



**Research & Vehicle Technology**  
**“Infotainment Systems Product Development”**

**Feature – Rear Seat Occupant Alert v2**

**APIM Infotainment Subsystem Part Specific  
Specification (SPSS)**

Version 1.2

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## Revision History

Date	Version	Notes	
August 16, 2019	1.0	Initial Release	
August 23, 2019	1.1		
	RSOAv2-REQ-360915/B-Monitoring the Rear Door Status	ndecia: Updated requiriement to start the timeout timer on a Door Close event rather than a Door Open. Also added provisions to only start the timer if both doors are closed, and restart the timer on subsequent Close events.	
	RSOAv2-REQ-360916/B-Rear Seat Alert Timeout Period	ndecia: Removed copy paste error	
	RSOAv2-ACT-REQ-360920/B-Arming or Disarming the Alert Prior to Ignition On	ndecia: Diagram updated to show the timeout timer doesn't start until the rear door closes	
	RSOAv2-SD-REQ-360921/B-Alert Disarmed Prior to Ignition On	ndecia: Diagram updated to show the timeout timer doesn't start until the rear door closes	
	STR-680667/B-Use Cases	ndecia: Revised structure to include new use case	
	RSOAv2-UC-REQ-362349/A-Only Notification Triggered	ndecia: New Use Case to capture when only a notification is displayed	
	RSOAv2-SD-REQ-361469/B-Alert Armed, Triggered, and Disarmed After Ignition Off	ndecia: Diagram updated to show the timeout timer doesn't start until the rear door closes	
	RSOAv2-SD-REQ-361696/B-Alert Armed, Triggered, and Rearmed After Ignition Off	ndecia: Diagram updated to show the timeout timer doesn't start until the rear door closes	
	RSOAv2-REQ-361690/B-Feature Menu Setting	ndecia: Added HMI ID # references	
October 18, 2019	1.2		
	STR-681477/B-Logical Signal Mapping	ndecia: updated to include carmode signal mapping	
	RSOAv2-IIR-REQ-360908/B-RearSeatOccupantAlertV2Client_Rx	ndecia: updated structure to include carmode method 273721	
	STR-679435/B-General Requirements	ndecia: updated structure to add new requirement 369128	
	RSOAv2-REQ-369128/A-Operating in CarMode Normal	ndecia: new requirement added to restrict feature to only operate in Normal car mode	
	STR-680666/B-Requirements	ndecia: updated structure to add two new requirements (366869,366870)	
	RSOAv2-REQ-361463/B-Triggering the Alert	ndecia: Updated requirement to state that the alert shall remain active per the duration of a newly defined timer value T_AlertDuration	
	RSOAv2-REQ-366869/A-Configurable Parameter for Alert Duration	ndecia: New requirement to define a configurable parameter for T_AlertDuration	
	RSOA-TMR-REQ-366870/A-T_AlertDuration	ndecia: New timer requirement for T_AlertDuration	
	STR-681339/B-Requirements	ndecia: updated structure to include new requirement (366867)	
	RSOAv2-REQ-361690/C-Feature Menu Setting	ndecia: Removed HMI ID # reference	
	STR-681340/B-Use Cases	ndecia: updated structure to add new use case	



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# 1 Overview

The purpose of Rear Seat Occupant Alert (RSOA) v2 feature is to monitor rear door status upon entry and remind the driver to check the rear seat prior to exiting in the vehicle.

## 1.1 Feature Operation

The driver can select to enable or disable the feature from the In-Vehicle HMI. Once the feature is enabled, the driver will receive a visual and audible alert upon turning the ignition off if a rear door was opened prior to entry. This involves monitoring for the presence of a rear door ajar event within a certain amount of time prior to turning the ignition on, and then triggering the notification when the ignition status transitions to off, but prior to the driver door being opened.

## 1.2 Feature Assumptions

This variant of the feature assumes that the only vehicle conditions to be monitored are any of the rear door status signals, in conjunction with the ignition status signal.

## 1.3 Logical Block Diagram

## 1.4 Terminology and Abbreviations

The following table lists terminologies that are used in this document along with a brief description.

Term	Description
RSOA	Rear Seat Occupant Alert
APIM	Accessory Protocol Interface Module
HMI	Human Machine Interface
BCM	Body Control Module
AHU	Audio Head Unit



## 2 Architectural Design

### 2.1 RSOAv2-CLD-REQ-360906/A-RearSeatOccupantAlertV2Client

The RearSeatOccupantAlertV2Client is responsible for monitoring the status of all rear door signals, arming/disarming the notification trigger, displaying the visual reminder, and requesting the audible alert to be played via the audio system.

### 2.2 CLD-REQ-360907/A-VehicleDataServer

The VehicleDataServer is responsible for providing the status of the rear door signals, as well as the ignition status.

### 2.3 Physical Mapping of Classes

The table below shows an example of how the logical classes that make up the Rear Seat Occupant Alert feature may be mapped into physical modules. This mapping example is specific to the CGEA1.3C architecture and does not necessarily carryover to other carlines or vehicle architectures.

