Final OSED for Conflicting ATC Clearances and Conformance Monitoring Alerts for Controllers

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Abstract

This document is the final Operational Services and Environment Description (OSED) which details the Operational Improvement (OI) **AO-0104-A** Airport Safety Nets for Controllers in Step 1. The OI falls under the Operational Focus Area (OFA) 01.02.01 Airport Safety Nets and focuses on **SESAR Solution 2** which details the new functions:

- Conflicting ATC Clearances (CATC)
- Conformance Monitoring Alerts for Controllers (CMAC)

Following the widespread P06.07.01 validation programme of Real Time Simulations and a Live trial the Airport Safety Nets Solution #02 is considered to have **achieved V3 validation status.**

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None.

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Edition	Date	Status	Author	Justification
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00.00.06	20/07/2016	Draft	ECTL	Version for project member review
00.00.07	01/09/2016	Revised Draft	ECTL	Update with DSNA, Airbus, SEAC, NATMIG Comments.
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Executive summary

This document is the Final Operational Services and Environment Description (OSED) which details the Operational Improvement (OI) AO-0104-A Airport Safety Nets for Controllers in Step 1. The OI falls under the Operational Focus Area (OFA) 01.02.01 Airport Safety Nets and focuses on SESAR Solution 2 which details the new functions: Conflicting ATC Clearances (CATC) and Conformance Monitoring Alerts for Controllers (CMAC).

This OSED defines the operational services, environments, operating methods, use cases and requirements for the SESAR operational concept elements mentioned above.

The detection of CATC and CMAC alerts situations shall be applied to all mobiles operating on the manoeuvring area and parts of the apron area and is a complement to the A-SMGCS Runway Monitoring and Conflict Alerting (RMCA) function currently in operation in many European airports. It provides an early detection of situations that if not corrected would end up in hazardous situations that would be detected in turn by the Advanced Surface Movement Guidance and Control Systems (A-SMGCS) RMCA.

The functions CATC and CMAC are support tools for the Tower Controller and are operated by the ATC system based on the knowledge of data such as the clearances given to aircraft or vehicles (mobiles) by the Tower Controller, the assigned runway, route and holding point.

Working procedures for the Tower Controllers shall be adapted to ensure that all relevant clearances given to mobiles are input into the system by the Tower Controller. The Tower Controller should therefore be provided with a Human Machine Interface (HMI) to inform the system of the clearances given to mobiles (e.g. Electronic Flight Strips (EFS) or input of clearances via the radar/track label). The HMI should also be capable of displaying Alert messages to the Tower Controllers for the CATC and CMAC situations detected by the Air Traffic Control (ATC) system.

It is important to note that the term ‘Conflicting’ in the title CATC refers to the fact that it is not normal practice for a Controller to give certain clearances at the same time, it does not mean that the aircraft/vehicles have ended up in conflict with each other.

Previous European studies have identified that the integration of ATC systems such as A-SMGCS and EFS makes it possible to detect when mobiles are not behaving in the manner that the Controller is expecting them to. Existing alerting tools generally use just the surveillance data from the A-SMGCS, and whilst this is a useful asset to the Controller, it normally provides an alert at the last minute when the Controller and Flight Crew have to react quickly to avoid an incident or collison.

The integration of data from the EFS will correlate the Controller’s intentions and flight plan details with the position and speed of the aircraft and alert when any deviation from local rules and procedures is detected. Validation exercises (several Real Time Simulations and a Live Trial) have shown that many of these alerts can be triggered before any imminent danger is reached which could lead to a large reduction in runway incursions and taxiway incidents in the future. As a conclusion of the validation programme, the Airport Safety Nets Solution #02 is considered to have achieved V3 validation status.

The new alerts detailed in this OSED are not meant to replace the existing RMCA but are designed to predict potential incidents and provide alerts before the RMCA triggers allowing the Controller more time to resolve the potential incident.

1 Introduction

1.1 Purpose of the document

The Operational Service and Environment Definition (OSED) document describes the operational concept defined in the Detailed Operational Description (DOD) [1] in the scope of its Operational Focus Area (OFA).

It defines the operational services, their environment, scenarios and use cases and requirements.

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

This OSED is a top-down refinement of the P06.02 DOD [1] produced by the federating OPS P06.02 project and the P06.07.01 Operational Concept Document (OCD) [16] . It also contains additional information which should be consolidated back into the higher level SESAR concepts using a “bottom up” approach.

The figure below presents the location of the OSED within the hierarchy of SESAR concept documents, together with the SESAR Work Package or Project responsible for their maintenance.

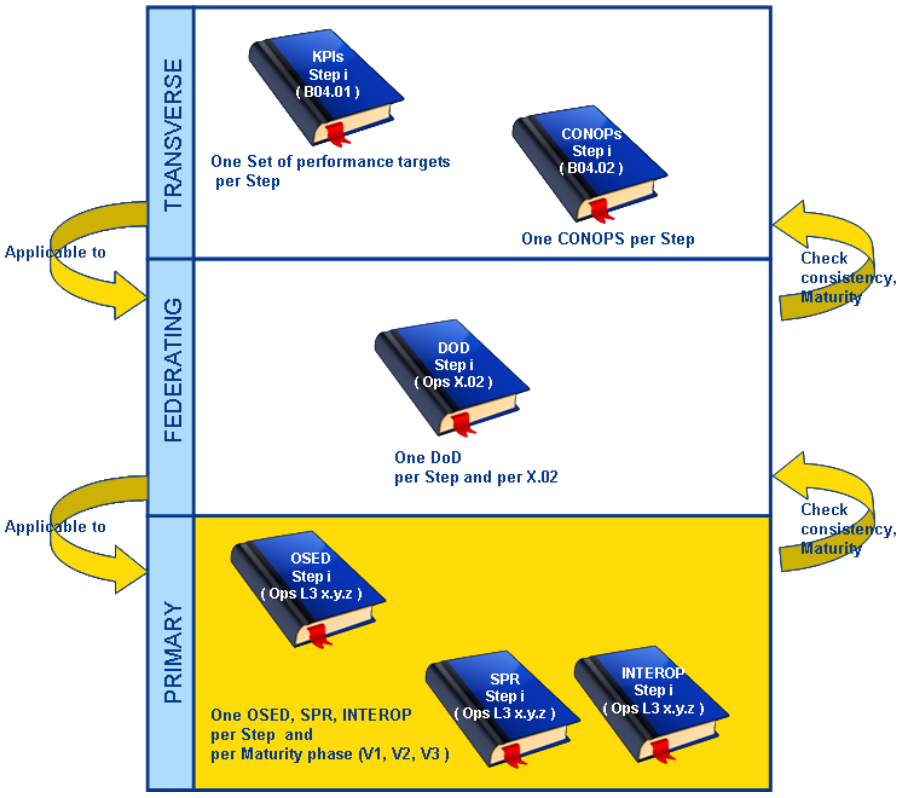

Figure 1: OSED document with regards to other SESAR deliverables

This OSED is an updated version of the P06.07.01 D28 OSED [17] and has been produced taking into account experience and results gained in the following SESAR validations:

- V2 trials EXE-06.07.01-VP-437 for "Conflicting ATC Clearances" performed by EUROCONTROL from 18th to 21st of October 2011 [15].
- V2 trials EXE-06.07.01-VP-537 for "Conformance Monitoring for Controllers" performed by EUROCONTROL from 22nd to 26th of October 2012 [6].
- V3 trials EXE-06.07.01-VP-438 on "Conflicting ATC Clearances" performed by DLR/DFS from 26th to 30th of November 2012 [5].
- The results of two Release 3 P06.03.02 validations (614[7] and 652[8]).
- V3 Release 5 trials EXE-06.03.01-VP-679 (DFS/Frequentis), VP-699 (DSNA), VP-719 (ENAV), VP-758 (ENAIRE) and VP761 (EUROCONTROL) [9].

Following the validation programme of Real Time Simulations and a Live trial the Airport Safety Nets Solution #02 is considered to have achieved V3 validation status.

1.2 Scope

This OSED details the **Operational Improvement (OI) AO-0104-A** Airport Safety Nets for Controllers in Step 1. The OI falls under the Operational Focus Area (OFA) 01.02.01 Airport Safety Nets and focuses on **SESAR Solution 2** which details the new functions:

- **Conflicting ATC Clearances (CATC)**
- **Conformance Monitoring Alerts for Controllers (CMAC)**

The following functions are detailed in separate documents:

- Alerts for Vehicle Drivers (AVDR) in OSED for AVDR [10]
- The detection of Conformance Monitoring Alerts for Pilots (CMAP) in OSED for CMAP [11]

Note: The images used in this document are taken from the EUROCONTROL ITWP demonstrator and show generic situations. They generally symbolize aircraft whereas some situations can be valid for vehicles too. Moreover, the concept does not require that the HMI displays aircraft with their shape and orientation as illustrated in the images.

1.3 Intended readership

The main audience for this OSED is:

- Partners contributing to tasks within the 06.07.01 using the OSED as input, e.g. SPR for Conflicting ATC Clearances and Conformance Monitoring Alerts for Controllers.
- The other SWP 06.07 projects, 06.07.02 and 06.07.03 that are not directly affected by the scope of this project but are interested in what is being developed in the other surface management projects and how the OSED was developed.

- The project 06.09.02 that developed the “A-CWP”, future Controller Working Position Requirements.
- The project 06.03.01 that performed integrated validation of concepts developed in SWP 06.07, SWP06.08 and SWP06.09.
- The technical projects 12.03.02 and 12.05.04 from WP12 developing the prototypes for 06.07.01 validation.
- The federating project 06.02 to maintain a co-ordination with the development of the DOD.
- WP16 R&D transversal areas for Safety.

1.4 Structure of the document

The structure of the document is as follows:

- §1 introduces the document.
- §2 addresses what is to be developed and provides the traceability to the relevant DOD. It details in simple terms and plain language the operational concept and scope.
- §3 describes the Operational Services and method identified by the project. For every operational service, the future operating principles of the concept, along with the expected benefits, assumptions, constraints, actors and ATM services are documented.
- §4 describes the Environment for the Operational Services described above, in order to get knowledge of the fundamental operational and technical characteristics that govern ATM, Communication, Navigation and Surveillance (CNS) performance and safety.
- §5 outlines the key Use Cases, with details of the Operational service and process and sub-process interactions.
- §6 defines the Requirements (Operational, Functional and Human Machine Interface (HMI), Information exchange requirements).
- §7 provides a list of the reference and applicable documents.

1.5 Background

Runway incursions are still occurring almost on a daily basis within the ECAC region. In addition to runway incursions a significant number of incidents / accidents occur on taxiways and apron areas. International organisations such as ICAO, EUROCONTROL and European Commission (DG TREN now part of DG MOVE) have run dedicated programmes for the prevention of ground accidents.

ICAO SMGCS Manual (Doc 9476) describes how traffic should be controlled on the surface of an airport, based on the principle of “see and be seen”.

ICAO A-SMGCS Manual (Doc.9830), EUROCAE (Doc ED-87C) and EUROCONTROL A-SMGCS Project have established the A-SMGCS Services: Surveillance and Airport Safety Support (RMCA).

The European Commission (DG TREN) has also initiated major R&D projects (NUP-2, BETA, EMMA, EMMA-2) dedicated to the future evolutions of A-SMGCS.

The current A-SMGCS RMCA system, which provides an alerting service for runway conflicts, has a limited scope as it uses only surveillance data; warnings are given to ATC only with a short time-ahead before a potential collision on active runway(s). They also suffer from performance limitations due to the technology employed.

Further improvements are therefore needed to broaden the scope of applicability to the whole airport movement area (to fulfil the ICAO A-SMGCS manual requirements), to permit an earlier detection of hazardous situations to eventually enhance the performance of the existing safety nets.

EUROCONTROL has conducted studies on safety nets including the Integrated Tower Working Position (ITWP) project, and the results of this project were used as a baseline to continue the development and validation of CATC and CMAC alerts.

1.6 Glossary of terms

ALARM ALERT - is used to inform the controller that a critical situation is developing which needs immediate action *(Definition: Created for this OSED).*

ALERT - An indication of an existing or pending situation during aerodrome operations, or an indication of abnormal A-SMGCS operation, that requires attention/action. *(Definition: ICAO-A-SMGCS Manual 9830).*

ALERT WINDOW – is a window on the HMI that is used to indicate all currently triggered alerts *(Definition: Created for this OSED)*.

COOPERATIVE MOBILE - Mobile, which is equipped with systems capable of automatically and continuously providing information including its identity to the A-SMGCS *(Definition: EUROCONTROL A-SMGCS Specification)*.

ELECTRONIC FLIGHT STRIPS (EFS) – Throughout this document the term EFS is used generically as the means to digitally input the clearances into the ATC System. Although EFS are used at many airports in Europe, Electronic Clearance inputs may also be performed using other ways such as via the radar label *(Definition: Created for this OSED)*.

INFORMATION ALERT - is used to inform the controller that a situation which is potentially dangerous may occur, and he/she needs to be made aware of it. According to the situation, the controller receiving an INFORMAION alert may take a specific action to resolve the alert if needed *(Definition: Created for this OSED)*.

MOBILE - A mobile is either, an aircraft, aircraft being towed or a vehicle *(Definition: EUROCONTROL A-SMGCS Specification)*.

NON-COOPERATIVE MOBILE – A mobile which is not equipped with systems capable of automatically and continuously providing information including its identity to the A-SMGCS *(Definition: EUROCONTROL A-SMGCS Specification)*.

RUNWAY INCURSION – Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft *(Definition: ICAO)*.

1.7 Acronyms and Terminology

Term	Definition
A-CDM	Airport – Collaborative Decision Making
A-CWP	Advanced Controller Working Position
A/C	Aircraft
AIBT	Actual In-Block Time
ALDT	Actual Landing Time
AoR	Area of Responsibility
A-SMGCS	Advanced-Surface Movement Guidance and Control Systems
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATS	Air Traffic Service
AU	Airspace User
BETA	Operational Benefit Evaluation by Testing an A-SMGCS
CATC	Conflicting ATC Clearances
CMAC	Conformance Monitoring Alerts for Controllers
CMAP	Conformance Monitoring Alerts for Pilots
CWP	Controller Working Position
DG MOVE	Directorate-General for Mobility and Transport
DG TREN	Directorate-General for Transport and Energy
DOD	Detailed Operating Description (document)
EFS	Electronic Flight Strips
ELDT	Estimated Landing Time
EMMA	European Airport Movement Management by A-SMGCS
FDP	Flight Data Processing system

Term	Definition
GND	Tower Ground Controller
HMI	Human Machine Interface
HP	Holding Point
ICAO	International Civil Aviation Organisation
ITWP	Integrated Tower Working Position
KPA	Key Performance Area
LAHSO	Land And Hold Short Operation
LVP	Low Visibility Procedures
METAR	Meteorological Aerodrome Report
NOTAM	Notice to Airmen
NUP-2	North European ADS-B Network Update Programme
OFA	Operational Focus Area
OI	Operational Improvement
OSED	Operational Services and Environment Description (document)
RMCA	Runway Monitoring and Conflict Alerting
RPA	Runway Protected Area
R&D	Research & Development
R/T	Radio Telephony
RWY	Runway
SESAR	Single European Sky ATM Research Programme
SJU	SESAR Joint Undertaking
SPR	Safety and Performance Requirements (document)
SSR	Secondary Surveillance Radar
SWP	Sub-work Package
TOBT	Target Off Block Time
TSAT	Target Start Up Approval Time
TTOT	Target Take Off Time

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2 Summary of Operational Concept from DOD

2.1 Mapping tables

This section contains the link with the relevant DOD [3] scenarios and use cases, environment, processes and services relevant for this particular OSED.

The following tables are coherent with the related DOD Ops 06.02: Airport Detailed Operational Description.

Table 1 lists the Operational Improvement steps (OIs from the definition phase), within the associated Operational Focus Area addressed by the OSED.

Relevant OI Steps ref. (coming from the Integrated Roadmap)	Operational Focus Area name / identifier	Step	Master or Contributing (M or C)	Contribution to the OIs short description
AO-0104-A	OFA01.02.01 Airport safety nets	Step 1	M	The system detects Conflicting ATC Clearances during runway operations, and non-conformance to procedures or clearances for traffic on runways, taxiways and in the apron/stand/gate area. Appropriate alerts are provided to controllers.

Table 1: List of relevant OIs within the OFA

Table 2~~Table 2~~ identifies the link with the applicable scenarios and use cases of the DOD.

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Scenario identification	Use Case Identification	Reference to DOD section where it is described
Taxi In	General (UC 6 21)	4.2.5.2.3
Taxi In	Deviation from Taxi route (UC 6 28)	4.2.5.2.3
Taxi In	Holding position overrun (UC 6 30)	4.2.5.2.3
Pushback	General Procedures (UC 6 76)	4.2.7.2.1
Taxi Out	General Procedures (UC 6 79)	4.2.7.2.1.1
Taxi Out	Resolve deviation from taxi route (UC 6 28)	4.2.7.2.1.1

Scenario identification	Use Case Identification	Reference to DOD section where it is described
Take Off	General Procedures (UC 6 86)	4.2.7.2.1.2

Table 2: List of relevant DOD Scenarios and Use Cases

Table 3~~Table 3~~ identifies the link with the applicable environments of the DOD.

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Operational Environment	Class of environment	Reference to DOD section where it is described
Network Function	1: Intercontinental Hub 2: European Hub 3: Primary Node 4: Secondary Node	3.1.1.1
Layout & Basic Operational Criteria	1: Multiple Independent Runways, complex surface layout 2: Multiple Dependent Runways, complex surface layout 3: Single Runway, complex surface layout 4. Multiple Independent Runways, non-complex surface layout 5: Multiple Dependent Runways, non-complex surface layout 6: Single Runway, non-complex surface layout	3.1.1.2
Capacity Utilisation	1: Highly utilised airports/runways, traffic mix of heavy, medium and light aircraft. More than 90% load during 3 or more peak periods a day. 2: Highly utilised airports/runways, homogeneous traffic (dominant heavy or medium or light). More than 90% load during 3 or more peak periods a day 3: Normally utilised airports/runways. 70 – 90% load during 1 or 2 peak periods a	3.1.1.3

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Operational Environment	Class of environment	Reference to DOD section where it is described
	day 4: Low utilised airports/runways less than 70% load during peak periods	

Table 3: List of relevant DOD Environments

Table 4~~Table 4~~ identifies the link with the applicable Operational Processes and Services defined in the DOD.

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DOD Process / Service Title	Process/ Service identification	Process/ Service short description	Reference to DOD section where it is described
Manage Safety at Airport – (Perform Conformance Monitoring)	Monitor Airport–related Conformance	The system detects any non-conformance to procedures or clearances for traffic on airport surface.	5.2.4
Manage Safety at Airport - (Perform Conformance Monitoring)	Manage Airport Conformance Alert	Do everything which is necessary to cancel a non-conformance alert.	5.2.4

Table 4: List of the relevant DOD Processes and Services

Table 5~~Table 5~~ summarizes the Requirements including Performance (KPA related) requirements relevant of the OSED. This table supports defining the performance objectives in the scope of the addressed OFA. The DOD performance requirements are structured to respond to Key Performance Indicators (PI) targets / decomposed PIs, so this table will support traceability to the performance framework.

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DOD Requirement Identification	DOD requirement title	Reference to DOD section where it is described
REQ-06.02-DOD-6200.0003	The Tower Runway Controller and Tower Ground Controller shall be able to detect conflicting ATC clearances during operations and non-conformance to procedures or clearances for traffic in their area of responsibility.	6.2

Table 5: List of the relevant DOD Requirements

2.2 Operational Concept Description

The ATC system detects CATC e.g. Clear to Land versus Clear to Line-Up on the same runway and prevents incursions involving mobiles (both aircraft and vehicles; stationary traffic is included as well) on runways. Appropriate alerts are provided to controllers only.

Alerts are also generated when a mobile deviates from its assigned 3D-trajectory (the two dimensions on airport surface and the associated time dimension); i.e. does not adhere to the apron/taxiway/runway routing assigned to it. This category includes situations such as:

- Non-compliance to the ATC instructions by the Flight Crew and vehicle drivers in the proximity of active runways, e.g. aircraft/vehicle do not stop at the runway holding point.

- Where a communication misunderstanding occurs between what is meant by the instructions of the controller and what is interpreted by the mobile operator (e.g. as a result of communication break-down, through say callsign / conditional clearances confusion, incorrect/missed read-backs, poor phraseology, lack of radio communications).

The implementation of many of the alerts defined in this document will require the A-SMGCS to be equipped with the Routing Service. The Routing function has been developed and Validated to V3 level by P06.07.02 (OFA04.02.01) and is detailed in SESAR Solution #22.

This category also covers deviations from standards operating procedures and practices by mobiles, such as aircraft taxiing with extreme taxi speed that can indicate for example intention to take-off from the taxiway.

In general, the causal factors that create this category of “potentially hazardous situation” are largely expected to be due to mobile operator error.

Non-conformance to ATC clearances by the pilots and vehicle drivers (whatever the cause is, e.g. technical, operational) can be identified amongst the precursors of runway incursions.

2.3 Processes and Services (P&S)

2.3.1 ’’Taxi-out and Take-off’’ process

Figure 2~~Figure 2~~ represents the high level operational activities of the ’’Taxi-out and Take-off’’ operations as described in the "Departure" scenario.

The high level process model tries to synthesize all recurrent activities that are performed by all involved stakeholders during ’’Taxi-out and Take-off operations. The process covered by the current OSED is identified as “Manage Alert in Taxi-out and Take-off” in the ATS related activities (as shown in Figure 2~~Figure 2~~ taken from the European ATM Masterplan architecture portal).

2.3.2 “Landing and Taxi-in" process

Figure 3~~Figure 3~~ represents the high level activities of the “Landing and Taxi-in" operations as described in the "Arrival" scenario.

The high level process model tries to synthesize all recurrent activities that are performed by involved stakeholders during “Landing and Taxi-in" operations. The process covered by the current OSED is identified as “Manage Alert in Landing and Taxi-in” in the ATS related activities (as shown in the Figure 3~~Figure 3~~ taken from the European ATM Masterplan architecture portal).

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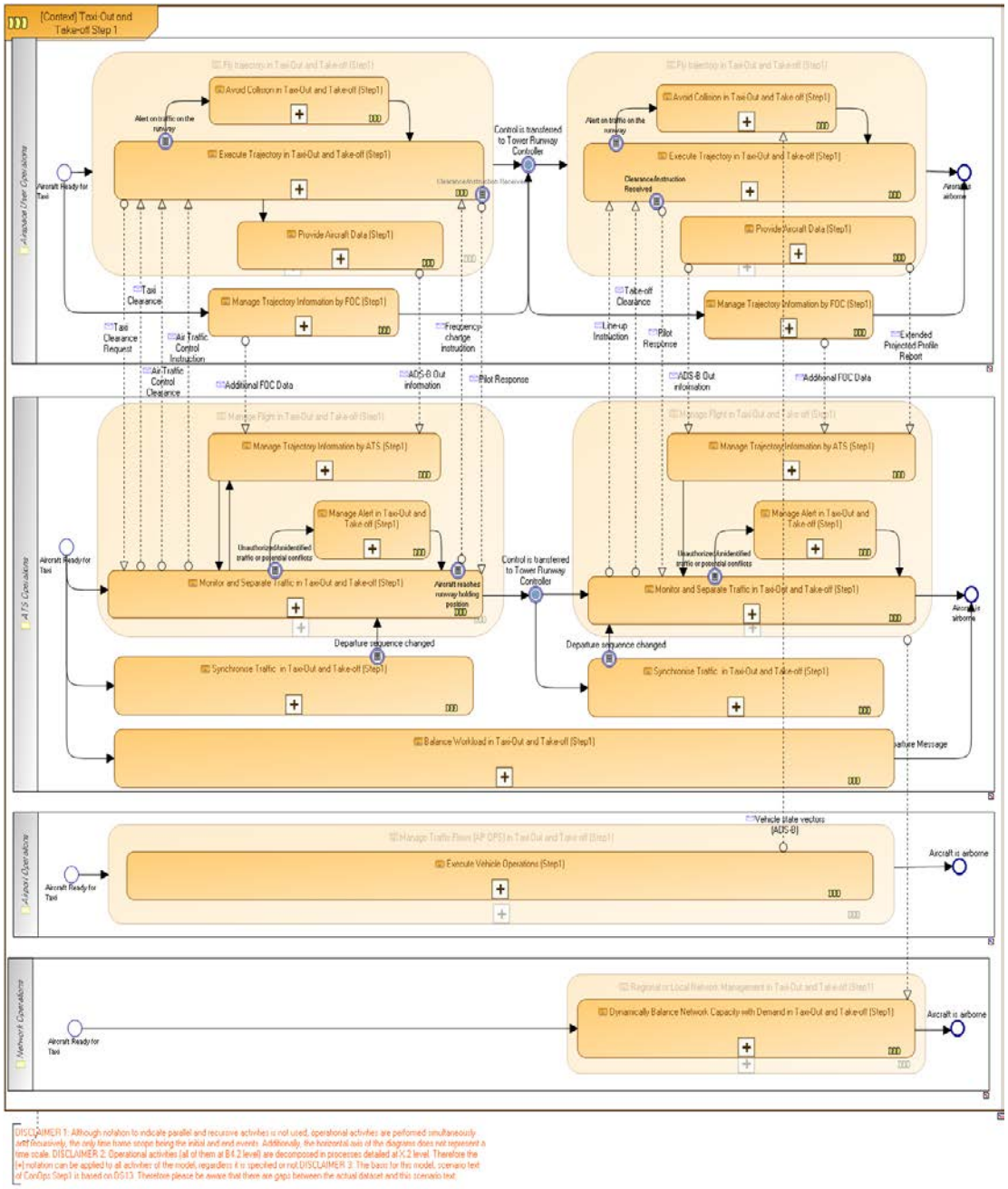

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376 Figure 2: Taxi-out and Take-off high level process.

