the nominal method to proceed with runway operations.

However, the new operating method with SURF-A/ITA provides an additional safety net to address risks of collision during runway operations with attention getters to alert the crew – what is not done by the common CDTI.

If the flight crew identifies this type of situations with the previous operating method (see section 3.1), the flight crew proceeds with the previous operating method to avoid any risk of collision. If the flight crew does not identify a situation that can potentially result in a collision on the runway (e.g. limited visibility, conflicting traffic outside the field of view), a triggered alert will inform the flight crew who will then apply the new operating method to address and resolve this situation.

The procedures for the controllers and activities are not changed with the use of the SURF-A/SURFITA application.

Differences for operations on taxiways (TWY-ITA)

New taxiway part TWY-ITA relies on previous Operating Methods, which is the same as the SURF-ITA on runways only.

TWY-ITA consisting of taxiway traffic alerting algorithms brings additional area for safety net addressing risks of collision on taxiways. This is done with the same intended function and means providing crew with an audio and visual traffic alerting information during taxi operations.

There is no change to any previous operating method unless the crew will receive an audio and visual alert by the TWY-ITA during taxiway operations. The flight crew then apply new operating method to resolve and address traffic alerting situation.

There is no change of any ATC procedures and activities with the use of TWY-ITA during taxiway surface operations.

4 Safety, Performance and Interoperability Requirements (SPR-INTEROP)

4.1 Assumptions

4.1.1 Targeted mobiles

4.1.1.1 SURF-A/ITA RWY

Assumption Id	Assumption text
ASSUMP-OSD.1	SURF-A/ITA will be used by commercial aircraft, i.e. mainline and business aircraft.

Note: ASSUMP-OSD.2 in DO-323 also covers military and general aviation aircraft. However, in the context of PJ.03b-05, only commercial aircraft will be covered in the OSD, SPR and validation exercises.

ASSUMP-OSD.2	SURF-IA will not be installed on helicopters or surface vehicles.
ASSUMP-OSD.3	SURF-A/ITA will generate alerts against any aircraft equipped with ADS-B OUT transmitter.
ASSUMP-OSD.4	Alerts will be generated in the same way for traffic that includes military and general aviation aircraft.

Note: This assumption merges ASSUMP-OSD 3 and ASSUMP-OSD 13 from DO-323.

Note: V3 validation was performed considering civilian aircraft. The results can be extended to any type of aircraft operating in the same conditions (e.g. not considering specific military operations). The use cases could be extended to helicopters operating on runways after a careful review of use cases.

Table 7: SURF-A/ITARWY Assumptions

4.1.1.2 TWY-ITA

The same as SURF-ITA

4.1.2 Actors

4.1.2.1 SURF-ITA

Assumption Id	Assumption text
ASSUMP-OSED.6	See ASSUMP-OSED.1 (flight crew procedures) in DO-323
ASSUMP-OSED.7	See ASSUMP-OSED.16 (head down time) in DO-323
ASSUMP-OSED.8	See ASSUMP-OSED.17 (manual activation) in DO-323
ASSUMP-OSED.9	See ASSUMP-OSED.4 (controller procedures and responsibilities) in DO-323
<i>Note: See the note below ASSUMP-OSED.4 in DO-323</i>	
ASSUMP-OSED.10	See ASSUMP-OSED.12 (ground vehicles clearance) in DO-323

Table 8: SURF-A/ITA Actors Assumptions

4.1.2.2 TWY-ITA

The same as SURF-ITA with changes below:

Assumption Id	Assumption text
ASSUMP-OSED.6	See ASSUMP-OSED.1 in DO-323 - New ASSUMP-OSED.6 extending: TWY-ITA will supplement current flight crew procedures for safety operations on taxiway and approaching runway alerting zone.
ASSUMP-OSED.9	See ASSUMP-OSED.4 in DO-323 - Added also for TWY-ITA (extended by taxiways)

Table 9: TWY-ITA Actors Assumptions

4.1.3 Environment

4.1.3.1 SURF-ITA

Assumption Id	Assumption text
ASSUMP-OSD.11	See ASSUMP-OSD.6 (airport control type) in DO-323.
ASSUMP-OSD.12	SURF-A/ITA will be used in full range of aerodrome types (within Code 3 or 4 aerodromes), from relatively simple aerodrome layouts and low-density operations, to highly complex runway and taxiway layouts supporting super-high traffic densities.
ASSUMP-OSD.15	There are no requirements for ground surveillance capability to support SURF-A/ITA. For a complete coverage and benefit of the SURF-A/ITA system, some mitigation for ADS-B link performance is necessary.
<i>Note: To address the partial ADS-B OUT equipage of mobiles, TIS-B relying on ground surveillance can be implemented.</i>	
ASSUMP-OSD.16	For SURF-A/ITA, voice communications between pilots and controllers are the same as today (without a new phraseology).
ASSUMP-OSD.17	See ASSUMP-OSD.14 in DO-323.
ASSUMP-OSD.24	SURF-A/ITA will not include the data link of alerts between aircraft.
ASSUMP-OSD.25	SURF-A/ITA will not include the data link of alerts between the ground and the aircraft.

Table 10: SURF-ITA Environment Assumptions

4.1.3.2 TWY-ITA

The same as SURF-ITA above.

4.1.4 SURF-A/ITA equipment

4.1.4.1 SURF-ITA

Assumption Id	Assumption text
ASSUMP-OSD.18	See ASSUMP-OSD.9 (non-directive alerts) in DO-323
<i>Note: See the note below ASSUMP-OSD.9 in DO-323</i>	
ASSUMP-OSD.19	See ASSUMP-OSD.10 (alerts comply to AC 25.1322) in DO-323

Note: See the note below ASSUMP-OSED.10 in DO-323

ASSUMP-OSED.20	See ASSUMP-OSED.11 (approach runway detection and nuisance rate) in DO-323
----------------	--

Note: See the note below ASSUMP-OSED.11 in DO-323

ASSUMP-OSED.21 (Optional)	SURF-A/ITA will use an electronic map database containing at minimum the information about the airport surface that is required by SURF-ITA.
---------------------------	--

Note 1: This assumption is ASSUMP-OSED.15 in DO-323 with additional text “containing at minimum the information about the airport surface that is required”.

Note 2: See the notes below ASSUMP-OSED.15 in DO-323

ASSUMP-OSED.26	SURF-A may be implemented on-board aircraft that are not equipped with CDTI (ATSA-SURF).
----------------	--

Table 11: SURF-A/ITA equipment Assumptions

4.1.4.2 TWY-ITA

Assumption Id	Assumption text
ASSUMP-OSED.19	See ASSUMP-OSED.10 in DO-323 added with EASA AMC25.1322
ASSUMP-OSED.20	See ASSUMP-OSED.11 in DO-323 – not applicable for TWY-ITA
ASSUMP-OSED.21	TWY-ITA will use an electronic map database containing at minimum the information about the airport surface that is required by TWY-ITA.
ASSUMP-OSED.26	TWY-ITA may be implemented on-board aircraft that are equipped with CDTI (ATSA-SURF) .

Table 12: TWY-ITA equipment Assumptions

4.1.5 Operations

4.1.5.1 SURF-ITA

DO-323 LAHSO assumption is reused here because we consider SURF-A/ITA cope with the LAHSO operation with protection against the risk of collision.

4.1.5.2 TWY-ITA

N/A to TWY-ITA.

Apron area is not addressed.

4.2 Requirements for traffic alerts on runways SURF-A/ITA

Note 1: To ease traceability, requirements taken from DO323 that are retained are written in full text. When modified, the previous text is kept. Moreover as this OSD has been initiated in P06.07.01 project, requirements reference has been kept for traceability issue.

Note 2: Requirements taken from DO-323 referring to SURF-IA are also applicable for SURF-A/ITA.

Note 3: There are 2 possible implementations: a basic one (without ATSA-SURF and associated advisories) and a full one with ATSA-SURF. Requirements that are only fulfilled with the full implementation are tagged with the mention “(Optional)” at the beginning of the requirement.

