System Requirements Document

Feature Name: Considerate Prompts	**Feature ID:** F001149

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Date	LET	FR	Revisions	DR	CK	**Reference:**
						Prepared/Approved By: Nigar Sultana/ Anthony D'Amato
						Checked By: / **Detailed By:**
						Concurrence/Approval Signatures:
						Design Engineering Supervisor Anthony D'Amato
						Design Engineering Manager **Dante Crockett**
						Other Approvals/Concurrences (as required):

STANDARD NOTES:
FOR CURRENT RELEASE STATUS, SEE THE WERS ENGINEERING NOTICE.

▽CONTROL ITEM – THE ▽ALSO IDENTIFIES CRITICAL CHARACTERISTICS DESIGNATED BY THE CROSS FUNCTIONAL TEAMS DEVELOPING THE PRODUCT. THESE, AND ADDITIONAL CRITICAL CHARACTERISTICS IDENTIFIED BY PROCESS REVIEWS, MUST APPEAR ON THE CONTROL PLANS ACCORDING TO ISO/TS 16949. THESE CONTROL PLANS REQUIRE PRODUCT ENGINEERING APPROVAL.

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1 INTRODUCTION

1.1 Purpose

The System Requirements Document (SRD) specifies the generic electrical/electronic system functional and architectural requirements for the Considerate Prompt.

The 3 chapters

- Feature Definitions
- Feature Decomposition
- Feature Deployment

correspond to the 3 levels of the RE Information Model - Feature Level, Function Level, and Component Level.

1.2 Scope

The following set of features from the Global Feature & Function List and the deployment to the

- Considerate Prompt

is described in this Functional Specification.

Feature ID	Feature Name	Owner	Reference
F001149	Considerate Prompts	Nigar Sultana	VSEM Link

Table 1: Feature described in this SRD

1.3 Audience

The SRD is authored by Nigar Sultana / Feature owner for Considerate Prompt. All Stakeholders, i.e., all people who have a valid interest in the ECU behavior should read and, if possible, review the AFS. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the AFS.

The following table lists all stakeholders, who should be involved in the creation and maintenance of this AFS. Refer to the Roles & Responsibilities page in the in the Ford RE Wiki for a list of common Ford roles and responsibilities.

1.3.1 Stakeholder List

The latest list of the feature stakeholder and their roles & responsibilities are given below:

Name	CDSID	Role
Dante Crockett	DCROCKET	Feature Owner Manager
Robin Rivard	RRIVARD1	Feature Owner Technical Specialist
Micheal Nikiforuk	MNIKIFOR	Feature Owner Supervisor
Geoff Turbiak	GTURBIAK	Feature Champion
James Blatchford	JBLATCHF	DI Core
Sherri Bettendorf	SBETTEND	HMI Supervisor
Jim Kaminske	JKAMIN14	Instrument Cluster D&R
Scott Watkins	SWATKINS	DI Technical Expert
Jim Gregoire	JGREGOIR	DI Core
Vishal Patel	VPATEL7	DI Core
Stavros Dionyssopoulos	SDIONYSS	DI HMI Senior Engineer
Alec Struthers	ASTRUTHE	DI HMI Supervisor
Jayne Spence	JSPEN126	HMI Designer
Mack Dobbie	MDOBBIE	HMI Designer
Doron Elliott	DELLIO38	Connectivity Supervisor
Gail Chang	GCHENG	Infotainment System Supervisor
Jason Myslinski	JMYSLIN2	Infotainment System Eng

Robert Paquette	RPAQUET2	Infotainment Systems Engineer
Vilay Patel	VPATEL18	Navigation Systems Engineer
Casey Feldman	CFELDMA1	HMI Designer/Engineer
Lars Doelling	Ldoellin	Application Engineer
Kenneth Williams	KWILL307	Product Development Supervisor
Christopher Cruse	CCRUSE6	Technical Program Manager
Grant Gatchel	GGATCHEL	IVI Software Engineer
William Crafts	WCRAFTS	Core Switches Supervisor
Roy Sutherland	RSUTHERL	D&R Steering wheel switches
John Rentis	JRENTIS	Product Design Engineer
Toby Pulickal	TPULICKA	Feature TDR
William Wong	WWONG24	SW Engineer
Pei-Ching Tzeng	PTZENG	EE Software Supervisor
Doug Gillespie	DGILLESP	FF QA Engineer
Ali Kabalan	AKABALA1	Feature TDR Engineer
Yazan Hamzeh	YHAMZEH	F/F Quality Assurance
Nigar Sultana	NSULTANA	Feature Owner Engineer

Table 2: List of Stakeholders

1.4 Document Organization

1.4.1 Document Context

Refer to the Specification Structure page in the Ford RE Wiki to understand how the AFS relates to other Ford Requirements Documents and Specifications.

1.4.2 Document Structure

The structure of this document is explained below:

Section 1 – Introduction how to use this document including responsibilities and requisite documents. Explains the tterminology. Gives a clarification of the definitions, concepts and abbreviations used in the document.

Section 2 – Feature Definitions. Defines the feature level requirements of the features realized by the system described in this specification

Section 3 – Feature Decomposition: Specifies the functions of the functional architecture of the features, which realize the features from section 2.

Section 4 – Feature Deployment: Specifies details of how the features / functions are deployed to the given electrical platform.

Section 5 – Open Issues

Section 6 – Traceability information generated by RM tool

Section 7 Revision history.

1.5 References

1.5.1 Ford documents

Reference	Doc. ID	Title	Revision
[1]	IPC SPSS v3.20	IPC SPSS	02/07/2017
[2]	LIST BROWSER PROTOCOL IPC SPSS v1.6	List Browser Protocol IPC SPSS	02/15/2017
[3]	Considerate Prompts IPC SPSS v1.0	Considerate Prompt IPC Specification	02/17/2017
[4]	MESSAGE CENTER – M3 DISPLAY WITH MESSAGE CENTER AND QUICK ACTION MENU BUTTON INTERFACE – CGEA 1.3	IPC STSS	

[5]	LIST BROWSER PROTOCOL APIM SPSS v1.6	List Browser Protocol APIM SPSS	02/17/2016
[6]	Transport Protocol APIM SPSS v1.12	Transport Protocol APIM SPSS	02/07/2017
[7]	NAVIGATION APIM SPSS v1.5	Navigation_APIM_SPSS	01/08/2016
[8]	MAX LEVEL SPSS v1.15	Max level SPSS part 1 and 2	04/15/2016
[9]	APIM Carplay SPSS v1.7	APIM Infotainment SPSS	10/03/2016
[10]	CarPlay IPC SPSS v1.0	CarPlay IPC SPSS	07/14/2016
[11]	Considerate Prompt APIM SPSS v1.0	APIM Infotainment Subsystem Part Specific Specification (SPSS)	02/10/2017
[12]	BT Connectivity APIM SPSS v2.8	APIM Infotainment SPSS	02/08/2017
[13]	X-Car_IMSCAN_R34i_APIM_G3_FixUp.dbc	CAN database	05/16/2017
[14]	Released_Global_Message_Lists	Global Message list with Category	

Table 3: List of Ford Internal Documents

1.5.2 External documents and publications

None of the external documents and publications is referred in this document

1.6 Terminology

1.6.1 Definitions

Definition	Description
Warning Categorization	Functional algorithm that categorizes received warning request into different types following Global Message List with Category
Fuel Warning	List of all warnings for indicating low fuel and warning related to it
Warning POI List	List of POIs nearby depending on warning type
Warning POI Route	Route to warning dependent POI selected from warning POI list
Roadside Warning	List of all warnings that require customer attention for immediate roadside assistance
Unit Change	Change numeric digital speed units, add secondary numeric speedometer unit (old unit), change indicate min/max to new unit, change set speed to new unit for border crossing from USA to Canada/Mexico (and vice versa)

Table 4: Definitions used in this document

1.6.2 Abbreviations

Abbr.	Stands for	Description
SRD	Systems Requirements Document	Type of this document
IPC	Instrument Panel Cluster	
SCCM	Steering Column Control Module	
BCM	Body Control Module	
SDLC	Smart Data Link Connector	
GWM	Gateway Module	
APIM	Accessory Protocol Interface Module	
ECU	Electronic Control Unit	
POI	Point of Interest	
Spec	Specification	
HMI	Human Machine Interface	
EOL	End Of Line	
CAN	Controller Area Network	
HS1	High Speed 1	High Speed CAN network 1

HS2	High Speed 2	High Speed CAN network 2
HS3	High Speed 3	High Speed CAN network 3
TP	Transport Protocol	
BT	Bluetooth	
LRA	Lincoln Roadside Assistance	
Req	Request	

Table 5: Abbreviations used in this document.

1.7 Notation

1.7.1 Requirements Templates

Each requirement, use case or scenario in this specification shall follow the corresponding template given in the document template *Specification_Macros.dotm* on Wiki page "Specification Templates". This document template also provides macros to insert the requirement templates. Refer to "How to use the Specification Templates" on how to enable the macros and the requirements templates in this specification.

The requirements macro and requirements templates also enable the import of the specification to VSEM (refer to "How to import specifications into VSEM as separate requirements").

1.7.1.1 Identification of requirements

The unique requirement ID given in the headline of any requirement follows the requirement throughout the development process. The requirement ID format follows a well-defined syntax.

All identifiers in a AFS shall be composed of 4 parts:

- A leading letter F / FNC / FI (= Feature/Function/Feature Implementation) according to the abstraction level of the requirement.
- Followed by the feature name (typically an acronym)
- Followed by a letter indicating the category of requirement (whether it is a Scenario (=SC), a Use Case (=UC) or a Requirement (=R))
- Ending with the actual requirement number

Example:

F_PCL_R_00004 This is the fourth requirement on feature level for the feature Power Child Lock.

1.7.1.2 Requirements Attributes

The macros provided by "Specification Templates" add attributes to each requirement. This helps to classify requirements. The list of available attributes is given in the RE Wiki.

2 FEATURE DEFINITINON

2.1 Feature Description

2.1.1 Purpose and Overview of Feature

The purpose of this feature is to assist driver with displaying additional actionable option when any vehicle warning triggered. Feature will categorize the warning in different type and driver will get a list of relevant POIs or call Lincoln Roadside Assistance depending on warning type. In addition to warning display, new situational prompt will assist driver to change digital speedometer unit when certain conditions meet.

2.1.2 Background

2.1.2.1 Current State

The feature will add options while displaying any warning for customer to act on it. Feature is expected to improve customer experience by providing assistance in critical situation. Currently, driver can choose any POI's and can change digital speedometer unit settings manually while driving through menus settings. The implementation of this feature will allow driver to select POI depending on what situation vehicle is in and in which area customer need help on. Lincoln Roadside Assistance is also becoming more reachable through phone call by pairing cell phone with vehicle. While customer is able to change the digital speedometer unit manually, now this feature will display warning to change digital speedometer unit right at the moment while vehicle changes the US border and unit remains same as vehicle's previous location. Frequent customers could set the preference for the unit change warning displays well.

2.1.2.2 Feature Opportunity

The feature will provide option for the driver to take depending on warning category. Currently, drivers are only allowed to close all the warnings. The implementation of this feature will update the current situation. The feature will keep the current warning closing option and provide additional option to either go warning POI's or calling roadside assistance depending on warning types. Feature will also display situational warning based on the condition of change in country.

2.1.2.3 Feature Goals

The goal of this feature is to ease the pain point of customer by assisting with actionable options whenever any vehicle warning displays. Implementation of this feature will improve driver experience with navigating to warning dependent POI bypassing the root POI screens/table of contents menus. The feature will also allow customer to change the digital speedometer unit through warning display whenever condition applies.

2.1.2.4 Feature Objectives [5]

The objectives of this feature are as follows:

- In case of Fuel ~~and xEV~~ Warnings, customer will be able to choose respective POI station to go there
- In case of Roadside Warnings, an option will be available that allows the customer to Call Lincoln Roadside Assistance
- Depending on vehicle's current location (USA to Canada/Mexico and vice versa), customer will be able to change digital speedometer unit from English to Metric and vice versa with unit change warning

2.1.2.5 Feature Planning

The feature is planning to be introduced in Lincoln U611 and CX483 for MY2020. Implementation in other Lincoln vehicle is optional. Feature has planned to extend and version 2 will be available for SYNC 4. The updated version of the feature will provide Remind in park option that displays video snack for customer assistance and proactive prompts that will assist customer with phone call from LRA whenever severe warning triggers etc.

2.1.2.6 Regions & Markets

Application Engineers must verify local market requirements and advise DI core any changes in regulations in this direction

Market / Region / Variant Name	North America	South America	Europe	MiddleEast/Africa	Asia / Pacific	China
	USA "*Optional*" Canada *"Optional"* Mexico "*Optional*"					*"Optional"*

2.1.2.7 Input Requirements

2.1.2.7.1 Legal Requirements

Feature shall abide by the following legal requirements:

RR Country	FSMS Requirement ID	Title	Author	Published Date
United States	REG-001300-007864 REG-001300-007866 REG-001300-007884 REG-001300-007885	USA/CDN DF-T S1 INSTALLATION PRINCIPLES USA/CDN DF-T S2 INFORMATION PRESENTATION PRINCIPLES USA/CDN DF-T S3 INTERACTIONS W/ CONTROLS/DISPLAYS PRINCIPLES USA/CDN DF-T S4 SYSTEM BEHAVIOR PRINCIPLES	Overbeck,Thomas-TOVERBEC (toverbec)	21-Oct-2016
United States	REG-130101-003390	USA FMVSS 101 - Controls, Displays and Telltales	Laesch,Renu-RLAESCH1 (rlaesch1)	05-Oct-2016
Mexico	REG-001401-008288	Mexico Indicators	Davila,Enrique-EDAVILA9 (edavila9)	28-Sep-2016
Canada	REG-130100-008051	CANADA Controls, Displays and Telltales Certification	Laesch,Renu-RLAESCH1 (rlaesch1)	18-Aug-2016
China [Peoples Republic]	REG-011200-008250	CHN GB/T 4094.2 EV	Laesch,Renu-RLAESCH1 (rlaesch1	03-Jan-2017

Table 6: List of Legal document reference

2.1.2.7.2 Trustmark Requirements

No additional Trustmark requirements for the intended implementation.

2.1.2.7.3 Corporate Standard Requirements (FSMS)

No additional Corporate Standards requirements for the intended implementation.

2.1.2.7.4 Industry Standards

No additional Industry Standards requirements for the intended implementation.

2.1.2.8 Assumptions & Constraints

Assumptions and Constraints listed below are representative of current strategies and may be subject to change. Review documentation of respective features.

(A) Contents of this feature Spec assume that configuation is set to ENABLE for all aspects of this feature. In areas or regions where Considerate Prompts is not required, below requirements do not apply.

(B) Feature assumes that displaying warning context will maintain the character limit, text, color, arbitration following warning HMI strategy

(C) Any new warning needs to be in a category to display with options

(D) Embedded navigation is required for the feature

(E) Phone call to Lincoln Roadside Assistance can only be made with pairing cell phone

(F) Feature receives Ignition status and warning trigger information as input to start functionality

(G) Feature shall be available for any (Park, Reverse, Neutral, Drive, Sports) of the transmission status

2.1.3 Feature Context

2.1.3.1 Feature Context Diagram

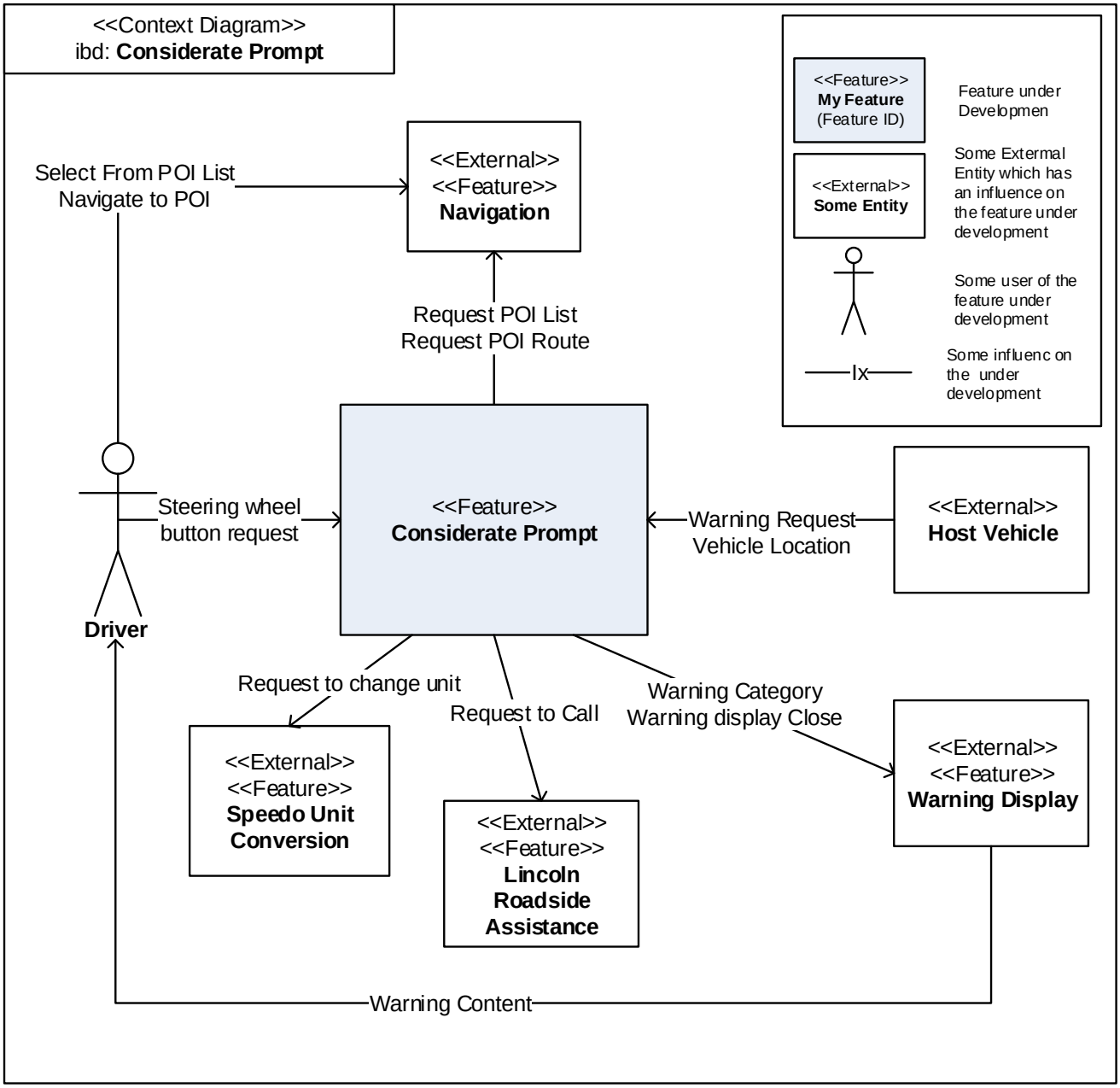

Figure 1: Context Diagram

2.1.3.2 List of Influences [5]

Influence	External Entity	Influence Description
Host Vehicle	~~Ignition Status~~	~~Feature is active when Ignition status ON/RUN~~
	Warning Request	Feature activate when warning triggered
	Vehicle Location	Displays digital speedometer Unit change prompt based on location change
Driver	Steering Wheel Switch Request	Driver is able to take action on displayed warning through set of up, down, ok and back Switches
Warning	Warning Category	Feature categorizes warning and provides option

Display Feature	Warning Display Close	Feature provides option to close the warning display
Navigation Feature	Request POI List	Feature requests and displays warning POI list
	Request POI Route	Feature requests to display warning POI Route
Lincoln Roadside Assistance Feature	Request to Call LRA	Feature will provide option to call for Roadside Assistance
Speedo Unit Conversion Feature	Request to change digital speedometer unit	Feature will provide option to change digital speedometer unit when vehicle unit mismatches with location

Table 7: List of Influences

2.1.4 Feature Modeling

2.1.4.1 Operation Modes and States

Feature has no mode dependent behavior.

