Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – Stand-alone Rear View Camera

APIM Infotainment Subsystem Part Specific Specification (SPSS)

Version 2.7

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Version Date: April 26, 2019

FORD CONFIDENTIAL

Revision History

Date	Version	Notes	
May 31, 2013	**1.0**	**Initial Release**	
December 16, 2014	**2.0**		
	RVC-IIR-REQ-014199/B-RVC Server CAN Status (TcSE ROIN-146765-7)	rpaquet2 - Added PrkBrkActv_B_Actl and PrkBrkStatus for Manual Transmission applications.	
	RVC-FUR-REQ-014088/B-Deactivate RVC (TcSE ROIN-293328)	rpaquet2 - Added new text to clarify Forward gear and Park no prak for Manual transmission applications.	
	CAMERA-FUR-REQ-014093/B-Camera Image Priority (TcSE ROIN-264652-1)	rpaquet2 - Updated requirement to work for all camera views. no change to requirement intent.	
June 25, 2015	**2.1**		
	RVC-FUR-REQ-014087/B-RVC Malfunction (TcSE ROIN-146656-2)	rpaquet2 - Updated requirement per APIM team.	
	RVC-TMR-REQ-166649/A-T_cameraMalfunctionDelay	rpaquet2 - Added new timer requirement for delay.	
	RVC-FUR-REQ-014088/C-Deactivate RVC (TcSE ROIN-293328)	wstephe1: Revised to align with Max Speed requirement CAMERA-REQ-014077	
	CAMERA-REQ-014077/B-Feature Maximum Speed (TcSE ROIN-290556)	wstephe1: Updated requirement for Max Speed per feature scenario types: camera activation (any feature), RVC active, and DAFVC active by configuration of front (off road) camera. Scenarios to continue application across camera features.	
	RVC-UC-REQ-014099/B-Rear Camera Delay Mode is On (TcSE ROIN-289798)	wstephe1: Revised to align with Max Speed requirement CAMERA-REQ-014077	
	RVC-UC-REQ-014100/B-Active Park Assist is Active (TcSE ROIN-290554)	wstephe1: Revised to align with Max Speed requirement CAMERA-REQ-014077	
October 2, 2015	**2.2**		
	STR-052775/B-Interface Requirements (TcSE ROIN-146884)	Added RVC Split View Request and Status interfaces.	
	CAMERA-REQ-014077/C-Feature Maximum Speed (TcSE ROIN-290556)	tmertiri: Updated requirement to account for off road changes.	
	RVCv1-FUN-REQ-196091/A-Split View	tmertiri: Added Split View functionality.	
	RVC-UC-REQ-196086/A-Rear Split View Exit	tmertiri: Added Split View use cases.	
	RVC-UC-REQ-196085/A-Enable Split View	tmertiri: Added Split View use case	
	RVC-ACT-REQ-196084/A-Rear View Camera Split View	tmertiri: Added Split View Activity Diagram	
October 19, 2016	**2.3**		
	RVC-IIR-REQ-014199/D-RVC Server CAN Status (TcSE ROIN-146765-7)+	tmertiri: Update old signal PJB_BootLidStatus to new one DrStatTgate_B_Actl and another replacement old signal GearRvrseActv_D_Actl to new signal GearRvrse_D_Actl .	
	RVC-IIR-REQ-014199/E-RVC Server CAN Status (TcSE ROIN-146765-7)	tmertiri: The feature shall be responsive to both signals PJB_BootlidStatus and DrStatTgate_B_Actl.Also to both GearRvrseActv_D_Actl and GearRvrse_D_Actl. Updated GearRvrse_D_Actl with more parameters.	
	RVC-FUR-REQ-014088/D-Deactivate RVC (TcSE ROIN-293328)+	tmertiri: updated Reverse can signal name	
	RVC-FUR-REQ-014090/B-Display RVC Video (TcSE ROIN-194462-2)+	tmertiri: replaces old signal name to new one. GearRvrse_D_Actl.	
January 19, 2018	**2.4**		
	RVC-REQ-292387/A-GearPos_D_Trg	tmertiri: Added new signal name	
	RVC-REQ-292388/A-Veh_V_ActlEng	tmertiri: Added new signal name	
	RVC-FUR-REQ-014090/D-Display RVC Video (TcSE ROIN-194462-2)	tmertiri: updated with new signal names	
February 1, 2018	**2.5**		
	RVC-FUR-REQ-014090/E-Display RVC Video (TcSE ROIN-194462-2)	tmertiri: Update wording	

July 23, 2018	**2.6**	
	RVC-FUR-REQ-014090/F-Display RVC Video (TcSE ROIN-194462-2)	tmertiri: Remove DE values details.
April 26, 2019	**2.7**	
	RVC-FUR-REQ-014090/G-Display RVC Video (TcSE ROIN-194462-2)	tmertiri: update the GeaRvrse_D_Actl New Strategy

Table of Contents

1 Architectural Design

1.1 RVC-CLD-REQ-014201/A-RVC Client (TcSE ROIN-146885-1)

Responsibility: The RVC Client is the interface of the Rear View Camera function. It acts with other system parts that control the Rear View Camera or need data from it.

1.2 Interface Requirements

1.2.1 RVC-IIR-REQ-014197/B-RVC Client CAN Request (TcSE ROIN-146762-6)

Method	Notes	Parameters
«CAN» CamraOvrlDyn_D_Rq.Rq()	Request message from the HMI to the RVC to enable or disable the Dynamic Guidelines.	int *Dynamic Guideline*s 0x0: OFF 0x1: ON
«CAN» CamraOvrlStat_D_Rq.Rq()	Request from the HMI to the RVC to enable or disable Static Guidelines.	int *Static Guideline*s 0x0: OFF 0x1: ON
«CAN» CamraZoomMan_D_Rq.Rq()	Request from the HMI to RVC to set the current manual zoom level.	int *RVC Zoom* Level 0x0: Off 0x1: Zoom level I 0x2: Zoom level II 0x3: Zoom level III 0x4: Zoom level IV (Not Used) 0x5: Zoom level V (Not used) 0x6: Invalid 0x7: Unknown
«CAN» DistanceBarSetting.Rq()	Request from the HMI to the RVC to enable or disable the visual park aid alert feature.	int *Distance Bars* 0x0: OFF 0x1: ON
«CAN» CamraOvrlTow_D_Rq.Rq()	Request from the HMI to the RVC to enable or disable the Centerline Guideline.	int *Center Guideline* 0x0: Off 0x1: On
«CAN» CamraViewSplit_B_Rq() Logical name is SplitView_Rq()	Message Type: Request Used to activate or deactivate the rear view split mode camera.	0x00 : Off 0x01 : On

