Final OSED for "Alerts for vehicle drivers" following V3 trials

Document information	
Project Title	Safety support tools for Pilots, Vehicle Drivers and Controllers
Project Number	06.07.01
Project Manager	DSNA
Deliverable Name	Final OSED for "Alerts for vehicle drivers" following V3 trials
Deliverable ID	D77
Edition	00.01.01
Template Version	03.00.00
Task contributors	
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Abstract

This document describes the environment for vehicle drivers and provides operational requirements for the SESAR solution "#04 Enhanced Traffic Situational Awareness and **Airport Safety Nets** for the vehicle drivers." On the manoeuvring area, this solution provides vehicle drivers with a moving map with surrounding traffic and with alerts to avoid collisions with aircraft and infringement of restricted or closed area.

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██████ DLR		12/05/2016

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Document History

Edition	Date	Status	Author	Justification
00.00.01	16/03/2016	Initial Draft	NORACON	Initial Draft based on D44 for internal WA5 review
00.00.02	08/04/2016	Draft	Think Research on behalf of NORACON, NORACON, DSNA, SEAC	Updates following internal WA5 review
00.00.03	21/04/2016	Final Draft	Think Research on behalf of NORACON, NORACON, DSNA, SEAC	Updates following review from all project members
00.01.00	30/04/2016	Issue	Think Research on behalf of NORACON, NORACON, DSNA, SEAC	Updates following partner reviews.
00.01.01	07/06/2016	Issue	Think Research on behalf of NORACON, NORACON, DSNA, SEAC	Updates following SJU assessment comments.

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Executive summary

This document is the final version of the Operational Services and Environment Description (OSED) 06.07.01 related to the Aiport Safety Nets and Safety Support Tools for Vehicle Driver's element of the SESAR solution "#04 Enhanced Traffic Situational Awareness and Airport Safety Nets for the vehicle drivers".

It defines the operational services, environments, operating methods, use cases and requirements for the triggering of "traffic alerts for vehicle drivers and alerts for infringement of restricted/closed areas". It contains information which should be consolidated back into the higher level SESAR concepts using a "bottom up" approach.

OSED D77 is the final for "Alerts for vehicle drivers", built on previous versions and includes results from the V3 validation exercises conducted in Dublin [13] and Paris Charles de Gaulle [12] airports in Q2 2015 and represents the last phase of validation.

The third validation exercise completed in 2015 validated the concept and built on the previous results. The second validation completed in 2014 indicated that presenting alerts to vehicle drivers operating on the manoeuvring area was a safety enhancement. The system is designed to provide the vehicle drivers with a continuous update on their position on the airfield, an alert when entering a restricted or closed area or when in a conflict situation with an aircraft on the manoeuvring area. It provides detection and alerts in situations that if not corrected could end up in hazardous situations.

The system consists of an on-board Vehicle Display System (VDS) which comprises:

- An Airport Moving Map (AMM) which will indicate the position of the vehicle on the airfield ,

- A Ground Traffic Display (GTD) displaying other traffic operating on the movement area of the airport and

- A GTD that displays alerts to a vehicle driver on aircraft that are in a potential, or actual conflict with the vehicle and when the vehicle infringes on a restricted/closed area while the vehicle is operating on the manoeuvring area

- The alerts in the vehicles may be generated by an on-board system (e.g. ADS-B processor) or by a ground based system (A-SMGCS Airport Safety Nets) with an uplink to the vehicle

- An alerting system to provide an aural and visual alert to the vehicle driver

The moving map data can be provided by the vehicle's own Global Navigation Satellite System (GNSS) or via data link from the server providing the ground traffic display data and alerting function.

In a conflict situation the system will provide an alert to the driver but will not issue a resolution as this will be encompassed within local procedures to be developed by individual airport authorities

The trials confirmed that with the moving map the overall situational awareness of the vehicle drivers has improved and this combined with the alerting system will provide an additional measure of safety enhancement for traffic operating on active areas of the airfield.,

Working procedures for the vehicle drivers shall be adapted to ensure that inputs in the system for the vehicle driver are easy and suitable for working inside and outside the vehicle.

Results of the two V3 trials that were conducted at Dublin and Paris CDG have been taken into account in this update of the OSED.

As this is an update on the previous OSED, updates of the operational concept and environment, use cases and requirements have been added.

1 Introduction

1.1 Purpose of the document

The Operational Service and Environment Definition (OSED) describes the operational concept defined in the Detailed Operational Description (DOD) 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 Airport DOD produced by the federating OPS 6.2 project. 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.
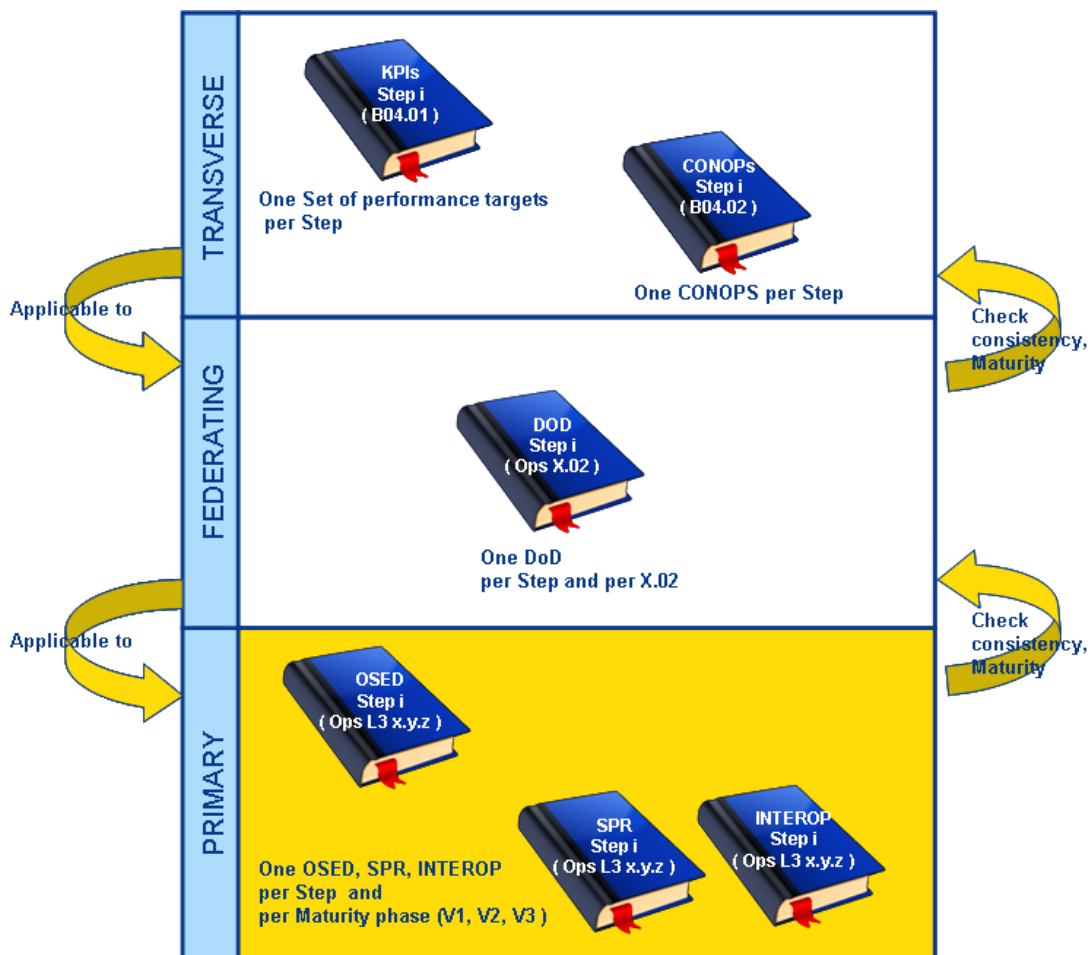

Figure 1: OSED document with regards to other SESAR deliverables

In Figure 1, the Steps are driven by the OI Steps addressed by the project in the Integrated Roadmap document [8].

1.2 Scope

This OSED details the operational concept for alerts for Vehicle Drivers. This Safety Net is part of Airport Safety Nets, OFA (01.02.01) in Operational Sub package "Airport Safety" (SPC01.02). Alerts for Controllers and Flight Crew will be addressed in different OSEDs.

1.3 Intended readership

The main audience for this OSED is:

- ▪ The other SWP 06.07 projects and especially P06.07.03 concerning the use of the moving map
- ▪ P06.03.01 for integrated V3 validations
- ▪ The federating project P06.02 for consolidation in the Airport DOD
- ▪ SWIM project P08.03.10 concerning updates and development of the map information in the moving map
- ▪ P12.03.04 in charge for the development of the technical specification
- ▪ P16.06.01 for safety, support and coordination management
- ▪ The other tasks within P06.07.01 using the OSED as input, e.g. SPR and INTEROP for alerts for vehicle drivers

1.4 Structure of the document

The structure of the document is as follows:

- • §1 (This section) 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 Environment for the Operational Services, in order to get knowledge of the fundamental operational and technical characteristics.
- • §4 describes the Operating Methods with and without the change described by the new SESAR concept.
- • §5 outlines the key Use Cases, which details the Operational service and process and sub-process interactions;
- • §6 defines the Requirements (Operational and HMI).

1.5 Background

This document is an updated OSED following on from OSED D44, which was completed after V2 simulation [14], which took place in January 2014 in Malmo, Sweden. The objective of the second trial was to further test the scenarios and better prepare for live trials to take place in summer 2015 as part of Release 5.

194 1.6 Glossary of terms

195 The following terms used in this document have been introduced in the Preliminary OSED for Alerts
196 for Vehicle Drivers [15]. The definitions for new terms, 'Nuisance' and 'False' alerts have been
197 sourced from the EUROCONTROL ATM Lexicon [20].

Term	Definition
Buffer Zone	The buffer zone is a protection zone around the runway. The dimensions of this zone may be decided locally, e.g. as the area between Cat I and CAT III holding points, or airports may state that they don't have a buffer zone as they already protect the runway up to 150m from the axis even in good weather conditions, as is the case in CDG.
Caution Alert	Advisory to vehicles about a situation that is becoming potentially dangerous, providing information to help the receiver to understand the reason for the danger. The receiver of this alert should follow local procedures for caution alert e.g. consider taking action that prevents the situation to develop into a dangerous situation and hence trigger a warning alert.
Warning Alert	Alert generated to vehicles about an imminent danger situation. This will be indicated on the moving map highlighting the situation and by a visual and an aural alert. The receiver of this alert should take immediate action to avoid an accident and leave the zone according to local procedures for warning alert. It shall be mandatory to describe local procedures for this type of alerts.
Nuisance Alert	Alert which is correctly generated according to the rule set but is considered operationally inappropriate.
False Alert	A false alert is an alert which does not reflect the actual traffic situation (e.g. caused by false surveillance tracks: split tracks and radar reflections, etc.)
Traffic Alert	An alert triggered in the case of possible collision conflict between aircraft and vehicle (A traffic alert could be either a Caution Alert or a Warning Alert)
Area Alert	An alert triggered in the case of infringement of predefined areas. (An area alert could be either a Caution Alert or a Warning Alert)

198

199 1.7 Acronyms and Terminology

Term	Definition
AATS	Aerodrome Air Traffic Services Operations
ADS-B	Automatic Dependent Surveillance-Broadcast
AMDB	Airport Mapping Database
AMM	Airport Moving Map
ANSP	Air Navigation Services Provider
A-SMGCS	Advanced Surface Movement Guidance and Control System
ATC	Air Traffic Control
ATCO	Air traffic Control officer
ATM	Air Traffic Management

Term	Definition
A/V	Aircraft/Vehicle
AVDR	Alerts for Vehicle Drivers
CAVOK	Ceiling and Visibility OK
DOD	Detailed Operational Description
GPS	Global Positioning System
GNSS	Global Navigation Satellite System
GTD	Ground Traffic Display
GSM	Global System for Mobile
HMI	Human Machine Interface
INTEROP	Interoperability Requirements
KPA	Key Performance Areas
LVC	Low Visibility Conditions
LVP	Low Visibility Procedures
Manoeuvring Area	That part of an aerodrome to be used for the take-off and landing of aircraft and for the surface movement of aircraft associated with take-off and landing, excluding aprons
OCD	Operational Concept Description
OFA	Operational Focus Areas
OSED	Operational Service and Environment Definition
OI	Operational Improvement
PIR	Project Initiation Report
RWY	Runway
RTS	Real Time Simulation
SESAR	Single European Sky ATM Research Programme
SESAR Programme	The programme which defines the Research and Development activities and Projects for the SJU.
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SJU Work Programme	The programme which addresses all activities of the SESAR Joint Undertaking Agency.

Term	Definition
SPC	Sub-package
SPR	Safety and Performance Requirements
SWIM	System Wide Information Management
SWP	Sub Work Package
T-CAS	Traffic Alert and Collision Avoidance system
TIS-B	Traffic Information Service Broadcast
Traffic Alert	A warning of possible collision conflict between aircraft and vehicle
TWR	Tower
TWY	Taxiway
VDS	Vehicle Display System
VALP	Validation Plan
VALR	Validation Report
VHF	Very High Frequency

200

201 2 Summary of Operational Concept from DOD

202 This section links this OSED to the Detailed Operational Descriptions (DOD) produced by SWP06.02
203 for Step 1 [10].

204 2.1 Mapping tables

205 Table 1 lists the Operational Improvement steps (OIs from the Integrated Roadmap, within the
206 associated Operational Focus Area addressed by the OSED).

Operational Package	Operational Sub-package	Operational Focus Area name / identifier	Relevant OI Steps ref. (coming from the Integrated Roadmap)	Story Board Step	Master or Contributing (M or C)	Contribution to the OIs short description
PAC01 Increased runway and Airport Throughput	SPC01.02 Airport Safety	OFA 01.02.01 Airport safety nets	AO-0105 Airport Safety Net for Vehicle Drivers	1	M	The System detects potential and actual risk of collision with aircraft and infringement of restricted or closed areas. The vehicle driver is provided with the appropriate alert, either generated by the on-board system or uplinked from the controller airport safety net. This will improve safety on the airport surface.
PAC01 Increased runway and Airport Throughput	SPC01.02 Airport Safety	OFA 01.02.01 Airport safety nets	AO-0204 Airport Vehicle Driver´s Traffic Situational awareness	1	M	Information regarding the surrounding traffic (incl. Both aircraft and airport vehicles) during taxi and runway operations is displayed in the vehicle driver's cockpit. The provision of traffic information in the ground vehicle is justified by safety and efficiency. This OI concerns "moving map" plus other vehicles and aircraft. AO-0206 will go further in e.g. colour code

							the runway depending on clearance to cross or not.

207   Table 1: List of relevant OIs within the OFA

208

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

Scenario identification	Use Case Identification	Use case Description	Reference to DOD section where it is described
Taxi in Scenario	Taxi in (UC 6 21)	The Flight Crew acknowledges and executes the taxi instructions by ATC for the route from the runway to the stand	4.2.5.3.2.3 (DOD Step1)
Taxi out Scenario	Ensure Taxi Out General procedures (UC6 79)	The Flight Crew acknowledges and executes the taxi instructions by ATC for the route from the stand to the runway.	4.2.5.5.2.2 (DOD Step1)

210   Table 2: Applicable scenarios and DOD use cases

211

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

Operational Environment	Class of environment	Description/Examples	Reference to DOD section where it is described
Network Function	1: Intercontinental Hub	Large intercontinental airport acting as transfer hub for one or more major European airlines with a wide route network spanning to a large number of destinations inside and outside Europe. Examples for this of airports are: London LHR, Paris CDG, Frankfurt, Amsterdam, Madrid etc.	3.1.1.1 (DOD Step1)
	2: European Hub	Large European airport acting as a transfer hub for at least one European airline with a wide route network encompassing a wide range of European destinations. Only a limited number of destinations outside Europe are served directly from	3.1.1.1 (DOD Step1)

Operational Environment	Class of environment	Description/Examples	Reference to DOD section where it is described
		this airport. Examples of this class of airport are: Copenhagen, Helsinki, Vienna, Brussels, Palma, Milan-MXP etc.	
	3: Primary Node	Medium sized airport with a limited hub function and intercontinental P2P connections). Examples of this class of airport are: London-STN, Lyon-Saint Exupéry, Budapest, Warsaw, Athens etc.	3.1.1.1 (DOD Step1)
	4: Secondary Node	An airport with limited or no intercontinental traffic, mainly scheduled connections to the large intercontinental (class 1) or European (class 2) hubs, a significant size of charter/leisure operations and acting as a major base for one or more low fare carriers. Examples of this type of airport are:, London-LTN, Nuremberg, Gothenburg, Leeds Bradford, Milan-BGY, Rome –CIA, Valencia etc.	3.1.1.1 (DOD Step1)
	4: Tertiary Node	A regional airport with a limited number of scheduled connections mainly operated by one or two (low fare) carriers. Examples of this class of airport are: Bern, Dortmund, Aarhus, Rotterdam, Girona etc.	3.1.1.1 (DOD Step1)
Layout & Basic Operational Criteria	1: Multiple Independent Runways, complex surface layout	An example of this class of airports might be Madrid Barajas	3.1.1.2 (DOD Step1)
	2: Multiple Dependent Runways, complex surface layout	Examples of this class of airports might be London Heathrow, Paris CDG, Frankfurt and Amsterdam	3.1.1.2 (DOD Step1)
	3: Single Runway, complex surface layout	An examples of this class of airports might be London Gatwick	3.1.1.2 (DOD Step1)
	4. Multiple Independent Runways, noncomplex surface layout	An example of this class of airports might be Munich	3.1.1.2 (DOD Step1)
	5: Multiple Dependent Runways, noncomplex surface layout	Examples of this class of airports might be Hamburg and Hanover	3.1.1.2 (DOD Step1)
	6: Single Runway, non-complex surface layout	Examples of this class of Airports might be Rotterdam, Bremen and Stuttgart	3.1.1.2 (DOD Step1)

Operational Environment	Class of environment	Description/Examples	Reference to DOD section where it is described
Capacity Utilisation	1: Highly utilized airports/runways, traffic mix of heavy, medium and light aircraft. More than 90% load during 3 or more peak periods a day.	Examples of this class of airports might be London Heathrow, Amsterdam, Paris CDG, Madrid	3.1.1.3 (DOD Step1)
	2: Highly utilized airports/runways, homogeneous traffic (dominant heavy or medium or light). More than 90% load during 3 or more peak periods a day	Examples of this class of airports might be Barcelona, Palma, Oslo	3.1.1.3 (DOD Step1)
	3: Normally utilized airports/runways. 70 – 90% load during 1 or 2 peak periods a day	Examples of this class of airports might be Düsseldorf, Manchester, Hamburg	3.1.1.3 (DOD Step1)
	4: Low utilized airports/runways less than 70% load during peak periods	Examples of this class of airports might be Ljubljana, Luxembourg, Southampton	3.1.1.3 (DOD Step1)
External Influencing Factors	1. Highly Constrained (Geographical / Weather issues)	Example of this class of airports might be Funchal	3.1.1.4 (DOD Step1)

213   Table 3: List of relevant DOD Environments

214

215   Table 4: List of the relevant DOD Processes and Services identifies the link with the applicable
216   Operational Processes and Services defined in the DOD.