4.2.1 Operational Requirements

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0001
Requirement	See OR.6 requirement in RTCA DO-323:
Title	Applicable procedures and training
Status	<Validated>
Rationale	Safe and efficient operations rely on the application of defined procedures supported by an appropriate training. The use of rules common to any type of alert facilitates the procedures and training.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0040
Requirement	The flight crew shall follow SURF-A/ITA advisory/caution as supplemental to existing means and procedures
Title	Use of SURF-A/ITA advisories/caution by flight crews
Status	<Validated>
Rationale	The existing operating method (i.e. without SURF-A/ITA) is the primary means to detect risk of collision during runway operations. SURF-A/ITA is a supplementary means to enhance safety when an actual risk of collision is not detected with the primary means.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0003
Requirement	(Optional) See OR.4 requirement in RTCA DO-323
Title	Flight crew reaction to SURF-ITA indications – information verification
Status	<Validated>
Rationale	As indications are supplemental, the flight crew has to verify them with existing sources of information, e.g. to identify any potential false indications.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0042
Requirement	<i>Upon perceiving a SURF-A/ITA advisory/caution the flight crew shall determine if a safety hazard exists and whether it is appropriate to continue with current operations.</i>
Title	Flight crew reaction to SURF-A/ITA advisories/cautions – safety hazard determination
Status	<Validated>
Rationale	Upon receiving a SURF-A/ITA advisory/caution the flight crew is expected to verify runway status prior to proceeding in their intended operation such as entering a runway, taxi, take-off, or landing on the runway.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0005
Requirement	See OR.2 requirement in RTCA DO-323
Title	Flight crew reaction to SURF-A/ITA advisory/caution alerts
Status	<Validated>
Rationale	Advisory/Caution alerts are provided at a sufficient amount of time prior to the warning to allow the flight crew time to evaluate the situation and to determine and initiate any appropriate response.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0006
Requirement	See OR.1 requirement in RTCA DO-323
Title	Flight crew reaction to SURF-A/ITA warning alerts
Status	<Validated>
Rationale	Warning alerts are provided in situations of imminent collision risk and therefore immediate flight crew awareness and immediate flight crew response are necessary to resolve this risk.
Category	<Operational>



[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.2.2 Functional Requirements

4.2.2.1 Surveillance

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0007
Requirement	This requirement corresponds to OSR.5 requirement in RTCA DO-323 for ADS-B only.
Title	Main surveillance means
Status	<Validated>
Rationale	ADS-B is the main surveillance means to support SURF-ITA. ADS-B data must meet the performance requirements defined in the SPR for SURF-A/ ITA to be used.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0008
Requirement	This recommendation corresponds to OSR.5 requirement in RTCA DO-323 for TIS-B and ADS-R / ADS-SLR.
Title	Other surveillance means
Status	<Validated>
Rationale	ADS-R or TIS-B are not required for SURF-ITA. However, if ADS-R or TIS-B surveillance is/are available and meet the performance requirements as provided in the SPR (this should be the case in the United States), it will increase the level of surveillance and provide additional traffic situational awareness and alerting.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0001
Requirement	(Optional) When SURF-ITA is enabled, the traffic on CDTI shall be depicted by using a symbology able to clearly distinguish among: ● ownship ● other a/c moving within the RPA ● ground vehicles moving within the RPA
Title	Traffic symbology depiction
Status	<Validated>
Rationale	Providing flight crew with a clear picture of the traffic.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0022	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0002
Requirement	(Optional) When SURF-ITA is enabled, ownship shall be displayed on CDTI as an aircraft symbol.
Title	Ownship symbol on AMM
Status	<Validated>
Rationale	Providing flight crew situational awareness during runway operations when a CDTI is implemented.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0015	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0021	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0022	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0003
Requirement	(Optional) When SURF-ITA is enabled, each a/c shall be displayed on CDTI as an aircraft symbol plus a label using the following information: • a/c identity (call-sign) • horizontal position • vertical position (when airborne) or on-ground indication
Title	Traffic symbology depiction
Status	<Validated>
Rationale	Providing flight crew situational awareness during runway operations.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0015	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0021	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0022	<Partial>

<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0004
Requirement	Ownship shall be able to process : • ADS-B surveillance data transmitted by ADS-B equipped mobiles, • TIS-B surveillance data transmitted by ground stations
Title	Input means
Status	<Validated>
Rationale	To provide ownship with a more complete traffic information in situation where not all surrounding mobiles are equipped with ADS-B OUT capability or ADS-B information cannot be received properly by ownship.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0015	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

4.2.2.2 Activation/deactivation

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0009
Requirement	This requirement is based on OSR.6 requirement in RTCA DO-323 and it also includes the disabling function.
Title	SURF-A/ITA enabling
Status	<Validated>
Rationale	However, a distinction has to be made between: 1) Automatic enabling/disabling when ownship enters into/exits from the SURF-A/ITA volume (criteria should be defined and validated) in order to avoid a manual action to do it 2) possibility for flight crews to enable/disable SURF-A/ITA(not covered by this REQ – see REQ-06.07.01-OSD-ITAP.0091)
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0091
Requirement	This requirement is based on OSR.6 requirement in RTCA DO-323 with additional operational cases
Title	SURF-A/ITA enabling
Status	<Validated>
Rationale	In addition to the automatic enabling/disabling, the flight crew should have the possibility to enable/disable SURF-A/ITA manually in specific situation when nuisance alerts are triggered. In RTCA DO-323, LAHSO operations are mentioned but it is likely that triggering conditions can cover such situations. The need for manual disabling is confirmed (e.g. to avoid nuisance alerts when the stop bar position derogates ICAO minimum distance, or by precaution for any usage in unforeseen operational environment generating systematic nuisance alerts).
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0010
Requirement	This requirement merges OSR.21 and OSR.30 requirements from RTCA DO-323. (Either on the ground or on final approach).
Title	Active SURF-A/ITA criteria
Status	<Validated>
Rationale	See definition of “near a runway” in the note below OSR.21 requirement in RTCA DO-323
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0012
Requirement	(Optional) SURF-ITA shall trigger alerts whether ATSA-SURF display is active (i.e. compatible selected display range) or not.
Title	SURF-ITA independent of ATSA-SURF display status
Status	<Validated>
Rationale	The triggering of alerts is independent of the ATSA-SURF display activation. For instance, even if the flight crew has set the traffic display to an airborne mode before the take-off roll (i.e. ATSA-SURF is no more active), alerts must still be triggered if needed according to the appropriate requirements.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A

<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.2.2.3 CDTI display (for optional implementation)

These requirements are applicable if CDTI display is available (eventually enhanced with an airport moving map) is available with the possibility of traffic display (ATSA-SURF).

[REQ]

Identifier	REQ-06.07.01-OSED-ITAP.0013
Requirement	(Optional) SURF-ITA shall provide Alert information to the displays.
Title	Minimum map information
Status	<Validated>
Rationale	This requirement corresponds to OSR.7 requirement in RTCA DO-323, with one modification: the condition “when a suitable scale is selected” has been deleted in accordance with requirement REQ-06.07.01-OSED-ITAP.0012. Runways represent the minimum required information for triggering of Alerts. Indeed, SURF-ITA scope is only runway operation. Furthermore, it significantly increases the availability of the SURF-ITA because full airport maps are only available a subset of airports while runway data are usually available. Nevertheless, it is strongly recommended to also use taxiway information for the display when available (see REQ-06.07.01-OSED-ITAP.0012).
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0014
Requirement	(Optional) SURF-ITA should provide Alert information to a display that provides information about all taxiways and runways in the database.
Title	Recommended map information
Status	<Validated>
Rationale	This requirement corresponds to OSRec.2 recommendation in RTCA DO-323, with one modification: the condition “when a suitable scale is selected” has been deleted in accordance with requirement 0012. Although it is not the minimum requirement (see 0012), it is strongly recommended that both taxiways and runways are available and displayed.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0010
Requirement	(Optional) With a full implementation with traffic display, CDTI shall display the airport map at different scale selectable by the flight crew and the relevant traffic (airborne and on ground)
Title	Traffic visualisation
Status	<Validated>
Rationale	This function allows the crew to select the optimum range to acquire the traffic position on CDTI and anticipate a conflict.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0026	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0030
Requirement	Ownship navigation data shall provide continuously SURF-A/ITA function with aircraft data.
Title	Information flow provided
Status	<Validated>
Rationale	Necessary input to the Traffic alerts application to determine ownship location and speed vector.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0034	<Partial>
<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