Logical Class	Physical Module (ECU)
Rear Seat Occupant Alert Interface Client	APIM
Vehicle Data Server	BCM
Audio Server	AHU

### 2.4 Logical Signal Mapping

The CAN signals mentioned throughout this document shall refer to the CAN signal's logical name. The logical names shall be mapped to their actual CAN signal names. Please use the table below to perform the mapping. The InfoCAN database file is the master file for the actual CAN signal names. Note: There may be cases where the actual CAN signal name is used in this documentation.

Logical Name	CAN Signal Name
RearDriverDoor_St	DrStatRI_B_Actl
RearPassengerDoor_St	DrStatRr_B_Actl
IgnitionStatus_St	Ignition_Status
CarMode	LifeCycMde_D_Actl

Table: Logical name/CAN signal mapping

### 2.5 RSOAv2-IIR-REQ-360908/B-RearSeatOccupantAlertV2Client\_Rx

#### 2.5.1 MD-REQ-354734/A-RearDoor\_St

Message Type: Status

The method is used to report the status of only the rear doors.

Name	Literals	Value	Description
RearDriverDoor_St	-	-	Rear Driver Side Door Status
	Closed	0x0	
	Ajar	0x1	
RearPassengerDoor_St	-	-	Rear Passenger Side Door Status
	Closed	0x0	
	Ajar	0x1	

**2.5.2 MD-REQ-199809/A-IgnitionStatus\_St**

Message Type: Status

Signal used to indicate ignition state.

Name	Literals	Value	Description
Type	-	-	Indicates ignition state
	Unknown	0x0	
	Off	0x1	
	Accessory	0x2	
	Run	0x4	
	Start	0x8	
	Invalid	0xF	

**2.5.3 MD-REQ-273721/C-LifeCycMde\_D\_Actl / CarMode**

Message Type: Status

This signal defines what Car Mode / Life Cycle Mode state is active in the vehicle.

Note: In CAN dB CarMode is used for CGEA 1.2 and C1MCA, and LifeCycMde\_D\_Actl is used for CGEA 1.3 but in the SPSS CarMode is just the logical signal name representing both

Logical Signal Name	Literals	Value	Description
LifeCycMde_D_Actl / CarMode /	Normal	0x0	
	Factory	0x1	
	Not Used	0x2	
	Transport	0x3	

**2.6 RSOAv2-IIR-REQ-360911/A-RearSeatOccupantAlertV2Client\_Tx****2.6.1 MD-REQ-360912/A-SYNC\_Alerts**

Message Type: Request

This signal is used to request a prompt to be played on the Audio Server

SYNC_Alerts	Event-Periodic message from SYNC to the applicable Alert components	
	<u>Alert_ChanX</u> : Method from the SYNC Prompt Generator to the Prompt Audio Source to control the Alert channels	<u>Alert_Chan</u> (Signal) 0x0 OFF_Inactive (prompts OFF) 0x1 Mute 0x2 Initialize for Prompts (keep set while prompts are active)
	<u>Attn_Info_Audio</u> : From the SYNC Prompt Generator to the Prompt Audio Source for attenuating the active audio source.	<u>Attn_Info_Audio</u> (Signal) – Attenuates the Infotainment Audio 0x0 No Attenuation of Audio 0x1 Attenuation_1 0x2 Attenuation_2 cont. 0x6 Attenuation_6 (higher attenuation number indicates a greater increase in audio attenuation) 0x7 Unknown



New\_Attn\_Event: From the SYNC Prompt Generator to the Prompt audio source for an attenuation event.

PromptX\_Directionality: From the SYNC Prompt Generator to the Prompt audio source indicating what speaker(s) to play the prompt(s) through.

Audible\_Beep:  
Event-Periodic signal from the SYNC Beep Client to the Beep Generator so the Beep Generator can produce an audible beep

New\_Attn\_Event (Signal)  
0x0 Inactive  
0x1 Active

Prompt\_Directionality (Signal)  
0x0 Inactive / OFF  
0x1 All  
0x2 Front  
0x3 Rear

Audible\_Beep(Signal)  
0x0 Inactive  
0x1 Active



### 3 General Requirements

#### 3.1 RSOAv2-REQ-360918/A-Rear Seat Occupant Alert Configuration Parameter

The Rear Seat Occupant Alert Interface Client shall have a configurable parameter to determine whether the Rear Seat Occupant Alert feature is to be supported. Refer to the Infotainment Diagnostic Specification for further details.

#### 3.2 REQ-361692/A-Ignition On and Ignition Off References

For the purposes of this document, references to Ignition ON can be interpreted as Ignition\_St = Run/Start. References to Ignition OFF can be interpreted as Ignition\_St = Off/Acc.

#### 3.3 RSOAv2-REQ-369128/A-Operating in CarMode Normal

The Rear Seat Occupant Alert Interface Client shall only allow the feature to function when the CarMode signal is set to Normal.





## 4 Functional Definition

### 4.1 RSOAv2-FUN-REQ-360914/A-Arming the Alert

#### 4.1.1 Requirements

##### 4.1.1.1 RSOAv2-REQ-360915/B-Monitoring the Rear Door Status

The Rear Seat Occupant Alert Interface Client shall monitor both of the RearDoor\_St signals and arm the Rear Seat Alert system (e.g. internal flag *RearSeatAlertArmed* set to TRUE) if either signal transitions to Ajar.