1.2.2 RVC-IIR-REQ-014198/A-RVC HMI Logic Operations (TcSE ROIN-146763-5)

Method	Notes	Parameters
Active Guidelines Status()		int *Status* 0x0: Activated 0x1: Deactivated
CenterLine()		int *Status* 0x0: Inactive 0x1: Active
Fixed Guidelines Status()		int *Status* 0x0: Activated 0x1: Deactivated
HMI Display Status()		int *RVC Display* 0x0: RVC OFF 0x1: RVC ON
RVC Guidelines()		int *Request* 0x0: Dynamic ON

Method	Notes	Parameters
		0x1: Dynamic OFF 0x3: Fixed ON 0x4: OFF
Visual Park Aid Alert()		int *Status* 0x0: OFF 0x1: ON
Zoom()		int *Type* 0x0: OFF 0x1: Auto Active 0x2: Man Level 1 0x3: Man Level 2 0x4: Man Level 3 0x5: Man Level 4 0x6: Man Level 5

1.2.3 RVC-IIR-REQ-014199/E-RVC Server CAN Status (TcSE ROIN-146765-7)

FMethod	Notes	Parameters
«CAN» CamPDCGuidStat.St()	Status from RVC to HMI to show state of the visual park aid alert feature.	int *Distance Bar Status* 0x0: Invalid 0x1: Active 0x2: Inactive 0x3: Not Used
«CAN» CamraOvrlDyn_D_Actl.St()	Status from RVC to HMI to show state of dynamic guidelines.	int *Dynamic Guideline Status* 0x0: Invalid 0x1: Active 0x2: Inactive 0x3: Not Used
«CAN» CamraOvrlStat_D_Actl.St()	Status from RVC to HMI to show state of the static guidelines.	int *Static Guideline Status* 0x0: Invalid 0x1: Active 0x2: Inactive 0x3: Not Used
«CAN» CamraZoomMan_D_Actl.St()	Status from RVC to HMI to show the current manual zoom level.	int *RVC Zoom Status* 0x0: Off 0x1: Zoom level I 0x2: Zoom level II 0x3: Zoom level III 0x4: Zoom level IV (Not Used) 0x5: Zoom level V (Not Used) 0x6: Invalid 0x7: Unknown
«CAN»PJB_BootLidStatus	Status from gateway to HMI to tell when the decklid/liftgate is ajar.	int *Trunk Status* 0x0: TrunkClosed 0x1: TrunkAjar
«CAN»DrStatTgate_B_Actl	Status from gateway to HMI to tell when the decklid/liftgate is ajar.	int *Trunk Status* 0x0: Closed 0x1: Ajar
«CAN» CamraOvrlTow_D_Actl.St()	Status from RVC to HMI to show the state of the centerline guideline	int *Center Guideline Status* 0x0: Invalid 0x1: Active 0x2: Inactive 0x3: Unused
«CAN» GearLvrPos_D_Actl	Status of the Gear Lever Position on an automatic transmission vehicle.	0x0: Park 0x1: Reverse 0x2: Neutral

FMethod	Notes	Parameters
	RVC uses to determine when Reverse Gear is engaged on automatic transmission vehicles.	0x3: Drive 0x4: Sport_DriveSport 0x5: Low 0x6: first 0x7: second 0x8: third 0x9: fourth 0xA: fifth 0xB: sixth 0xC: Undefined_Treat_as_Fault 0xD: Undefined_Treat_as_Fault1 0xE: Unknown_Position 0xF: Fault
«CAN» GearRvrseActv_D_Actl	The purpose of this signal is to notify that Reverse Gear is engaged on a manual transmission vehicle	0x0: Inactive 0x1: Active 0x2: Unknown 0x3: Fault
«CAN» GearRvrse_D_Actl	The purpose of this signal is to notify that Reverse Gear is engaged on a manual transmission vehicle	$0: Inactive_not_confirmed $1: Inactive_confirmed $2: Active_not_confirmed $3: Active_confirmed $4: NotUsed_1 $5: NotUsed_2 $6: NotUsed_3 $7: Fault
«CAN» PrkBrkStatus	Signal used to indicate the Parking Brake status in Manual Transmission Vehicle with Electronic Park Brake.	0x0: NotUsed 0x1: Rear_Caliper_Closed 0x2: Rear_Caliper_Transition 0x3: RWU_By_EPB_Active 0x4: Rear_Caliper_Open 0x5: EPB_Limphome_Active 0x6: ECD_by_Brake_ECU_Active 0x7: GeneralFault_MaintenceMod
«CAN» PrkBrkActv_B_Actl	Signal used to indicate the Parking Brake status in Manual Transmission Vehicle with Mechanical Park Brake.	0x0: Inactive 0x1: Active
«CAN» CamraViewSplit_D_Actl() Logical name is RVCSplitView_St()	Message Type: Status Indicates the stats from Rear View Camera when a Split View mode request has been sent previously. Invalid: Rear Normal View Active: Rear Split View Inactive: Rear Normal View Not Used: Rear Normal View	0x00: Invalid 0x01: Active 0x02: Inactive 0x03: Not Used

1.2.4 RVC-REQ-292387/A-GearPos_D_Trg

GearPos_D_Trg
This signal is used to indicate Gear direction. Used with other gear signals to determine whether or not RVC is to be turned On or Off.

Name	Literals	Value	Description
Type	-	-	-
	Neutral	0x0	
	First	0x1	
	Second	0x2	
	Third	0x3	
	Fourth	0x4	
	Fifth	0x5	
	Sixth	0x6	
	Seventh	0x7	
	Eighth	0x8	
	Ninth	0x9	
	Tenth	0xA	
	Undefined_3	0xB	
	Undefined_4	0xC	
	Undefined_5	0xD	
	Reverse	0xE	
	Unknown	0xF	

1.2.5 RVC-REQ-292388/A-Veh_V_ActlEng

Veh_V_ActlEng
This signal is used to indicate vehicle speed. Refer to database for proper signal values.

1.2.6 RVC-IR-REQ-014200/A-Guideline Signals Always On (TcSE ROIN-289021)

The following signals shall permanently be set to "ON":

*CamraOvrlDyn_D_Rq
*CamraOvrlStat_D_Rq

*Reference: RVC-GIF-146762-6-RVC Client CAN Request

2 General Requirements

2.1 RVC-FUR-REQ-014087/B-RVC Malfunction (TcSE ROIN-146656-2)

When the RVC Client (RearViewCameraClient) does not detect video present in the signal from the camera it shall set a DTC and the RVC Client shall display camera overlays for T_cameraMalfunctionDelay before displaying an error message allowing the user to acknowledge the video error and revert to the previous screen. At any time the video signal is detected RVC client should check for Gear position and show the camera.