4.2.2.4 Qualification

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0015
Requirement	SURF-A/ITA Alerts shall only be triggered for traffic that complies with all the SURF-A/ITA data quality requirements.
Title	SURF-A/ITA qualification
Status	<Validated>
Rationale	This requirement corresponds to OSR.10 requirement in RTCA DO-323, with one modification: the requirement to be qualified for display on CDTI (i.e. ATSA-SURF) has been removed as it is expected that qualification for SURF-A/ITA will be more stringent. To be qualified for SURF-A/ITA to be able to trigger Alerts is an obvious minimum requirement. It is expected that the qualification for SURF-A/ITA is more stringent than the qualification for ATSA-SURF and therefore that a traffic triggering an Alert will be displayed by ATSA-SURF for systems integrating both applications. Nevertheless, a comparison between ATSA-SURF requirements and SURF-ITA requirements when determined has to be conducted to check that this expectation is correct.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0005
Requirement	ADS-B/TIS-B/ADS-R data shall meet minimum performance requirements to be qualified for SURF-A/ITA application.
Title	Input means performance
Status	<Validated>
Rationale	Any traffic information received by ownship shall meet certain surveillance quality indicators (accuracy, integrity, etc.) to be SURF-A/ITA qualified.

Founding Members

	Quality indicators for SURF-IA application were identified in RTCA DO-323 § 4.3.7. and confirmed with SESAR 2020 V&V activities.
Category	<Performance>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0015	<Partial>
<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
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A

4.2.2.5 Triggering of Alerts

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0019
Requirement	See OSR.19 requirement in RTCA DO-323
Title	Warning Level Alert triggering conditions
Status	<Validated>
Rationale	SURF-A/ITA shall provide Warning Level Alerts when either ownship or traffic is above taxi speed (e.g., > 30 knots in absolute value or relative to each other) and a collision risk is expected to occur on a runway within e.g., 30 sec.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A

<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

Identifier	REQ-06.07.01-OSD-ITAP.0053
Requirement	SURF-A/ITA function shall issue a warning level alert requiring an immediate and appropriate crew action only when, with given available parameters, a risk of collision can be identified.
Title	Warning Level Alert triggering conditions
Status	<Validated>
Rationale	SURF-A/ITA shall provide Warning Level Alerts provide an alert upon conditions where it cannot be considered as a false alert or only information.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0020
Requirement	(Optional) See OSR.20 requirement (Caution) in RTCA DO-323
Title	Caution Level Alert triggering conditions
Status	<Validated>
Rationale	SURF-ITA shall provide Caution Level Alerts when either ownship or traffic is above taxi speed (e.g., >30 knots) and a collision risk is detected on a runway within e.g., 30 sec
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0039
Requirement	(Optional) See OSR.20 requirement (Advisory/Caution) in RTCA DO-323
Title	Advisory/Caution Level Alert triggering conditions
Status	<Validated>
Rationale	SURF-ITA shall provide Advisory/Caution Level Alerts when a collision risk is expected to occur on a runway. within e.g., 20/30 to 40/60 sec
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0008
Requirement	Ownship shall have an alert prioritisation function capable of managing and prioritising all the ownship's alerts being generated, including SURF-A/ITA alerts.
Title	Alert prioritisation
Status	<Validated>

Rationale	A prioritisation logic shall be implemented to take into account the criticality of the alerts being generated during runway operations, including other alerting functions (eg. TCAS, ROPS, WINDSHEAR...)
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-ITAP.0037	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0009
Requirement	Ownship shall have an automatic alert suppression function capable of inhibiting SURF-A/ITA alerts during take-off roll at high-speed regime
Title	Alert suppression
Status	<Validated>
Rationale	If an alert is triggered in this phase, rejecting take-off should be avoided.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0011	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0015
Requirement	When the ownship is on final approach, SURF-A/ITA system shall trigger a caution/warning alert if there is a risk of collision with another a/c on the runway.
Title	Triggering condition on final approach
Status	<Validated>
Rationale	Meaning it is associated with an immediate crew reaction.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0035	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

<ALLOCATED_TO>	<Functional Block>	Alerts	N/A
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[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0016
Requirement	When the ownship is landing, SURF-A/ITA system shall trigger a caution/warning alert if an aircraft is entering the runway ahead of the ownship such that collision risk is detected within e.g. 30 seconds.
Title	Triggering condition at landing
Status	<Validated>
Rationale	Operational criterion
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0035	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0017
Requirement	(Optional) Full implementation: When the ownship is entering/crossing the runway, SURF-ITA shall trigger an advisory/caution alert if another a/c is moving on the runway with a possible risk of collision.
Title	Triggering condition during runway crossing
Status	<Validated>
Rationale	Condition for an early alert
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0034	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0018
Requirement	When the ownship is entering/crossing the runway, SURF-A/ITA shall trigger a warning alert if another a/c is landing on or taking off from the same runway with a risk of collision.
Title	Triggering condition during runway crossing
Status	<Validated>
Rationale	In this scenario, measurable parameters to trigger an alert should be identified (e.g. distance from runway shoulder edge, ownship's speed, etc.).
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0035	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0019
Requirement	(Optional) When the ownship is lined up, SURF-ITA shall trigger an advisory alert if a mobile is entering/crossing the runway ahead the ownship.

Title	Triggering condition
Status	<Validated>
Rationale	In this scenario, measurable parameters to trigger an alert should be identified (e.g. distance from runway shoulder edge, mobile's speed, etc.).
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0034	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0020
Requirement	When the ownship is in the low-speed regime during the take-off roll, SURF-A/ITA shall trigger a warning alert if a mobile is entering/crossing the runway ahead.
Title	Triggering condition at take-off
Status	<Validated>
Rationale	In this scenario, a timely SURF-A/ITA alert allows pilot to stop the ownship without significant safety repercussions while avoiding potential risk of runway collision.

Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0035	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0021
Requirement	When the ownship is on final approach, SURF-A/ITA system shall trigger a caution/warning alert if an aircraft is entering/crossing the same runway and there is a risk of collision.
Title	Triggering condition for ownship on final approach
Status	<Validated>
Rationale	In this scenario, a timely SURF-A/ITA alert allows pilot to interrupt the approach without significant safety repercussions while avoiding a potential risk of runway collision.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0035	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0022
Requirement	When the ownship is on final approach and a warning alert is triggered by SURF-A/ITA system, the crew shall initiate a go-around under his/her own decision
Title	Alert non-directivity
Status	<Validated>
Rationale	The action following the alert remains subject to pilots' decision.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0004	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0006	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0023
Requirement	When the ownship is landing and a warning alert is triggered by SURF-A/ITA system due to an aircraft entering/crossing the runway ahead of the ownship, the pilot shall promptly be aware of the threat position and decide the appropriate action: • to maximise the braking action to stop the ownship as early as possible • or to retard the braking action to overtake the threat as early as possible • or to exit the runway through an high-speed taxiway (if possible) • or to perform a touch and go (if possible)
Title	Pilots actions possibility
Status	<Validated>
Rationale	In this situation the pilot's decision making process can be highly complex. A warning alert could support the right choice.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0003	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0004	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0024
Requirement	When the ownship is entering/crossing the runway and a warning alert is triggered by SURF-A/ITA system, pilot shall immediately either stop the ownship or expedite vacation.
Title	Pilots actions possibility
Status	<Validated>
Rationale	A warning alert can promptly inform pilot about an a/c which is landing or taking off sufficiently before the runway shoulder edge
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0003	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0004	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0025
Requirement	When a warning alert is triggered by SURF-A/ITA during take-off roll at low-speed regime, pilot shall perform a rejected take-off
Title	Pilots actions possibility
Status	<Validated>
Rationale	During this scenario, an RTO is the expected reaction to avoid a collision.
Category	<Safety>

Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0003	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0004	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0026
Requirement	(Optional) When an advisory/caution alert is triggered by SURF-ITA system on final approach, pilot shall timely acquire the position of the threat by: • by performing OTW scan • looking at the CDTI, or • by communicating with ATCo before performing the appropriate action
Title	Pilots reaction following advisory/caution
Status	Validated
Rationale	Advisory/caution to increase traffic awareness and to expect warning alert with go-around procedure
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0001	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0040	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0042	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0027
Requirement	(Optional) When the ownship is entering/crossing the runway and an advisory/caution alert is triggered by SURF-ITA system, pilot shall timely acquire the position of the potential threat by: • by performing OTW scan • looking at the CDTI, or • by communicating with ATCo before performing the appropriate action
Title	Pilots reaction following advisory/caution
Status	<Validated>
Rationale	An advisory alert can support crew to be timely aware of a potential threat before entering/crossing a runway
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0040	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0042	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0028
Requirement	(Optional) When the ownship is lined-up on the runway and an advisory/caution alert is triggered by SURF-ITA system, pilots shall timely acquire the position of the potential threat by: • performing OTW scan • looking at the CDTI, or • by communicating with ATCo before performing the appropriate action
Title	Pilots reaction following advisory
Status	<Validated>
Rationale	An advisory alert can support crew to be timely aware of a potential threat before starting the take-off roll
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0040	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0042	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

4.2.3 Human factor requirements

4.2.3.1 Display of traffic triggering an Alert

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0006a
Requirement	SURF-A/ITA system shall trigger both aural and visual alerts when a warning level is triggered
Title	Warning alert means
Status	<Validated>
Rationale	According to CS25.1322, warning alerts require immediate flight crew awareness through two different senses (visual and aural alert)
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0015	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0006b
Requirement	SURF-ITA system shall trigger both aural and visual alerts when a caution level is triggered
Title	Caution alert means

Status	<Validated>
Rationale	According to EASA CS25.1322, caution alerts do not require immediate flight crew awareness and are provided visually and by audio.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0015	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0006c
Requirement	SURF-A/ITA system shall trigger visual alerts when an advisory level is triggered
Title	Advisory alert means
Status	<Validated>
Rationale	According to EASA CS25.1322, advisory alerts do not require immediate flight crew awareness and are normally provided through a single sense.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0015	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0021
Requirement	(Optional) SURF-ITA shall display all the information elements required by ATSA-SURF for traffic triggering an Alert if they are available.
Title	SURF-ITA information elements
Status	<Validated>
Rationale	This requirement results from the merge and adaptation of RTCA DO-323 OSR.9, OSR.18, OSR.27, OSR.32, OSRec.8, OSRec.9 and OSRec.11. The list of information elements to be displayed if available is: • Horizontal position; • Altitude; • Direction; • Aircraft Identification; • Ground speed; • Aircraft emitter category or wake vortex category; and • Vertical tendency. While the last four items are required to be selectable for display in ATSA-SURF, they are required to be displayed in case of an Alert to enhance the flight crew traffic situational awareness and to suppress the pilot's action to select them in this demanding situation.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0022
Requirement	(Optional) This requirement corresponds to OSR.4 requirement in RTCA DO-323 with two modifications.
Title	Aircraft and ground vehicles differentiation
Status	<Validated>
Rationale	This requirement corresponds to OSR.4 requirement in RTCA DO-323 with two modifications: the reference to the flight crew and the introduction of the ATSA-SURF traffic display. When the information is available, it is important to inform the flight crew whether the Alert is triggered by another aircraft or a ground vehicle, in particular to support an efficient visual search of the mobile and also as the resulting action may be different. This requirement is already part of ATSA-SURF and RTCA DO-317A.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.2.3.2 Integration with ATSA-SURF

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0023
Requirement	(Optional) This requirement corresponds to OSRec.3 requirement in RTCA DO-323. Considering that ATSA-SURF and SURF-ITA are integrated together, the flight crew shall be able to differentiate on the ATSA-SURF traffic display between SURF-ITA qualified traffic and traffic that is only qualified for ATSA SURF.
Title	ATSA-SURF qualification only
Status	<Validated>
Rationale	This requirement corresponds to OSRec.3 requirement in RTCA DO-323 with the introduction of the ATSA-SURF traffic display and the removal of reference to ASSA and FAROA. See note below OSRec.3 recommendation in RTCA DO-323
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.2.3.3 Usability

[REQ]

Identifier	REQ-06.07.01-OSED-ITAP.0025
Requirement	See OSR.2 requirement in RTCA DO-323.
Title	SURF-A/ITA usability
Status	<Validated>
Rationale	The initial objective is to enable the use of SURF-A/ITA by flight crews of one or more pilots. <i>Note: in the frame of SESAR, we consider an implementation on aircraft with 2 pilots crews on all categories (mainline, business and regional)</i>
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.2.3.4 Off-scale traffic

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0026
Requirement	(Optional) This requirement corresponds to the merge of OSR.15 and OSR.31 requirements in RTCA DO-323.
Title	Alerts for off-scale traffic
Status	<Validated>
Rationale	As off-scale traffic can trigger Alerts, SURF-ITA traffic displays must display off-scale traffic triggering Alerts and Indication.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0027
Requirement	(Optional) See OSRec.4 recommendation in RTCA DO-323.
Title	Information for off-scale traffic
Status	<Validated>
Rationale	ATSA-SURF does not require to display “off-scale traffic”. However, traffic displays which also support SURF-ITA must display off-scale traffic to be able to display Alerts.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0028
Requirement	(Optional) When an Alert is triggered by off-scale traffic, a message shall be displayed to the flight crew to select an appropriate display range.
Title	Message for display range modification
Status	<Validated>
Rationale	Depending on the selected display range, an alert can be triggered by a traffic which is off-scale. In this case, a message must be displayed to increase appropriately the display range to show this traffic (similar to TCAS alerts generated by off-scale traffic).
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.2.3.5 Capability status

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0029
Requirement	See OSR.8 requirement in RTCA DO-323.
Title	SURF-A/ITA capability status
Status	<Validated>
Rationale	See note below OSR.8 requirement in RTCA DO-323.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.2.3.6 Display of alerts

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0030
Requirement	(Optional) See OSR.14 requirement in RTCA DO-323.
Title	Traffic highlighting for Indications
Status	<Validated>
Rationale	The flight crew must be able to easily distinguish on the display a traffic that triggers an Indication from the other displayed traffic.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A

<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0031
Requirement	(Optional) See OSR.16 requirement in RTCA DO-323.
Title	Runway highlighting
Status	<Validated>
Rationale	The flight crew must be able to easily identify the runway for which a Runway Status Indication is triggered.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0033
Requirement	See OSR.26 requirement in RTCA DO-323.
Title	Visual attention-getter for Alerts
Status	<Validated>
Rationale	Out-the-window scan is the primary source of information for flight crew and SURF-A/ITA provides supplemental information. To draw flight crew's attention, there must be a visual attention-getter in the primary field of view in case of Alerts.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0034
Requirement	(Optional) An advisory/caution alert shall include amber highlighting of the traffic triggering the alert
Title	Display of Advisory/Caution Alerts
Status	<Validated>
Rationale	Amber is one of the usual colours to display Advisory or Caution Alerts.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0035
Requirement	(Optional) See OSR.25 requirement in RTCA DO-323.
Title	Display of Warning Alerts
Status	<Validated>
Rationale	Red is the usual colour to display Warning Alerts.(CS-25.1322)
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.2.3.7 Aural messages

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0037
Requirement	See OSR.29 requirement in RTCA DO-323.
Title	Aural messages in case of multiple alerts
Status	<Validated>
Rationale	To be clearly distinguishable and intelligible by the flight crews, only one aural alert is presented at a time and the most critical one must have the priority
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.0043.
Requirement	A warning alert shall include an aural speech element
Title	Aural message for Warning Alerts
Status	<Validated>
Rationale	As an immediate processing of an alert is required, an aural annunciation is effective to inform the flight crew that a warning alert is triggered. Generally it is recommended to keep TCAS alert messages philosophy.

Category	<HMI>
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[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.2.4 Requirements for Process/Service

Traffic Alerts for Pilots are linked with ADS-B service (extended to ground transmission of TIS-B and ADS-R data) as identified in REQ-06.07.01-OSD-ITAP.0007 and REQ-06.07.01-OSD-ITAP.0008.