DOD Process	DOD Node – node which is responsible for the activities in the process	Activity sub-process called to realize a part of the process	Description of activity	Reference to DOD section where it is described
Prepare and execute taxi-in routing	FD	Execute taxi-in	Manoeuvre the aircraft from the runway exit point to the stand following the taxi in guidance, using taxi aids and following the route displayed in the cockpit.	DOD Step 1 ch.5.2.4
	AATS	Provide taxi-in routing guidance	After vacating the runway, guide the aircraft until it reaches a stand. The taxi route may be revised.	DOD Step 1 ch.5.2.4
Prepare and execute taxi-out	FD	Execute taxi-out	Manoeuvre the aircraft from the	DOD Step 1 ch.5.2.4

DOD Process	DOD Node – node which is responsible for the activities in the process	Activity sub-process called to realize a part of the process	Description of activity	Reference to DOD section where it is described
routing			stand to the runway entry point following the taxi out guidance, using taxi aids and following the route displayed in the cockpit.	
	AATS	Provide taxi-out routing guidance	Guide the aircraft until it reaches the holding point for take-off. The taxi route may be revised.	DOD Step 1 ch.5.2.4
Plan and provide routing for a vehicle	AV	Execute runway crossing		DOD Step 1 ch.5.2.4
		Execute vehicle route	Execute a route on the airport surface.	DOD Step 1 ch.5.2.4
	AATS	Provide vehicle routing guidance	Guide a ground vehicle (aircraft excluded) on the airport surface.	DOD Step 1 ch.5.2.4
		Provide runway crossing		DOD Step 1 ch.5.2.4
Manage safety nets systems for airport vehicles	AV	Manage Alert for Vehicle Drivers	When an alert is triggered, vehicle drivers must do everything which is necessary to cancel it.	DOD Step 1 ch.5.2.5
	AATS	Provide Alert to Vehicle Drivers		DOD Step 1 ch.5.2.5

217   Table 4: List of the relevant DOD Processes and Services

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

DOD Requirement Identification	DOD requirement title	Reference to DOD section where it is described
REQ-06.02-DOD-6200.0005	The Vehicle Driver shall be able to detect if he is part of a potential conflicting situation/incursion on the runway, taxiway or the apron/stand/gate area	DOD Step 1 ch. 6.2
REQ-06.02-DOD-6200.0008	The Vehicle Driver shall have the awareness of surrounding traffic situation (vehicles and aircraft) on ground taxi and runway by displayed information in the vehicle driver's cockpit.	DOD Step 1 ch. 6.2
REQ-06.02-DOD-6200.0011	The Vehicle Driver shall have the awareness of traffic context information including at least the status of runways and taxiways, obstacles, and an airport moving map displayed on a vehicle's driver cockpit.	DOD Step 1 ch. 6.2

222   Table 5: List of relevant DOD Requirements
223

2.2 Operational Concept Description

The System detects potential and actual risk of collision with aircraft and infringement of restricted or closed areas. The Vehicle Driver is provided with the appropriate alert, either generated by the on-board system or uplinked from a ground based system.

The alerting system for Vehicle drivers detects potential conflicting situations on the manoeuvring area between vehicles and aircraft, which will help prevent runway incursions by alerting the driver to the proximity of the runway zone and through improved situational awareness by use of a moving map. Alerts will also be triggered in case of penetration of restricted/closed areas other than runways. Resolutions will not be suggested by the alerting system but rather be taken care of by local regulations.

Likewise, the ground vehicles will have a display with dynamic traffic context information, including status of runways, taxiways, obstacles and route by application of an airport moving map. There will also be a possibility in the future to have automated exchange between Vehicle Drivers and Tower Controllers using Data link for ground-related clearances and information. The vehicle alerting system detects and informs the vehicle driver of a potential runway incursion or infringement of restricted/closed areas. The Vehicle Drivers will get an alert directly on board the vehicle in case a risk of conflict with the aircraft is detected, and in case of infringement of restricted/closed areas.

2.3 Processes and Services (P&S)

The purpose of this chapter is to ensure coherence between federating and primary projects regarding the used processes and services in the OFA. The following table lists the processes ensuring the safety of the aircraft on the airport surface as well as the airport vehicles. Table 6: Process Manage Safety at Airport, was taken from Step 1 Airport DOD Update 2014 chapter 5.2.4, Manage Safety at Airport [10].

Process	Node	Activity	Description	OFA	OI step	Associated Use Cases
Manage safety nets systems for airport vehicles	AV	Monitor surrounding traffic		01.02.01	AO-0204	UC 6 21
		Manage Alert for Vehicle Drivers	When an alert is triggered, vehicle drivers must do everything which is necessary to solve conflicting situations		AO-0105	UC 6 76 UC 6 31
	AATS	Provide Alert to Vehicle Drivers			AO-0105	UC 6 76 UC 6 31

Table 6: Process Manage Safety at Airport [10]

2.3.1 Services

As there are no services currently listed in the 06.02 Step 1 DOD 2014 Update (cf. [10]) the following service has been defined by the P06.07.01 WA5 team:

- Alerting Vehicle Drivers when there is an upcoming potential hazardous situation towards an aircraft, a runway incursion or an infringement of a restricted/closed area.

2.3.2 Mapping to Service portfolio and Systems

Note the figures below have been taken from the current DOD document and need to be altered by the controller of the document. The differences are included in Notes 1&2 below

The following diagrams were taken from the European ATM Architecture portal [11] and describe the operational processes.
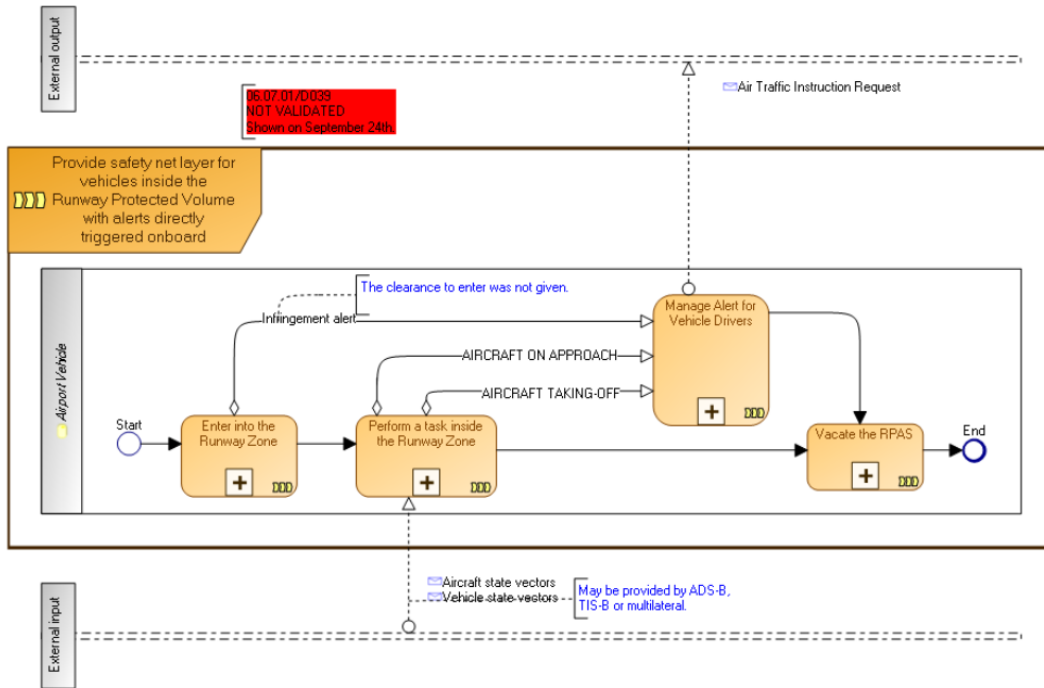
261

262   Figure 2: Provide safety net layer for vehicles inside the RWY triggered on-board

263   *Note 1: To be included in the figure above is departing reference to aircraft lining up on the runway*
264   *and vehicle operating on the runway and were based on previous OSED*

265
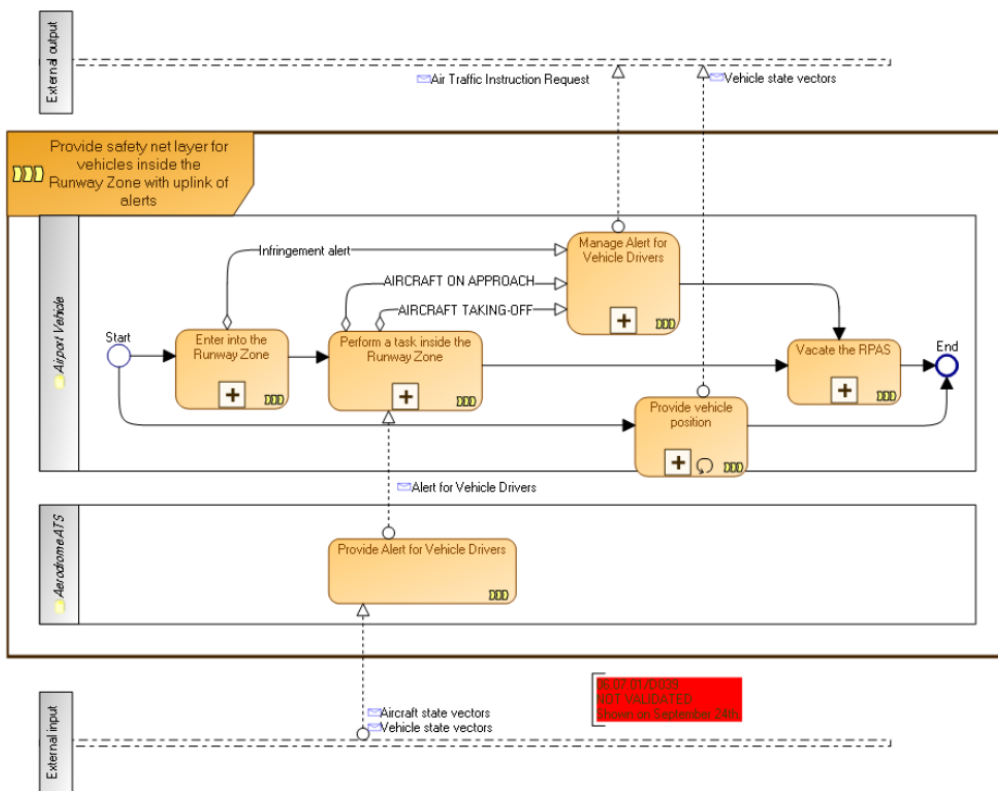
266

267
268   *Note 2: "Aircraft deviating and heading" to be removed from figure*

269
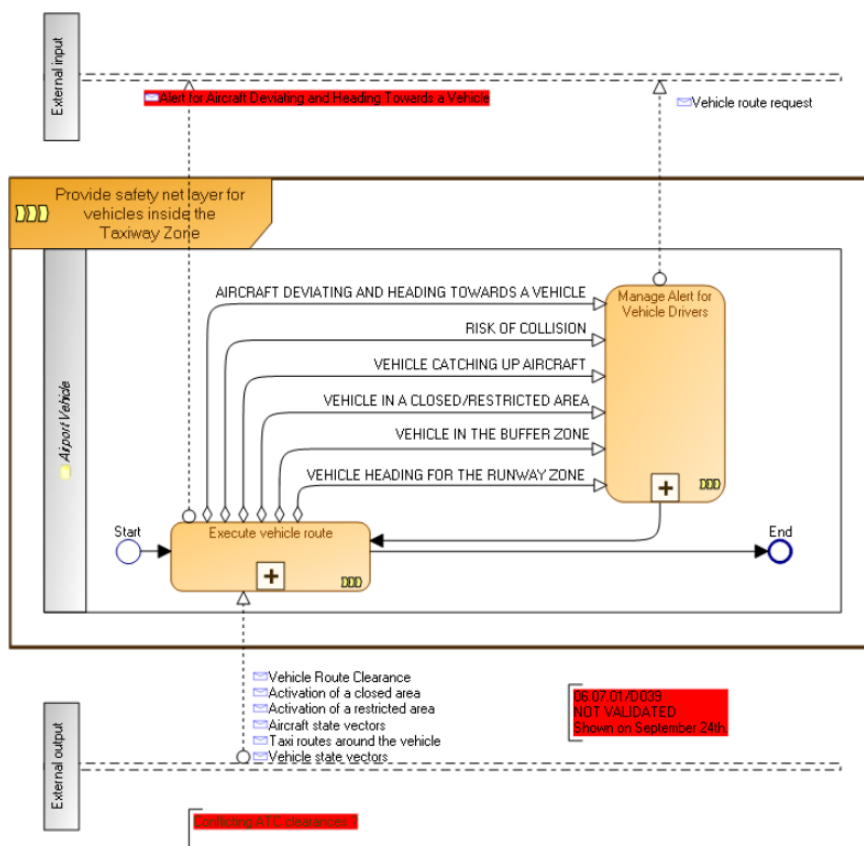
270

271   Figure 3: Provide safety net layer for vehicle inside the Taxiway zone

3 Detailed Operating Method

As a support feature for the driver, a Vehicle Display System (VDS) can indicate the current position of the vehicle and surrounding traffic on an Airport Moving Map (AMM)[1] and provide warnings or alerts in case of area infringements. Additionally, routing may be provided as described in OFA04.02.01 (cf. P06.07.03 Preliminary OSED D22, [9]).

3.1 Previous Operating Method

Most vehicle drivers currently don't have any support in traffic conflict detection when driving on the manoeuvring area although some of them are allowed to enter the manoeuvring area or at least drive on taxiways at certain airports without clearance from ATC.

All communication (where needed) between the Controller (either Ground or Runway) and the vehicle driver is usually done either via aeronautical VHF R/T or on a dedicated R/T channel.[2] Additionally, the driver has no moving map support or any alerting function in case he or she gets too close to a restricted area or possibly some endangering traffic. At some airports, vehicle drivers are required to get a clearance to enter the manoeuvring area while at others, this is only requested for the runway protected area and a listening watch is at least requested while on the taxiway.

The main issue constraining airport operations is when Low Visibility Procedures (LVPs) are in force. During such periods, arrival capacity decreases due to larger separation on final, and at many airports not equipped with A-SMGCS, results in congestion on taxiways as the ATCOs must rely on flight crew reports for aircraft position on the airport movement area

In these situations vehicle drivers have to drive and, simultaneously, determine their position on the airfield by recognising the name and the position of the taxiways and of the runways. Moreover, differently from the cockpit procedures there is usually no second person that can do the navigation. In adverse weather conditions and under low visibility it is often difficult for the vehicle driver to determine his/her position on the manoeuvring area and to see and avoid aircraft and fixed obstacles.

3.2 New SESAR Operating Method

In the new SESAR operating method vehicle drivers on the manoeuvring area are provided with a system to improve the driver's situational awareness and to issue alerts in situations of risk for collision or infringement of a restricted/closed area.

3.2.1 Enhanced Situational Awareness

A Vehicle Display System (VDS) can serve as the basis for new functionalities supporting vehicle drivers. The driver's out-of-the-window visual assessment of the vehicle position on the airport layout will be supplemented by the VDS. This can either be a separate (physical) display or be an integrated application. The VDS services available to the vehicle driver encompass an airport moving map (AMM), display of other traffic (Ground Traffic Display, GTD) as well as an alerting function and potentially even a guidance function as described in OSED P06.07.03 [9].