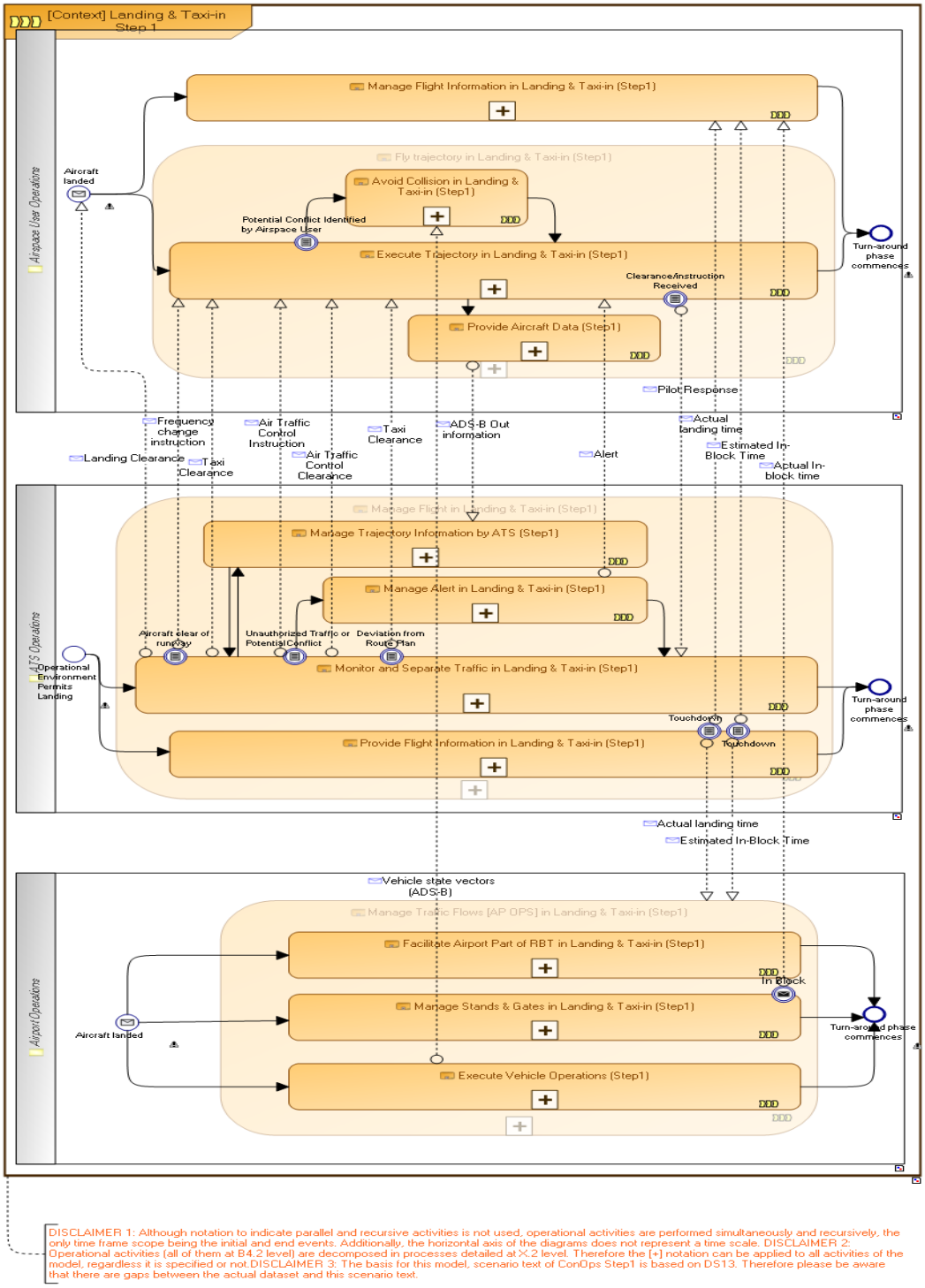

Figure 3: Landing and Taxi-in high level Process.

2.3.3 Services

As there are no services listed in the 06.02 DOD, the two following services have been defined by the OFA 01.02.01:

- **Detection of Conflicting ATC Clearances.**
- **Detection of Non Conformance to ATC instructions and/or procedures.**

Note: These services apply to both of the Processes (“Landing and Taxi-in” and “Taxi-out and Take-off”) described above.

2.3.4 Mapping to Service portfolio and Systems

No services listed in the 06.02 DOD.

3 Detailed Operating Method

3.1 Previous Operating Method

Currently the principal tool available to the controller is the A-SMGCS RMCA which uses A-SMGCS Surveillance data to detect dangerous situations within the Runway Protection Area. Detections and subsequent alerts to Controllers are provided at the very last moment and require immediate Controller reaction.

The main draw back with the RMCA is that it does not know the clearances given by the controllers; this leads to a high level of tuning being required to obtain an effective detection and to avoid nuisance alerts. This is a very critical constraint for putting the safety net in operation and is a factor for its slow implementation within Europe.

RMCA provides two stages of alert to the controller:

- **Stage 1- INFORMATION**: An INFORMATION alert is displayed usually in Yellow colour on the controller HMI. For example an INFORMATION alert is displayed when a departing and an arriving aircraft are on the same runway and the arrival aircraft is less than **30 seconds flying time from the threshold in non-LVP and 45 seconds in LVP conditions** *(30/45 seconds are values subject to local implementation)*.

- **Stage 2- ALARM**: An ALARM alert is displayed usually in Red colour on the controller HMI. For example an ALARM alert is displayed when a departing and an arriving aircraft are on the same runway and the arrival aircraft is less than **15 seconds flying time from the threshold in non-LVP and 30 seconds in LVP conditions** *(15/30 seconds are values subject to local implementation)*.

The baseline OIs from Implementation Package (IP) 1 are:

- **AO-0101** Reduced Risk of Runway Incursions through Improved Procedures and Best Practices on the Ground.
- **AO-0102** Automated Alerting of Controller in Case of Runway Incursion or Intrusion into Restricted Areas**.**
- **AO-0201** Enhanced Ground Controller Situational Awareness in all Weather Conditions.
- **AO-0202** Detection of Foreign Object Debris on the Airport Surface.

3.1.1 Conflicting ATC Clearances (CATC)

Many ATC Towers are now equipped with Electronic Flight Strips (EFS) where Controllers' clearances are input on the EFS and therefore known by the system. However, each input and EFS is treated individually and no cross check is performed with the clearances input on other EFS to see if the given input goes against the rules /procedures at the concerned airport, which could lead to a hazardous situation/conflicting situation.

3.1.2 Conformance Monitoring Alerts for Controllers (CMAC)

The Controller relies mainly on visual observation either out of the window or using the A-SMGCS to detect when a mobile is not conforming to instructions or procedures (e.g. not following the correct taxiway route or not stopping at the holding point). The A-SMGCS RMCA also provides alerts based on the position of mobiles within the runway protection area or in restricted/closed areas, but doesn't take into account instructions or clearances given by the Controller. Therefore, many incidents are not detected or detected when it is too late often leading to a conflict, infringement or collision.

3.2 New SESAR Operating Method

3.2.1 Prioritisation of Alerts

The new CATC and CMAC alerts described in the following paragraphs are not intended to replace RMCA, but to complement RMCA by predicting incidents before the RMCA Alerts trigger. Therefore, the RMCA Alerts have a higher priority than other alerts.

In certain situations it will be possible for more than one alert to be triggered for the same mobile e.g. an aircraft LINING UP with no clearance will trigger an alert (CMAC - RWY INCURSION) with an aircraft on short final approach (RMCA).

It is also evident that it will be impossible for some alerts to be triggered at the same moment for the same mobile e.g. a NO PUSH BACK alert will not be triggered for an aircraft on final approach with a NO LANDING alert.

While the titles of all alerts shall be displayed in the optional ALERT window, it is recommended that only one alert title shall be displayed in the radar/track label and/or the EFS of the concerned mobile. This alert title shall be the one having the highest priority according to requirements defined in section 6.

3.2.2 Protected and Restricted Areas

Many of the alerts defined in the Airport Safety Support service require that a protected area around the runways and restricted areas is defined, and this area will be dependent on different weather conditions (e.g. Low Visibility Procedures (LVP) or Non LVP).

As different rules and alerts have been defined on the movement area the area around the runway will be referred to as the **Runway Protected Area (RPA)** and other areas as **Restricted Areas**. The basic rule is that a mobile, whether it is cooperative or non-cooperative, must have a clearance to enter one of these areas, otherwise it is considered to be an Intruder.

Runway Protected Area (RPA)

The dimensions of the RPA may vary depending on airport/runway layout and ATC procedures (e.g. LVP).

The RPA is composed of two boundaries:

- A ground boundary to detect the mobiles on the surface.
- An air boundary to detect airborne aircraft.

Around the same runway several “layers” of protected areas may be defined (e.g. LVP or Non-LVP), and each one will have defined corresponding alert situations.

Figure 4: Example of an RPA defined at a major airport

- **Ground boundary**

The length and width of the ground boundary must at least include the runway and can also contain ILS restricted areas around the localiser and glide path equipment. The width shall be defined according to different meteorological conditions, e.g. Non-LVP, LVP.

As an example based on current ILS holding positions:

- **In Non-LVP** : ground boundary defined by CAT I holding position (normally extends **90 metres** from Runway centreline).
- **In LVP** : ground boundary defined by CAT II/III holding position (normally extends **150 metres** from Runway centreline).

This ground boundary will be used for both INFORMATION and ALARM stages.

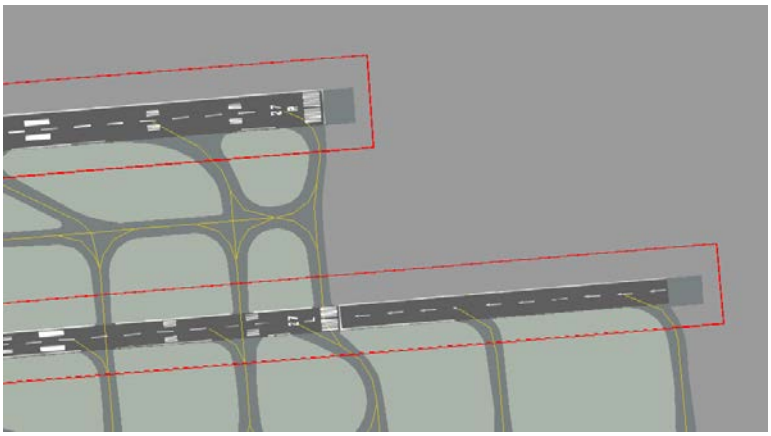

Figure 5: Example of RPA CAT I Ground boundary

Subject to further development, if the runway protection is ensured by an algorithm which could predict that a mobile is able or not to stop before entering the protected area, i.e. the ground boundary, an alert could be generated before the mobile crosses the boundary.

Such algorithms, based on the speed and position of a mobile, may already exist but they have to be evaluated.

- **Air boundary**

The air boundary is defined as a flight time to the runway threshold and would take into account the two stages of alert, as well as the meteorological conditions:

- Non-LVP : INFORMATION around T1 = 30'', ALARM around T2 = 15''
- LVP : INFORMATION around T1 = 45'', ALARM around T2 = 30''

These times of the two alert stages outlined above should be configurable, depending upon optimisation at the aerodrome.

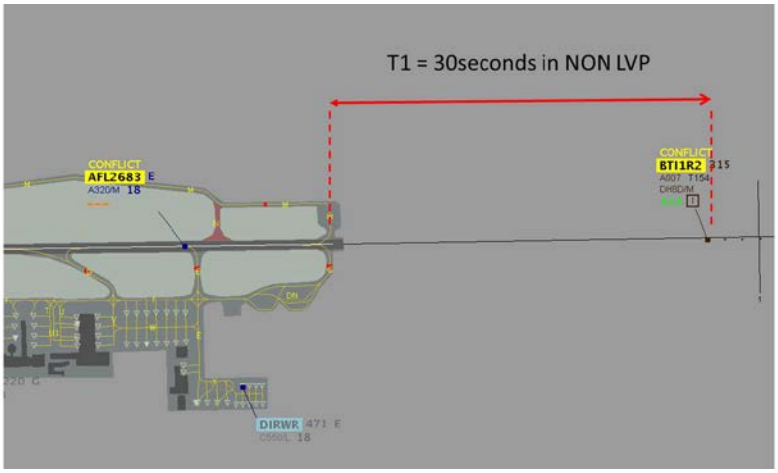

Figure 6: Example of RPA Air boundary for Information Alert.

3.2.2.1 Restricted Areas

An ALARM **shall** be provided to the controller when a mobile enters a restricted area, or when the A-SMGCS has a reliable prediction algorithm, when the mobile is expected to enter based on its trajectory and speed.

Local procedures may define some areas where certain mobiles are permitted to enter without an alert being raised. When closed, runways may also be considered as restricted areas, however, a runway closed for operations such as snow clearing may be accessible at certain points for aircraft to cross.

The restricted areas and their associated protections used to detect incursions should be defined locally with respect to each airport particularity. However, since restricted area incursions deal only with ground traffic, the definition of the corresponding protected areas is easier than for runways. The restricted area will be composed of only a ground boundary.

When the Routing service is implemented and the cleared route of the mobile is known, then an INFORMATION alert will be triggered predicting that the mobile will pass through the area and an ALARM will be provided to the controller when the mobile enters a restricted area. *Note: This alert is detailed in the CMAC section 3.2.4.15.*

3.2.3 Conflicting ATC Clearances (CATC)

It is important to note that the term 'Conflicting' in the title refers to the fact that certain clearances input on the EFS at the same time by an ATCO do not comply with the local ATC rules/procedures, it does not mean that the aircraft/vehicles have ended up in conflict with each other.

The detection of CATC is to provide an early prediction of situations that if not corrected would end up in hazardous situations that would be detected in turn by the RMCA if in operation.

The detection of CATC will be performed by the ATC system and depending on the situation, some or all of the following data will need to be known by the ATC system,

- The clearances given to the mobiles concerned.
- The assigned runway.
- The assigned holding point.
- The route of the mobile/s.
- The position of the mobile/s using A-SMGCS Surveillance data correlated to flight plans on the mobiles concerned.

The Controller should therefore be provided with an HMI to input into the ATC system when clearances are given to aircraft or vehicles. The HMI should also be capable of displaying alert messages (the choice between INFORMATION and ALARM is a local decision) to the controllers for the CATC detected by the ATC system and also the identity of the mobiles involved.

Working procedures for the controllers shall be adapted to ensure that all clearances given to aircraft or vehicles are input in the ATC system by the controller in a timely manner (click/input at the same time as the R/T clearance is given, without necessarily waiting for read back).

Any clearance input in the ATC system will be a triggering event for the ATC system to detect any new CATC.

Different types of CATC are identified and shall be implemented. Some of them are only based on the controller input; others are in addition using other data such as A-SMGCS Surveillance data to confirm that an abnormal situation is detected.

An alert shall be automatically triggered when conditions matching those described in paragraphs 3.2.3.1 to 3.2.3.16 are detected by the ATC system. There are different ways of indicating an actual or possible CATC to a Controller. The following examples detail three possible implementation solutions using a combination of a prediction indicator, a pop-up window, alerts displayed on the HMI and in the alert window.

1. **CATC with a prediction indicator.**

   The HMI can indicate to the ATCO that the clearance if selected will generate an alert. In Figure 7~~Figure 7~~ the potential CATC is indicated by the appearance of a small orange line on the side of the clearance box (LND being the abbreviation for Cleared to Land and LUP being Line Up).

   The orange line will disappear when the mobiles are no longer in a situation where a CATC alert is possible.

   If the ATCO selects the clearance with the orange line showing the system can either directly display on the HMI the mobiles that are affected and/or it can display a pop-up window that asks the ATCO to confirm the following-CANCEL or ACCEPT (see Figure 8~~Figure 8~~).

   CANCEL – this will cancel the last input clearance and remove the pop-up window.

Note: It is expected that this will be the normal procedure and the ATCO will then inform the pilot by R/T that the clearance is cancelled.

ACCEPT – this will close the pop-up window and allow the last input clearance to be accepted by the system. It will be a local implementation issue whether the 2 mobiles are flagged to remind the ATCO of the situation.

Note: ACCEPT - will be in specific circumstances only where the ATCO deems it safe to do so. The act of accepting will not prevent other alerts being triggered after the event such as A-SMGCS RMCA. The ATCO inputs will also be recorded so that they can be accessed for replay in case of an actual incident occurring.

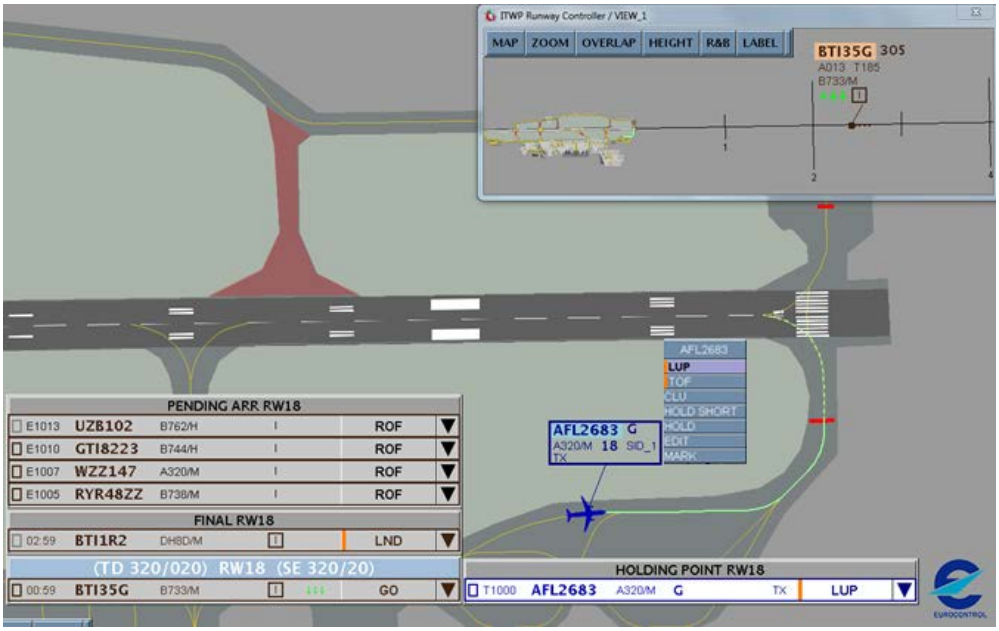

Figure 7: Indication (orange lines) of potential CATCs on the EFS

2. CATC without prediction indicator.

This option is as option 1 but does not include the orange line in the clearance box, so the first warning of a CATC will be when the ATCO tries to enter the second clearance and a pop-up window is displayed on the screen (see Figure 8~~Figure 8~~). The ATCO will then have the same option as above CANCEL or ACCEPT.

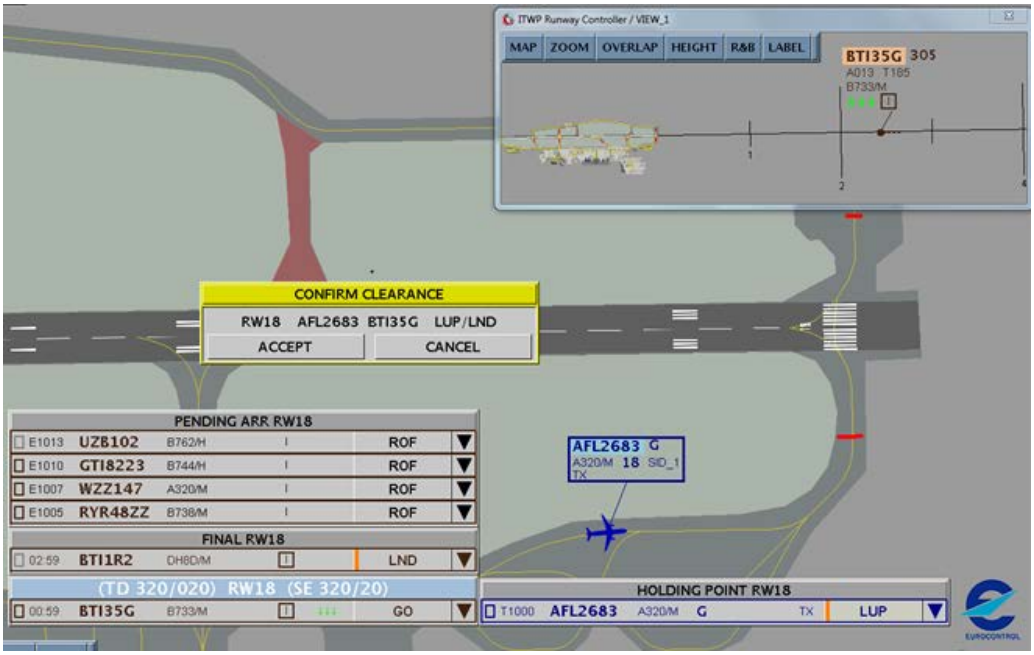

Figure 8: Indication of the CATC in a pop-up window (CONFIRM CLEARANCE)

3. CATC displayed in Alert Window.

This option is as option 1 but with no pop up window, and when the second clearance is input it is directly accepted by the system and the HMI displays the alert in the alert window and on the mobiles affected. The ATCO will have to undo the clearance to cancel the alert.

The method chosen will be a local implementation decision, but the first option is considered favourable due to the fact that the HMI shows any potential CATC without the ATCO needing to make any input therefore less workload is involved than having to make an input and then undo the input.

The different situations where Conflicting ATC Clearances can occur are described in the following images along with the data required to trigger the alert, the triggering conditions and exemptions where applicable. **Important Note: In each case it is deemed that the first clearance in the heading title is the one that has been input by the ATCO first and the second clearance triggers the alert.**

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*Note: The following screen shots show runway layouts at different airports, however, the situations shown are based on **generic examples** and do not necessarily reflect procedures currently in use at these airports.*

3.2.3.1 Line Up vs Line Up

Data required – Clearances, Assigned Runway, Holding Point and Surveillance.

Alert triggered -

1. If the **AZA654** is given Line Up and the **IBE987** is given Line Up from the same holding point on the same runway.
2. If the **AZA654** is given Line Up and the **AFR123** is given Line Up from the holding point directly opposite on the same runway.
3. If the **AZA654 or AFR123 or DLH321** is given Line Up and the **KLM789** is given Line Up from a holding point at the opposite end of the same runway.

Exemptions to the rule –

If a conditional Line Up /Line Up in sequence is given then no alert is triggered in situation 1 and 2.

No alert is triggered in situation 1 if multiple line up from the same holding point is authorised at the airport

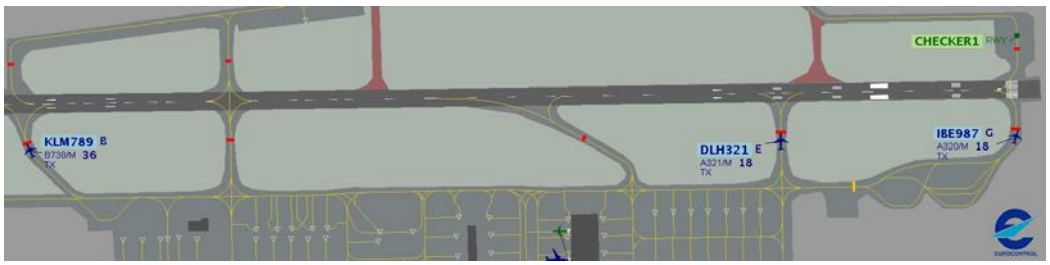
At some airports Line Up vs Line Up maybe be permitted in certain weather conditions (Local Rule)

3.2.3.2 Line Up vs Cross or Enter

Data required – Clearances, Assigned Runway, Holding Point and Surveillance.

Alert triggered -

If the **IBE987** is given Line Up and the **CHECKER1** is given Cross or Enter from a holding point directly opposite on the same runway.



Exemptions to the rule –

No alert is triggered if the aircraft lining up has reached a position (local parameter) where it is considered not to be an obstruction to the mobile crossing behind it or moving away from it.

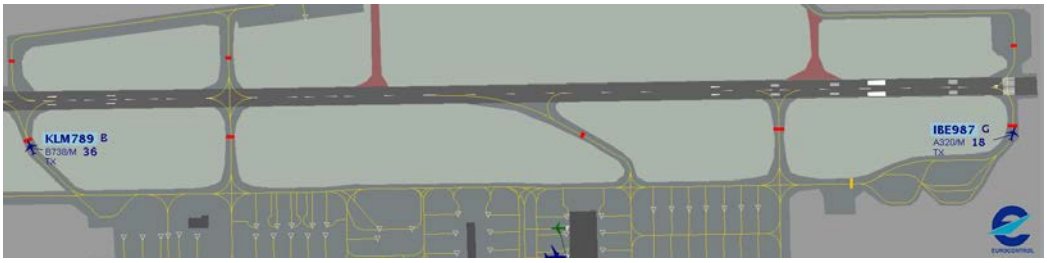
3.2.3.3 Line Up vs Take Off

Data required – Clearances, Assigned Runway, Holding Point and Surveillance.

Alert triggered -

If on the same runway, the **DLH321** is given Line Up from a holding point and the **AZA654** is given Take Off from a position on the runway or from a holding point behind **DLH321**.

If on the same runway, the **IBE987** is given Line Up from a holding point and the **KLM789** is given Take Off from a holding point at the opposite end of the runway



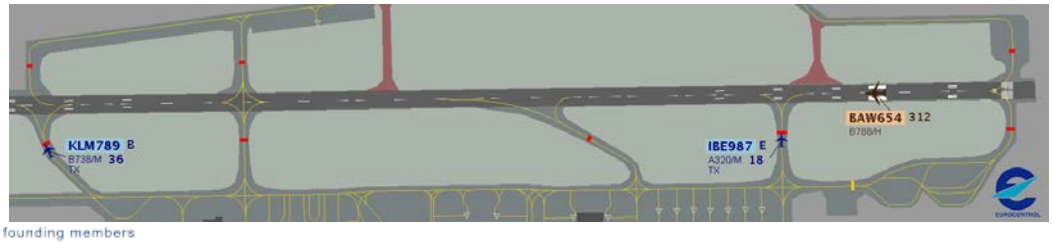
3.2.3.4 Line Up vs Land

Data required – Clearances, Assigned Runway, Holding Point and Surveillance.

Alert triggered -

If the **IBE987** is given Line Up and the **BAW654** is given cleared to land on the same runway

If the **KLM789** is given Line Up and the **BAW654** is given cleared to land on the same runway in the opposite direction.