If either of the RearDoor\_St signals transition from Ajar to Closed while the Ignition Status is OFF and while the other door is Closed, the Rear Seat Occupant Alert Interface Client shall start a timer T\_RearSeatAlertTimeout. If this timer expires prior to the Ignition Status transitioning to ON, the Rear Seat Alert system shall be disarmed (e.g. internal flag *RearSeatAlertArmed* set to FALSE.)

The Rear Seat Occupant Alert Interface Client shall restart the timer T\_RearSeatAlertTimeout if either of the RearDoor\_St signals transitions a subsequent time from Ajar to Closed while the Ignition Status is OFF and while the other door is Closed. This means that the timer shall not be started, or restarted, if one of the rear doors transitions to Closed while the other is still Ajar.

##### 4.1.1.2 RSOAv2-REQ-360916/B-Rear Seat Alert Timeout Period

The Rear Seat Occupant Alert Interface Client shall implement a timeout period with a value as defined in T\_RearSeatAlertTimeout. This timer shall be maintained in real-time through key cycles and network sleep/wake cycles.

##### 4.1.1.3 RSOAv2-REQ-360917/A-Configurable Parameter for Rear Seat Alert Timeout Period

The value defined in T\_RearSeatAlertTimeout shall be adjustable via a configurable parameter. Refer to the Infotainment Diagnostic Specification for further details.

##### 4.1.1.4 RSOAv2-REQ-361693/A-T\_RearSeatAlertTimeout

Name	Description	Units	Range	Resolution	Default
T_RearSeatAlertTimeout	Timeout period for how long the alert system should remain armed while the ignition is OFF.  Note: Set by configurable parameter, refer to IDS	min	See IDS	See IDS	See IDS

#### 4.1.2 Use Cases

##### 4.1.2.1 RSOAv2-UC-REQ-360919/A-Alert Armed Prior to Ignition On

<b>Actors</b>	Rear Seat Occupant Alert Interface Client
<b>Pre-conditions</b>	Ignition is OFF
<b>Scenario Description</b>	A rear door is opened, and the ignition status transitions to ON before the timeout period
<b>Post-conditions</b>	The Rear Seat Occupant Alert Interface Client has armed the Rear Seat Occupant Alert system
<b>List of Exception Use Cases</b>	Alert Disarmed Prior to Ignition On
<b>Interfaces</b>	

**4.1.2.2 RSOAv2-UC-REQ-361780/A-Alert Disarmed Prior to Ignition On**

<b>Actors</b>	Rear Seat Occupant Alert Interface Client
<b>Pre-conditions</b>	Ignition is OFF
<b>Scenario Description</b>	A rear door is opened, but the Ignition Status remains OFF until the Timeout Period has expired
<b>Post-conditions</b>	The Rear Seat Occupant Alert Interface Client has disarmed the Rear Seat Occupant Alert system
<b>List of Exception Use Cases</b>	
<b>Interfaces</b>	

**4.1.2.3 RSOAv2-UC-REQ-361781/A-Alert Armed After Ignition On**

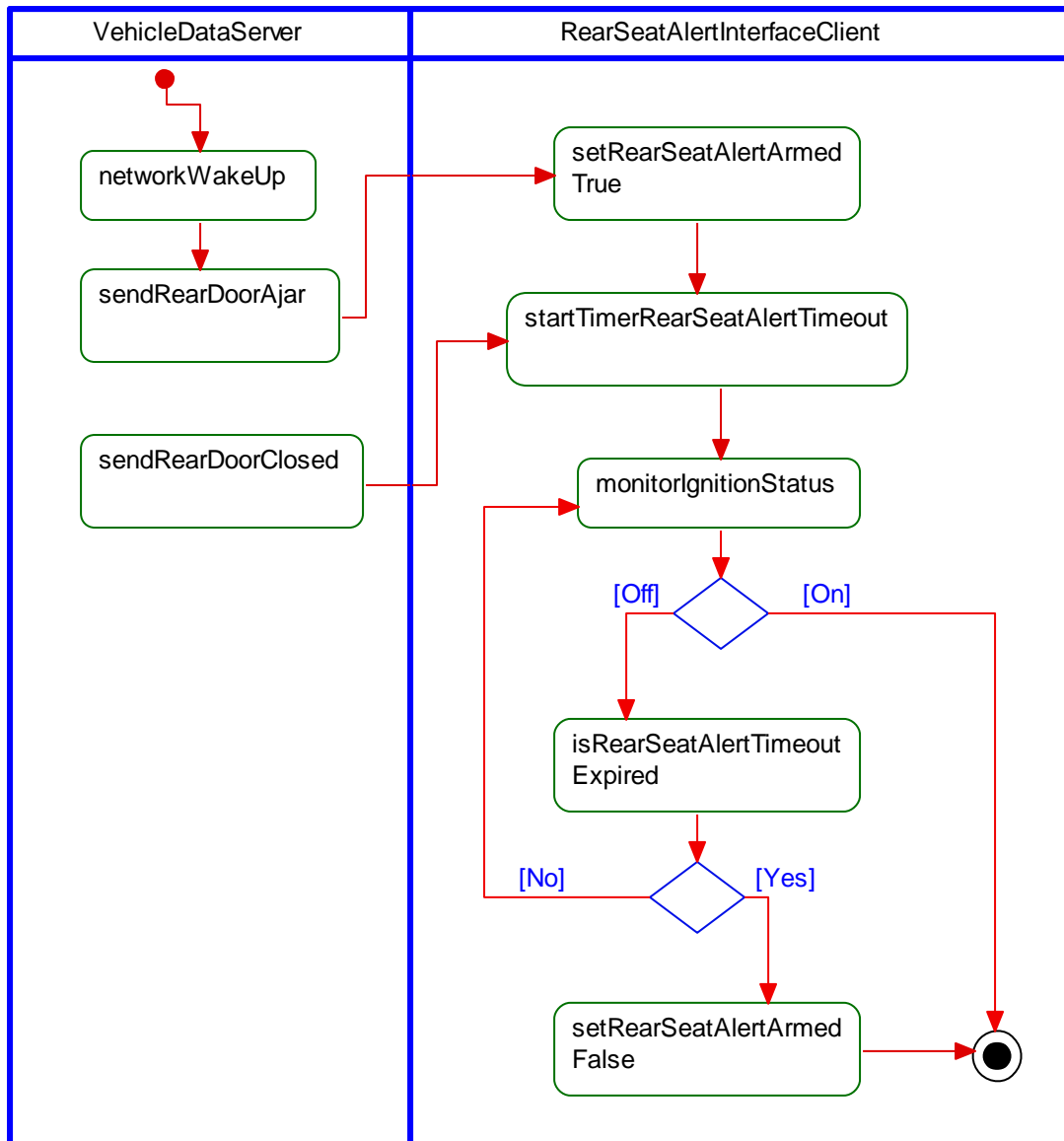
<b>Actors</b>	Rear Seat Occupant Alert Interface Client
<b>Pre-conditions</b>	Ignition is ON
<b>Scenario Description</b>	A rear door is opened
<b>Post-conditions</b>	The Rear Seat Occupant Alert Interface Client has armed the Rear Seat Occupant Alert system
<b>List of Exception Use Cases</b>	
<b>Interfaces</b>	



