1 HUD Infotainment Quick Action Menu Button Control Mirror Function – CGEA1.3

1.1 Functional Description

This specification triggers control mirrors in HUD, when certain infotainment quick action menu buttons in steering wheel ends up with no action in Cluster.

- When Audio is OFF and the user presses the Media Quick-Action Button, the proposal is to display an "Audio Off" control mirror.
- When a phone is not paired and the user presses the Phone Answer (Send) Quick-Action Button, the proposal is to display a "Phone Not Paired" control mirror.

1.2 Interfaces

1.2.1 Interface Context Diagram (I/O Block Diagram)

HUD Infotainment Quick Action Menu Button Control Mirror Function Context Diagram
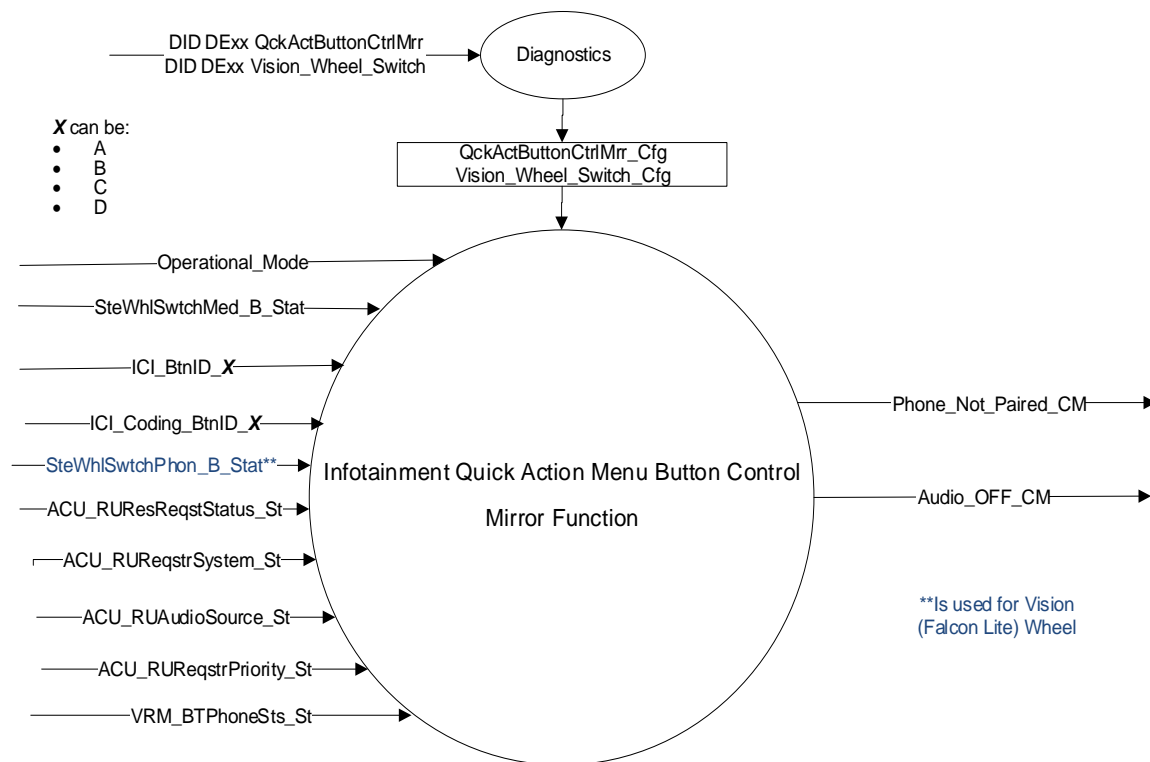
1.2.2 Inputs

1.2.2.1 *IR-REQ-304418/B-INTERNAL:*

- o Operational_Mode
- o Vision_Wheel_Switch_Cfg
- o QckActButtonCtrlMrr_Cfg

1.2.2.2 MUX message on the CAN Bus

1.2.2.2.1 SIG-REQ-304396/A-SteWhlSwtchMed_B_Stat

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
SteWhlSwtchMed_B_Stat	1		SED	1	0		0(0x0)	1(0x1)
		Button_Not_Pressed				(0x0)		
		Button_Pressed				(0x1)		