2.2 RVC-TMR-REQ-166649/A-T_cameraMalfunctionDelay

Name	Description	Units	Range	Resolution	Default
T_cameraMalfunctionDelay	Time DAFVC or RVC Client should wait before displaying an error message to the user according to RVC-REQ-014087-RVC Malfunction or DAFVC-REQ-166649 DAFVC Malfunction.	sec	0-30	1	10

2.3 RVC-FUR-REQ-014088/E-Deactivate RVC (TcSE ROIN-293328)

The RVC Client (RearViewCameraClient) shall stop displaying RVC video when one of the following conditions is met:

1. Vehicle is shifted out of reverse (Camera Delay = OFF)
2. Vehicle is shifted out of reverse (GearLvrPos_D_Actl does not equal Reverse in automatic Transmission vehicle or GearRvrse_D_Actl or GearRvrseActv_D_Actl does not equal active in Manual Transmission vehicle) and vehicle speed > limit per CAMERA-REQ-014077-Feature Maximum Speed~~feature maximum~~ (Camera Delay = ON)
3. CGEA 1.2:
   Power Mode does not equal IgnitionOn_2 or Running_2 or Crank_3
   CGEA 1.3:
   Ignition_Status does not equal Run
4. Vehicle is shifted into Park
   a) Automatic Transmission vehicle GearLvrPos_D_Actl == 0x0
   b) Manual Transmission Vehicle with Mechanical Park Brake
   GearRvrse_D_Actl == Inactive or GearRvrseActv_D_Actl == Inactive AND PrkBrkActv_B_Actl == Active
   c) Manual Transmission Vehicle with Electronic Park Brake
   GearRvrse_D_Actl == Inactive or GearRvrseActv_D_Actl == Inactive AND PrkBrkStatus == Active

2.4 CAMERA-REQ-014077/C-Feature Maximum Speed (TcSE ROIN-290556)

The feature maximum speed when displaying a camera image in forward gear shall be as described for each operational scenario below:

Scenario 1: Any camera feature activation attempted by User

a. Rear Camera

Feature maximum speed = 10 kph

b. Off Road Front Camera configured: *Not Available*

Feature maximum speed = 10 kph

c. Off Road Front Camera configured: *Available and does NOT meet conditions for Off Road Mode per Determine Off Road Mode requirement*

Feature maximum speed = 10 kph

d. Off Road Front Camera configured: *Available and meets conditions for Off Road Mode per Determine Off Road Mode requirement*

Feature maximum speed = 20 kph

Scenario 2: Rear Camera Active

Feature maximum speed = 10 kph

Scenario 3: Front Camera Active

a. Off Road Front Camera configured: *Not Available*

Feature maximum speed = 10 kph

b. Off Road Front Camera configured: *Available and does NOT meet conditions for Off Road Mode per Determine Off Road Mode requirement*

Feature maximum speed = 10 kph

c. Off Road Front Camera configured: *Available and meets conditions for Off Road Mode per Determine Off Road Mode requirement*

Feature maximum speed = 24 kph

2.5 RVC-FUR-REQ-014089/A-Decklid/Liftgate Ajar (TcSE ROIN-146658-2)

When the RVC Client (RearViewCameraClient) detects the decklid or liftgate is ajar, the RVC Client shall display a warning message that explains why no guidelines are available in the camera image.

2.6 RVC-FUR-REQ-014090/G-Display RVC Video (TcSE ROIN-194462-2)

There are two ways for Reverse Detection. What way to use is decided on configuration values.

Reverse Detection NEW:

Reverse_Gear is determined as mentioned in below table. Once GearLvrPos_D_Actl is reverse, System need to loop through signal GearPos_D_Trg to determine reverse gear until either GearLvrPos_D_Actl is not reverse OR Camera turn ON.

GearLvrPos_D_Actl = 0x1 (Reverse) (automatic transmission)	GearPos_D_Trg	Gear position and Camera Status
Reverse	0xE (Reverse)	Gear is Reverse, Turn Camera On

Upon detecting the conditions for RVC to be ON, the RVC Client (RearViewCameraClient) shall start a timer (T_minImageDisp) and shall not display the RVC image until the expiration of this timer. Upon expiration of the timer, the RVC Client shall start another timer (T_maxImageDisp). The RVC Client must display the RVC image prior to the expiration of T_maxImageDisp.

Once the conditions for displaying RVC are no longer applicable the RVC client shall:
1. Cancel the timer
2. Not display the RVC image

Reverse Detection LEGACY:

Reverse Detection is determined as mentioned in below table.

GearLvrPos_D_Actl = 0x1 (Reverse) (automatic transmission) or GearRvrseActv_D_Actl = 0x1 (Active)(manual transmission vehicle and Legacy Message Set) or GearRvrse_D_Actl = 0x3 or 0x2 (Active Confirmed or Active_not_confirmed) (manual transmission vehicle and New Message Set)	Gear position and Camera Status
Reverse	Gear is Reverse, Turn Camera On

Upon detecting the conditions for RVC to be ON, the RVC Client (RearViewCameraClient) shall start a timer (T_minImageDisp) and shall not display the RVC image until the expiration of this timer. Upon expiration of the timer, the RVC Client shall start another timer (T_maxImageDisp). The RVC Client must display the RVC image prior to the expiration of T_maxImageDisp.

Once the conditions for displaying RVC are no longer applicable the RVC client shall:
1. Cancel the timer
2. Not display the RVC image

2.7 RVC-TMR-REQ-014091/A-T_minImageDisp (TcSE ROIN-264661-1)

Name	Description	Units	Range	Resolution	Default
T_minImageDisp	Minimum time RVC Client should wait before displaying the RVC video image to the user according to RVC-GREQ-194462-2-Display RVC Video.	msec	225-275	5	250

2.8 RVC-TMR-REQ-014092/A-T_maxImageDisp (TcSE ROIN-264662-1)

Name	Description	Units	Range	Resolution	Default
T_maxImageDisp	Maximum time RVC Client should wait before displaying the RVC video image to the user according to RVC-GREQ-194462-2-Display RVC Video.	msec	450-550	5	500

2.9 CAMERA-FUR-REQ-014093/B-Camera Image Priority (TcSE ROIN-264652-1)

Once the camera image has been displayed to user, the image shall be maintained as long as the conditions required to be in the particular camera view are present and shall have highest priority:

- No pop-up screens shall interrupt the video image.
- Media functions (source change, volume control, etc.) shall be available, but shall not interrupt the image view to the user.