## 4.1.3 White Box View

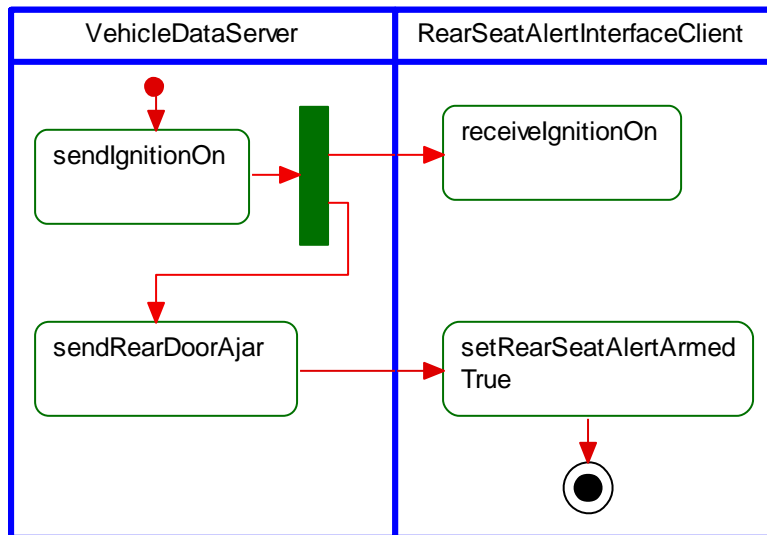
## 4.1.3.1 Activity Diagrams

## 4.1.3.1.1 RSOAv2-ACT-REQ-360920/B-Arming or Disarming the Alert Prior to Ignition On





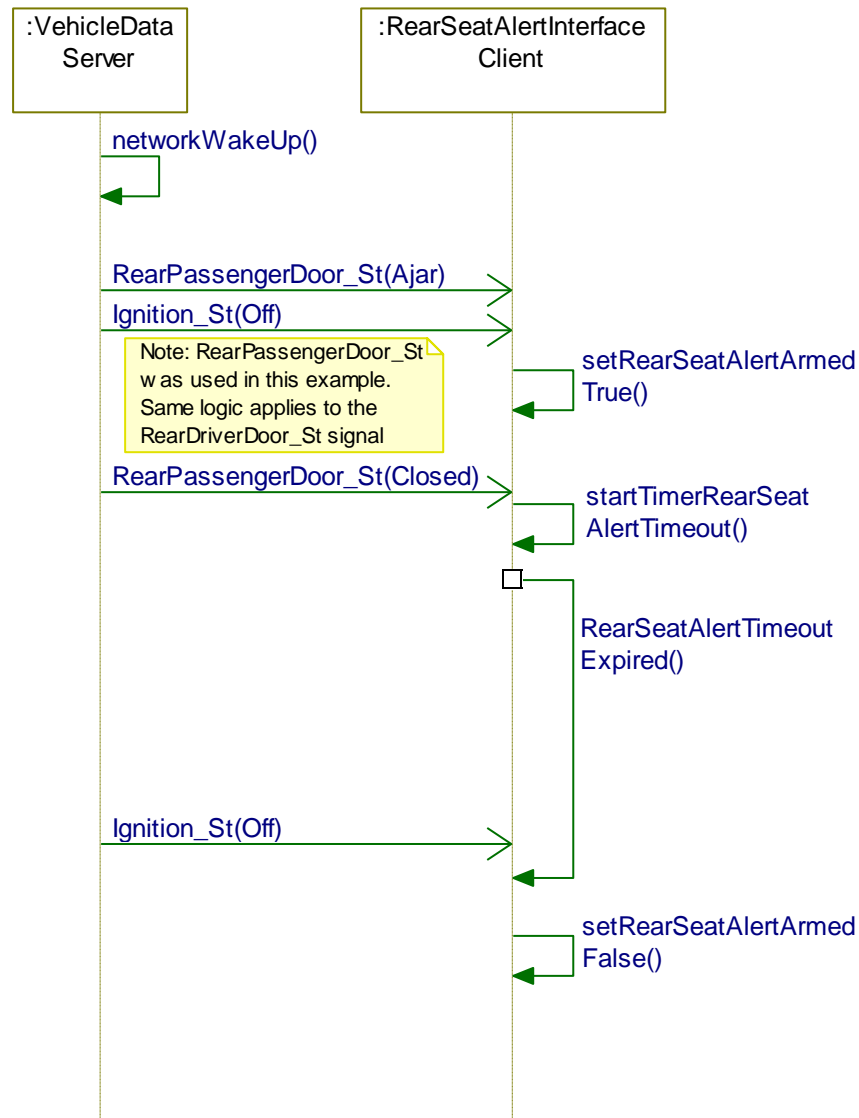
## 4.1.3.1.2 RSOAv2-ACT-REQ-361695/A-Arming the Alert After Ignition On





#### 4.1.3.2 Sequence Diagrams

##### 4.1.3.2.1 RSOAv2-SD-REQ-360921/B-Alert Disarmed Prior to Ignition On



## 4.2 RSOAv2-FUN-REQ-361462/A-Triggering and Rearming the Alert

### 4.2.1 Requirements

#### 4.2.1.1 RSOAv2-REQ-361463/B-Triggering the Alert

The Rear Seat Occupant Alert Interface Client shall trigger the Alert if the system is armed (e.g. internal flag **RearSeatAlertArmed** is TRUE) when the Ignition Status transitions to OFF. Triggering the Alert consists of displaying a notification to the user via the HMI and also playing an audible alert, **with Prompt ID <TBD>**, by sending a SYNC\_Alert request to the Audio Server to play audio on the Alerts Channel. The notification and audible alert shall remain active for a period of **T\_AlertDuration**. For more details on this interface, please refer to the Alerts APIM SPSS. For more details on Prompt ID or priority, please refer to the A22C Prompts Specification.

#### 4.2.1.2 RSOAv2-REQ-361464/A-Disarming or Rearming After a Transition Back to Ignition On

After triggering an Alert, the Rear Seat Occupant Alert Interface Client shall start the timer **T\_RearSeatAlertTimeout** and if the timer expires prior to the Ignition Status transitioning back to ON, the Rear Seat Alert system shall be disarmed (e.g. internal flag **RearSeatAlertArmed** set to FALSE.)



If the Ignition Status transitions back to ON prior to the timer expiring, Rear Seat Occupant Alert Interface Client shall rearm the Rear Seat Alert system (e.g. internal flag RearSeatAlertArmed set to TRUE), and another Alert shall be triggered upon the next transition to Ignition OFF.