2.1.4.2 Use Cases

2.1.4.2.1 Use Case Diagram

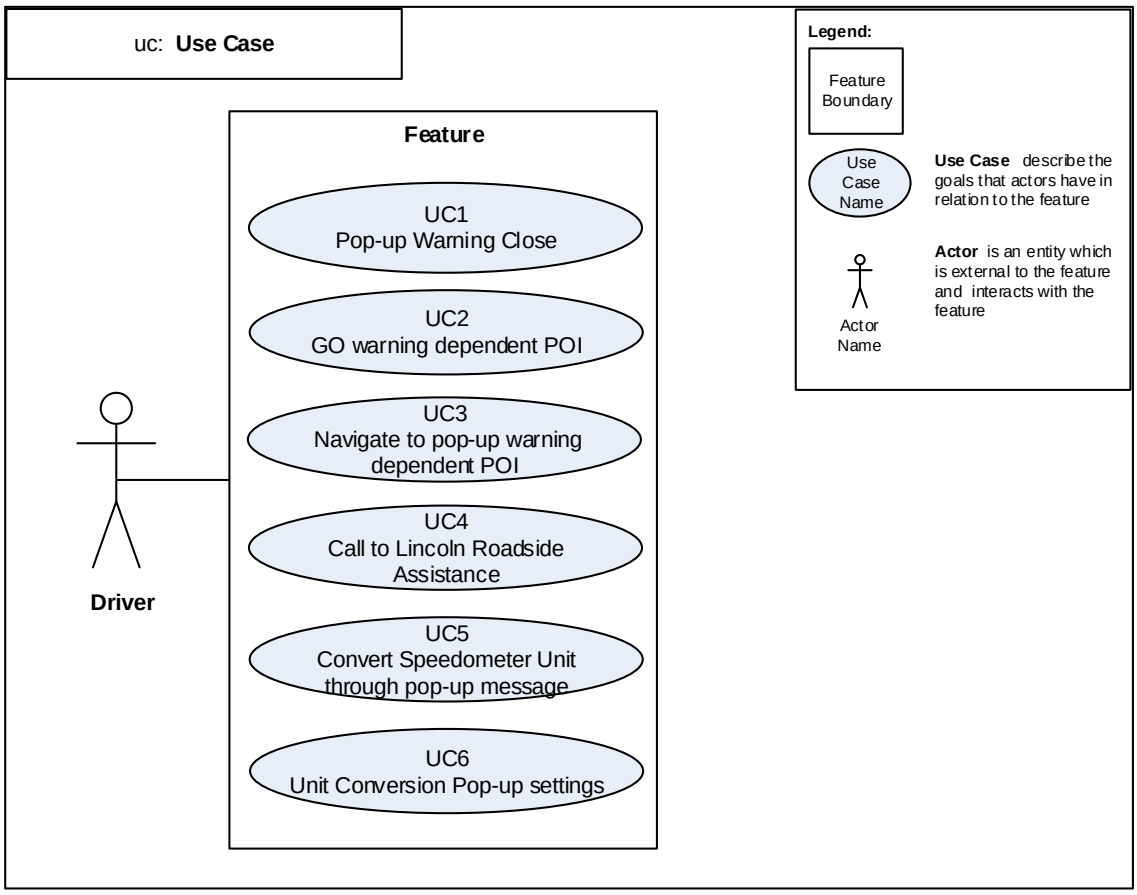

Figure 2: Use Case Diagram

2.1.4.2.2 Actors

Actor	Description
Driver	User who operates/drives the vehicle

Table 8: List of Actors

2.1.4.2.3 Use Case Descriptions

CSPR-UC-1- Warning Close [5]

Actors	Driver
Pre-conditions	Ignition in Start/RUN, warning active, Display is ON, displayed options with warning are selectable All warning will appear as per existing warning strategy
Main Flow	- Warning message displayed related to fuel, ~~EV Charging~~, roadside and none (see list) - warning displays option to clear the warning display - Customer selects CLOSE option to clear the warning display - Warning will be disappeared from cluster following warning HMI strategy - No further action can be taken once warning display is closed

CSPR-UC-2-GO warning dependent POI [4] [5]

Actors	Driver
Pre-conditions	Ignition in Start/RUN, Display is ON, Fuel ~~or EV Charging~~ warning active, displayed options with warning are selectable, Navigation available and running on SYNC, Navigation is configured ~~as Enable~~ON in Cluster All warning will appear as per existing warning strategy
Main Flow	- Warning message displayed in cluster related to Fuel ~~or EV Charging~~ (see list) - Warning displays with option to go to nearby fuel warning POI - Customer selects GO option to go nearby ~~warning dependent~~fuel ~~POI~~ station - List of POI nearby will be displayed in the cluster - Warning will be disappeared from cluster following warning HMI strategy

CSPR-UC-3-Navigate to warning dependent POI [4] [5]

Actors	Driver
Pre-conditions	Ignition in Start/RUN, Display is ON, Fuel ~~or EV Charging~~ Warning active, displayed options with warning are selectable, Navigation available and running on SYNC, Navigation is configured ~~as Enable~~ON on Cluster List of warning dependent POI are displaying followed by selecting “GO POI”
Main Flow	- Customer selects any item displayed in warning POI station list - Vehicle will be navigated to the newly selected location - Selected POI Route will be displayed - POI list will be disappeared from cluster following HMI strategy - Cluster display will be updated accordingly

CSPR-UC-4-Call to Lincoln Roadside Assistance [4]

Actors	Driver
Pre-conditions	Ignition is Start/ RUN, Display is ON, displayed options with warning are selectable, Roadside Warning active, cell phone is paired with the vehicle, vehicle location is USA or Canada, Roadside Assistance number for USA and Canada are stored in vehicle, Navigation available All warning will appear as per existing warning strategy
Main Flow	- Warning message displayed related to Roadside (see list) - warning displays option to Call Lincoln Roadside Assistance - Customer selects CALL option to call Lincoln Roadside Assistance - Call will be placed to Lincoln Roadside Assistance USA or Canada based off of vehicle's location - Warning will be disappeared from cluster following warning HMI strategy

CSPR-UC-5-Convert Digital Speedometer Unit through warning [4]

Actors	Driver
Pre-conditions	Ignition in Start/RUN, Display is ON, displayed options with warning are selectable, vehicle crosses the USA border to/from Canada or Mexico and digital speedometer unit does not match with current location, Navigation available and running on SYNC
Main Flow	- Warning displays related to digital speedometer unit Change - Customer selects "YES" to change unit - Digital speedometer unit will be converted from English to Metric unit (or vice versa) - warning will be disappeared from cluster following HMI strategy

CSPR-UC-6-Unit Conversion warning settings

Actors	Driver
Pre-conditions	Ignition in Start/RUN, Display is ON, options on settings display are selectable
Main Flow	- Customer is browsing Menu Settings - Options displayed to turn digital speedometer unit change reminder on, reminder off and auto unit change - Customer makes any selection from: a. Reminder ON b. Reminder OFF c. Auto Unit Change - Reminder ON will display unit change warning each time location and unit mismatch found after USA border crossing - Reminder OFF will never allow to display unit change warning and will not change the digital speedometer unit - Auto Unit Change will never allow to display unit change warning but change digital speedometer unit automatically when condition matches

2.1.5 Feature Requirements

2.1.5.1 Functional Requirements

- Warning display existing functionality:

- Detect if any warning is active following Global Warning Strategy
- Display Warning following Warning HMI Strategy
- Warning arbitration following Warning HMI Strategy
- Display option to close the warning
- Respond to SCCM Switch press request when warning is active in closing the warning display
- Display POI list and route

- Considerate Prompt functionality: [5]
  - Warning Categorization (Fuel, ~~EV Charging,~~ Roadside, none)
  - Display warning with options (GO, Call and CLOSE) available per category
  - Display warning based POI List nearby with Close option
  - Display warning based POI route
  - Display option to call to Lincoln Roadside Assistance USA and Canada
  - Display warning for digital speedometer unit change
  - Provide menu settings to turn ON/OFF digital speedometer unit change

###R_ CSPR _001 ### Feature Activation with warning trigger

This feature shall activate as soon as any or multiple warning triggered

###R_ CSPR _002 ### Feature Activation with Location and Unit Change

Feature shall activate when digital speedometer unit does not match with vehicle location (USA, Canada, Mexico) after border crossing

###R_ CSPR _003 ### Warning Categorization [5]

When any warning is active, it shall be categorized as “Fuel”, ~~“EV Charging”,~~ “Roadside” Warning or not being to any category/none following Global Message list with category

###R_ CSPR _004 ### Warning Display with Option

Feature shall display Close or (Close and Go) or (Close and Call) options with any active warning depending on warning category

###R_ CSPR _005 ### Display Warning POI List

Feature shall be able to display warning dependent POI list

###R_ CSPR _006 ### Display Warning POI Route

Feature shall be able to display route to the selected warning dependent POI

###R_ CSPR _007 ### Call location based LRA

Feature shall be able to call Lincoln roadside Assistance based on vehicle’s location (USA and Canada) in times of severe warning

###R_ CSPR _008 ### Location based Digital Speedometer Unit Conversion

Feature shall be able to change digital speedometer unit depending on vehicle’s location (USA, Canada and Mexico) upon driver request

###R_ CSPR _009 ### Unit Change Warning display preference

Feature shall allow driver to set preference on displaying digital speedometer unit change warning when condition matches

###R_ CSPR _010 ### Warning display when warning issue resolved

Resolving the warning issue from active to inactive shall lead to clear the warning display immediately without any driver action on displayed options

###R_ CSPR _011 ### Steering Wheel Switch Request [5]

Feature shall allow steering wheel switch request as an input to select options displayed with warning

2.1.5.1.1 Error Handling

###R_ CSPR _012 ### Error in Feature configuration

Warning shall be displayed as a non Considerate Prompt warning if any configuration error occurs

###R_ CSPR _013 ### Warning Categorization failure

Warning shall be displayed as non Considerate Prompt warning if algorithm fails to categorize the active warning

2.1.5.2 Nonfunctional Requirements

2.1.5.2.1 Performance

###R_ CSPR _014 ### Warning display timeout

The warnings shall be displayed for the duration the associated issue remains unresolved within the same ignition cycle or until customer takes an action
Warnings with timeout (identified in Global Message List as TA or TA*) will follow existing timeout strategy

###R_ CSPR _015 ### Acceptance in Categorized Warning display latency

No additional latency shall be allowed to categorize the warning than its original display time (display within “X” seconds of triggering) after that warning triggered

###R_ CSPR _016 ### Warning display when feature not configured

If feature is not configured in Lincoln vehicle, then warning shall be displayed as non Considerate Prompts warning

2.1.5.2.2 Security

No additional security requirements for the intended implementation.

2.1.5.2.3 Reliability

###R_ CSPR _017 ### Consistency in categorizing Warning

Same warning item in Global Message list shall always categorized as same warning type

###R_ CSPR _018 ### Categorization effect on Warning Display

Warning Categorization shall have no effect on warning display strategy per IPC STSS

###R_ CSPR _019 ### Switch illumination Strategy

SCCM Switch illumination during warning display with options shall follow Steering wheel control logic and strategy per Max Level SPSS 2

2.1.5.3 Safety

###R_ CSPR _020 ### Warning display Strategy

All warnings shall be displayed following Cluster warning display strategy per IPC STSS and Global Message list

###R_ CSPR _021 ### Consecutive Warning display Strategy

Consecutive warnings shall be displayed following warning and chime arbitration strategy owned by Cluster HMI Global Message List

2.1.5.3.1 Functional Safety Goals [7]

Feature does not require Hazard Analysis and Risk Assessment (HARA) confirmed by Functional Safety team

2.1.5.4 HMI Requirements

###R_ CSPR _022 ### Warning HMI

Feature shall abide by warning HMI for warning context, color, severity, timeout, frequency of displaying, chime and warning telltale

###R_ CSPR _023 ### Unit Change warning preference HMI

Feature shall display digital speedometer unit change warning display settings following cluster HMI for message context, color, timeout, priority and number of characters

2.1.5.5 Other Requirements

2.1.5.5.1 Manufacturing Requirements

###R_ CSPR _024 ### Feature Version [3]

Feature shall have a DID to monitor the latest software version

###R_ CSPR _025 ### Feature Configuration [2]

This feature shall have enable and disable configuration at EOL

2.1.5.5.2 Service Requirements

###R_ CSPR _026 ### Feature behavior with software update [3]

Any new warning added in the Global Message list shall be categorized and displayed with option available per category after updating software

###R_ CSPR _027 ### Feature behavior with serviced module [3]

Any newly activated warning or digital speedometer unit change warning display shall considered as new warning after Servicing IPC/SYNC/Radio

2.1.5.5.3 After Sales Requirements

###R_ CSPR _028 ### Feature Learning [1]

Learning sections shall available in Owner's Manual to help customer in understanding the functions of steering wheel switch on displayed warning and explaining the function of displayed options

2.1.5.5.4 Process requirements

No additional process requirements for the intended implementation.

3 FEATURE DECOMPOSITION (LOGICAL DESIGN)

3.1 Overview

The feature consists of nine functions to perform from start to end. Five functions are associated with option display and handle on displayed warning and three functions work to assist driver with digital speedometer Unit Conversion from English to Metric and vice versa depending on vehicles location after USA border crossing. One function assists to close both these warning display functions. Among the nine functions, three functions are introduced as new dedicated to this feature only. The new functions are: Option display and handle on displayed warning, settings and Unit Change warning display & option handle. Other functions such as request to display warning POI list and Route, POI request receive and List send, POI Route Request receive & Display will work together to support on demand customer action on Request to Display Warning POI function. Call LRA request receive & make call function will receive customer request and assist to make call to Lincoln Roadside Assistance in severe vehicle conditions. Unit change function will receive the request to change digital speedometer unit on the condition of unit mismatch with location after USA border crossing and make the change accordingly.

3.2 Input Requirements

###R_ CSPR _029 ### Ignition Status

Ignition status (START, RUN, ACCESSORY and OFF) shall be an input to determine when to display the warning with options

###R_ CSPR _030 ### Warning Status

Active warnings declared under the Global Message List shall be a valid input for the feature

###R_ CSPR _031 ### Warning Category

Active warning's category mentioned under the Global Message List shall be an input for the feature to tie option based off of warning's category

###R_ CSPR _032 ### Embedded Nav Status

Embedded nav status shall be an input for the feature

###R_ CSPR _033 ### Waypoint Status

Waypoint status shall be an input for the feature for adding warning POI as a waypoint

###R_ CSPR _034 ### Lincoln Roadside Available Status

Country based Lincoln Roadside Assistance status shall be an input for the feature

###R_ CSPR _035 ### Vehicle Location

Vehicle's GPS coordinate shall be an input to request call to LRA, generate POI list & Route and to request for digital speedometer unit change whenever condition matches

###R_ CSPR _036 ### Steering wheel switch ~~request~~Input [5]

Momentary toggle request from Steering wheel switch shall be an input to take any action on the displayed warning message with options

Right side toggle switches (Up, Down, Back and OK) of steering wheel shall only source of input in this feature to select options available with displayed warning
Toggling Left (back) has no function/impact on feature

3.3 Assumptions & Constraints

Assumptions and Constraints are listed below:

(A) Feature will be available when Ignition Key status is START/ON
(B) Feature will not depend on transmission status
(C) Feature shall become active as soon as any or multiple warning triggered
(D) Feature shall become active as soon as vehicle crosses the USA border to/from Canada/Mexico and digital speedometer unit does not matched with that country
(E) Feature requires embedded navigation system
(F) Navigation required to configured ON on Cluster
(G) Cell phone needs to be paired with vehicle for making call to LRA

3.4 Functional Architecture

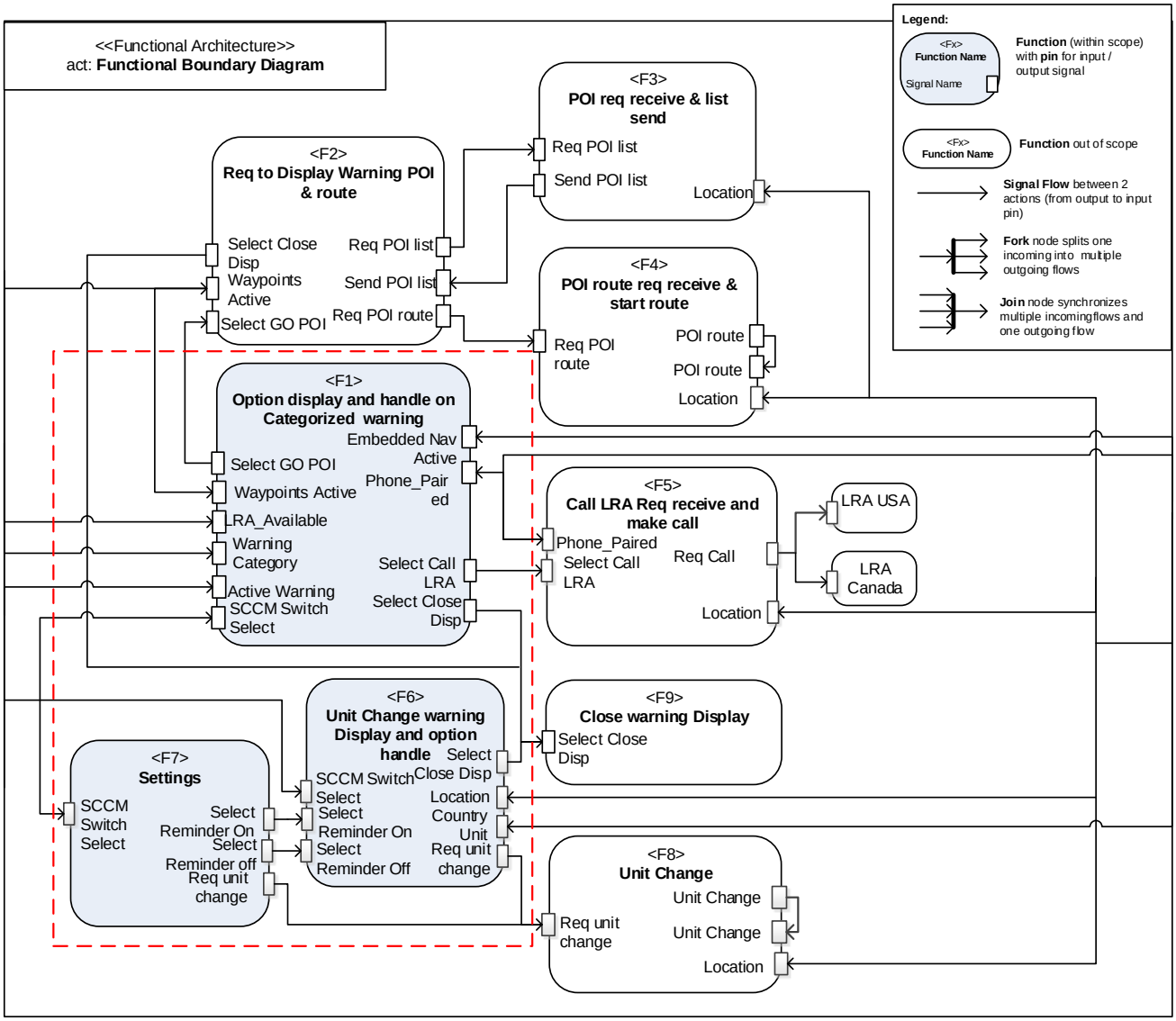

Figure 3: Functional Boundary Diagram [6]

3.5 Function List

Function Name	Description
Option Display and handle on Categorized Warning	Receives active warning request as input to display warnings with options available per category and process the request made through option handler
Request to Display Warning POI & Route	Receives active warning with category for requesting to display warning based POI nearby if category matches
POI request receive and list send	Receive warning based POI request and send the POI list to display
POI Route request receive and start route	Receive warning based POI Route request to start that POI Route
Call LRA request receive and make call	Receive the request to call Lincoln Roadside Assistance to make call LRA if category matches
Unit Change warning Display and Option handler	Accepts change in country code warning while vehicle is moving from USA to Canada/Mexico (vice versa) to convert digital speedometer unit through warning display
Settings	Make request to enable and disable Unit Change display function partially or completely
Unit Change	Receive the request to convert digital speedometer unit from English to Metric and vice versa and execute the request
Close Warning Display	Receive the request to clear the warning display and execute the request

Table 9: List of Functions

3.6 Logical Functions

3.6.1 Option Display and handle on Categorized Warning

3.6.1.1 Function Description [5]

All the warnings will be displayed with close option regardless of warning category. Fuel ~~and EV Charging~~ warnings will be displayed with option to go respective POI stations nearby. Roadside type warning will appear with Call option to make call at Lincoln Roadside Assistance depending on vehicle's location which is currently available in USA and Canada only. Any warning display can be closed upon driver request. For Fuel ~~and EV Charging~~ warning driver will be able to select GO option to go POI stations nearby. For roadside type warning, driver can request to call Lincoln Roadside Assistance selecting call option while cell phone required to be paired with vehicle.