1.2.2.2.2 SIG-REQ-304397/A-ICI_BtnID_A

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ICI_BtnID_A	8		Unitless	1	0		0 (0x0)	255 (0xFF)

1.2.2.2.3 SIG-REQ-304398/A-ICI_BtnID_B

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ICI_BtnID_B	8		Unitless	1	0		0 (0x0)	255 (0xFF)

1.2.2.2.4 SIG-REQ-304399/A-ICI_BtnID_C

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ICI_BtnID_C	8		Unitless	1	0		0 (0x0)	255 (0xFF)

1.2.2.2.5 SIG-REQ-304400/A-ICI_BtnID_D

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ICI_BtnID_D	8		Unitless	1	0		0 (0x0)	255 (0xFF)

1.2.2.2.6 SIG-REQ-304401/A-ICI_Coding_BtnID_A

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ICI_Coding_BtnID_A	4		SED	1	0		0 (0x0)	15 (0xF)
		Inactive				0x0		
		Active				0x1		
		ShortEvent				0x2		
		ShortElapsed				0x3		
		LongEvent				0x4		
		Stuck				0x5		
		Idle				0xF		

1.2.2.2.7   SIG-REQ-304402/A-ICI_Coding_BtnID_B

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ICI_Coding_BtnID_B	4		SED	1	0		0 (0x0)	15 (0xF)
		Inactive			0x0			
		Active			0x1			
		ShortEvent			0x2			
		ShortElapsed			0x3			
		LongEvent			0x4			
		Stuck			0x5			
		Idle			0xF			

1.2.2.2.8   SIG-REQ-304403/A-ICI_Coding_BtnID_C

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ICI_Coding_BtnID_C	4		SED	1	0		0 (0x0)	15 (0xF)
		Inactive			0x0			
		Active			0x1			
		ShortEvent			0x2			
		ShortElapsed			0x3			
		LongEvent			0x4			
		Stuck			0x5			
		Idle			0xF			

1.2.2.2.9   SIG-REQ-304404/A-ICI_Coding_BtnID_D

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ICI_Coding_BtnID_C	4		SED	1	0		0 (0x0)	15 (0xF)
		Inactive			0x0			
		Active			0x1			
		ShortEvent			0x2			
		ShortElapsed			0x3			
		LongEvent			0x4			
		Stuck			0x5			
		Idle			0xF			

1.2.2.2.10 SIG-REQ-304405/A-VRM_BTPhoneSts_St

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
VRM_BTPhoneSts_St	5		Unitless	1	0		0 (0x0)	31 (0x1F)
		Invalid				0x0		
		Idle				0x1		
		Dialing				0x2		
		Connected				0x3		
		CradlephNotReady				0x4		
		NumUnobtainable				0x5		
		IncomCall				0x6		

	NoLinkToBt			0x7		
	InitBtCon			0x8		
	PhoneBusy			0x9		
	PhoneVr			0xA		
	NotSupported			0xB		
	BtPhPriv			0xC		
	ConfCall			0xD		
	Conference_2ndIncCall			0xE		
	Conference_OtherCallOnHold			0xF		
	Connected_Call_on_hold			0x10		

1.2.2.2.11 SIG-REQ-304406/A-ACU_RUResReqst Status_St

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ACU_RUResReqst Status_St	3		Unitless	1	0		0 (0x0)	7 (0x7)
		NoResourceupdate				0x0		
		Deallocated				0x1		
		Allocated				0x2		
		Stacked				0x3		
		Granted				0x4		
		GrantedNoControlOfAudioSrc				0x5		

1.2.2.2.12 SIG-REQ-304407/A-ACU_RUResReqst System_St

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ACU_RUResReqst System_St	1		Unitless	1	0		0 (0x0)	1 (0x1)
		FrontRequester				0x0		
		RearRequester				0x1		

