



Research & Vehicle Technology "Infotainment Systems Product Development"

Feature – Rear Seat Occupant Alert v2

APIM Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.3
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Revision History

Date	Version		Notes		
August 16, 2019	1.0	Initial Release			
August 23, 2019	1.1				
	RSOAv2-REO Status	Q-360915/B-Monitoring the Rear Door	ndecia: Updated requriement 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-REO Period	Q-360916/B-Rear Seat Alert Timeout	ndecia: Removed copy paste error		
		REQ-360920/B-Arming or Disarming to Ignition On	ndecia: Diagram updated to show the timeout timer doesn't start until the rear door closes		
	RSOAv2-SD- Ignition On	REQ-360921/B-Alert Disarmed Prior to	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- Triggered	REQ-362349/A-Only Notification	ndecia: New Use Case to capture when only a notification is displayed		
	RSOAv2-SD-	REQ-361469/B-Alert Armed, Triggered, I 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, After Ignition Off	ndecia: Diagram updated to show the timeout timer doesn't start until the rear door closes		
		Q-361690/B-Feature Menu Setting	ndecia: Added HMI ID # references		
		ÿ	1		
October 18, 2019	1.2				
	STR-681477/	B-Logical Signal Mapping	ndecia: updated to include carmode signal mapping		
	RSOAv2-IIR-I	REQ-360908/B- upantAlertV2Client_Rx	ndecia: updated structure to include carmode method 273721		
	STR-679435/B-General Requirements		ndecia: updated structure to add new requirement 369128		
	RSOAv2-REO Normal	Q-369128/A-Operating in CarMode	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-REC	Q-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-REO Alert Duration	Q-366869/A-Configurable Parameter for	ndecia: New requirement to define a configurable parameter for T_AlertDuration		
	RSOA-TMR-F	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-REC	Q-361690/C-Feature Menu Setting	ndecia: Removed HMI ID # reference		
	STR-681340/	B-Use Cases	ndecia: updated structure to add new use case		
December 18, 2019	1.3				
	STR-681477/	C-Logical Signal Mapping	ndecia: Updated logical mapping to include door presence signals		
		REQ-360908/C- upantAlertV2Client_Rx	ndecia: updated structure to include new method 372327		
	MD-REQ-372	327/A-DoorPresent_St	ndecia: new method for door presence status signals		
	STR-681339/	C-Requirements	ndecia: updated structure to include new requirements 366867, 372253, 372323		
	RSOAv2-REO Reactivation I	Q-366867/A-Feature Menu Setting Prompt	ndecia: new requirement to prompt the user to reset the feature menu setting to the ON position on specific dates of the year		
		Q-372253/A-Feature Menu Setting	ndecia: new requirement for reporting feature settings usage analytics		
	RSOAv2-REC	Q-372323/A-Feature Deactivation When ected as Removed	ndecia: new requirement for feature deactivation on vehicle with door(s) removed		
		REQ-361784/B-Feature Setting	ndecia: Updated post-conditions to include the notification pop-up that a reminder prompt will be dispalyed twice a year.		



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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
ВСМ	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 RSOAv2-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_ActI
DriverDoorPresent_St	DrPrsntDrv_D_Stat
PassengerDoorPresent_St	DrPrsntPsngr_D_Stat
RearDriverDoorPresent_St	DrPrsntRearDrv_D_Stat
RearPassengerDoorPresent _St	DrPrsntRearPsngr_D_Stat

Table: Logical name/CAN signal mapping

2.5 RSOAv2-IIR-REQ-360908/C-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

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	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	8x0	
	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 /	Normal	0x0	
CarMode /	Factory	0x1	
	Not Used	0x2	
	Transport	0x3	

2.5.4 MD-REQ-372327/A-DoorPresent_St

Message Type: Status

The method is used to report the status of whether any of the doors have been removed on a vehicle with removal doors.