The AMM allows the vehicle driver to determine the actual position of his vehicle on the airport surface. The main change to operating methods will be that it displays the vehicle position with respect to aerodrome geographic locations (i.e. geographic features, or ground based facility locations in proximity of the vehicle) and in particular, the aerodrome elements referenced in the ATC instructions. In low visibility conditions and at airports with a complex layout, the use of the airport moving map function will significantly increase the situational awareness of the vehicle driver. The GTD function will support the vehicle driver during operation on the movement area.

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[1] The AMM and its OI AO-0204 had previously been allocated to OFA01.02.02 and described in the P06.07.03 Preliminary OSED D22 but has been moved to OFA01.02.01 in 2014.
[2] At some airports, this is even done via telephone.

316 The main goal of the ground traffic display function is to reduce the potential for conflicts, errors and
317 collision with aircraft by providing enhanced situational awareness to the vehicle driver operating on
318 the airport surface especially in all weather conditions.
319
320 The ground traffic display function mainly includes the following aspects:
321   a) Provide the vehicle driver with traffic information (ground/airborne) on an appropriate display
322   b) Display potential conflict with surrounding aircraft (and associated alert means).

323 The VDS equipped with AMM and GTD is a prerequisite to show the cause of an alert. The vehicle
324 driver´s situational awareness will increase in comparison with an alert not presenting the cause or
325 the target. This will be especially beneficial since there could be more than one target at the same
326 time. Target presentation will make it easier for the driver to grasp the situation and decide how to act
327 when receiving the alert.

328 The VDS should be robust and appropriate to work with for all kinds of vehicles operating on the
329 manoeuvring area under various conditions, e.g. different light conditions.

330 The display system should be able to automatically switch from day to night mode according to the
331 luminosity conditions. Careful selection of a display unit suitable for bright daylight and nighttime
332 operations should be undertaken and a screen cover to reduce the glare should be installed.

333 HMI can be defined as the software application that presents information to an operator or user about
334 the state of a process, and to accept and implement the operators control instructions.

3.2.1.1 Airport Moving Map

336 The AMM function displays own ship position with respect to the aerodrome geographic locations. To
337 facilitate the driver to determine his/her actual position the AMM should contain information on airport
338 characteristics, for example, the following features may be displayed

339   •   the runway and taxiway layout with name indication,

340   •   taxiway centre-line marking, runway entry marking,

341   •   runway marking, service roads, apron area

342   •   the aircraft stand numbers indication,

343   •   terminal building contour

344   •   a north direction indicator.

345 Dependent on local preferences more geographical information may be displayed.

346 The AMM can also indicate the runway zone and buffer zone as defined in this document and may
347 indicate its actual status (active or non-active). The runway zone may be a fix zone (CAT III)
348 operations or a dynamic zone depending on the current visibility status (CAT I – CAT III).

349 The driver shall be able to identify restricted or closed areas, which shall be dynamically indicated on
350 the moving map based upon the actual status of the manoeuvring area.

351 Once the GNSS receiver has identified its position, an "own ship position" is being placed, by default,
352 in the centre or lower third of the display (exact location may depend on local configuration). The
353 driver may 'pan' and/or 'zoom' the AMM to monitor different areas then its current position, but in case
354 of an alert the AMM should auto zoom to its default situation.

355 The vehicle driver may have the possibility to change the settings of the AMM between a fixed
356 orientation of the vehicle and a fixed orientation of the map. In the first situation the vehicle keeps the
357 same orientation on the VDS and the map turns depending on the actual heading. In the second
358 situation the map is fixed orientated to the north and the vehicle indicator turns depending on the
359 actual heading.

360 To avoid that the driver is dazzled in darker environment (e.g. in a tunnel or at night), the driver should
361 be able to adjust the brightness of the VDS. This could possibly also be achieved via an automatic
362 ambient light sensor.

3.2.1.2 Ground Traffic Display

The GTD function displays surrounding traffic on the AMM. Vehicle drivers should therefore have visibility from the GTD of all types of mobiles on the manoeuvring area: aircraft, aircraft being towed and other vehicles. All mobiles should have an identification label and there should be a visual distinction between the different types of mobiles.

Likewise, drivers should be able to distinguish between arrival and departure aircraft. How other traffic is displayed depends on local preferences. This may be done by using different colours or different indicator symbols. Additional information (e.g. aircraft type) can be displayed in a permanent label or by clicking on the mobile symbol.

The VDS can be used to display other relevant information to the vehicle driver, this is up to local implementation, but at least an indication of active LVP conditions should be displayed to the driver.

3.2.2 Alerts for Vehicle Drivers

The basic feature in a vehicle to allow for alerting is a moving map. Alerts will be given as a caution to alert the vehicle driver to a potential hazardous situation and thus increase his/her situational awareness or as a warning in the event of aircraft or other critical situations requiring immediate action and resolution. Alerts to the driver will be presented in aural and visual modes.

Alerts are generated on board the vehicle when it is operating within the manoeuvring area of the aerodrome. They are based on pre-set algorithms within the system that measure the speed and heading (trajectory) of the vehicle relative to the position of the vehicle and its relative position and projected trajectory to other aircraft and restricted areas or active runway zones.

In all weather conditions, but especially in adverse weather conditions, vehicle drivers may have difficulties in finding their way and knowing their exact position on the manoeuvring area. To assist them when a potential risk for an area infringement or a collision with an aircraft is imminent, an alert will be triggered.

Caution alert = Advisory to vehicles about a situation that is becoming potentially dangerous, providing information to help the receiver understand the reason for the danger. The receiver of this alert should follow local procedures for caution alert e.g. consider taking action that prevents the situation to develop into a dangerous situation and hence trigger a warning alert. An example could be when a vehicle receives a caution for a RWY buffer zone the driver could initiate action to stop the vehicle entering the runway zone and thus prevent the driver receiving a warning alert

Warning alert = Alert generated to vehicles about an imminent danger situation. This will be indicated on the moving map highlighting the situation and by an aural alert. The receiver of this alert should take immediate action to avoid an accident according to local procedures. An example of the action is to vacate the runway zone by the most expeditious means. It shall be mandatory to describe local procedures for this type of alerts.

Vehicles may be equipped with an on-board alerting system (GNSS location system) and also an uplink to a ground server supporting an A-SMGCS.

Vehicles with an independent on-board system will receive an alert when entering a restricted/closed area or RWY zone and when in a conflict situation with other suitably equipped aircraft.

Vehicles equipped with both an on-board system and an uplink to a ground server supporting an A-SMGCS will receive alerts for area infringements and also when the vehicle is in a conflict situation with aircraft.

Both systems can operate independently of each other in the event of a failure of either system.

On-board alerting system determines locally if an alert needs to be triggered based upon own ship position, determined by an on-board GNSS receiver and information about other traffic received from a central, ground based system (A-SMGCS) or information received directly from other traffic through ADS-B.

For the centralized, ground based system the centralized system determines if an alert needs to be triggered and sends the alert information together with other traffic information to the vehicle where the alert is displayed.

413 The alerting system shall always be active when a vehicle is in the manoeuvring area irrespective of
414 whether the vehicle engine is running or not.

415 Alerts will be triggered on two different situations.

416 • Traffic alerts on the manoeuvring area towards aircraft;

417 • Alerting functions in case of infringement of a runway zone or a restricted or closed area.

418 The results of the V3 trials suggest the requirement to generate an alert for a restricted or closed area
419 should be based on a prediction (look ahead value) to enter the area and that there may be an
420 increased risk of nuisance alerts and therefore this will need fine tuning based on local conditions.

421 Unlike TCAS on aircraft, the system will not present a resolution to an alert to the driver but indicate
422 the concerned area or aircraft. Local procedures should be developed to decide expected actions for
423 the vehicle driver. In case the driver, while avoiding a hazardous situation, finds himself in a new
424 conflict, he will receive a new alert. To implement the alerting function the moving map is needed and
425 considered to be a pre-requisite.

426 Efforts should be made to reduce the number of false alerts (alert without an imminent risk of intrusion
427 or collision) and nuisance alerts (alerts that disturb and distract rather than support) according to
428 accepted local procedures.

429 Based on the V2 and V3 validation results, the following recommendations are made for all alerts:

430 • The alert word used by the system should be uttered twice, paused and repeated until
431 acknowledged by driver. This acknowledgement will stop the aural alert but not the visual
432 alert, which will remain until the situation is resolved.

433 • for the acknowledgement of the alert, a means (button) will be required and it is suggested
434 that the entire display become sensitive to acknowledge the alert.

435 Please note that the above will need to be validated locally.

3.2.2.1 Operational Scenarios

437 The following examples illustrate some operational scenarios based on when alerts will be triggered.
438 These include:

439 • When a landing aircraft is about to enter the runway Zone and a vehicle is operating
440 within the runway zone.

441 • When a departing aircraft has passed 20kts on a take- off run and a vehicle is
442 operating within the runway zone

443 • When a vehicle is operating on an active runway and a departing aircraft has entered
444 the runway

445 • When a vehicle has entered the runway behind a departing aircraft

446 • When a vehicle without confirmation of the ATC clearance in the system has infringed
447 on a runway buffer zone, an active runway zone or restricted/closed area of the
448 manoeuvring area.

449 • When the predicted trajectory vectors between a vehicle and an aircraft operating on
450 the manoeuvring area indicate a hazardous situation will exist within a time parameter
451 set within the system.

452 • When a partial or total failure has occurred within the system

453 To be able to generate an alert, in most situations the trajectory vectors (direction, speed and hence
454 projection where the mobile might be in a certain amount of time) of both vehicle and aircraft involved
455 need to be known.

456 Vehicle and aircraft in taxiway area (cf. situations 5-8 in ch. 3.2.2.1.6 - 3.2.2.1.9 below) may be very
457 difficult to configure to avoid nuisance alerts as V2 validation (RTS) has shown. The live trials have
458 shown, that with an intensive system tuning period, an acceptable level of nuisance alerts can be
459 achieved.

460

3.2.2.1.1 Vehicle on the runway, aircraft on approach with between 25 – 40 seconds from the RWY zone
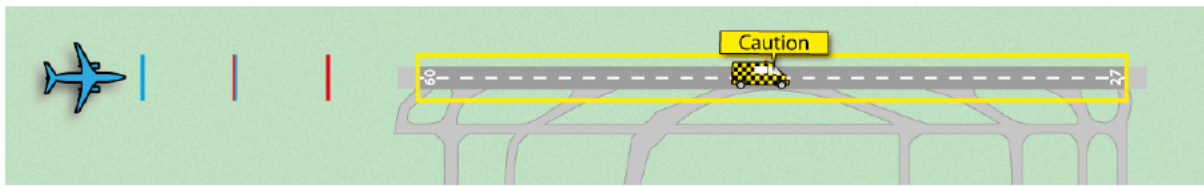

CASE	Vehicle
A vehicle is in the Runway zone (UC 1.1)	Caution

3.2.2.1.2 Vehicle on the runway, aircraft less than 25 seconds from the RWY zone
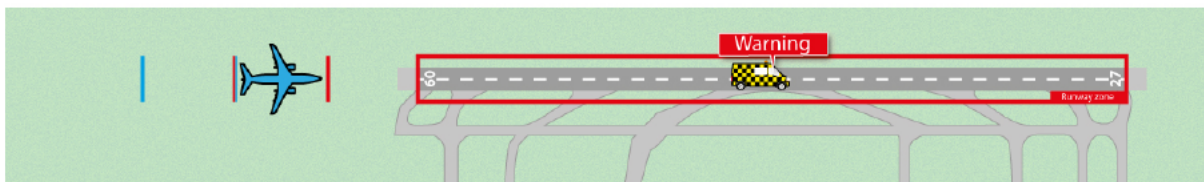

CASE	Vehicle
A vehicle is in the Runway zone (UC 1.2)	Warning

3.2.2.1.3 Vehicle on the runway, aircraft is taking off

Take-off means that aircraft velocity > 20 knots along runway axis.
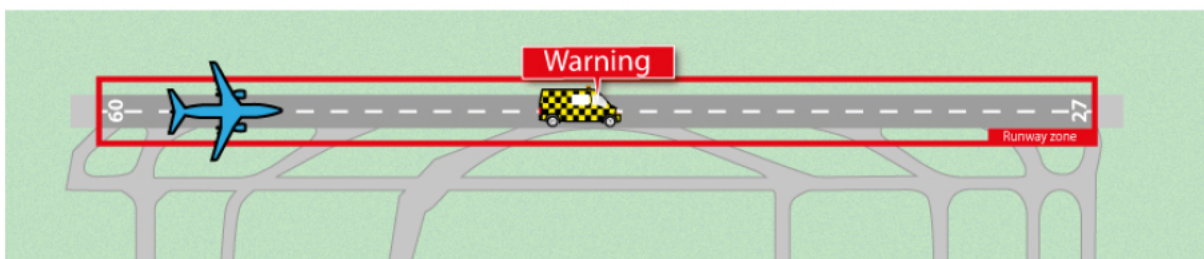
CASE	Vehicle
A vehicle is in the Runway zone ahead of the aircraft (UC 1.3)	Warning

473 3.2.2.1.4 Aircraft on the runway, vehicle entering behind
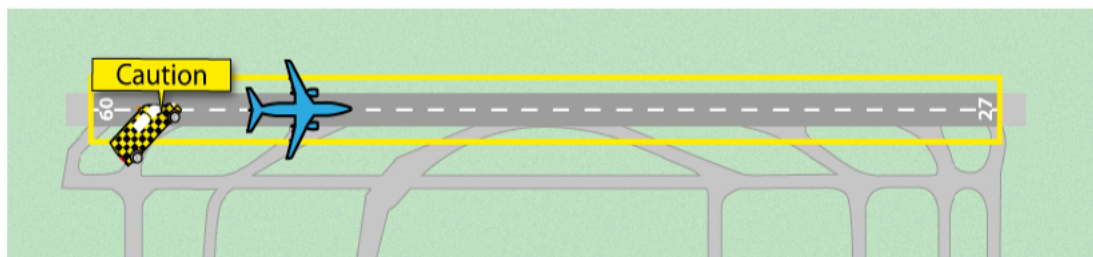
474

CASE	Vehicle
Vehicle entering the runway behind aircraft that is lined up (UC 1.4)	caution

475

476 3.2.2.1.5 Vehicle on the runway, aircraft is lining up

477 Lining up means that aircraft is entering the runway zone keeping a velocity < 20 knots
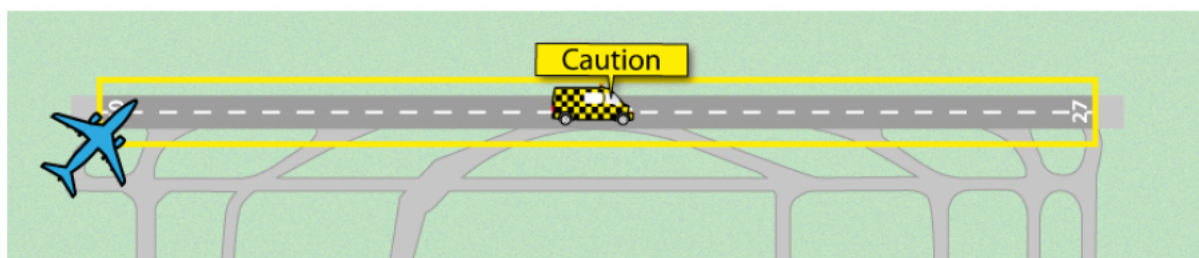

478

CASE	Vehicle
A vehicle is in the Runway Zone ahead of the aircraft (UC 1.5)	Caution

479

480 3.2.2.1.6 Vehicle to Aircraft merging path
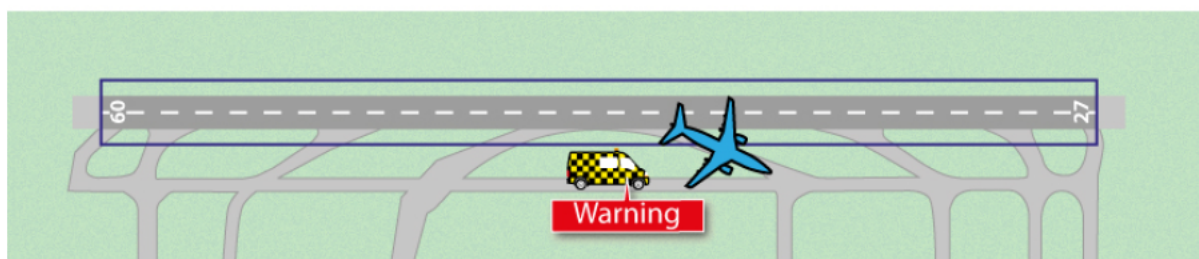
481

CASE	Vehicle
A vehicle is in the taxi zone and merging to aircraft leaving runway (UC 2.1)	Warning