1.2.2.2.13 SIG-REQ-304408/A-ACU_RUAudioSource_St

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ACU_RUAudioSource_St	4		Unitless	1	0		0 (0x0)	15 (0xF)
		AmfmRadio				0x0		
		FrontDisc				0x1		
		SDARS_DAB				0x2		
		InDashCdChanger				0x3		
		VoiceRecogniser				0x4		
		TelematicUnit				0x5		
		BluetoothPhone				0x6		

	RearDisc					0x7		
	APIM					0x8		
	FrontAuxInput					0x9		
	Navigation					0xA		
	RearAux					0xB		
	NotReq					0xC		
	BTAudio					0xD		
	USB					0xE		
	iPod					0xF		

1.2.2.2.14 SIG-REQ-304409/A-ACU_RUReqstr Priority_St

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
ACU_RUReqstr Priority_St	4		Unitless	1	0		0 (0x0)	15 (0xF)
		EmergencyServ				0x0		
		TelService				0x1		
		AutoAnswer				0x2		
		Ta				0x3		
		PttMutevoice				0x4		
		NavUserVoiceCmd				0x5		
		NavSysVoiceCmd				0x6		
		Radio				0x7		
		Disc				0x8		
		Alarm				0x9		
		Ptynews				0xA		
		Aux_ExtSource				0xB		
		BT_BTNavAndTelMute				0xC		
		ManualAudioMute				0xD		
		NotReq				0xE		

1.2.2.2.15 SIG-REQ-304410/A-SteWhlSwtchPhon_B_Stat

Signal Name	Size (bits)	Detail	Units	Res.	Offset	State Encoded	Min	Max
SteWhlSwtchPhon_B_Stat	1		SED	1	0		0x0	0x1
		Not_Pressed				0x0		
		Pressed				0x1		

1.2.3   IR-REQ-304421/A-Outputs

- o   Phone_Not_Paired_CM
- o   Audio_OFF_CM

1.3 Function/Performance

1.3.1 F-REQ-304423/A-Operational Modes

Mode	Differentiating Vehicle Conditions
Sleep Mode	HUD Infotainment Quick Action Menu Button Control Mirror Function Disabled
Limited Mode	HUD Infotainment Quick Action Menu Button Control Mirror Function Disabled
Normal Mode	HUD Infotainment Quick Action Menu Button Control Mirror Function Enabled/Disabled
Crank Mode	HUD Infotainment Quick Action Menu Button Control Mirror Function Enabled/Disabled

1.3.2 Voltage Levels

Refer to HUD Features Table located in the Operational Modes and Voltage Range Strategies section in this SPSS.

1.3.3 Human-Machine Interface

1.3.3.1 Visual

1.3.3.1.1 Indicator Graphics / Display Format

1.3.3.1.1.1 Audio OFF control mirror
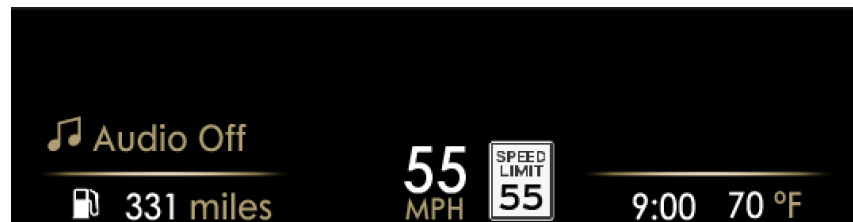
1.3.3.1.1.2 Phone Not Paired control mirror
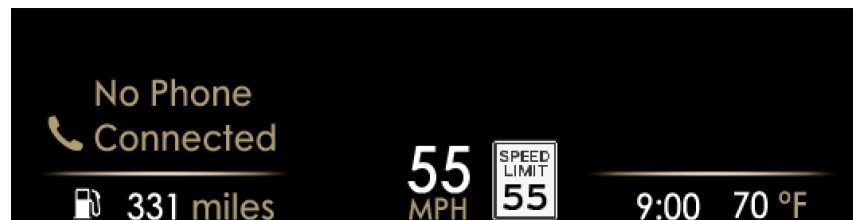
The exact graphics will be part of HMI specification.

1.3.3.2 Audio

None

1.3.3.3   Switch Control Logic

For Phone Send button decoding, refer CAN Button Strategy HUD SPSS.