3 Functional Definition

3.1 RVC-FUN-REQ-014189/A-Camera System Initialization (TcSE ROIN-146874-1)

3.1.1 Sequence Diagrams

3.1.1.1 RVC-SD-REQ-014156/A-Camera System Initialization (TcSE ROIN-202661-4)

Scenario

Normal Usage

The Rear View Camera (RVC) receives power due to Ignition being in Run or Engine On. The RVC updates camera system status signals with the last known values.

Constraints

Pre-condition

CGEA 1.2:

Power Mode != IgnitionOn_2 or Running_2 or Crank_3

CGEA 1.3:

Ingition_Status != Run

Post-condition

CGEA 1.2:

Power Mode = IgnitionOn_2 or Running_2 or Crank_3

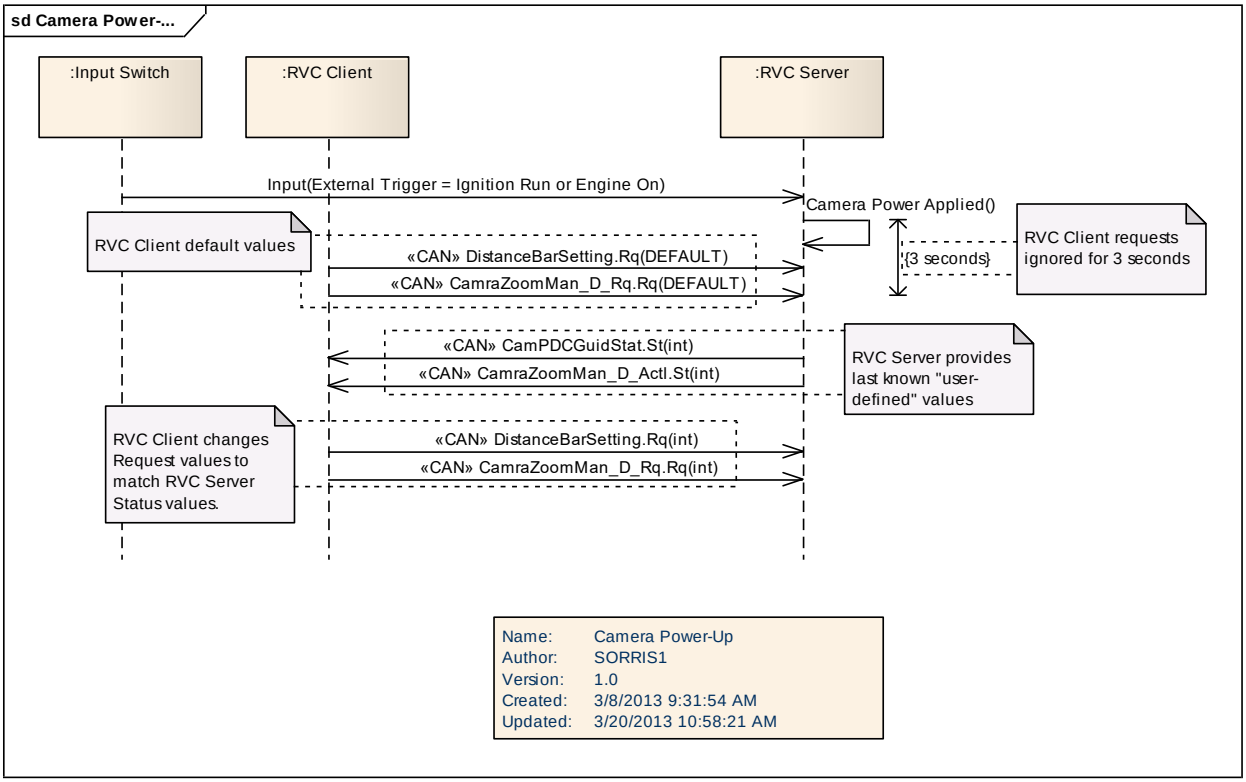
CGEA 1.3:

Ignition_Status = Run

Post-condition

Rear View Camera system is initialized with last known values of all status messages.

Sequence Diagram



3.2 RVC-FUN-REQ-014185/A-RVC Active (TcSE ROIN-293214)

3.2.1 Use Cases

3.2.1.1 RVC-UC-REQ-014095/A-Activate Rear View Camera (TcSE ROIN-289794)

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start.
Scenario Description	The driver activates the Rear View Camera (RVC) by placing the vehicle in Reverse Gear.
Post-conditions	The vehicle display shows the RVC image.
List of Exception Use Cases	E1 – Rear View Camera Malfunction E2 – Decklid/Liftgate is Ajar while Rear View Camera is ON
Interfaces	G-HMI Vehicle System Interface

3.2.1.2 RVC-UC-REQ-014096/A-Rear View Camera Malfunction (TcSE ROIN-289795)

Linked Elements
RVC-UC-REQ-014095/A-Activate Rear View Camera (TcSE ROIN-289794)

Actors	Vehicle Occupant
Pre-conditions	Same as Normal Usage Use Case.
Scenario Description	The HMI interface indicates that the Rear View Camera (RVC) image cannot be shown because of a malfunction.
Post-conditions	The vehicle display is NOT showing RVC image.
List of Exception Use Cases	NA
Interfaces	G-HMI Vehicle System Interface

3.2.1.3 RVC-UC-REQ-014097/A-Decklid/Liftgate is Ajar while Rear View Camera is ON (TcSE ROIN-289796)

Linked Elements
RVC-UC-REQ-128278/A-Activate Rear View Camera
RVC-UC-REQ-014095/A-Activate Rear View Camera (TcSE ROIN-289794)

Actors	Vehicle Occupant
Pre-conditions	Same as Normal Usage Use Case.
Scenario Description	The HMI interface indicates that the Decklid/Liftgate is Ajar.
Post-conditions	The vehicle display shows the Rear View Camera image. The video feed from the Rear View Camera contains an image without guideline overlays.
List of Exception Use Cases	NA
Interfaces	G-HMI Vehicle System Interface

3.2.1.4 RVC-UC-REQ-014098/A-Deactivate Rear View Camera (TcSE ROIN-289797)

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on.