482

483

3.2.2.1.7 Vehicle follows behind Aircraft
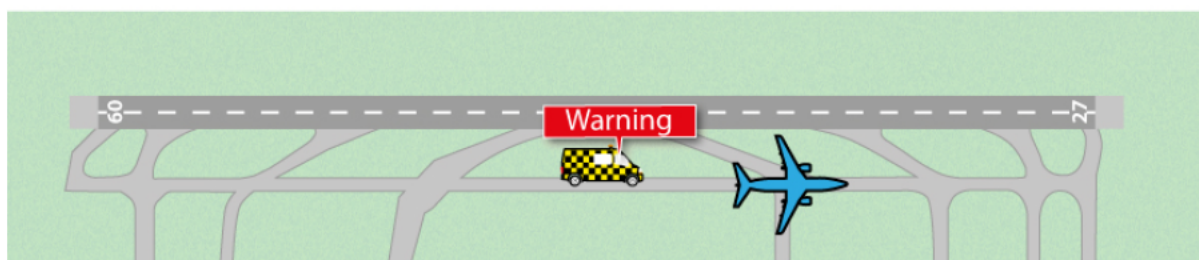
484

CASE	Vehicle
A vehicle is in the taxi zone follows behind aircraft (UC 2.2)	**Warning**

485

486

### 3.2.2.1.8 Vehicle to Aircraft opposite direction
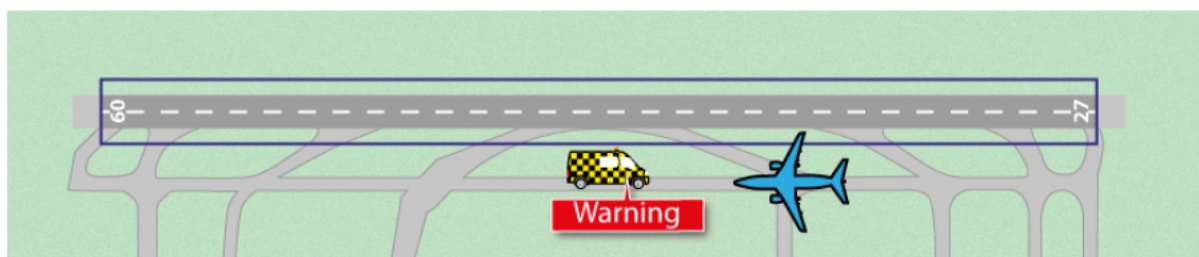
487

| CASE	Vehicle
A vehicle is in the taxi zone in the opposite direction to an aircraft with a trajectory vector that will cross (UC 2.3)	**Warning**

488

489

3.2.2.1.9 Aircraft approaching a vehicle from behind
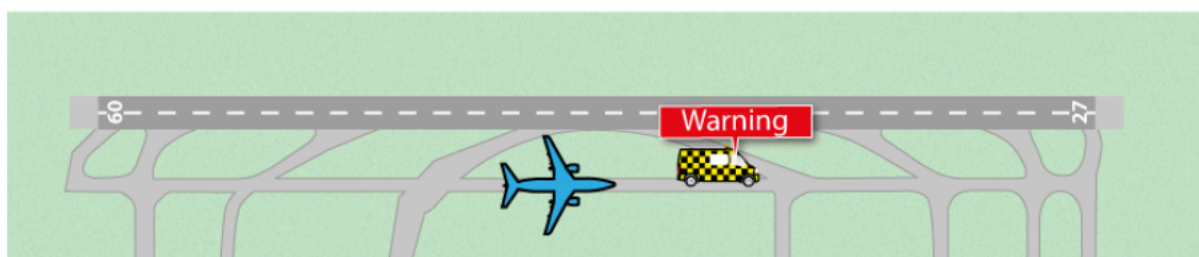
490

CASE	Vehicle
A vehicle is in the taxi zone and an aircraft is approaching from behind. Local profile should include provision for the alert on a follow me vehicle (awaiting arrival of an aircraft) to be muted /deactivated for a specific aircraft. (UC 2.4)	**Warning**

491

492   ### 3.2.2.1.10   Vehicle enters restricted/closed area
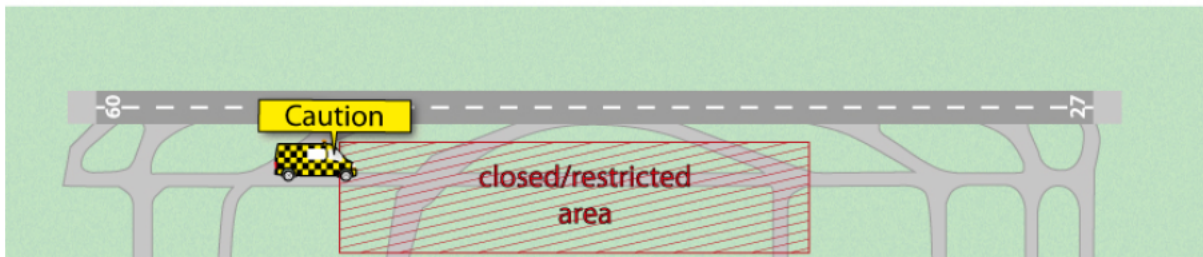
493

CASE	Vehicle
A vehicle enters a restricted/closed area or closure or restriction of the area is dynamically activated whilst vehicle is on that part of the taxiway (UC 3.1)	Caution

494

495   ### 3.2.2.1.11   Vehicle in the buffer zone
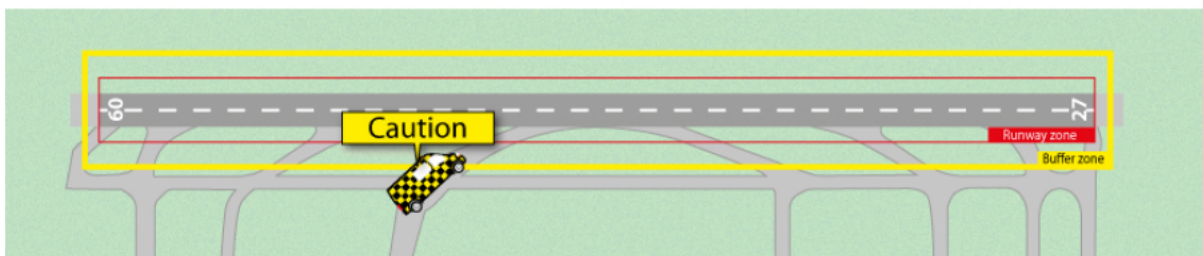
496

CASE	Vehicle
A vehicle in the buffer zone (UC 3.2)	Caution

497

498   ### 3.2.2.1.12   Vehicle enters Runway zone
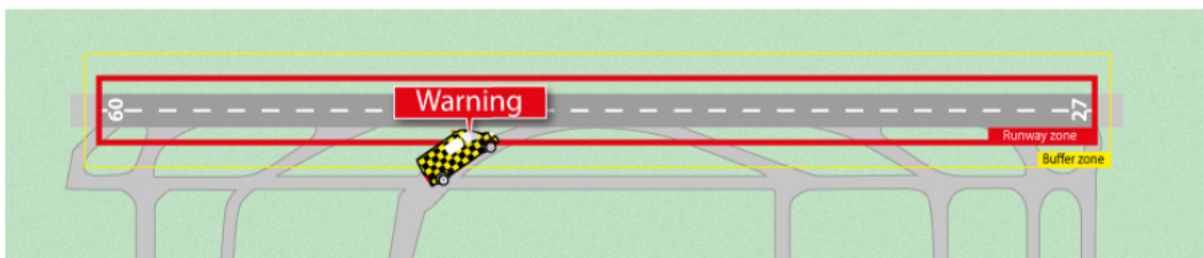
499

CASE	Vehicle
A vehicle enters the runway zone (UC 3.3)	Warning

500

501   ## 3.2.2.2 Alert indication

502   Alerts will be given to the vehicle driver as an aural and also visual indication on the VDS as to the
503   type of alert that exists. In the case of a caution alert it will be aural and visual, the aural (but not the
504   visual indication) will be self-cancelling after a pre-determined period of time or when the alert no
505   longer exists. This time period will be determined by local regulations.

506 In the case of a warning the indication shall be aural and with a visual indication on the VDS. In the
507 case of a warning between an aircraft and a vehicle, the system may automatically adjust the range
508 on the screen to the default value and highlight and display the relative bearing and the position of
509 both symbols on the VDS (when the aircraft is outside of the range of the screen the direction of the
510 aircraft will be indicated with a line in the direction of the location of the aircraft). The aural and visual
511 alert will continue until the situation has been resolved. In the case of an infringement of an area of
512 the manoeuvring area the area concerned may also be highlighted along with the appropriate aural
513 alert.

514 The driver of the vehicle will receive the alert whether operating inside or outside the vehicle. When
515 operating outside the vehicle (e.g. the speed of the vehicle is detected as being nil for a configurable
516 period of time) the alert will be aural, additional measures such as the horn sounding or loudspeaker
517 system and visual such as headlights flashing may also be considered. Local procedures should be
518 developed so that while operating on the manoeuvring area the vehicle driver shall assure that the
519 alerting system is switched on at all times.

520 At most larger airports there are a wide variety of vehicle types in use and respective missions being
521 conducted. This can range from a small car or buses to clearing and snow removal vehicles. To allow
522 for these differences when configuring and tuning the VDS to local needs, different parameters can be
523 saved in separate profiles. Speed vectors and hence the calculation when an alert is triggered can
524 vary between such profiles and are activated when the profile is selected at start-up of the VDS. The
525 selection of profile could be set as a default with manual input to alter to the profile appropriate to the
526 vehicle use

527 **Recommended alerting times**

528 Following the V3 trials, the following alerting times were recommended as an initial value for the
529 projected trajectory of aircraft and or vehicles but they may need to be increased depending on local
530 conditions

531   •   In the case of an aircraft approaching a runway zone with a vehicle on the runway zone the
532   caution will be given when the aircraft is between 40 and 25 seconds from the RWY zone and
533   a warning alert will be given when the aircraft is less than 25 seconds from the RWY zone.

534   •   In the case of a vehicle on the manoeuvring area approaching an aircraft from behind a 7
535   second **warning** alert will be given to the driver based on the trajectory of the vehicle and the
536   aircraft

537   •   A vehicle driver operating on the manoeuvring area taxiway system will receive a 7 sec
538   **warning** alert in respect of projected trajectory of the vehicle and the aircraft in a converging
539   or head on situation

540 Alerting time given to the drivers shall be the locally stated time plus an additional
541 transmission/processing time. This additional time should not exceed 2 seconds e.g. example alerting
542 time is 40 seconds before aircraft reaches the RWY zone, system takes max 2 seconds to generate
543 the alert in the vehicle, and system should start generating alert when the aircraft is 42 seconds from
544 the RWY zone.
545   Note: The system will not provide a resolution to an alert but will indicate the concerned area or
546 aircraft. Local regulations will determine the action to be taken by the driver in each event.

547 The surveillance performance (accuracy of aircraft position report compared to aircraft transponder
548 position) and Aircraft type may contribute to the appropriate timing of alerts and consideration needs
549 to be given to local performance as values may need to be adjusted to take account of this.

550 ### 3.2.2.2.1 Sounds for aural alerts

551 Aural alerts for caution may be in the form of a "ping" sound and should self- cancel after a
552 predetermined number of pings (The visual alert will remain until the situation has been resolved).
553 Warning aural alerts should be a single word in the local language (depending on the driver's mother
554 tongue(s) or by local regulation such as "Traffic "or "Runway". In the case of a warning alert both the
555 aural and visual remain on the visual display until the situation has been resolved.

556 The results of the V3 trial in Paris CDG revealed the requirement for a difference between caution
557 landing and caution line-up alerts. The aural for a caution landing alert should be the word
558 "approaching" and the aural for a caution line-up alert should be the words "line-up".

559 The results from V3 trials found that for restricted/closed area alerts the "Bip" sound is too aggressive
560 and the purpose of this alert is not always and/or immediately understood": the system should utter a
561 word.

562 The alarm was also triggered each time a section of a closed area is crossed: it should be triggered
563 only once when entering the closed area. If the vehicle has been stationary on a closed area for a
564 prolonged period, it should be repeated as a prompt to the driver. This is an implementation issue and
565 it should be solved with the implementation of the acknowledgement function.

566 The visual indication of caution or warning alerts should show in the case of an area infringement
567 which area is concerned and dye it yellow or red (for caution and warning alerts respectively).

568 In the case of warning traffic alerts, a kind of "lollipop" around the target and own vehicle with a
569 connecting line may indicate the involved other mobile and its direction relative to the own position.
570 Color-coding between a caution and warning alert shouldl be added. Possible visualisations are
571 shown in Figure 4 (traffic alert) and Figure 5 (area infringement). As the symbol can be a lollipop,
572 there should not be a circle around the vehicle's "ownship" position. Especially in a noisy environment
573 alerts shall not only be aural but also visual on the screen with the concerned area or mobile
574 indicated. V3 results reinforced the requirement that a circle should only be displayed around the
575 conflicting aircraft (and not around the vehicle) and that the symbol representing the vehicle should
576 become more obvious (e.g. colour change, bigger).

577 In general for aural alerts the following words should be suggested for guidance ("may"):
578 "approaching", "landing", "line-up", "take-off" and "traffic".

579 Visual alerts for caution and warning alerts will continue until the situation has been resolved
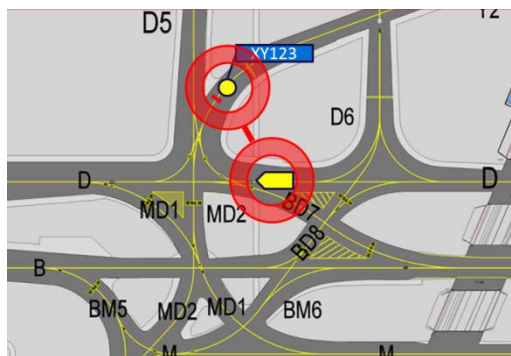

Figure 4: Example traffic alert

Note: Figure for illustrative purposes only, final figure will be lollipop around conflicting aircraft and no circle around vehicle "ownship "position
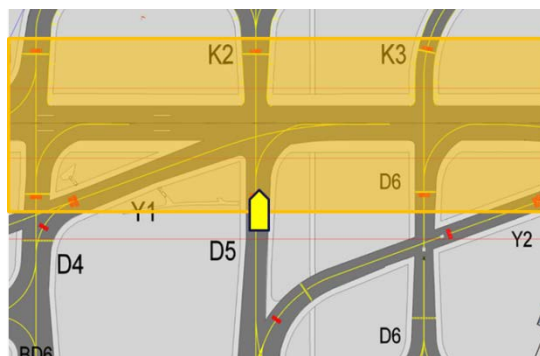
Figure 5: Example area infringement alert

580 ## 3.2.2.3 Hierarchy of alerts

581 When the driver finds himself/herself in a situation where more than one alert is being provided the
582 system will incorporate a hierarchy of alerts, giving priority to a warning alert over a caution alert. In
583 some situations it may be possible that two warning or two caution alerts will be triggered at the same
584 time. In such a situation the visual display of all alerts will be displayed on the GTD but only the aural
585 alert of the alert with the highest priority will be triggered. In Table 7**: Priority of displaying alerts**,
586 the priority of all the alerts are ranked relative to the other alerts. The provided ranking is a proposal
587 which could be adapted to local needs.

588

Priority	Alert type	Alert title
1	Warning	Vehicle on runway aircraft is taking off with speed<.20kts
2	Warning	Vehicle on runway aircraft on approach less than 25 seconds from RWY zone
3	Warning	Vehicle in RWY zone without input of authorisation –runway incursion
4	Warning	Vehicle to aircraft merging path
5	Warning	Vehicle to aircraft opposite direction
6	Warning	Aircraft follows behind vehicle
7	Warning	Vehicle follows behind aircraft
8	Caution	Vehicle on runway aircraft on approach 40 - 25 seconds from RWY zone
9	Caution	Vehicle on runway aircraft is lining up
10	Caution	Vehicle in buffer zone
11	Caution	Vehicle in restricted/closed area

589   Table 7: Priority of displaying alerts

3.2.3 Procedures

Once the driver starts the system, the system has to do a self-check each time and show the driver the system status. If the system fails during operation this new status must be displayed for the vehicle driver. The system will conduct continuous self-checks during period of operation.

The driver should verify that the latest map is loaded using the VDS for the first time during a shift. Hence, an indication may be given on the display should a new version have become available (e.g. "Difference in map version detected"). Additionally, an indication should be given to the driver when starting the system that this is a support system and the responsibility remains with the driver.

In order to provide consistency and avoid confusion, map updates should be carried out by an authorised person or agency, who can be responsible for the consistency of data accuracy of information provided to ATC and vehicle drivers The map data used by vehicle drivers can contain additional information than what is needed by ATC. This process should be compliant with the ADQ regulation (EU) No 73/2010.

Once started, the display may indicate the quality of the GNSS receiver (e.g. "GNSS OK" or while acquiring "GNSS NOK"). In the same way, the status of the data link (or the different data links if multiple communication modes like GSM, Wi-Fi or VHF are implemented) may also be displayed to the driver. In the case where an alert is generated locally by the on-board VDS (e.g. ADS-B) itself and the data link is unavailable the other suitably traffic should continue to be displayed and an alert should be generated when the vehicle is in conflict with other aircraft

In the case where the vehicle was not equipped with an on-board alerting system and if the data link was lost, the map should still be available but all alerts (incl. area alerts) would be lost. Whether such a degraded mode is still acceptable under certain circumstances (e.g. only during CAVOK), is a local decision. At least a textual and/or aural indication to the driver is needed to make him aware that all other traffic is removed from VDS. Rules regarding operations in degraded mode should be decided locally by the airport authorities.

