Final INTEROP for "Alerts for Vehicle Drivers" following V3 trials

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Abstract

This document presents the Interoperability Requirements for the SESAR Solution #4 following V3 trials on "Moving map and alerts for vehicle drivers" at Dublin and Paris CDG that contribute to OFA01.02.01 (Airport Safety Nets).

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None.

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00.00.03	11/07/2016	Draft	NORACON, DSNA, SEAC, NORACON (Think Research on behalf of IAA)	Updates following external review
00.01.00	22/07/2016	Final	NORACON, DSNA, SEAC, NORACON (Think Research on behalf of IAA)	Updates following partner reviews.
00.01.01	10/10/2016	Revised Draft	NORACON, DSNA, SEAC, NORACON (Think Research on behalf of IAA)	Updates following SJU Assessment

9 Intellectual Property Rights (foreground)

10   This deliverable consists of SJU foreground.

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51 # Executive summary

52 This document presents the Final Interoperability Requirements (INTEROP) for Alerts for Vehicle
53 Drivers following the two V3 trials conducted at Paris Charles de-Gaulle (LFPG) and Dublin Airport
54 (EIDW) during the summer of 2015, deliverable within the 06.07.01 SESAR project Airport Safety
55 Support tools for Pilots, Vehicle Drivers and Controllers.

56 The Final Operational Service and Environment Definition (OSED) D77 [11] for "Alerts for vehicle
57 drivers" following V3 Trials and the Final Safety and Performance Requirements (SPR) D78 [12]
58 together with the two Validation Reports (VALR) D151 [13] and D76 [14] [13]contributed to the
59 INTEROP and describe what the vehicle alert system requires to operate with other Air Traffic
60 Management (ATM) systems, in order to operate as a safety tool to vehicle drivers.

61 The system must be robust, easy to operate and understand, must clearly display alerts following
62 aural and visual alarm outputs, and must provide information to be displayed on a moving map
63 Human Machine Interface (HMI), where defined areas including taxiways and runways must be
64 depicted. Requirements developed within task T089, Final INTEROP for "Alerts for vehicle drivers",
65 incorporated requirements from earlier projects into the development of the platform used in the V3
66 live trials which took place in Dublin and Paris CDG. The live trials validated the OSED requirements.

67 Vehicles may be equipped with an on-board alerting system and also an uplink from a ground server
68 supporting an Advanced Surface Movement Guidance and Control System (A-SMGCS).

69 Vehicles equipped with their own Automatic Dependent Surveillance – Broadcast (ADS-B) on-board
70 system will trigger an alert for aircraft that are in a potential, or actual conflict with the vehicle and
71 when the vehicle infringes on a restricted/closed area or Rwy zone while the vehicle is operating on
72 the manoeuvring area.

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

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

77 The on-board alerting system determines locally if an alert needs to be triggered based upon ownship
78 position, determined by an on-board Global Navigation Satellite System (GNSS) receiver and
79 information about other traffic received from a central, ground based, system (A-SMGCS). Information
80 received directly from other traffic through ADS-B IN could be a potential enabler for the surveillance
81 data acquisition by the vehicle itself, nevertheless it has not been assessed during the V3 validation
82 activities at Dublin and Paris. For the centralised, ground based system the centralised system
83 determines if an alert needs to be triggered and sends the alert information together with other traffic
84 information to the vehicle where the alert is displayed.

85

1   Introduction

1.1   Purpose of the document

The final INTEROP D79 provides the revised document following the live trials and together with the final OSED [11] and final SPR [12] provides the final set of technical solutions and requirements to enable the development of the Safety Support Tool – Alerts for vehicle drivers.

The OSED describes the operational concept defined in the 6.2 Airport Detailed Operational Description (DOD) [9] in the scope of Airport Safety Nets Operational Focus Area WA5 (OFA) 01.02.01.

The final INTEROP forms together with the OSED D77 [11] and SPR D78 [12] a base for the function and interoperability of the Alerts for Vehicle Drivers (AVDR)-system within the ATM community and will include the technical and operational expectations of the related systems.

In the below figure the location of the OSED D77 [11], SPR D78 [12] and INTEROP D79 is depicted within the hierarchy of SESAR concept documents, together with the SESAR Work Package or Project responsible for their maintenance.