Exemptions to the rule –

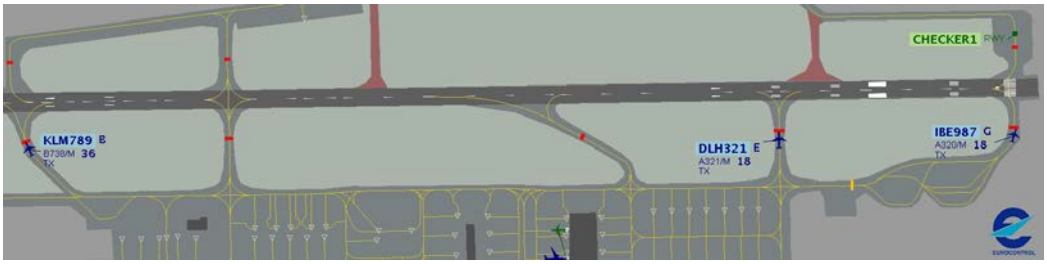
The surveillance function and holding point are used to determine whether **BAW654** has passed the assigned holding point of **IBE987** and if this is the case then no alert is triggered. This allows the ATCO to maintain a high runway throughput.

3.2.3.5 Cross or Enter vs Line Up

Data required – Clearances, Assigned Runway, Holding Point and Surveillance.

Alert triggered -

If the **CHECKER1** is given Cross or Enter and the **IBE987**, that has been cleared to line-up, is waiting at /or approaching a holding point directly opposite on the same runway.



Exemptions to the rule –

If the **CHECKER1** has entered the runway and has passed the position where the **IBE987** will line up then no alert is triggered.

3.2.3.6 Cross or Enter vs Cross or Enter

Data required – Clearances, Assigned Runway, Holding Point and Surveillance.

Alert triggered -

If the **AZA654** (aircraft or vehicle) is given Cross or Enter and the **CHECKER1** (aircraft or vehicle) is given Cross or Enter from a holding point directly opposite on the same runway.

Exemptions to the rule –

Surveillance is needed if Cross is given behind Enter to ensure that there is sufficient space for the mobile to Cross.

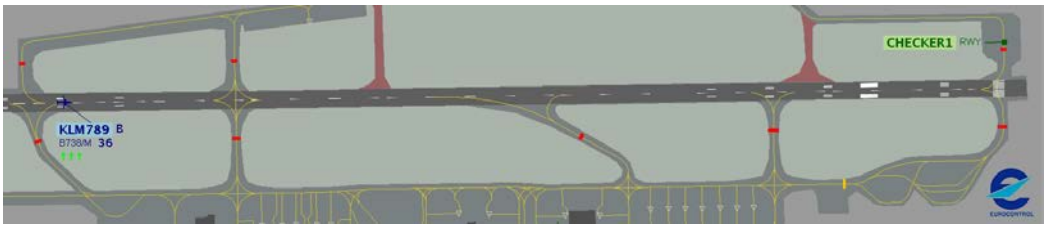
No alert is triggered if both mobiles are vehicles.

3.2.3.7 Cross or Enter vs Take Off

Data required – Clearances, Assigned Runway, Holding Point, Surveillance and Route.

Alert triggered -

If the **CHECKER1** is given Cross or Enter and the **KLM789** is given take off (whilst either already lined up or holding at the holding point) on the same runway.



Exemptions to the rule –

The holding point and route are needed to determine if the position that the mobile **CHECKER1** will Cross or Enter is behind the take-off position of the **KLM789** in which case no alert is triggered.

In some situations controllers may give a crossing clearance and then transfer the mobile to the next frequency before the crossing mobile has vacated the runway. In this case surveillance should be used to determine the position of the mobile and maintain the CATC logic against an aircraft that is ready for Take Off. The CATC would end when the position of the crossing traffic is detected as clear of the runway and not when the transfer of control is made.

3.2.3.8 Cross or Enter vs Land

Data required – Clearances, Assigned Runway, Holding Point and Surveillance.

Alert triggered -

If the **CHECKER1** is given Cross or Enter and the **DLH123** (or **IBE789**) is given Cleared to Land on the same runway.

Or

Exemptions to the rule –

Surveillance will be used to determine if the CROSS/ENTER mobile has vacated the runway protection area in which case no alert is triggered.

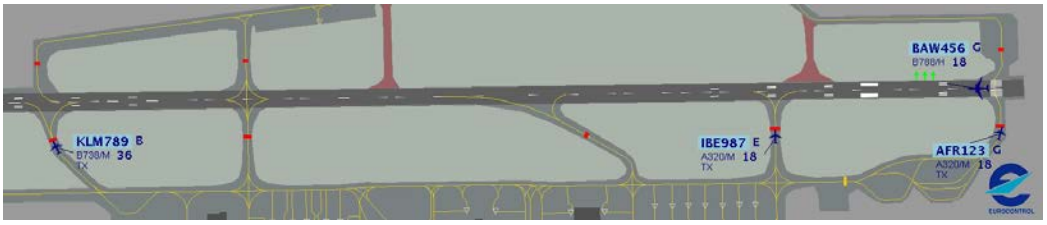
3.2.3.9 Take Off vs Line Up

Data required – Clearances, Assigned Runway, Surveillance and Holding Point.

Alert triggered -

If the **BAW456** is given Take Off and the **IBE987** (or **AFR123)** is given Line Up from a Holding Point on the same runway.

If the **BAW456** is given Take Off and the **KLM789** is given Line Up from a Holding Point on the same runway in the opposite direction.



Exemptions to the rule –

Holding point is needed to determine whether the position of **IBE987 (or AFR123)** is behind the position of the **BAW456** (based on surveillance), in which case no alert is triggered.

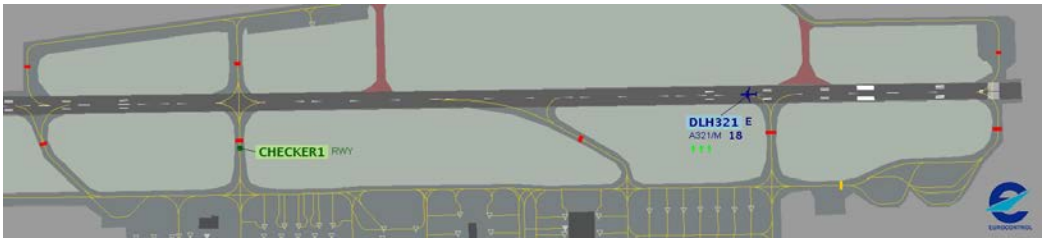
Surveillance is needed to determine whether **BAW456** is airborne (positive climb), in which case no alert is triggered for **KLM789**.

3.2.3.10 Take Off vs Cross or Enter

Data required – Clearances, Assigned Runway, Holding Point**,** Surveillance and Route.

Alert triggered -

If the **DLH321** is given Take Off and **CHECKER1** is given Cross or Enter from a Holding Point on the same runway.



Exemptions to the rule –

Holding Point and Route are needed to determine if the **DLH321** is given Take Off and **CHECKER1** is given Cross or Enter from a Holding Point on the same runway but behind the **DLH321**, in this case no alert would be triggered but jet blast will need to be taken into account.

3.2.3.11 Take Off vs Take Off

Data required – Clearances, Assigned Runway/s, Holding Point and Surveillance.

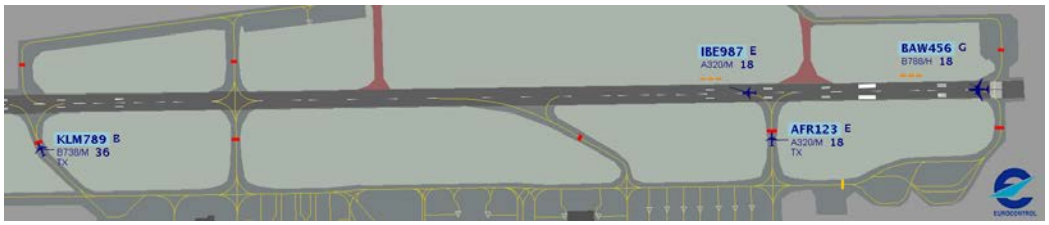
Alert triggered –

Single Runway

If the **IBE987** is given Take Off and the **BAW456** is given take off whilst lined up on the same runway.

If the **IBE987** is given Take Off and the **AFR123** is given take off whilst at a holding point on the same runway.

If the **IBE987** is given Take Off and the **KLM789** is given take off whilst at a holding point on the same runway in the opposite direction.



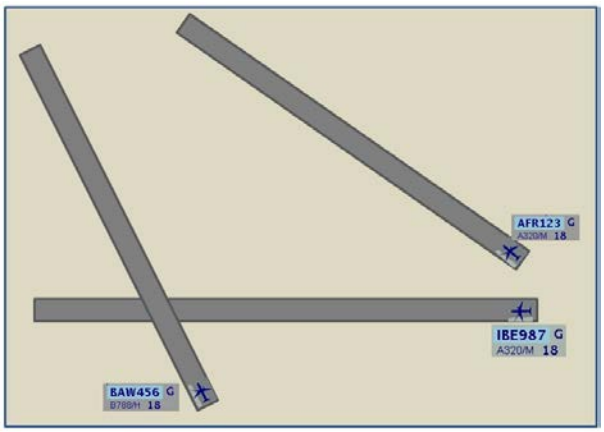
Exemptions to the rule –

Local procedures may permit **BAW456** to be given take off before **IBE987** is airborne in which case surveillance is needed to determine the position of the aircraft.

Crossing/Converging Runways

1. If the **IBE987** is given Take Off and the **BAW456** is given take off from a runway that intersects/crosses the runway that is being used by **IBE987**. When the aircraft ground trajectories are converging an alert is triggered.

2. If the **BAW456** is given Take Off and the **AFR123** is given take off from a runway where the climb out trajectory converges with the runway that is being used by **BAW456**.



Exemptions to the rule –

Local procedures may permit **BAW456** to be given take off before **IBE987** is airborne in which case surveillance is needed to determine the position of the aircraft.

Local procedures may permit **AFR123** to be given take off before **BAW456** is airborne in which case surveillance is needed to determine the position of the aircraft.

Surveillance data is used to determine whether one of the two aircraft has already passed a point on the runway that is considered as safe, after the crossing point of the runways, in which case no alert is triggered.

3.2.3.12 Take Off vs Land

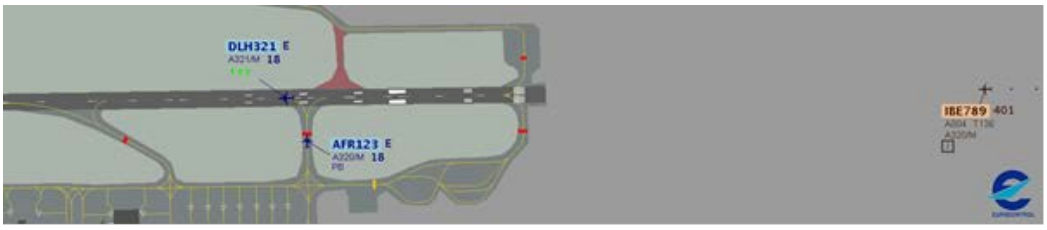
Data required – Clearances, Assigned Runway/s, Holding Point and Surveillance.

Alert triggered –

Single Runway

If the **AFR123** is given Take Off from the holding point and the **IBE789** is cleared to Land on the same runway.

If the **DLH321** is given Take Off and is lined up on the runway and the **IBE789** is cleared to Land on the same runway.



Exemptions to the rule –

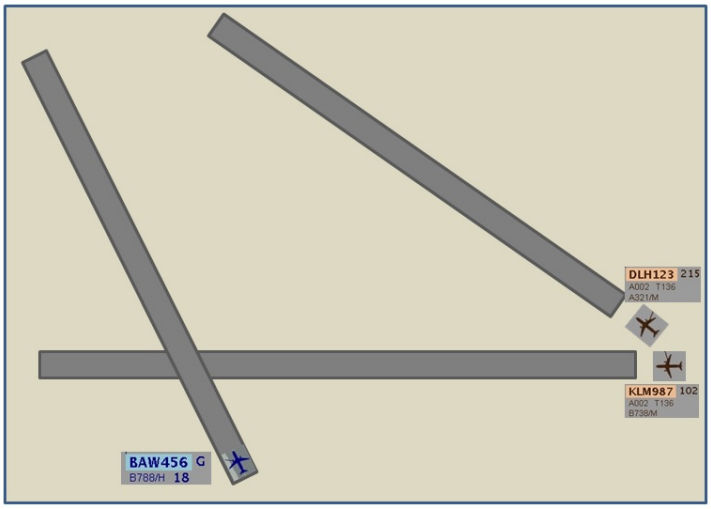
Local procedures may allow the **IBE789** to be given clearance to land if the **DLH321** is a certain distance into its take off run (and maybe at a certain speed as well) in which case surveillance is needed to determine the position of the aircraft.

If the **IBE987** is given Take Off and the **AFR321** is cleared to Land on the same runway in the opposite direction.

Crossing/Converging Runways

If the **BAW456** is given Take Off and is lined up on the runway and the **KLM987** is cleared to Land on an **intersecting/crossing** runway.

If the **BAW456** is given Take Off and is lined up on the runway and the **DLH123** is cleared to Land on a converging runway.



Exemptions to the rule –

Local procedures may allow the **KLM987** to be given clearance to land if the **BAW456** is a certain distance into its take off run (and maybe at a certain speed as well), also if LAHSO (Land and Hold Short Operation) are in use then an alert will not be triggered.

Local procedures may allow the **DLH123** to be given clearance to land if the **BAW456** is a certain distance into its take off run (and maybe at a certain speed as well) in which case surveillance is needed to determine the position of the aircraft.

3.2.3.13 Land vs Line Up

Data required – Clearances, Assigned Runway, Holding Point and Surveillance.

Alert triggered –

If the **AFR321** is given Cleared to Land and the **IBE987** is given Line Up on the same runway.

If the **AFR321** is given Cleared to Land and the **AZA654** is given Line Up on the same runway in the opposite direction.

Exemptions to the rule –

Surveillance and Holding Point are needed to determine if the position of the **IBE987** is lining up from is behind the actual position of the **AFR321** in which case no alert is triggered. This allows the ATCO to maintain a high runway throughput.

A conditional Line Up will not trigger an alert

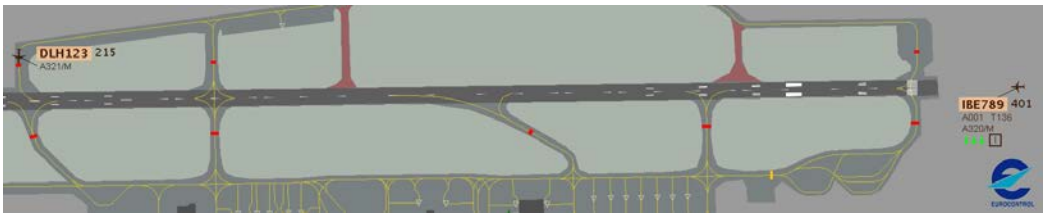
Local procedures may permit the situation where the **AFR321** has landed and is still on the runway and is moving below a specified speed and is a certain distance from the **AZA654** and the ATCO is confident that the aircraft will vacate before the Line Up point of the **AZA654**. In this case surveillance, holding point and route are needed to determine whether to trigger an alert or not.

3.2.3.14 Land vs Cross or Enter

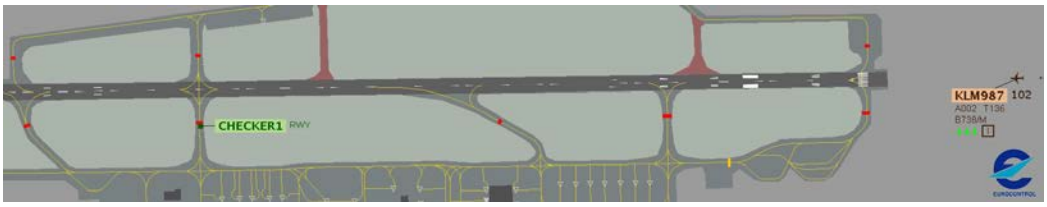
Data required – Clearances, Assigned Runway, Holding Point**,** Surveillance and Route.

Alert triggered -

If the **IBE789** is given Cleared to Land and the **DLH123** is given Cross on the same runway



If the **KLM987** is given Cleared to Land and the **CHECKER1** is given Enter on the same runway.



Exemptions to the rule –

Holding Point, Surveillance and Route are needed to determine if the position that the **CHECKER1** is Crossing or Entering from is behind the actual position of the **KLM987** in which case no alert is triggered. This allows the ATCO to maintain a high runway throughput.

Local procedures may permit the situation where the **IBE789 (or KLM987)** has landed and is still on the runway and is moving below a specified speed and is a certain distance from the **DLH123 (or CHECKER1)** and the ATCO has instructed the **IBE789 (or KLM987)** to vacate at an exit before the crossing point of the **DLH123 (or CHECKER1)**. In this case surveillance, holding point and route are needed to determine whether to trigger an alert or not.

3.2.3.15 Land vs Take Off

Data required – Clearances, Assigned Runway/s, Holding Point and Surveillance.

Alert triggered –

Single Runway

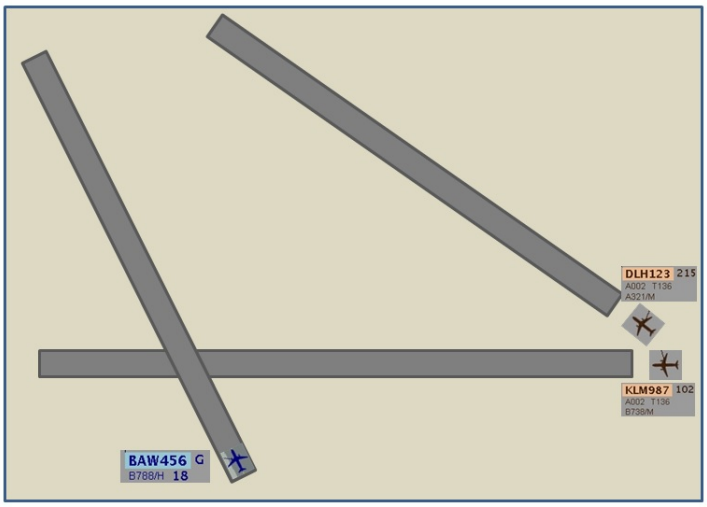
If the **AZA456** is given Cleared to Land and the **IBE987** is given Cleared to Take Off on the same runway.

If the **AZA456** is given Cleared to Land and the **KLM789** is given Cleared to Take Off on the same runway in the opposite direction.

Crossing/Converging Runways

If the **KLM987** is given Cleared to Land and the **BAW456** is given Cleared to Take Off.

If the **DLH123** is given Cleared to Land and the **BAW456** is given Cleared to Take Off from a converging runway (this alert is required in case the **DLH123** performs a missed approach and could conflict with the departing **BAW456**.



825

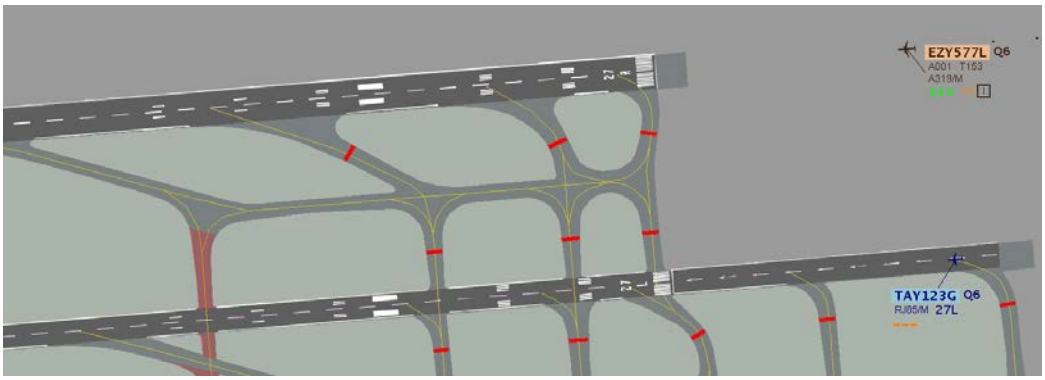
826 **Exemptions to the rule –**

827 If LAHSO for **KLM987** is in use then an alert will not be triggered.

828

829 **Closely Spaced Parallel Runways**

830 At certain airports with closely spaced parallel runways, local procedures may apply if the **EZY577L** is
831 given Cleared to Land and the **TAY123G** is given Cleared to Take Off from the adjacent runway (this
832 alert is required in case the **EZY577L** performs a missed approach it could conflict with the departing
833 **TAY123G** or the wake vortex from the **EZY577L** could interfere with the take-off run of the **TAY123G**.



834

835 **Exemptions to the rule –**

836 Local procedures may allow the **TAY123G** to be given clearance to take off if the **EZY577L** is at a
837 certain position in which case surveillance is needed to determine the position of the aircraft.

838

3.2.3.16 Land vs Land

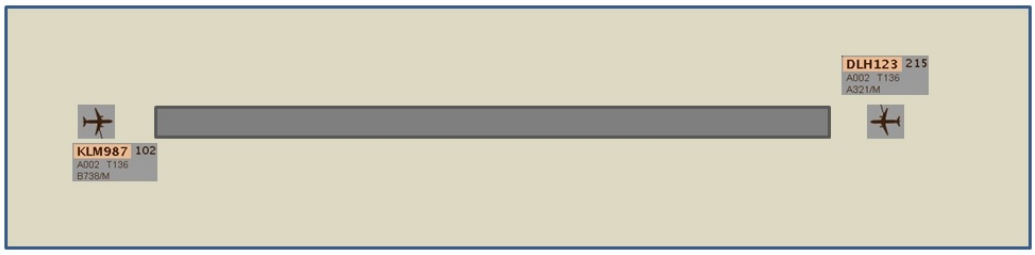
Data required – Clearances, Assigned Runway/s, Holding Point and Surveillance.

Alert triggered –

Single Runway

If the **AZA456** is given Cleared to Land and the **IBE789** is given Cleared to Land on the same runway.

If the **KLM987** is given Cleared to Land and the **DLH123** is given Cleared to Land on the same runway in the opposite direction.

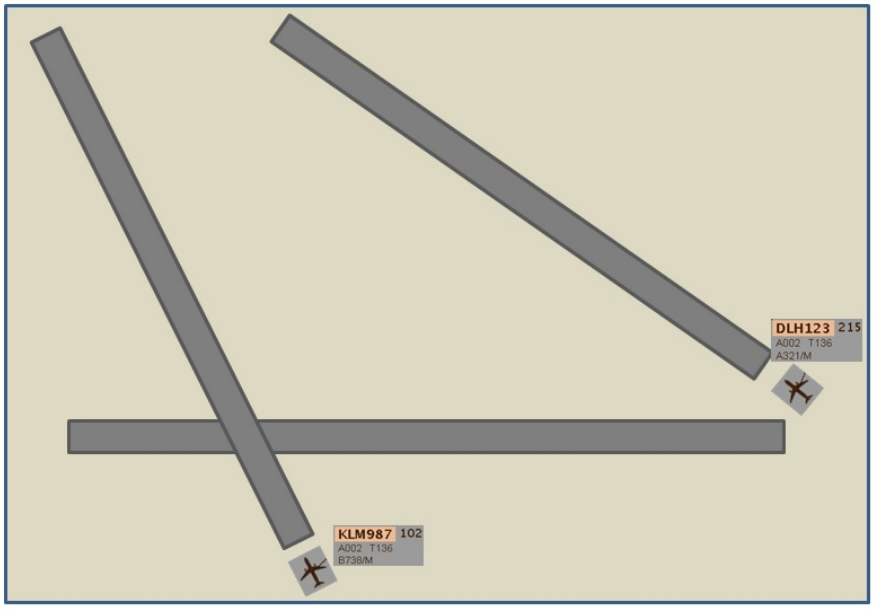


Exemptions to the rule –

Local procedures may allow multiple landing clearances to be given, this is often based on the position of the aircraft and/or the weather conditions.

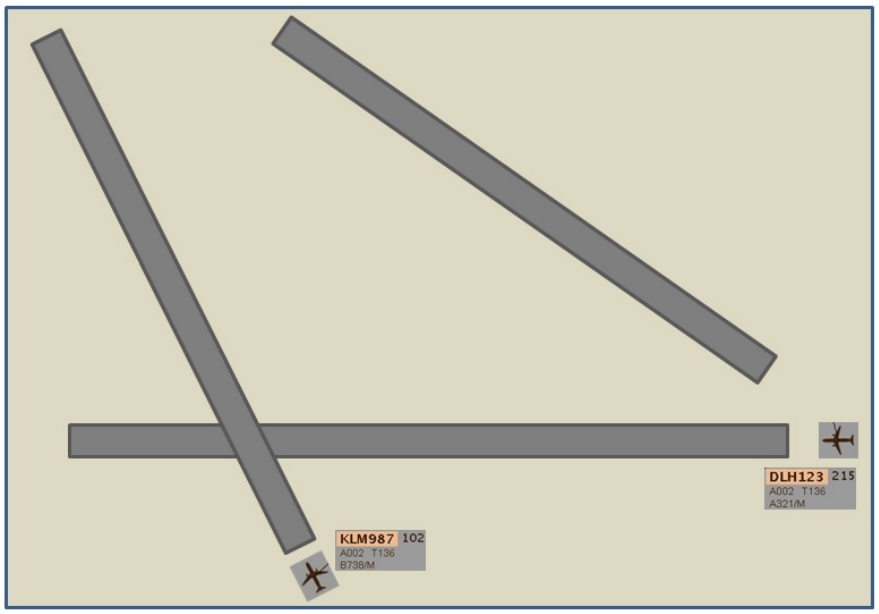
Crossing/Converging Runways

If both **KLM987** and **DLH123** are given cleared to land and have **converging air trajectories** (this could be a local rule in case of both aircraft go around at the same time).



856

857 If both **KLM987** and **DLH123** are given cleared to land and have **crossing trajectories.**



858

859 **Exemptions to the rule –**

860 Local procedures may allow multiple landing clearances to be given; this is often based on the
861 position of the aircraft and/or the weather conditions.