3.6.1.2 Function Scope

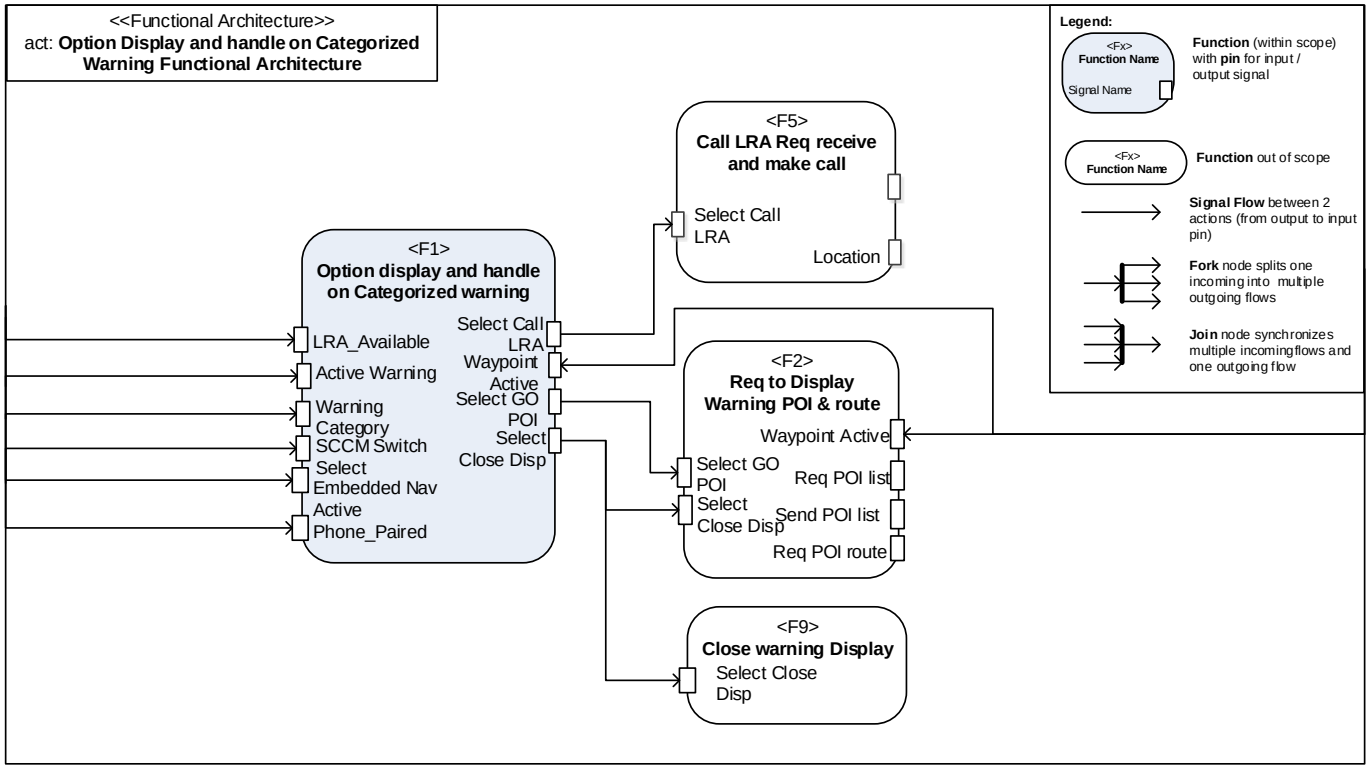

Figure 4: Option Display and handle on Categorized Warning functional architecture [6][8]

3.6.1.3 Function Interfaces

3.6.1.3.1 Logical Inputs [5] [6]

Logical Signal Name	Signal Value	Description
Active_Warning	0x0 Inactive	Input from warning status
	0x1 Active	
Warning_Category	0x0 Not Categorized	Input from Warning Categorization
	0x1 Fuel	
	~~0x2 xEV~~	
	~~0x3~~ 0x2 Roadside	
	~~0x4~~ 0x3 None	
SCCM_Switch_Select	0x0 No Action	Input from Steering Wheel Switches
	0x1 Back	
	0x2 Up	
	0x3 Okay	
	0x4 Down	
Embedded_Nav_Active	0x0 Null	Input from Embedded Nav Status
	0x1 Inactive~~Active~~	
	0x2 Active~~Inactive~~	
Waypoints_Active	0x0 Invalid	Input from route waypoint status
	0x1 Inactive	
	0x2 Active	
	0x3 Max_Active	
LRA_Available	0x0 Null	Input from location update

	0x1 Available 0x2 Not Available	
Phone_Paired	0x0 Not Paired 0x1 Paired	

Table 10: Option Display and handle on Categorized Warning functional logical inputs [6]

3.6.1.3.2 Logical Outputs

Logical Signal Name	Signal Value	Description
Select_Call LRA	0x0 No Action 0x1 Select	Output to call LRA
Select_Go_POI	0x0 No Action 0x1 Select	Output to request warning POI
Select_Close_Disp	0x0 No Action 0x1 Select	Output to request close warning display

Table 11: Option Display and handle on Categorized Warning functional logical outputs

3.6.1.4 Function Modeling

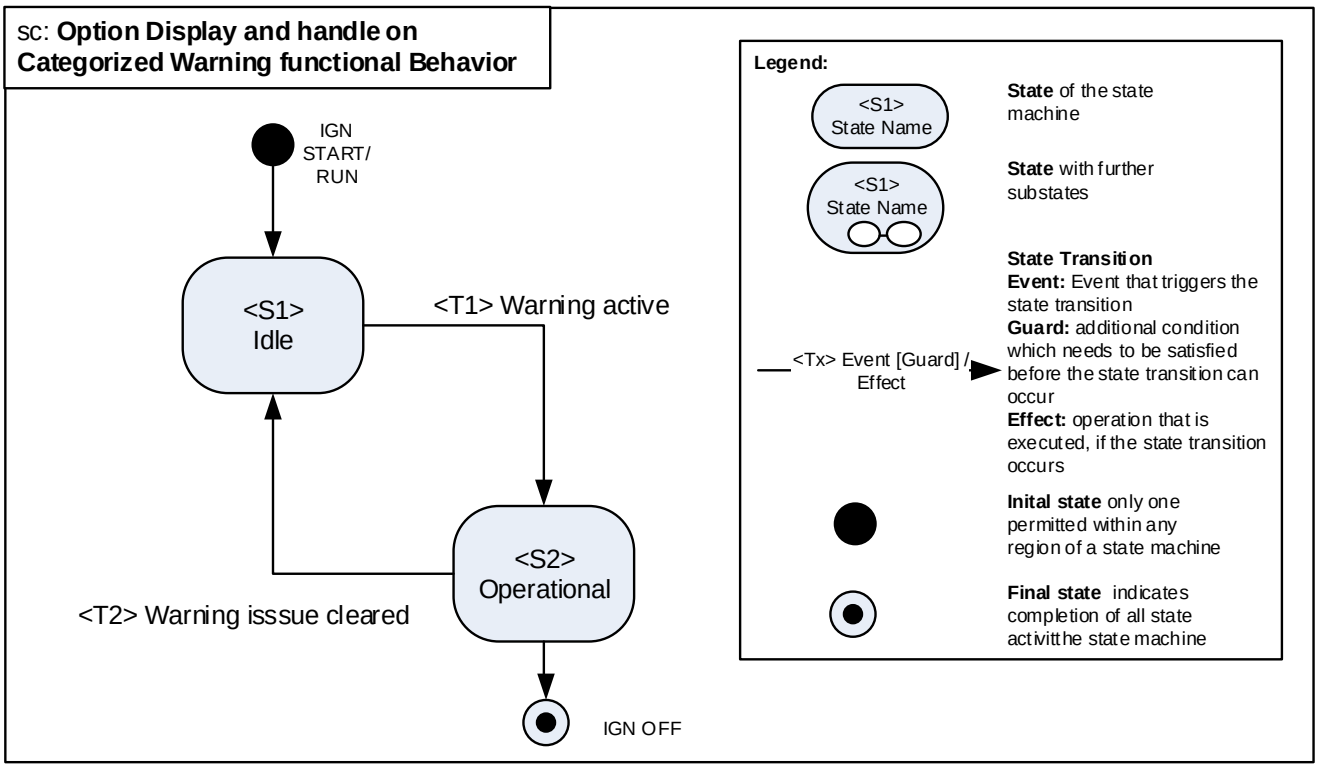

Figure 5: Option Display and handle on Categorized Warning functional behavior

3.6.1.5 Function Requirements

3.6.1.5.1 Functional Requirements

3.6.1.5.1.1 Normal Operation [5]

Options Display / Warning Type	CLOSE	GO	CALL LRA
Fuel	Yes	Yes	No
~~EV Charging~~	~~Yes~~	~~Yes~~	~~No~~
Roadside	Yes	No	Yes
None	Yes	No	No

###R_ CSPR _037 ### Display Warning Close option

All the warnings shall be displayed with option to clear the warning display regardless of warning category

###R_ CSPR _038 ### Fuel Warning Display with GO option

Fuel type warnings shall be displayed with option to go nearby Fuel Station

~~###R_ CSPR _00X ### EV Charging Warning Display with GO option~~ [5]

~~EV Charging type warnings shall be displayed with option to go nearby EV Charging Station~~

###R_ CSPR _039 ### Roadside Warning display with CALL option

Roadside type warnings shall be displayed with option to call Lincoln Roadside Assistance

###R_ CSPR _040 ### Request to Close warning display

Request to close warning display shall be made through Warning display option handler

###R_ CSPR _041 ### Request to Go Fuel Station

Request to go Fuel Station shall be made through Fuel Warning display option handler

~~###R_ CSPR _00X ### Request to Go EV Charging Station~~ [5]

~~Request to go EV Charging Station shall be made through EV Charging Warning display option handler~~

###R_ CSPR _042 ### Request to CALL LRA

Request to call Lincoln Roadside Assistance shall be made through Roadside Warning display option handler

3.6.1.5.1.2 Error Handling

###R_ CSPR _043 ### Option display when function is in sleep mode with IGN START/RUN

Warnings shall be displayed as non Considerate Prompt warning if function does not wake up when Ignition key status in START/RUN and any warning is active

###R_ CSPR _044 ### Warning Category Reception Error

Warnings shall be displayed as a non Considerate Prompt warning if function fails to receive warning category

###R_ CSPR _045 ### Incorrect Warning Category Received

Warning shall be displayed with option available on that determined category if incorrect warning category received

###R_ CSPR _046 ### Warning and Option Language mismatch

Options display language shall follow cluster strategy if option language does not match with warning context

3.6.1.5.2 Non-Functional Requirements

3.6.1.5.2.1 Performance

###R_ CSPR _047 ### Display Warning with Embedded navigation unavailable [5]

When apple carplay, android auto or any other 3rd party navigation system is active, Fuel ~~and EV Charging~~ type warning shall be displayed as non Considerate Prompts warning
Option to Call Lincoln Roadside Assistance should be available for Roadside type warnings

###R_ CSPR _048 ### Display Warning with max waypoints active [5]

Fuel ~~and EV Charging~~ type warning shall be displayed as non Considerate Prompts warning if vehicle is routing to destination with maximum number of waypoints active

~~###R_ CSPR _00X ### Display Location based EV Charging Warning~~ [5]

~~EV Charging warning shall be displayed as non Considerate Prompts warning if vehicle location found anywhere other than USA or Canada~~

###R_ CSPR _049 ### Display Location based Roadside Warning

Roadside warning shall be displayed as non Considerate Prompts warning if vehicle location found anywhere other than USA or Canada

###R_ CSPR _050 ### Display Warning when cell phone not paired [5]

Roadside warning shall be displayed as non Considerate Prompts warning if cell phone is not paired with the vehicle,
Option to GO POI stations should be available for Fuel ~~and EV Charging~~ type warnings

###R_ CSPR _051 ### Display Warning in Drive Mode

Warning display will be moved to the alternate zone from warning zone and displayed as non Considerate Prompts warning when drive mode pops-up

###R_ CSPR _052 ### Display Warning when Drive Mode goes away

Warning display will be moved back to the warning zone from the alternate zone and still displayed as non Considerate Prompts warning when drive mode goes away

3.6.1.5.2.2 Safety

###R_ CSPR _053 ### Options display text

Font size and color for options display context shall follow Cluster HMI and translation strategy

###R_ CSPR _054 ### Warning option highlight

Warning Option highlighting through text box prior to selection shall follow warning display HMI Strategy

###R_ CSPR _055 ### Display Clear HMI

Choosing any option on displayed warning shall always clear the warning screen leaving telltale if available following warning HMI

3.6.1.5.2.3 Security

No additional security requirements for the intended implementation

3.6.1.5.2.4 Reliability

###R_ CSPR _056 ### Consistency in displaying Warning option

Warning falls in same category shall be displayed with same options available on that specific category

###R_ CSPR _057 ### Warning and options display language

Displayed options available on each warning type shall match with the language of warning context

3.6.2 Request to Display Warning POI & Route

3.6.2.1 Function Description [5]

Fuel ~~and EV Charging~~ POI list can be requested through Fuel ~~and EV Charging~~ warnings. POI List request will be received and in response to the request, POI list shall be sent if available and list will be displayed following list display HMI. The new edition to list display is an additional ~~close~~ Exit option at the ~~bottom~~ Top of the POI list for customer to clear the POI list screen if wish not to select any POI item. Items from POI list can be chosen to navigate there and navigation Route shall be presented following route display HMI.

3.6.2.2 Function Scope

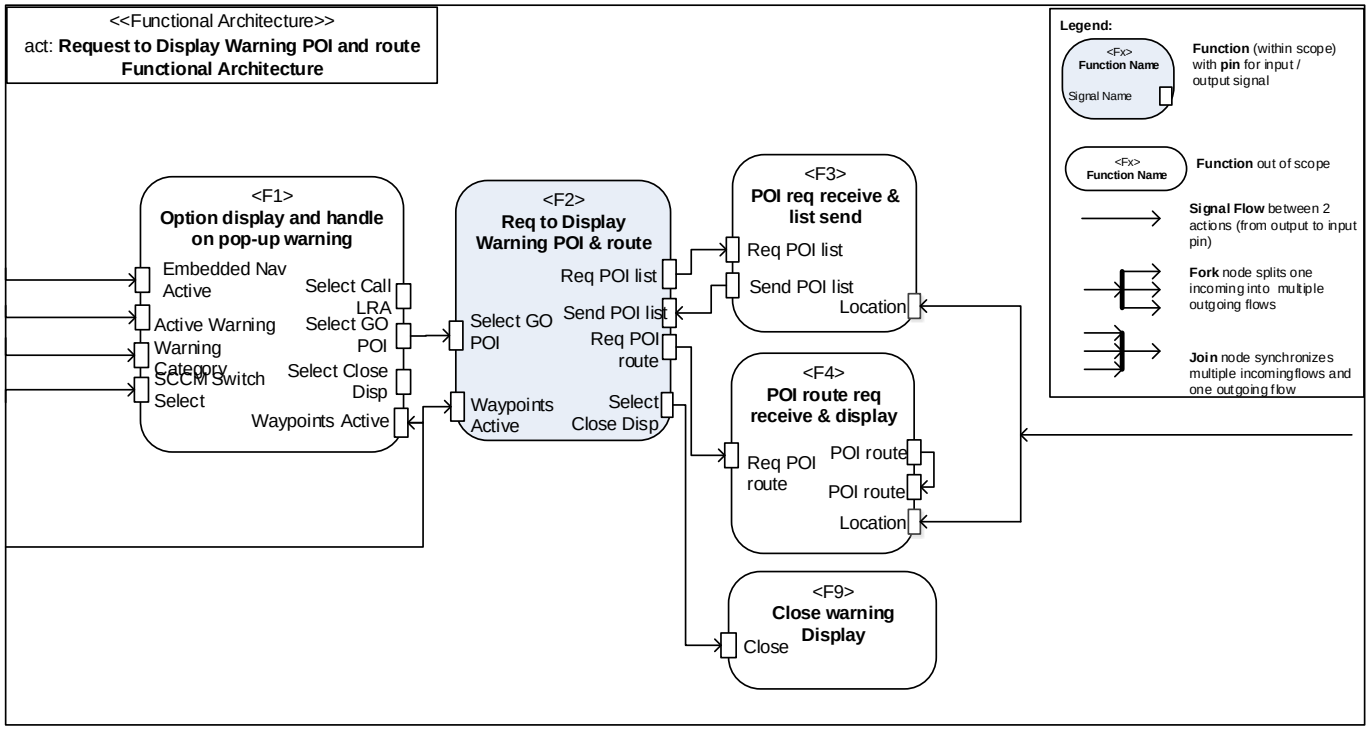

Figure 6: Request to Display Warning POI and Route functional architecture [8]

3.6.2.3 Function Interfaces

3.6.2.3.1 Logical Inputs

Logical Signal Name	Signal Value	Description
Select_GO_POI	0x0 No Action	Input from warning display to select POI option
	0x1 Select	
Send_POI_List	0x0 No Action	Input to display warning POI list
	0x1 POI List	
Waypoint_Active	0x0 Invalid	Input from route waypoint status
	0x1 Inactive	
	0x2 Active	
	0x3 Max_Active	

Table 12: Req to Display Warning POI & Route functional logical Inputs

3.6.2.3.2 Logical Outputs

Logical Signal Name	Signal Value	Description
Req_POI_List	0x0 No Action	Output to request for warning dependent POI List
	0x1 Req POI	
Req_POI_Route	0x0 No Action	Output to request for warning dependent POI map/Route
	0x1 Req route	
	0x2 Req Close	
Select_Close_Disp	0x0 No Action	Output to request close POI warning list display
	0x1 Select	