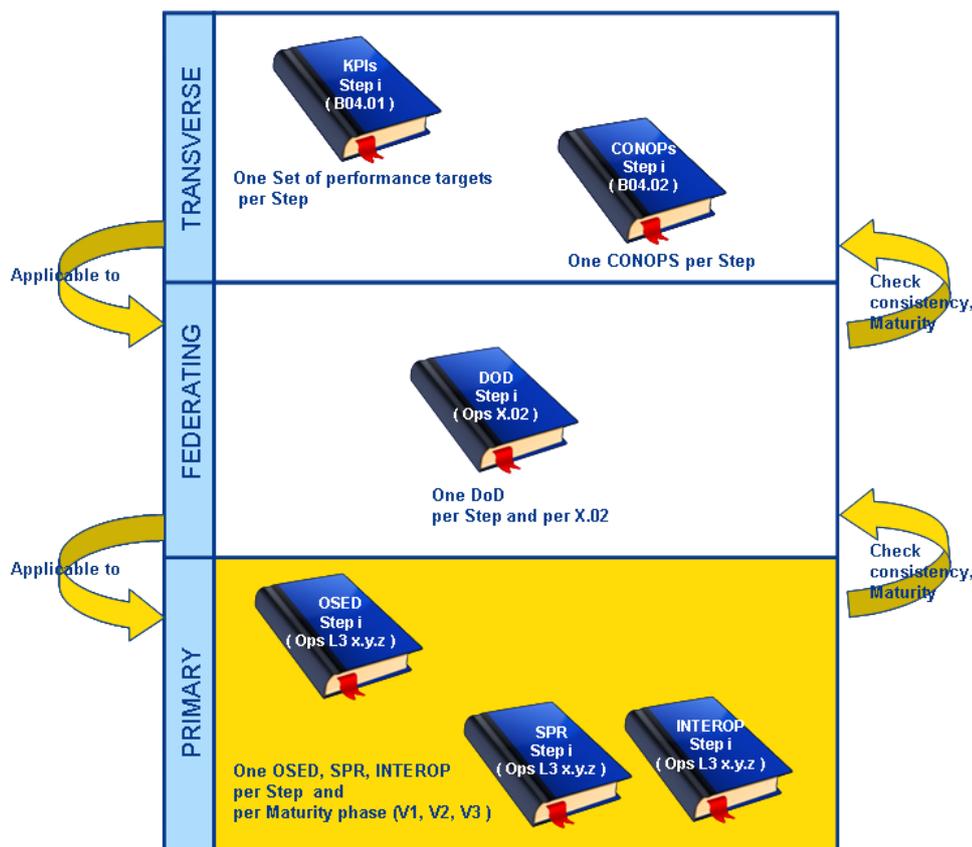In Figure 1 the Steps are driven by the OI Steps addressed by the project in the Integrated Roadmap document.

Figure 1: Interop document with regards to other SESAR deliverables

1.2   Intended readership

103   This document will have an interest to members within:

104   • P06.07.01 for the continuing work with Airport safety support tools;

105   • P06.03.01 for the validation activities with alerts for vehicle drivers;

106   • P08.03.10 for the work with Aerodrome Map Information and Taxiway Status Information
107   Service;

108   • P12.03.02 for the work with Enhanced Surface Safety Net alert;

109   • P06.02 for consideration in the airport DOD;

110   • P12.01.07 Airport Systems Specification drafting and maintenance.

1.3   Inputs from other projects

112   The work performed in the North European ADS-B Network Update Programme (NUP2+) project was
113   used to form a base for the initial approach to the validation exercise.

1.4   Glossary of terms

115   The term "Ground Domain" is used in Section 2.1 and also in the detail of some requirements in
116   Section 3.1. This term was a term introduced by the project to categorise the functional components
117   of the AVDR-system. The term (used alongside "Vehicle Domain" and "Aircraft Domain") is used to
118   cover the parts of the system under management of the ANSP at the airport. The approach to

119 implementation can vary and in P06.07.01 two alternatives were taken – one where the function was
120 done via A-SMGCS in the tower; one where the function was executed on a module fitted in the
121 vehicle itself. For this reason, the generic term "Ground Domain" was used and this relates to the
122 Surface Guidance Management Functional Block from P12.01.07 Technical Architecture Description.

123   1.5   Acronyms and Terminology

Term	Definition
ADS-B	Automatic Dependent Surveillance – Broadcast
AMM	Airport Moving Map
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATM	Air Traffic Management
A-SMGCS	Advanced Surface Movement Guidance and Control System
ATS	Air Traffic Services
AVDR	Alerts for Vehicle Drivers
CDG	Paris Charles de Gaulle Airport (also LFPG)
CNS	Communication, Navigation and Surveillance
DOD	Detailed Operational Description
DUB	Dublin Airport (also EIDW)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GTD	Ground Traffic Display
HMI	Human Machine Interface
INTEROP	Interoperability Requirements
MLAT	Multilateration
NUP2+	North European ADS-B Network Update Programme
OFA	Operational Focus Areas
OI	Operational Improvement
OSED	Operational Service and Environment Definition
PDA	Predefine Area (Runway Zone, Taxiway Zone, Closed/Restricted Areas)

Term	Definition
RTCA	Radio Technical Commission for Aeronautics
Rwy	Runway
SESAR	Single European Sky ATM Research Programme
SJU	SESAR Joint Undertaking
SMR	Surface Movement Radar
SPR	Safety and Performance Requirements
TAD	Technical Architecture Description
VALP	Validation Plan
VALR	Validation Report
VDS	Vehicle Display System
WGS84	World Geodetic system 1984

124

2 System Description

2.1 System description

The AVDR uplink and on-board alerting systems can be described as follows:

A system with either:

1. On-board generated alerts; or

2. Up-linked, ground based centralised server generated alerts.

And services available for choice, individually or grouped:

1. Traffic alerts;

2. Area infringement alerts.

The description for either system can be found in:

➢ Section 2.2 for on-board generated alerts;

➢ Section 2.3 for the Up-linked, ground based centralised server generated alerts.

The description of either service can be found in:

➢ Section 2.2.1 and 2.3.1 for Traffic alerts;

➢ Section 2.2.2 and 2.3.2 for Area infringement alerts.

The functional components of the AVDR-system will span over the following three domains for interoperability allocation:

• Vehicle Domain;

• Ground Domain; and

• Aircraft Domain.

Depiction of the functional architecture for the equipment for on-board alerts can be found in Figure 2 and the functional architecture for the equipment with up-linked ground server can be found in Figure 3.