While the colours of the status indications is preferably configurable, green for "OK" and red for "NOK" is suggested. The driver may then select his/her profile (e.g. "tow truck", "marshalling" or "snow clearing") to activate the respective parameters.

618 Since many airports differentiate between certain areas (usually those close to/around a runway) who
619 is still allowed to enter them in low visibility conditions (LVC), the system may need to warn differently.
620 Those restricted areas may then be taken into account to generate an area alert for those roles that
621 are not allowed to enter it. This status can either be input manually by the driver or even be uplinked
622 via data-link. As in today's procedure, the driver is responsible for avoiding any LVP-area if need be.

623 Drivers should be notified of changes in LVP conditions, the status of the runway and
624 restricted/closed areas, which may be presented automatically on the moving map in the vehicles and
625 displayed on the moving map. Such changes into the mapping server should be carried out by one
626 agency only, and this should be the local ANSP.

627 There are different procedures at different airports regarding prerequisites to drive on the
628 manoeuvring area. At some airports, an ATC clearance is needed while at others vehicles are allowed
629 to drive on the manoeuvring area without needing an ATC clearance.

630 To enter a RWY zone the vehicle driver can make an input in the on-board VDS system to
631 acknowledge the clearance. If the driver doesn't make an input on his screen he can receive a
632 warning (aural/ visual), as if he has not received a clearance, to enter the RWY zone.

633 The alerting function should always be active when operating in the manoeuvring area only. To avoid
634 too many nuisance alerts the system could be de-activated automatically based on the actual position
635 on the aerodrome (e.g. when operating in the apron area). The system should auto-indicate the status
636 of the alerts.

637 When the vehicle has received a clearance to be on the RWY and TWY simultaneously, e.g.
638 inspecting high-speed exits along the RWY, a suitable solution for this action needs to be agreed. It
639 will not be functional to have alerts going "on and off" continuously when the vehicle driver is cleared
640 to be on the RWY and TWY simultaneously and to re-enter the RWY without the need for a new
641 clearance. Possible solution could be using a time-out function for the clearance allowing the vehicle
642 to leave and return to the runway within a short time frame. Traffic alerts will always be triggered. The
643 "shape" of traffic alerts differs from alerts towards RWY/ TWY.

3.2.4 Optional features in addition to nominal features

645 A touch screen for VDS would be preferential. The clearance acknowledgement would involve only
646 one input by vehicle drivers and the touch screen was the preferred option of the drivers during the
647 previous simulation.

648 **Data Link**

649 It is anticipated that at some point in the future procedures will be developed to issue certain types of
650 clearances to vehicle drivers via data-link and the system should have the capacity to provide for this
651 eventuality.

3.3 Differences between new and previous Operating Methods

653 With the new operating method there is no change of responsibility.

654 Both methods require that a vehicle with a clearance (or without it if not required locally) to drive on
655 the manoeuvring area has to be monitored at all times from the tower. There are no separation
656 minima on the taxiways and the responsibility of manoeuvring mobiles lies on drivers and flight crew
657 looking out of the window. As before, it is still the responsibility of the ATC to give correcting
658 instructions if a vehicle diverges from the given clearance, e.g. if some other mobile is taking a wrong
659 route and thus creating an unwanted situation and whenever there is a need for a correcting
660 clearance.

661 Using the Vehicle Display System the involved drivers can locate aircraft more easily which suggests
662 that they can avoid a hazardous situation especially in poor/ adverse weather conditions. The system
663 will not give resolution advisories so local regulations shall take care of expected avoiding actions.

664 An alerting system in the vehicles will increase safety on the manoeuvring area.

665 Compared with today´s situation the difference and advantage is that an alert will be given to an
666 involved vehicle driver before he is having an incident, an accident or is entering a predefined

667   restricted area. The new method will give the driver an increased situational awareness and the
668   opportunity to take avoiding action.

669   The main difference is the new operating method gives the Vehicle Driver improved situational
670   awareness concerning the route that they are supposed to be following and surrounding traffic.

671   Similarly the display of other traffic is expected to help Vehicle Drivers to safely manoeuvre their
672   vehicle resulting in fewer collisions and enhanced situational awareness.

4 Detailed Operational Environment

4.1 Operational Characteristics

The operational processes described in this OSED are intended for application at all airports with medium or high traffic levels or low utilisation airports with complex layouts.

The principle adopted in this OSED is that there are many categories of airports within the ECAC area and the SESAR concept of "Airport Safety Nets" should be adaptable to suit local circumstances.

All numerical values in this concept, such as the tuning of alert levels and acceptance of various alert devices for vehicle drivers are initial proposals which will be refined by validation exercises. The results are presented in VALR [12] [13] and may be adapted to suit local requirements.

Airports with multiple parallel runways should note that the CDG trial revealed that there was a "nuisance alert when aircraft is crossing the internal RWY (e.g. 27L) at more than 20 kt to take off on the external RWY (e.g. 27R): aircraft motion direction should be considered" and that there should be consideration given to issues of this nature.

4.2 Roles and Responsibilities

Below will follow a description of the responsibilities of the various roles that influence the vehicle driver in his daily work at the airport and why there is a need for a support tool for the vehicle drivers.

4.2.1 Actors: operator and automatic actions

- Vehicle driver: The alerting system in the vehicle shall trigger alerts if it hasn't been manually operated (input of clearance acknowledge) by the vehicle driver before entering a RWY zone or a restricted/closed area. The driver is to follow predefined procedures when alerted. The driver will be helped in understanding the cause for the alert by looking at the moving map.

- Automatic actions: An alert shall be triggered when a vehicle is too close to an aircraft during a departure- or landing phase (predefined limits). An alert will be triggered when an aircraft and a vehicle are approaching one another with such trajectory vector that a hazardous situation might occur. An alert shall be triggered when a vehicle driver has entered a restricted/closed area or repeated if the vehicle has been stationary on a closed area for a prolonged period. An alert shall also be triggered when a vehicle is operating within the runway zone and a departing aircraft is entering the runway with a speed < than 20kts.

  In case of system failure, the vehicle driver shall be advised by the on board system and follow local procedures. Local procedure should include that ATC should be told that the vehicle doesn't have an expected level of alerting function in operation.

Distribution of restricted/closed areas should be made by ATC-input into the mapping server system. Work done in 8.3.3 could be useful to look into.

4.2.2 Vehicle drivers

A vehicle driver on the airport needs to move efficiently and safely, avoiding dangerous situations. The driver would benefit from tools for navigation on complex airports (*ownship situational awareness*) and for avoiding aircraft whilst operating on the surface (*traffic situational awareness*). The need for supporting tools is greater at night and in reduced visibility conditions. The driver should receive alerts in case a hazardous situation should develop.

A vehicle driver should manoeuvre by looking out of the window and not by looking at the screen except when having an alert or being unsure of his position. Whether he needs a clearance to enter a certain part of the manoeuvring area (e.g. taxiways) depends on local regulation (except for entering a runway zone where always a clearance is needed).

A vehicle driver must always monitor the relevant aeronautical frequency while on the manoeuvring area. At some airports it is mandatory to monitor several frequencies e.g. internal vehicle frequency and ATC frequencies.

719 In order to guarantee that the alert is noticed by the driver both an audio and a visual alert is needed.
720 Traffic alerts must be presented on a moving map to make it easier for the driver to detect the reason
721 or reasons for the alert in order to be able to avoid the reason for the hazard/hazards.
722 Restricted/closed areas will be presented on a moving map.

723 A distinction can be made between those vehicles authorised to operate on the manoeuvring area
724 and the apron service vehicles. The latter group is restricted to operate on the apron area and is not
725 authorised to enter the manoeuvring area. It is assumed that they will not enter the manoeuvring area.
726 Thus, not having a moving map, they are not considered further.

727 4.2.3 ATC

728 The principal responsibility of air traffic controllers is to issue clearances, instructions and information
729 to aircraft and vehicles under their control to achieve a safe, orderly and expeditious flow of air traffic
730 on and in the vicinity of the airport. The TWR has the full responsibility for ensuring that the runway is
731 free when issuing a take-off or landing clearance.

732 Typical TWR environment areas
733
734 The runways
735 The runway exits
736   Manoeuvring Area
737 The taxiways   Movement Area
738 The aprons
739 The stands
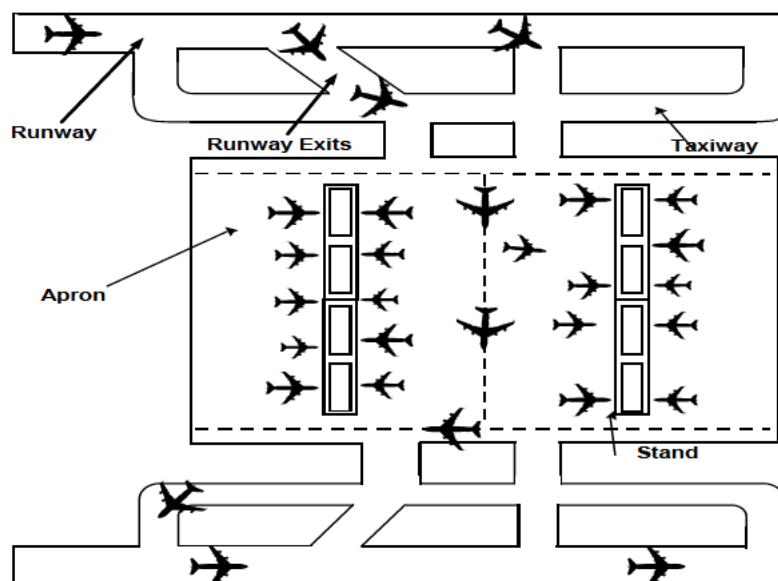
740

741 Figure 6: Taxiways and aprons

742

743
744 Runway operations require that separation is applied while spacing rules are used on aprons and
745 taxiways to avoid conflicting situations. Procedures are based on visual "see and avoid" principles to
746 maintain spacing between aircraft and/or vehicles. The progressive increase in traffic, the complexity
747 of aerodrome layouts and the increasing number of operations that take place in low visibility
748 conditions require advanced capabilities to ensure spacing when visual means are not adequate. This
749 is a prerequisite to maintain aerodrome capacity and safety in low visibility conditions and can be
750 achieved e.g. by having only one aircraft per section of a taxiway.
751
752 Aprons are often not controlled by ATC but rather by the airport operator. At certain aerodromes (e.g.
753 FRA, MUC & ZRH), the airport operator takes also the role of the ground controller, which may be
754 responsible for any traffic from runway exit to stand and vice versa.

755

756 Controllers primarily need a clear and dynamic presentation of the traffic situation in order to safely
757 and efficiently manage aircraft and vehicle operations. The controller would also benefit from decision
758 support tools to detect and resolve specific situations. Functions for interacting with, and monitoring
759 of, the system operation must be available.

760 The following tower operator roles are involved in airport surface operations. Operator roles can be
761 combined depending on traffic situation, e.g. TWR and Ground, and sometimes all roles, can be held
762 by one controller.

763 • **Airport Tower Supervisor** coordinates TWR operations and is responsible for contacts with
764   external parties.
765 • **Tower Clearance Delivery Controller** issues the clearance for engine start and delivers the
766   ATC clearance to the flight crew.
767 • **Tower Ground Controller** issues pushback approval and taxi instructions to and from the
768   runways to the parking stand with restrictions that may be required to provide sequencing,
769   spacing to other departing and arriving traffic and possible vehicle traffic on the manoeuvring
770   area. The Tower Ground Controller is responsible for all instructions for aircraft and vehicles
771   that are issued on the taxiways.
772 • **Tower Runway Controller** sequences flights for take-off taking into account slot times,
773   arriving traffic, wake-vortex constraints and required separation after departure. For arriving
774   flights, the RWY controller manages the runway occupancy, issues the landing clearance and
775   controls the aircraft until it exits the runway. The TWR controller is responsible for all
776   clearances (aircraft and vehicles) that are issued on the runway.

4.2.4 Flight Crew

777

778 On taxiways and aprons, flight crew are responsible for avoidance of collisions with obstacles, aircraft
779 and vehicles except when in visibility conditions 3 & 4 (cf. Appendix A in [6]), where they are not
780 capable anymore to avoid collisions. In visibility conditions 1 & 2 they shall apply "see and avoid"
781 rules. The flight crew will use out-the-window scanning to acquire visual contact with other traffic,
782 including vehicles, and adjust manoeuvres accordingly. TWR Ground controller will issue taxi
783 clearances, instructions, safety and efficiency related information to help the flight crew perform their
784 task but this does not relieve the flight crew from their responsibilities.

785 In low visibility conditions, at night or if the flight crew are unfamiliar with the airport, there is an
786 increased probability of the flight crew misunderstanding or misinterpreting the taxi clearance or
787 becoming confused as to their actual position. The controller can then (with the help of an A-SMGCS)
788 provide respective instructions or commit a follow-me vehicle to help the crew find its way.

4.3 Constraints

789

790 The position of the aircraft transmitted by the transponder needs to be determined in order to know
791 how to decide the target position and size. This is vital for target accuracy. As per the trial the target
792 position shall be regarded to be in the centre of gravity of the aircraft. Algorithms were used to ensure
793 this assumption. The alerting systems in vehicles must react when they are supposed to, i.e. show the
794 position and cause for the warning on a moving map (visual) and also give an aural alert to the driver.

795 The restricted/closed areas must be displayed on a moving map. If they aren't, reasons could be
796 system failure in transmitting and/or receiving accurate information to the moving map.

797 The alerting system must be trustfully/accurately tuned. If not it is possible that it will eventually be
798 ignored or even shut off. The driver must feel that alerts are triggered at the right moment.

799 The alerting system should have parameters/algorithms that can be changed to fit any airport.

800 The moving map should be robust and easy to work with for all kinds of vehicles operating on the
801 manoeuvring area under various conditions, e.g. different light conditions.

802 The systems should be capable of accommodating different vehicle profiles e.g. snow ploughs, tow
803 trucks etc.

804

4.3.1 Uplinks of alerts from a ground server

806 A ground server shall provide information used for conflict calculation.

807 Constraints could be:

808   • The ground server must be configured to deliver vehicle specific alerts that may be different
809   from those used for a controller

810   • The ATCO and driver systems should be distinct systems in order provide some measure of
811   redundancy in the event of failure of one of the systems

812   • slower response time in both directions,

813   • poorer precision and an overall slower service due to lack of possibilities to send position
814   reports with the same frequency using ADS-B as is possible with a e.g. GPS transmitter in a
815   vehicle,

816   • the vehicle must be equipped with ADS-B or by any other means to send position reports,

817   • increased complexity,

818   • radio shadows

819

4.3.2 Alerts triggered on-board of the vehicle due to technical failures

822 The technical system could fail in receiving and/or transforming crucial information to an alert in the
823 vehicle.

824 If the system in a vehicle fails to receive accessible ADS-B data or other adequate data, e.g. Data
825 Link, not having aircraft displayed on the moving map, would prevent the system detecting a
826 hazardous situation and the driver should be informed so as to adapt his behaviour or follow the
827 relevant local procedure.

5 Use Cases

828

829 Various situations occur when there is a need to provide traffic alerts on the manoeuvring area since
830 aircraft and vehicles both operate on it and often in close proximity. As a prerequisite for the alerting
831 service, a moving map needs to be installed on the vehicle. Three zones will be defined (cf. Figure 7
832 for the validation trials: runway zone, buffer zone and taxiway zone. To allow for local adaptations, it
833 should be possible to parameterise these zones.
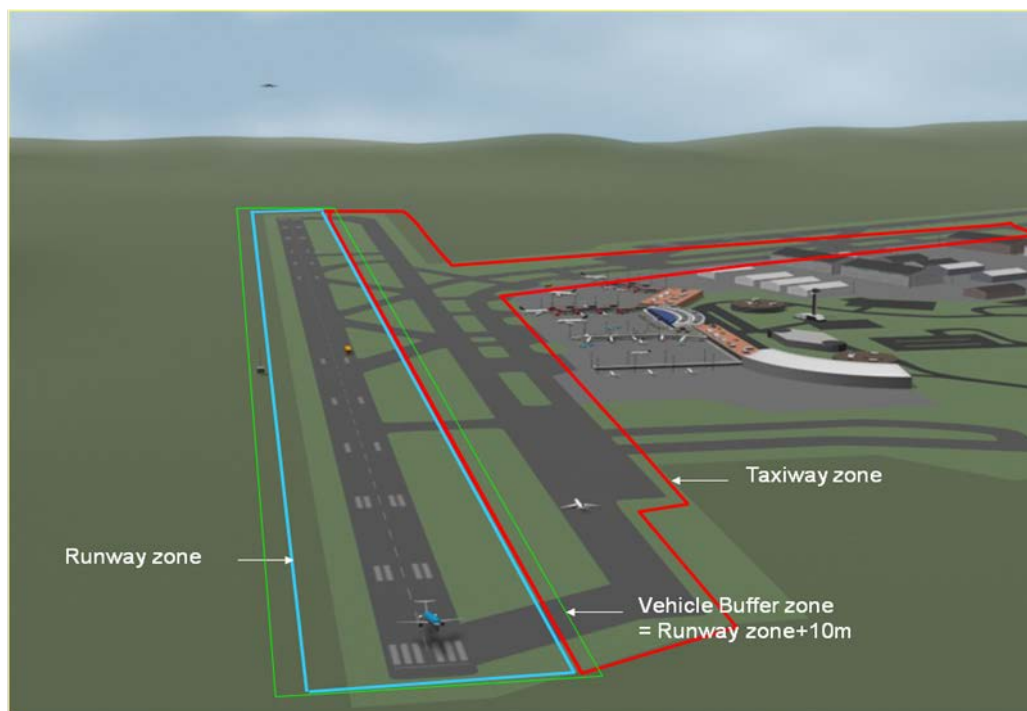
834

835 Figure 7: Zone description

836 In the case of a conflict with an aircraft and according to the nature of that conflict, two alert levels are
837 defined: caution and warning alerts (cf. Ch. 1.6). These alerts are either generated by the on board
838 system for the vehicle driver or uplinked to the vehicle.