Table 13: Req to Display Warning POI & Route functional logical Outputs

3.6.2.4 Function Modeling

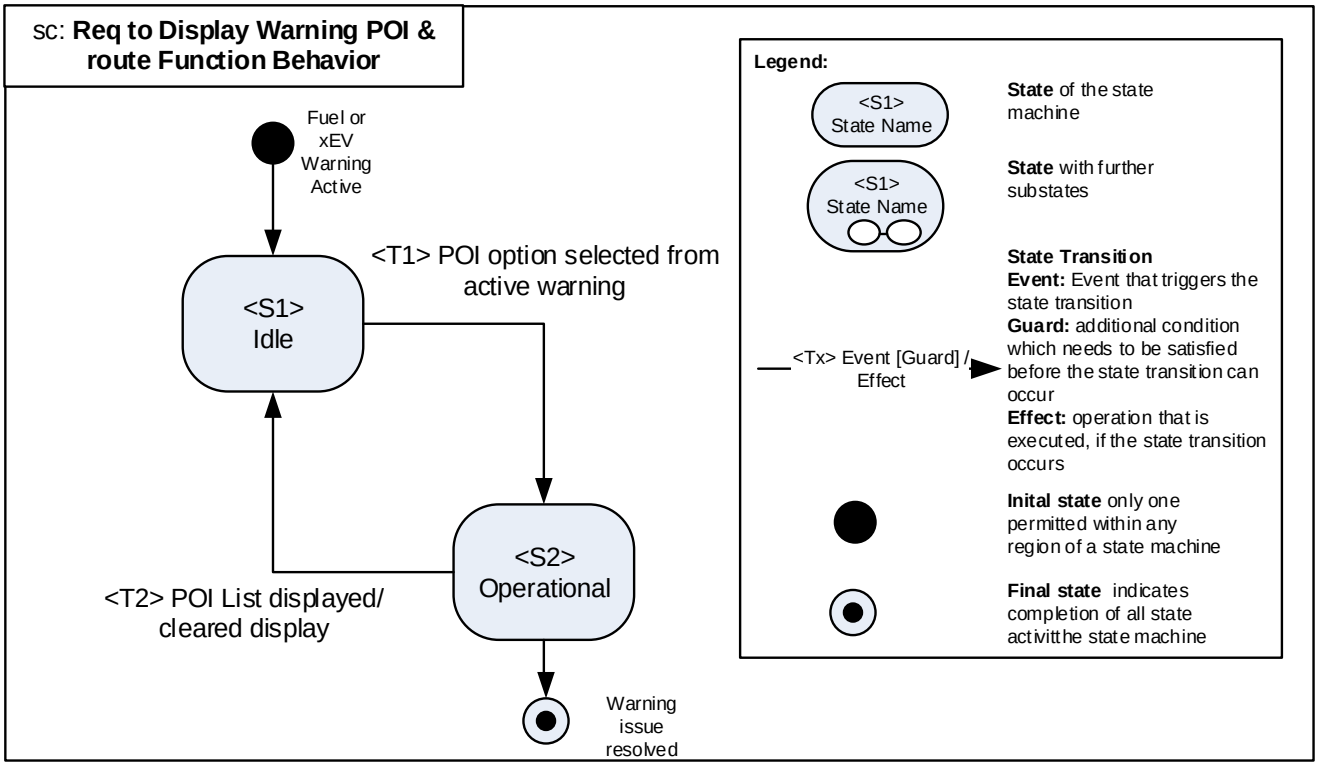

Figure 7: Req to Display Warning POI & Route function behavior

3.6.2.5 Function Requirements

3.6.2.5.1 Functional Requirements

3.6.2.5.1.1 Normal Operation

###R_ CSPR _058 ### POI Request [5]

Fuel ~~and EV Charging~~ POI List request shall be sent through Fuel ~~and EV Charging~~ Warnings respectively

###R_ CSPR _059 ### Receive POI List [5]

Fuel ~~or EV Charging~~ POI List shall be received to display Fuel ~~and EV Charging~~ POI nearby when requested through Warning

###R_ CSPR _060 ### POI List Display [5]

Fuel ~~or EV Charging~~ POI List shall be displayed upon reception of POI List sent as a response to list request following Cluster List display HMI

###R_ CSPR _061 ### POI List Display with Exit option [5]

Fuel ~~or EV Charging~~ warning POI List shall be displayed with exit option to clear the POI list warning screen

###R_ CSPR _062 ### POI List Display Close [5]

Warning dependent POI List display shall be cleared upon driver request through Fuel ~~and EV Charging~~ POI List warning display option handler

###R_ CSPR _063 ### POI Route Request [5]

Fuel ~~and EV Charging~~ POI Route request shall be sent through Fuel ~~and EV Charging~~ POI list warning display

###R_ CSPR _064 ### POI Route Display [5]

Fuel ~~or EV Charging~~ POI route shall be displayed upon reception of POI route sent as a response to route request following Cluster route display HMI

3.6.2.5.1.2 Error Handling

###R_ CSPR _065 ### POI List Request Error [5]

Fuel ~~and EV Charging~~ Warnings shall disappear after making request for warning POI list following cluster strategy if POI request not sent due to CAN signal error

###R_ CSPR _066 ### POI List Reception Error [5]

Fuel ~~and EV Charging~~ Warning display shall be disappeared after requesting for respective POI List and display shall remain cleared following cluster strategy if POI list not received due to CAN signal error

###R_ CSPR _067 ### POI Route Request Error [5]

Fuel Warning POI List shall be disappeared after requesting for respective POI route and display shall remain cleared following cluster strategy if POI route request not received due to CAN signal error

###R_ CSPR _068 ### POI List and Route Request frequency [5]

If Fuel ~~and EV Charging~~ POI List/Route shall not receive within 2sec after requesting, POI List/Route request shall sent again automatically
Request will send 3 times with a waiting time of 2 sec after each request has sent if POI List/Route not received by then

3.6.2.5.2 Non-Functional Requirements

3.6.2.5.2.1 Performance

###R_ CSPR _069 ### Transition from POI List display to Warning display

Transition from warning POI list display to warning display shall not be possible

###R_ CSPR _070 ### Display POI List Warning with max waypoints active

If maximum number of waypoints set while/after fuel warning displayed, selecting nearest fuel station option shall lead to display a notification message

3.6.2.5.2.2 Safety

###R_ CSPR _071 ### POI item highlight [5]

First POI item in the warning POI list shall be highlighted

###R_ CSPR _072 ### POI display HMI

Warning POI List display with number of POI items shall abide by HMI strategy for POI list display in Cluster

###R_ CSPR _073 ### POI display HMI with multiple active warning

Warning POI List display while any other/multiple warning triggered shall abide by warning display arbitration strategy in Cluster

###R_ CSPR _074 ### Follow List Browser Protocol

Choosing item from Warning POI List display shall abide by List browser protocol APIM SPSS and Considerate Prompt_ APIM SPSS

###R_ CSPR _075 ### Follow Transport Protocol

Warning POI List request response shall abide by Transport protocol APIM SPSS

3.6.2.5.2.3 Security

No additional security requirements for the intended implementation.

3.6.2.5.2.4 Reliability

No additional reliability requirements for the intended implementation.

3.6.3 POI request receive and list send

3.6.3.1 Function Description [5]

Request to display Fuel ~~and EV Charging~~ POI list will be received by this function. After receiving the POI list request, response will send back providing the warning POI list. Warning POI list generation, distance and direction calculation, number of items included in the POI list will follow the existing strategy.

3.6.3.2 Function Scope

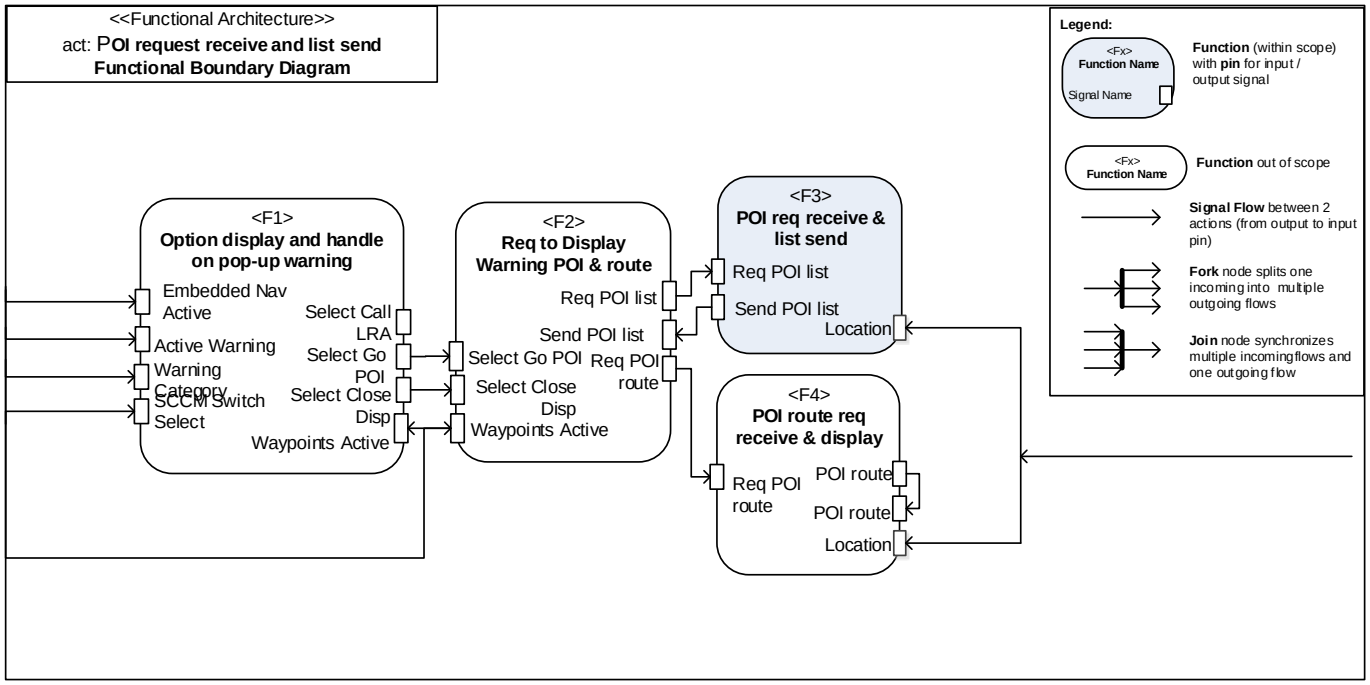

Figure 8: POI request receive and list send fuction architecture [8]

3.6.3.3 Function Interfaces

3.6.3.3.1 Logical Inputs

Logical Signal Name	Signal Value	Description
Req_POI_List	0x0 No Action	Input to request for warning POI list
	0x1 Req POI	
Location		Input from GPS Coordinate

Table 14: POI Req receive and List send Function logical inputs [10]

3.6.3.3.2 Logical Outputs

Logical Signal Name	Signal Value	Description
Send_POI_List	0x0 No Action	Output to display warning POI list
	0x1 POI List	

Table 15: POI Req receive and List send Function logical output

3.6.3.4 Function Modeling

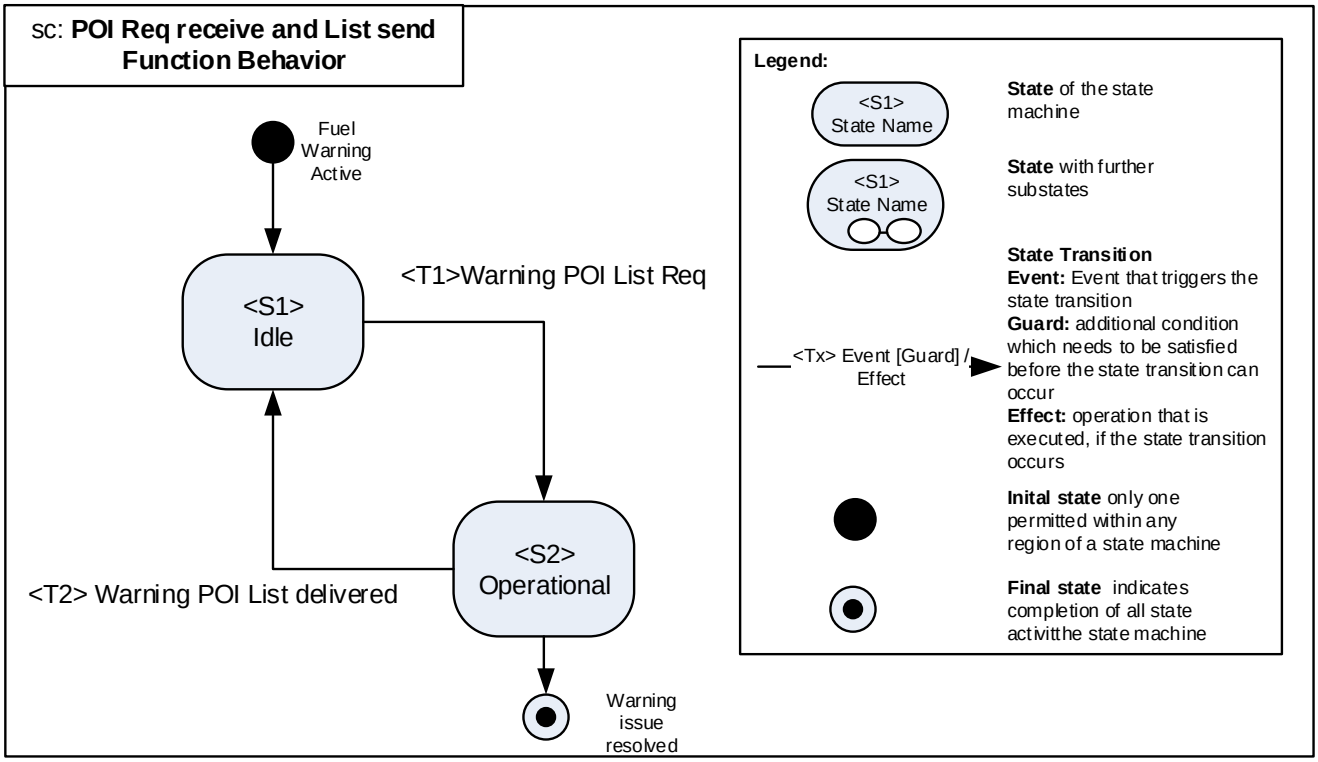

Figure 9: POI Req receive and List send Function Behavior

3.6.3.5 Function Requirements

3.6.3.5.1 Functional Requirements

3.6.3.5.1.1 Normal Operation

###R_ CSPR _076 ### Receive POI List Request [5]

Fuel ~~and EV Charging~~ POI List request shall be received when requested through Fuel ~~and EV Charging~~ warning display

###R_ CSPR _077 ### Response to POI List Request [5]

Fuel ~~and EV Charging~~ POI List shall be sent as response to Fuel ~~and EV Charging~~ POI List request reception

3.6.3.5.1.2 Error Handling

###R_ CSPR _078 ### POI List Request Reception Error [5]

Fuel ~~and EV Charging~~ Warning display shall disappeared after requesting for respective POI List and display shall remain cleared if POI list request not received due to CAN signal error

3.6.3.5.2 Non-Functional Requirements

3.6.3.5.2.1 Performance

###R_ CSPR _079 ### Latency acceptance on POI List Response

No additional latency is allowed in receiving the POI List request and response back to list display function

3.6.3.5.2.2 Safety

###R_ CSPR _080 ### POI List generation

POI list generation based off of vehicle's updated location shall follow existing navigation strategy per Navigation APIM SPSS

###R_ CSPR _081 ### Response Strategy for number of POI items [5]

Numbers of items send through POI List response for Fuel ~~and EV Charging~~ shall follow Transport protocol APIM SPSS

###R_ CSPR _082 ### Response POI List Request Strategy [5]

Fuel ~~and EV Charging~~ POI List request shall be responded following Transport protocol APIM SPSS

###R_ CSPR _083 ### No POI found display

If no POI is found nearby while request received for warning POI list, a notification message will be displayed following navigation strategy

###R_ CSPR _084 ### POI list loading Error

If POI List cannot be loaded due to network/other failure while requested for warning POI list, a notification message will be displayed following navigation strategy per Navigation SPSS

3.6.3.5.2.3 Security

No additional security requirements for the intended implementation.

3.6.3.5.2.4 Reliability

No additional reliability requirements for the intended implementation.

3.6.4 POI Route request receive and start route

3.6.4.1 Function Description [5]

Routing to Fuel ~~and EV Charging~~ POI Station can be requested through Warning POI List display item selection handler. Once requested, the selected warning POI will be added as a new waypoint and will have higher priority over other waypoints. Route will start to the POI Station first. In case when vehicle is routing with maximum waypoint active, the Warning POI cannot be added as a new waypoint and routing will not be possible.

3.6.4.2 Function Scope

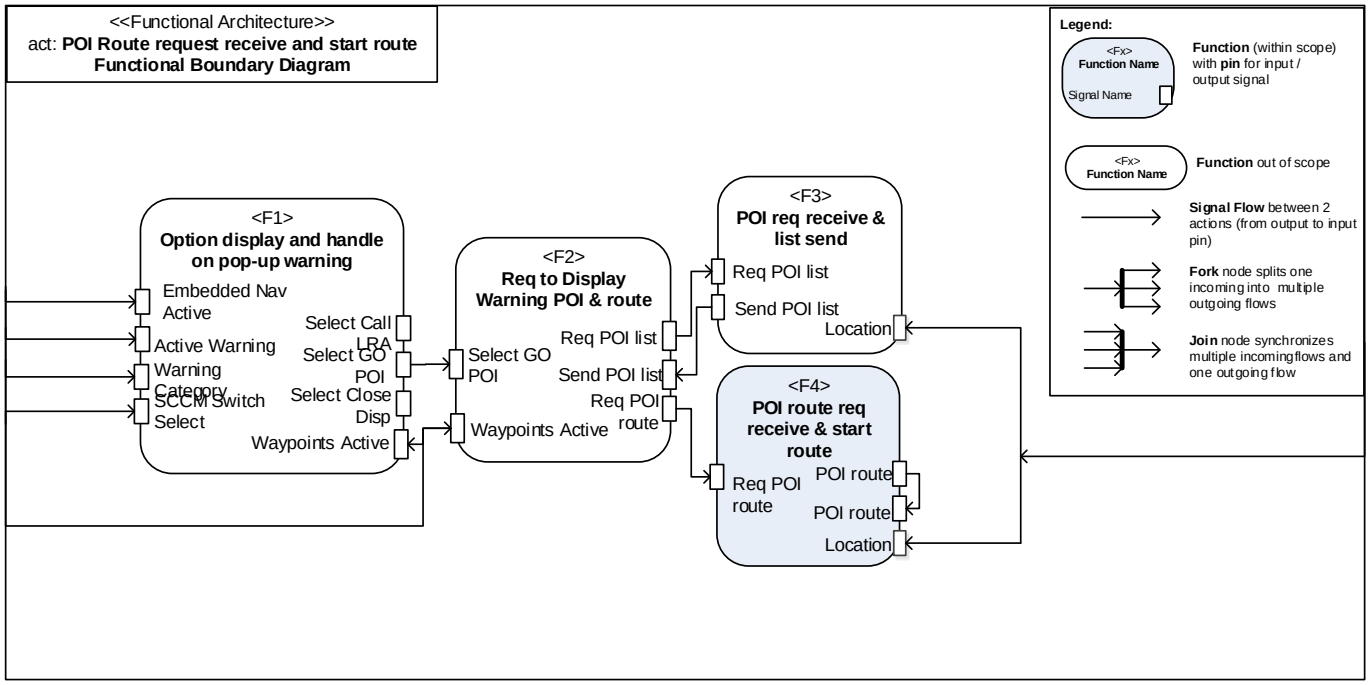

Figure 10: POI Route request receive and start route fuction architecture [8]

3.6.4.3 Function Interfaces

3.6.4.3.1 Logical Inputs

Logical Signal Name	Signal Value	Description
Req_POI_Route	0x0 No Action	Input to request for warning POI list
	0x1 Req Route	
Location		Input from GPS Coordinate

Table 16: POI Route request receive and display function logical inputs [10]

3.6.4.3.2 Logical Outputs

Logical Signal Name	Signal Value	Description
POI_Route	0x0 No Action	Route POI as output
	0x1 Start Route	