Performance is also addressed at a high level in requirements REQ-06.07.01-OSD-ITAP.0007 and REQ-06.07.01-OSD-ITAP.0008.

SURF-A/ITA being a safety net inside PJ.03b Solutions (SAFE), requirements given in OSD are inputs to the Safety analysis developed in D37 SPR, mainly for the success approach.

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0031
Requirement	SURF-A/ITA function shall receive runway data from aircraft systems.
Title	Runway data
Status	<Validated>
Rationale	Necessary input of basic runway segment data for the system to identify the right runway where the ownship is operating and a conflict could occur. This is associated with the SPR model developed in the associated SAR.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A

<SATISFIES>	<ATMS Requirement>	ASSUMP-OSD.21	<Partial>
<SATISFIES>	<ATMS Requirement>	SAR SR#31	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Database	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0032
Requirement	After the avoidance manoeuvre is ended, the Flight Crew shall contact the Controller for further instructions.
Title	Crew communication with ATC
Status	<Validated>
Rationale	Like TCAS resolution, ATC must have a quick feedback to adapt his strategy to this new situation.
Category	<Safety>
Validation Method	<Real time Simulation/Flight Test>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	SAR SR#032	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0036
Requirement	Flight Crew shall be trained to use SURF-A/ITA function.
Title	Crew training
Status	<Validated>

Rationale	Proper crew knowledge of the function is necessary to have good results.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.0001	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

4.2.5 Interoperability Requirements

4.2.5.1 General requirements

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.0002
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 RTCA DO-323 § 4.3.7. and confirmed with SESAR V&V activities.
Category	<Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<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

4.2.5.2 General Requirements for ownship domain

In reference to AIRM ATM Information Reference Model there are no new Information Elements identified. There are 4 new data elements identified for the PJ.03b-05 with below traceability:

- ADS-B OUT data -> RTCA DO-260B
- Caution Alert -> On board alert only (EASA CS25.1322)-> No AIRM/SWIM applicability
- Warning alert -> On board alert only (EASA CS25.1322) -> No AIRM/SWIM applicability
- Controller/Pilot ATC exchange -> existing compliant AIRM phraseology

4.2.5.2.1 Surveillance data from surrounding traffic

This section addresses aircraft data expected from ownship domain. A distinction is made between:

- Basic ADS-B data (Requirement 0003)
- Complementary data (requirements 0004 and 0005) necessary for Traffic Alerts because they improve data quality.

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.0003
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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<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

The above information can be considered as basic. However, because distances on ground considered for triggering alerts are of the same order as aircraft dimension, additional information would be beneficial to SURF-A/ITA.

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.0004
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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<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	REQ-06.07.01-INTEROP-ITAP.0005
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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<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	REQ-06.07.01-INTEROP-ITAP.0006
Requirement	The SURF-A/ITA system shall be able to receive the information specified in REQ-06.07.01-SPR-ITAP.0004 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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0004	<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

4.2.5.2.2 Ownship navigation Data

The SURF-ITA-system shall be able to receive ownship data from the on-board navigation system:

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.0007
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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0002	<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

4.2.5.2.3 System status

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.0008
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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0007	<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

4.2.5.3 Requirements for external sources

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.0009
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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<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-06.07.01-INTEROP-ITAP.0010
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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<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-06.07.01-INTEROP-ITAP.0011
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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<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

Update rates

Update rates of ADS-B Surveillance Reports are as defined in RTCA DO-242A.

Latency

For latency analysis, it will be referred to RTCA DO-323 SURF IA.

RTCA DO-323 refers to DO-317 about the total latency induced by avionics:

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.0012
Requirement	See requirement SPR.18 of RTCA DO-323.
Title	Total latency of avionics
Status	<Validated>
Rationale	Refer to mentioned RTCA DO-323 and DO-317.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	Alerts Control and display	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.0013
Requirement	See requirement SPR.19 of RTCA DO-323.
Title	Uncompensated latency error of traffic position
Status	<Validated>
Rationale	Traffic alerts require a reactive system behaviour to detect timely risks of collision or avoid false alerts.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	Alerts Controls & Display	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

4.2.5.4 Unique characteristics

Being based on predefined ADS-B IN communication, no specific characteristics are expected from:

- Aircraft systems provided they achieve the expected performance to detect timely an alert as ownship,
- Aircraft systems provided they do not degrade own information broadcast to other aircraft,
- Ground systems provided they achieve the expected performance in terms of accuracy/integrity, delay and refresh.

4.2.6 Failure-case safety Requirements (Integrity/Reliability)

This section will be modified when a quantitative safety analysis derived from a failure approach will be performed.

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0033
Requirement	Requirement from RTCA DO-323 (SPR.64 and table 3-8).

Title	Reliability requirement
Status	<Validated>
Rationale	Erroneous shall be understood as A/C position not meeting the performance requirement (see REQ-06.07.01-SPR-ITAP.0005) due to an undetected failure.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	RTCA DO-323 SPR.64	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0034
Requirement	Software used in SURF-A/ITA System shall be compliant with a Software Assurance Level : level C (RTCA DO-178 C)
Title	Software Assurance Level
Status	<Validated>
Rationale	In-line with system criticality and matches other surveillance functions. It is assessed this way in fault-trees.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	SAR SR#034	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0035
Requirement	For ADS-B equipped mobiles, probability to fail to transmit the ADS-B data (GNSS sensor integrity errors, integrity failure of the Transmit Processing Function and heading sensor integrity errors), including errors arising from equipment malfunction, “bit-flips” or other non-nominal causes shall be equal to or less than 3×10^{-5} per hour.
Title	Reliability requirement
Status	<Validated>
Rationale	This is an overall value consistent with the overall objectives and the fault-trees identified in SAR.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	SAR SR#035	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.0037
Requirement	See SPR.69 of RTCA DO-323. The false alert rate shall be better than 5×10^{-4} per operation.

Title	Reliability requirement
Status	<Validated>
Rationale	This is an overall value consistent with the overall objectives, the low criticality and the fault-trees identified in SAR.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	SAR SR#037	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A

4.3 Requirements for traffic alerts on taxiways (TWY-ITA)

Below are provided specific requirements for traffic alerts and indication on taxiways TWY-ITA only. Most of the requirements follow from runway part requirements of this document and work previously done within RTCA DO-323 [42].

4.3.1 Operational Requirements (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1001
Requirement	See reference to OR.6 requirement in RTCA DO-323. <i>Applicable to TWY-ITA function.</i>
Title	Applicable procedures and training
Status	New
Rationale	Safe and efficient operations rely on the application of defined procedures supported by an appropriate training. The use of rules common to any type of alert facilitates the procedures and training.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1040
Requirement	The flight crew shall follow <i>TWY-ITA</i> advisories/caution as supplemental to existing means and procedures
Title	Use of <i>TWY-ITA</i> advisories by flight crews
Status	New
Rationale	The existing operating method (i.e. without <i>TWY-ITA</i>) is the primary means to detect risk of collision during taxiway operations. <i>TWY-ITA</i> is a supplementary means to enhance safety when an actual risk of collision is not detected with the primary means.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1003
Requirement	(Optional) See reference to OR.4 requirement in RTCA DO-323: <i>Applicable to TWY-ITA function.</i>
Title	Flight crew reaction to <i>TWY-ITA</i> indications – information verification
Status	New
Rationale	As indications are supplemental, the flight crew has to verify them with existing sources of information, e.g. to identify any potential false indications.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1041
Requirement	<i>Upon perceiving a TWY-ITA advisory/caution the flight crew shall verify the information with other available information sources</i>
Title	Flight crew reaction to TWY-ITA advisory/caution
Status	New
Rationale	As advisories/cautions are supplemental, the flight crew has to verify them with existing sources of information, e.g. to identify any potential false indications.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1042
Requirement	<i>Upon perceiving a TWY-ITA advisory/caution the flight crew shall determine if a safety hazard exists and whether it is appropriate to continue with current operations.</i>
Title	Flight crew reaction to TWY-ITA advisories/cautions – safety hazard determination
Status	New
Rationale	Upon receiving a TWY-ITA advisory the flight crew is expected to verify taxiway status prior to proceeding in their intended operation such as entering a taxiway, taxiing, taxiway intersection and runway exit.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1005
Requirement	See reference to OR.2 requirement in RTCA DO-323: <i>Applicable to TWY-ITA function.</i>
Title	Flight crew reaction to TWY-ITA advisory/caution alerts
Status	New
Rationale	Advisory/Caution alerts are provided at a sufficient amount of time prior to the collision to allow the pilot to evaluate the situation and to determine and initiate any appropriate response.
Category	<Operational>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A