862 If LAHSO are in use then an alert will not be triggered in case of crossing trajectories.

863

864

3.2.4 Conformance Monitoring Alerts for Controllers (CMAC)

The introduction of systems such as Electronic Flight Strips (EFS) means that the instructions given by the ATCO are now available electronically and can be integrated with other data such as flight plan, surveillance, routing, published rules and procedures. The integration of this data allows the system to monitor the information and when inconsistencies are detected, the ATCO can be alerted via the HMI and/or audibly with a buzzer. The main benefit of this is the **early detection** of Flight Crew / vehicle driver errors that, if not detected and resolved, might result in a hazardous situation.

The current A-SMGCS RMCA will still exist as the last minute warning system based on the position of the mobiles. RMCA was considered as baseline in all validation activities.

When a hazardous situation is detected, the A-SMGCS will provide the controller with two types of alerts, named 'INFORMATION' and 'ALARM'

- INFORMATION: When receiving an 'information alert', this means that a potential hazardous situation may occur. The tower controller will use his skill and backgrounds to decide if, with remaining possible actions, the situation can be saved without using a too restrictive procedure (e.g. go around). If successful, there will be no alarm; if not successful the alarm will be activated and be presented on the surveillance display.

- ALARM: When receiving an "alarm", it is said that a critical situation is developing and that an immediate action should be performed. An alarm will also trigger an audio warning (e.g. buzzer) in case the controller is not looking at the HMI at the time.

Depending on local implementation the alerts can be displayed on the EFS, the radar/track label and in a dedicated Alert Window on the screen**. It is recommended that all alerts that are triggered are shown in the Alert Window until they are resolved.** In the case where more than one alert is triggered for the same mobile it is recommended to display the alert with the highest priority only in the radar/track label and /or EFS, bearing in mind that all the alerts are always being displayed in the Alert Window. Previous studies have highlighted the following issues

- Display of alerts will be subject to local agreements as there has been a divided opinion on when to show an ALARM to ATCOs, when an INFORMATION alert would suffice, in other words restrict the number of ALARM to a minimum so that when they are triggered ATCOs react with the urgency they warrant. Also, should a Runway Incursion alert always be an ALARM regardless of whether other traffic is present or not?

- The number of false or nuisance alerts must be kept to a minimum so that ATCOs do not become complacent and ignore them. An example could be at an airport with high intensity runway operations where arrivals are closely spaced and regularly receive a late landing clearance; there might not be a need to implement the No Landing Clearance alert.

- The question of where (which controller position) and when to display alerts also brings divided opinion, however, initial requirements have now been defined as guidance to implementation and it will be left to individual sites to define their own rules for this.

- It is not always possible to resolve the alert situation straight away, therefore, in the case of an ALARM ATCOs have requested the possibility to silence the warning buzzer once it has been activated so as not to continue to distract them or their colleagues. Similarly for an INFORMATION alert ATCOs requested the possibility to remove the alert from the EFS and the radar/track label but leave the alert showing in the alert window until it was resolved. This action helps to reduce clutter and distraction on the HMI.

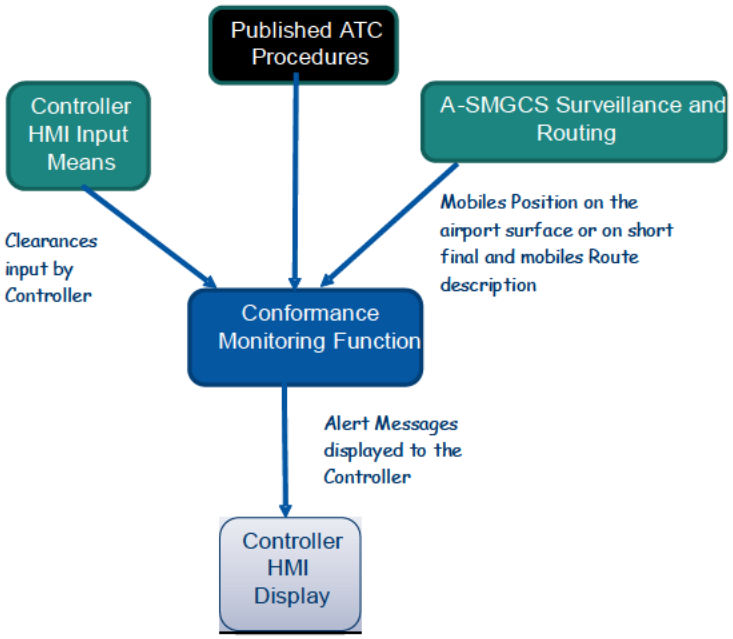


Figure 9: Conformance monitoring alerts – Ground functional architecture

3.2.4.1 Route Deviation Alert (Instruction)

Data required / Prerequisite – Mobile under control, Taxi Instruction Issued, Surveillance and Cleared Route.

Recommended Text to be displayed on HMI = ROUTE DEV

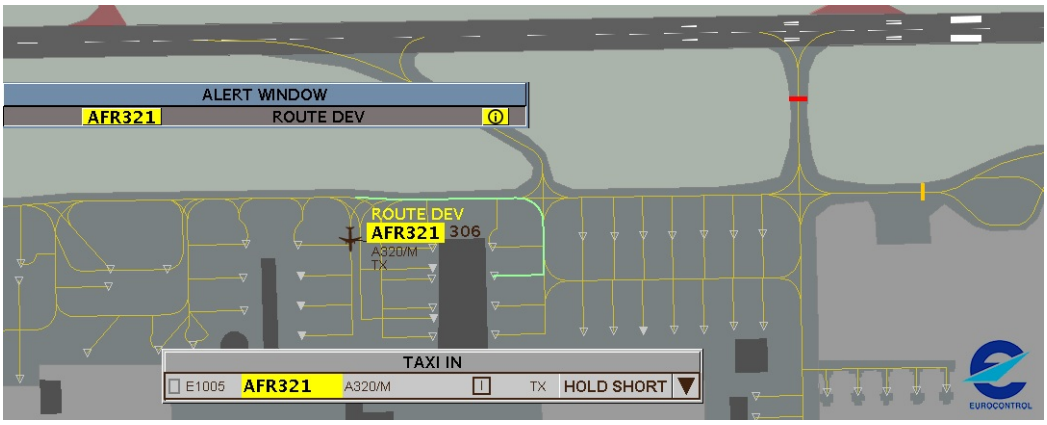
Alert Type - INFORMATION or ALARM (Local implementation decision e.g. depending on whether the aircraft is deviating within a specified distance and heading towards an active runway)

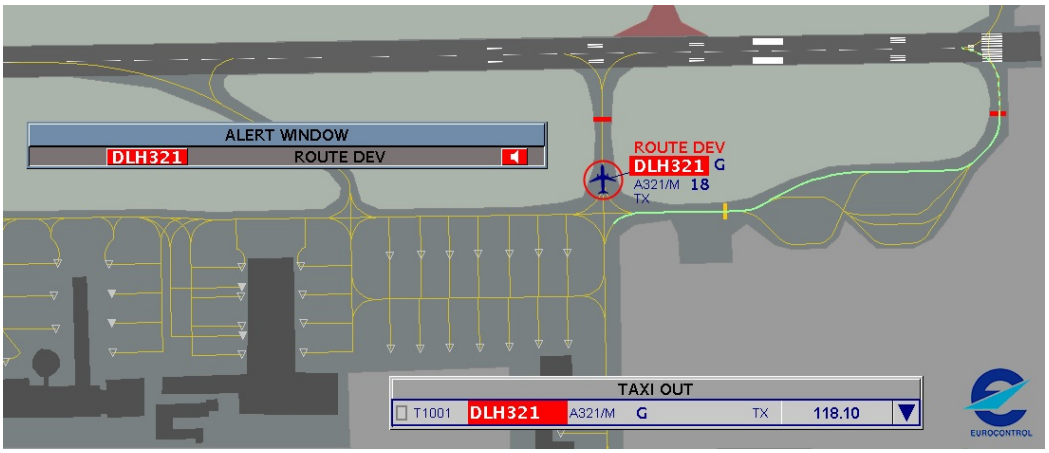
Alert trigger condition - When the Mobile is detected deviating from the cleared taxi route on the taxiway or crossing a runway.

Alert cancelled - When the mobile either re-joins the original taxi route or the ATCO issues new instructions and updates the taxi route via the HMI.

An example of a taxi route deviation is shown in the picture below; the Cleared taxi route is displayed for 10 seconds to show the ATCO the taxi route that the aircraft should have been following.

Where alert is displayed - GND or RWY. Dependant on local procedures and the position of the mobile. E.g. if the taxiing aircraft is close to the runway it could be shown on both GND and RWY positions.

928 

929 

930

931 3.2.4.2 No Push Back approval (Instruction)

932 **Data required / Prerequisite –** Mobile under control, Push back Instruction **NOT** Issued, Surveillance
933 and Stand information from the EFS.

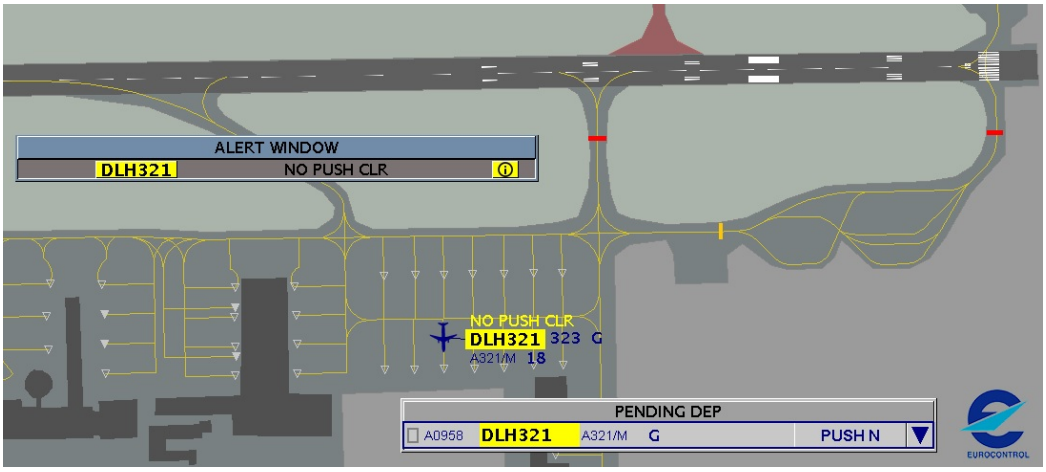
934 **Recommended Text to be displayed on HMI** – NO CLEARANCE (Local Implementation option -
935 NO PUSH CLR).

936 **Alert Type –** INFORMATION**.**

937 **Alert trigger condition -** When the aircraft is moving from a stand that requires a Push back and no
938 Push back instruction has been input for that aircraft.

939 **Alert cancelled –** When the ATCO inputs “Push Back” Instruction on the EFS or the aircraft returns to
940 stand.

941 **Where alert is displayed** - The alert is likely to be displayed only on the Tower Ground Controller’s
942 (or Apron Manager’s) HMI depending on the local AORs.



3.2.4.3 No Taxi approval (Instruction)

Data required / Prerequisite – Mobile under control, Taxi Instruction **NOT** Issued, Surveillance

Recommended Text to be displayed on HMI – NO CLEARANCE (Local Implementation option - NO TAXI CLR).

Alert Type - INFORMATION

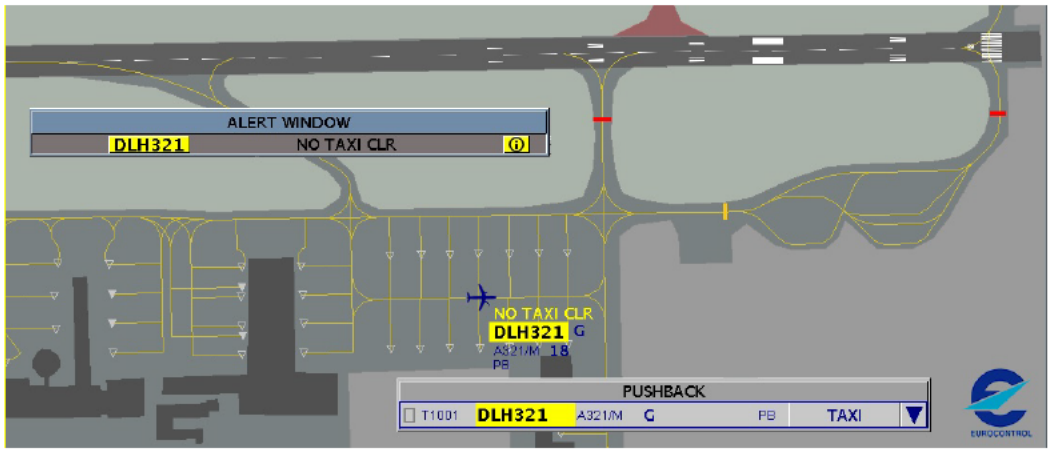
Alert trigger conditions –

1. When the aircraft is starting to taxi after its push-back or directly from a stand position where taxi is possible without push back.

2. When a mobile has been given instructions to stop at an intermediate point on the taxi route (e.g. hold short of taxiway bravo) and fails to adhere to the instruction.

Alert cancelled – When the ATCO inputs “Taxi” Instruction on the EFS or the aircraft stops.

Where alert is displayed - The alert is likely to be displayed only on the Tower Ground Controller’s (or Apron Manager’s) HMI.



3.2.4.4 Stationary (Instruction)

Data required / Prerequisite – Mobile under control, Surveillance and last instruction given to the aircraft or vehicle.

Recommended Text to be displayed on HMI – STATIONARY (Local Implementation option - STATIONARY RPA: see condition 2 below).

Alert Type - INFORMATION or ALARM (local implementation decision) depending on position, situation and other traffic.

Alert trigger conditions –

1. The A-SMGCS detects if a mobile is given an instruction on the EFS (e.g. push back, taxi, cross, enter, Line Up, take off) but doesn't move within a certain time frame (e.g. 90 seconds for PUSH, TAXI, CROSS and ENTER, and 120 seconds for LINE UP and TAKE OFF). This could indicate that the Flight Crew has forgotten about the instruction (recommendation = INFORMATION).

2. A mobile that has vacated a runway but has stopped within the runway protection area (e.g. for more than 15 seconds) and is a potential hazard to arriving or departing aircraft. This could indicate that the Flight Crew is unsure about their position or have a technical problem (recommendation =ALARM).

3. An aircraft that was taxiing and stops for a specified time (local parameter) before getting to the holding point area. The parameter will need to consider that aircraft frequently have to slow down/stop to give way to other mobiles and whilst queuing at the holding point they will move forward and stop whilst in the queue (recommendation = INFORMATION).

In the event of such an alert the ATCO will contact the Flight Crew to verify their intentions.

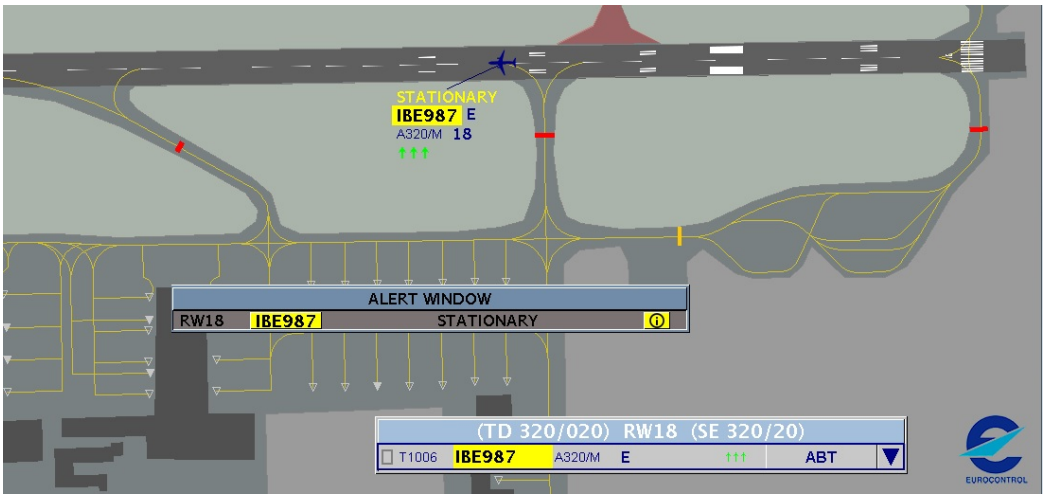
Alert cancelled – When the aircraft is detected to be moving.

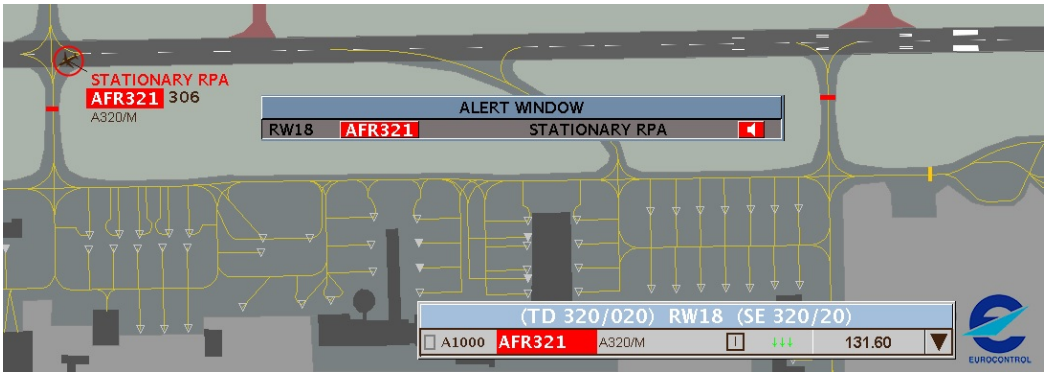
Where alert is displayed –

1. Stationary after Push-Back Instruction: The alert is likely to be displayed only on the Tower Ground Controller's HMI.

2. Stationary after Taxi Instruction: The alert is likely to be displayed only on the controller position that has the aircraft under control and it could be the Tower Ground Controller's HMI or the Tower Runway Controller's HMI.

3. Other cases: The alert is likely to be displayed only on the Tower Runway Controller's HMI.





3.2.4.5 No Contact (Instruction)

In most towers it is standard procedure for the Tower Runway Controller to make either an input on the EFS or move the EFS to a different bay when an aircraft on final makes initial contact on the frequency. Using system coordination between the Approach and the Tower, the EFS in the tower will indicate when the approach controller transfers control of the flight to the tower and similarly when the Tower Runway Controller assumes control of the flight the approach controller will have confirmation of contact

Data required / Prerequisite – Surveillance, Aircraft has been transferred from Approach to the Tower.

Recommended Text to be displayed on HMI – NO CONTACT

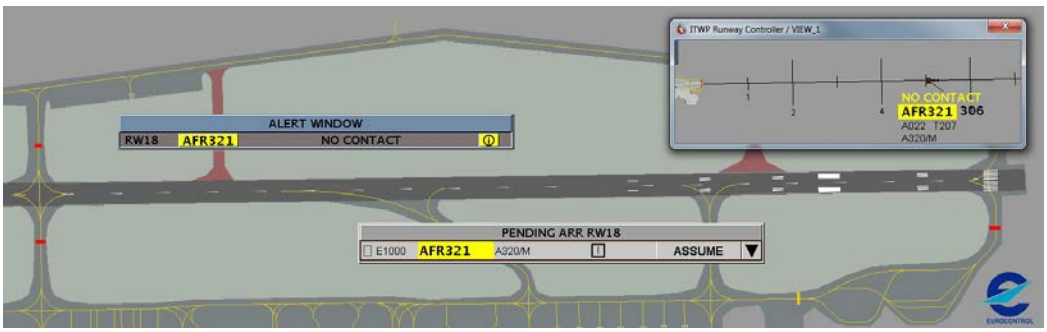
Alert Type – INFORMATION.

Alert trigger conditions – when the flight is transferred and the aircraft fails to contact the tower within a certain distance/time from the runway (e.g. 4 miles or 120 seconds, based on the fact that the Tower Runway Controller has not yet assumed the flight versus the surveillance position of the flight).

Alert cancelled – When the flight is assumed by the Tower Runway Controller or re-assumed by the previous approach controller.

Where alert is displayed – It is likely that this alert need only be displayed on the Tower Runway Controller's HMI and possibly the Tower Supervisor's HMI

Note: *A similar situation to above is identified but since it is not a standard procedure, this case is described as an optional feature. When an aircraft is transferred between ATCOs in the tower, e.g. Tower Ground Controller to the Tower Runway Controller or Tower Ground Controller to another Tower Ground Controller, and fails to make R/T contact by a certain point (based on local procedures). Based on the fact that the receiving ATCO has not assumed the flight verses the surveillance position of the flight, then an INFORMATION alert will be triggered, and will be cancelled when the flight is assumed by the receiving ATCO or reassumed by the previous ATCO.*



3.2.4.6 No Transfer (Instruction)

Data required / Prerequisite – Surveillance, Aircraft still on Tower Runway controller

Recommended Text to be displayed on HMI – NO TRANSFER (Local Implementation option - TRANSFER?).

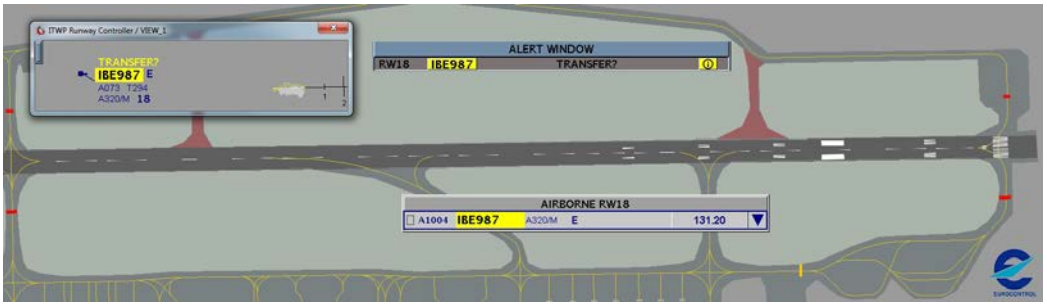
Alert Type – INFORMATION**.**

Alert trigger conditions – According to local implementation, the triggering condition could be:

- The position of the aircraft after take-off, e.g. altitude or distance from the runway.
- A time parameter after take-off.

Alert cancelled – When the Tower Runway Controller inputs the Transfer instruction on the EFS.

Where alert is displayed – This alert needs only be displayed on the Tower Runway Controller's HMI and possibly the Tower Supervisor's HMI.



3.2.4.7 No Take Off Clearance (Instruction)

Data required / Prerequisite – Surveillance, **NO** take off clearance issued.

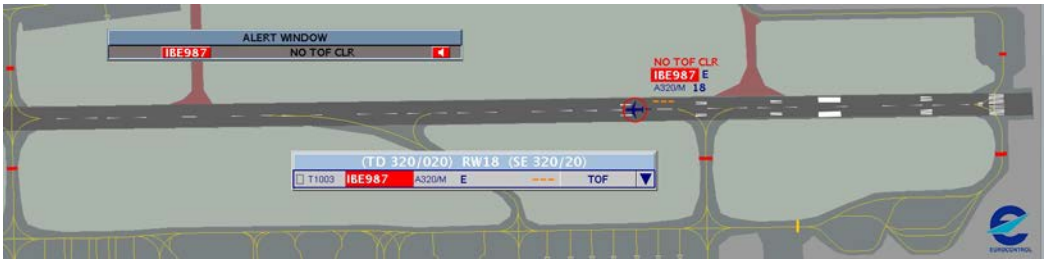
Recommended Text to be displayed on HMI – NO CLEARANCE (Local Implementation option - NO TOF CLR).

Alert Type – INFORMATION or ALARM (local implementation decision) depending on whether other traffic is known to be or planned to be in a hazardous position, such as within the RPA or within the climb out area.

Alert trigger conditions – Aircraft is supposed to line up and wait but is detected moving outside of a specified area on the runway.

Alert cancelled – When the alert is triggered the ATCO will assess the situation and either will tell the aircraft to abort take off, or let the aircraft take off if it is considered safe to do so. Therefore the alert is cancelled when the controller inputs Take-Off or Abort Take-Off on the EFS.

Where alert is displayed – It is likely that this alert need only be displayed on the Tower Runway Controller's HMI and possibly the Tower Supervisor's HMI.



3.2.4.8 No Landing Clearance (Instruction)

Data required / Prerequisite – Surveillance, **NO** Landing clearance issued.

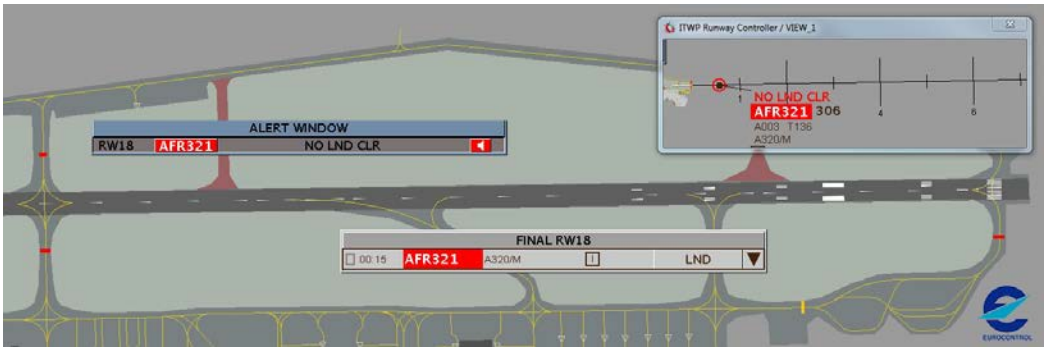
Recommended Text to be displayed on HMI – NO CLEARANCE (Local Implementation option - NO LND CLR).

Alert Type – INFORMATION or ALARM (local implementation decision) depending on whether another mobile is known to be in the RPA or planned to enter the RPA.

Alert trigger conditions – The landing aircraft is detected at a certain distance/time (e.g. 0.5 miles or 15 seconds) from the runway threshold.

Alert cancelled – When the alert is triggered the ATCO will assess the situation and either clear the aircraft to land, or instruct the aircraft to go around if a landing clearance can not be issued. Therefore, the alert is cancelled when the controller inputs Clear to Land or Go-Around on the HMI.

Where alert is displayed – It is likely that this alert need only be displayed on the Tower Runway Controller's HMI and possibly the Tower Supervisor's HMI.