1.3.4   PFM-REQ-304420/A-System Accuracy

HUD shall display the control mirror within 100msec of the trigger

1.3.5 Operation: Performance and Functional

1.3.5.1 Subsystem Algorithm Flowchart / State Diagram

1.3.5.1.1 F-REQ-304411/A-Flowchart

```
          ┌─────────────────────┐
          │  Part of CAN         │
          │  Diagnostic Routine  │
          └──────────┬──────────┘
                     │
                     ▼
              ╱─────────────╲
             ╱  Is DID DExx   ╲
            ╱ QckActButtonCtrlMrr╲──────────┐
            ╲  bit received?    ╱           │
             ╲─────────────────╱            │
                     │                      │
                    Yes                     │
                     ▼                      │ No
     ┌─────────────────────────────┐        │
     │ QckActButtonCtrlMrr_Cfg =    │        │
     │        DID DExx              │        │
     │ QckActButtonCtrlMrr Bit      │        │
     └──────────────┬──────────────┘        │
                    │                        │
                    ▼          ┌────────┐    │
                    └─────────▶│   ○    │◀───┘
                               └────┬───┘
                                    │
                                    ▼
                             ┌────────────┐
                             │    END     │
                             └────────────┘
```
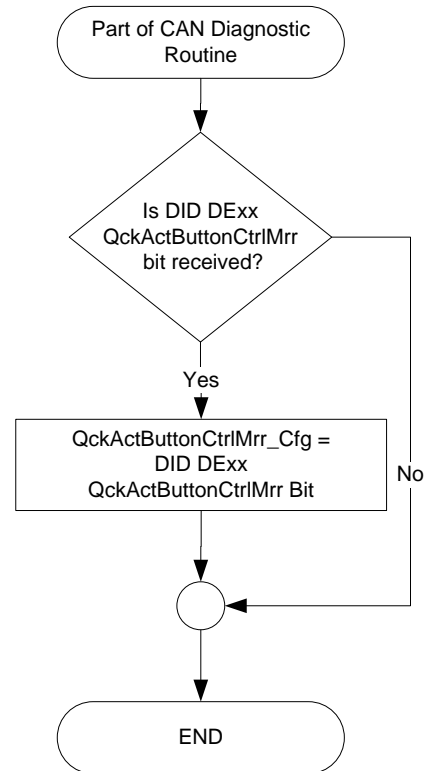
1.3.5.1.2   F-REQ-350599/A-Flowchart for Vision Steering Wheel Configuration

```
        ┌──────────────────────┐
        │  Part of CAN Diagnostic │
        │       Routine        │
        └──────────┬───────────┘
                   │
                   ▼
              ◇ Is DID DExx
              Vision_Wheel_Switch ────────┐
               bit received?              │
                   │                      │
                  Yes                     │
                   │                      No
                   ▼                      │
        ┌──────────────────────┐          │
        │ Vision_Wheel_Switch_Cfg= │      │
        │      DID DExx         │          │
        │  Vision_Wheel_Switch Bit │      │
        └──────────┬───────────┘          │
                   │                      │
                   ▼                      │
                  ( ) ◄───────────────────┘
                   │
                   ▼
        ┌──────────────────────┐
        │        END           │
        └──────────────────────┘
```
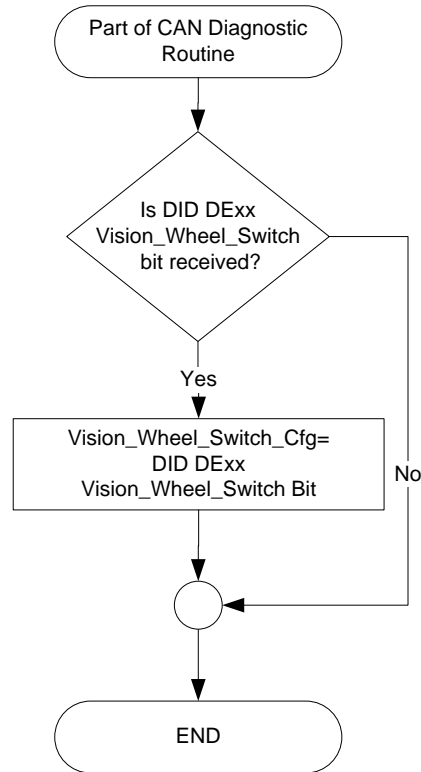
1.3.5.1.3   F-REQ-304412/A-Audio OFF Control Mirror Function Flowchart

```
          ┌─────────────────────────┐
          │ HUD Audio off Control    │
          │ mirror Routine (Called   │
          │ at least every 100msec   │
          │ in Normal and Crank      │
          │ Mode)                    │
          └─────────────────────────┘
                       │
                       ▼
              ◇ Media_Switch_Press_Event= TRUE ◇ ──Yes──┐
                       │                                 │
                       No                                ▼
                       │                  ◇ ACU_RUReqstrSystem_St =     ◇
        ┌──No──────────┤                    0x0 (FrontRequester) &
        │              │                    ACU_RUAudioSource_St =
        ▼              │                    0xC (NotReq) &
  Audio_OFF_CM = False │                    ACU_RUReqstrPriority_St =
                       │                    0xE (NotReq) &
                       │                    ACU_RUResReqstStatus_St =
                       │                    0x1 (Deallocated)?
                       │                                 │
                       │                                Yes
                       │                                 ▼
                       │                        Audio_OFF_CM = True
                       │                                 │
                       │                                 ▼
                       └──────────────────────────►   ( END )
```