<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1005
Requirement	ADS-B/TIS-B/ADS-R data shall meet minimum performance requirements to be qualified for TWY-ITA application.
Title	Input means performance
Status	<Validated>
Rationale	Any traffic information received by ownship shall meet certain surveillance quality indicators (accuracy, integrity, etc.) to be TWY-ITA qualified. Quality indicators for TWY-ITA refer to SURF IA application and identified in RTCA DO-323 § 4.3.7. and confirmed with SESAR V&V activities.
Category	<Performance>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1015	<Partial>
<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
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A

4.3.2 Functional Requirements (TWY-ITA)

4.3.2.1 Surveillance (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1007
Requirement	TWY-ITA shall use ADS-B for alerting if meeting the performance requirements for TWY-ITA.
Title	Main surveillance means
Status	<Validated>
Rationale	This requirement corresponds to OSR.5 requirement in RTCA DO-323 for ADS-B only applicable to TWY-ITA function. ADS-B is the main surveillance means to support TWY-ITA. ADS-B data must meet the performance requirements defined in the SPR for TWY-ITA to be used.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1008
Requirement	TWY-ITA should use TIS-B and ADS-R for alerting if available and meeting the performance requirements for TWY-ITA.
Title	Other surveillance means
Status	<Validated>
Rationale	This recommendation corresponds to OSR.5 requirement in RTCA DO-323 for TIS-B and ADS-R applicable to TWY-ITA function ADS-R or TIS-B are not required for TWY-ITA. However, if ADS-R or TIS-B surveillance is/are available and meet the performance requirements as provided in the SPR (this should be the case in the United States), it will increase the level of surveillance and provide additional traffic situational awareness and alerting.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1001
Requirement	When TWY-ITA is enabled, the traffic on CDTI shall be depicted by using a symbology able to clearly distinguish among: ● ownship ● other a/c moving within the Taxiway Relevant Zone (TRZ) ● ground vehicles moving within the TRZ
Title	Traffic symbology depiction
Status	<Validated>
Rationale	Providing flight crew with a clear picture of the traffic.
Category	<Safety>

Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1022	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1002
Requirement	When TWY-ITA is enabled, ownship shall be displayed on CDTI as an aircraft symbol plus an additional label based on the following information: ● identity (24-bit address) ● horizontal position ● vertical position (when airborne) or on-ground indication ● horizontal velocity ● heading (on ground) ● aircraft size ● distance or time between ownship and traffic triggering an alert (for off-scale traffic)
Title	Ownship symbol on CDTI
Status	<Validated>
Rationale	Providing flight crew situational awareness during taxiway operations when a CDTI is implemented. That information of label could be optionally selected based on display setting and target selection.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1015	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1021	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1022	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1003
Requirement	When TWY-ITA is enabled, traffic shall be displayed on CDTI as a symbol plus an additional label using the following information: • a/c identity (call-sign) • horizontal position • vertical position (when airborne) or on-ground indication
Title	Traffic symbology depiction. That information of label could be optionally selected based on display setting and target selection.
Status	<Validated>
Rationale	Providing flight crew situational awareness during taxiway operations.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
Relationship	Linked Element Type	Identifier	Compliance

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1015	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1021	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1022	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1004
Requirement	Ownship shall be able to process : ● ADS-B surveillance data transmitted by ADS-B equipped mobiles, ● TIS-B and ADS-R surveillance data transmitted by ground stations
Title	Input means
Status	<Validated>
Rationale	To provide ownship with a more complete traffic information in situation where not all surrounding mobiles are equipped with ADS-B OUT capability or ADS-B information cannot be received properly by ownship.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1015	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A

<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

4.3.2.2 Activation/deactivation

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1009
Requirement	TWY-ITA should allow for automatic and manual enabling/disabling together with whole SURF-ITA+ application.
Title	TWY-ITA enabling
Status	<Validated>
Rationale	This requirement is based on OSR.6 requirement in RTCA DO-323 and it also includes the disabling function applicable to TWY-ITA function. However, a distinction has to be made between: 1) Automatic enabling/disabling when ownship enters into/exits from the SURF-ITA+ volume (criteria should be defined and validated) in order to avoid a manual action to do it 2) possibility for pilots to manually enable/disable SURF-ITA+ including TWY-ITA (for whole SURF-ITA+ system) TWY-ITA should have an option to enable only together with SURF-ITA function.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1010
Requirement	TWY-ITA shall generate Alerts only when ownship is out of the Runway Alerting Zone (RAZ) and on the ground only.
Title	Active TWY-ITA criteria
Status	<Validated>
Rationale	To define TWY-ITA application area in the same manner as requirement for SURF-ITA (OSR.21 and OSR.30 requirements from RTCA DO-323).
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1010A
Requirement	TWY-ITA should not generate Alerts when ownship is in the Apron area unless the nuisance alerts rate in this area comply with requirements
Title	Active TWY-ITA criteria
Status	<Validated>
Rationale	In the apron area there could be a signal multipath and RF shielding issues, with the limitation to assure acceptable nuisance alerts rate and availability of ADS-B signal.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A

<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSED-ITAP.1012
Requirement	For equipment supporting both TWY-ITA and ATSA-SURF, TWY-ITA shall trigger alerts whether ATSA-SURF display is active (i.e. compatible selected display range) or not.
Title	TWY-ITA independent of ATSA-SURF display status
Status	<Validated>
Rationale	For equipment supporting both TWY-ITA and ATSA-SURF, the triggering of alerts is independent of the ATSA-SURF display activation. For instance, even if the flight crew has set the traffic display to an airborne mode before the take-off roll (i.e. ATSA-SURF is no more active) during taxiing, alerts must still be triggered if needed according to the appropriate requirements.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.3.2.3 CDTI display (for TWY-ITA implementation)

These requirements are applicable if an airport moving map is available with the possibility of traffic display CDTI (ATSA-SURF).

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1014
Requirement	TWY-ITA should provide Alert information to a display that provides information about all taxiways and runways in the database
Title	Recommended map information
Status	<Validated>
Rationale	This requirement refers to OSRec.2 recommendation in RTCA DO-323. Although it is not the minimum requirement, it is strongly recommended that both taxiways and runways are available and displayed.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1010
Requirement	CDTI shall display the airport map at different scale selectable by the flight crew and the relevant traffic (airborne and on ground)
Title	Traffic visualisation
Status	<Validated>
Rationale	This function allows the crew to select the optimum range to acquire the traffic position on CDTI and anticipate a conflict.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1026	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1030
Requirement	Ownship navigation data shall provide continuously TWY-ITA function with aircraft data.
Title	Information flow provided
Status	<Validated>
Rationale	Necessary input to the Traffic alerts application to determine ownship location and speed vector.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1034	<Partial>
<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

4.3.2.4 Qualification (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1015
Requirement	TWY-ITA Alerts shall only be triggered for traffic that complies with all the TWY-ITA data quality requirements.
Title	TWY-ITA qualification
Status	<Validated>
Rationale	This requirement refers to OSR.10 requirement in RTCA DO-323 and REQ-06.07.01-OSD-ITAP.0015 for SURF-ITA.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.3.2.5 Triggering of Alerts (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1020
Requirement	See OSR.20 requirement in RTCA DO-323
Title	Advisory/Caution Level Alert triggering conditions
Status	New
Rationale	TWY-ITA shall provide Advisory/Caution Level Alerts when either ownship or traffic is within taxi speed and a collision risk is expected to occur on a taxiway.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1039
Requirement	TWY-ITA shall provide advisory/caution level alerts when a taxiway collision hazard exists where traffic and ownship are converging at taxiing speed and immediate flight crew awareness of conflict is required and a subsequent path modifying response may be required by the flight crew.
Title	Advisory/Caution Level Alert triggering conditions
Status	<Validated>
Rationale	TWY-ITA shall provide Advisory/Caution Level Alerts
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1006
Requirement	TWY-ITA system shall trigger: 1) both aural and visual alerts when a caution level is triggered 2) only visual indication when an advisory level is triggered
Title	Advisory and caution alerts means
Status	<Validated>