Table 17: POI Route request receive and display function logical outputs

3.6.4.4 Function Modeling

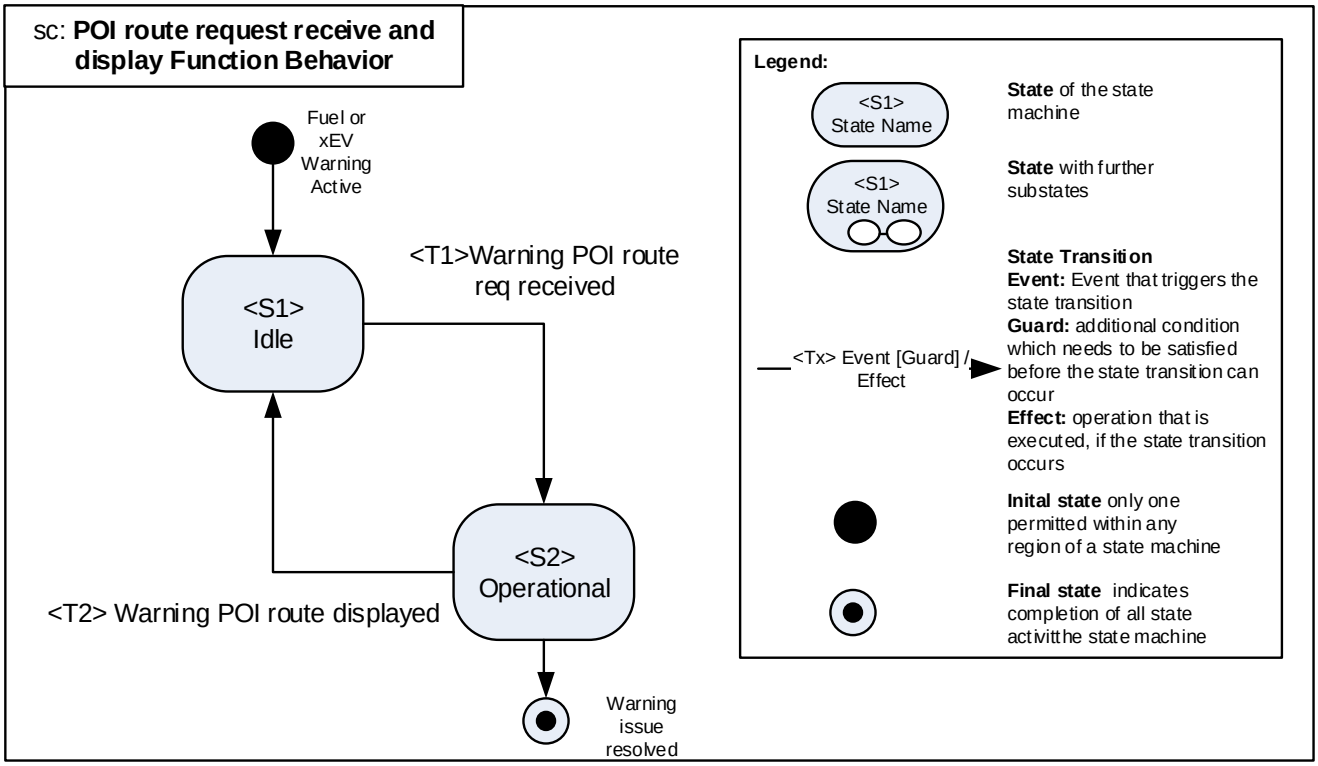

Figure 11: POI Route request receive and display Function Behavior

3.6.4.5 Function Requirements

3.6.4.5.1 Functional Requirements

3.6.4.5.1.1 Normal Operation

###R_ CSPR _085 ### Receive POI Route Request [5]

Fuel ~~and EV Charging~~ POI Route request shall be received when requested through Fuel ~~and EV Charging~~ POI list display

###R_ CSPR _086 ### Response to POI Route Request [5]

Fuel ~~and EV Charging~~ POI Route request shall be received as response to Fuel ~~and EV Charging~~ POI selection from list

###R_ CSPR _087 ### Add POI while navigating to destination

If vehicle is routing to any destination, selected POI shall be added as a new waypoint and will be routed to the warning POI Station first

###R_ CSPR _088 ### Add POI while navigating to destination with <max no of waypoint

If vehicle is routing to any destination with less than 5 preselected waypoints, selected warning POI shall be added as a new waypoint and will be routed to the POI Station first

###R_ CSPR _089 ### Add POI while navigating with max no of POI

If vehicle is routing to any destination with maximum number of preselected waypoints, selected POI shall not be added as a new waypoint

3.6.4.5.1.2 Error Handling

###R_ CSPR _090 ### POI Route Request Reception Error [5]

Fuel ~~and EV Charging~~ POI List display shall disappeared after requesting for respective POI Route and display shall remain cleared if POI Route request not received due to CAN signal error

3.6.4.5.2 Non-Functional Requirements

3.6.4.5.2.1 Performance

###R_ CSPR _091 ### Latency acceptance on POI Route Response

No additional latency is allowed in receiving the POI Route request and response in displaying Route

3.6.4.5.2.2 Safety

###R_ CSPR _092 ### POI Route loading error

If POI Route cannot be loaded due to network/other failure while requesting for warning POI list, a notification message will be displayed following navigation strategy

###R_ CSPR _093 ### No of Max waypoints

Number of maximum waypoints selectable will follow existing navigation strategy

###R_ CSPR _094 ### POI route request with Max waypoints

If warning POI cannot be added as a new point due to maximum waypoint number limit, a notification message will be displayed

3.6.4.5.2.3 Security

No additional security requirements for the intended implementation.

3.6.4.5.2.4 Reliability

No additional reliability requirements for the intended implementation.

3.6.5 Call LRA Request receive and make call

3.6.5.1 Function Description

When any severe warning activates that falls into roadside category, it allows driver to call Lincoln Roadside Assistance via pairing cell phone with vehicle. Roadside Assistance is available currently in USA and Canada and call will be placed depending on where vehicle's location is detected during that moment for proper assistance.

Roadside Assistance number will be prepopulated in the vehicle. If cell phone is paired via Bluetooth, then call will be placed following Bluetooth strategy. If phone is paired via any other way (apple carplay/ android auto and others), call will be placed following respective strategy.

3.6.5.2 Function Scope

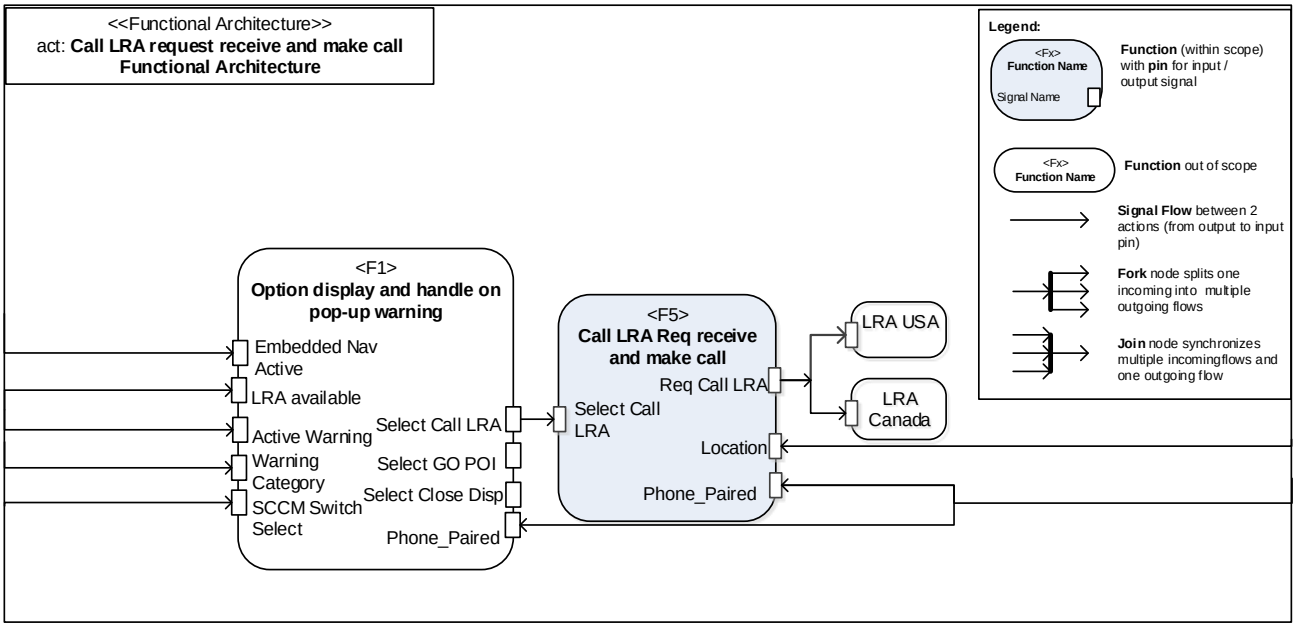

Figure 12: Call LRA request receive and make call function architecture [6]

3.6.5.3 Function Interfaces

3.6.5.3.1 Logical Inputs

Logical Signal Name	Signal Value	Description
Select_Call_LRA	0x0 No Action	Input from warning display to select Call option
	0x1 Select	
Phone_Paired	0x0 Not Paired	Input from phone pair status
	0x1 Paired	
Location	0x0 USA	Input from GPS Coordinate
	0x1 Canada	
	0x3 Others	

Table 18: Call LRA request receive and make call function logical inputs [10]

3.6.5.3.2 Logical Outputs

Logical Signal Name	Signal Value	Description
Req_Call_LRA	0x0 No Action	Output to request making call to LRA
	0x1 Call LRA	

Table 19: Call LRA request receive and make call function logical outputs

3.6.5.4 Function Modeling

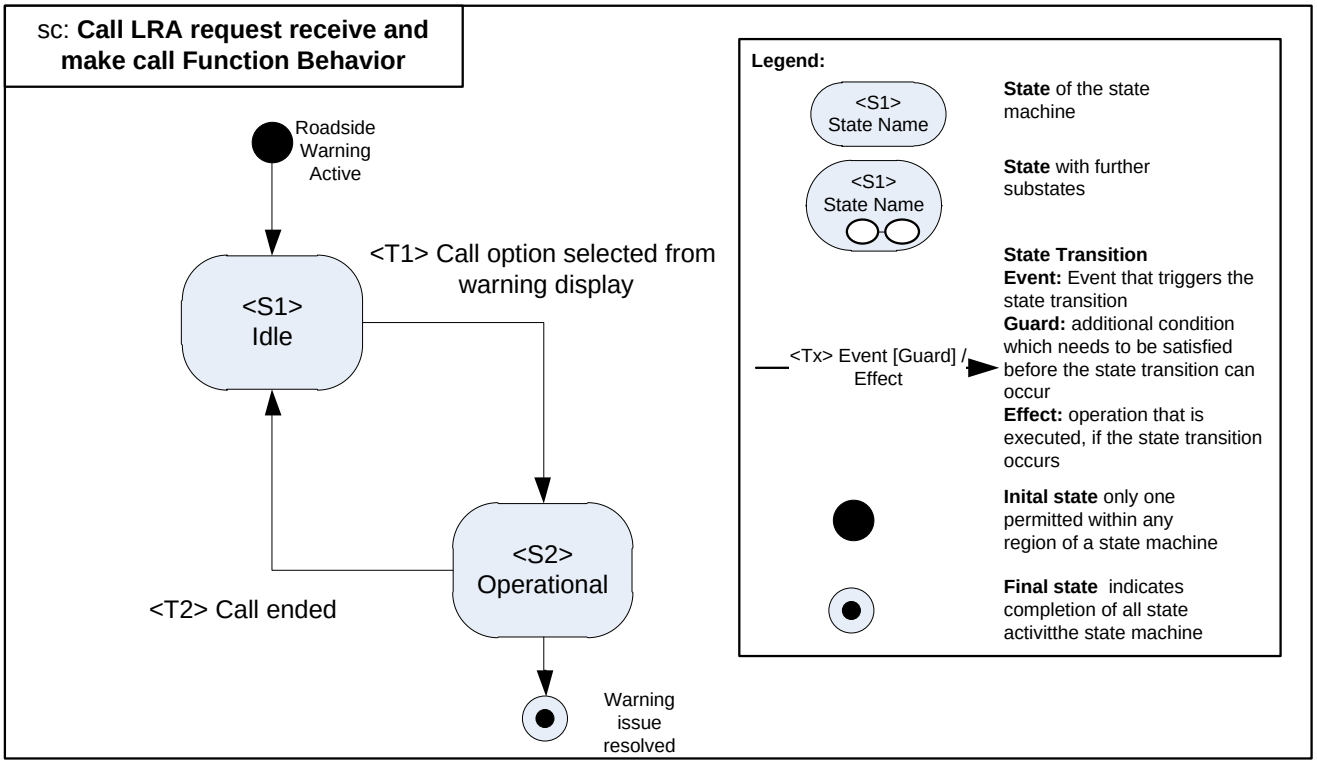

Figure 13: Call LRA request receive and make call function behavior

3.6.5.5 Function Requirements

3.6.5.5.1 Functional Requirements

3.6.5.5.1.1 Normal Operation

###R_ CSPR _095 ### Receive Call LRA request

Request to Call to Lincoln Roadside Assistance shall be received to make call through displayed Roadside Warning

###R_ CSPR _096 ### Call LRA USA

Phone call to Lincoln Roadside Assistance in USA shall be made through displayed Roadside Warning when vehicle is in USA

###R_ CSPR _097 ### Call LRA Canada

Phone call to Lincoln Roadside Assistance in Canada shall be made through displayed Roadside Warning when vehicle is in Canada

###R_ CSPR _098 ### Call LRA pairing phone

Call to Lincoln Roadside Assistance for roadside warnings shall not be made if cell phone is not paired to the vehicle

3.6.5.5.1.2 Error Handling

###R_ CSPR _099 ### Call Request Reception Error

Warning Display with Call option shall disappeared after requesting for call to LRA and display shall remain cleared if Call request not received due to CAN signal error

###R_ CSPR _100 ### Call Request frequency

Call to Lincoln Roadside Assistance request shall not repeat if found no cell phone is paired or call cannot be established due to network error

###R_ CSPR _101 ### Call LRA while Location updated Error

If vehicle's updated location not found then Call to Lincoln Roadside Assistance shall be made based off of vehicle's last updated country info (for USA and Canada only)

3.6.5.5.2 Non-Functional Requirements

3.6.5.5.2.1 Performance

###R_ CSPR _102 ### Call LRA for North America

Request to Call Lincoln Roadside Assistance function is available for USA and Canada only

###R_ CSPR _103 ### Latency acceptance on Response to Call Request

No additional latency is allowed in receiving the Call LRA request and make call if phone paired

3.6.5.5.2.2 Safety

###R_ CSPR _104 ### Make Call Strategy

Call Lincoln Roadside Assistance shall follow existing call strategy pairing cell phone with vehicle via Bluetooth, apple carplay, android auto and others documented in Carplay and BT Connectivity APIM SPSS

###R_ CSPR _105 ### Call LRA when another call is ongoing

Call Lincoln Roadside Assistance when another call is continuing shall follow existing call strategy

~~###R_ CSPR _106 ### Call LRA unavailable notification~~

~~If vehicle moves to new country where LRA is not available right after selecting call to LRA through Roadside Warning display option handler, a notification message will be displayed that LRA is not available~~

~~###R_ CSPR _107 ### Call LRA unsuccessful notification~~ [9]

~~If call cannot be established to Lincoln Roadside Assistance due to network error/others, a notification message will be displayed following call strategy~~

3.6.5.5.2.3 Security

No additional security requirements for the intended implementation

3.6.5.5.2.4 Reliability

No additional reliability requirements for the intended implementation

3.6.6 Unit Change Warning Display and option handle

3.6.6.1 Function Description

This function will display a warning requesting to change digital speedometer unit when there is a mismatch in speedometer unit with vehicle's location after USA border crossing to assist driver with English to Metric (and vice versa) speedometer unit change. As soon as the speedometer unit and location mismatch triggered, there will be a delay of 1 mile to check if condition still valid and then display the speedometer unit change warning. Unit Change warning will allow driver to change the digital Speedometer unit, set speed and Speed indicator to match with Vehicle's updated location. If driver decide not to align the unit with location or do not take any action through unit change warning display handler, then warning will be displayed again whenever the border crossing and speedometer unit mismatch condition occurs. This Functionality is only available for USA, Canada and Mexico.

3.6.6.2 Function Scope

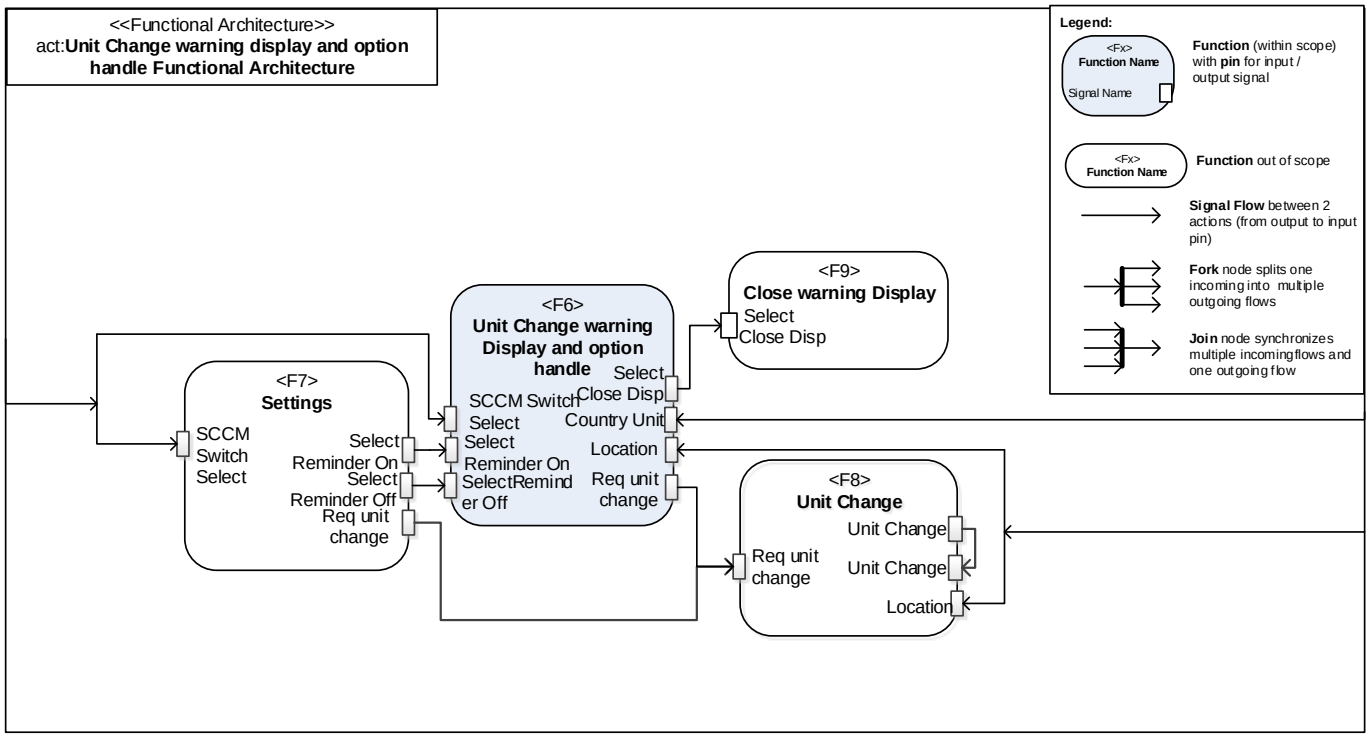

Figure 14: Unit Change warning display and option handle functional architecture

3.6.6.3 Function Interfaces

3.6.6.3.1 Logical Inputs [6]

Logical Signal Name	Signal Value	Description
SCCM_Switch_Select	0x0 No Action	Input from Steering Wheel Switches
	0x1 Back	
	0x2 Up	
	0x3 Okay	
	0x4 Down	

Select_Reminder_On	0x0 No Action 0x1 Enable	Input to enable unit change warning
Select_Reminder_Off	0x0 No Action 0x1 Disable	Input to disable unit change warning
Country_Unit	0x0 Null 0x1 ~~Imperial~~Mile/hr 0x2 ~~MetricL100km~~Km/hr 0x3 Metrickm	Input from current country's unit
Loctaion		Input from GPS Coordinate

Table 20: Unit Change warning display and option handle functional architecture [10]

3.6.6.3.2 Logical Outputs

Logical Signal Name	Signal Value	Description
Select_Close_Disp	0x0 No Action 0x1 Select	Output to request close warning display
Req_Unit_Change	0x0 No Action 0x1 Req unit change	Output to request change units

Table 21: Unit Change warning display and option handle functional logical output