Name	Literals	Value	Description
DriverDoorPresent_St	-	-	Driver Side Door Presence Status
	NotDetermined	0x0	
	NotPresent	0x1	
	Present	0x2	
	Faulty	0x3	
PassengerDoorPresent_St	-	-	Passenger Side Door Presence Status
	NotDetermined	0x0	
	NotPresent	0x1	
	Present	0x2	
	Faulty	0x3	

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RearDriverDoorPresent_St	-	-	Rear Driver Side Door Presence
			Status
	NotDetermined	0x0	
	NotPresent	0x1	
	Present	0x2	
	Faulty	0x3	
RearPassengerDoorPresent_St	-	-	Rear Passenger Side Door
			Presence Status
	NotDetermined	0x0	
	NotPresent	0x1	
	Present	0x2	
	Faulty	0x3	

2.6 RSOAv2-IIR-REQ-360911/A-RearSeatOccupantAlertV2Client _Tx

2.6.1 MD-REQ-360912/A-SYNC_Alerts

Message Type: Request

hi <u>s signal is used to</u>	request a prompt to be played on the Audio Ser	rver
	Event-Periodic message from SYNC to the applicable Alert components	
	Alert ChanX: Method from the SYNC Prompt Generator to the Prompt Audio Source to control the Alert channels	Alert_Chan (Signal) 0x0 OFF_Inactive (prompts OFF) 0x1 Mute 0x2 Initialize for Prompts (keep set while prompts are active)
SYNC_Alerts	Attn Info Audio: From the SYNC Prompt Generator to the Prompt Audio Source for attenuating the active audio source.	Attn_Info_Audio (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	New_Attn_Event (Signal) 0x0 Inactive 0x1 Active Prompt_Directionality (Signal) 0x0 Inactive / OFF 0x1 All
	Generator to the Prompt audio source indicating what speaker(s) to play the prompt(s) through. Audible Beep:	0x2 Front 0x3 Rear Audible_Beep(Signal) 0x0 Inactive
	Event-Periodic signal from the SYNC Beep Client to the Beep Generator so the Beep Generator can produce an audible beep	0x1 Active

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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 RSOAv2-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

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



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

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

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

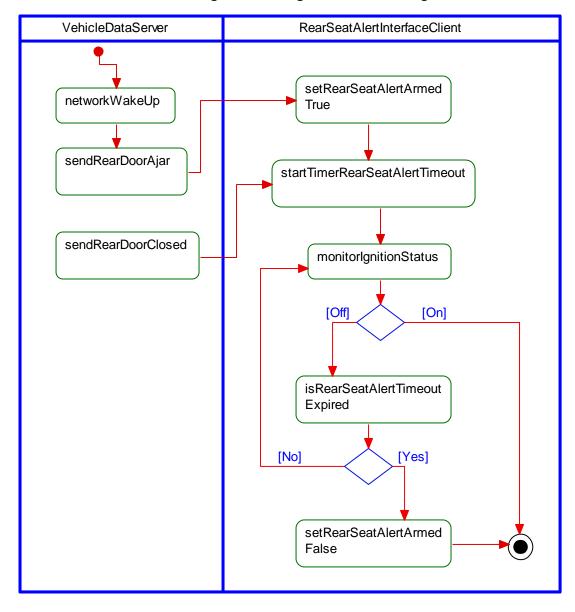
Actors	Rear Seat Occupant Alert Interface Client
Pre-conditions	Ignition is ON
Scenario	A rear door is opened
Description	
Post-conditions	The Rear Seat Occupant Alert Interface Client has armed the Rear Seat
	Occupant Alert system
List of	
Exception Use	
Cases	
Interfaces	



4.1.3 White Box View

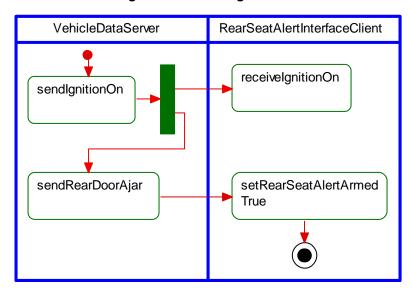
4.1.3.1 Activity Diagrams

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





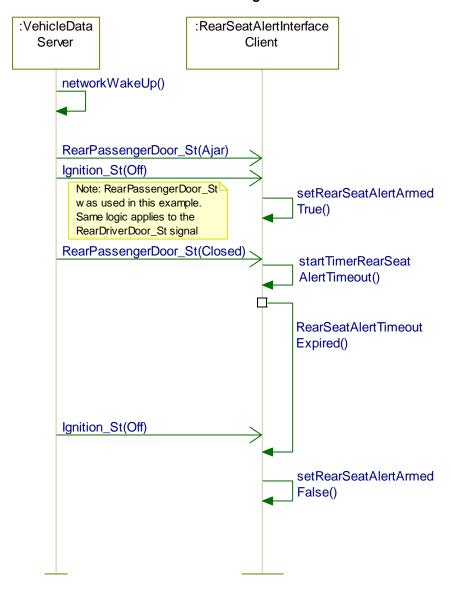
4.1.3.1.2 RSOAv2-ACT-REQ-361695/A-Arming the Alert After Ignition On





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.)