	The ignition status is Run/Start.
Scenario Description	The driver deactivates the Rear View Camera (RVC) by shifting the vehicle out of Reverse Gear.
Post-conditions	The vehicle display is NOT showing RVC image.
List of Exception Use Cases	E1 – Rear Camera Delay Mode is On E2 – Active Park Assist is Active E3 – Trailer Backup Assist is Active (N/A for stand-alone RVC)
Interfaces	G-HMI Vehicle System Interface

3.2.1.5 RVC-UC-REQ-014099/B-Rear Camera Delay Mode is On (TcSE ROIN-289798)

Linked Elements
RVC-UC-REQ-128280/A-Deactivate Rear View Camera
RVC-UC-REQ-014098/A-Deactivate Rear View Camera (TcSE ROIN-289797)

Actors	Vehicle Occupant
Pre-conditions	Same as Normal Usage Use Case.
Scenario Description	The driver shifts out of Reverse Gear and into any gear other than Park. The RVC image remains displayed to the driver until the vehicle reaches limit per CAMERA-REQ-014077-Feature Maximum Speed~~feature maximum speed~~.
Post-conditions	The vehicle display stops showing Rear View Camera image when vehicle speed reaches limit per CAMERA-REQ-014077-Feature Maximum Speed~~feature maximum speed~~.
List of Exception Use Cases	NA
Interfaces	G-HMI Vehicle System Interface

3.2.1.6 RVC-UC-REQ-014100/B-Active Park Assist is Active (TcSE ROIN-290554)

Linked Elements
RVC-UC-REQ-014098/A-Deactivate Rear View Camera (TcSE ROIN-289797)
RVC-UC-REQ-128280/A-Deactivate Rear View Camera
DAFVCv1-UC-REQ-128313/A-Deactivate Driver Assist Front View Camera
DAFVCv1-UC-REQ-014049/B-Deactivate Driver Assist Front View Camera (TcSE ROIN-290146)

Actors	Vehicle Occupant
Pre-conditions	Same as Normal Usage Use Case.
Scenario Description	The driver shifts out of Reverse Gear and into any other gear while Active Park Assist (APA) is active. The camera image feed remains displayed to the driver as long as APA is active and vehicle speed does not exceed limit per CAMERA-REQ-014077-Feature Maximum Speed~~feature maximum~~.
Post-conditions	The vehicle display stops showing Rear View Camera image when APA is no longer active or vehicle speed exceeds limit per CAMERA-REQ-014077-Feature Maximum Speed~~feature maximum~~.
List of Exception Use Cases	NA
Interfaces	G-HMI Vehicle System Interface

3.2.2 Sequence Diagrams

3.2.2.1 RVC-SD-REQ-014160/A-Activate RVC (TcSE ROIN-146686-4)

Scenario

Normal Usage

The user activates the RVC by placing the vehicle in R (reverse) Gear

Constraints

Pre-condition

CGEA 1.2:

Power Mode = IgnitionOn_2 or Running_2 or Crank_3

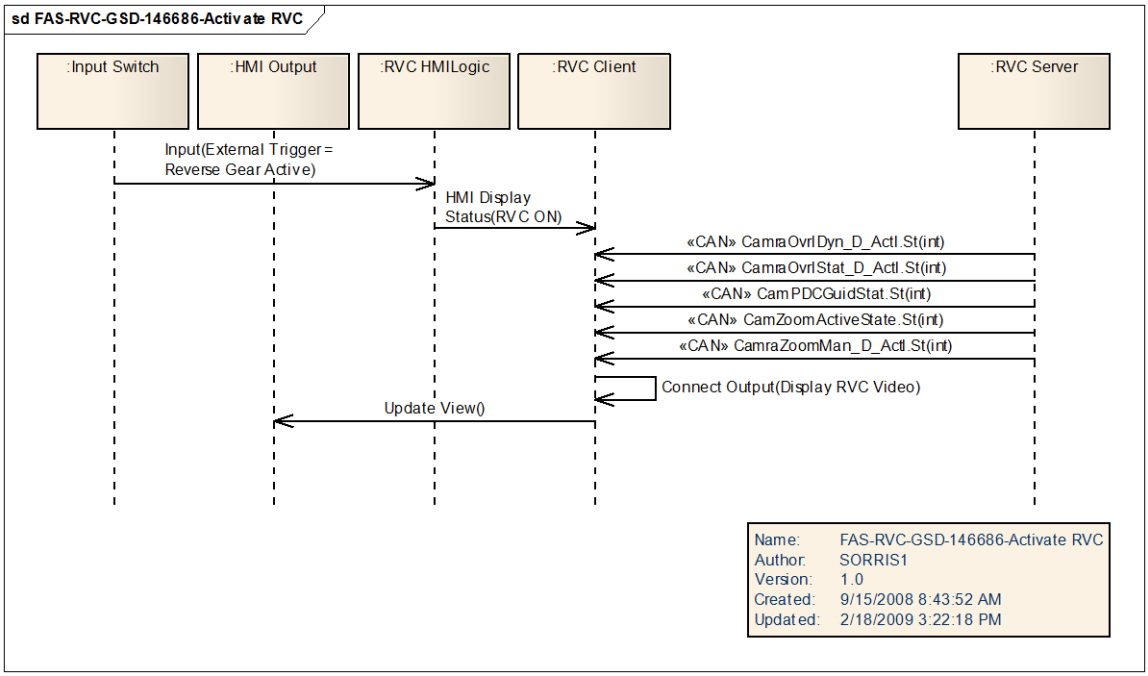
CGEA 1.3:

Ignition_Status = Run

Post-condition

HMI Display shows RVC image

Sequence Diagram



3.3 RVC-FUN-REQ-014186/A-RVC Zoom (TcSE ROIN-293217)

3.3.1 Use Cases

3.3.1.1 RVC-UC-REQ-014107/A-Select Manual Zoom Level X (TcSE ROIN-289799)

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start. The vehicle display is showing the Rear View Camera image.
Scenario Description	The driver activates Manual Zoom Mode Level X via the HMI interface.
Post-conditions	The vehicle display continues to show the Rear View Camera image. The vehicle display indicates that a zoom level is selected. The video feed from the Rear View Camera contains a zoomed-in image.
List of Exception Use Cases	NA
Interfaces	G-HMI Vehicle System Interface

Notes	*There are three defined zoom levels and "Level X" is used to generically designate that one of the three is selected as described in this use case. Refer to HMI documentation (requirements and/or screen-flow) for which level(s) of zoom will be utilized.*