3.2.4.9 Landing on wrong runway (Instruction)

Data required / Prerequisite – Surveillance, Assigned landing runway.

Recommended Text to be displayed on HMI – WRONG RWY (Local Implementation option - LND WRONG RWY?).

Alert Type – INFORMATION or ALARM depending on whether other traffic is known within or planned to enter RPA within a specified time.

Alert trigger conditions – An arriving aircraft is detected to be aligned to a runway that differs to the assigned runway.

Alert cancelled – When the alert is triggered the ATCO will assess the situation and either tell the aircraft to go around, or let the aircraft land if it is considered safe to do so (does not apply if the Runway is Closed). Therefore, the alert is cancelled when the controller inputs Go-Around on the EFS or inputs the new runway on the EFS (if there is time) or when the aircraft is detected as having vacated the runway.

Where alert is displayed – It is likely that this alert need only be displayed on the Tower Runway Controller's HMI and possibly the Tower Supervisor's HMI.

3.2.4.10 Red Stop Bar Crossed (Instruction)

Data required / Prerequisite – Surveillance, Red stop bar position and status.

Recommended Text to be displayed on HMI – NO CLEARANCE (Local Implementation option - RED STOP BAR CROSSED).

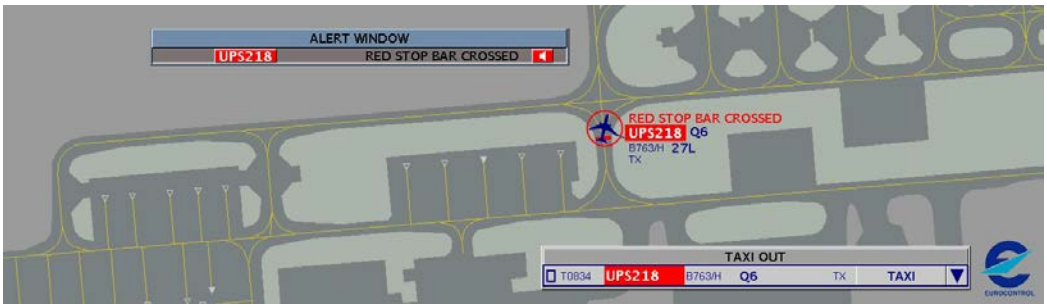
Alert Type – ALARM.

Alert trigger conditions – A mobile is detected crossing a red stop bar, which can be positioned at an intermediate holding point or at the limit between control positions areas of responsibility. *Note: The detection here is assumed to be by A-SMGCS Surveillance and not by other detection systems which currently exist at some airports. At airports where independent detection systems sense Stop bars being crossed there will need to be an operational assessment on how to manage the integration of the two concepts.*

Alert cancelled – When the alert is triggered the ATCO will assess the situation and issue instructions accordingly e.g. inform the mobile of the infringement, pass traffic information, tell the mobile to continue to taxi or stop. Therefore, cancellation of the alert will be a local decision based on the system/s installed e.g. the ATCO might have to manually turn the stop bar off and on again or make an input on the EFS to Taxi or Hold Position.

Where alert is displayed – It is likely that this alert need only be displayed on the Tower Runway or Tower Ground Controller's/Apron Manager HMI and possibly the Tower Supervisor's HMI.

Note: If the stop bar is positioned at a runway holding point and aligned with the RPA, then the RWY INCURSION (NO LINE-UP or NO CROSSING or NO ENTER) alarm will be used instead of this one.



3.2.4.11 Lining Up on the wrong runway (Instruction)

Data required / Prerequisite – Surveillance, Assigned Runway.

Recommended Text to be displayed on HMI – WRONG RWY (Local Implementation option - LUP WRONG RWY?).

Alert Type – INFORMATION or ALARM depending on whether other traffic is known within or planned to enter RPA within a specified time).

Alert trigger conditions – A departing aircraft is detected lining up on a runway that differs to the assigned runway.

Alert cancelled – When the alert is triggered the ATCO will assess the situation and will give the aircraft instructions to proceed to the correct runway. Therefore the alert is cancelled when the A-SMGCS detects that the aircraft is no longer lined up on the incorrect runway, or the ATCO changes the runway on the EFS to match the runway where the aircraft is positioned.

Where alert is displayed – It is likely that this alert need only be displayed on the Tower Runway Controller's HMI and possibly the Tower Supervisor's HMI.

3.2.4.12 Runway Incursion (Procedure or Instruction)

Data required / Prerequisite – Surveillance, RPA description, last Clearance given to the aircraft or vehicle.

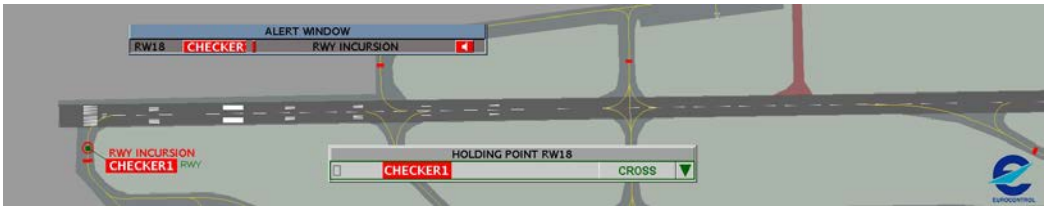
Recommended Text to be displayed on HMI – RWY INCURSION (Local Implementation option – RWY INCURSION for Vehicles and NO LUP CLR, or NO CROSS CLR, or NO ENTER CLR for Aircraft*).*

Alert Type – INFORMATION or ALARM (local implementation decision e.g. depending on whether other traffic is known to be in, or planned to enter, the RPA within a specified time).

Alert trigger conditions – Mobile detected within the RPA without a clearance (e.g. Line Up, Cross, or Enter). *Note: If runway Stop bars are in use the detection is the crossing of a lit stop bar and if they are not in use the detection is crossing a defined point without a suitable clearance.*

Alert cancelled – When the mobile leaves the RPA or is assigned an appropriate clearance.

Where alert is displayed – It is likely that this alert will be displayed on all positions due to its severity and the need to identify the offending mobile as soon as possible.



3.2.4.13 Runway or Taxi Type (Procedure)

Data required / Prerequisite – Airport procedures, Surveillance, Assigned Runway/Route and aircraft type.

Recommended Text to be displayed on HMI – RWY TYPE or TWY TYPE.

Alert Type – INFORMATION or ALARM depending on whether the aircraft is planned to use the runway/taxiway or is actually on the runway/taxiway.

Alert trigger conditions – When the cross check to see if the runway or taxi route is suitable for the aircraft type is negative.

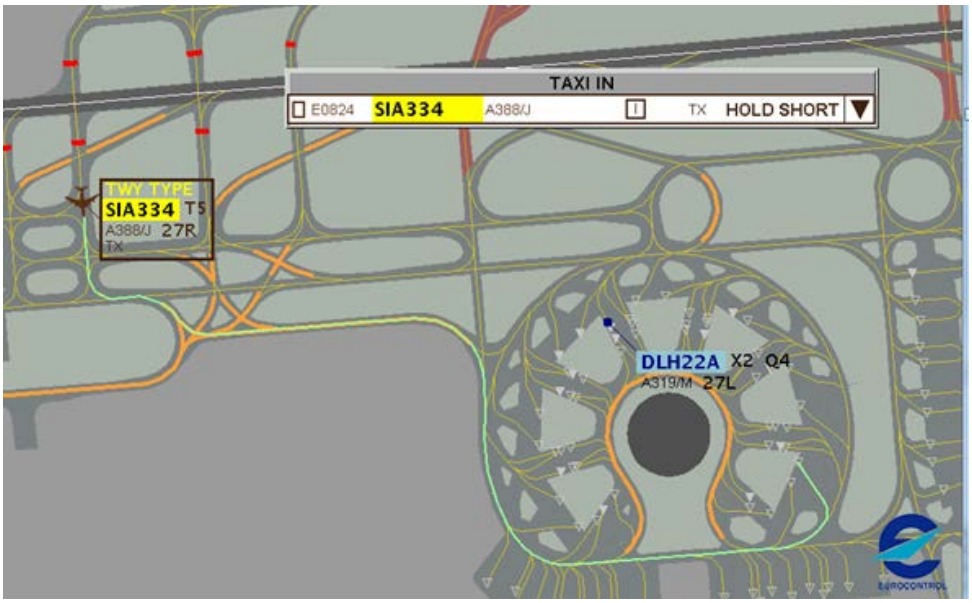
Alert cancelled – When the aircraft is assigned a different and suitable runway or taxiway.

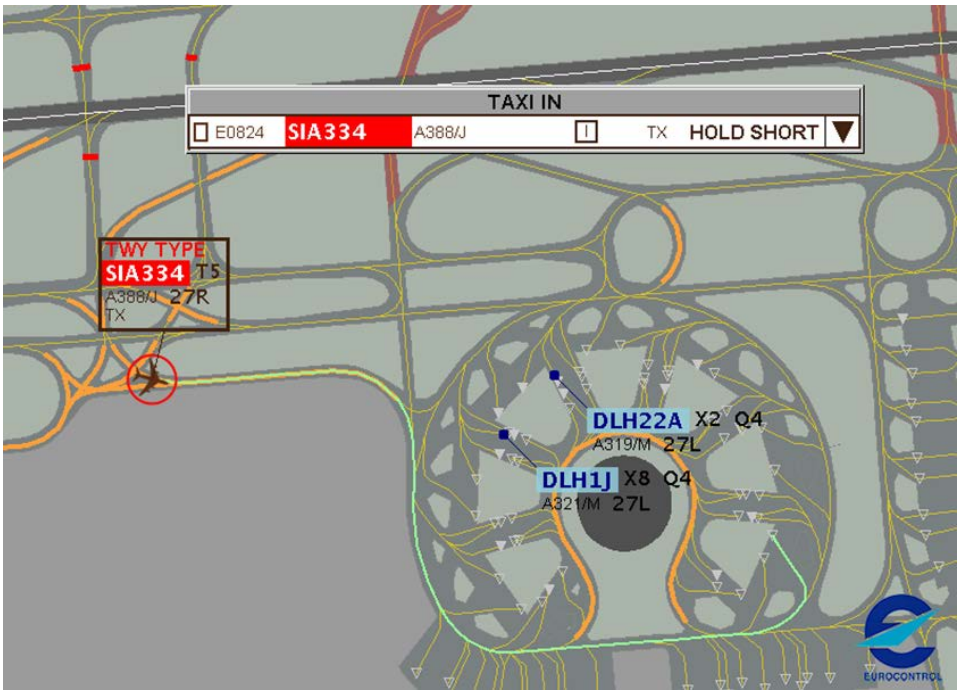
Where alert is displayed –

1. For Runway type non-conformance, It is likely that this alert need only be displayed on the Tower Runway Controller's HMI.

2. For Taxiway type non-conformance, It is likely that this alert need to be displayed on the Tower Runway and Ground Controller's HMI.

Note: In the two images below the orange lines on the taxiways indicate the segments of taxiway unsuitable for a taxiing Airbus 380 at Paris CDG Airport.





3.2.4.14 Runway Closed (Procedure)

Data required / Prerequisite – Airport current operational environment description including runway status, Surveillance, Assigned Runway/Route.

Recommended Text to be displayed on HMI – RWY CLOSED.

Alert Type – INFORMATION or ALARM depending on whether the aircraft is planned to use the runway or is actually present on the runway (or subject to local decision when the aircraft is at a specific distance/time from landing).

Alert trigger conditions – When a selected runway is declared as closed within the system and a aircraft or towed aircraft is assigned to use that runway or is on that runway. The alert can be configured to trigger at a specific time before the landing time of an aircraft subject to local decision.

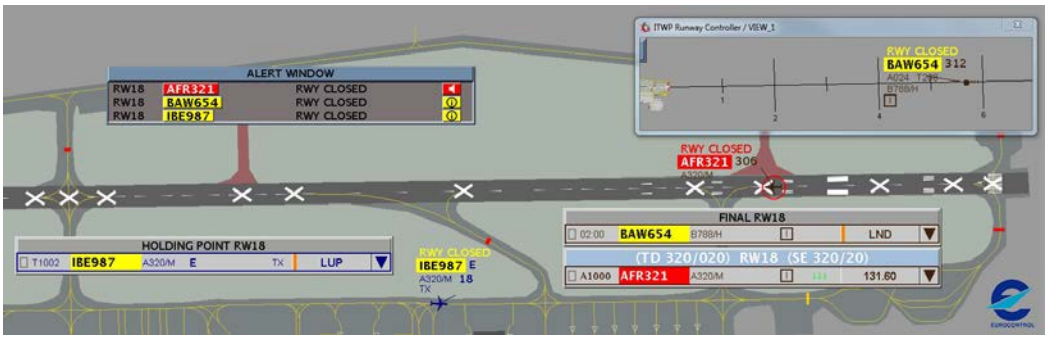
Alert cancelled – When the aircraft of towed aircraft is allocated a different runway or the runway status is changed.

Where alert is displayed – It is likely that this alert need be displayed on the Tower Runway Controller's HMI and the Tower Supervisor's HMI.

In order to accommodate different situations it may be necessary to declare that a runway has one of the following states,

- active (useable for take-off and landing).
- inactive (useable as a taxiway so alerts will not be generated).
- closed (not useable by mobiles).

The update of the runway status will be either the responsibility of the Tower Supervisor or the Airport Operator depending on local rules.



3.2.4.15 Taxiway Closed (Procedure)

Data required / Prerequisite – Airport current operational environment description including taxiway status, Surveillance and Assigned Route.

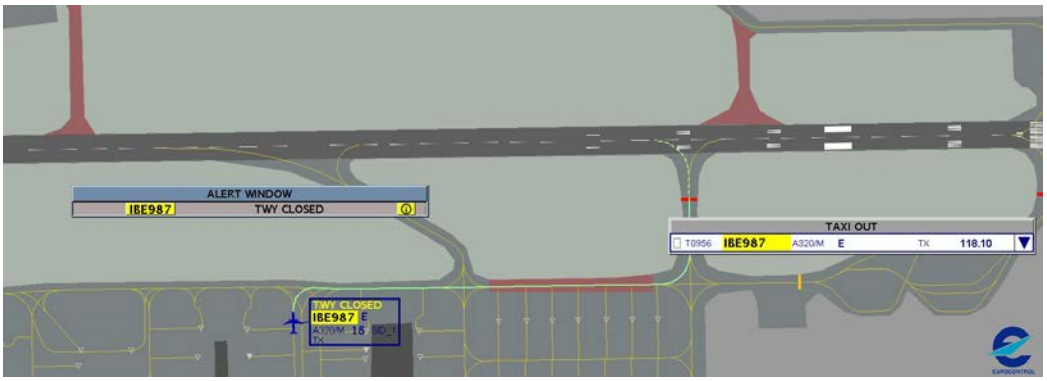
Recommended Text to be displayed on HMI – TWY CLOSED.

Alert Type – INFORMATION or ALARM depending on the mobiles position.

Alert trigger conditions – When a selected taxiway, or segment of the taxiway, is declared as closed within the system and an aircraft or aircraft being towed taxi route includes the closed area or the aircraft /aircraft being towed is already in that area.

Alert cancelled – When a new taxi route is input into the system avoiding the closed area or the aircraft /aircraft being towed moves out of the closed area.

Where alert is displayed – It is likely that this alert need be displayed on the HMI of the ATCO that has the aircraft / aircraft being towed under control and the Tower Supervisor's HMI.



3.2.4.16 High Speed (Procedure)

High speed alert is not to control a speed limitation on taxiways but to provide an early detection of take-off from taxiway based on an abnormal speed or acceleration. As recently as February 2010, aircraft have been known at major European airports to take off from taxiways instead of the runway.

Recommended Text to be displayed on HMI – HIGH SPEED.

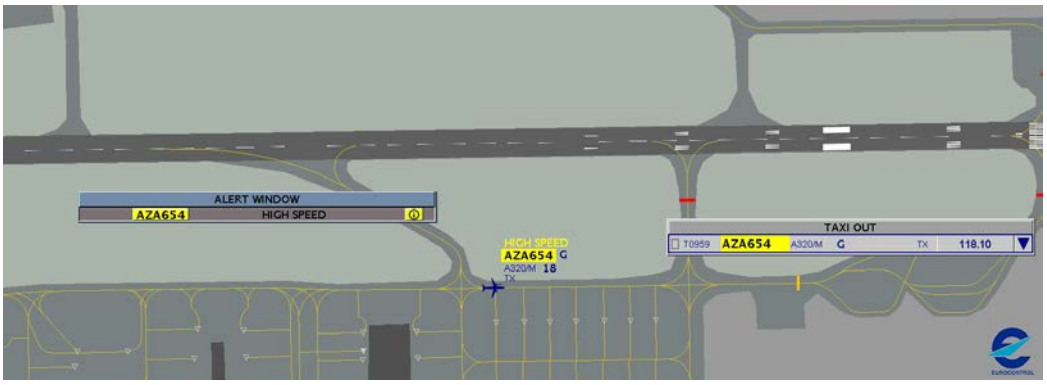
Data required / Prerequisite – Current aircraft speed. Alerts have to take into account taxiway design and the type of Aircraft Operators using the airport (e.g. some operators are known to regularly taxi at high speed).

Alert Type – INFORMATION or ALARM depending on local implementation.

Alert trigger conditions – When a high speed on a taxiway is detected and where it could endanger itself and/or other mobiles, examples could be that the initial INFORMATION alert is triggered when the speed is >40kts and the ALARM is triggered when the speed is >55kts, or when an abnormal acceleration is detected. Some airports may wish to implement only one of the alerts.

Alert cancelled – When the aircraft speed reduces below the triggering speed.

Where alert is displayed – It is likely that this alert need only be displayed on the Tower Ground Controller's HMI (and maybe the Tower Runway Controller's HMI if the taxiway is within or close to their area of responsibility) and possibly the Tower Supervisor's HMI.



3.3 Differences between new and previous Operating Methods

The introduction of the new alerts aims to warn the ATCO well in advance of an incident where the main tools used today (like A-SMGCS RMCA) give a warning more or less at the last minute or not at all. The predictive nature of the alerts will help the ATCO and Flight Crews to maintain a higher level of safety on the surface by keeping to the published procedures and following instructions correctly.

The operating methods for the use of A-SMGCS RMCA will not change.

3.3.1 Conflicting ATC Clearances (CATC)

Working procedures for the controllers may need to be adapted to ensure that all clearances given to aircraft or vehicles are input in the ATC system by the controller. Providing the ATCOs input the clearances according to the local procedures then they will see no difference to their current operating method. Only in the unlikely event of an incorrect input will the system warn the ATCO of a possible incident. This functionality will help to prevent incidents such as the ZRH incident 2008 where 2 aircraft were both cleared to take off on intersecting runways and narrowly missed each other or more tragically the Los Angeles accident 1991 where one aircraft was cleared to land on an aircraft that was lined up on the same runway resulting in 34 fatalities.

3.3.2 Conformance Monitoring for Controllers (CMAC)

The taxi route deviation alert will be one of the most useful alerts as it is known that there are several deviations a day at large busy airports and although they are identified by the ATCOs most of the time it is clear that when they go undetected the result could be a runway incursion and/or fatal accident (e.g. the accidents at Linate airport, Italy 2001 and Lexington airport, USA 2006).

4 Detailed Operational Environment

4.1 Operational Characteristics

The implementation of CATC and CMAC alerts needs to be discussed with local operational experts and regulators, in particular which alerts need to be implemented at the specific airport in question, which local parameters should be used for triggering the alerts and on which control positions they should be displayed.

The Detection of CATC shall be applied to all mobiles under ATC control that are moving on the runways and taxiways close to the runway. Most of the CATC alerts require the availability of A-SMGCS surveillance data.

The CMAC application for checking non-conformance to ATC instructions is using in all cases A-SMGCS Surveillance data. This requires that the traffic is transponder equipped and it is operating correctly and that Airports also have an A-SMGCS infrastructure in operation.

The Detection of CMAC shall be applied to:

- all mobiles that are on the manoeuvring area (runways, taxiways).
- all mobiles under, or foreseen to be under, Air Traffic Control on the apron. Example: foreseen to be could be an aircraft pushing back without authorisation.
- Arriving and departing aircraft.

4.2 Roles and Responsibilities

- The Tower Clearance Delivery Controller is responsible for issuing an initial clearance to the Flight Crew, which may be associated with a TSAT (Target Start-up Approval Time) that will enable the crew to take off at the TTOT (Target Take Off Time).
- The Apron Manager is responsible for giving the departing Flight Crew the approval to start up engines at the TSAT, push back and start taxiing towards the boundary between the apron and the manoeuvring area. He is also responsible for approving the arriving Flight Crews' taxi from the boundary between the manoeuvring area and the apron towards the stand, according to the predicted stand number. At some airports, these tasks apply to every mobile present on the apron taxi lanes, including vehicles. Note: some airports do not have apron managers and at these airports the tasks are performed by the Tower Ground Controller.
- The Tower Ground controller is responsible for issuing a taxi clearance to the Flight Crews, either from the apron boundary or a given transfer point, to the holding point or a given transfer point, or from the runway exit or a given transfer point to the apron boundary or a given transfer point. He/she is also responsible for monitoring the movements on the taxiways so that they comply with the issued clearances. At some airports, these tasks apply to every mobile present on the taxiways, including vehicles.
- The Tower Runway controller is responsible for managing the runway and issuing clearances to all mobiles (aircraft and vehicles), to enter or cross a runway, line-up, take-off and land on the active runways (for aircraft only).
- The Tower Supervisor is responsible for managing and reporting any issues encountered during his team's work and takes any appropriate action to solve any encountered problem, especially technical ones.

- The Flight Crew is responsible for piloting the aircraft, and following any instructions or clearances issued by the Controller on the manoeuvring area and once airborne. The Flight Crew is also responsible for the safety of the aircraft during movement on the aprons.

The detection of CATC is a safety support tool for the **Tower Runway Controller** who is responsible for managing departing and arrival flights on the manoeuvring area (mainly on the runway and on taxiways close to the runway).

The detection of CMAC is a safety support tool for **the Apron Manager, the Tower Ground Controller, the Tower Runway Controller and the Tower Supervisor** who are responsible for managing/monitoring mobiles on the movement area.

4.3 Constraints

The detection of CATC and CMAC requires the availability of accurate A-SMGCS Surveillance data, especially on and around the runway/s and precise Controller inputs. An HMI will be necessary to permit the Clearances/Instructions given to aircraft and vehicles, and it will be imperative that Controllers make timely inputs to the HMI coincident with the R/T transmissions.

The detection of CATC and CMAC alerts involving vehicles that frequently operate on the manoeuvring area will require an operative vehicle transmitter ensuring detection and correct labelling by the A-SMGCS. Non-cooperative vehicles will need to be tracked and manually identified and labelled.

For many of the CATC and CMAC alerts the A-SMGCS will need to know the status of runways and taxiways and the runway and taxiways assigned to every mobile.

5 Use Cases

As mentioned in section 2.3.3, the two services, “Detection of Conflicting ATC Clearances” and “Detection of Non Conformance to ATC instructions and/or procedures”, defined for this OSED apply to both of the Scenarios “Taxi-In” and “Taxi-Out”. Therefore it is decided to describe use cases per service instead of scenario.

5.1 Use Cases for “Detection of CATC”

5.1.1 Use Case 1 CATC – Cleared to Land versus Line Up (DOD - UC6 86)

General Conditions (Scope and Summary)

This Use Case describes how the ATC system detects a Cleared to Land versus Line-Up CATC and how it will be presented on the Tower Runway Controller’s HMI.

Pre Conditions

The ATC system is equipped with EFS (and A-SMGCS surveillance for alternative flow).

Post Conditions

A “CATC” alert (Cleared to Land versus Line-Up) is presented on the Tower Runway Controller’s HMI.

Actor

Tower Runway Controller.

Trigger

The input of the ATC Clearance ‘line up’ by the Tower Runway Controller.

Main Flow

1. Aircraft A is on final for RWY1 and receives from the Tower Runway Controller his landing clearance on this runway via R/T.

2. The Tower Runway Controller makes an input ‘Cleared to Land on runway 1’ on the Human Machine Interface (HMI) for Aircraft A.

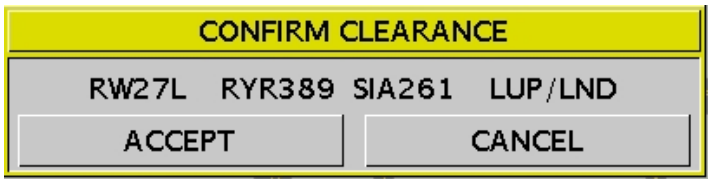
3. Aircraft B is ready for departure, waiting at a Holding Point HP1 for RWY1.

4. The Tower Runway Controller does not notice the CATC predictive indicator on his EFS and clears aircraft B to line up on RWY1 and makes an input ‘Line-Up RWY1’ on the HMI for Aircraft B.

5. The ATC system verifies the relative position of both aircraft based on A-SMGCS surveillance data.

6. The ATC system detects that the aircraft A has not passed the HP1 for the runway where aircraft B is waiting and then triggers an alert, informing the Tower Runway Controller, that a potential conflict situation has been detected by the ATC system.

7. The Alert triggered by the ATC system, is displayed on the Tower Runway Controller’s HMI, and clearly identifies the pair of aircraft involved and the reason for the alarm.



Note: The pop-up window displayed above is a generic example only.

8. The Tower Runway Controller cancels the 'line up' clearance by R/T to aircraft B and cancels the 'line up' input on the HMI.
9. The ATC system removes the CATC from the Tower Runway Controller's HMI.
10. The Use Case ends.

Alternative Flows

[3] –The ATC system is designed to show predictive (see section 3.2.2) CATCs

11. The ATC system flags Aircraft B with an indication for a potential CATC on the Tower Runway Controller's HMI.
12. The Use Case continues at [4]

[6] –The ATC system detects that the landing aircraft A has already passed the HP1 for the runway where aircraft B is waiting and then no alarm is triggered.

13. The ATC system, if designed to show predictive CATCs, removes the flag for Aircraft B (indication for a potential CATC) on the Tower Runway Controller's HMI.
14. No alarm is triggered.
15. The Use Case ends.

[9] – The Tower Runway Controller considers the situation still safe and ignores the triggered alarm.