Rationale	According to EASA CS25.1322, Advisory/Caution alerts do not require immediate flight crew awareness.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1015	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1008
Requirement	Ownship shall have an alert prioritisation function capable of managing and prioritising all the ownship's alerts being generated, including TWY-ITA alerts.
Title	Alert prioritisation
Status	<Validated>
Rationale	A prioritisation logic shall be implemented to take into account the criticality of the alerts being generated during runway operations
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1037	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
<ALLOCATED_TO>	<Functional Block>	Display and Controls	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

4.3.3 Human factor requirements (TWY-ITA)

4.3.3.1 Display of traffic triggering an Alert (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1021
Requirement	TWY-ITA shall display all the information elements required by ATSA-SURF for traffic triggering an Alert if they are available.
Title	TWY-ITA information elements
Status	<Validated>
Rationale	This requirement results from the reference to REQ-06.07.01-OSD-ITAP.0021 for SURF-ITA merging of RTCA DO-323 OSR.9, OSR.18, OSR.27, OSR.32, OSRec.8, OSRec.9 and OSRec.11 requirements. The list of information elements to be displayed if available is: • Horizontal position; • Altitude; • Direction; • Aircraft Identification; • Ground speed; • Aircraft emitter category or wake vortex category; and While the last four items are required to be selectable for display in ATSA-SURF, they are required to be displayed in case of an Alert to enhance the flight crew traffic situational awareness and to suppress the pilot's action to select them in this demanding situation.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1022
Requirement	TWY-ITA shall enable the flight crew to distinguish between aircraft and ground vehicles by their representations on the ATSA-SURF Traffic Display if the information that allows this differentiation is available.
Title	Aircraft and ground vehicles differentiation
Status	<Validated>
Rationale	This requirement corresponds to SURF-ITA REQ-06.07.01-OSD-ITAP.0022. When the information is available, it is important to inform the flight crew whether the Alert is triggered by another aircraft or a ground vehicle, in particular to support an efficient visual search of the mobile and also as the resulting action may be different. This requirement is already part of ATSA-SURF and DO317B.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1101
Requirement	TWY-ITA shall inform crew with all relevant traffic in close proximity of ownship which could turn into possible threat via visual indication.
Title	Traffic indication in close proximity
Status	<Validated>
Rationale	All relevant traffic in close proximity of ownship could be possible threat for the crew and all other traffic of non interest should be decluttered.
Category	<Functional>

4.3.3.2 Integration TWY-ITA with ATSA-SURF

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1023
Requirement	See SURF-ITA requirement REQ-06.07.01-OSD-ITAP.0023
Title	ATSA-SURF qualification only
Status	<Validated>
Rationale	This requirement corresponds to OSRec.3 requirement in RTCA DO-323 with the introduction of the ATSA-SURF traffic display and the removal of reference to ASSA and FAROA. See note below OSRec.3 recommendation in RTCA DO-323
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.3.3.3 Usability (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1025
Requirement	See REQ-06.07.01-OSD-ITAP.0025 (OSR.2 requirement in RTCA DO-323)
Title	TWY-ITA usability
Status	<Validated>
Rationale	The same condition as SURF-ITA <i>TWY-ITA shall be usable by single-pilot or dual-pilot aircraft</i>
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.3.3.4 Off-scale traffic (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1026
Requirement	See reference to REQ-06.07.01-OSD-ITAP.0026 applicable to TWY-ITA function
Title	Alerts for off-scale traffic
Status	<Validated>
Rationale	This requirement corresponds to the merge of OSR.15 and OSR.31 requirements in RTCA DO-323. As off-scale traffic can trigger Alerts, TWY-ITA traffic displays must display off-scale traffic triggering Alerts.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1027
Requirement	See OSRec.4 recommendation in RTCA DO-323. <i>Applicable to TWY-ITA function.</i>
Title	Information for off-scale traffic
Status	<Validated>
Rationale	ATSA-SURF does not require to display “off-scale traffic”. However, traffic displays which also support TWY-ITA must display off-scale traffic to be able to display Alerts.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1028
Requirement	When an Alert is triggered by off-scale traffic, a message shall be displayed to the flight crew to select an appropriate display range.
Title	Message for display range modification
Status	<Validated>
Rationale	Depending on the selected display range, an alert can be triggered by a traffic which is off-scale. In this case, a message must be displayed to increase appropriately the display range to show this traffic (similar to TCAS alerts generated by off-scale traffic).
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A

<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.3.3.5 Capability status (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1029
Requirement	See OSR.8 requirement in RTCA DO-323: Applicable to TWY-ITA function.
Title	TWY-ITA capability status
Status	<Validated>
Rationale	See note below OSR.8 requirement in RTCA DO-323.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.3.3.6 Display of alerts (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1030
Requirement	See OSR.14 requirement in RTCA DO-323: Applicable to TWY-ITA function.
Title	Traffic highlighting for Indications
Status	<Validated>
Rationale	The flight crew must be able to easily distinguish on the display a traffic that triggers an Indication from the other displayed traffic.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1033
Requirement	See OSR.26 requirement in RTCA DO-323 Applicable to TWY-ITA function.
Title	Visual attention-getter for Alerts
Status	<Validated>
Rationale	Out-the-window scan is the primary source of information for flight crew and TWY-ITA provides supplemental information. To draw flight crew's attention, there must be a visual attention-getter in the primary field of view in case of Alerts.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1034
Requirement	A caution alert shall include amber highlighting of the traffic triggering the alert
Title	Display of Caution Alerts
Status	<Validated>
Rationale	Amber is one of the usual colours to display Caution Alerts.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.3.3.7 Aural messages (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1037
Requirement	See OSR.29 requirement in RTCA DO-323 Applicable to TWY-ITA function.
Title	Aural messages in case of multiple alerts
Status	<Validated>
Rationale	To be clearly distinguishable and intelligible by the flight crews, only one aural alert is presented at a time and the most critical one must have the priority
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

[REQ]

Identifier	REQ-06.07.01-OSD-ITAP.1043.
Requirement	A Caution alert shall include an aural speech element.
Title	Aural message for Caution Alerts
Status	<Validated>
Rationale	As an immediate awareness of an alert is required, an aural annunciation is effective to inform the flight crew that a caution alert is triggered. Generally it is recommended to keep TCAS alert messages philosophy.
Category	<HMI>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<SATISFIES>	<ATMS Requirement>	S03-B5-HLOR-01	<Partial>

4.3.4 Requirements for Process/Service (TWY-ITA)

Traffic Alerts for Pilots are linked with ADS-B service (extended to ground transmission of TIS-B and ADS-R data) as identified in REQ-06.07.01-OSD-ITAP.1007 and REQ-06.07.01-OSD-ITAP.1008.

Performance is also addressed at a high level in requirements REQ-06.07.01-OSD-ITAP.1007 and REQ-06.07.01-OSD-ITAP.1008.

TWY-ITA being a safety net inside PJ.03b Solutions (SAFE), requirements given in OSD are inputs to the Safety analysis developed in the SPR part II.