839 When a user receives an alert related to his position he should apply the adequate procedure,
840 examples are defined in Table 8: Procedures for traffic alert detection, according to the alert level.

Alert Level	VEHICLE DRIVER
Normal Ops Only awareness, not alert	The driver maintains continuous R/T contact with ATC.
Buffer zone info Awareness and alert	The driver shall monitor his position very closely in order not to penetrate the runway zone which can be done with the help of buffer zone information. If he enters the buffer zone there will be a caution alert and the driver shall follow local regulations.
Caution Alert	The driver shall start to vacate the area and contact ATC for instructions/follow local regulations.
Warning Alert	The driver shall clear the area immediately and contact ATC for instructions/follow local regulations.

841 Table 8: Procedures for traffic alert detection

842 Three main categories of Use Cases are being described in the following sub-chapter, where each of
843 them will be split into detailed use cases.

844 - 1. Traffic alerts for vehicles in the runway zone (UC1.X)

845 - 2. Traffic alerts for vehicles in the taxiway zone (UC2.X)

846 - 3. Alerts for vehicles for infringement of restricted or closed areas (UC3.X)

847

848 **Use Cases**

849 UC 1.1 Vehicle in runway zone, aircraft on approach 25-40 seconds from runway zone

850 UC 1.2 Vehicle in runway zone, aircraft on approach 25 seconds from runway zone

851 UC 1.3 Vehicle in runway zone, aircraft taking off

852 UC 1.4 Vehicle enters runway zone behind aircraft taking off

853 UC 1.5 Vehicle in runway zone, aircraft lining up

854 UC 2.1 Vehicle to aircraft merging path

855 UC 2.2 Vehicle follows behind aircraft

856 UC 2.3 Vehicle and aircraft opposite direction

857 UC 2.4 Vehicle on a taxiway and an aircraft is approaching from behind

858 UC 3.1 Vehicle is inside restricted/closed area when area is activated

859 UC 3.2 Vehicle in buffer zone

860 UC 3.3 Vehicle enters runway zone

861

862 5.1 Traffic alerts for vehicles in the runway zone

863 Various situations occur where there is a need for traffic alerts in the runway zone. Aircraft and
864 vehicles both operate on the runway often in close proximity. All suggested times and distances are
865 parameters that will be validated in trials and can be adapted to local needs.

866 Two zones will be defined for the validation trials: a runway zone and a buffer zone.

867 A runway zone includes the runway and an area around it that is considered safe for aircraft when
868 operating on the runway. Alerts are triggered when needed.

869 A buffer zone is defined in connection with the runway zone and will provide the vehicle driver with an
870 increased situational awareness. A vehicle inside the buffer zone is subject to receive information
871 presented on the moving map highlighting the fact that he is in close proximity (in this case 10m, a
872 parameter that has to be validated) of a runway zone and therefore should be cautious.

873 For all types of alerts in the runway zone, one set of lateral dimensions should be used to describe
874 the zone where the alarm will be triggered (e.g. rwy zone alert 150m and lateral parameter 90m for
875 landing alert).

876 Typical situations will be studied and described in different use cases.

877

878 5.1.1 UC 1.1 Vehicle in runway zone, aircraft on approach 25-40
879   seconds from runway zone

880 **General Conditions (Scope and Summary)**

881 This use case describes how the system detects an aircraft on approach, with 25 seconds or more
882 from the runway zone, when a vehicle is inside the runway zone.

883

Pre-conditions
885 The vehicle is equipped with an alerting system and a moving map.

886

Post Conditions
888 A caution alert is presented on the moving map to the vehicle driver who will act according to local
889 regulations.

890

Actors
892 Vehicle driver, flight crew and tower runway controller

893

Trigger
895 The aircraft is on final between 25-40 seconds from the runway zone

896

Main Flow

898   1.   A vehicle is inside the runway zone

899   2.   An aircraft is on approach within more than 25 seconds from runway zone

900   3.   A caution alert is triggered and presented on the vehicle moving map

901   4.   Vehicle driver starts to vacate the runway zone

902   5.   Vehicle driver contacts ATC for instructions

903   6.   When the vehicle is out of the runway zone the alert is ended

904   7.   The use case is ended
905

Alternative Flows

907   8.   Tower runway controller gives the vehicle driver clearance to remain in the runway zone a
908   while more if considered safe (e.g. to finalise a runway inspection)

909   9.   Vehicle driver leaves the runway zone

910   10. When the vehicle is out of the runway zone the alert is ended

911   11. The use case is ended

912

Failure Flows

914   12. In the case where an alarm is not triggered due to Alerting system failure then (as today) only
915   the tower runway controller and the vehicle driver can identify the potentially hazardous
916   situation and resolve the problem as quickly and safely as possible.

917   13. In case of an alert the vehicle driver starts to vacate the runway zone and contacts ATC to
918   report it. All alert situations shall be reported according to local procedures, including false
919   alerts.

5.1.2 UC 1.2 Vehicle in runway zone, aircraft on approach less than 25 seconds from runway zone

General Conditions (Scope and Summary)
923 This use case describes how the system detects an aircraft on approach with less than 25 seconds
924 from the runway zone when a vehicle is inside the runway zone.

925

Pre-Conditions
927 The vehicle is equipped with an alerting system and a moving map.

928

Post Conditions
930 A warning alert is presented on the moving map to the vehicle driver who will act according to local
931 regulations.

932

Actors
934 Vehicle driver, flight crew and tower runway controller

935

Trigger
937 The aircraft is on final less than 25 seconds from the runway zone

938

Main Flow

940   1. A vehicle inside the runway zone

941   2. An aircraft on approach within 25 seconds from the runway zone

942   3. A warning alert is triggered and presented on the vehicle moving map

943   4. Vehicle driver vacates the runway zone immediately

944   5. Vehicle driver contacts ATC for instructions

945   6. When the vehicle is out of the runway zone the alert is ended

946   7. The use case is ended

Alternative Flows

948   8. Vehicle driver realises the situation before an alert is triggered in the vehicle

949   9. Vehicle driver leaves the runway zone immediately

950   10. When the vehicle is out of the runway zone the alert is ended

951   11. The use case is ended

952

Failure Flows

954   8. In the case where an alarm is not triggered due to alerting system failure then (as today) only
955   the tower runway controller and the vehicle driver can identify the potentially hazardous situation
956   and resolve the problem as quickly and safely as possible.

957   9. In case of an alert the vehicle driver starts to vacate the runway zone and contacts ATC to
958   report it. All alert situations shall be reported according to local procedures, including false alerts.

959   10. If necessary flight crew make a go around

5.1.3 UC 1.3 Vehicle in runway zone, aircraft taking off

General Conditions (Scope and Summary)
962 This use case describes how the system detects an aircraft about to take off, velocity > 20 knots, with
963 a vehicle inside the runway zone ahead of the aircraft.

964

Pre-Conditions
966 The vehicle is equipped with an alerting system and a moving map.

967

Post Conditions

A warning alert is presented on the moving map to the vehicle driver who will act according to local regulations.

971

Actors

Vehicle driver, flight crew and tower runway controller

974

Trigger

An aircraft on the runway about to take off

977

Main Flow

1. A vehicle is inside the runway zone
2. An aircraft is on the runway
3. An aircraft start its take off roll, velocity > 20 knots
4. A warning alert is triggered and presented on the vehicle moving map
5. Vehicle driver vacates the runway zone immediately
6. Vehicle driver contacts ATC for instructions
7. When the vehicle is out of the runway zone the alert is ended
8. The use case is ended

987

Alternative Flows

9. Vehicle driver realises the situation before an alert is triggered in the vehicle
10. Vehicle driver vacates the runway zone immediately
11. When the vehicle is out of the runway zone the alert is ended
12. The use case is ended

993

Failure Flows

13. In the case where an alarm is not triggered due to alerting system failure then (as today) only the tower runway controller and the vehicle driver can identify the potentially hazardous situation and resolve the problem as quickly and safely as possible.

14. In case of an alert the vehicle driver starts to vacate the runway zone and contacts ATC to report it. All alert situations shall be reported according to local procedures, including false alerts.

5.1.4 UC 1.4 Vehicle entering the runway zone behind an aircraft taking off

General Conditions (Scope and Summary)

This use case describes how the system detects an aircraft about to take off and a vehicle is cleared to enter the runway zone behind.

1006

Pre-Conditions

The vehicle is equipped with an alerting system and a moving map.

1009

Post Conditions

1011
1012 A caution alert is presented on the moving map to the vehicle driver who will act according to local regulations.

1013

Actors

1015 Vehicle driver, tower runway controller

1016

Trigger

1018 Vehicle entering the runway zone behind an aircraft about to take off

1019

Main Flow

1021   1. An aircraft is lined up and is taking off

1022   2. A vehicle enters the runway zone behind the departing aircraft

1023   3. A caution alert is triggered and presented on the vehicle moving map

1024   4. Vehicle driver starts to vacate the runway

1025   5. Vehicle driver contacts ATC for instructions

1026   6. Aircraft is airborne

1027   7. The use case is ended

Alternative Flows

1029   8. Tower runway controller is situationally aware of the situation before an alert is triggered in
1030   the vehicle.

1031   9. Tower runway controller gives a new clearance or instruction to proceed along the runway
1032   behind the departing aircraft

1033   10. The use case is ended

Failure Flows

1035   11. In the case where an alarm is not triggered due to alerting system failure then (as today)
1036   only the tower runway controller and the vehicle driver can identify the potentially hazardous
1037   situation and resolve the problem as quickly and safely as possible.

1038   12. In case of an alert the vehicle driver starts to vacate the runway zone and contacts ATC to
1039   report it. All alert situations shall be reported according to local procedures, including false
1040   alerts.

5.1.5 UC 1.5 Vehicle in runway zone, aircraft lining up

General Conditions (Scope and Summary)

1043
1044 This use case describes how the system detects an aircraft about to line up on the runway, with a velocity < 20 knots, with a vehicle already in the runway zone.
1045

Pre-Conditions

1047 The vehicle is equipped with an alerting system and a moving map.

1048

Post Conditions

A warning alert is presented on the moving map to the vehicle driver who will act according to local regulations.

Actors

Vehicle driver and tower runway controller

Trigger

An aircraft is lining up on the runway and a vehicle is in the runway zone

Main Flow

1. An aircraft is lining up on the runway holding its position

2. A vehicle is in the runway zone and information is presented about aircraft position on the vehicle moving map to increase driver situational awareness.

3. A warning alert is triggered and presented on the vehicle moving map

4. Vehicle driver prepares to vacate the runway and contacts ATC

5. Vehicle driver vacates the runway zone immediately

6. The aircraft departs

7. The use case is ended

Alternative Flows

1. The tower runway controller is situationally aware of the situation before an alert is triggered in the vehicle.

2. The tower runway controller instructs the flight crew of the aircraft to hold on line up

3. The vehicle driver completes the task and vacates the runway zone

4. The aircraft departs

5. The use case is ended

Failure Flows

6. In the case where an alarm is not triggered due to alerting system failure then (as today) only the tower runway controller and the vehicle driver can identify the potentially hazardous situation and resolve the problem as quickly and safely as possible.

7. In case of an alert the vehicle driver starts to vacate the runway zone and contacts ATC to report it. All alert situations shall be reported according to local procedures, including false alerts.

5.2 Traffic alerts for vehicles on taxiways

The taxiway zone is in line with the manoeuvring area excluding the runway zone. Normally a vehicle driver always gives way to an aircraft (if not instructed otherwise). If a hazardous situation on a taxiway occurs, the vehicle driver will receive a warning alert. The vehicle driver shall follow the rules and regulations for these kinds of situations to avoid increasing the severity of an upcoming situation. S/he shall request an alternative clearance from ATC. Figure 8 shows an example for merging taxiways.

Figure 8: Example for alerts for vehicle drivers on merging taxiways

5.2.1 UC 2.1 Vehicle to aircraft merging path

General Conditions (Scope and Summary)

This use case describes the behaviour of the system when an aircraft is cleared to taxi on a certain taxiway and a vehicle is moving on a merging path. Neither the aircraft nor the vehicle has received a restriction to give way to the other and they are likely to collide unless either of them carries out an avoiding action.

Pre-Conditions

The vehicle is equipped with an alerting system and a moving map.

Post Conditions

A warning alert is presented on the moving map to the vehicle driver who will act according to local regulations.

Actors

Vehicle driver, flight crew, tower ground controller

Trigger

The vehicle is on a merging path with an aircraft with a possible conflict arising.

Main Flow

1. A vehicle and an aircraft are heading towards a merging path of a taxiway.

2. Vehicle driver´s predicted trajectory vector function will sense that there is a risk of collision

3. A warning alert is triggered and target is presented on the vehicle moving map

4. Vehicle driver stops or makes an avoiding action (according to local regulations)

5. When the situation is solved the alert is ended.

6. Vehicle driver contacts the tower ground controller for instructions

7. The use case is ended.

Alternative Flows

8. Tower ground controller realises the situation before an alert is triggered in the vehicle.

9. Tower ground controller gives a new clearance or instruction

10. When the situation is solved the alert is ended.

1126   11. The use case is ended.

1127   or

1128   12. Vehicle driver realises the situation before an alert is triggered in the vehicle

1129   13. Vehicle driver stops or makes an avoiding action

1130   14. When the situation is solved the alert is ended

1131   15. The use case is ended

1132

Failure Flows

1134   16. In the case where an alarm is not triggered due to alerting system failure then (as today)
1135   only the tower runway/ground controller and the vehicle driver can identify the potentially
1136   hazardous situation and resolve the problem as quickly and safely as possible.

1137   17. In case of an alert the vehicle driver starts to vacate the taxiway zone and contact ATC to
1138   report it. All alert situations shall be reported according to local procedures, including false
1139   alerts

5.2.2 UC 2.2 Vehicle follow behind aircraft

General Conditions (Scope and Summary)

This use case describes when a vehicle is moving behind an aircraft on the same taxiway and the alert which Vehicle Driver will receive if the vehicle catches up with the aircraft.

Pre-Conditions

The vehicle is equipped with an alerting system and a moving map.

Post Conditions

A warning alert is presented on the moving map to the vehicle driver who will act according to local regulations.

Actors

Vehicle driver, flight crew, tower ground controller

Trigger

The vehicle is catching up with an aircraft.

Main Flow

1159   1. Vehicle is following an aircraft on the taxiway

1160   2. Vehicle driver's predicted trajectory vector will indicate when catching up with an aircraft

1161   3. A warning alert is triggered and target is presented on the vehicle moving map

1162   4. Vehicle driver stops or makes an avoiding action (according to local regulations)

1163   5. When the situation is solved the alert is ended

1164   6. Vehicle driver contacts the tower ground controller for instructions

1165   7. The use case is ended

1166

Alternative Flows

8. Tower ground controller realises the situation before an alert is triggered in the vehicle.

9. Tower ground controller gives a new clearance or instruction

10. When the situation is solved the alert is ended.

11. The use case is ended

    or

12. Vehicle driver realises the situation before an alert is triggered in the vehicle

13. Vehicle driver stops or makes an avoiding action (e.g. slow down)

14. When the situation is solved the alert is ended

15. The use case is ended

Failure Flows

16. In the case where an alarm is not triggered due to alerting system failure then (as today) only the tower runway/ground controller and the vehicle driver can identify the potentially hazardous situation and resolve the problem as quickly and safely as possible.

17. In case of an alert the vehicle driver starts to vacate the taxiway zone and contacts ATC to report it. All alert situations shall be reported according to local procedures, including false alerts

5.2.3 UC 2.3 Vehicle and aircraft opposite direction

General Conditions (Scope and Summary)
This use case describes an aircraft cleared to taxi in one direction and a vehicle that is moving in the opposite direction towards the aircraft.

Pre-Conditions
The vehicle is equipped with an alerting system and a moving map.

Post Conditions
A warning alert is presented on the moving map to the vehicle driver who will act according to local regulations.

Actors
Vehicle driver, flight crew, tower ground controller

Trigger
A vehicle and an aircraft are opposite on a taxiway and a possible conflict is indicated.