16. The Tower Runway Controller informs the ATC system, via an input, that he/she ignores the triggered alarm.
17. The flow continues at step 10.

Failure Flow

18. In the case where an alarm is not triggered due to an ATC system failure then the Tower Runway Controller and Flight Crew will be relied upon to identify the potentially hazardous situation and resolve the problem as quickly and safely as possible. This is often the case today where these alerts do not exist.

19. In the case of a false alert the Tower Runway Controller will assess the situation as soon as the alert is presented, and if the alert is deemed to be false, cancel the alert and inform the supervisor of the error.

5.1.2 Use Case 2 CATC – Cleared to Land versus Cross Runway (DOD - UC6 86)

General Conditions (Scope and Summary)

This Use Case describes how the ATC system detects a 'Cleared to Land' versus 'Cross Runway' CATC and how it will be presented on the Tower Runway Controller's HMI.

Pre Conditions

The ATC system is equipped with EFS (and A-SMGCS surveillance for alternative flow).

Post Conditions

A "CATC" alert (Cleared to Land versus Cross Runway) is presented on the Tower Runway Controller's HMI.

Actor

Tower Runway Controller.

Trigger

The input of the ATC Clearance 'Cross Runway' by the Tower Runway Controller.

Main Flow

1. Aircraft A is on final for RWY1 and receives from the Tower Runway Controller his landing clearance on this runway via R/T.

2. The Tower Runway Controller makes an input 'Cleared to Land on RWY1' on the HMI for Aircraft A.

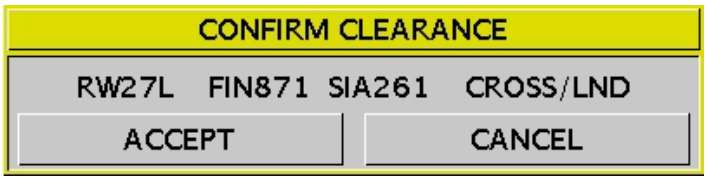
3. Aircraft B is holding at HP1and needs to cross RWY1 in order to proceed to its stand.

4. The Tower Runway Controller makes an input 'Cross RWY1' on the HMI for Aircraft B.

5. The ATC system verifies the relative position of both aircraft, based on A-SMGCS surveillance data.

6. The ATC system detects that the landing aircraft A has not passed the crossing point on the runway for aircraft B and then triggers an alert, informing the Tower Runway Controller, that a conflict situation has been detected by the ATC system.

7. The Alert triggered by the ATC system, is displayed on the Tower Runway Controller's HMI, and clearly identifies the pair of aircraft involved and the reason for the alert.



Note: The pop-up window displayed above is a generic example only.

Simultaneously with [7], an audio alarm sounds (depending on local implementation INFORMATION or ALARM) on the CWP to warn the Tower Runway Controller.

8. The Tower Runway Controller will cancel the 'Cross RWY1' clearance by R/T to aircraft B and cancel the 'Cross RWY1' input on the HMI.

9. The ATC system removes the Conflicting ATC clearance from the Tower Runway Controller's HMI.

10. The Use Case ends.

Alternative Flows

[3] –The ATC system is designed to show predictive CATCs

11. The ATC system flags Aircraft B with an indication for a potential Conflicting ATC clearance on the Tower Runway Controller's HMI.

12. The Use Case continues at [4].

[6] – The ATC system detects that the landing aircraft A has already passed the crossing point on the runway for aircraft B and then no alarm is triggered.

13. The ATC system, if designed to show predictive CATCs, removes the flag for Aircraft B (indication for a potential Conflicting ATC clearance) on the Tower Runway Controller's HMI.

14. no alarm is triggered.

15. The Use Case ends.

[10] – The Tower Runway Controller considers the situation still safe and ignores the triggered alarm.

16. The Tower Runway Controller informs the ATC system, via an input, that he/she ignores the triggered alarm.

17. The flow continues at step 10.

Failure Flows

18. In the case where an alarm is not triggered due to a ATC system failure then the ATCO and Flight Crew will be relied upon to identify the potentially hazardous situation and resolve the problem as quickly and safely as possible. This is often the case today where these alerts do not exist.

19. In the case of a false alert the ATCO will assess the situation as soon as the alert is presented, and if the alert is deemed to be false, cancel the alert and inform the supervisor of the error.

5.1.3 Use Case 3 Conflicting ATC Clearance – Line Up versus Line Up (opposite Holding Points) (DOD - UC6 86)

General Conditions (Scope and Summary)

This Use Case describes how the ATC system detects a Line-Up versus Line-Up Conflicting ATC Clearance for aircraft holding at opposite holding points for the same runway and how it will be presented on the Tower Runway Controller's HMI.

Pre Conditions

The ATC system is equipped with Electronic Flight Strips.

Post Conditions

A "Conflicting ATC Clearance" alarm (Line-Up versus Line-Up) is presented on the Tower Runway Controller's HMI.

Actor

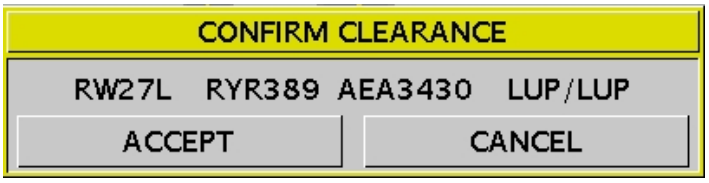
Tower Runway Controller.

Trigger

The input of the 2nd ATC Clearance 'Line Up' by the Tower Runway Controller.

Main Flow

1. Aircraft A is ready for departure, holding at holding point HP1 for RWY1, awaiting a Line Up clearance from the Tower Runway Controller.
2. The Tower Runway Controllers, gives, via R/T, aircraft A his 'Line Up' Clearance.
3. The Tower Runway Controller makes an input 'Line Up RWY1' on the HMI for Aircraft A.
4. Aircraft B is ready for departure, holding at a Holding Point HP2 for RWY1, awaiting a Line Up clearance from the Tower Runway Controller.
5. Holding Point HP2 is opposite to HP1.
6. The Tower Runway Controllers, gives, via R/T, aircraft B his 'Line Up' Clearance.
7. The Tower Runway Controller makes an input 'Line Up RWY1' on the HMI for Aircraft B.
8. The Alert triggered by the ATC system, is displayed on the Tower Runway Controller's HMI, and clearly identifies the pair of aircraft involved and the reason for the alarm.



9. The Tower Runway Controller cancels the 'Line Up' clearance by R/T to aircraft A or B and cancels the associated 'Line Up RWY1' input on the HMI.
10. The ATC system removes the Conflicting ATC clearance from the Tower Runway Controller's HMI.
11. The Use Case ends.

Alternative Flows

[4] –The ATC system is designed to show predictive CATCs

12. The ATC system flags Aircraft B with an indication for a potential Conflicting ATC clearance on the Tower Runway Controller's HMI.

13. The Use Case continues at [5]

Failure Flows

14. In the case where an alarm is not triggered due to a ATC system failure then the ATCO and Flight Crew will be relied upon to identify the potentially hazardous situation and resolve the problem as quickly and safely as possible. This is often the case today where these alerts do not exist.

15. In the case of a false alert the ATCO will assess the situation as soon as the alert is presented, and if the alert is deemed to be false, cancel the alert and inform the supervisor of the error.

5.1.4 Use Case 4 Conflicting ATC Clearance – Take Off versus Take Off (crossing runways) (DOD - UC6 86)

General Conditions (Scope and Summary)

This Use Case describes how the ATC system detects a Take-Off versus Take-off Conflicting ATC Clearance on crossing runways and how it will be presented on the Tower Runway Controller's HMI.

Pre Conditions

The ATC system is equipped with Electronic Flight Strips (and A-SMGCS surveillance for alternative flow).

Post Conditions

A "Conflicting ATC Clearance" alarm (Take-Off versus Take-Off) is presented on the Tower Runway Controller's HMI.

Actor

Tower Runway Controller.

Trigger

The input of the 2nd 'Take Off' ATC Clearance by the Tower Runway Controller.

Main Flow

1. Aircraft A is lined up on RWY1 and receives from the Tower Runway Controller his take-off clearance on this runway via R/T.

2. The Tower Runway Controller makes an input 'Cleared Take Off RWY1' on the HMI for Aircraft A.

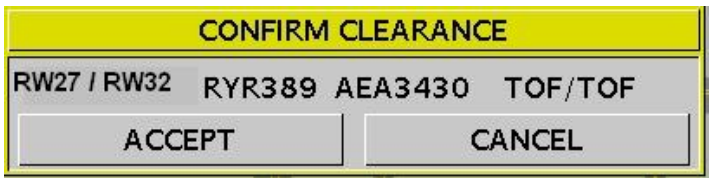
3. Aircraft B is lined up on RWY2, waiting for his take-off clearance on RWY2.

4. The Tower Runway Controller makes an input 'Cleared Take Off RWY2' on the HMI for Aircraft B,

5. The ATC system verifies the relative position of both aircraft, based on A-SMGCS surveillance data.

6. The ATC system detects that aircraft A has not already passed a point on the runway considered as safe, after the crossing Point of the runways and triggers an alarm, informing the Tower Runway Controller, that a conflict situation has been detected by the ATC system.

7. The Alert triggered by the ATC system, is displayed on the Tower Runway Controller's HMI, and clearly identifies the pair of aircraft involved and the reason for the alarm.



8. Simultaneously with [7], an audio alarm sounds on the CWP to warn the Tower Runway Controller.

9. The Tower Runway Controller cancels the 'Cleared Take Off RWY2' clearance by R/T to aircraft B and cancels the 'Cleared Take Off RWY2' input on the EFS.

10. The ATC system cancels the Conflicting ATC clearance alarm and removes the Conflicting ATC clearance from the Tower Runway Controller's HMI.

11. The Use Case ends.

Alternative Flows

[3] –The ATC system is designed to show predictive CATCs.

12. The ATC system flags Aircraft B with an indication for a potential Conflicting ATC clearance on the Tower Runway Controller's HMI.

13. The Use Case continues at [4].

[6] – The ATC system detects that aircraft A has already passed a point on the runway considered as safe, after the crossing Point of the runways and then no alarm is triggered.

14. The ATC system, if designed to show predictive CATCs, removes the flag for Aircraft B (indication for a potential Conflicting ATC clearance) on the Tower Runway Controller's HMI.

15. No alarm is triggered.

16. The Use Case ends.

[9] – The Tower Runway Controller considers the situation still safe and ignores the triggered alarm.

17. The Tower Runway Controller informs the ATC system, via an input, that he/she ignores the triggered alarm.

18. The flow continues at step [11].

Failure Flows

19. In the case where an alarm is not triggered due to a ATC system failure then the ATCO and Flight Crew will be relied upon to identify the potentially hazardous situation and resolve the problem as quickly and safely as possible. This is often the case today where these alerts do not exist.

20. In the case of a false alert the ATCO will assess the situation as soon as the alert is presented, and if the alert is deemed to be false, cancel the alert and inform the supervisor of the error.

5.2 Use Cases for "Non Conformance to ATC instructions and/or procedures"

5.2.1 Use Case 1 "Conformance Monitoring functions for an Arrival Flight" (DOD UC6 21, 6 31)

General Conditions (summary and scope)

This Use Case describes the triggering conditions for Conformance Monitoring alerts for ATCOs for an arrival flight to an airport.

The use case is based on a use case developed for the project 6.9.2 (Advanced Integrated Controller Working Position), describing the nominal flow of interactions between ATCOs, Flight Crew and the System.

The con-conformance events in this use case are described as alternative flows.

Pre Condition

The Ground system is equipped with Electronic Flight Strips (EFS) and A-SMGCS surveillance.

Post Condition

The aircraft has arrived at the assigned Stand.

Actors

ATCO's (Approach Controller, Tower Runway Controller and Tower Ground Controller).
Tower Supervisor.
Flight Crew.

Trigger

The Use Case starts when the Arrival flight is within the planning horizon of the Tower Runway Controller (time or distance parameter).

Nominal Flow

1. The Tower Runway Controller is informed by the system that the planned arrival flight is within his planning horizon (certain time or distance parameter from touch-down) by the display of a PENDING ARRIVAL Electronic Flight strip (EFS) for the concerned flight on the A-CWP.

2. The Tower Runway Controller is informed by the system that the Approach Controller has made a system input indicating that the Flight Crew has been instructed to contact him, using R/T, by a change of the PENDING EFS to a TRANSFER-IN EFS.

3. The Flight Crew establish two-way R/T communication with the Tower Runway Controller.

4. The Tower Runway Controller informs the system, by a system input, that two-way R/T has been established with the Flight Crew.

5. The system changes the status of the flight from TRANSFER-IN to ASSUMED by the display of an ASSUMED EFS on the A-CWP of the Tower Runway Controller.

6. The system informs the Tower Ground Controller that the Arrival Flight has been ASSUMED by the Tower Runway Controller by the display of a PENDING EFS on his A-CWP.

7. The Tower Runway Controller verifies (visually or by observing the A-SMGCS surveillance) that the assigned runway for the Arrival Flight is clear.

8. The Tower Runway Controller communicates the latest wind information, displayed on the A-CWP, to the Flight Crew and delivers the landing clearance, via R/T to the Flight Crew.

9. The Tower Runway Controller informs the system, by a system input that the landing clearance has been given to the Flight Crew.

10. The Flight Crew land the aircraft.

11. The system detects that the aircraft has landed and records the Actual Landing Time (ALDT).

12. The Flight Crew vacate the Runway.

13. The Tower Runway Controller verifies (visually or by observing the A-SMGCS surveillance) that the aircraft has vacated the runway and informs the system, by a system input (e.g. moves the EFS out of the runway bay), that the runway has been vacated.

14. The Tower Runway Controller instructs the Flight Crew via R/T to contact the Tower Ground Controller.

15. The Tower Runway Controller informs the System, via a system input, that the Flight Crew has been instructed to contact the Tower Ground Controller.

16. The system changes the state of the aircraft from ASSUMED to TRANSFER-OUT on the A-CWP display of the Tower Runway Controller by the display of a TRANSFER-OUT EFS.

17. The Tower Ground Controller is informed by the system that the Tower Runway Controller has made a system input indicating that the Flight Crew has been instructed to contact him, by a change of the PENDING EFS to a TRANSFER-IN EFS on his A-CWP

18. The Flight Crew establish two-way R/T communication with the Tower Ground Controller.

19. The Tower Ground Controller informs the system, by a system input, that two-way R/T is established with the Flight Crew.

20. The system changes the status of the flight from TRANSFER-IN to ASSUMED by the display of an ASSUMED EFS on the A-CWP of the Tower Ground Controller.

21. The system changes the status of the flight for the Tower Runway Controller from TRANSFER-OUT to NON-CONCERNED by removing the EFS on the A-CWP of the Tower Runway Controller.

22. The Tower Ground Controller verifies that the planned TAXI-IN route proposed by the system for the aircraft is suitable.

23. The Tower Ground Controller, via R/T or data link, delivers TAXI-IN instructions to the Flight Crew.

24. The Tower Ground Controller informs the system, via an system input, that the TAXI-IN instructions have been given to the Flight Crew.

25. The Flight Crew taxies the aircraft according to the TAXI-IN instructions received.

26. The system detects that the aircraft has reached the stand and records the Actual In-Block Time (AIBT).

27. The EFS for the flight on the Tower Ground Controller's A-CWP display is automatically removed by the system X seconds (time parameter) after AIBT.

28. The Use Case ends.

Alternative Flows

[3] The Flight Crew has not established 2-way radio-communication with the Tower Runway Controller at a certain distance parameter before the runway threshold / or time parameter before the estimated landing time (ELDT)

29. The Conformance Monitoring function of the system triggers a **NO CONTACT** information alert for the concerned aircraft that is displayed on the ATCOs HMI.

30. The Tower Runway Controller evaluates the situation and take all actions necessary in order to establish 2-way radio-communication with the Flight Crew.

31. The Tower Runway Controller informs the system, by a system input, that two-way R/T has been established with the Flight Crew.

32. The Conformance Monitoring information alert NO CONTACT is cancelled and removed from the ATCOs HMI.

33. The Use Case continues at step [5].

[8] The Tower Runway Controller has not delivered the landing clearance to the Flight Crew at a certain distance parameter before the runway threshold / or time parameter before the estimated landing time (ELDT)

34. The Conformance Monitoring function of the system triggers a **NO LANDING CLEARANCE** alert for the concerned aircraft that is displayed on the ATCOs HMI.

35. The Tower Runway Controller evaluates the situation and takes all actions necessary to deliver the Landing Clearance to the Flight Crew.

36. The Tower Runway Controller informs the system, by a system input, which the Landing Clearance has been given to the Flight Crew.

37. The Conformance Monitoring alert NO LANDING CLEARANCE is cancelled and removed from the ATCOs HMI. *Note: In the event that a landing clearance can not be issued and a Go around instruction is input into the system then the NO LANDING CLEARANCE alert is also cancelled.*

38. The Use Cases continues at step [10].

[12] The Flight Crew does not vacate the runway and stops the aircraft within the Runway Protection Area

39. The Conformance Monitoring function of the system detects, based on surveillance data, that the aircraft has stopped within the Runway Protection Area (RPA).

40. X seconds (time parameter) after the detection, the Conformance Monitoring function triggers a **STATIONARY IN RPA** alert.

41. The alert is an INFORMATION alert if, based on information on the Electronic Flight Strips, no other aircraft is foreseen to use the same runway within a certain time parameter

42. The alert is an ALARM if, based on information on the Electronic Flight Strips, another aircraft is foreseen to use the same runway within a certain time parameter.

43. The triggered STATIONARY IN RPA alert is displayed on the ATCOs HMI.

44. The Tower Runway Controller evaluates the situation and takes all necessary actions in order that the aircraft vacates the RPA.

45. The Conformance Monitoring function detects that the aircraft is moving again and has vacated the RPA and cancels the STATIONARY IN RPA alert.

46. The STATIONARY IN RPA alert is removed from the ATCOs HMI.

47. The Use Case continues at step [13].

[14] The aircraft has to cross an active runway before it can be transferred to the Tower Ground Controller

48. The Tower Runway Controller instructs the Flight Crew, via R/T, to hold short of the active runway.

49. The Tower Runway Controller informs the system, by a system input that a hold short instruction for the active runway has been given to the Flight Crew.

50. The Flight Crew fails to stop the aircraft at the red stop bar associated with the active runway.

51. The Conformance Monitoring function of the system detects that the aircraft has not stopped at the red stop bar protecting the active runway and triggers a **RWY INCURSION** alert for the concerned aircraft that is displayed on the ATCOs HMI.

52. The Tower Runway Controller evaluates the situation and takes all necessary actions in order to resolve the situation.

53. The Tower Runway Controller delivers via R/T a crossing clearance for the active Runway to the Flight Crew.

54. The Tower Runway Controller informs the system, by a system input that a crossing clearance for the active runway has been given to the Flight Crew.

55. The Conformance Monitoring function cancels the **RWY INCURSION** alert.

56. The **RWY INCURSION** alert is removed from the ATCOs HMI.

57. The Flight Crew crosses the runway.

58. The Tower Runway Controller verifies (visually or by observing the A-SMGCS surveillance) that the aircraft has vacated the Runway Protection Area and informs the system, by a system input, that the runway has been vacated

59. The Use Case resumes at step [14].

[25] The Flight Crew deviates from the TAXI-IN instructions received (DOD - UC6 21)

60. The Flight Crew deviates from the cleared taxi-in route.

61. The Conformance Monitoring function of the system detects that the aircraft has deviated from the cleared TAXI-IN route and triggers a **ROUTE DEVIATION** alert for the concerned aircraft that is displayed on the ATCOs HMI.

62. The alert is an ALARM if the deviation detected takes place near the RPA of an active runway or the taxiway on which the aircraft is currently detected is unsuitable or closed.

63. The alert is an INFORMATION alert in other cases.

64. The triggered ROUTE DEVIATION alert is displayed on the ATCOs HMI.

65. The Tower Ground Controller evaluates the situation and shall issue updated taxi instructions to the Flight Crew. (normally via R/T)

66. The Tower Ground Controller updates the cleared taxi-in route in the system.

67. The Conformance Monitoring function shall detect that the aircraft is moving again along its cleared trajectory and cancels the ROUTE DEVIATION alert.

68. The ROUTE DEVIATION alert is removed from the ATCOs HMI.

69. The Use Case resumes at step [25].

[25] While the Flight Crew taxies the aircraft according to the TAXI-IN instructions received, a part of the Taxi route gets closed (DOD - UC6 21)

70. The Tower Supervisor informs the system, via a system input, that a taxiway is closed.

71. The Conformance Monitoring function of the system detects that the ‘cleared taxi route’ of an aircraft passes via a now closed taxiway and triggers a **TAXIWAY CLOSED** information alert.

72. The triggered TAXIWAY CLOSED information alert is displayed on the ATCOs HMI.

73. The Tower Ground Controller evaluates the situation and issues updated taxi instructions to the Flight Crew. (normally via R/T)

74. The Tower Ground Controller updates the cleared taxi route in the system.

75. The Conformance Monitoring function detects that the updated cleared taxi route no longer passes via the closed taxiway and cancels the alert.

76. The TAXIWAY CLOSED alert is removed from the ATCOs HMI.

77. The Use Case resumes at step [25].

78.

Failure Flow

79. In the case where an alert is not triggered due to a system failure then the ATCO and Flight Crew will be relied upon to identify the non-conformance situation and resolve the problem as quickly and safely as possible. This is often the case today where these alerts do not exist.

80. In the case of a false alert the ATCO will assess the situation as soon as the alert is presented, and if the alert is deemed to be false, cancel the alert and inform the supervisor of the error.

5.2.2 Use Case 2 "Conformance Monitoring functions for a Departure Flight"

General Conditions (summary and scope)

This Use Case describes the triggering conditions for Conformance Monitoring alerts for ATCOs for a departing flight at an airport.

The use case is based on a use case developed for the project 6.9.2 (Advanced Integrated Controller Working Position), describing the nominal flow of interactions between ATCOs, Flight Crew and the System.

The non-conformance events in this use case are described as alternative flows.

Pre Condition

The Ground system is equipped with Electronic Flight Strips and A-SMGCS surveillance.

Post Condition

The aircraft is airborne.

Actors

ATCO's (Clearance Delivery Controller, Tower Ground Controller, Tower Runway Controller and Approach Controller).
Tower Supervisor.
Flight Crew.

Trigger

The Use Case starts when the Departing flight is within the planning horizon of the Clearance Delivery Controller (time parameter before TOBT)

Nominal Flow

1. The Clearance Delivery Controller is informed by the system that the planned departure flight is within his planning horizon (time parameter before TOBT) by the display of a PENDING DEPARTURE Electronic Flight strip (EFS) for the concerned flight on the A-CWP.

2. The Flight Crew contacts the Clearance Delivery Controller, following local procedures (as from X time before TOBT), to obtain the Departure Clearance.

3. The Clearance Delivery Controller informs the system, via a system input, that the Flight Crew has established R/T contact.

4. The system changes the status of the flight from PENDING DEP to ASSUMED by the display of an ASSUMED EFS on the A-CWP of the Clearance Delivery Controller.

5. The Clearance Delivery Controller delivers the Departure Clearance (DCL) to the Flight Crew.

6. The Flight Crew verifies the received DCL and informs the Clearance Delivery Controller of their acceptance.

7. The Clearance Delivery Controller informs the system, via a system input, that the DCL has been delivered to the Flight Crew.

8. The Flight Crew requests via R/T or data link, when the aircraft is ready and following local procedures, Start-up Approval to the Clearance Delivery Controller.

9. The Clearance Delivery Controller verifies that the Start-up Approval Request is within a defined time window for the TSAT (local procedure) and approves the request.

10. The Clearance Delivery Controller informs the system, via a system input, that the Start-up Approval has been given to the Flight Crew.

11. The system informs the Tower Ground Controller that the Flight Crew has received Start-up approval by the display of a PENDING DEPARTURE EFS on his A-CWP.

12. The Clearance Delivery Controller instructs the Flight Crew, via R/T or data link, to contact the Tower Ground Controller.

13. The Clearance Delivery Controller informs the system via a system input that the Flight Crew has been instructed to contact the Tower Ground Controller.

14. The system shall change the state of the aircraft from ASSUMED to TRANSFER-OUT on the A-CWP display of the Clearance Delivery Controller by the display of a TRANSFER-OUT EFS.

15. The Tower Ground Controller is informed by the system that the Clearance Delivery Controller has made a system input indicating that the Flight Crew has been instructed to contact him, by a change of the PENDING EFS to a TRANSFER-IN EFS on his A-CWP

16. The Flight Crew establish two-way R/T communication with the Tower Ground Controller.

17. The Tower Ground Controller informs the system, by a system input, that two-way R/T has been established with the Flight Crew.

18. The system changes the status of the flight from TRANSFER-IN to ASSUMED by the display of an ASSUMED EFS on the A-CWP of the Tower Ground Controller.

19. The system changes the status of the flight for the Clearance Delivery Controller from TRANSFER-OUT to NON-CONCERNED by removing the EFS on the A-CWP of the Clearance Delivery Controller.

20. The Flight Crew request, via R/T, Push Back Approval to the Tower Ground Controller.

21. The Tower Ground Controller verifies that the Push Back Approval Request is within a defined time window for the TSAT (local procedure).

22. The Tower Ground Controller verifies (visually or by observing the A-SMGCS surveillance) that the Push Back can be safely started.

23. The Tower Ground Controller, via R/T, approves the Push Back request.

24. The Tower Ground Controller informs the system, via a system input, that the Push Back Approval has been given to the Flight Crew.

25. The system informs the Tower Runway Controller that the Flight Crew has received Push Back approval by the display of a PENDING DEPARTURE EFS on his A-CWP.

26. The Ground / Flight Crew perform the Push Back manoeuvre.

27. The Flight Crew request, via R/T or data link, TAXI OUT instructions.

28. The Tower Ground Controller verifies that the planned TAXI-OUT route proposed by the system for the aircraft is suitable.

29. The Tower Ground Controller, via R/T or data link, delivers TAXI-OUT instructions to the Flight Crew.

30. The Tower Ground Controller informs the system, via a system input, that the TAXI-OUT instructions have been given to the Flight Crew.