3.3.1.2 RVC-UC-REQ-014108/A-Deactivate Manual Zoom (TcSE ROIN-289802)

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start. The vehicle display is showing the Rear View Camera image with Zoom Level X selected.
Scenario Description	The user deactivates Manual Zoom Mode via HMI interface.
Post-conditions	The vehicle display continues to show the Rear View Camera image. The vehicle display indicates that no zoom level is selected. The video feed from the Rear View Camera contains a normal (no zoom applied) image.
List of Exception Use Cases	NA
Interfaces	G-HMI Vehicle System Interface
Notes	*There are three defined zoom levels and "Level X" is used to generically designate that one of the three is selected as described in this use case. Refer to HMI documentation (requirements and/or screen-flow) for which level(s) of zoom will be utilized.*

3.3.2 Sequence Diagrams

3.3.2.1 RVC-SD-REQ-014176/A-Activate Manual Zoom Level X (TcSE ROIN-146721-5)

Scenario

Normal Usage

The user activates Manual Zoom Level 1, 2, or 3 via HMI

Constraints

Pre-condition

CGEA 1.2:

Power Mode = IgnitionOn_2 or Running_2 or Crank_3

CGEA 1.3:

Ignition_Status = Run

Pre-condition

Vehicle is in R (reverse)

Pre-condition

Semi Automatic Parallel Parking is Not enabled

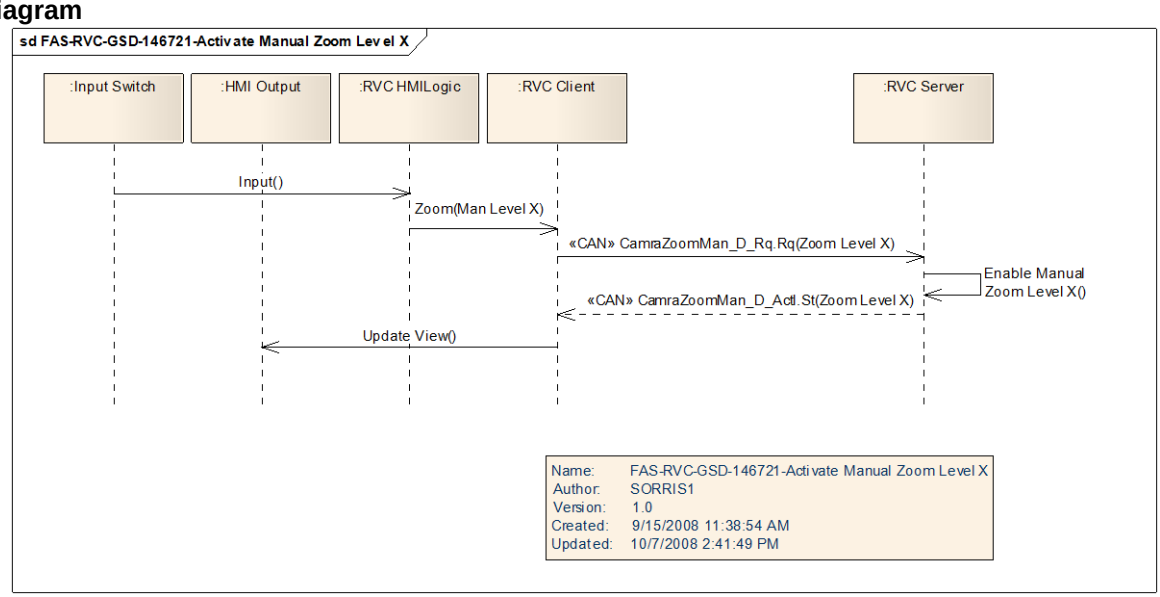
Pre-condition

HMI Display is showing RVC Image

Post-condition

HMI display shows a zoom Level 1, 2, or 3 Rear Video Camera image

Sequence Diagram



3.3.2.2 RVC-SD-REQ-014177/A-Deactivate Manual Zoom (TcSE ROIN-146728-4)

Scenario

Normal Usage

The user deactivates Manual Zoom Mode via HMI

Constraints

Pre-condition

CGEA 1.2:

Power Mode = IgnitionOn_2 or Running_2 or Crank_3

CGEA 1.3:

Ignition_Status = Run

Pre-condition

Vehicle is in R (reverse)

Pre-condition

Semi Automatic Parallel Parking is Not enabled

Pre-condition

HMI Display is showing RVC Image

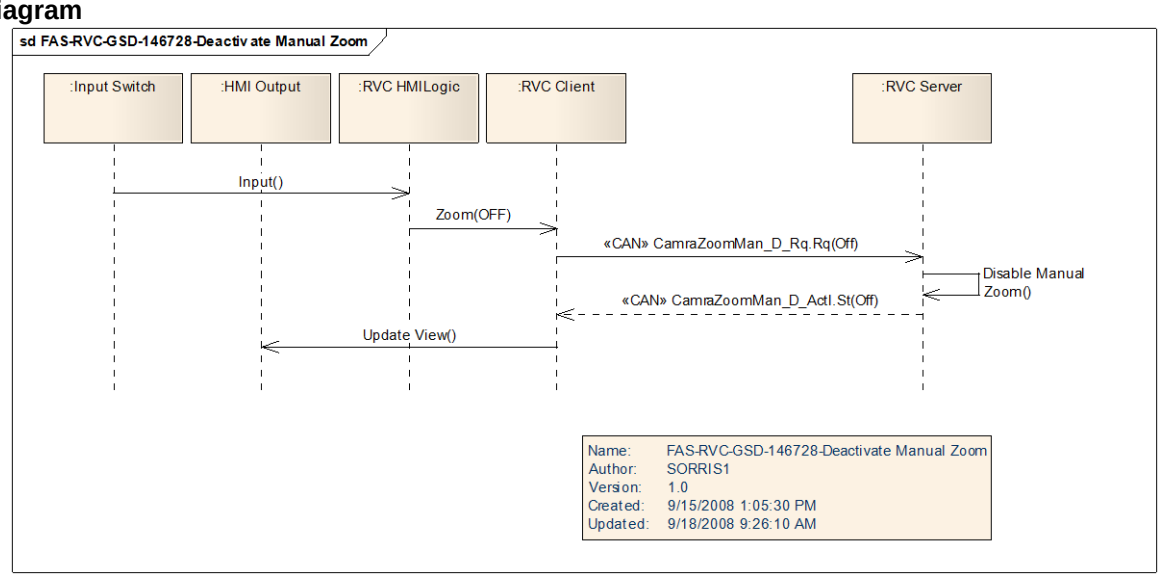
Pre-condition

Manual Zoom Level 1, 2, or 3 is active

Post-condition

HMI display shows a non-zoomed Rear Video Camera image

Sequence Diagram



3.4 RVC-FUN-REQ-014187/A-RVC Delay Mode (TcSE ROIN-293220)

3.4.1 Use Cases

3.4.1.1 RVC-UC-REQ-014112/A-Activate/Deactivate Rear Camera Delay (TcSE ROIN-289803)

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start.
Scenario Description	The driver activates/deactivates the Rear View Camera (RVC) Delay Mode via the HMI interface.
Post-conditions	The RVC Delay Mode is activated/deactivated.
List of Exception Use Cases	NA
Interfaces	G-HMI Vehicle System Interface

3.5 RVC-FUN-REQ-014188/A-RVC Visual Park Aid Alert Mode (TcSE ROIN-293222)

3.5.1 Use Cases

3.5.1.1 RVC-UC-REQ-014121/A-Activate/Deactivate Enhanced Park Aids (TcSE ROIN-289804)

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start.
Scenario Description	The driver activates/deactivates the Enhanced Park Aids via the HMI interface.
Post-conditions	The Enhance Park Aids are activated/deactivated. The HMI indicates the setting change determined by vehicle system interface signal.