Common ground for the solution will be requiring Area Navigation GNSS for ownship navigation, and a moving map display incorporating the airport maps showing runways, taxiways, airport infrastructure, obstacles and buildings, with a HMI for driver input in the vehicle domain. The moving map shall show vehicle ownship position, the surroundings (airport layout, borders of defined and restricted or closed areas, as described 06.07.01-D77-Final OSED for "Alerts for Vehicle Drivers" following V3 trials [11] as well as surrounding and conflicting aircraft traffic. In the Ground Domain A-SMGCS surveillance will be utilised via a server to format and transmit surveillance data regarding aircraft traffic

2.2 On-board generated alerts

Note on this section: This section includes functional architecture diagrams to illustrate the alert generation processes. P06.07.01 and P12.01.07 are aware that there may be some light inconsistencies between these figures and architecture described in TAD Airport. This is due to changes suggested by OFA01.02.01 and OFA04.02.01 which are traced and explained in Appendix A.1 of the P12.01.07 TAD. P12.01.07 noted the suggestions and recommended the evolution of a Vehicle System in the context of one of the existing airport Capability Configurations to be further investigated in the context of SESAR 2020 programme

164 ## 2.2.1   On-board generated traffic alerts

165 The AVDR system will make use of aircraft surveillance data by receiving data from the Aerodrome
166 Core Surveillance system, which is presented on the moving map HMI display.

167 Traffic alerts will be processed in a unit on-board the vehicle, providing aural and visual alarm outputs.

168 ## 2.2.2   On-board generated area infringement alerts

169 Area infringements will be processed in a VDS unit on-board the vehicle, providing aural and visual
170 alarm alerts. The moving map shall show vehicle ownship position and the surroundings, airport
171 layout, borders of defined and restricted or closed areas. Traffic information is transmitted via datalink
172 to the vehicle that will potentially generate alerts to be displayed on the vehicle VDS. AMM updates
173 on the PDA will be entered by authorised personnel only.

174

175 *Figure 2: Functional architecture for on-board generated alerts for vehicle drivers*

2.3 Up-linked, ground based generated alerts

The position of mobiles will be calculated by the ground based uplink server either via ADS-B data message or Multilateration (MLAT) and will be processed by the A-SMGCS server. An infringement detected by the ground based A-SMGCS server will generate an alert that will be uplinked to the vehicle and displayed on the vehicle VDS

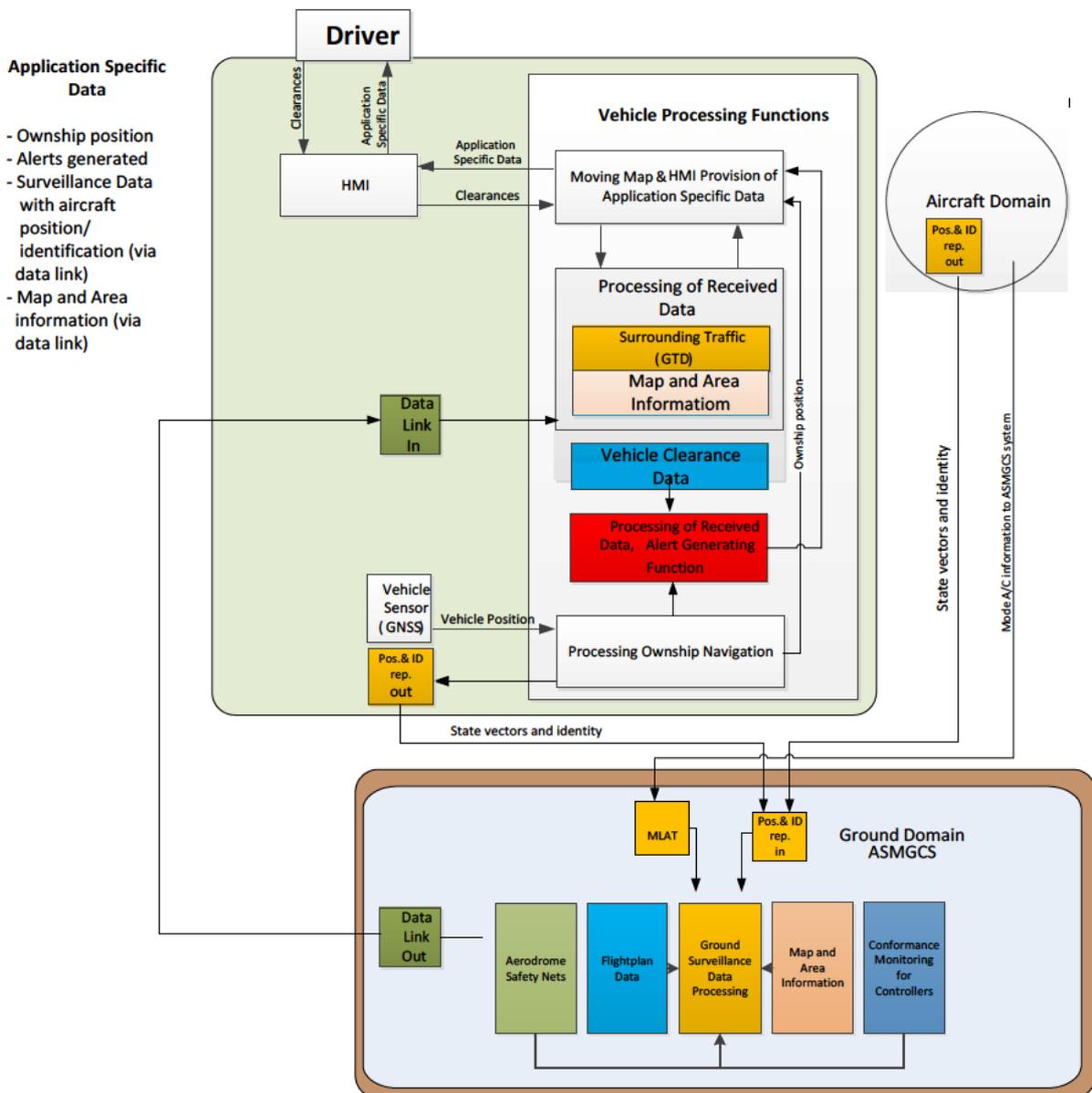### 2.3.1 Up-linked, ground based generated, traffic alerts

The AVDR system will make use of aircraft surveillance data by receiving data from the Aerodrome Core Surveillance system, which is presented on the moving map HMI display

Traffic alerts will be processed in a ground server and up-linked via Data Link to the vehicle unit that will be providing aural and visual alarm outputs.