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If the Ignition Status transitions back to ON prior to the timer expiring, Rear Seat Occupant Alert Interface Client shall the 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.	sec	1-30	1	10
	Note: Use the default value				

4.2.2 Use Cases

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

Actors	Rear Seat Occupant Alert Interface Client
Pre-conditions	Ignition is ON, Rear Seat Occupant System is Armed
Scenario	The Ignition Status transitions to OFF
Description	
Post-conditions	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
List of	
Exception Use	
Cases	
Interfaces	HMI

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

Actors	Rear Seat Occupant Alert Interface Client
Pre-conditions	Ignition is ON, Rear Seat Occupant System is Armed, Driver/Passenger Door is
	Open
Scenario	The Ignition Status transitions to OFF
Description	
Post-conditions	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
List of	
Exception Use	
Cases	
Interfaces	HMI
Notes	The Rear Seat Occupant Alert Interface Client does not request an audible Alert
	in this case because it shut downs 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

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Actors	Rear Seat Occupant Alert Interface Client
Pre-conditions	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
Scenario	The Ignition Status transitions to ON prior to the expiration of the Timeout Period
Description	
Post-conditions	The Rear Seat Occupant Alert Interface Client has rearmed the Rear Seat
	Occupant Alert system
List of	Alert Disarmed After Transition to Ignition Off
Exception Use	
Cases	
Interfaces	HMI

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

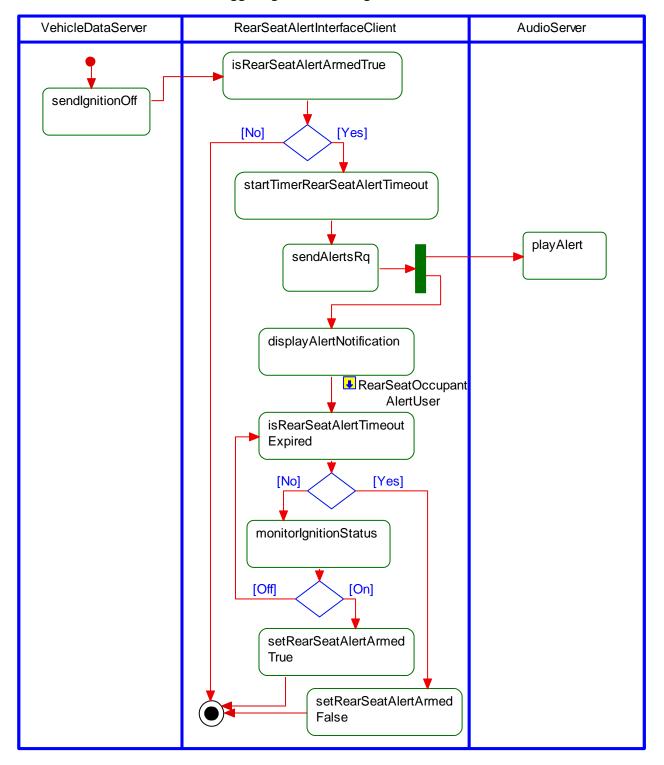
Actors	Rear Seat Occupant Alert Interface Client
Pre-conditions	The Ignition Status is OFF
	The Rear Seat Occupant Alert Interface Client has displayed a notification to the
	driver and has requested and Alert to be played via the Audio Server
Scenario	The Ignition Status remains OFF until the Timeout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



4.2.3 White Box View

4.2.3.1 Activity Diagrams

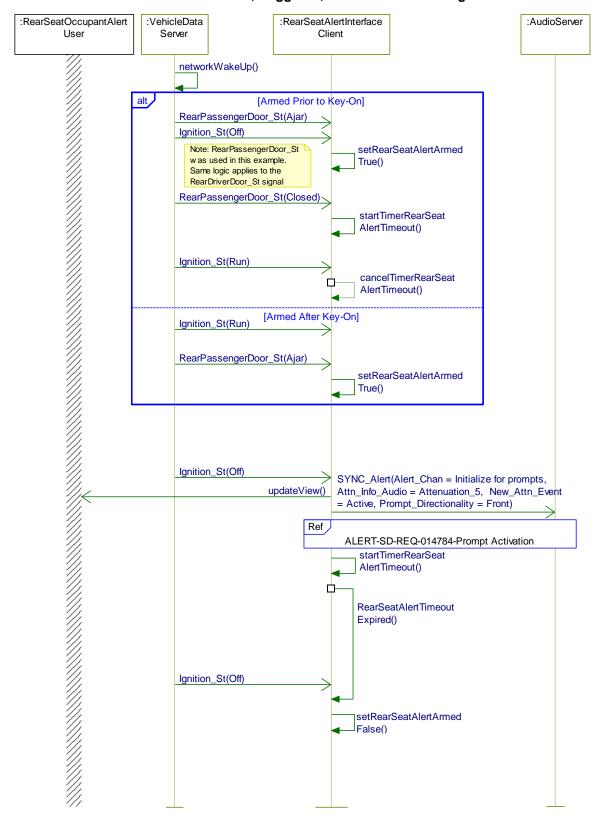
4.2.3.1.1 RSOAv2-ACT-REQ-361468/A-Triggering and Rearming the Alert