31. The Flight Crew taxies the aircraft according to the TAXI-OUT instructions received.

32. Following local procedures, the Tower Ground Controller instructs, via R/T, the Flight Crew to contact the Tower Runway Controller.

33. The Tower Ground Controller informs the system, via a system input, that the Flight Crew has been instructed to contact the Tower Runway Controller.

34. The System changes the state of the aircraft from ASSUMED to TRANSFER-OUT on the A-CWP display of the Tower Ground Controller by the display of a TRANSFER-OUT EFS.

35. The Tower Runway Controller is informed by the system that the Tower Ground Controller has made a system input indicating that the Flight Crew has been instructed to contact him, by a change of the PENDING EFS to a TRANSFER-IN EFS on his A-CWP

36. The Flight Crew establish two-way R/T communication with the Tower Runway Controller.

37. The Tower Runway Controller informs the system by a system input that two-way R/T has been established with the Flight Crew.

38. The system changes the status of the flight from TRANSFER-IN to ASSUMED by the display of an ASSUMED EFS on the A-CWP of the Tower Runway Controller.

39. The system changes the status of the flight for the Tower Ground Controller from TRANSFER-OUT to NON-CONCERNED by removing the EFS on the A-CWP of the Tower Ground Controller.

40. The Flight Crew reaches the assigned Holding Point for the Departure Runway.

41. The Tower Runway Controller verifies (visually or by observing the A-SMGCS surveillance) that the Final Approach path for the Departure runway is clear.

42. The Tower Runway Controller delivers, via R/T, a LINE UP clearance to the Flight Crew.

43. The Tower Runway Controller informs the system, via a system input, that the LINE UP clearance has been given to the Flight Crew.

44. The system turns off the RED STOP BAR for the assigned Holding Point.

45. The system moves the EFS of the departure flight to the assigned Runway Bay.

46. The Flight Crew lines up the aircraft.

47. The System detects that the aircraft has crossed the extinguished STOP BAR and automatically turns on the RED STOP BAR.

48. The system records, based on surveillance data, that the line up of the aircraft on the departing runway is completed.

49. The Tower Runway Controller verifies (visually or by observing the A-SMGCS surveillance) that the Departure runway is clear.

50. The Tower Runway Controller communicates the latest wind information, displayed on the A-CWP, to the Flight Crew and delivers the take-off clearance, via R/T.

51. The Tower Runway Controller informs the system, via a system input, that the TAKE-OFF clearance has been given to the Flight Crew.

52. The Flight Crew take off the aircraft.

53. Following local procedures, the Tower Runway Controller instructs, via R/T or data link, the Flight Crew to contact the Departure Controller.

54. The Tower Runway Controller informs the system, via a system input, that the Flight Crew has been instructed to contact the Departure Controller.

55. The System changes the state of the aircraft from ASSUMED to TRANSFER-OUT on the A-CWP display of the Tower Runway Controller by the display of a TRANSFER-OUT EFS.

56. The Departure Controller is informed by the system that the Tower Runway Controller has made a system input indicating that the Flight Crew has been instructed to contact him, by a change of the PENDING EFS to a TRANSFER-IN EFS on his A-CWP

57. The Flight Crew establish two-way R/T communication with the Departure Controller.

58. The Departure Controller informs the system by a system input that two-way R/T has been established with the Flight Crew.

59. The system changes the status of the flight from TRANSFER-IN to ASSUMED by the display of an ASSUMED EFS on the A-CWP of the Departure Controller.

60. The system changes the status of the flight for the Tower Runway Controller from TRANSFER-OUT to NON-CONCERNED by removing the EFS on the A-CWP of the Tower Runway.

61. The Use Case ends.

Alternative Flow

[20] The Flight Crew starts the Pushback manoeuvre without approval from the Tower Ground Controller

62. The Conformance Monitoring function of the system detects that the aircraft is moving without a pushback clearance, based on information available in the Electronic Flight Strip system, and triggers a **NO PUSHBACK APPROVAL** information alert.

63. The triggered NO PUSHBACK APPROVAL information alert is displayed on the ATCOs HMI.

64. The Tower Ground Controller evaluates the situation, take all actions necessary, and when possible, approves the pushback. (normally via R/T)

65. The Tower Ground Controller informs the system that the Pushback approval has been delivered to the Flight Crew.

66. The Conformance Monitoring function detects that the aircraft has received Pushback Clearance and cancels the NO PUSHBACK APPROVAL information alert.

67. The NO PUSHBACK APPROVAL information alert is removed from the ATCOs HMI.

68. The Use Case continues at step [25].

[27] The Flight Crew starts taxiing without approval from the Tower Ground Controller

69. The Conformance Monitoring function of the system detects that the aircraft is moving without a taxi clearance, based on information available in the Electronic Flight Strip system, and triggers a **NO TAXI APPROVAL** information alert.

70. The triggered NO TAXI APPROVAL information alert is displayed on the ATCOs HMI.

71. The Tower Ground Controller evaluates the situation, takes all actions necessary, and when possible, approves the taxi. (normally via R/T)

72. The Tower Ground Controller informs the system that the Taxi instructions have been given to the Flight Crew.

73. The Conformance Monitoring function detects that the aircraft has received Taxi instructions and cancels the NO TAXI APPROVAL information alert.

74. The NO TAXI APPROVAL information alert is removed from the ATCOs HMI.

75. The Use Case continues at step [31].

[31] The Flight Crew does not stop the aircraft at an intermediate Holding Point, defined in the TAXI-OUT route delivered by the Tower Ground Controller. (DOD - UC6 21)

76. The Conformance Monitoring function of the system detects that the aircraft is moving past the intermediate holding point defined in the TAXI-OUT route and triggers a **NO TAXI APPROVAL** information alert.

77. The triggered NO TAXI APPROVAL information alert is displayed on the ATCOs HMI.

78. The Tower Ground Controller evaluates the situation, take all actions necessary, and when possible, deliver further taxi instructions (normally via R/T)

79. The Tower Ground Controller updates the TAXI-OUT route for the aircraft in the system.

80. The Flight Crew continue to taxi the aircraft according to the updated TAXI-OUT instructions received.

81. The Conformance Monitoring function detects that the aircraft is conforming with the updated TAXI-OUT route and cancels the NO TAXI APPROVAL information alert.

82. The NO TAXI APPROVAL information alert is removed from the ATCOs HMI.

83. The Use Case resumes at step [31].

[31] While the Flight Crew taxies the aircraft according to the TAXI-OUT instructions received, the assigned Departure runway gets closed

84. The Tower Supervisor informs the system, via a system input, that the assigned departure runway for the aircraft is closed.

85. The Conformance Monitoring function of the system detects that the assigned departure runway for the aircraft is now closed and triggers a **RUNWAY CLOSED** information alert.

86. The triggered RUNWAY CLOSED information alert is displayed on the ATCOs HMI.

87. The Tower Ground Controller evaluates the situation and, if feasible, issues updated taxi instructions including the assignment of another Departure runway to the Flight Crew. (normally via R/T)

88. The Tower Ground Controller updates the assigned departure runway and the cleared taxi-out route in the System.

89. The Conformance Monitoring function detects the newly assigned departure runway and cancels the alert.

90. The RUNWAY CLOSED alert is removed from the ATCOs HMI.

91. The Use Case resumes at step [31].

[40] The Flight Crew taxies the aircraft beyond the Holding Point and lines up the aircraft without a line-up clearance (DOD - UC6 21 and UC6 31)

92. The Conformance Monitoring function of the system detects that the aircraft is moving passed the Holding point defined in the TAXI-OUT route and that, according to information contained on the EFS no Line Up clearance has been given and triggers a **RWY INCURSION** alarm.

93. The triggered **RWY INCURSION** alarm is displayed on the ATCOs HMI.

94. The Tower Runway Controller evaluates the situation, take all actions necessary, and when possible, delivers the Line up clearance via R/T

95. The Tower Runway Controller updates the system by an input of a Line Up clearance on the EFS.

96. The Conformance Monitoring function detects that the Line Up has been given and cancels the **RWY INCURSION** alarm.

97. The **RWY INCURSION** alarm is removed from the ATCOs HMI.

98. The Use Case continues at step [45].

[93] An arriving aircraft is on short final approach and multiple alerts are triggered

99. The arriving aircraft on short final and the aircraft lining up triggers a RMCA information alert which is displayed on the radar/track labels/EFS and Alert Window of the mobiles concerned (it replaces the **RWY INCURSION** alarm message for the aircraft on the runway). As a RMCA Information has higher priority than a CMAC alarm, the original **RWY INCURSION** alarm is only displayed in the Alert Window.

100. The Tower Runway Controller issues a GO AROUND instruction to the aircraft on Final Approach and the Flight Crew commences the GO AROUND procedure.

101. As the approaching aircraft commences the GO AROUND it is still approaching the aircraft on the runway and the RMCA now triggers an ALARM alert for both mobiles which replaces the RMCA information on the radar/track labels/EFS and Alert Window. As a RMCA alarm has higher priority than a CMAC alarm the original **RWY INCURSION** alarm is only displayed in the Alert Window.

102. The arriving aircraft passes the runway and climbs away, the RMCA alerts are no longer displayed and the CMAC **RWY INCURSION** alarm is re-displayed on the radar/track label/EFS of the aircraft on the runway.

103. The Use Case continues at step [94].

[50] The Flight Crew starts the take-off roll without a take off clearance and gets airborne

104. The Conformance Monitoring function of the system detects that the aircraft has started the take-off roll, based on surveillance data, and triggers a **NO TAKE-OFF CLEARANCE** alert.

105. The alert is an INFORMATION alert if, based on information on the Electronic Flight Strips, no other aircraft/mobile is foreseen to use the same runway for landing, take-off, crossing or entering within a certain time parameter.

106. The alert is an ALARM if, based on information on the Electronic Flight Strips, another aircraft/mobile is foreseen to use the same runway for landing, take-off, crossing or entering within a certain time parameter.

107. The triggered NO TAKE-OFF CLEARANCE alert is displayed on the ATCOs HMI.

108. The Tower Runway Controller evaluates the situation, takes all actions necessary, and if possible, issues the take-off clearance via R/T, or waits until the aircraft is airborne and then informs the Flight Crew of the unauthorised take off.

109. The Tower Runway Controller informs the system, via a system input, that the TAKE-OFF clearance has been given to the Flight Crew.

110. The Conformance Monitoring function detects that the take-off clearance has been given to the aircraft and cancels the NO TAKE OFF CLEARANCE alert.

111. The NO TAKE OFF CLEARANCE alert is removed from the ATCOs HMI.

112. The Use Case continues at step [52].

[50] The Flight Crew starts the take-off roll without a take off clearance and has to abort the take off

113. The Conformance Monitoring function of the system detects that the aircraft has started the take-off roll, based on surveillance data, and triggers a **NO TAKE-OFF CLEARANCE** alert.

114. The alert is an INFORMATION alert if, based on information on the Electronic Flight Strips, no other aircraft/mobile is foreseen to use the same runway for landing, take-off, crossing or entering within a certain time parameter.

115. The alert is an ALARM if, based on information on the Electronic Flight Strips, another aircraft/mobile is foreseen to use the same runway for landing, take-off, crossing or entering within a certain time parameter.

116. The triggered NO TAKE-OFF CLEARANCE alert is displayed on the ATCOs HMI.

117. The Tower Runway Controller evaluates the situation, and tells the Flight Crew to abort the take off via R/T.

118. The Tower Runway Controller informs the system, via a system input, that the aircraft is aborting the take off.

119. The Conformance Monitoring function detects that an abort instruction has been given to the aircraft and cancels the NO TAKE OFF CLEARANCE alert.

120. The NO TAKE OFF CLEARANCE alert is removed from the ATCOs HMI.

121. The Flight Crew abort the take off roll, and vacate the runway.

122. The Tower Runway Controller instructs the Flight Crew via R/T to contact the Tower Ground Controller.

123. The Use Case continues at step [29]

[53] The Tower Runway Controller forgets to transfer the aircraft to the Departure Controller

124. The Conformance Monitoring function of the system detects, using either the position of the aircraft or a time parameter after take-off that the Tower Runway Controller has not informed the system that the Flight Crew has been instructed to contact the Departure Controller.

125. The triggered NO TRANSFER information alert is displayed on the ATCOs HMI.

126. The Tower Runway Controller instructs the Flight Crew via R/T or data link to contact the Departure Controller.

127. The Tower Runway Controller informs the system, via a system input, that the Flight Crew has been instructed to contact the Departure Controller.

128. The NO TRANSFER information alert is removed from the ATCOs HMI.

129. The Use Case continues at step [55].

Anywhere between [31] and [49] The Flight Crew taxi the aircraft with excessive speed

130. The Conformance Monitoring function of the system constantly monitors the speed of the aircraft and triggers a HIGH SPEED Information alert if the aircraft is detected moving with a speed greater than X knots (parameter) but less than Y (parameter greater than X) on a taxiway.

131. The triggered HIGH SPEED information alert is displayed on the ATCOs HMI.

132. The Tower Runway Controller evaluates the situation and takes all actions necessary.

133. If the monitored speed exceeds Y knots (parameter), the Conformance monitoring function triggers a HIGH SPEED alarm.

134. The triggered HIGH SPEED alarm is displayed on the ATCOs HMI.

135. The Tower Runway Controller evaluates the situation and take all actions necessary.

136. The triggered HIGH SPEED alarm / information alert is cancelled if the speed of the aircraft detected falls below respectively X or Y knots or when the aircraft is detected to be airborne.

137. The HIGH SPEED alarm / information alert is removed from the ATCOs HMI.

138. The use case continues at step [50]

Failure Flow

139. In the case where an alert is not triggered due to a system failure then the ATCO and Flight Crew will be relied upon to identify the non-conformance situation and resolve the problem as quickly and safely as possible. This is often the case today where these alerts do not exist.

140. In the case of a false alert the ATCO will assess the situation as soon as the alert is presented, and if the alert is deemed to be false, cancel the alert and inform the supervisor of the error.

6 Requirements

Eight requirements still have the status ''In Progress" as it was not possible to validate them in the validations performed due to the operational layout of the airports being assessed and the test system being provided for the trials.

6.1 General Requirements for CATC and CMAC

[REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0001**
Requirement	The Tower Supervisor / Tower controller shall have the means to replay any alert (including necessary information associated to the alert detected, e.g. aircraft positions, surrounding mobiles, closed/inactive RWYs/TWYs) that has been triggered
Title	**Replay of Alerts**
Status	<In Progress>
Rationale	It is necessary to evaluate what happened when an alert has been triggered
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0002**
Requirement	The Tower controller shall be presented with CATC, CMAC and RMCA alerts on their HMI and/or audibly.
Title	**Reception of CATC, CMAC and RMCA alerts**
Status	<Validated>
Rationale	To clearly state that CATC and CMAC are complementing and not replacing RMCA alerts.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2069 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0003**
Requirement	The Tower controller shall be presented with RMCA alerts with a higher priority than CATC and CMAC alerts
Title	**Priority of CATC, CMAC and RMCA alerts**
Status	<Validated>
Rationale	To clearly state that RMCA alerts (especially the RMCA INFORMATION alert as this is an indication that a RMCA ALARM will trigger soon afterwards) have a higher priority compared to CATC and CMAC alerts.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2070

2071 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2072

2073 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0004**
Requirement	The Tower controller shall have a means to be warned about multiple alerts displayed on the HMI for either one mobile or more than one mobile within his/her AOR.
Title	**Display of multiple alerts on HMI**
Status	<Validated>
Rationale	The ATCO needs to have a means to be warned about all alerts that are triggered, this could be one mobile generating several alerts or several mobiles generating individual alerts or 2 mobiles involved in the same alert
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2074

2075 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2076

2077 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0005**
Requirement	The Tower controller shall be warned about an alert on the HMI associated with the mobile position and identification.
Title	**Display of alerts on the mobile/s concerned**
Status	<Validated>
Rationale	The relevant ATCO needs to have a means to be warned about which mobile is involved in an alert and what type of alert is being triggered. Local implementation will dictate on which controller role alerts shall be displayed (see section 3 for recommendations)
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2078

2079 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2080

2081 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0006**
Requirement	The Tower controller should have the means to be warned about all active alerts via a dedicated alert window. It is recommended that the window is positioned at a fixed location and is layered on top of any other windows. The alert window should not be too intrusive in case of complex and overloaded radar display.
Title	**Alert Window for Tower controller**
Status	<Validated>
Rationale	The ATCO needs to have a means to be warned about all active alerts in a dedicated window
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2082

2083 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2084

2085 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0007**
Requirement	The Tower controller shall be able to have a means to be warned about alerts on mobiles that are planned to enter his/her AOR. The alert may be shown as soon as it is triggered or within a certain distance or time before the AOR (local implementation rule)
Title	**Alert on mobiles planned to enter an AOR**
Status	<Validated>
Rationale	The ATCO needs to be have a means to be warned about alerts on mobiles in (or about to enter) his/her AOR.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2086

2087 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2088

2089 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0008**
Requirement	The Tower controller shall receive CATC and CMAC alerts with different stages characterising the degree of importance of the alert. The alerts shall be either • INFORMATION or • ALARM (Based on local implementation decision)
Title	**Stage of Alerts for CATC and CMAC**
Status	<Validated>
Rationale	Characterize the degree of importance of the alert detected by the ATC system for CATC and CMAC alerts
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2090

2091 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2092

2093 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0009**
Requirement	The Tower controller shall receive an audio warning when the ATC system detects an ALARM alert. The type of audio warning and length of time it sounds for are matters of local implementation but it is recommended that the warning is different to other audio sounds in use in the Tower.
Title	**Audio Alert associated to a detected ALARM**
Status	<Validated>
Rationale	Provision of an audio alert to the Tower Controller when the ATC system detects an ALARM to cope with the fact that the Tower Controller may not look at the screen when the error is detected
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2094

2095 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2096

2097 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0010**
Requirement	The Tower Runway, Ground or Apron Controller shall receive an ALARM alert on the HMI with an “ALARM colour” (recommendation Red)
Title	**A-SMGCS - ALARM alert colour**
Status	<Validated>
Rationale	Characterize on the Tower Controller HMI the degree of importance of the alert detected by the A-SMGCS.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2098

2099 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2100

2101 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0011**
Requirement	The Tower Runway, Ground or Apron Controller shall receive an INFORMATION alert on the HMI with an “INFORMATION colour” (recommendation Yellow)
Title	**A-SMGCS - INFORMATION alert colour**
Status	<Validated>
Rationale	Characterize on the Tower Controller HMI the degree of importance of the alert detected by the A-SMGCS.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2102

2103 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2104

2105 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0012**
Requirement	The Tower Supervisor or Tower controller shall be able to deactivate the detection (display) of CATC and CMAC alerts
Title	**De-activation of CATC and CMAC alerts**
Status	<Validated>
Rationale	The Supervisor or Tower Controller might require to disable alerts in case of an accident or incident on the airport surface
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2106

2107 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2108

2109 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0013**
Requirement	The Tower controller shall only receive alerts for which the alert triggering conditions are still valid and the terminating conditions are not satisfied yet.
Title	**Removal of alerts which are no longer valid**
Status	<Validated>
Rationale	The Tower Controller does not want to be warned about alerts displayed that are no longer valid
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2110

2111 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2112

2113 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0014**
Requirement	The Tower controller may have a means via the HMI to toggle between displaying or suppressing an INFORMATION alert message that is displayed on the radar/track label and EFS (suppression will be independent of other CWPs). **(Note: When suppressed the details of the alert shall still be shown in the alert window).**
Title	**A-SMGCS - Suppression of an INFORMATION alert**
Status	<Validated>
Rationale	The Controller might not be able to instantly resolve the situation but want to remove the indication of the alert from the radar/track label and EFS in order to reduce clutter. .
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2114

2115 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2116

2117 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0015**
Requirement	The Tower controller shall have a means via the HMI to cancel an ALARM alert audio buzzer that has been triggered. All visual representations of the alert shall remain until the situation has been resolved.. Note: If a different ALARM is triggered after the buzzer has been turned off then the buzzer will be re-activated
Title	**A-SMGCS - Suppression of the ALARM Buzzer**
Status	<Validated>
Rationale	The controller will instantly be warned of the ALARM situation and might prefer to silence the buzzer in order to prevent further distraction to him/her or other colleagues
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2118

2119 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2120

2121 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0016**
Requirement	The Tower controller shall be able to have a means to be warned about alerts on mobiles that have left his/her AOR **but are still on his/her frequency**.
Title	**Alert on mobiles having left an AOR but still on frequency**
Status	<Validated>
Rationale	The ATCO needs to be have a means to be warned about alerts on mobiles that have left his/her AOR but that are still on frequency, this will be based on the status of the mobile on the EFS (e.g. assumed or transferred).
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2122

2123 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2124

2125 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0017**
Requirement	The Supervisor shall have the means to be warned about **all** active alerts via a dedicated alert window.
Title	**Alert Window for Supervisor**
Status	<In Progress>
Rationale	The Supervisor needs to be have a means to be warned about in a dedicated window **all** active alerts
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2126

2127 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2128

2129 [REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0018**
Requirement	The Tower Controller shall have the means to be warned about alerts in adjacent AoR on mobiles that are not planned to enter his/her AoR. It will be a local implementation decision on which alerts are displayed.
Title	**Alert on mobiles operating in an adjacent AOR**
Status	<Validated>
Rationale	The ATCO may need to be warned about alerts on mobiles in an adjacent AoR which could affect his/her operations.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2130

2131 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>

<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-GENL.0019**
Requirement	Local deployment shall have the choice to implement only a sub-set of CMAC and CATC alerts, depending on their local relevance.
Title	**Local Deployment of CMAC and CATC**
Status	<Validated>
Rationale	The deployment of CMAC and CATC on an airport shall be decided by local responsible authorities based on their own criteria.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.2 Requirements “Detection of Conflicting ATC Clearances”

Note 1: In the requirements for CATC where there is reference to Line Up this refers to a direct Line Up instruction and does not take into account Conditional Line Up inputs.

Note 2: In each case it is deemed that the first clearance in the heading title is the one that has been input by the ATCO first and the second clearance triggers the alert.

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0001**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive clearances to line-up on the same runway, when multiple line-up is not authorised.
Title	**Conflicting Clearance “Line-Up versus Line-Up” Case 1**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2147 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0002**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive clearances to line-up from holding points which are situated on the opposite ends of the same runway.
Title	**Conflicting Clearance "Line-Up versus Line-Up" Case 2**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2148

2149 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2150

2151 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0003**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive clearances to line-up from holding points which are opposite each other on the same runway.
Title	**Conflicting Clearance "Line-Up versus Line-Up" Case 3**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2152

2153 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2154

2155 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0004**
Requirement	The Tower Runway Controller shall receive an alert when an aircraft and a mobile (aircraft or vehicle) receive Line-up and Cross clearances respectively and their holding points are opposite each other on the same runway. No alert is triggered if the aircraft lining up has reached a position (local parameter) where it is considered not to be an obstruction to the mobile crossing behind it.
Title	**Conflicting Clearance "Line-Up versus Cross"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2156

2157 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0005**
Requirement	The Tower Runway Controller shall receive an alert when an aircraft and a mobile (aircraft or vehicle) receive Line-up and Enter clearances and holding points are opposite each other on the same runway. Alert shall not trigger if the mobile entered the runway first and the aircraft has enough space (local parameter) to line-up behind the mobile or the mobile enters behind the aircraft and moves away from it.
Title	**Conflicting Clearance "Line-Up versus Enter"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0006**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Line-up and Take-Off clearances and the planned runway entry point for the aircraft that has the line-up clearance is in front of the aircraft receiving the Take-Off clearance on the same runway.
Title	**Conflicting Clearance "Line-Up versus Take-Off" Case 1**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0007**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Line-up and Take-Off clearances and the aircraft are at opposite ends of the same runway.
Title	**Conflicting Clearance "Line-Up versus Take-Off" Case 2**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0008**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Line-up and Landing clearances and the planned runway entry point for the aircraft that has the Line-Up clearance is in front of the aircraft receiving the landing clearance on the same runway.
Title	**Conflicting Clearance "Line-Up versus Landing" Case 1**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0009**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Line-up and Landing clearances and the aircraft receiving the clearances are at opposite ends of the same runway.
Title	**Conflicting Clearance "Line-Up versus Landing" Case 2**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>

<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0010**
Requirement	The Tower Runway Controller shall receive an alert when two mobiles (at least one is an aircraft) both receive Cross clearances and holding points are directly opposite each other on the same runway.
Title	**Conflicting Clearance "Cross versus Cross"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0011**
Requirement	The Tower Runway Controller shall receive an alert when two mobiles (at least one is an aircraft) receive Cross and Enter clearances and holding points are directly opposite each other on the same runway. Alert does not trigger if the first mobile entered the runway and the second one can cross behind the first one (distance will be determined locally).
Title	**Conflicting Clearance "Cross versus Enter"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2188 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0012**
Requirement	The Tower Runway Controller shall receive an alert when two mobiles (at least one is an aircraft) both receive Enter clearances and holding points are on opposite sides of the same runway. Alert does not trigger if the first mobile entered the runway and the second one can enter behind the first one (distance will be determined locally).
Title	**Conflicting Clearance "Enter versus Enter"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2189

2190 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2191

2192 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0013**
Requirement	The Tower Runway Controller shall receive an alert when a mobile (aircraft or vehicle) and an aircraft receive Cross and Take-Off clearances and the planned runway entry point for the mobile that has the Cross clearance is in front of the aircraft receiving the Take-Off clearance on the same runway. Local implementation - If the crossing mobile receives a transfer input before it has vacated the runway then surveillance may be used to maintain the CATC logic until the crossing mobile has vacated the runway. Alert does not trigger if the mobile crossing behind the aircraft is doing so at a distance where it is deemed safe to do so (distance will be determined locally).
Title	**Conflicting Clearance "Cross versus Take-Off"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2193

2194 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2195

2196 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0014**
Requirement	The Tower Runway Controller shall receive an alert when a mobile (aircraft or vehicle) and an aircraft receive Enter and Take-Off clearances respectively on the same runway. Alert does not trigger if the mobile position has passed the line up area and is moving in the opposite direction to the planned take off.
Title	**Conflicting Clearance "Enter versus Take-Off"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2197