Main Flow

1. The vehicle is heading towards an aircraft from its opposite direction.

2. Vehicle driver's predicted trajectory vector will detect the conflict

3. A warning alert is triggered and target is presented on the vehicle moving map

4. Vehicle driver makes an avoiding action (according to local regulations)

5. When situation is solved the alert is ended.

6. Vehicle driver contacts the tower ground controller for instructions

7. The use case is ended

Alternative Flows

8. Tower ground controller realises the situation before an alert is triggered in the vehicle.

9. Tower ground controller gives a new clearance or instruction

10. The use case is ended

   OR

11. Vehicle driver realises the situation before an alert is triggered in the vehicle

12. Vehicle driver stops or makes an avoiding action

13. When the situation is solved the alert is ended

14. The use case is ended

Failure Flows

15. In the case where an alarm is not triggered due to Alerting system failure then (as today) only the air traffic/ground controller and the vehicle driver can identify the potentially hazardous situation and resolve the problem as quickly and safely as possible.

16. In case of an alert the vehicle driver starts to vacate the taxiway zone and contacts ATC to report it. All alert situations shall be reported according to local procedures, including false alerts

5.2.4 UC2.4 Vehicle on a taxiway and an aircraft is approaching from behind

General Conditions (Scope and Summary)
This use case describes a vehicle (e.g. a follow-me vehicle) parked on a taxiway and an aircraft approaches from behind.

Pre- Conditions
The vehicle is equipped with an alerting system and a moving map.

Post Conditions
A warning alert is presented on the moving map to the vehicle driver who will act according to local regulations.

Actors
Vehicle driver, flight crew, tower ground controller

Trigger
A vehicle is on the taxiway and an aircraft is approaches from behind and the alerting function indicates a possible conflict.

1250

Main Flow

1251

1252   1. The vehicle is parked on a taxiway awaiting an aircraft awaiting guidance to a stand

1253   2. The aircraft's predicted trajectory vector will detect the conflict with the vehicle

1254   3. A warning alert is triggered and target is presented on the vehicle moving map

1255   4. Vehicle driver is made aware of the approaching aircraft's position relative to his vehicle and
1256   proceeds according to local regulations/requirements

1257   5. Vehicle driver mutes the warning alert to avoid continuous nuisance alert.

1258   6. Vehicle driver proceeds to allocated stand /parking area

1259   7. The use case is ended

1260

Alternative Flows

1261

1262   8. Tower ground controller instructs the flight crew to taxi behind the follow-me vehicle .The
1263   flight crew is made aware of the presence of the vehicle realises the situation before an alert
1264   is triggered in the vehicle.

1265   9. The aircraft proceeds to allocated stand behind the follow-me vehicle

1266   10. The Use Case is ended

1267

Failure Flows

1268

1269   11. In the case where an alarm is not triggered due to alerting system failure then (as today).the
1270   flight crew stops behind the follow-me vehicle or the vehicle driver observes the aircraft
1271   approaching in the rear view mirror.

1272   12. In case of an alert the vehicle driver starts to move forward and guide. The vehicle driver
1273   can mute the alert as required to avoid nuisance alerts as the aircraft follows the vehicle. All
1274   alert situations shall be reported according to local procedures, including false alerts

5.3 Vehicle alerts on restricted/closed areas

1275

1276   The taxiway zone is the manoeuvring area excluding the runway zone. Restricted/closed areas can
1277   be found all over the movement area. The validation will consider restricted/closed areas on the
1278   manoeuvring area and infringements will be studied from a strict vehicle point of view.

1279   The restricted/closed areas are to be displayed on the moving map. This should be true for long term
1280   closings as well as for short term ones. ATC and/or airport authorities are responsible for the update
1281   of the restricted/closed areas. It is desired that information about closings are automatically uploaded
1282   into the moving map once they are in effect.

1283   Closed areas are normally only closed for aircraft and are normally working areas for vehicles of
1284   different kinds.

5.3.1 UC 3.1 Vehicle is inside a restricted/closed area or when area
1285
1286   is activated

General Conditions (Scope and Summary)

1287

1288   A vehicle is on the taxiway and enters an area that is restricted/closed –or where a restricted/closed
1289   area is scheduled to be activated. The area is activated while the vehicle is inside it. The vehicle
1290   driver receives an alert and act according to local regulations. Or a vehicle enters an area that is
1291   restricted/closed.

1292

Pre-Conditions

The vehicle is equipped with an alerting system and a moving map which is correctly updated with information about the restriction.

Post Conditions

A caution alert is presented on the moving map to the vehicle driver who will act according to local regulations and informs ATC about his position.

Actors

Vehicle driver, tower runway controller

Trigger

The restricted/closed area is activated and the vehicle driver enters the restricted/closed area or the area is activated while the vehicle is inside it

Main Flow

1. A vehicle driver is on taxiway
2. A vehicle enters a restricted/closed area or restricted/closed area is activated
3. A caution alert is triggered in the vehicle
4. Vehicle driver follows local regulations e.g. vacates the area
5. Vehicle driver contacts the tower ground controller for instructions
6. The use case is ended

Alternative Flows

7. Tower ground controller realises the situation before an alert is triggered in the vehicle
8. Tower ground controller gives a new clearance or instructions
9. The use case is ended

Failure Flows

10. In the case where an alarm is not triggered due to alerting system failure then (as today) only the tower ground controller and the vehicle driver can identify the potentially hazardous situation and resolve the problem as quickly and safely as possible.

11. In case of an alert the vehicle driver starts to vacate the restricted/closed and contacts ATC to report it. All alert situations shall be reported according to local procedures, including false alerts

5.3.2 UC 3.2 Vehicle in buffer zone

General Conditions (Scope and Summary)

A vehicle is in the buffer zone without having received clearance from ATC.

Pre-Conditions

The vehicle is equipped with an alerting system and a moving map.

1335

Post Conditions
A caution alert is presented on the moving map to the vehicle driver who will vacate the buffer zone and inform ATC about the position of the vehicle.

Actors
Vehicle driver, flight crew and tower runway and tower ground controller

Trigger
The vehicle driver is entering the buffer zone

Main Flow
1. Vehicle driver heads towards the buffer zone
2. Vehicle enters the buffer zone
3. An caution alert is triggered in the vehicle
4. Vehicle driver follows local procedures e.g. vacates the buffer zone
5. Vehicle driver contacts tower ground or tower runway controller for instructions
6. When situation is solved alert is ended
7. The use case is ended

Alternative Flows
8. Tower ground controller realises the situation before an alert is triggered in the vehicle
9. Tower ground controller gives a new clearance or instruction
10. The Use case is ended

Failure Flows
11. In the case where an alarm is not triggered due to alerting system failure then (as today) only the tower runway controller and the vehicle driver can identify the potentially hazardous situation and resolve the problem as quickly and safely as possible.

12. In case of an alert the vehicle driver follow local regulations (e.g. vacates the buffer zone) and contacts ATC to report it. All alert situations shall be reported according to local procedures, including false alerts.

5.3.3 UC 3.3 Vehicle enters runway zone
General Conditions (Scope and Summary)
A vehicle is entering the runway zone without having received clearance from ATC.

Pre-Conditions
The vehicle is equipped with an alerting system and a moving map.

Post Conditions

A warning alert is presented on the moving map to the vehicle driver who shall follow local regulations e.g. s/he vacates the runway zone and inform ATC about the position of the vehicle.

Actors

Vehicle driver, flight crew and tower runway and tower ground controller

Trigger

The vehicle driver predicted trajectory vector indicates entering the runway zone

Main Flow

1. Vehicle driver heads towards the runway zone

2. Vehicle enters runway zone

3. A warning alert is triggered in the vehicle

4. Vehicle driver vacates the runway zone (follows local regulations)

5. Vehicle driver contacts the tower runway controller or tower ground controller for instructions

6. When situation is solved alert is ended

7. The use case is ended

Alternative Flows

8. Tower ground controller realises the situation before there is an alert in the vehicle

9. Tower ground controller gives a new clearance or instruction

10. The use case is ended

Failure Flows

11. In the case where an alarm is not triggered due to alerting system failure then (as today) only the tower runway controller and the vehicle driver can identify the potentially hazardous situation and resolve the problem as quickly and safely as possible.

12. In case of an alert the vehicle driver starts to vacate the runway zone and contact ATC to report it. All alert situations shall be reported according to local procedures, including false alerts.

6 Requirements

This section outlines the requirements about the various alerts provided by the system and the requirements for the functionality of the VDS, GDT and the AMM.

The VDS is the overall display unit upon which layers that include AMM and the GDT are displayed. The AMM displays the airport geography and the vehicle's "own position" and the GDT displays surrounding mobiles. The VDS also includes the display for alerts that have been triggered either by the on-board system or by the central A-SMGCS server. Requirements are numbered as follows:

HMI/Procedures: REQ-06.07.01-OSED-AVDR.01xx

Alerting Service: REQ-06.07.01-OSED-AVDR.02xx

Airport Moving Map: REQ-06.07.01-OSED-AVDR.03xx

Ground Traffic Display: REQ-06.07.01-OSED-AVDR.04xx

System: REQ-06.07.01-OSED-AVDR.05xx

6.1 HMI & Procedures

[REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0101
Requirement	A Caution Alert shall be composed of a visual and audio aspects on the vehicle HMI and in accordance with local recommendations
Title	Caution alert associated with detected alerting situation
Status	<Validated>
Rationale	To provide dual method of providing alerts to vehicle drivers
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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-AVDR.0102
Requirement	A Warning Alert shall be composed of a visual and audio aspects on the vehicle HMI and in accordance with local recommendations
Title	Warning alert associated with detected alerting situation
Status	<Validated>
Rationale	To provide dual method of providing alerts to vehicle drivers
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>

<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1427
1428
1429   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0103
Requirement	The vehicle driver shall follow local regulations when alerted with a Caution Alert
Title	Caution alert triggered associated with detected alerting situation
Status	<Validated>
Rationale	Procedures should be developed according to local requirements and conditions
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1430
1431   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1432
1433
1434   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0104
Requirement	The vehicle driver shall follow local regulations when alerted with a Warning Alert
Title	Warning alert triggered associated with detected alerting situation
Status	<Validated>
Rationale	Procedures should be developed according to local requirements and conditions
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1435
1436   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1437
1438
1439   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0105
Requirement	The vehicle driver shall select the clearance acknowledge function when

	he/she is provided with a runway clearance.
Title	Clearance acknowledge
Status	<Validated>
Rationale	In order to avoid an alert in a situation when the vehicle driver is cleared to be in the runway zone the driver shall select the clearance acknowledge on his HMI
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1440
1441   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1442
1443
1444   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0106
Requirement	The Vehicle Driver shall receive alerts when on the manoeuvring area when in or outside the vehicle.
Title	Alerts on manoeuvring area
Status	<Validated>
Rationale	The vehicle driver must be sure of receiving alerts even if he is outside his vehicle and the vehicle engine is turned off.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1445
1446   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1447
1448
1449   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0107
Requirement	The Vehicle Driver shall receive alerts independent of whether the engine is running or not when on the manoeuvring area.
Title	Alerts when engine off.
Status	<Validated>
Rationale	The alerting function must also need to be available when the engine is not running (if locally allowed to do so on the manoeuvring area).
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1450
1451   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1452
1453
1454   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0112
Requirement	The VDS shall have the functionality to indicate on the display if LVP conditions are active.
Title	LVP condition indication
Status	<Validated>
Rationale	The LVP conditions could be of influence for the use of the alerting system for vehicle drivers
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1455
1456   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1457
1458
1459   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0113
Requirement	The VDS shall have the functionality to adjust the display, brightness, zoom and orientation as locally required
Title	Display and Driver HMI
Status	<Validated>
Rationale	The display should adjust for local ambient conditions and driver HMI needs
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1460
1461   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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 Alerting service

[REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0205
Requirement	The vehicle driver shall not receive an alert if he/she exits the runway and returns to the same runway zone within a very short time period.
Title	Alerting tolerance
Status	<Validated>
Rationale	Adapted time frame to provide for a reduced number of nuisance alerts to allow cleared vehicles to move in and out of the runway zone (e.g. snow sweepers clearing diagonal taxiways leading from the runway zone into the taxiway and back).
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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-AVDR.0206
Requirement	The vehicle driver shall receive a caution alert when in the buffer zone.
Title	Caution alert associated to a detected alerting situation
Status	<Validated>
Rationale	Support the vehicle driver in knowing that he is coming close to the runway zone.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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-AVDR.0207
Requirement	The vehicle driver shall receive a warning alert for traffic when the vehicle and the aircraft predicted trajectories intersect within a pre-determined time parameter.

Title	Traffic alert triggered associated with detected alerting situation vehicle and aircraft.
Status	<Validated>
Rationale	To avoid hazardous situation with regards to vehicle and aircraft.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1474

1475   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1476

1477

1478   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0208
Requirement	The vehicle driver shall receive a warning alert when in the runway zone without an "acknowledged " ATC clearance
Title	Warning alert triggered associated with unacknowledged clearance to enter runway zone runway
Status	<In Progress>
Rationale	Avoid hazardous situation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1479

1480   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1481

1482

1483   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0209
Requirement	In a situation of multiple alerts at the same time the VDS shall visually display all alerts.
Title	Display all active alerts visual
Status	<Validated>
Rationale	The vehicle drivers should be aware of all the different issues causing a problem at a moment in order to take the right decision in a dangerous situation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1484

1485   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1486
1487
1488   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0210
Requirement	In a situation of multiple alerts at the same time only the aural signal of the alert having the highest priority shall be activated. The priority list may be defined based on local implementation preferences.
Title	Aural signal of alert highest priority
Status	<Validated>
Rationale	Mixed aural alerts at the same time will make the situation confusing for the vehicle driver.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1489
1490   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1491
1492
1493   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0211
Requirement	In the case of a caution alert, the alert shall be self-cancelling after a pre-determined period of time or when the alert no longer exists. This time period will be determined by local regulations.
Title	Self- cancelling of alert following set time period or resolution of alert situation
Status	<Validated>
Rationale	Situation no longer exists or sufficient time has elapsed for drive to have been made aware of the situation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1494
1495   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets	N/A

		systems for airport vehicles	
<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

1496
1497
1498   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0212
Requirement	In the case of a warning alert, the aural and visual alerts shall continue until the situation has been resolved.
Title	Continuous aural and visual alert during warning alert
Status	<Validated>
Rationale	Situation is still considered a hazard until resolved
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1499
1500   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1501
1502
1503   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0213
Requirement	In the case of an infringement of an area of the manoeuvring area the area concerned shall be highlighted along with the appropriate aural alert
Title	Highlighting of infringement area during caution alert
Status	<Validated>
Rationale	Visual alert the driver of the area concerned
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1504
1505   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1506
1507
1508   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0214
Requirement	A warning alert shall always have a higher priority than a caution alert
Title	Warning priority over caution
Status	<Validated>

Rationale	The most important alert shall be prioritized
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1509
1510 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1511
1512
1513 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0215
Requirement	Alerting time given to the drivers shall be the stated time plus an additional transmission/processing time.
Title	Transmission and processing alerting time
Status	<Validated>
Rationale	To ensure that declared alerting time period is adhered to
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1514
1515 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1516
1517
1518 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0218
Requirement	Aural alerts shall be a word determined by local regulation
Title	Wording for aural alerts
Status	<Validated>
Rationale	It's important that the aural alerts allow for immediate attention of the vehicle driver of the kind of alert such as "Traffic "or " Runway" or in the local language as determined by local regulation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1519
1520 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>

<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1521
1522
1523 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0223
Requirement	The vehicle driver shall receive a warning or caution alert when in the runway zone and an aircraft is on approach depending on aircraft time to the RWY zone.
Title	Warning and caution alerts triggered associated with detected alerting situation
Status	<Validated>
Rationale	Avoid hazardous situation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1524
1525 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1526
1527
1528 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0224
Requirement	The vehicle driver shall receive an appropriate alert when in the runway zone and when an aircraft is operating on the runway or has commenced take-off roll.
Title	Caution/Warning alerts triggered associated with detected alerting situation
Status	<Validated>
Rationale	Avoid hazardous situation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1529
1530 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1531
1532
1533 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0225
Requirement	Warning and caution alerts should be displayed differently.
Title	Warning and caution alert display
Status	<Validated>
Rationale	Visual indication to driver the nature of the alert and area concerned
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1534

1535 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1536

6.3 Airport Moving Map

1537

1538 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0301
Requirement	The AMM shall display locally determined geographical features.
Title	Display geographical features
Status	<Validated>
Rationale	To be able to gain situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1539

1540 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1541

1542

1543 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0302
Requirement	The AMM shall indicate the runway zone, taxiway zone and where applicable, buffer zone.
Title	Runway and Buffer zones indicator
Status	<Validated>
Rationale	To prevent runway incursions
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1544

1545 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1546
1547
1548   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0303
Requirement	The AMM should indicate the current runway status.
Title	Runway status indication
Status	<In Progress>
Rationale	To provide situational awareness however if the runway status is not known then it should be considered as active
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1549
1550   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1551
1552
1553   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0304
Requirement	The AMM shall (dynamically) indicate restricted/closed areas on manoeuvring areas based on the actual status
Title	Restricted/closed area indication
Status	<In Progress>
Rationale	To provide situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1554
1555   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1556
1557

1558   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0307
Requirement	Only one agency shall perform AMM updates regarding airport layout.
Title	AMM update responsibility
Status	<Validated>
Rationale	To prevent confusion in layout map differences so that airport map base layers are consistent in all systems.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1559
1560   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1561
1562
1563   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0308
Requirement	In situations where the system is coupled with the A-SMGCS server, only the agency in charge of A-SMGCS should apply AMM updates regarding airport layout.
Title	AMM update responsibility coupled to A-SMGCS
Status	<Validated>
Rationale	To prevent confusion in layout map differences so that airport map base layers are consistent in all systems.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1564
1565   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1566