Decision box: **Media_Switch_Press_Event= TRUE** — Yes / No

Decision box: **ACU_RUReqstrSystem_St = 0x0 (FrontRequester) & ACU_RUAudioSource_St = 0xC (NotReq) & ACU_RUReqstrPriority_St = 0xE (NotReq) & ACU_RUResReqstStatus_St = 0x1 (Deallocated)?** — No / Yes

Process box: **Audio_OFF_CM = False**

Process box: **Audio_OFF_CM = True**

Terminator: **END**

1.3.5.1.4 F-REQ-304413/A-Phone not Paired Control Mirror Function Flowchart

Phone Not paired Control mirror routine (Called at least every 100msec in Normal and Crank Mode)

When Vision_Wheel_Switch_Cfg is enabled, Send_Switch_Press = True when SteWhlSwtchPhon_B_Stat is Pressed(0x1)

Send_Switch_Press_Event= TRUE

Yes

No

No

VRM_BTPhoneSts_St = NoLnkToBt (0x7)

Phone_Not_Paired_CM = False

Yes

Phone_Not_Paired_CM = True

END
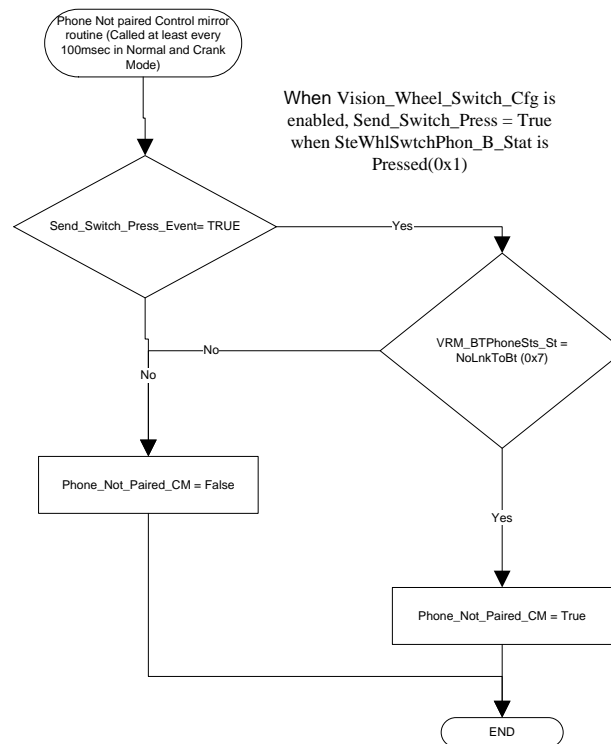
1.3.5.2   Operation Description (supports algorithm flowchart/state diagram)