#### 4.2.1.3 *RSOAv2-REQ-366869/A-Configurable Parameter for Alert Duration*

The length of time of an alert shall be configurable in the Rear Seat Alert Client. The value defined in T\_AlertDuration shall be adjustable via a configurable parameter. Refer to the Infotainment Diagnostic Specification for further details.

#### 4.2.1.4 *RSOA-TMR-REQ-366870/A-T\_AlertDuration*

Name	Description	Units	Range	Resolution	Default
T_AlertDuration	The amount of time for the alert to remain active.  Note: Use the default value	sec	1-30	1	10

### 4.2.2 Use Cases

#### 4.2.2.1 *RSOAv2-UC-REQ-361467/A-Notification and Alert Triggered*

<b>Actors</b>	Rear Seat Occupant Alert Interface Client
<b>Pre-conditions</b>	Ignition is ON, Rear Seat Occupant System is Armed
<b>Scenario Description</b>	The Ignition Status transitions to OFF
<b>Post-conditions</b>	The Rear Seat Occupant Alert Interface Client has displayed a notification to the driver and has requested an Alert to be played via the Audio Server
<b>List of Exception Use Cases</b>	
<b>Interfaces</b>	HMI

#### 4.2.2.2 *RSOAv2-UC-REQ-362349/A-Only Notification Triggered*

<b>Actors</b>	Rear Seat Occupant Alert Interface Client
<b>Pre-conditions</b>	Ignition is ON, Rear Seat Occupant System is Armed, Driver/Passenger Door is Open
<b>Scenario Description</b>	The Ignition Status transitions to OFF
<b>Post-conditions</b>	The Rear Seat Occupant Alert Interface Client has displayed a notification to the driver but no Alert is requested to be played via the Audio Server
<b>List of Exception Use Cases</b>	
<b>Interfaces</b>	HMI
<b>Notes</b>	The Rear Seat Occupant Alert Interface Client does not request an audible Alert in this case because it shut down as soon as Delayed Accessory ends (i.e. when a front door is opened and the ignition transitions to OFF.)