3.6.6.4 Function Modeling

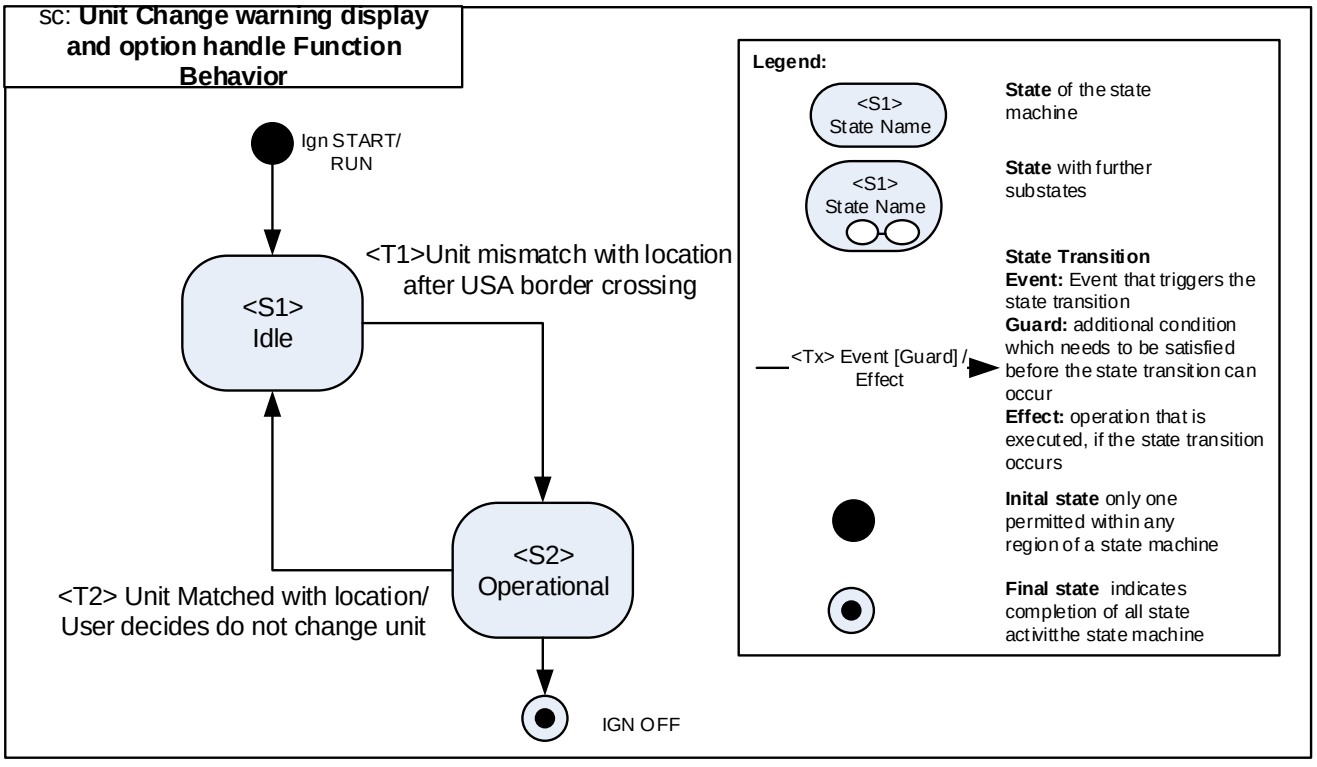

Figure 15: Unit Change warning display and option handler Operation States and Modes [8]

3.6.6.5 Function Requirements

3.6.6.5.1 Functional Requirements

3.6.6.5.1.1 Normal Operation [1]

Border Crossing	Distance traveled from border to new country	Vehicle Speedometer Unit	Display Unit Change Warning
USA > Canada	1 miles	miles/hr	Yes
USA > Mexico	1 miles	miles/hr	Yes
USA > Canada	any	km/hr	No
USA > Mexico	any	km/hr	No
Canada > USA	1 miles	km/hr	Yes
Mexico > USA	1 miles	km/hr	Yes
Canada > USA	any	miles/hr	No
Mexico > USA	any	miles/hr	No

###R_ CSPR _108 ### Unit Change Warning Activation

Speedometer Unit Change warning shall be triggered as soon as vehicle has crossed the USA border to/from Canada or Mexico and vehicle digital Speedometer unit has a mismatch with current country

###R_ CSPR _109 ### Display Unit Change warning [4]

Speedometer Unit Change Warning shall be displayed after driving 1 mile from the border within the new country anytime the unit change warning conditions remain satisfied

###R_ CSPR _110 ### Unit Change warning display when condition revert

Revert back to previous location where digital speedometer unit has a match with location shall lead to clear the Unit Change warning display immediately without any driver action on displayed options

###R_ CSPR _111 ### Display unit change warning close option

Speedometer Unit change warning shall be displayed with option to clear the warning display

###R_ CSPR _112 ### Warning Display with Unit Change option

Unit Change warning message shall be displayed with option to change digital speedometer unit

~~###R_ CSPR _00X ### Display warning in next ignition cycle~~ [6]

~~Speedometer Unit change warning shall not be displayed in the next ignition cycle after making any selection/no selection through unit change warning option handler unless another border crossing and unit mismatch occurs~~

###R_ CSPR _113 ### Request to close Unit Change display

Request to close digital speedometer unit change warning display shall be made through unit change warning display option handler

###R_ CSPR _114 ### Request to Change Unit (English to Metric)

Request to change digital speedometer unit from English to Metric when vehicle location found Canada/Mexico shall be made through displayed unit change warning option handler

###R_ CSPR _115 ### Request to Change Unit (Metric to English)

Request to change speedometer unit from Metric to English when vehicle location found USA shall be made through displayed unit change warning option handler

###R_ CSPR _116 ### Unit change warning display clear

After taking any user action through unit change warning option handler, unit change warning display shall be cleared

3.6.6.5.1.2 Error Handling

###R_ CSPR _117 ### Unit Change display when function is in sleep mode with IGN START/RUN

If function does not wake up when Ignition key status in START/RUN and failed to receive vehicle's current location info, no Unit Change warning shall display

###R_ CSPR _118 ### Location updated Error [5]

If vehicle's updated location not found after USA border crossing then unit change warning shall not be displayed

3.6.6.5.2 Non-Functional Requirements

3.6.6.5.2.1 Performance

###R_ CSPR _119 ### Unit Change Warning Display for North America [5]

Digital Speedometer Unit Change Warning Display function is available for USA, Mexico and Canada only

###R_ CSPR _120 ### Acceptance in Unit Change warning display latency

No additional latency is allowed to display Unit Change warning
Latency includes updating vehicle location info and generating warning display

###R_ CSPR _121 ### Acceptance in action latency through unit change warning option handler

No additional latency is allowed in operation when any option has chosen through unit change warning option handler

3.6.6.5.2.2 Safety

###R_ CSPR _122 ### Unit Change warning display Strategy

Unit Change warning shall be displayed following Cluster HMI strategy

3.6.6.5.2.3 Security

No additional security requirements for the intended implementation

3.6.6.5.2.4 Reliability

###R_ CSPR _123 ### Consistency in displaying unit change warning

Unit change warning shall not display or flash or appear periodically due to failure/problem in location update

###R_ CSPR _124 ### Consistency in clearing unit change warning display

After taking any user action through displayed option handler, unit change warning shall not display or flash or appear periodically

3.6.7 Settings

3.6.7.1 Function Description

Settings function allows driver to set their preference on displaying digital speedometer unit change warning. Unit change warning display function can be turned on to display each time the digital speedometer unit has a mismatch with country after border crossing event (applicable for USA, Canada and Mexico) with option to ignore or change the units. The function will also provide option to auto unit change that results no digital speedometer unit change warning display again but change unit automatically each time a unit mismatch with location found after border crossing. Reminder off option will not display warning again and there will be no unit conversion; units will remain as they were set previously.

3.6.7.2 Function Scope

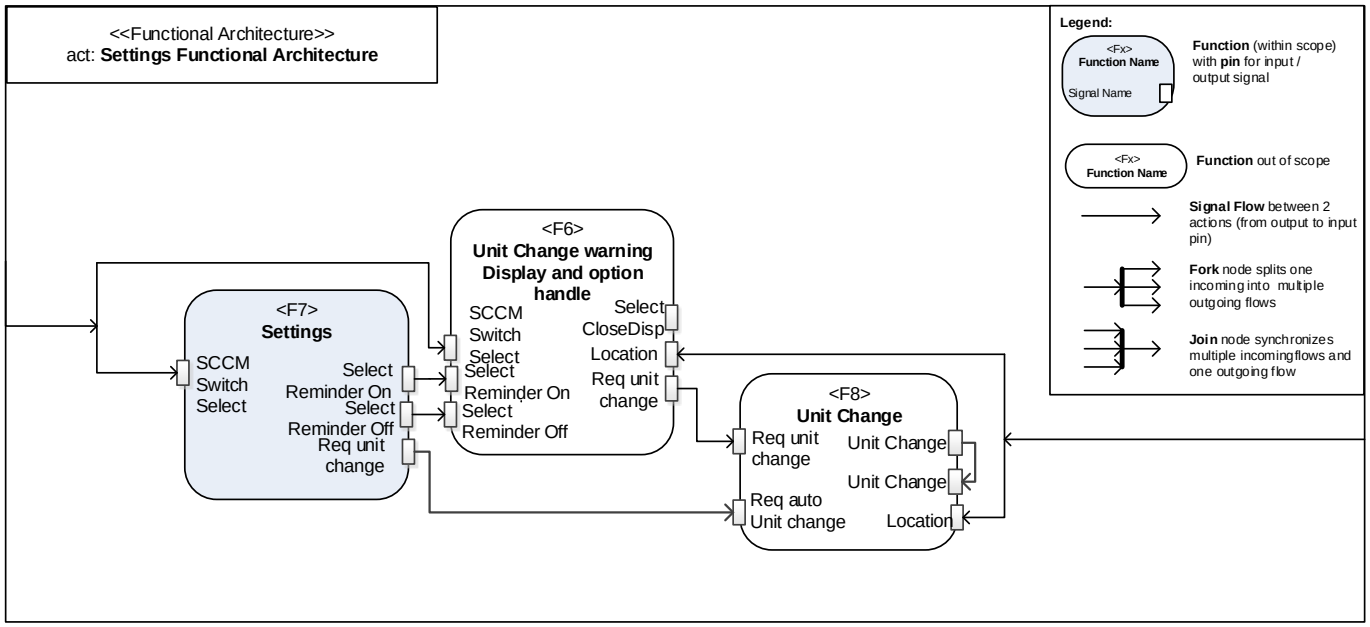

Figure 16: Settings functional architecture [10]

3.6.7.3 Function Interfaces

3.6.7.3.1 Logical Inputs

Logical Signal Name	Signal Value	Description
SCCM_Switch_Select	0x0 No Action	Input to select option displayed with Unit Change settings
	0x1 Back	
	0x2 Up	

	0x3 Okay	
	0x4 Down	

Table 22: Unit Change warning display settings functional logical inputs

3.6.7.3.2 Logical Outputs

Logical Signal Name	Signal Value	Description
Select_Reminder_On	0x0 No Action	Output to enable unit change warning
	0x1 Select	
Select_Reminder_Off	0x0 No Action	Output to disable unit change warning
	0x1 Select	
Req_Unit_Change	0x0 No Action	Output to request for location based unit change
	0x1 Req unit change	

Table 23: Settings functional logical output

3.6.7.4 Function Modeling

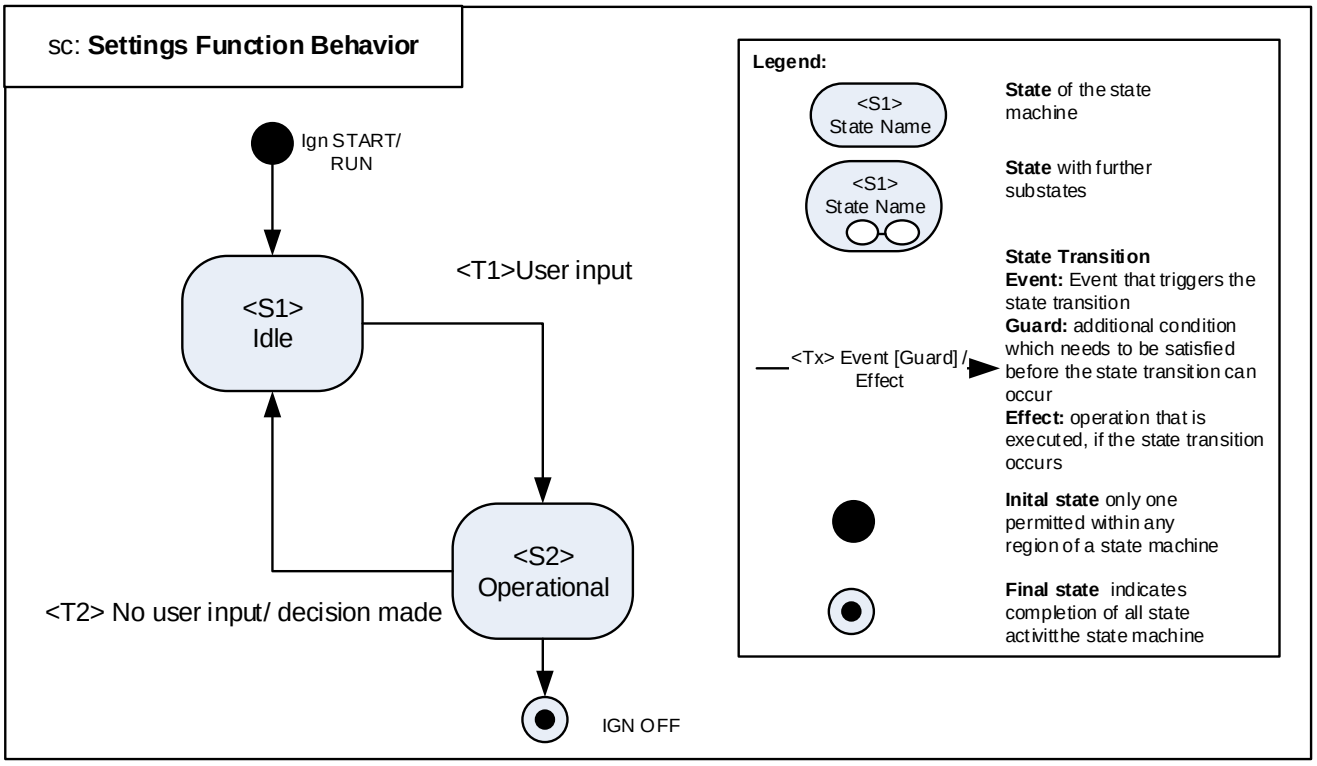

Figure 17: Settings function Operation States and modes

3.6.7.5 Function Requirements

3.6.7.5.1 Functional Requirements

3.6.7.5.1.1 Normal Operation

Displayed Options	Unit Change Warning Display when conditions match	Unit Change per request
Reminder ON	Yes	Yes
Reminder OFF	NO	NO
Auto Unit Change	NO	Yes

###R_ CSPR _125 ### Display option to turn Reminder ON

Settings shall display option to turn reminder on to display Unit Change warning each time unit mismatches with vehicle's location after USA border crossing

###R_ CSPR _126 ### Display option to automatic unit change

Settings shall display option to auto unit change to change the digital speedometer unit automatically without displaying the unit change warning each time digital speedometer unit mismatches with vehicle's location after USA border crossing event

###R_ CSPR _127 ### Display option to turn Reminder OFF

Settings shall display option to turn reminder off that neither displays Unit Change warning nor makes any change in digital speedometer unit when unit mismatches with vehicle's location after USA border crossing event occurs

###R_ CSPR _128 ### Unit Change warning display Reminder ON

Unit Change warning display reminder shall be turned on through Settings anytime

###R_ CSPR _129 ### Change Unit Automatically

Automatic digital speedometer Unit Change with no unit change warning display when unit mismatches with vehicle's location with border crossing event shall be requested through Settings anytime

###R_ CSPR _130 ### Unit Change warning display Reminder OFF

Unit Change warning display reminder shall be turned off through Settings anytime

3.6.7.5.1.2 Error Handling

###R_ CSPR _131 ### Warning display reminder ON request Error

If Unit Change warning reminder cannot be turned ON due to error in algorithm or error in signal transmission after making request choosing remind on option from settings display, then digital speedometer unit change warning shall not be displayed or unit shall not automatically change when condition matches

###R_ CSPR _132 ### Automatic Change Unit request Error

If Unit Change warning reminder cannot be turned OFF due to error in algorithm or error in signal transmission after making request choosing auto unit change option from settings display, then speedometer unit shall not automatically change when condition matches

###R_ CSPR _133 ### Warning Display reminder OFF request Error

If Unit Change warning cannot be disabled due to error in algorithm or error in signal transmission after making request choosing does not remind option from settings display, then digital speedometer unit change warning shall be displayed anytime the condition matches

3.6.7.5.2 Non-Functional Requirements

3.6.7.5.2.1 Performance

###R_ CSPR _134 ### Acceptance in action latency through unit change settings

No additional latency is allowed in operation when any option has chosen from unit change display settings

###R_ CSPR _135 ### Default unit change settings

The default condition for unit change display through settings will be “Reminder ON”

3.6.7.5.2.2 Safety

###R_ CSPR _136 ### Unit Change display Settings HMI Strategy

Unit Change warning display Settings shall be displayed following Cluster HMI strategy

3.6.7.5.2.3 Security

No additional security requirements for the intended implementation

3.6.7.5.2.4 Reliability

###R_ CSPR _137 ### Consistency in unit change settings display

After taking any user action through displayed unit change settings, settings shall not display or flash or appear periodically

###R_ CSPR _138 ### Transition to/from main menu

Transition to/from main menu from/to unit change settings shall be available

3.6.8 Unit Change

3.6.8.1 Function Description

Speedometer Unit Change function will assist driver to align with digital speedometer and set speed unit after crossing USA border. Whenever the function receives unit change request, it will convert the digital speedometer unit accordingly from English to Metric or Metric to English depending on vehicle’s updated location.