2198 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2199

2200 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0015**
Requirement	The Tower Runway Controller shall receive an alert when a mobile (aircraft or vehicle) and an aircraft receive Cross and Landing clearances and the planned runway entry point for the mobile that has the Cross clearance is in front of the aircraft receiving the Landing clearance on the same runway, and the landing aircraft has either not landed or has landed and is not expected to vacate the runway before the crossing point based on a speed parameter. Surveillance will be used to determine if the Crossing mobile has vacated the runway protection area in which case no alert is triggered.
Title	**Conflicting Clearance "Cross versus Landing"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2201

2202 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2203

2204

2205 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0016**
Requirement	The Tower Runway Controller shall receive an alert when a mobile (aircraft or vehicle) and an aircraft receive Enter and Landing clearances and the planned runway entry point for the mobile that has the Enter clearance is in front of the aircraft receiving the Landing clearance on the same runway, and the landing aircraft has either not landed or has landed and is not expected to vacate the runway before the crossing point based on a speed parameter. Alert will also trigger if the aircraft has not landed and the mobile is one the runway in front of the landing aircraft. Surveillance will be used to determine if the mobile that is Entering has vacated the runway protection area in which case no alert is triggered.
Title	**Conflicting Clearance "Enter versus Landing"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2206

2207 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2208

2209 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0017**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Take-Off clearances on the same runway (e.g. Take off RWY27 vs Take off RWY27). Alert shall not trigger if the first aircraft has reached a position (local parameter) where it is deemed safe for the second aircraft to be given take off clearance (whether the aircraft number 2 is not yet on the runway or already lined up).
Title	**Conflicting Clearance "Take-Off versus Take-Off" Case 1**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2210

2211 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2212

2213 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0018**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Take-Off clearances on different but converging runways and aircraft air trajectories are converging.
Title	**Conflicting Clearance "Take-Off versus Take-Off" Case 2**
Status	<In Progress>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2214

2215 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2216

2217 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0019**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Take-Off clearances on different but intersecting runways and aircraft ground trajectories are converging.
Title	**Conflicting Clearance "Take-Off versus Take-Off" Case 3**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

2218

2219 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2220

2221 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0020**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Take-Off clearances and are at opposite ends of the same runway.(e.g Take off RWY27 vs Take off RWY09)
Title	**Conflicting Clearance "Take-Off versus Take-Off" Case 4**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2222

2223 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0021**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Take-Off and Land clearances on the same runway (e.g. Take off RWY27 then Land RWY27), and the aircraft taking off has not reached a certain position and/or speed (local parameters).
Title	**Conflicting Clearance "Take-Off then Land" Case 1**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0022**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Take-Off and Land clearances on different but intersecting runways and aircraft ground trajectories are converging, and the aircraft taking off has not reached a certain position or speed (parameter).
Title	**Conflicting Clearance "Take-Off then Land" Case 2**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2233 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0055**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Take-Off and Land clearances on different runways and the aircraft air trajectories are converging. Local parameters will dictate when the alert will trigger based on the position of the aircraft (e.g. if the second aircraft performs a go around and the aircraft taking off has not reached a certain position or speed then the trajectories could meet at the upwind end of the runways)
Title	**Conflicting Clearance "Take-Off then Land" Case 3**
Status	<In Progress>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2234

2235 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2236

2237 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0023**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Land and Take-Off clearances and are at opposite ends of the same runway (e.g. Land RWY27 vs Take off RWY09).
Title	**Conflicting Clearance "Take-Off versus Land in opposite direction"**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2238

2239 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2240

2241 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0024**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Land clearances on the same runway (e.g. Land RWY27 vs Land RWY27). Note: In this case Cleared to Land also includes an aircraft that has Landed on the runway and not yet vacated the runway protection area.
Title	**Conflicting Clearance "Land versus Land" Case 1**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2242

2243 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0025**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Land clearances on different but intersecting runways and aircraft ground trajectories are converging.
Title	**Conflicting Clearance "Land versus Land" Case 2**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0056**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Land and Take-Off clearances on the same runway or the opposite end of the runway (e.g. Land RWY27 then Take off RWY27 or RWY09). Note: In this case Cleared to Land also includes an aircraft that has Landed on the runway and not yet vacated the runway protection area.
Title	**Conflicting Clearance "Land then Take-Off" Case 1**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2254 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0057**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Land and Take-Off clearances on different but intersecting runways and aircraft ground trajectories are converging, and the landing aircraft has not reached a certain position or speed (local parameter).
Title	**Conflicting Clearance "Land then Take-Off" Case 2**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

2255

2256 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2257

2258 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0058**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Land and Take-Off clearances on different but converging runways and aircraft air trajectories are converging, in case of a go around and the landing aircraft has not reached a certain position or speed (parameter).
Title	**Conflicting Clearance "Land then Take-Off" Case 3**
Status	<In Progress>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2259

2260 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2261

2262 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0059**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Land and Take-Off clearances on different but closely spaced parallel runways, which are not independent towards wake turbulence. Specific parameters have to be defined according to local procedures.
Title	**Conflicting Clearance "Land then Take-Off" Case 4**
Status	<In Progress>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2263

2264 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0060**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Land clearances on different but converging runways and aircraft air trajectories are converging in case of a go around.
Title	**Conflicting Clearance "Land versus Land" Case 3**
Status	<In Progress>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0061**
Requirement	The Tower Runway Controller shall receive an alert when two aircraft receive Land clearances and are at opposite ends of the runway.(e.g Land RWY27 vs Land RWY09).
Title	**Conflicting Clearance "Land versus Land" Case 4**
Status	<Validated>
Rationale	To avoid hazardous situation.
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3 HMI Requirements "Detection of Conflicting ATC Clearances"

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0026**
Requirement	The Tower Runway Controller shall be able to input Line-Up clearance in the ATC system via the HMI.
Title	**Line-Up clearance Input**
Status	<Validated>
Rationale	Permit the Tower Runway Controller to input the ATC clearance given to mobile by voice in the system via the HMI.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0027**
Requirement	The Tower Runway Controller shall be able to input Conditional Line-Up clearance together with the conditional aircraft in the ATC system via the HMI.
Title	**Conditional Line-Up clearance Input**
Status	<Validated>
Rationale	Permit the Tower Runway Controller to input the ATC clearance given to mobile by voice in the system via the HMI.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2287 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0028**
Requirement	The Tower Runway Controller shall be able to input Take-Off clearance in the ATC system via the HMI.
Title	**Take-Off clearance Input**
Status	<Validated>
Rationale	Permit the Tower Runway Controller to input the ATC clearance given to mobile by voice in the system via the HMI.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2288

2289 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2290

2291 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0029**
Requirement	The Tower Runway Controller shall be able to input a Cleared to Land clearance in the ATC system via the HMI.
Title	**Land clearance Input**
Status	<Validated>
Rationale	Permit the Tower Runway Controller to input the ATC clearance given to mobile by voice in the system via the HMI.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2292

2293 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2294

2295 [REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0030**
Requirement	The Tower Runway Controller shall be able to input a Cross clearance in the ATC system via the HMI.
Title	**Cross clearance Input**
Status	<Validated>
Rationale	Permit the Tower Runway Controller to input the ATC clearance given to mobile by voice in the system via the HMI.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2296

2297 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0031**
Requirement	The Tower Runway Controller shall be able to input an Enter clearance in the ATC system via the HMI.
Title	**Enter clearance Input**
Status	<Validated>
Rationale	Permit the Tower Runway Controller to input the ATC clearance given to mobile by voice in the system via the HMI.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0052**
Requirement	The Tower Runway Controller shall have a means to be warned by the HMI on which clearances are conflicting and the callsigns of the mobiles involved.
Title	**Display of CATC on the Tower Runway Controller HMI**
Status	<Validated>
Rationale	The Tower Runway Controller needs to know which clearances are conflicting and the identification of the mobiles involved.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0062**
Requirement	The Tower Runway Controller may be able to see an indicator next to a clearance button that signifies that if that specific clearance is input it will trigger a CATC alert
Title	**Indicator for a potential CATC on the Tower Runway Controller HMI**
Status	<Validated>
Rationale	The Tower Runway Controller should have an indication on the HMI to show that a potential CATC could be triggered if they make a certain input
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CATC.0063**
Requirement	The Tower Runway Controller may be asked to confirm via the HMI that if that specific clearance is input it will trigger a CATC alert
Title	**Confirmation for a potential CATC on the Tower Runway Controller HMI**
Status	<Validated>
Rationale	The Tower Runway Controller should be asked to confirm the clearance input via the HMI to show that a potential CATC could be triggered if they continue the input
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.4 Requirements for "Non Conformance to ATC instructions and/or procedures"

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0001**
Requirement	The Tower controller shall receive an alert when a mobile is deviating by x or more metres (x parameter) from its cleared taxi route. The recommended maximum value of 'x' is 25 metres. It is recommended that this alert is suppressed for aircraft that are lining up on the runway to avoid nuisance alerts.
Title	**A-SMGCS - Route deviation detection**
Status	<Validated>
Rationale	Inform the Tower Runway or Ground Controller that a mobile is deviating from its cleared taxi route.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0002**
Requirement	The Tower controller shall receive an alert when an aircraft is moving from its stand where a Push-back is required without having received a "Push-back" instruction
Title	**A-SMGCS - Push-back without authorisation detection**
Status	<Validated>
Rationale	Inform the Tower Ground Controller that an aircraft is pushing back without authorisation.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2325
2326 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0003**
Requirement	The Tower controller shall receive an alert when an aircraft is moving on the taxiway without having received a “Taxi” instruction
Title	**A-SMGCS - Taxiing without authorisation detection**
Status	<Validated>
Rationale	Inform the Tower Ground or Runway Controller that an aircraft is taxiing without authorisation.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2327
2328 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2329
2330 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0004**
Requirement	The Tower controller shall receive an alert when a mobile does not move after X seconds (e.g. X= 90 seconds for PUSH/TAXI/CROSS/ENTER and 120 seconds for LINE UP and TAKE OFF) having received an instruction to push-back, taxi, line-up, cross, or take-off). The time parameter X seconds can be different according to the clearance type.
Title	**A-SMGCS - Stationary mobile detection**
Status	<Validated>
Rationale	Inform the Tower Ground or Runway Controller that a mobile is stationary after having received an instruction to proceed.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2331
2332 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2333
2334 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0005**
Requirement	The Tower controller shall receive an alert when an aircraft is approaching the runway threshold for landing from X (X = time or distance local parameter) and no contact indication has been input by the ATCO via the HMI.
Title	**A-SMGCS - Landing on a runway without contact detection**
Status	<Validated>
Rationale	Inform the Tower Runway Controller that an aircraft is about to land and is not on the R/T frequency
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2335
2336 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2337
2338 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0006**
Requirement	The Tower controller shall receive an alert when a mobile is entering the Runway Protection Area without having received one of the following clearances: line-up, take off, cross or enter. *Note: If runway Stop bars are in use the detection is the crossing of a lit stop bar and if they are not in use the detection is crossing a defined point without a suitable clearance.*
Title	**A-SMGCS - Runway Incursion**
Status	<Validated>
Rationale	Inform the Tower Runway Controller that a mobile is entering the RPA without an appropriate clearance.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2339
2340 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2341
2342 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0009**
Requirement	The Tower controller shall receive an alert when an aircraft is Taking-Off without a Take Off Clearance. The triggering event can be when the aircraft is detected at a specific speed (e.g. >20kts) and/or its surveillance position is detected rolling out of a defined area/s on a runway without having received a Take Off Clearance "or a "Taxi on the runway" instruction. The defined area is normally the line up positions on the runway.
Title	**A-SMGCS - Taking-off from a runway without clearance detection**
Status	<Validated>
Rationale	Inform the Tower Runway Controller that an aircraft is initiating a take off from a runway without having received a "Take-Off" instruction
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2343
2344 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2345
2346 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0010**
Requirement	The Tower controller shall receive an alert when an aircraft is X (X = time and/or distance local parameter) from the runway threshold for landing without having received a "Clear to Land" or "Go Around" instruction.
Title	**A-SMGCS - Landing on a runway without instruction detection**
Status	<Validated>
Rationale	Inform the Tower Runway Controller that an aircraft is initiating a landing procedure on a runway without having received a "Clear to Land" instruction
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2347
2348 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0011**
Requirement	The Tower controller shall receive an alert when an aircraft is lining-up on a runway that differs from the assigned runway indicated by the FDP.
Title	**A-SMGCS - Lining-up on a wrong runway detection**
Status	<Validated>
Rationale	Inform the Tower Runway Controller that an aircraft is lining-up on a wrong runway.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0012**
Requirement	The Tower controller shall receive an alert when an aircraft is crossing a lit red stop bar situated at an Intermediate Holding Point or at the limit between control positions areas of responsibility.
Title	**A-SMGCS - Red stop bar crossing detection**
Status	<Validated>
Rationale	Inform the Tower Runway or Ground Controller that an aircraft is crossing a lit red stop bar situated at an Intermediate Holding Point or at the limit between control positions areas of responsibility.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2357
2358 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0013**
Requirement	The Tower controller shall receive an alert when the Cleared or pending route for an aircraft includes a non-suitable taxiway. The parameters to check are aircraft type/weight/wingspan compared to the taxiway capabilities described in local airport manual or in compliance with procedures currently in force.
Title	**A-SMGCS - Non-suitable taxiway detection**
Status	<Validated>
Rationale	Inform the Tower Controller that the planned or cleared route of an aircraft includes a non-suitable taxiway or one that is subject to temporary restrictions.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2359
2360 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2361
2362 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0014**
Requirement	The Tower controller shall receive an alert when a non-suitable runway is assigned to an aircraft. The parameters to check are aircraft type compared to local airport procedures.
Title	**A-SMGCS - Non-suitable runway detection**
Status	<Validated>
Rationale	Inform the Tower Controller that a non-suitable runway is assigned to an aircraft.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2363
2364 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2365
2366 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0015**
Requirement	The Tower controller shall receive an alert when a cleared or pending route of an aircraft /aircraft being towed will pass through a taxiway that is closed after the route has been assigned
Title	**A-SMGCS - Closed taxiway detection**
Status	<Validated>
Rationale	Inform the Tower Controller that the planned or cleared route will include a closed taxiway.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2367
2368 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2369
2370 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0016**
Requirement	The Tower controller shall receive an alert when a runway is assigned to an aircraft/aircraft being towed and then closed after the runway has been assigned. A time and distance parameter may be used to avoid showing alerts on aircraft that are at a local specified distance from landing.
Title	**A-SMGCS - Closed runway detection**
Status	<Validated>
Rationale	Inform the Tower Controller that a closed runway is assigned to an aircraft/aircraft being towed.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2371
2372 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2373
2374 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0017**
Requirement	The Tower controller shall receive an alert when an aircraft is taxiing at a speed greater than a locally defined parameter for the airport. The system can be tuned to detect different speeds that would trigger either an information alert or an alarm (local implementation e.g. Information Alert when speed >40kts and Alarm when speed >55kts.)
Title	**A-SMGCS - Excessive speed detection**
Status	<Validated>
Rationale	Inform the Tower Controller that an aircraft is taxing too fast on a taxiway.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2375
2376 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A

2377
2378 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0023**
Requirement	For every non-conformance to ATC procedure or instruction detected by the A-SMGCS, the Tower controller shall receive an alert message, either visual or visual and audible, indicating the mobile(s) involved and the type of non-conformance (according to local procedures).
Title	**A-SMGCS - Non-Conformance Messages on the Controller HMI**
Status	<Validated>
Rationale	Update the controller's situational awareness by displaying a message indicating the mobile(s) involved and the type of non-conformance detected.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2379
2380 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0024**
Requirement	The Tower controller should receive an alert when an aircraft is aligned for landing on a runway different to the assigned runway.
Title	**A-SMGCS – Landing on the wrong runway**
Status	<In Progress>
Rationale	Inform the Tower Controller that an aircraft is aligned to land on the wrong runway.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0025**
Requirement	A Tower controller shall receive an alert when the A-SMGCS detects that a mobile is not conforming to an instruction or procedure
Title	**Non-conformance to ATC instruction or procedure**
Status	<Validated>
Rationale	Inform the ATCO that a mobile is not conforming to an instruction or procedure
Category	<Operational>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0028**
Requirement	The Tower controller shall receive an alert when a departing aircraft is X nm (X = local parameter) from the departure runway or is passing a specified altitude without having received an instruction to change frequency to the departure controller.
Title	**A-SMGCS – No Transfer Out alert**
Status	<Validated>
Rationale	Inform the Tower Runway Controller that an aircraft has departed and has not received the instruction to change to the next frequency within a certain distance or altitude.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0029**
Requirement	The Tower controller shall receive an alert when a mobile that has vacated a runway has stopped within the runway protection area (e.g. for 15 seconds or more) and is a potential hazard to arriving or departing aircraft.
Title	**A-SMGCS – Stationary in RPA mobile detection**
Status	<Validated>
Rationale	Inform the Tower Runway Controller that a mobile is stationary in the Runway Protection Area. This could indicate that the Flight Crew or Vehicle Driver is unsure about their position or have a technical problem.
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0031**
Requirement	The Tower controller should receive either an INFORMATION or ALARM alert **depending on Local Decision** for implementation for the following Conformance Monitoring alerts: “Route Deviation” and “No Landing Clearance”
Title	**Conformance Monitoring Alerts Type 1**
Status	<Validated>
Rationale	Project recommendation for alert type for Conformance Monitoring Alerts
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0032**
Requirement	The Tower controller should receive an INFORMATION for the following Conformance Monitoring alerts: “No Push-Back approval”, “No Taxi approval”, “Stationary” (outside the RPA), “No Contact”, “No Transfer”.
Title	**Conformance Monitoring Alerts Type 2**
Status	<Validated>
Rationale	Project recommendation for alert type for Conformance Monitoring Alerts
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0033**
Requirement	The Tower controller should receive an ALARM alert for the Conformance Monitoring alerts “No Enter or Cross Clearance”, “No Take-Off Clearance”, “Red Stop bar crossed, “Stationary” (inside the RPA) and “Runway Incursion”.
Title	**Conformance Monitoring Alerts Type 3**
Status	<Validated>
Rationale	Project recommendation for alert type for Conformance Monitoring Alerts
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0034**
Requirement	The Tower controller should receive either an INFORMATION or ALARM alert depending on whether other traffic is known within or planned to enter RPA within a specified time for the following Conformance Monitoring alerts “Landing on Wrong Runway” and “Lining-Up on wrong runway”.
Title	**Conformance Monitoring Alerts Type 4**
Status	<Validated>
Rationale	Project recommendation for alert type for Conformance Monitoring Alerts
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0035**
Requirement	The Tower controller should receive either an INFORMATION or ALARM alert depending on whether the aircraft is planned to use the runway/taxiway or is actually on the runway/taxiway for the following Conformance Monitoring alerts “Runway Type or Taxiway Type”.
Title	**Conformance Monitoring Alerts Type 5**
Status	<Validated>
Rationale	Project recommendation for alert type for Conformance Monitoring Alerts
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0036**
Requirement	The Tower controller should receive either an INFORMATION or ALARM alert depending on whether the aircraft is planned to use the runway/taxiway or is actually present on the runway/taxiway for the following Conformance Monitoring alerts “Runway Closed” and “Taxiway Closed”.
Title	**Conformance Monitoring Alerts Type 6**
Status	<Validated>
Rationale	Project recommendation for alert type for Conformance Monitoring Alerts
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2422
2423 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0037**
Requirement	The Tower controller should receive either an INFORMATION or ALARM alert depending on the aircraft speed for the following Conformance Monitoring alert “High Speed”.
Title	**Conformance Monitoring Alerts Type 7**
Status	<Validated>
Rationale	Project recommendation for alert type for Conformance Monitoring Alerts
Category	<Functional>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

2424
2425 [REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2426
2427

6.5 HMI Requirements "Non Conformance to ATC instructions and/or procedures"

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0039**
Requirement	The Tower controller shall be able to identify the type of alert detected by the system via the text displayed on the HMI, being this text clear and unambiguous. The text may be one of the two possibilities presented hereunder. Other options may be defined based on local implementation preferences.

Conformance Monitoring alerts	Text 1	Text 2
Route deviation alert	ROUTE DEV	ROUTE DEV
No pushback approval	NO CLEARANCE	NO PUSH CLR
No taxi approval	NO CLEARANCE	NO TAXI CLR
Stationary (outside RPA)	STATIONARY	STATIONARY
Stationary (inside RPA)	STATIONARY	STATIONARY RPA
No contact	NO CONTACT	NO CONTACT
No transfer	NO TRANSFER	TRANSFER?
No line-up clearance	RWY INCURSION	NO LUP CLR
No crossing clearance	RWY INCURSION	NO CROSS CLR
No enter clearance	RWY INCURSION	NO ENTER CLR
No take-off clearance	NO CLEARANCE	NO TOF CLR
No landing clearance	NO CLEARANCE	NO LND CLR
Landing on wrong runway	WRONG RWY	LND WRONG RWY?
Red stop bar crossed (intermediate HP)	NO CLEARANCE	RED STOP BAR CROSSED
Red stop bar crossed (runway HP)	RWY INCURSION	NO LUP CLR
Lining up on wrong runway	WRONG RWY	LUP WRONG RWY?
Runway incursion	RWY INCURSION	RWY INCURSION
Taxiway type	TWY TYPE	TWY TYPE
Runway type	RWY TYPE	RWY TYPE
Taxiway closed	TWY CLOSED	TWY CLOSED
Runway closed	RWY CLOSED	RWY CLOSED
High speed	HIGH SPEED	HIGH SPEED

Title	**A-SMGCS – Text on controller HMI for Non Conformance Alerts in radar/track label**
Status	<Validated>
Rationale	By looking at the HMI, the controller will instantly see what type of alert is detected for a particular mobile.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification	

Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

2434 [REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0040**
Requirement	When several alerts are detected for the same mobile, the Tower controller shall be presented, in the mobile radar/track label and or EFS on the HMI, with the text of the alert having the highest priority. The priorities may be defined as presented hereunder. Other options may be defined based on local implementation preferences.

Priority 1 is higher than priority 2 etc…;**Alerting situations**	**Proposed Priority of Text in radar/track label**
RMCA ALARM	1
RMCA INFORMATION	2
No take-off clearance	3
Runway incursion	4
Runway closed Alarm	5
Runway or taxiway type (runway type)	6
Stationary (inside RPA)	7
No landing clearance Alarm	8
Landing on wrong runway	9
Lining up on wrong runway	10
Route deviation Alarm	11
Red stop bar crossed (intermediate HP)	12
Runway or taxiway type (taxiway type)	13
Taxiway closed Alarm	14
High speed Alarm	15
Runway closed Information	16
Runway or taxiway type (runway type) Alarm	17
No landing clearance Information	18
No transfer	19
No contact	20
Route deviation Information	21
Runway or taxiway type (taxiway type) Information	22
Taxiway closed Information	23
Stationary (outside RPA)	24
High speed Information	25
No taxi approval	26
No pushback approval	27

Title	**A-SMGCS – Priorities of Alert text on controller HMI for Non Conformance Alerts in radar/track label and or EFS.**
Status	<Validated>
Rationale	By looking at the HMI, the controller will instantly see in the radar/track label and or EFS the alert with the highest priority for a particular mobile.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	**REQ-06.07.01-OSED-CMAC.0041**
Requirement	The Tower Runway Controller shall be able to input a Go Around instruction in the ATC system via the HMI.
Title	**Go Around instruction Input**
Status	<Validated>
Rationale	Permit the Tower Runway Controller to input the Go Around instruction given to an aircraft by voice in the system via the HMI.
Category	<HMI>
Validation Method	<Shadow Mode><Real Time Simulation>
Verification Method	

[REQ Trace]

Rela ionship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200 0003	<Par ial>
<APPLIES_TO>	<Operational Focus Area>	OFA01 02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.6 Information Exchange Requirements

The services defined by this OSED do not involve exchange of information between actors hence no IERs are identified.

7 References

7.1 Applicable Documents

[1] P06.02 D122 Airport Step 1 DOD 2014 update V00.01.01.doc 31/03/2015.

[2] P06.02 D105 Airport Step1 VALS 2014 update V00.01.00.doc 18/03/2015.

7.2 Reference Documents

The following documents were used to provide input/guidance/further information/other:

[3] EUROCAE ED-78A Guidelines for Approval of the provision and use of Air Traffic Services supported by Data Communications December 2000.

[4] ICAO Document 9694 First Edition — 1999.

[5] D19-SESAR V3 Validation Report for ''Conflicting ATC Clearances'' V00.01.01 dated 17/05/2013.

[6] D25–SESAR V2 Validation Report for Conformance Monitoring Alerts for Controllers V00.01.02 dated 09/04/2013.

[7] D46–SESAR P06.07.02 OFA04.02.01 (Integrated Surface Management) Final OSED V00.01.01 Dated 11/10/2016

[8] D45–SESAR P06.07.02 OFA04.02.01 (Integrated Surface Management) Final SPR V00.01.01 Dated 24/10/2016

[9] D149–SESAR P06.03.01 Consolidated DEL Release 5 Validation Report (with 06.09.02 T1031) V00.01.00 31/08/2016.

[10] D77-SESAR P06.07.01 Final OSED for Alerts for Vehicle Drivers following V3 trial V00.01.00 Dated 30/04/2016.

[11] D39-SESAR P09.14 Updated OSED for "Conformance Monitoring for pilots" following V2 trials V00.01.01 Dated 31/03/2016.

[12]D75–SESAR P06.03.01 D75 6.3.2 Release 3 Validation Report V00.01.00 14/05/2015.

[13] ICAO (Doc. 9830) A-SMGCS Manual First Edition, ICAO Montreal, Canada 2004.

[14] EUROCAE Doc ED-87C MASPS for Advanced Surface Movement Guidance and Control Systems (A-SMGCS) – Levels 1 & 2 - Including Amendment N°1 - January 2009.

[15] D15-SESAR V2 Validation Report for ''Conflicting ATC Clearances'' V00.01.00 dated 20/01/2012.

[16]D05 SESAR P06.07.01 Operational Concept Document (OCD) V00.01.02 Dated 19/10/2016

[17]D28 SESAR P06.07.01 OSED for Conflicting ATC Clearances" and "Conformance Monitoring for Controllers V00.01.01 Dated 07/01/2014

2482 **-END OF DOCUMENT-**