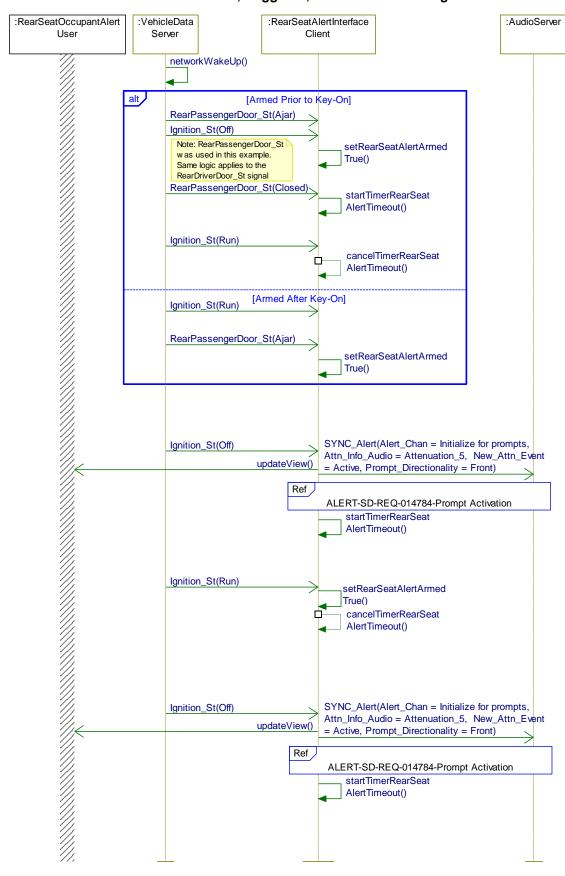
4.2.3.2 Sequence Diagrams

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	
1039	

4.3.1.2 RSOAv2-REQ-366867/A-Feature Menu Setting Reactivation Prompt

The feature setting has a default position of ON. If the setting has been switched to the OFF position, the Rear Seat Occupant Alert Interface Client shall prompt the user to switch the feature back to the ON setting, on the following UTC dates every year:

- April 1st
- October 1st

4.3.1.3 RSOAv2-REQ-372253/A-Feature Menu Setting Usage Analytics

The Rear Seat Occupant Alert Interface Client shall track the status of the feature setting usage and report usage statistics in accordance with the existing feature data and analytics functionality.

4.3.1.4 RSOAv2-REQ-372323/A-Feature Deactivation When a Door is Detected as Removed

The Rear Seat Occupant Alert Interface Client shall have a configurable parameter to determine when the feature is on a vehicle that has removable doors.

On such a vehicle, the Rear Seat Occupant Alert Interface Client shall monitor the presence of all doors via the DoorPresent_St signals. When any of the DoorPresent_St signals (e.g. DriverDoorPresent_St) reports *NotPresent* or *Faulty*, the Rear Seat Occupant Alert Interface Client shall deactivate the feature and present a notification to the User informing them that the feature has been deactivated as a result of one of the doors being removed. The Rear Seat Occupant Alert Interface Client shall reactivate the feature once the presence of all doors is confirmed via the DoorPresent_St signals being all reported as *Present*.

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	The user enables the Rear Seat Occupant Alert feature via the menu setting
Description	
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/B-Feature Setting Disabled

Actors	Rear Seat Occupant Alert Interface Client
Pre-conditions	Infotainment System is ON
Scenario	The user disables the Rear Seat Occupant Alert feature via the menu setting
Description	
Post-conditions	The Rear Seat Occupant Alert Interface Client feature is disabled, and a notification is presented to the user that a reminder prompt will be displayed twice a year to confirm whether the user wants the setting to remain 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	