3.6.8.2 Function Scope

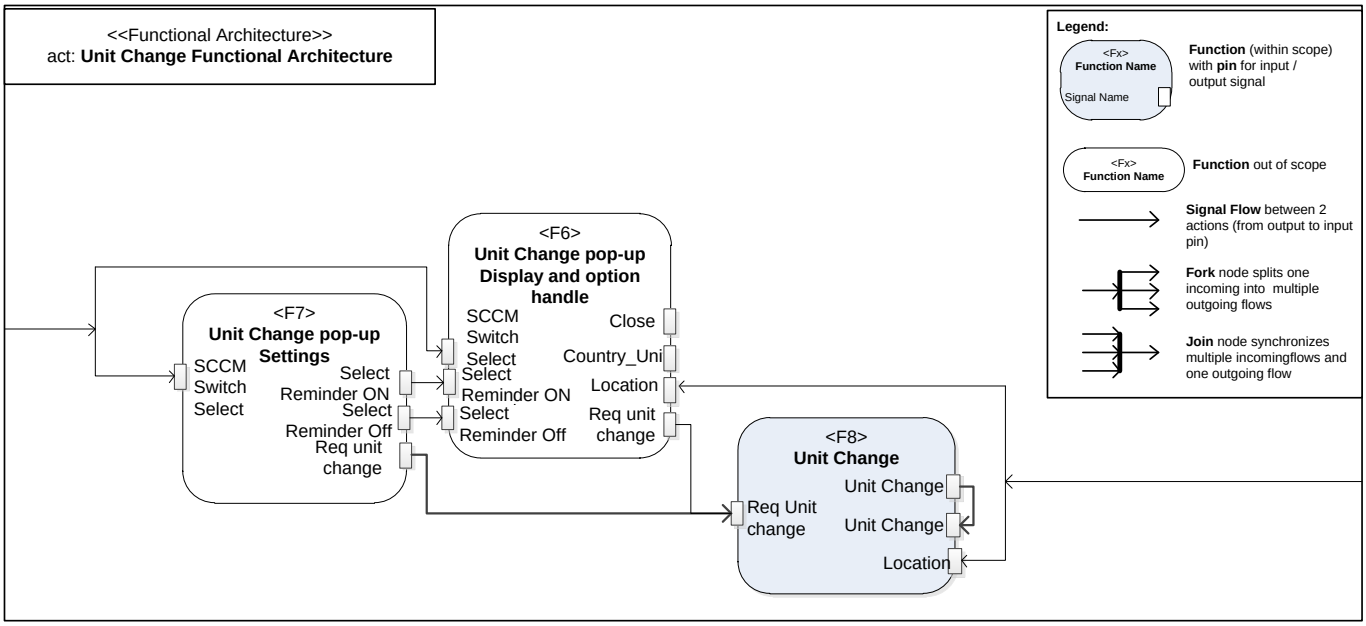

Figure 18: Unit Change functional architecture

3.6.8.3 Function Interfaces

3.6.8.3.1 Logical Inputs

Logical Signal Name	Signal Value	Description
Req_Unit_Change	0x0 No Action	Input from unit change warning to update once
	0x1 Metric	
	0x2 Imperial	
Location		Input from GPS Coordinate

Table 24: Unit Change function logical inputs [10]

3.6.8.4 Function Modeling

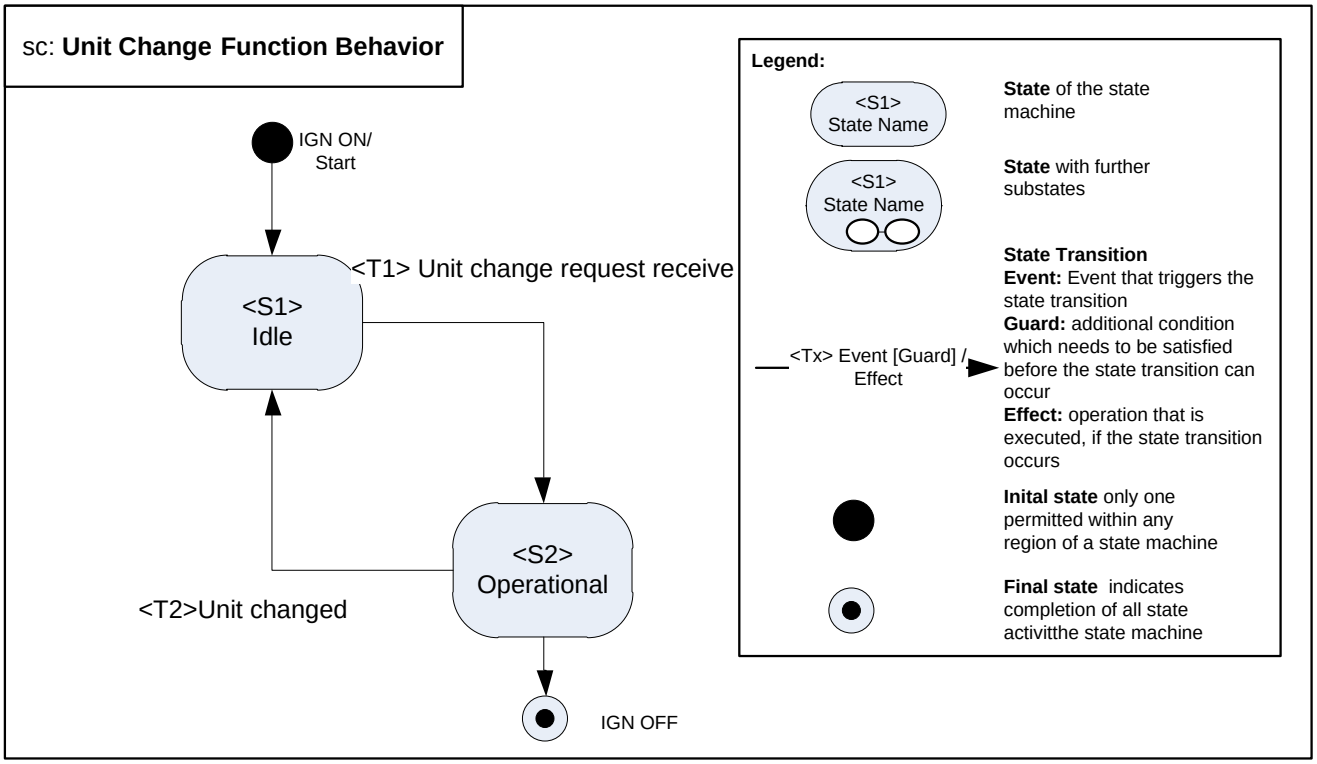

Figure 19: Unit Change Function Operation States and Modes

3.6.8.5 Function Requirements

3.6.8.5.1 Functional Requirements

3.6.8.5.1.1 Normal Operation

###R_ CSPR _139 ### Receive Unit Change Request

Request to change digital speedometer unit through displayed unit change warning or unit change settings shall be received to match units with vehicle's location

###R_ CSPR _140 ### Change Unit

Digital Speedometer, set speed and speed indicator Unit shall be changed from English to Metric or vice versa depending on vehicle's location when requested through digital speed unit change warning display handler

3.6.8.5.1.2 Error Handling

###R_ CSPR _141 ### Unit Change Request Reception Error

Digital Speedometer Unit shall not change and remain in same states after condition changes if unit change request not received due to CAN signal error

###R_ CSPR _142 ### Unit Change Request Processing Error

Digital Speedometer Unit shall not change and remain in same states if unit change request not processed due to error in algorithm

###R_ CSPR _143 ### Location update Error

Digital Speedometer Unit shall be changed aligning with vehicle location; error in updating location will lead to change units incorrectly

3.6.8.5.2 Non-Functional Requirements

3.6.8.5.2.1 Performance

###R_ CSPR _144 ### Acceptance in Unit Change latency

No additional latency is allowed to change digital speedometer unit after making request
Request includes both one time and automatic digital speedometer unit change

3.6.8.5.2.2 Safety

###R_ CSPR _145 ### Unit change Strategy

Unit change request shall proceed with following existing digital speedometer unit change strategy

3.6.8.5.2.3 Security

No additional security requirements for the intended implementation

3.6.8.5.2.4 Reliability

###R_ CSPR _146 ### Consistency in unit change

Digital Speedometer Unit shall always change aligning with vehicle's current location

3.6.9 Close Warning Display

3.6.9.1 Function Description

All the Considerate Prompts warnings, POI list warning and digital speedometer unit change warning will display with option to clear the warning display screen. Upon driver request through displayed option handler, the warning display can be closed. Once the warning display is closed no additional option can be taken or customer cannot revert back to previous warning screen.

3.6.9.2 Function Scope

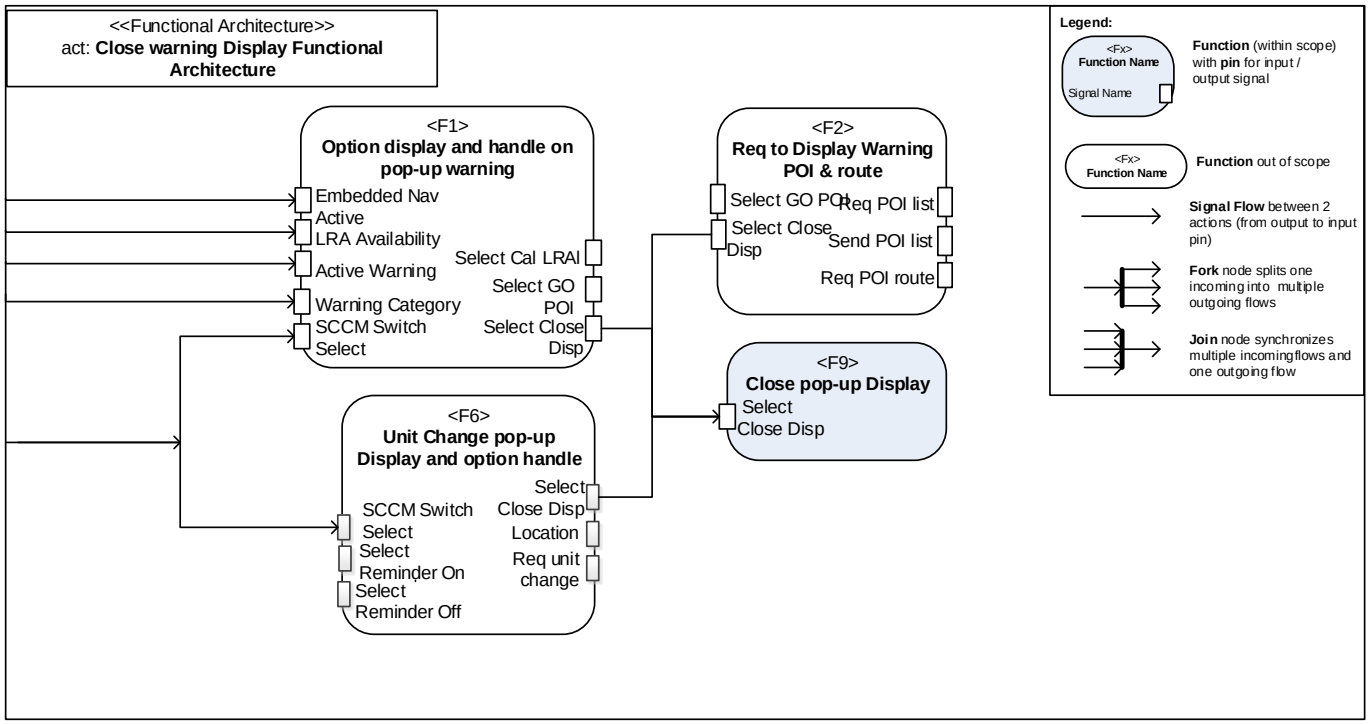

Figure 20: Close Warning Display functional architecture

3.6.9.3 Function Interfaces

3.6.9.3.1 Logical Inputs

Logical Signal Name	Signal Value	Description
Select_Close_Disp	0x0 No Action	Input to close the warning display
	0x1 Close	

Table 25: Close warning Display functional logical inputs

3.6.9.4 Function Modeling

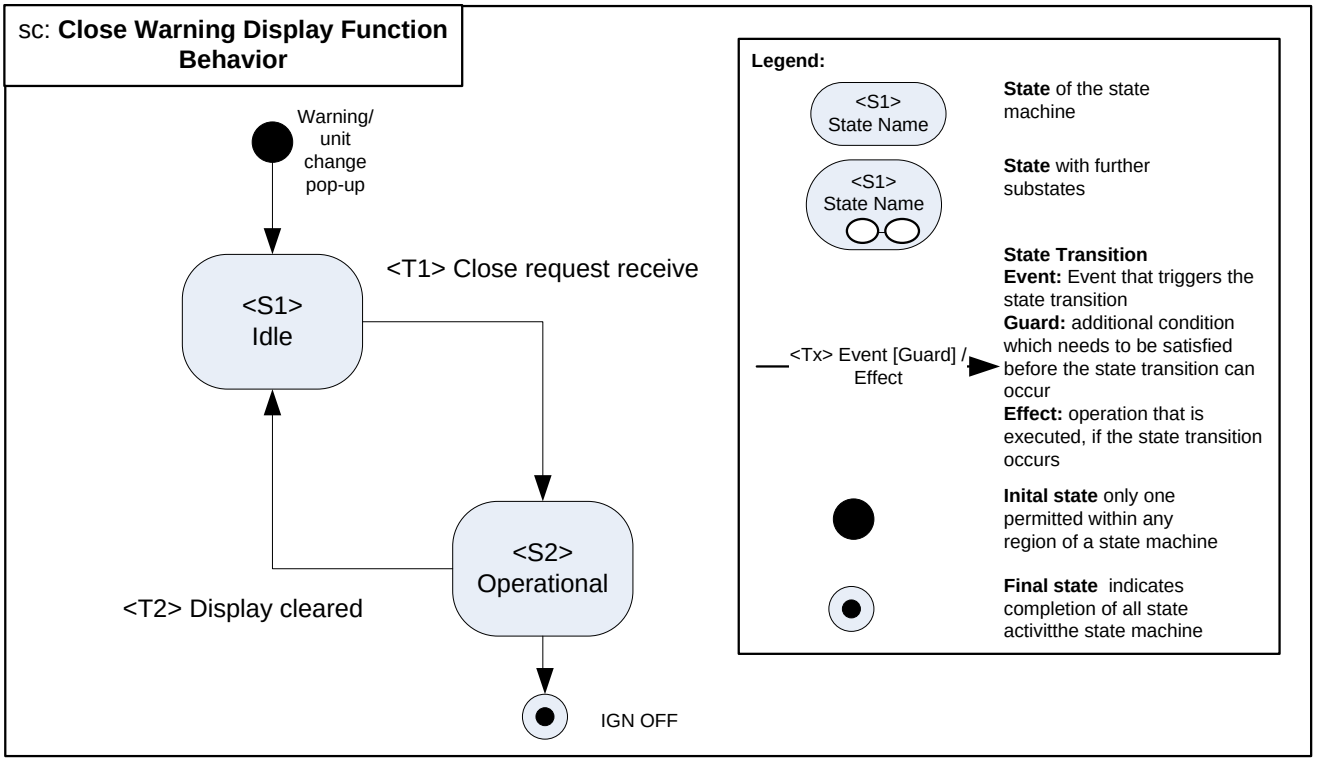

Figure 21: Close Warning Display Function Behavior

3.6.9.5 Function Requirements

3.6.9.5.1 Functional Requirements

3.6.9.5.1.1 Normal Operation

###R_ CSPR _147 ### Warning Display Closed by request

Any active warning display shall be cleared upon driver request through selecting warning close option

###R_ CSPR _148 ### Unit Change Warning Closed by request [5]

Unit Change ~~pop-up~~warning shall be cleared upon driver request through selecting warning close option

###R_ CSPR _149 ### POI Warning Closed by request

Warning dependent POI List display shall be cleared upon driver request through selecting POI warning close option

3.6.9.5.1.2 Error Handling

###R_ CSPR _150 ### Warning Display Clear Error

If active warning display does not get cleared due to error in algorithm after making any selection, then warning shall keep displaying following cluster strategy for warning display

###R_ CSPR _151 ### Unit Change Display Clear Error

If Unit Change warning display does not get cleared due to error in algorithm or error in signal transmission after making any request choosing option from warning display, then Unit Change warning shall keep displaying following cluster strategy for warning display

###R_ CSPR _152 ### POI Warning Close request Error

If POI warning does not get cleared due to error in algorithm after making display clear request, then POI List warning shall keep displaying following cluster strategy for warning display

3.6.9.5.2 Non-Functional Requirements

3.6.9.5.2.1 Performance

###R_ CSPR _153 ### Latency acceptance on clearing the warning

No additional latency is allowed to close the warning display when requested from warning display option handler

3.6.9.5.2.2 Safety

###R_ CSPR _154 ### Display close Strategy

Warning display shall be cleared following existing warning display close strategy

3.6.9.5.2.3 Security

No additional security requirements for the intended implementation

3.6.9.5.2.4 Reliability

###R_ CSPR _155 ### Transition to warning display

Transition to warning display shall not available after closing the warning

4 FEATURE IMPLEMENTATION (PHYSICAL DESIGN)

4.1 Feature Implementation Description

4.1.1 Overview

The following section applies to CGEA 1.3C Gen III and further architecture

4.1.2 Input Requirements

###R_ CSPR _156 ### Ignition Status

Feature shall become active when Ignition_Status = 0x4 (Run) or Ignition Status = (Start)
When Ignition_Status = 0x0 (Unknown), 0x1 (Off), 0x2 (Accessory) or 0xF (Invalid), feature will be unavailable

###R_ CSPR _157 ### Warning Status

Feature shall become active when Active_Warning~~_Status~~ = 0x1 (active)

###R_ CSPR _158 ### Embedded Nav Status

Feature functionalities shall depend on Embedded_Nav_Active = 0x1 (Active)

###R_ CSPR _159 ### Waypoint Status [5]

Feature shall receive WaypointsActive_St = 0x1 (Waypoints_Inactive), 0x2 (Waypoints_Active), 0x3 (Max_Waypoints_Active) as input to display Fuel ~~or EV Charging~~ warning and decide adding warning POI as waypoint

###R_ CSPR _160 ### Lincoln Roadside Available Status

Feature shall receive RoadsideAsstAvail_D_St~~at~~ = 0x1 (Available) to display Roadside Warning

###R_ CSPR _161 ### Vehicle Location and unit

Feature shall become active when vehicle's location and unit are either (Location = USA and Unit =Metric), (Location = Canada and Unit = English), or (Location = Mexico and Unit = English) after USA border crossing

###R_ CSPR _162 ### Switch toggle

Feature shall respond to SteWhlSwtchOk_B_Stat = 0x1, SteWhlSwtchUp_B_Stat = 0x1 and SteWhlSwtchDown_B_Stat = 0x1 as input when requested to select option displayed with active warning
SteWhlSwtchBack_B_Stat = 0x1 has no impact on feature

~~**###R_ CSPR _162 ###**~~

4.1.3 Assumptions & Constraints

Assumptions and Constraints are listed below: [5]

(A) Feature implementation depends on vehicle network architecture

(B) Feature implementation depends on vehicle cluster type and characteristics
(C) Feature shall be implemented on SYNC 3.3V2 and later versions
(D) Feature will be implemented on vision steering wheel and later versions
(E) Feature will receive warning category as an input to display it with options
(F) Lincoln Roadside Assistance number will be prepopulated in SYNC
(G) Navigation will be configured as ON in Cluster
(H) Cluster will check if any 3rd party navigation is active and display Fuel ~~and EV Charging~~ warnings as non Considerate Prompt Warning
(I) Cluster will check if cell phone is paired with vehicle and do not display Call option for Roadside warnings if phone is not paired
(J) Cluster will check if unit has a mismatch when receives Unit info after USA border crossing

4.2 Function Deployment

4.2.1 Feature Implementation Architecture

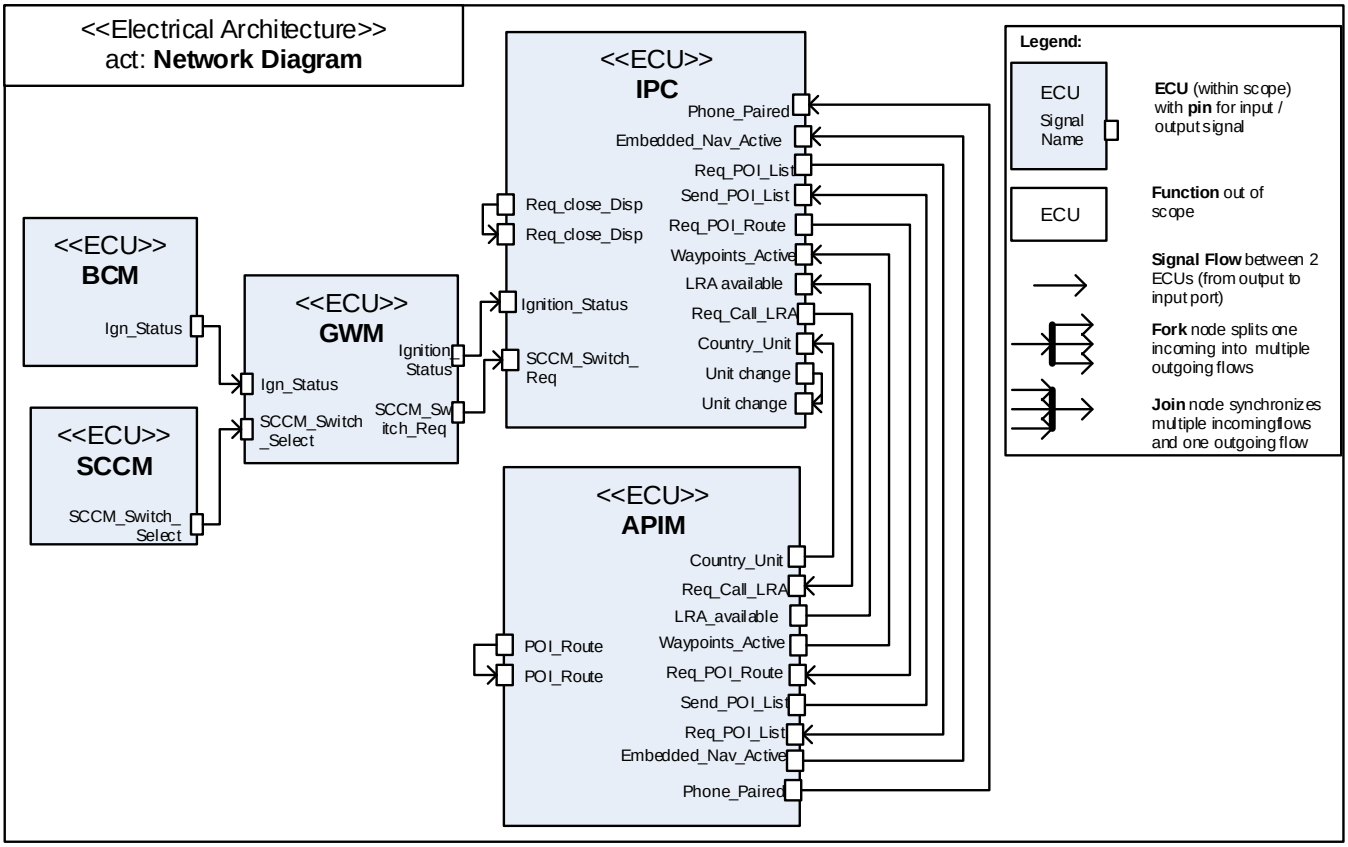

Figure 22: Feature Network Diagram [8]