**4.2.2.3 RSOAv2-UC-REQ-361782/A-Alert Rearmed After Transition to Ignition Off**

<b>Actors</b>	Rear Seat Occupant Alert Interface Client
<b>Pre-conditions</b>	The Ignition Status is OFF The Rear Seat Occupant Alert Interface Client has displayed a notification to the driver and has requested and Alert to be played via the Audio Server
<b>Scenario Description</b>	The Ignition Status transitions to ON prior to the expiration of the Timeout Period
<b>Post-conditions</b>	The Rear Seat Occupant Alert Interface Client has rearmed the Rear Seat Occupant Alert system
<b>List of Exception Use Cases</b>	Alert Disarmed After Transition to Ignition Off
<b>Interfaces</b>	HMI

**4.2.2.4 RSOAv2-UC-REQ-361783/A-Alert Disarmed After Transition to Ignition Off**

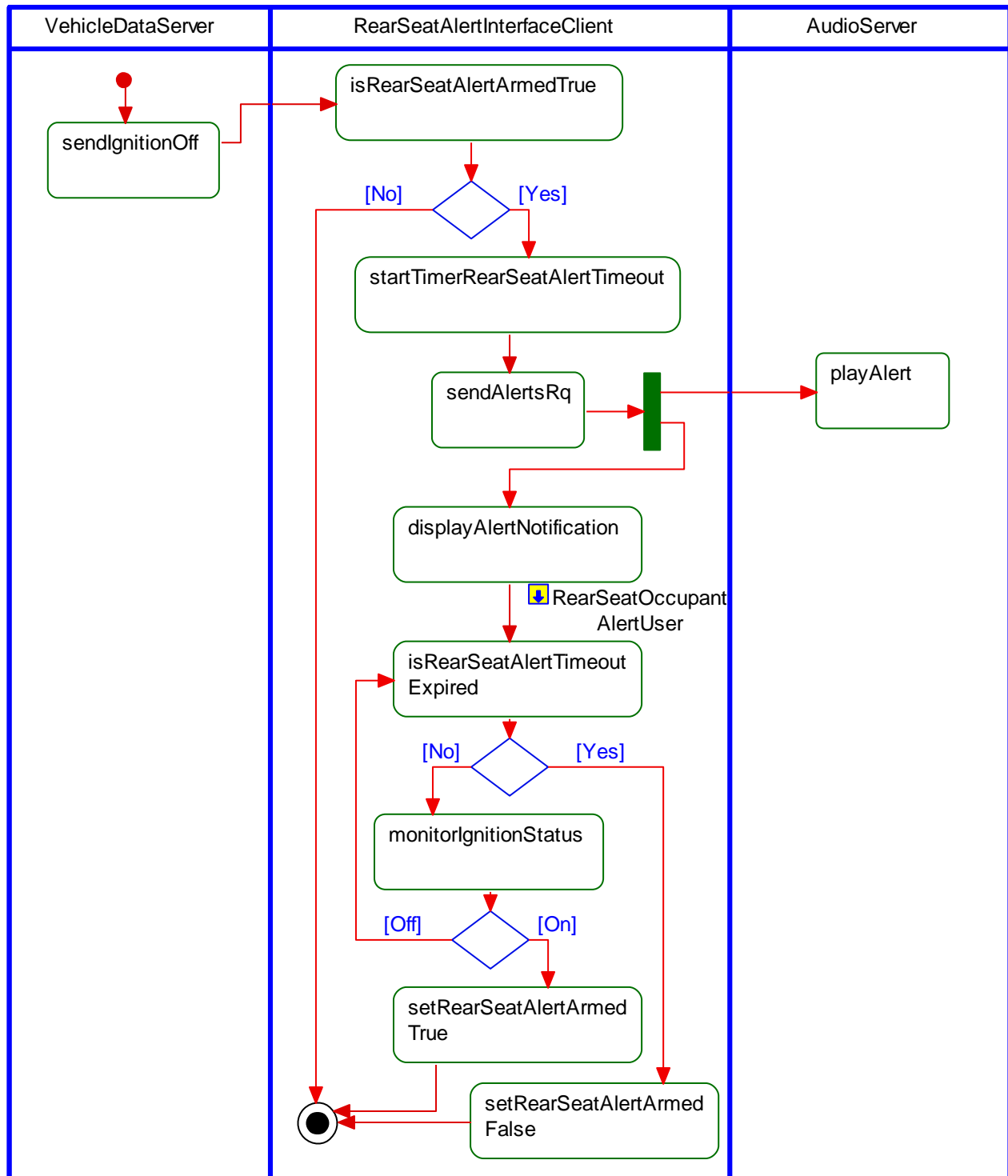
<b>Actors</b>	Rear Seat Occupant Alert Interface Client
<b>Pre-conditions</b>	The Ignition Status is OFF The Rear Seat Occupant Alert Interface Client has displayed a notification to the driver and has requested and Alert to be played via the Audio Server
<b>Scenario Description</b>	The Ignition Status remains OFF until the Timeout Period has expired
<b>Post-conditions</b>	The Rear Seat Occupant Alert Interface Client has disarmed the Rear Seat Occupant Alert system
<b>List of Exception Use Cases</b>	
<b>Interfaces</b>	HMI