2.3.2 Up-linked, ground based generated, area infringement alerts

The moving map shall show vehicle ownship position, the surroundings (airport layout, borders of defined and restricted or closed areas).

The MLAT gives position reports to the alerting system within the Ground Domain. A ground server will process the area infringement alerts and up-link them via data link to the vehicle unit that will be providing aural and visual alarm outputs.

The AVDR-system will use data from a ground based server for updates, that will transmit the relevant data in regards to defined area that have been entered into it by authorised personnel.
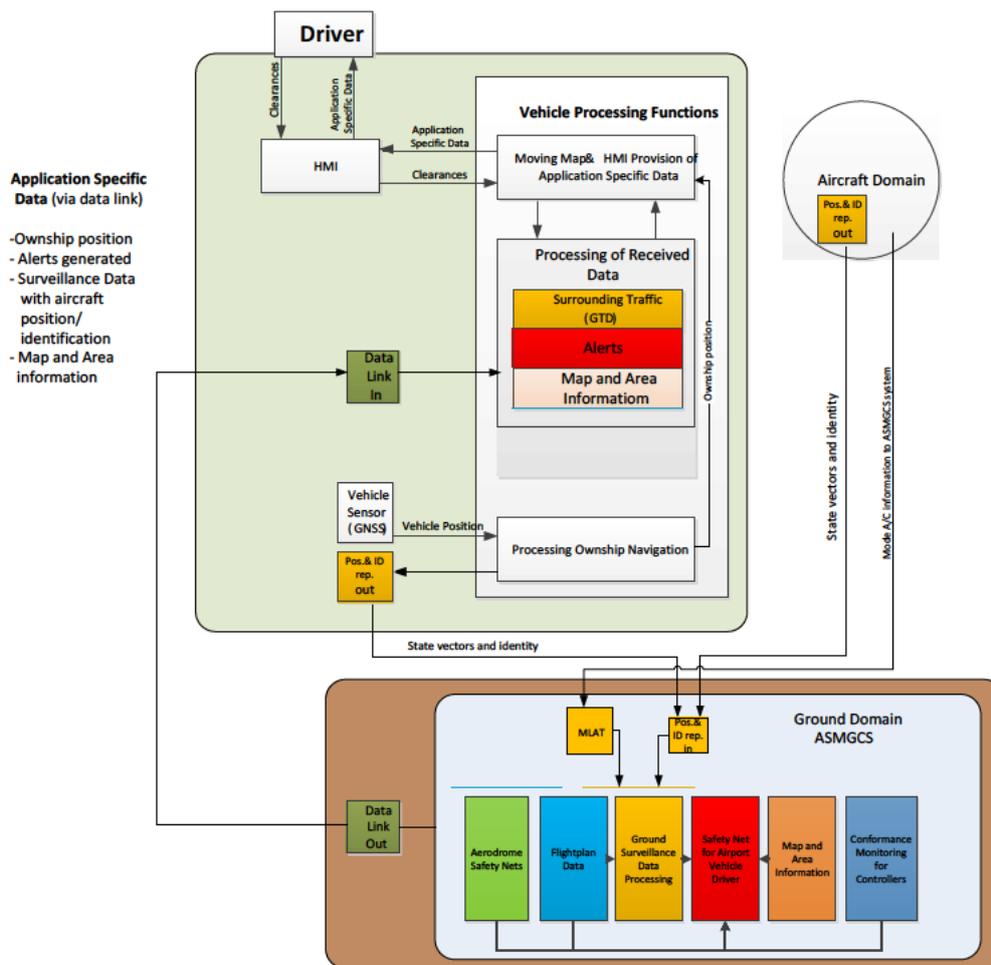
196
197

Figure 3 System uplinked to centralised server

198

3 Interoperability Requirements

Requirement Identifier numerical allocation (REQ-06.07.01-INTEROP-AVDR.xxxx)					
First number	Allocated to	Second number	Allocated to	Third and fourth number	Allocated to
1xxx	On-board generated traffic alerts	x1xx	Requirements Ground Domain	xx01 - onwards	Sequentially for requirements
2xxx	On-board generated area infringement alerts	x3xx	Recommendations Ground Domain	xx01 - onwards	Sequentially for recommendations
3xxx	Up-linked, ground based, traffic alerts	x5xx	Requirements Vehicle Domain		
4xxx	Up-linked, ground based area infringement alerts	x7xx	Recommendations Vehicle Domain		
5xxx	Common for traffic alerts in 1xxx and 3xxx	x9xx	Requirements Aircraft Domain		
6xxx	Common for area alerts in 2xxx and 4xxx				
7xxx	Common for all 1xxx-4xxx				

199   *Table 1: INTEROP requirements identifier numerical allocation*

200

201   3.1   Requirements for ATS CNS/ATM Applications

202   **3.1.1   On-board generated traffic alerts**

203   3.1.1.1   Ground Domain

204   3.1.1.1.1 Traffic Surveillance Data

205 Traffic Surveillance information is assembled and transmitted in a message from the Aerodrome Core
206 Surveillance system to the AVDR-system. Message format and transmission rate is depending on the
207 link technology chosen. The appropriate standards of the data link protocol in use shows how the
208 elements for the application will be transmitted, but all elements in the standard may not need to be
209 transmitted. The AVDR-system receive function receives and assembles the data.