6.4 Ground Traffic Display

1568   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0401
Requirement	The vehicle driver GTD shall highlight the aircraft causing the alert when a vehicle driver receives a traffic alert.
Title	Target display
Status	<Validated>
Rationale	Support the vehicle driver in identifying the cause for an alert by highlighting it.(by blinking symbol, enlarged symbol or other)

Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1569
1570   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1571
1572
1573   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0402
Requirement	The GTD should indicate the different types of surrounding traffic distinctively.
Title	Distinction surrounding traffic
Status	<Validated>
Rationale	To provide situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1574
1575   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1576
1577
1578   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0403
Requirement	The GTD shall display each mobile provided with a coupled identification label.
Title	GTD identification label
Status	<Validated>
Rationale	To provide situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1579
1580   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1581

1582

1583   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0404
Requirement	The GTD should indicate arriving and departing aircraft differently.
Title	Aircraft identification
Status	<Validated>
Rationale	To provide situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1584

1585   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1586

1587

1588   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0405
Requirement	The GTD should display the aircraft type of surrounding traffic.
Title	Aircraft type identification
Status	<Validated>
Rationale	To provide situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1589

1590   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1591

1592

1593   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0406
Requirement	The GTD function shall display the vehicle's own ship position with respect to the aerodrome layout and geographic locations.
Title	Own ship position
Status	<Validated>
Rationale	To gain situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1594
1595   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1596
1597
1598   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0407
Requirement	The Ground traffic display (GTD) function shall provide vehicle drivers with information on surrounding traffic (on the ground and airborne traffic) on the vehicle VDS.
Title	Ground traffic display
Status	<Validated>
Rationale	To provide situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1599
1600   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1601
1602

6.5 Vehicle Display System

1603
1604   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0501
Requirement	Authorized persons shall have access to all data recorded by the system incl. vehicle alerts and data presented on the HMI
Title	Record data for investigation
Status	<Validated>
Rationale	Gathered data shall be used for investigation purposes and safety improvement
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1605
1606   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	systems for airport vehicles	
<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

1607

1608

1609   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0502
Requirement	When the profile is selected at start-up of the VDS the system should be capable of accepting different vehicle profiles and automatically adjust speed vectors and trigger time to generate an alert
Title	To address local requirements for different vehicle types and modes of operation
Status	<In Progress>
Rationale	To allow for these differences when configuring and tuning the VDS to local needs, different parameters can be saved in separate profiles
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1610

1611   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1612

1613

1614   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0503
Requirement	The VDS shall be able to perform a self-diagnosis to check its current GNSS status.
Title	GNSS status determination
Status	<Validated>
Rationale	To be alerted in case of an malfunction of the system
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1615

1616   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1617

1618

1619   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0504

Requirement	After each start-up the VDS should auto check if the latest map data version is installed on this particular device.
Title	Auto-check map version
Status	<Validated>
Rationale	Regular check to verify if the latest map updates are installed
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1620

1621   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1622

1623

1624   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0505
Requirement	The VDS should auto check if the latest software version is installed on this particular device.
Title	Auto-check system software version
Status	<Validated>
Rationale	Regular check to verify if the latest software updates are installed by comparing the versions of the installed software with the one on the server.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1625

1626   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1627

1628

1629   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0506
Requirement	The VDS should indicate if the map version installed is not the latest version
Title	Airport map version indication
Status	<Validated>
Rationale	To prevent having maps based upon wrong information to be done by comparing version numbers via datalink
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1630

1631   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1632

1633

1634 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0507
Requirement	The VDS should indicate if the software installed is not the latest version.
Title	Software version indication
Status	<Validated>
Rationale	To prevent having outdated software on-board (e.g. regarding alerting functionality). to be done by comparing version numbers via datalink
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1635

1636 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1637

1638

1639 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0508
Requirement	Only one agency shall perform dynamic information layer updates (such as LVP condition indication, restricted/closed area indication, RWY status indication).
Title	Dynamic information update responsibility
Status	<Validated>
Rationale	To avoid maps based upon contradictory information
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1640

1641 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1642

1643

1644 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0509
Requirement	The VDS shall be able to perform a self-diagnosis to check its current Data-link status.
Title	Data-link status
Status	<Validated>
Rationale	In order to be conscious about the system status
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1645

1646 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1647

1648

1649 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0510
Requirement	The VDS shall indicate a malfunction of the data-link system.
Title	Data-link status indication
Status	<Validated>
Rationale	In order to be conscious about the system status
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1650

1651 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1652

1653

1654 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0511
Requirement	The VDS shall indicate a malfunction of the GNSS.
Title	GNSS status indication
Status	<Validated>
Rationale	To be alerted in case of an malfunction of the system
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1655

1656 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1657

1658

1659　　[REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0512
Requirement	In the case of a malfunction of the system the driver shall follow procedures as laid down by the airport authority.
Title	GNSS status indication
Status	<Validated>
Rationale	Action to be followed in the case of a malfunction of the system
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1660

1661　　[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1662

1663

1664　　[REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0513
Requirement	The system should be capable of accepting different vehicle profiles.
Title	Profile selection
Status	<Validated>
Rationale	To allow for these differences when configuring and tuning the VDS to local needs, different parameters can be saved in separate profiles.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1665

1666　　[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1667

6.6 Deleted Requirements

Following consultation with those involved in the V2 and V3 validation trials and the Work Package Manager, it was decided that the following requirements were not required in the OSED. Requirements were refined and duplicates removed as findings from each of the V2 and V3 validation activities were applied to the concept. Some of the specific requirements and values deleted below now are contained in the associated SPR [18] and INTEROP [19]. These include:

- REQ-06.07.01-OSED-AVDR.0108
- REQ-06.07.01-OSED-AVDR.0109
- REQ-06.07.01-OSED-AVDR.0110
- REQ-06.07.01-OSED-AVDR.0111
- REQ-06.07.01-OSED-AVDR.0201
- REQ-06.07.01-OSED-AVDR.0202
- REQ-06.07.01-OSED-AVDR.0203
- REQ-06.07.01-OSED-AVDR.0204
- REQ-06.07.01-OSED-AVDR.0216
- REQ-06.07.01-OSED-AVDR.0217
- REQ-06.07.01-OSED-AVDR.0219
- REQ-06.07.01-OSED-AVDR.0220
- REQ-06.07.01-OSED-AVDR.0221
- REQ-06.07.01-OSED-AVDR.0222
- REQ-06.07.01-OSED-AVDR.0305
- REQ-06.07.01-OSED-AVDR.0306

[REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0008
Requirement	The vehicle driver shall select the clearance acknowledge when he is provided with a clearance to enter a restricted/closed area
Title	Clearance acknowledge
Status	<Deleted>
Rationale	In order to avoid an alert in a situation when the vehicle driver is cleared to be in a restricted/closed area the driver shall select the clearance acknowledge on his HMI
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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-AVDR.0012
Requirement	The vehicle driver shall receive a warning alert when the vehicle predicted

	trajectory vector intersect with a restricted/closed area within Tintersect_area seconds.(7 seconds recommended deriving from VALR)
Title	Warning alert triggered associated with detected alerting situation
Status	<Deleted>
Rationale	To avoid hazardous situation with regards to a restricted/closed area
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1697

1698   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1699

1700

1701   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0013
Requirement	The vehicle driver shall receive a warning alert when in the restricted/closed area at the time of activation of the area.
Title	Warning alert triggered associated with detected alerting situation in a restricted/closed area
Status	<Deleted>
Rationale	To be informed about the activation of the restricted/closed area
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1702

1703   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1704

1705

1706   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0021
Requirement	The driver of a follow me vehicle shall receive an caution alert when an aircraft is approaching the vehicle from the rear
Title	Caution alert triggered associated with a detected alerting situation
Status	<Deleted>
Rationale	Increase driver situational awareness of approaching traffic from behind
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

1707

1708   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6201.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6201.0003	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6201.0004	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A

1709
1710   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0015
Requirement	The vehicle driver shall receive the position of all surrounding aircraft within a radius of X meters (distance TBD)
Title	aircraft position displayed
Status	<Deleted>
Rationale	The vehicle driver will get a clear view of surrounding traffic
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

1711
1712   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1713
1714
1715   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0017
Requirement	The Vehicle Driver shall receive Vehicle Alerting System Health Modes and Status Conditions.
Title	Alerting system health mode and status
Status	<Deleted>
Rationale	Support the vehicle driver in knowing if the alerting system runs according to local rules (system shall check power on, that it is receiving adequate data in, that the alerting functions produces alerts when it shall, etc)
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

1716
1717   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1718
1719
1720   [REQ]

Identifier	REQ-06.07.01-OSED-AMM.0105
Requirement	The AMM shall in case of an alert return automatically to its default 'zoom' and

	auto-centre to the own vehicle.
Title	Return to default view
Status	<Deleted>
Rationale	In case of an alert the affected mobiles will be displayed
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1721
1722   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1723
1724
1725   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0108
Requirement	The VDS shall have the functionality to adjust the brightness of the display either manually or automatically.
Title	Brightness VDS display
Status	<Deleted>
Rationale	In night time conditions a driver could be dazzled by a screen to ambient
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1726
1727   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1728
1729
1730   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0109
Requirement	The AMM may have a 'pan' or 'zoom' functionality.
Title	Pan and zoom functionality
Status	<Deleted>
Rationale	To be better equipped to gain situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1731
1732   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1733
1734   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0110
Requirement	The VDS shall in case of an alert return automatically to its default 'zoom' and auto-centre to the own vehicle.
Title	Return to default view
Status	<Deleted>
Rationale	In case of an alert the affected mobiles will be displayed- to be applied in the case where the requirement in AVDR0109 is implemented"
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1735
1736   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1737
1738
1739   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0111
Requirement	The VDS shall display a north direction indicator.
Title	North direction indicator
Status	<Deleted>
Rationale	To be able to gain situational awareness
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1740
1741   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1742
1743
1744   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0201
Requirement	The vehicle driver shall receive a warning alert when in the runway zone and an aircraft on approach is less than 25 seconds from the threshold.

Title	Warning alert triggered associated with detected alerting situation
Status	<Deleted>
Rationale	Avoid hazardous situation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

1745

1746 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1747

1748 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0202
Requirement	The vehicle driver shall receive a caution alert when in the runway zone and an aircraft is 25-40 seconds from the RWY zone.
Title	Caution alert triggered associated with detected alerting situation
Status	<Deleted>
Rationale	Avoid hazardous situation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1749

1750 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1751

1752

1753 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0203
Requirement	The vehicle driver shall receive a warning alert when in the runway zone ahead of an aircraft when the aircraft indicates velocity > 20 kt.
Title	Warning alert triggered associated with detected alerting situation
Status	<Deleted>
Rationale	Avoid hazardous situation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1754

1755 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>

<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1756
1757
1758   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0204
Requirement	The vehicle driver shall receive a caution alert when a vehicle is operating within the RWY zone and an aircraft is lining up for departure
Title	Caution alert triggered associated with detected alerting situation
Status	<Deleted>
Rationale	Avoid a potential hazardous situation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1759
1760   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1761
1762
1763   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0216
Requirement	This additional time to process and transmit an alert shall not exceed 2 seconds.
Title	Maximum additional alerting time
Status	<Deleted>
Rationale	To ensure that the driver receives the alert in a timely manner.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1764
1765   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1766
1767
1768   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0217
Requirement	Aural alerts for caution should be in the form of a "ping" sound.
Title	Aural alerting

Status	<Deleted>
Rationale	Distinctive and not to be confused with other sounds
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1769
1770   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1771
1772
1773   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0219
Requirement	The displayed colour on the VDS of area infringement during a caution alert shall be yellow
Title	Caution colour of restricted/closed area
Status	<Deleted>
Rationale	Visual indication to driver the nature of the alert and area concerned
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1774
1775   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1776
1777
1778   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0220
Requirement	The displayed colour on the VDS of area infringement during a warning alert shall be red.
Title	Warning colour of restricted/closed area to avoid nuisance distractions
Status	<Deleted>
Rationale	Visual indication to driver of the nature and area concerned
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1779
1780   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>

<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1781
1782
1783   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0221
Requirement	Yellow traffic alert lollipops shall be displayed around target with connexion line indicating direction of other item during caution alert
Title	Description and colour of displayed alert
Status	<Deleted>
Rationale	Visual indication of location of conflicting item and nature of alert
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1784
1785   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1786
1787
1788   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0222
Requirement	Red traffic alert lollipops shall be displayed around target with connexion line indicating direction of other item during caution alert
Title	Description and colour of displayed alert
Status	<Deleted>
Rationale	Visual indication of location of conflicting item and nature of alert
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	<Test>

1789
1790   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1791
1792
1793   [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0305
Requirement	The own ship vehicle symbol should be indicated in the centre or lower third of the AMM as a default.

Title	Own ship position on screen
Status	<Deleted>
Rationale	In order to look sufficiently ahead in the direction of the heading
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

1794

1795 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1796

1797

1798 [REQ]

Identifier	REQ-06.07.01-OSED-AVDR.0306
Requirement	The AMM shall have a functionality to fix the map orientation or fix the vehicle orientation.
Title	Fix map orientation
Status	<Deleted>
Rationale	More experienced vehicle drivers rather prefer a fixed map facing north
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

1799

1800 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02- DOD- Manage safety nets systems for airport vehicles	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

1801

1802

6.7 Information Exchange Requirements

Note: in this section, an effort was made to comply with the guidelines on the writing of Information Exchange Requirements to use as issuers and addressees human actors identified in B.04.02's Role and Responsibilities document [7]. However, in the case of information generated by a system (e.g. surveillance reports) or originating from outside the ATM community (e.g. AMDB supplier), the choice was made to use instead the first human actor using the information or an issuer/addressee not defined by B.04.02.

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.01-OSED-0001.0001	Airport layout	Airport Tower Supervisor	Vehicle Driver	Airport Infrastructure			<In Progress>	Closures of (sections of) taxiways need to be known in the vehicle.	REQ-06.02-DOD-6200.0005<Partial> REQ-06.02-DOD-6200.0011<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.01-OSED-0001.0002	LVPs in use	Airport Tower Supervisor	Vehicle Driver	LVPs in use			<Validated>	In Low Visibility Conditions, the valid alerting algorithms can differ from those in CAVOK conditions.	REQ-06.02-DOD-6200.0005<Partial>	

Table 9: IER Layout

7 References

7.1 Applicable Documents

[1] Template Toolbox 03.00.00
https://extranet.sesarju.eu/Programme%20Library/SESAR%20Template%20Toolbox.dot

[2] Requirements and V&V Guidelines 03.00.00
https://extranet.sesarju.eu/Programme%20Library/Requirements%20and%20VV%20Guidelin es.doc

[3] Templates and Toolbox User Manual 03.00.00
https://extranet.sesarju.eu/Programme%20Library/Templates%20and%20Toolbox%20User% 20Manual.doc

[4] EUROCONTROL ATM Lexicon
https://extranet.eurocontrol.int/http://atmlexicon.eurocontrol.int/en/index.php/SESAR

7.2 Reference Documents

The following documents were used to provide input/guidance/further information/other:

[5] OATA Operational Scenario and Use Case Guide V1.0

[6] Doc 9830, Advanced Surface Movement Guidance and Control Systems (A-SMGCS), First Edition, ICAO, 2004

[7] B04.02, SESAR B4.2 Actors - Roles and Responsibilities 00.01.05, 11/05/2011

[8] SESAR Safety Reference Material
https://extranet.sesarju.eu/Programme%20Library/Forms/Procedures%20and%20Guidelines. aspx

[9] SESAR, DEL06.07.03-D22-Preliminary OSED and Preliminary Operational Procedures development Phase 2, V00.01.00, 2013

[10] SESAR DEL06.02-D122-Step 1 Airport DOD 2014 Update, V00.01.00, December 2014

[11] European ATM Architecture porta. https://www.atmmasterplan.eu/architecture/

[12] SESAR, DEL06.07.01-D151-EXE 724 VALR, V00.00.03, September 2015

[13] SESAR, DEL06.07.01-D76-V3 Validation Report for Alerts for Vehicle Drivers, V00.00.02, November 2015.

[14] SESAR, DEL06.07.01-D38-V2 Validation Report for Alerts for Vehicle Drivers, V00.01.02, November 2012.

[15] SESAR, DEL06.07.01-D34-Preliminary OSED for Alerts for Vehicle Drivers, V00.01.04, April 2012

[16] SESAR, DEL06.07.01-D39-Updated OSED for "Alerts for Vehicle Drivers" following V2 Trials, V00.01.02, July 2012.

[17] SESAR, DEL06.07.01-D44-Updated OSED for "Alerts for Vehicle Drivers" following second V2 trials, V00.01.00, April 2015.

[18] SESAR, DEL06.07.01-D78-Updated SPR for Alerts for Vehicle Drivers following V3 Trials, May 2016.

[19] SESAR, DEL06.07.01-D79-Updated INTEROP for Alerts for Vehicle Drivers following V3 trials, 2016.

[20] EUROCONTROL ATM Lexicon
https://www.eurocontrol.int/lexicon/lexicon/en/index.php/Nuisance_alert

-END OF DOCUMENT-