1.3.5.2.1   F-REQ-304414/A-Phone not paired

HMI logic shall trigger Phone Not paired control mirror when the value of Phone_Not_Paired_CM transition from False to True

1.3.5.2.2   F-REQ-304415/A-Audio off Control

HMI logic shall trigger Audio off control mirror, when the value of Audio_OFF_CM transition from False to True

1.3.5.2.3   F-REQ-304416/A-Vision_Wheel_Switch_Cfg

If Vision_Wheel_Switch_Cfg is disabled, Send button shall be decoded according to CAN Button Strategy HUD SPSS. If Vision_Wheel__Switch_Cfg is enabled, Send button shall decode according to the signal SteWhlSwtchPhon_B_Stat

1.3.5.2.4   Priority and timeouts

Priority and timeouts are part of HMI Handling specification

1.3.5.2.5   F-REQ-304417/A-Phone_Not_Paired_CM and Audio_OFF_CM

Phone_Not_Paired_CM and Audio_OFF_CM shall be made False, when Operational_Mode transition to Limited or Sleep.

1.3.5.3   FS-REQ-304425/A-Function Safety Classification (EMC)

Class B

1.3.5.4   NVM-REQ-304419/A-Memory Storage

Parameter Name	Description	Value at Battery connect	Value at Module Wake-up
Operational_Mode	4 State indicator for cluster operational mode	Limited	Limited or Normal or Crank
ACU_RUResReqstStatus_St	CAN signal	0x1 (Deallocated)	Do not init
ACU_RUReqstrSystem_St	CAN signal	0x0 (FrontRequester)	Do not init
ACU_RUAudioSource_St	CAN signal	0xC (NotReq)	Do not init
ACU_RUReqstrPriority_St	CAN signal	0xE (NotReq)	Do not init
VRM_BTPhoneSts_St	CAN signal indication state of the phone	0x0 (Invalid)	Do not init
ICI_BtnID_A	CAN signal	0x0	0x0
ICI_BtnID_B	CAN signal	0x0	0x0
ICI_BtnID_C	CAN signal	0x0	0x0
ICI_BtnID_D	CAN signal	0x0	0x0
ICI_Coding_BtnID_A	CAN signal	0x0	0x0
ICI_Coding_BtnID_B	CAN signal	0x0	0x0
ICI_Coding_BtnID_C	CAN signal	0x0	0x0

ICl_Coding_BtnID_D	CAN signal	0x0	0x0
SteWhlSwtchMed_B_Stat	CAN signal	0x0	
SteWhlSwtchPhon_B_Stat	CAN signal	0x0	0x0
Phone_Not_Paired_CM	Control mirror output	False	False
Audio_OFF_CM	Control mirror output	False	False

1.4 Error Handling

1.4.1 Missing Message Strategy

1.4.1.1 Missing Reference:

The signals will be declared missing as per the Diagnostics section of this SPSS.

1.4.1.2 States and History:

DTCs states and history will be determined as per the Diagnostics section of this SPSS.

1.5 Diagnostics

1.5.1 Self-Test

None

1.5.2 Engineering Test Mode

1.5.3 Part II Performance

1.5.3.1 DTC-REQ-304424/A-Supported Diagnostic Trouble Codes (DTCs)

DTC	Description
C21200	Lost Communication with SCCM

1.6 Reference Specification

- CAN Button Strategy HUD SPSS
- Audio Management HUD SPSS
- BT Phone HUD SPSS

1.7   Revision History

SPSS Module Revision History

Revision Level	Name	Change Description	Date
1.0	A. Mathai	Initial Version	5/29/2015
1.1	A.Salameh	Added additional signal for Vision (Falcon Lite) Wheel.	7/19/2017
1.2	A.Salameh	Added description to 1.3.5.2.3	8/8/2017
1.3	P.Denduku	Initial VSEM RM Release	04/03/2018
1.4	llopezla	Merged Changes made by A.Salameh offline in 8/30/17 • Added Vision_Wheel_Switch_Cfg to Interface Context Diagram • Added F-REQ-350599 for Vision_Wheel_Switch Config	4/23/2019