210 The ground domain shall transmit aircraft traffic surveillance data to vehicle system, as defined in the
211 data link protocol chosen, containing the following parameters:

212   • Horizontal position

213   • Identity information

214   • Velocity vector (track and ground speed)

215 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5101
Requirement	The ground domain shall transmit horizontal position information (i.e. latitude, longitude) referenced to WGS-84 for aircraft traffic.
Title	Horizontal position of aircraft traffic.
Status	<Validated>
Rationale	Horizontal position information is provided using latitude and longitude.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

216 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0207	<Partial>
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<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

217
218 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5102
Requirement	The ground domain shall transmit aircraft identity information.
Title	Identity information from aircraft traffic.
Status	<Validated>
Rationale	To be able to determine the operational identity of aircraft, the AVDR application needs the flight identification (e.g. SAS901, BAW007) or registration marking of aircraft (SE-DEL, G-BUUR) in all related messages received from the ground domain.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

219
220 [REQ Trace]

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<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

221   [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5104
Requirement	The ground system shall transmit velocity vector (track and ground speed) for aircraft traffic to the AVDR-system.
Title	Velocity vector from aircraft traffic.
Status	<Validated>
Rationale	In order for the ground system to be able to transmit velocity vector to the AVDR system
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

222
223   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0207	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0224	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Surface Guidance Management	N/A

224   ### 3.1.1.1.2   Traffic Surveillance Data (Recommendations)

225
226   [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5304
Requirement	The ground domain should transmit aircraft traffic surveillance data to AVDR-system, as defined in the data link protocol chosen, containing the following parameters: • Emitter category • GPS antenna offset information (aircraft on ground only) • Mobile size (Length/Width codes) (aircraft on ground only)
Title	Aircraft surveillance data
Status	<Validated>
Rationale	The ground domain should be able to transmit aircraft surveillance data to the AVDR system in accordance with COMMISSION IMPLEMENTING REGULATION (EU) No 1207/2011 for the performance and interoperability of surveillance data.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

227
228   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

3.1.1.2 Vehicle Domain

3.1.1.2.1 Surveillance Data representing Aircraft Traffic

The AVDR-system shall be able to process received aircraft traffic surveillance data from the Aerodrome Core Surveillance system, as defined in the data link protocol chosen for the transmission, containing the following parameters:

- Horizontal position

- Identity Information

- Velocity vector (track and ground speed)

The AVDR system will make use of aircraft surveillance data by receiving data from the Aerodrome Core Surveillance system, which uses different surveillance means i.e. SMR, MLAT, ADS-B.

[REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5516
Requirement	The AVDR-system shall be able to receive the following surveillance data transmitted for process: • Horizontal position • Identity Information • Velocity vector (track and ground speed)
Title	Ability to receive transmitted surveillance data.
Status	<Validated>
Rationale	In order to present aircraft traffic on the moving map HMI and process data the AVDR-system shall be able to receive transmitted Aerodrome Core Surveillance data..
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

242 3.1.1.2.2 Surveillance Data representing ownship position

243 The AVDR-system shall be able to receive vehicle (ownship) position data from an on-board GNSS
244 receiver:

245 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.7519
Requirement	The AVDR-system shall have a GNSS receiver for ownship position location.
Title	GNSS receiver for ownship.
Status	<Validated>
Rationale	To have appropriate ownship position indication a GNSS receiver is required.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

246
247 [REQ Trace]

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<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

248 ### 3.1.1.3 **Aircraft Domain**

249 3.1.1.3.1 Surveillance Data

250 As indicated in Figure 2 and Figure 3, Mode A/C is transmitted via ADS-B data from aircraft to the
251 ground domain and can be used by the ground domain to display respective traffic and to generate
252 alerts.

253 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5908
Requirement	Aircraft shall transmit, if available, ADS-B data according to relevant standards (EUROCAE/RTCA) containing: • Horizontal Position • Speed • Heading • Identity Information
Title	ADS-B standard
Status	<Validated>
Rationale	For the respective systems of the vehicle and the ground domain to be able to compute and display correctly, ADS-B data shall be according to Surveillance Performance and Interoperability EU Regulation No 1207/2011 in relation to position, speed, heading and identity.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

254
255 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0207	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0402	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0403	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0404	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0405	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0406	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0407	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0072	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Surface Guidance Management	N/A

256

3.1.2 On-board generated area infringement alerts

3.1.2.1 Ground Domain

3.1.2.1.1 Moving map update

An authorised person will insert updates of restricted and closed areas valid for the manoeuvring area to the moving map via a mapping server in the ground domain. Via data-link this information will be available to the AVDR-system.

[REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.6116
Requirement	The ground system shall provide the AVDR-system with updated restricted and closed areas.
Title	Restricted/Closed areas updates in vehicle system.
Status	<Validated>
Rationale	To safe guard the presentation on the moving map HMI, the latest verified restricted and closed areas shall be made available by the ground system.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

264

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0213	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0302	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0304	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0508	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Aerodrome Safety Nets	N/A

3.1.2.2 Vehicle Domain

3.1.2.2.1 Surveillance Data representing vehicle ownship position

As in Section 3.1.1.2.2, the AVDR-system shall be able to receive vehicle (ownship) position data from an on-board GNSS receiver.

The same REQ as in Section 3.1.1.2.2 (REQ-06.07.01-INTEROP-AVDR.7519) applies.