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1031
Requirement	TWY-ITA function shall receive runway data from aircraft systems as a minimum.
Title	Runway data
Status	<Validated>
Rationale	Necessary input for the system to identify the right runway and it's RAZ (Runway Alerting Zone) where outside of this zone ownship is operating and

	a conflict on taxiway could occur. This is associated with the SPR model developed in the associated SAR.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	ASSUMP-OSD.21	<Partial>
<SATISFIES>	<ATMS Requirement>	SAR SR#031	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Database	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1036
Requirement	Flight Crew shall be trained to use TWY-ITA function and limitation.
Title	Crew training
Status	<Validated>
Rationale	Proper crew knowledge of the function is necessary to have good results.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSD-ITAP.1001	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A

<ALLOCATED_TO>	<Functional Block>	Alerts	N/A
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4.3.5 Interoperability Requirements (TWY-ITA)

4.3.5.1 General requirements (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1001
Requirement	Traffic horizontal positions exchanged through ADS-B shall be referenced relatively to WGS-84.
Title	Geographic reference system for horizontal position of traffic
Status	<Validated>
Rationale	Horizontal position information is provided using latitude and longitude with a common reference for all aircraft so that respective position and speed of both ownship and other aircraft can be processed to trigger alerts.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	Lateral positioning	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1002
Requirement	ADS-B/TIS-B/ADS-R data shall meet minimum performance requirements specified in the SPR chapter for Traffic Alerts for Pilots to be qualified for TWY-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 TWY-ITA qualified. Quality indicators for SURF-IA application were identified in RTCA DO-323 § 4.3.7. and confirmed with SESAR V&V activities.
Category	<Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0005	<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

4.3.5.2 General Requirements for ownship domain (TWY-ITA)

4.3.5.2.1 Surveillance data from surrounding traffic (TWY-ITA)

This section addresses aircraft data expected from ownship domain. A distinction is made between:

- Basic ADS-B data (Requirement 1003)
- Complementary data (requirements 1004 and 1005) necessary for Traffic Alerts because they improve data quality.

There is the same AIRM reference as for runway part:

- ADS-B OUT data -> RTCA DO-260B
- Caution Alert -> On board alert only (EASA CS25.1322)-> No AIRM/SWIM applicability
- Warning alert -> On board alert only (EASA CS25.1322) -> No AIRM/SWIM applicability

- Controller/Pilot ATC exchange -> existing compliant AIRM phraseology

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1003
Requirement	The TWY-ITA system shall receive data according to relevant standards (EUROCAE/RTCA) for each surrounding traffic containing: • identity (24-bit address) • horizontal position • quality indicators • air/ground indication • horizontal velocity • heading (when on ground)/track (when airborne) • aircraft type (if available) • emitter category (if available) ○ Length/Width code ○ Antenna position offset
Title	Basic Information content
Status	New
Rationale	Providing flight crew with alerts and if the implementation is possible, situational awareness during taxiway operations.
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-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

The above information can be considered as basic. However, because distances on ground considered for triggering alerts are of the same order as aircraft dimension, additional information would be beneficial to SURF-ITA.

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1004
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 ADS-R systems that have no access to this information.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-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>	N/A	N/A

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1005
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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-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>	N/A	N/A

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1006
Requirement	The TWY-ITA system shall be able to receive the information specified in REQ-06.07.01-SPR-ITAP.1004 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>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-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

4.3.5.2.2 Ownship navigation Data (TWY-ITA)

The TWY-ITA system shall be able to receive ownship data from the on-board navigation system:

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1007
Requirement	The TWY-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 TWY-ITA with ownship data (position, speed, track), a GNSS receiver is required to reach the expected performance.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1002	<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

4.3.5.2.3 System status (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1008
Requirement	TWY-ITA equipment shall provide its availability status to the crew.
Title	TWY-ITA status
Status	<Validated>
Rationale	Flight crew shall be aware when TWY-ITA is enabled, disabled or when a malfunction is detected that can create nuisance alerts. If necessary, the crew can disable ADS-B related functions also which disables TWY-ITA.
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1007	<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

4.3.5.3 Requirements for external sources (TWY-ITA)

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1009
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 ● quality indicators ● ground indication ● horizontal velocity ● heading / track when airborne ● aircraft type (if available) ● emitter category (if available) ● Length/Width code ● Antenna position offset
Title	TIS-B data
Status	<Validated>
Rationale	Providing ownship with the needed information for the TWY-ITA system
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1003	<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-06.07.01-INTEROP-ITAP.1010
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 ● quality indicators ● ground indication ● horizontal velocity ● heading / track when airborne ● aircraft type (if available) ● emitter category (if available) ● Length/Width code ● Antenna position offset
Title	ADS-R data
Status	<Validated>
Rationale	Providing ownship with the needed information for the TWY-ITA system
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1003	<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-06.07.01-INTEROP-ITAP.1011
Requirement	The ownship and surrounding traffic, if ADS-B equipped, shall transmit its own ADS-B data according to relevant standards (EUROCAE/RTCA) containing: ● identity (24-bit address) ● horizontal position ● quality indicators ● ground indication ● horizontal velocity ● heading when on ground ● 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 TWY-ITA system
Category	<Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1003	<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

4.3.5.4 Requirements for external sources (TWY-ITA)

Update rates

Update rates of ADS-B Surveillance Reports are as defined in RTCA DO-242A. There is no need for specific requirements.

Latency

For latency analysis, it will be referred to RTCA DO-323 [42] SURF IA.

DO-323 refers to DO-317 about the total latency induced by avionics:

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1012
Requirement	See reference to requirement SPR.18 of RTCA DO-323. Applicable to TWY-ITA
Title	Total latency of avionics
Status	<Validated>
Rationale	Refer to mentioned RTCA DO-323 and DO-317.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.1003	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	Alerts Control and display	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

[REQ]

Identifier	REQ-06.07.01-INTEROP-ITAP.1013
Requirement	See reference to SURF-ITA REQ-06.07.01-INTEROP-ITAP.0013. Applicable to TWY-ITA function.
Title	Uncompensated latency error of traffic position
Status	<Validated>
Rationale	Traffic alerts require a reactive system behaviour to detect timely risks of collision or avoid false alerts.
Category	<Interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-ITAP.0003	<Full>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional block>	Alerts Controls & Display	N/A
<CHANGED_BECAUSE_OF>	<Change Order>	N/A	N/A

4.3.5.5 Unique characteristics (TWY-ITA)

Being based on predefined ADS-B IN communication, no specific characteristics are expected from:

- Aircraft systems provided they achieve the expected performance to detect timely an alert as ownship,
- Aircraft systems provided they do not degrade own information broadcast to other aircraft,
- Ground systems provided they achieve the expected performance in terms of accuracy/integrity, delay and refresh.

4.3.6 Failure-case safety Requirements (Integrity/Reliability)

This section is in reference to a quantitative safety analysis derived from a failure approach of the SAR.

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1033
Requirement	See reference to SURF-ITA REQ-06.07.01-SPR-ITAP.0033. Applicable to TWY-ITA function.
Title	Reliability requirement
Status	<Validated>
Rationale	Erroneous shall be understood as A/C position not meeting the performance requirement (see REQ-06.07.01-SPR-ITAP.1005) due to an undetected failure.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	RTCA DO-323 SPR.64	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Lateral Positioning	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1034
Requirement	Software used in TWY-ITA System shall be compliant with a Software Assurance Level : level C (RTCA DO-178 C)
Title	Software Assurance Level
Status	<Validated>
Rationale	In-line with system minor criticality and matches other surveillance functions. It is assessed this way in fault-trees.

Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	SAR SR#034	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A
<ALLOCATED_TO>	<Functional Block>	Alerts	N/A

[REQ]

Identifier	REQ-06.07.01-SPR-ITAP.1035
Requirement	For ADS-B equipped mobiles, probability to fail to transmit the ADS-B data (GNSS sensor integrity errors, integrity failure of the Transmit Processing Function and heading sensor integrity errors), including errors arising from equipment malfunction, “bit-flips” or other non-nominal causes shall be equal to or less than 3×10^{-5} per hour.
Title	Reliability requirement
Status	<Validated>
Rationale	This is an overall value consistent with the overall objectives and the fault-trees identified in SAR. Reference to RTCA DO-322 SPR.16.
Category	<Safety>
Validation Method	<Real time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Project>	PJ.03b-05	N/A
<SATISFIES>	<ATMS Requirement>	SAR SR#035	<Partial>
<APPLIES_TO>	<SESAR 2020 Programme>	AIRPORT SAFETY NET	N/A



<ALLOCATED_TO>	<Functional Block>	ADS-B In	N/A
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5 References and Applicable Documents

5.1 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.
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PJ.03b-SAFE project Beneficiaries:



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

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