List of Exception Use Cases	NA
Interfaces	G-HMI Vehicle System Interface

3.5.2 Sequence Diagrams

3.5.2.1 RVC-SD-REQ-014184/A-Activate/Deactivate Visual Park Aid Alert (TcSE ROIN-146735-3)

Scenario

Normal Usage

The user selects Visual Park Aid Alert "ON/OFF" from the Rear Camera Settings via HMI.

Constraints

Pre-condition

CGEA 1.2:

Power Mode = IgnitionOn_2 or Running_2 or Crank_3

CGEA 1.3:

Ignition_Status = Run

Pre-condition

Vehicle is equipped with a Park Aid Module

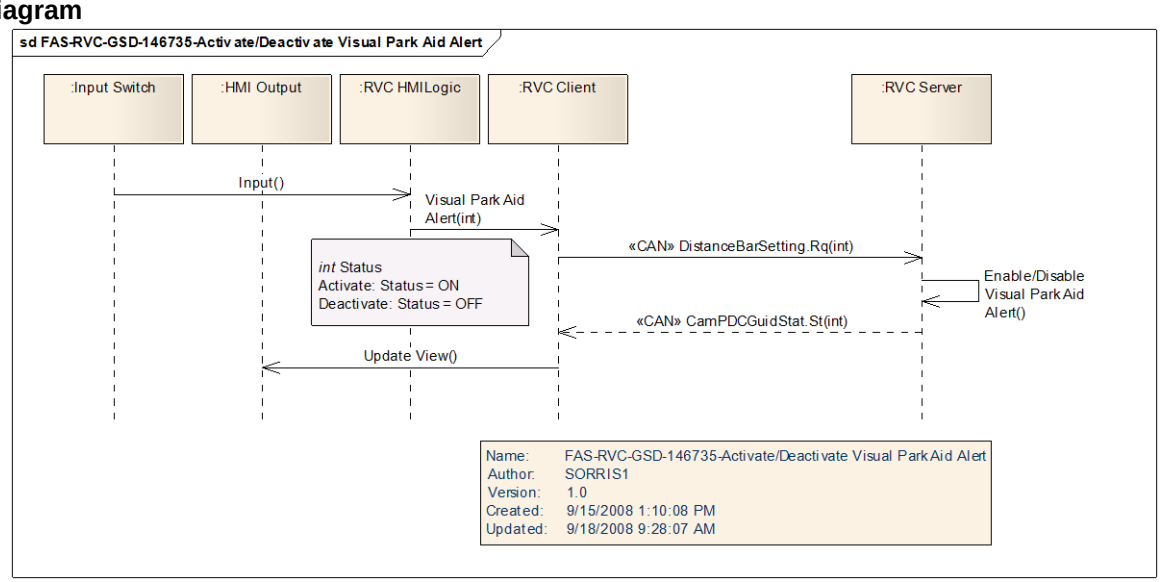
Pre-condition

Visual Park Aid Alert Mode is inactive/active

Post-condition

Visual Park Aid Alert mode is active/inactive

Sequence Diagram



3.6 RVCv1-FUN-REQ-196091/A-Split View

3.6.1 Use Cases

3.6.1.1 RVC-UC-REQ-196086/A-Rear Split View Exit

Actors	Rear Split View Exit
Pre-conditions	Vehicle Occupant

Scenario Description	• Vehicle in Run/Start • Rear Camera is showing • Rear Split View is showing on camera (rear split view stat = on) • Display and Camera are configured for Rear Split View (display also configured for without front camera, TBA, CHMSL camera, or Aux camera)
Post-conditions	• Customer presses Rear Normal View button OR • Rear Camera is sending Rear Normal View (Rear split view stat = off)
List of Exception Use Cases	Sync highlights Rear Normal View, populates the zoom button, and sends rear split request signal as on. Camera switches to rear normal view (if not already at rear normal view).
Interfaces	E1 – Vehicle is not RUN/START E2 – valid camera video signal not present E3 – Loss of communication with RVC
	G-HMI Vehicle System Interface

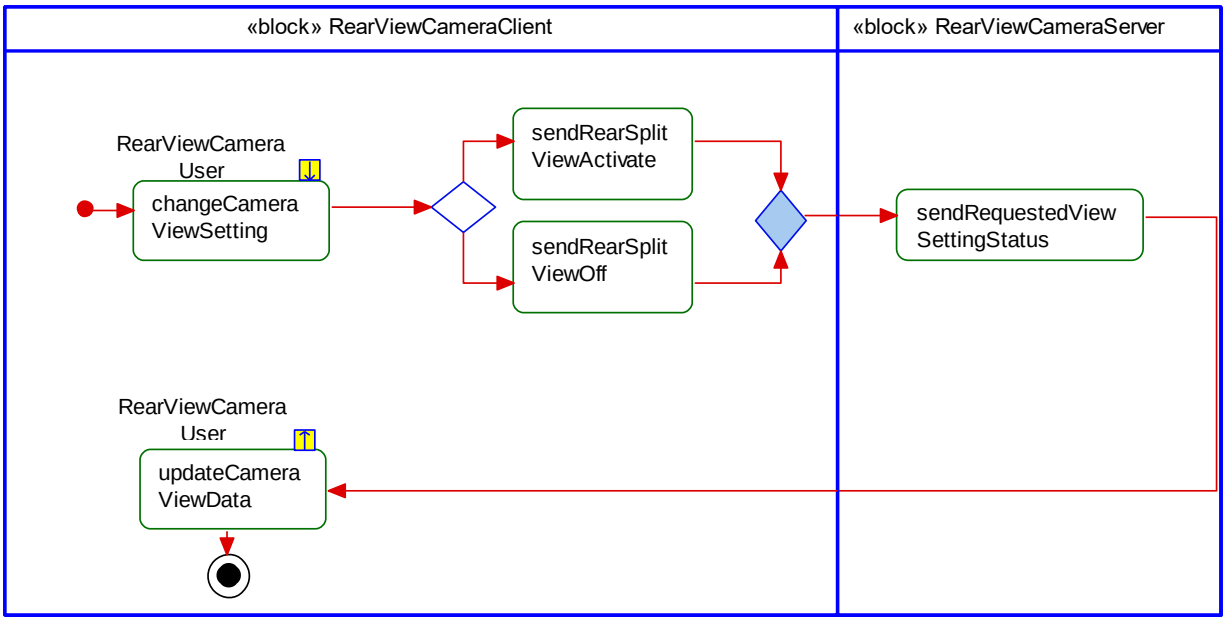
3.6.1.2 RVC-UC-REQ-196085/A-Enable Split View