3.1.2.2.2 Moving map update

An authorised person will insert updates of restricted and closed areas valid for the manoeuvring area to the moving map via a mapping server in the ground domain. Via data-link this information will be available to the AVDR-system.

[REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.6517
Requirement	The AVDR-system shall be able to receive updates of restricted and closed areas, to be depicted on the moving map HMI.
Title	Restricted/Closed areas updates in vehicle system.
Status	<Validated>

Rationale	To safe guard the presentation on the moving map HMI, the AVDR-system shall be able to receive the latest verified restricted and closed areas from the ground domain.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

276

277 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0213	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0302	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0304	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0508	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Aerodrome Safety Nets	N/A

278

279   3.1.3   Up-linked, ground based generated, traffic alerts

280   3.1.3.1   Ground Domain

281   3.1.3.1.1   Traffic Surveillance Data

282 As in Section 3.1.1.1.1, Traffic Surveillance information is assembled and transmitted in a message
283 from the ground system to the AVDR-system. Message format and transmission rate is dependent on
284 the link technology chosen. The appropriate standards of the data link protocol in use shows how the
285 elements for the application will be transmitted, but all elements in the standard may not need to be
286 transmitted. The AVDR-system receive function receives and assembles the data.

287 The ground domain shall transmit aircraft traffic surveillance data to AVDR-system, as defined in the
288 data link protocol chosen, containing the following parameters:

289   •   Horizontal position

290   •   Identity information

291   •   Velocity vector (track and ground speed)

292 The same REQ as in Section 3.1.1.1.1 (REQ-06.07.01-INTEROP-AVDR.5101 to REQ-06.07.01-
293 INTEROP-AVDR.5104) apply.

294   3.1.3.1.2   Traffic Surveillance Data (Recommendations)

295 As in Section 3.1.1.1.2, the ground domain should transmit aircraft traffic surveillance data to AVDR-
296 system, as defined in the data link protocol chosen, containing the following parameters, if available:
297
298   •   Emitter category
299   •   GPS antenna offset information (aircraft on ground only)
300   •   Mobile size (Length/Width codes) (aircraft on ground only)

301 The same REQ as in Section 3.1.1.1.2 (REQ-06.07.01-INTEROP-AVDR.5301 to REQ-06.07.01-
302 INTEROP-AVDR.5303) apply.

303   3.1.3.1.3   Alerts

304 Alerts will be processed in and up-linked from the ground domain.

305 Uplink alerts are detailed in REQ-OSED D44-06.07.01-AVDR-0201-0223.

306 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.3111

Requirement	The ground system shall be able to calculate process and transmit alerts for conflicting aircraft traffic to the AVDR-system.
Title	Vehicle alerts for conflicting aircraft traffic, up-linked from ground system.
Status	<Validated>
Rationale	To ensure that the vehicle driver receives appropriate alerts, the ground system shall be able to calculate, process and transmit alerts for conflicting aircraft traffic.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

307

308   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0101	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0102	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0103	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0104	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0106	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0107	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0205	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0206	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0207	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0208	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0209	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0210	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0211	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0212	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0213	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0214	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0215	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0218	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0223	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0224	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0225	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0401	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0402	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0070	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0071	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0072	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0073	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0074	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0075	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0076	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0101	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0102	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0106	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0107	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0109	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0111	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0112	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0113	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0114	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0210	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0211	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0212	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0213	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0214	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0215	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0216	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0217	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0218	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0219	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0220	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0221	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0222	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0223	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0224	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Aerodrome Safety Nets	N/A

309

3.1.3.2 Vehicle Domain

3.1.3.2.1 Surveillance Data representing Aircraft traffic

As in Section 3.1.1.2.1, the AVDR-system shall be able to process received aircraft traffic surveillance data from the ground domain, as defined in the data link protocol chosen for the transmission, containing the following parameters:

- Horizontal position;

- Identity Information;

- Velocity vector (track and ground speed).

The same REQ as in Section 3.1.1.2.1 (REQ-06.07.01-INTEROP-AVDR.5515) applies.

3.1.3.2.2 Surveillance Data representing vehicle ownship position

As in Section 3.1.1.2.2, the AVDR-system shall be able to receive vehicle (ownship) surveillance data from an on-board GNSS receiver.

The same REQ as in Section 3.1.1.2.2 (REQ-06.07.01-INTEROP-AVDR.7519) applies.

Additionally, the vehicle needs to send its own position to the Ground Domain.

[REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.3518
Requirement	The AVDR-system shall send its position via ADS-B to the Ground domain.
Title	Transmission of ownship position.
Status	<Validated>
Rationale	To be able to calculate the alerts the Ground Domain needs to receive the ownship position of the vehicle.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

3.1.3.2.3 ADS-B receiver

Information received directly from other traffic through ADS-B IN could be <u>a potential</u> enabler for the surveillance data acquisition by the vehicle itself, nevertheless it has not been assessed during the V3 validation activities at Dublin and Paris.

3.1.3.2.4 Alerts

Alerts will be processed in and up-linked from the ground domain.

333 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.3512
Requirement	The AVDR-system shall be able to receive and present alerts for conflicting aircraft traffic.
Title	Vehicle system reception of traffic alerts.
Status	<Validated>
Rationale	To ensure that the vehicle driver receives appropriate alerts, the vehicle system shall be able to receive and present alerts for conflicting aircraft traffic.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

334

335 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0101	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0102	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0103	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0104	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0106	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0107	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0206	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0207	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0208	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0209	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0210	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0212	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0214	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0218	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0223	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0224	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0225	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0401	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0070	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0071	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0072	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0073	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0074	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0075	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Aerodrome Safety Nets	N/A

336

3.1.4 Up-linked, ground based generated, area infringement alerts

3.1.4.1 Ground Domain

3.1.4.1.1 Moving map update

341 As in Section 3.1.2.1.1, an authorised person will insert updates of restricted and closed areas valid
342 for the manoeuvring area to the moving map via a mapping server in the ground domain. Via data-link
343 this information will be available to the AVDR-system.