## 4.2.3 White Box View

## 4.2.3.1 Activity Diagrams

## 4.2.3.1.1 RSOAv2-ACT-REQ-361468/A-Triggering and Rearming the Alert

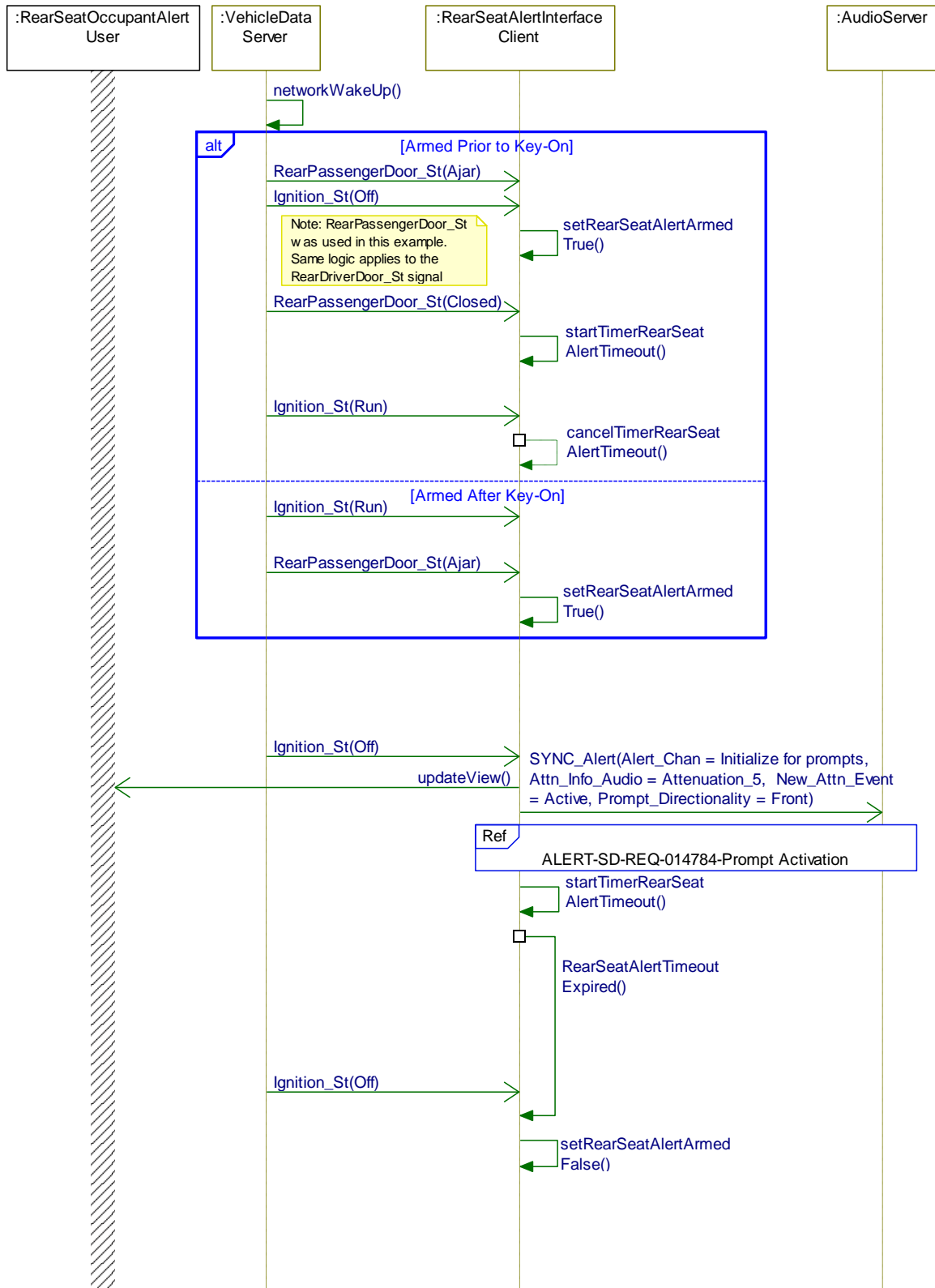






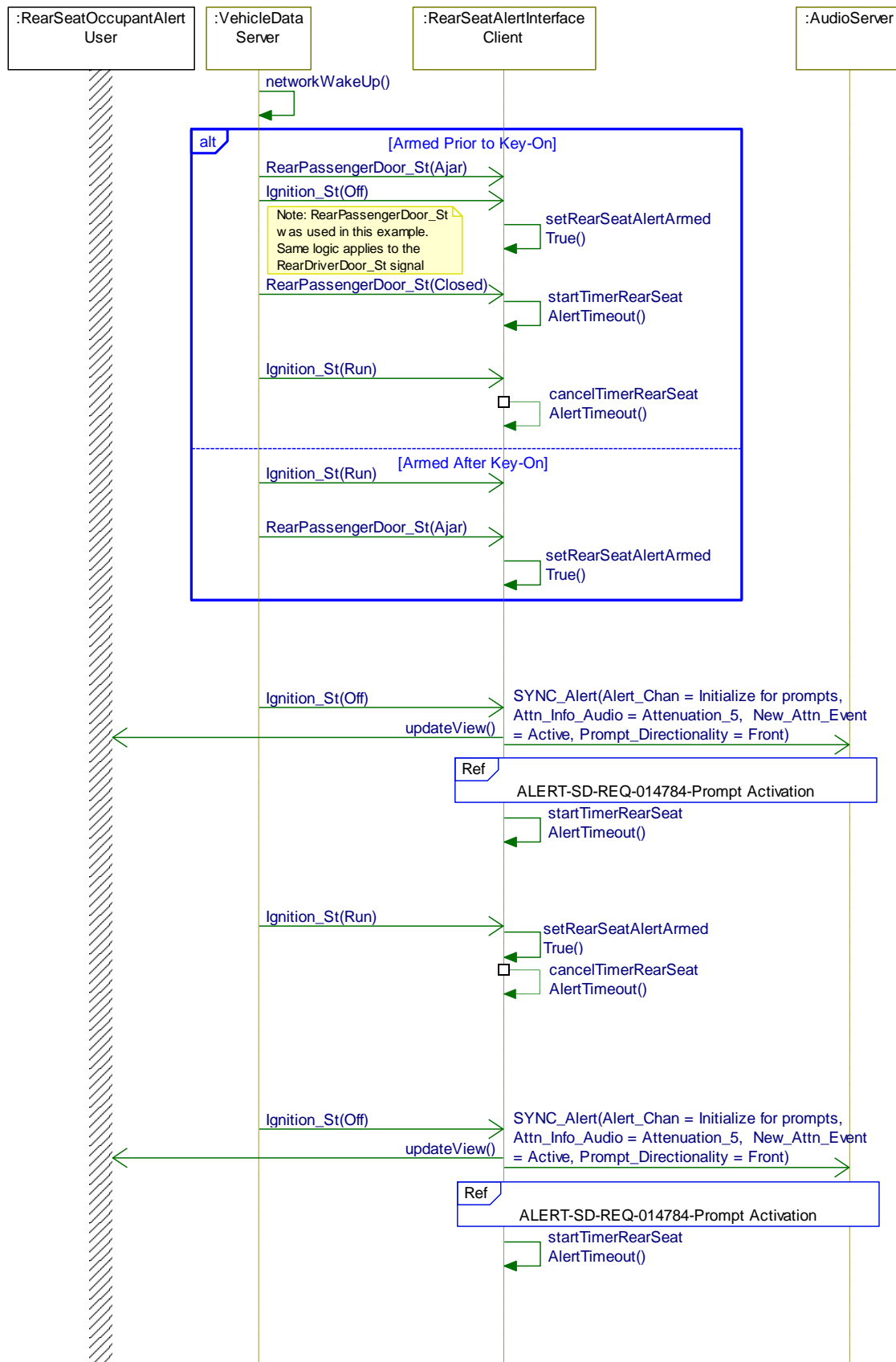
## 4.2.3.2 Sequence Diagrams

## 4.2.3.2.1 RSOAv2-SD-REQ-361469/B-Alert Armed, Triggered, and Disarmed After Ignition Off





## 4.2.3.2.2 RSOAv2-SD-REQ-361696/B-Alert Armed, Triggered, and Rearmed After Ignition Off





### 4.3 RSOAv2-FUN-REQ-361689/A-Feature Menu Setting

#### 4.3.1 Requirements

##### 4.3.1.1 *RSOAv2-REQ-361690/C-Feature Menu Setting*

The Rear Seat Occupant Alert Interface Client shall implement a feature setting in the HMI to allow the user to enable or disable the Rear Seat Occupant Alert feature. The logic of this feature setting is to be maintained internally to the Rear Seat Occupant Alert Interface Client.

HMI Setting ID
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1039
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#### 4.3.2 Use Cases

##### 4.3.2.1 *RSOAv2-UC-REQ-361694/A-Feature Setting Enabled*

Actors	Rear Seat Occupant Alert Interface Client
Pre-conditions	Infotainment System is ON
Scenario Description	The user enables the Rear Seat Occupant Alert feature via the menu setting
Post-conditions	The Rear Seat Occupant Alert Interface Client feature is enabled
List of Exception Use Cases	
Interfaces	HMI

##### 4.3.2.2 *RSOAv2-UC-REQ-361784/A-Feature Setting Disabled*

Actors	Rear Seat Occupant Alert Interface Client
Pre-conditions	Infotainment System is ON
Scenario Description	The user disables the Rear Seat Occupant Alert feature via the menu setting
Post-conditions	The Rear Seat Occupant Alert Interface Client feature is disabled
List of Exception Use Cases	
Interfaces	HMI



## 5 Appendix: Reference Documents

Reference #	Document Title
1	Infotainment Diagnostic Specification
2	A22C Prompts Specification
3	Alerts APIM SPSS
4	
5	
6	
7	
8	
9	
10	