Actors	Vehicle Occupant
Pre-conditions	• Vehicle in Run/Start • RVC is display • RVC is not showing Split View • Display and Camera are configured for Rear Split View (display also configured for without front camera, TBA, CHMSL camera, or Aux camera)
Scenario Description	Customer presses the view button to go to Rear Split View
Post-conditions	Sync highlights Rear Split View button, stops showing the zoom button, and sends Rear Split View request signal as Rear Split View On. Camera then shows Rear Split View
List of Exception Use Cases	E1 – Vehicle is not ON E2 – valid camera video signal not present E3 – Loss of communication with RVC
Interfaces	G-HMI Vehicle System Interface

3.6.2 White Box Views

3.6.2.1 Activity Diagrams

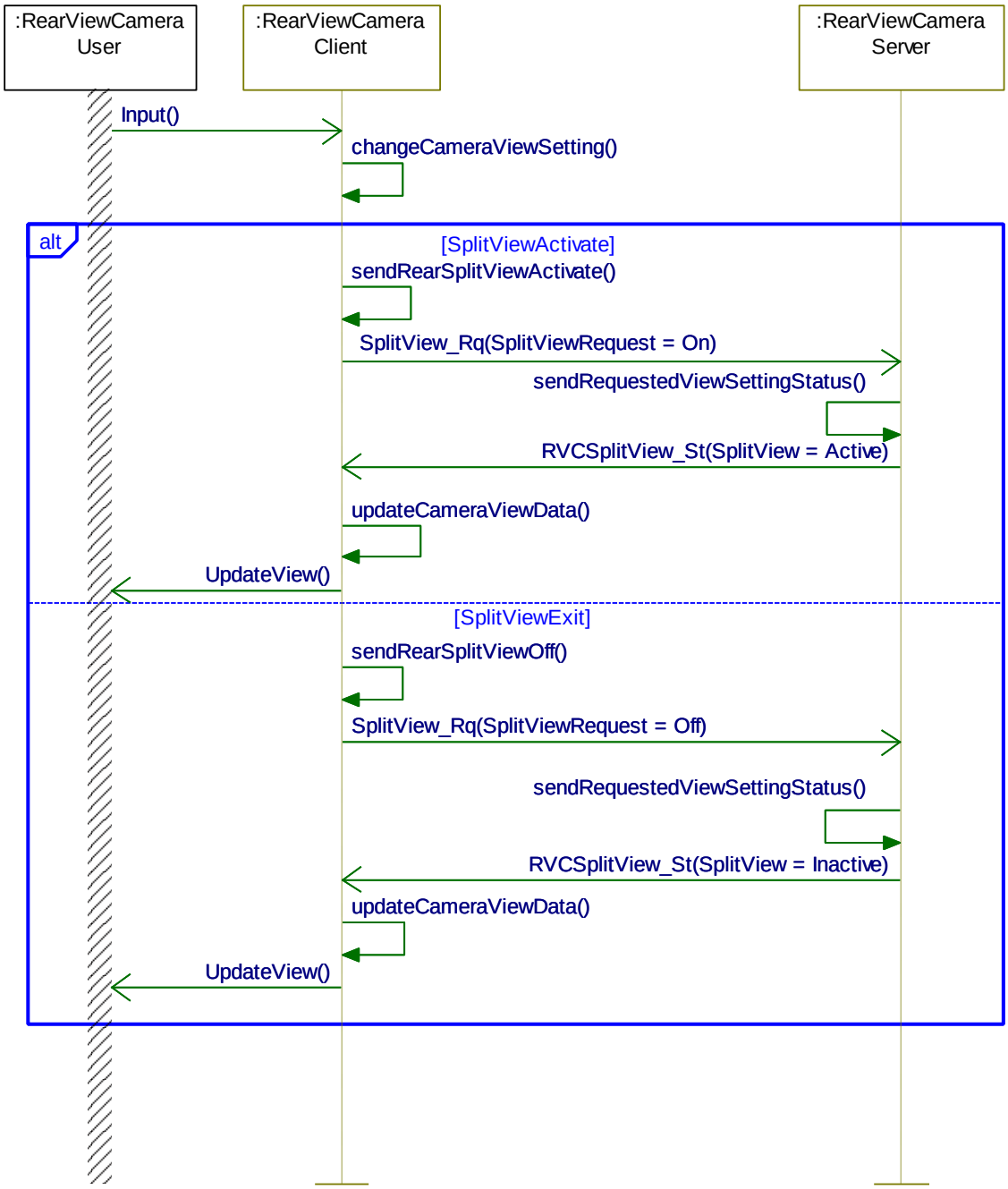
3.6.2.1.1 RVC-ACT-REQ-196084/A-Rear View Camera Split View



3.6.2.2 Sequence Diagrams

3.6.2.2.1 RVC-SD-REQ-196087/A-Activate and Exit Split View

Linked Elements
RVC-UC-REQ-014272/A-Activate RVC (TcSE ROIN-146094-1)


:RearViewCamera User
:RearViewCamera Client
:RearViewCamera Server
Input()
changeCameraViewSetting()
alt
[SplitViewActivate]
sendRearSplitViewActivate()
SplitView_Rq(SplitViewRequest = On)
sendRequestedViewSettingStatus()
RVCSplitView_St(SplitView = Active)
updateCameraViewData()
UpdateView()
[SplitViewExit]
sendRearSplitViewOff()
SplitView_Rq(SplitViewRequest = Off)
sendRequestedViewSettingStatus()
RVCSplitView_St(SplitView = Inactive)
updateCameraViewData()
UpdateView()

4 Appendix: Reference Documents

Reference #	Document Title
1	
2	
3	
4	
5	