344 The same REQ as in Section 3.1.2.1.1 (REQ-06.07.01-INTEROP-AVDR.6116) applies.

3.1.4.1.2 Alerts

346 Alerts will be processed in and up-linked from the ground domain.

347

348   [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.4113
Requirement	The ground system shall be able to calculate process and transmit alerts for area infringement.
Title	Vehicle alerts for area infringement, up-linked from ground system.
Status	<Validated>
Rationale	To ensure that the vehicle driver receives appropriate alerts, the ground system shall be able to calculate, process and transmit alerts for area infringement.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

349
350   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0106	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0107	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0205	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0206	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0208	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0213	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0223	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0224	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0070	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0071	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0072	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0073	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0074	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0075	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0076	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Aerodrome Safety Nets	N/A

351

3.1.4.2   **Vehicle Domain**

3.1.4.2.1   Surveillance Data representing vehicle ownship position

354   As in Section 3.1.1.2.2, the AVDR-system shall be able to receive vehicle (ownship) surveillance data
355   from an on-board GNSS receiver:

356   The same REQ as in Section 3.1.2.2.2 (REQ-06.07.01-INTEROP-AVDR.7519) and the additional
357   REQ as in Section 3.1.3.2.2 (REQ-06.07.01-INTEROP-AVDR.3518) applies.

3.1.4.2.2   Moving map update

359   As in Section 3.1.2.2.2, an authorised person will insert updates of restricted and closed areas valid
360   for the manoeuvring area to the moving map via a mapping server in the ground domain. Via data-link
361   this information will be available to the AVDR-system.

362   The same REQ as in Section 3.1.2.2.2 (REQ-06.07.01-INTEROP-AVDR.6517) applies.

3.1.4.2.3   Alerts

364   Alerts will be processed in and up-linked from the ground domain.

365   [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.4114
Requirement	The AVDR-uplink system shall be able to generate alerts in relation to restricted and closed areas, to be depicted on the moving map HMI.

Title	Restricted/Closed areas updates in vehicle system.
Status	<Validated>
Rationale	To ensure that the vehicle driver receives appropriate alerts, the ground system shall be able to calculate, process and transmit alerts for restricted and closed areas.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

366

367 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0304	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0204	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0211	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0224	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Aerodrome Safety Nets	N/A

368 ## 3.2 Dynamic Functions / Operations

369 The system is designed to provide the vehicle drivers with a continuous update on their position on
370 the airfield, and generate an alert when the vehicle enters a restricted or closed area or when in a
371 conflict situation with an aircraft on the manoeuvring area. It provides detection and alerts in situations
372 that if not corrected could end up in hazardous situations.

373 ## 3.3 Unique Characteristics

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

375 • An Airport Moving Map (AMM) which will indicate the position of the vehicle at the airport;

376 • A Ground Traffic Display (GTD) displaying other traffic operating on the movement area of the
377 airport;

378 • A GTD that displays alerts to a vehicle driver of aircraft that are in a potential, or actual
379 conflict with the vehicle and when the vehicle is in a restricted or closed area while the vehicle
380 is operating on the manoeuvring area;

381 • The alerts in the vehicles may be generated by an on-board system or by a centralised server
382 with an uplink to the vehicle.

383

384

4 References

4.1 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%20Guidelines.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

4.2 Reference Documents

[5] Second V2 VALR for Alerts for Vehicle drivers D43

[6] V2 Validation Report for "Alerts for Vehicle Drivers", D38, P06.07.01 Alerts for Vehicle Drivers, 00.03.00

[7] Validation plan (VALP) for "Alerts for Vehicles Drivers" following second V2 trials, D75, 06.07.01 Alerts for Vehicle Drivers,

[8] V3 Validation plan (VALP) for Alerts for Vehicle Drivers 06.03.01 VP724 D150

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

[10] P12.01.07, D30, SESAR 1 Airport Technical Architecture Description V00.02.00, 17th June 2016

[11] SESAR DEL 06.07.01-D77-Final OSED for "Alerts for vehicle drivers" following V3 trials

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

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

[14] SESAR, DEL06.07.01-D76-V3 Validation Report for Alerts for Vehicle Drivers, V00.01.00, May 2016.

413 # Appendix A   Deleted requirements and recommendations

414 The following requirements from previous versions of the INTEROP have been deleted due to the fact
415 that they have been either superseded by another requirement or removed due to changes in
416 approach following validation activities and concept clarification.

417 The removal of these requirements was done based on feedback from project partners and with their
418 agreement.

419 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.1509
Requirement	The vehicle system shall be able to calculate process and present alerts for aircraft traffic.
Title	Vehicle alerts for aircraft traffic.
Status	<Deleted>
Rationale	To ensure that the vehicle driver receives appropriate alerts, the vehicle system shall be able to calculate, process and present alerts using data received..
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

420
421 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Aerodrome Safety Nets	N/A

422
423 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.2510
Requirement	The vehicle system shall be able to calculate, process and present alerts for area infringement.
Title	Vehicle alerts for area infringement.
Status	<Deleted>
Rationale	To ensure that the vehicle driver receives appropriate alerts, the vehicle system shall be able to calculate, process and present alerts using data received.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

424 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Aerodrome Safety Nets	N/A

425
426 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.3701
Requirement	The AVDR-system shall send its position via ADS-B to the Ground domain.
Title	Transmission of ownship position.
Status	<Deleted>
Rationale	To be able to calculate the alerts the Ground Domain needs to receive the ownship position of the vehicle.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

427
428 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>

<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Surface Guidance Management	N/A

429

430 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5103
Requirement	The ground system shall transmit received pressure altitude from airborne aircraft traffic.
Title	Pressure altitude from airborne aircraft traffic.
Status	<Deleted>
Rationale	The ground domain shall transmit pressure altitude received from aircraft airborne. (Pressure altitude is the indicated altitude which corresponds to the pressure in the International Standard Atmosphere; ISO 2533:1975.).
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

431 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0016	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Surface Guidance Management	N/A

432

433 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5105
Requirement	• The ground domain should transmit aircraft traffic surveillance data to AVDR-system, as defined in the data link protocol chosen, containing the following parameter • Emitter category • GPS antenna offset information (aircraft on ground only) • Mobile size (Length/Width codes) (aircraft on ground only)
Title	Aircraft surveillance data
Status	<Deleted>
Rationale	The ground domain should be able to transmit aircraft surveillance data to the AVDR system in accordance with COMMISSION IMPLEMENTING REGULATION (EU) No 1207/2011 for the performance and interoperability of surveillance data.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

434

435 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0402	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0403	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0404	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0405	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0407	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0501	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0502	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0519	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0521	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Surface Guidance Management	N/A

436

437 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5504

Requirement	The vehicle system shall be able to receive the following surveillance data transmitted for process: • Horizontal position • Identity Information • Pressure Altitude • Velocity vector (heading/track and ground speed)
Title	Ability to receive transmitted surveillance data.
Status	<Deleted>
Rationale	In order to present aircraft traffic on the moving map HMI and process data the vehicle system shall be able to receive transmitted surveillance data via data link.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

438

439   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Surface Guidance Management	N/A

440   [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.5705
Requirement	The AVDR-system should, if available, receive aircraft traffic surveillance data ADS-B Out, as defined in the data link protocol chosen, containing the following parameters: • Horizontal position • Identity information • Velocity vector (track and ground speed)
Title	Vehicle system receiver of ADS-B Out data.
Status	<Deleted>
Rationale	To aid the AVDR-system, as a fall back solution; reception of ADS-B Out data should be available if chosen.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

441

442   [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0015	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0016	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

443   [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.7105
Requirement	Each surveillance message from the ground domain shall contain an unambiguous address.
Title	Identity Information for vehicle.
Status	<Deleted>
Rationale	To be able to determine the operational identity of the vehicle, the AVDR application needs the unambiguous 24-bit mobile address included in all messages received from the ground domain. Local procedure may substitute this by use of mode A code or identification in the same field as the one reserved for aircraft identification.
Category	<Interoperability>

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

444 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0015	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Surface Guidance Management	N/A

445
446 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.7106
Requirement	The ground system shall provide the vehicle system with an updated airport map, with valid restricted and closed areas entered.
Title	Airport map update.
Status	<Deleted>
Rationale	To safe guard the presentation on the moving map HMI, the latest updated verified airport map shall be presented by the ground system.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

447
448 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Surface Guidance Management	N/A

449 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.7306
Requirement	The ground domain should transmit horizontal position information (i.e. latitude, longitude) referenced to WGS-84., if the AVDR does not use on-board GNSS.
Title	Horizontal position for vehicle (ownship).
Status	<Deleted>
Rationale	Horizontal position information should be provided to the AVDR-system by on-board GNSS or via data link from the ground system.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

450 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0015	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

451
452 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.7507
Requirement	The vehicle system shall be able to receive airport map updates, including information about restricted and closed areas, to be depicted on the moving map HMI.
Title	Airport moving map updates.
Status	<Deleted>
Rationale	To ensure the latest updated airport moving map is used, the vehicle system shall be able to receive transmission of map updates from the ground domain.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

453
454 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

455 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.7702
Requirement	The AVDR-system should be able to receive and decode unambiguous addressed surveillance data position messages, if ownship GNSS receiver is not used.
Title	Ability to receive surveillance data position messages (ownship).
Status	<Deleted>
Rationale	If the AVDR-system is not equipped with ownship GNSS, reception of ground domain transmitted unambiguous addressed surveillance data position messages should be available.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

456

457 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0015	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

458 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.7708
Requirement	The vehicle system should be able to receive and decode unambiguous addressed surveillance data position messages, if ownship GNSS receiver is not used.
Title	Ability to receive surveillance data position messages (ownship).
Status	<Deleted>
Rationale	If the vehicle system is not equipped with ownship GNSS, reception of ground domain transmitted unambiguous addressed surveillance data position messages should be available.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

459

460 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED_TO>	<Functional block>	Surface Guidance Management	N/A

461

462 [REQ]

Identifier	REQ-06.07.01-INTEROP-AVDR.7710
Requirement	The AVDR-system shall have a GNSS receiver for ownship position location.
Title	GNSS receiver for ownship.
Status	<Deleted>
Rationale	To have appropriate ownship position indication a GNSS receiver is required.
Category	<Interoperability>
Validation Method	<Live trial>
Verification Method	<Test>

463

464 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0406	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0503	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-OSED-AVDR.0511	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0082	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0083	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.07.01-SPR-AVDR.0205	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA01.02.01	N/A
<ALLOCATED TO>	<Functional block>	Surface Guidance Management	N/A

465

466

467   **-END OF DOCUMENT-**

468

469