4.2.1.1 Electrical Components

ECU	Description
BCM	Implement Publisher requirements
SCCM	Implement Publisher requirements
SDLC	Gateway for Signals to APIM and IPC
IPC	Implement Subscriber and Publisher requirements

APIM	Implement Subscriber and Publisher requirements

Table 26: Electrical Components

4.2.1.2 Network Communication

Name	Type	Description	Connected Nodes
HS1	High Speed	High Speed 1 CAN network	BCM, GWM
HS2	High Speed	High Speed 2 CAN network	SCCM, GWM
HS3	High Speed	High Speed 3 CAN network	IPC, APIM, GWM

Table 27: Network Connections

4.2.1.2.1 HS1 Message List

Message Name	CAN ID	Transmission Mode	Period	Signal Name	Transmitters	Receiver
BodyInfo_3	0x3B3	Event Periodic	500ms	Ignition_Status	BCM	GWM

Table 28: HS1 message list

4.2.1.2.2 HS2 Message List

Message Name	CAN ID	Transmission Mode	Period	Signal Name	Transmitters	Receiver
Steering_Wheel_Data2	0x81	Event Periodic	1000ms	SteWhlSwtchBack_B_Stat	SCCM	GWM
				SteWhlSwtchUp_B_Stat		
				SteWhlSwtchOk_B_Stat		
				SteWhlSwtchDown_B_Stat		

Table 29: HS2 message list

4.2.1.2.3 HS3/INFOCAN Message List [6]

Message Name	CAN ID	Transmission Mode	Period	Signal Name	Transmitters	Receiver
BodyInfo_HS3	0x3B2	Event Periodic	500ms	Ignition_Status	GWM	IPC
MC_Send_Signals_1	0x2A1	Event Periodic	100ms	ICI_BtnID_A	GWM	IPC
				ICI_BtnID_B		
				ICI_BtnID_C		
				ICI_BtnID_D		
				ICI_Coding_BtnID_A		
				ICI_Coding_BtnID_B		
				ICI_Coding_BtnID_C		
				ICI_Coding_BtnID_D		
LBClient1_Request_Signals	0x195	No		LBC1_ActiveListID	IPC	APIM

		Send Type		LBC1_ItemIndex LBC1_Opcode LBC1_NbrOfItems LBC1_SetListServ LBC1_StartItemInd		
CONMP_MC_WORD_Tx	0x2B7	NoMsgSend Type		CONMP_MC_WORD_Tx	APIM	IPC
Nav_Send_Signals_2	0x2EE	Event Periodic	1000ms	WaypointsActive_St EmbedNavActive_D_Stat LoclFuelEffUnit_D_Stat RoadsideAsstAvail_D_St	APIM	IPC
Mc_Request_Signals10	0x193			DealerCall_B_Rq	IPC	APIM
Phone_Paired	0x2D0	Event Periodic	1000ms	VRM_BTPhoneSts_St	APIM	IPC

Table 30: HS3/INFOCAN message list

4.2.1.3 Power Supply

###R_ CSPR _163 ### Power Mode

Feature shall follow the power mode strategy (Accessory, Delayed Accessory, Under/Over Voltage etc) of the host modules

~~4.2.1.3~~4.2.1.4 Function Allocation

Function ID	Function Name	Reference	Allocated to
1	Option display and handle on warning	Functional Boundary Diagram	IPC
2	Req to Display Warning POI & Route	Functional Boundary Diagram	IPC
3	POI req receive and Send POI list	Functional Boundary Diagram	APIM
4	POI Route req receive and Start Route	Functional Boundary Diagram	APIM
5	Call LRA req receive and make call	Functional Boundary Diagram	APIM
6	Unit Change Warning Display and option handler	Functional Boundary Diagram	IPC
7	Settings	Functional Boundary Diagram	IPC
8	Unit Change	Functional Boundary Diagram	IPC
9	Close Warning Display	Functional Boundary Diagram	IPC

Table 31: Function allocation to ECUs

~~4.2.1.4~~4.2.1.5 Signal / Parameter Mapping [6]

Logical Signal Name	Value	Type	Physical Signal Name	Value
Ign_Status		HS1 CAN	Ignition_Status	0x0 (Unknown)) 0x1 (off) 0x2 (Accessory) 0x4 (Run) 0x8 (Start) 0xF (Invalid)
Ignition_Status		INFOCAN	Ignition_Status	0x0 (Unknown)) 0x1 (off)

				0x2 (Accessory) 0x4 (Run) 0x8 (Start) 0xF (Invalid)
SCCM_Switch_Select	0x0 No Action	HS2 CAN		
	0x1 Select		SteWhlSwtchBack_B_Stat	0x0 (Not_Pressed)
			SteWhlSwtchUp_B_Stat	0x0 (Not_Pressed)
			SteWhlSwtchOk_B_Stat	0x1 (Pressed)
			SteWhlSwtchDown_B_Stat	0x0 (Not_Pressed)
SCCM_Switch_Req (Select_Close_disp, Select_GO_POI, Select_Call_LRA,Selet_Reminder_On, Selet_Reminder_Off, Req_Unit_Change)		INFOCAN	ICI_BtnID_A	
			ICI_BtnID_B	
			ICI_BtnID_C	
			ICI_BtnID_D	
			ICI_Coding_BtnID_A	
			ICI_Coding_BtnID_B	
			ICI_Coding_BtnID_C	
			ICI_Coding_BtnID_D	
Embedded_Nav_Active	0x0 Null	INFOCAN	Embed~~ded~~NavActive_D_Stat	
	0x1 Inactive ~~Active~~			
	0x2 Active ~~Inactive~~			
Req_POI_List	0x0 No Action	INFOCAN		
	0x1 Req POI		LBC1_ActiveListID LBC1_ItemIndex LBC1_Opcode LBC1_NbrOfItems LBC1_SetListServ LBC1_StartItemInd	
Send_POI_List	0x0 No Action	TP Msg		
	0x1 POI List		CONMP_MC_WORD_Tx LBP1_ItemInfo_Rsp	
Req_POI_Route	0x0 No Action	INFOCAN		
	0x1 Req Route		LBC1_ActiveListID LBC1_ItemIndex LBC1_Opcode LBC1_NbrOfItems LBC1_SetListServ LBC1_StartItemInd	
Waypoints_Active	0x0 Invalid	INFOCAN	WaypointsActive_St	
	0x1 Waypoints_Inactive			
	0x2 Waypoints_Active			
	0x3 Max_Waypoints_Active			
Phone_Paired	0x0 Not Paired	INFOCAN	VRM_BTPhoneSts_St	
	0x1 Paired			

LRA_Available	0x0 Null 0x1 Not Available 0x2 Available	INFOCAN	RoadsideAsstAvail_D_St	
Req_Call_LRA	0x0 No Action 0x1 Call LRA ~~USA~~	INFOCAN	DealerCall_B_Rq	
Country_Unit	0x0 Null 0x1 MilesPerGallon~~Imperial~~ 0x2 LitrePer100Kilometer~~MetricL100km~~ 0x3 KilometerPerLitre~~MetrickmL~~	INFOCAN	LoclFuelEffUnit_D_Stat	

Table 32: Logical and Physical Signal Mapping

4.3 Feature Implementation Modeling

4.3.1 Component Interaction Diagrams

4.3.1.1 Scenario: “System Startup / Shutdown”

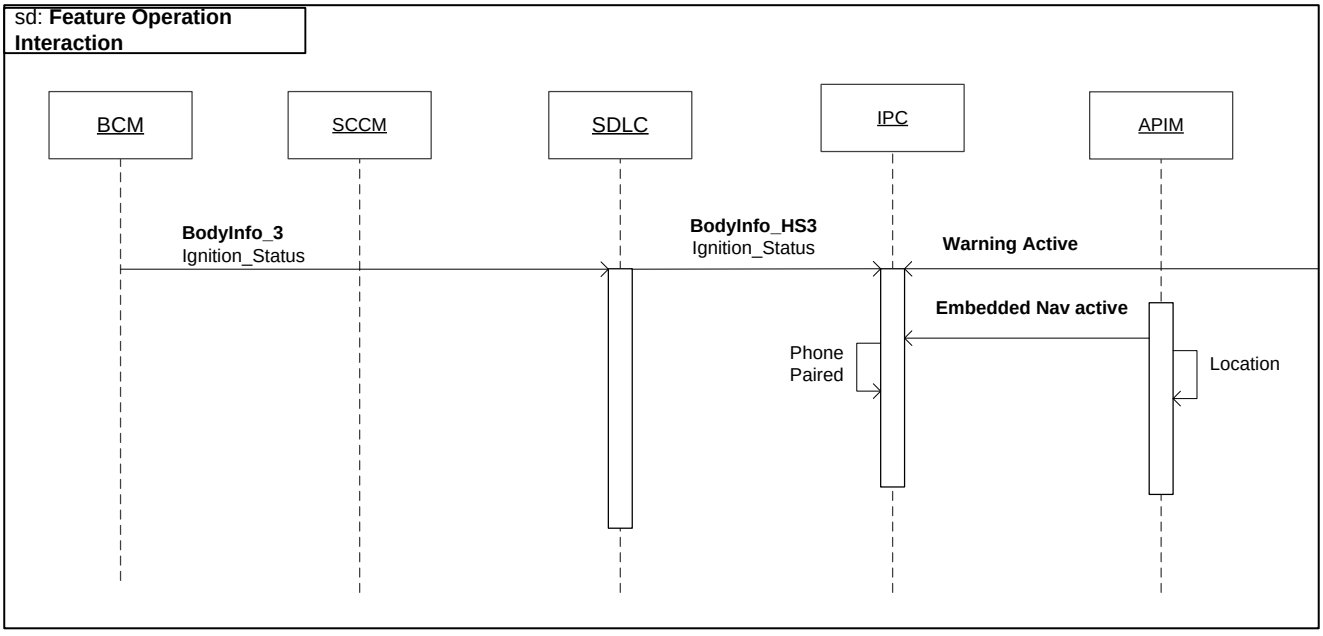

Figure 23: Startup sequence Diagram

4.3.1.2 Scenario: “Normal Operation” [6]

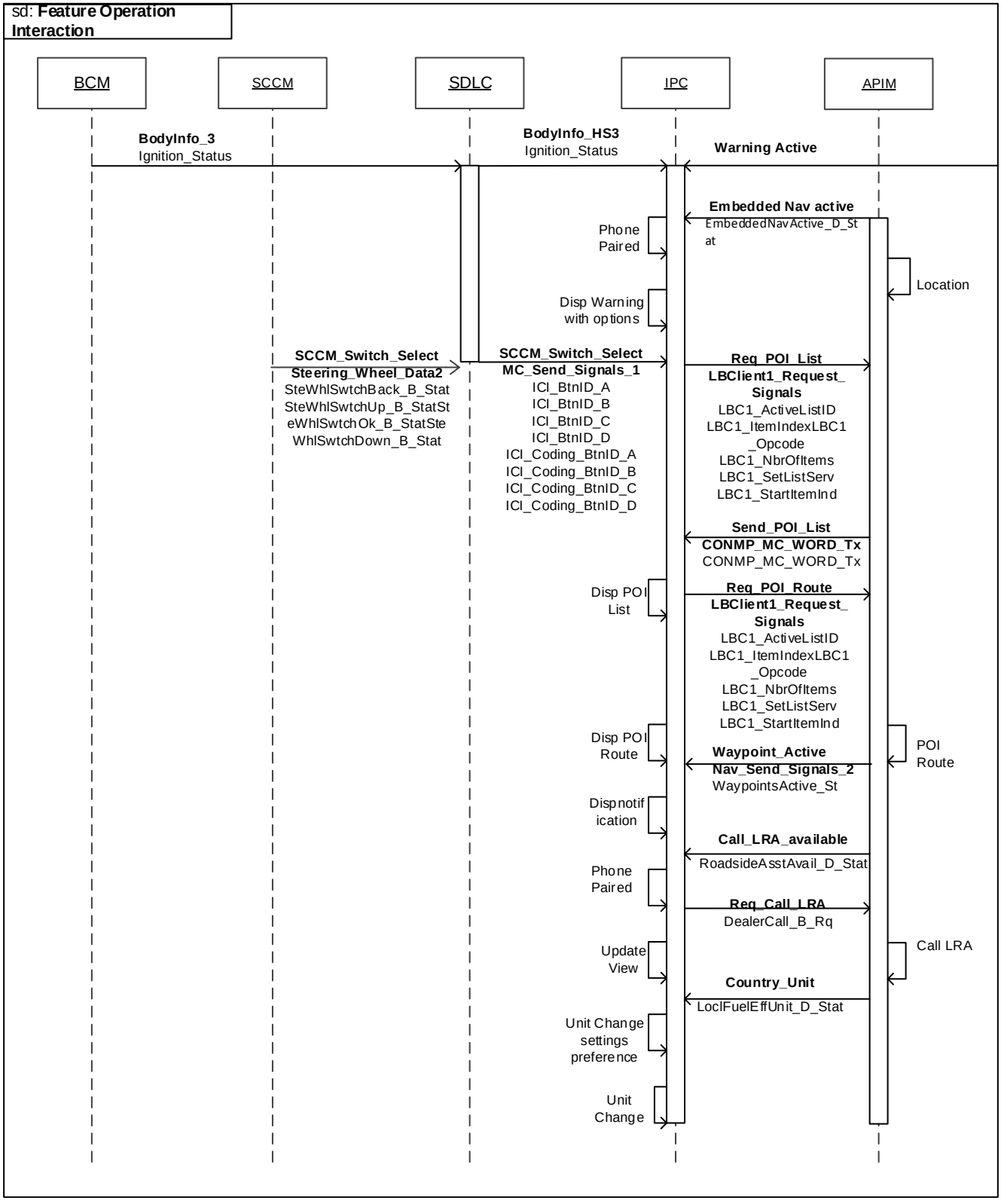

Figure 24: Feature Operation Sequence Diagram [6]

4.4 Feature Implementation Requirements

4.4.1 Requirements on ECUs

4.4.1.1 BCM

4.4.1.1.1 Interface Requirements

4.4.1.1.1.1 Publisher Signals

Signal ID	Signal Name	Description
0x3B3	Ignition_Status	Determine the current value of the Ignition state

Table 33: BCM Publisher Signals

4.4.1.1.1.2 Publisher Requirements

###R_ CSPR _164 ### BCM HS1-CAN Interface

BCM shall implement an interface via the HS1-CAN bus to be connected to the SDLC module. This interface would be used to publish signals to the SDLC.

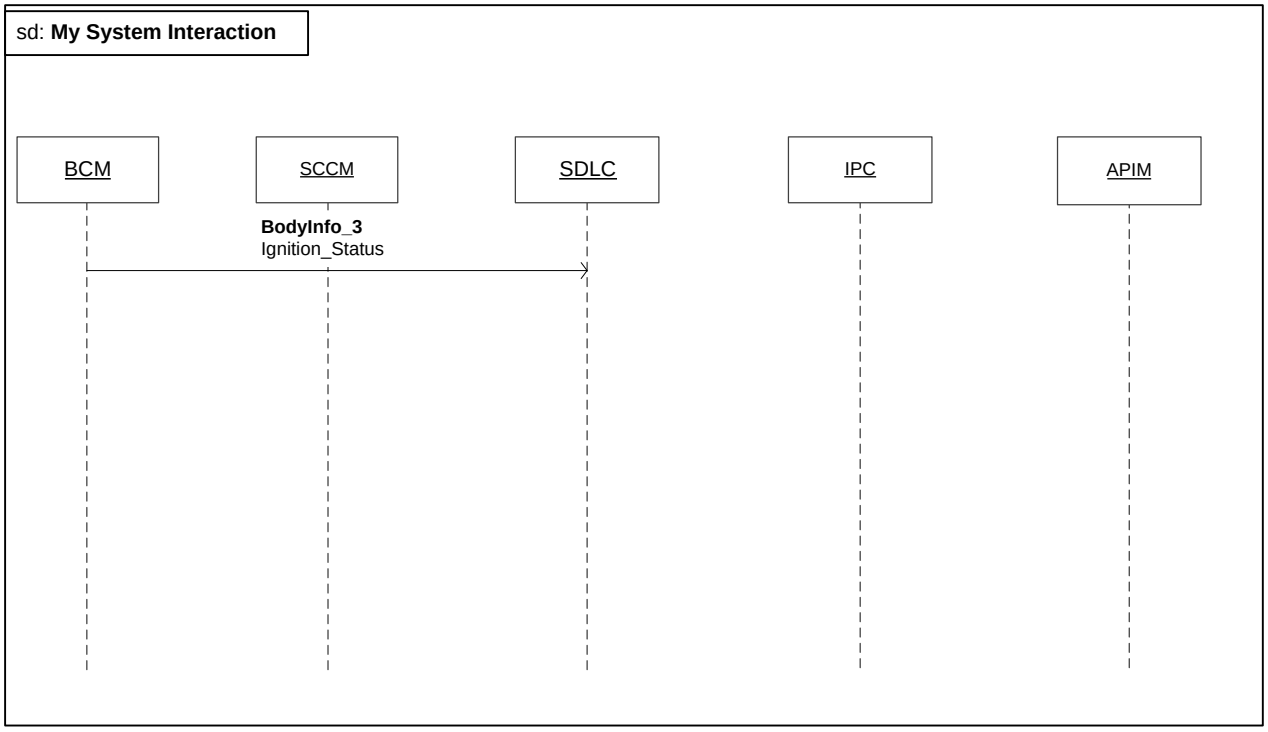

Figure 25: BCM Interface

4.4.1.2 SCCM

4.4.1.2.1 Interface Requirements

4.4.1.2.1.1 Publisher Signals [6]

Signal ID	Signal Name	Description
0x81	SteWhlSwtchBack_B_Stat	SCCM Switch requested to scroll back~~up~~
	SteWhlSwtchUp_B_Stat	SCCM Switch requested to scroll ~~ok~~Up
	SteWhlSwtchOk_B_Stat	SCCM Switch requested to scroll ~~back~~OK
	SteWhlSwtchDown_B_Stat	SCCM Switch requested to scroll down

Table 34: SCCM Publisher Signals

4.4.1.2.1.2 Publisher Requirements

###R_ CSPR _165 ### SCCM HS2-CAN Interface

SCCM shall implement an interface via the HS2-CAN bus to be connected to the SDLC module. This interface would be used to publish signals to the SDLC

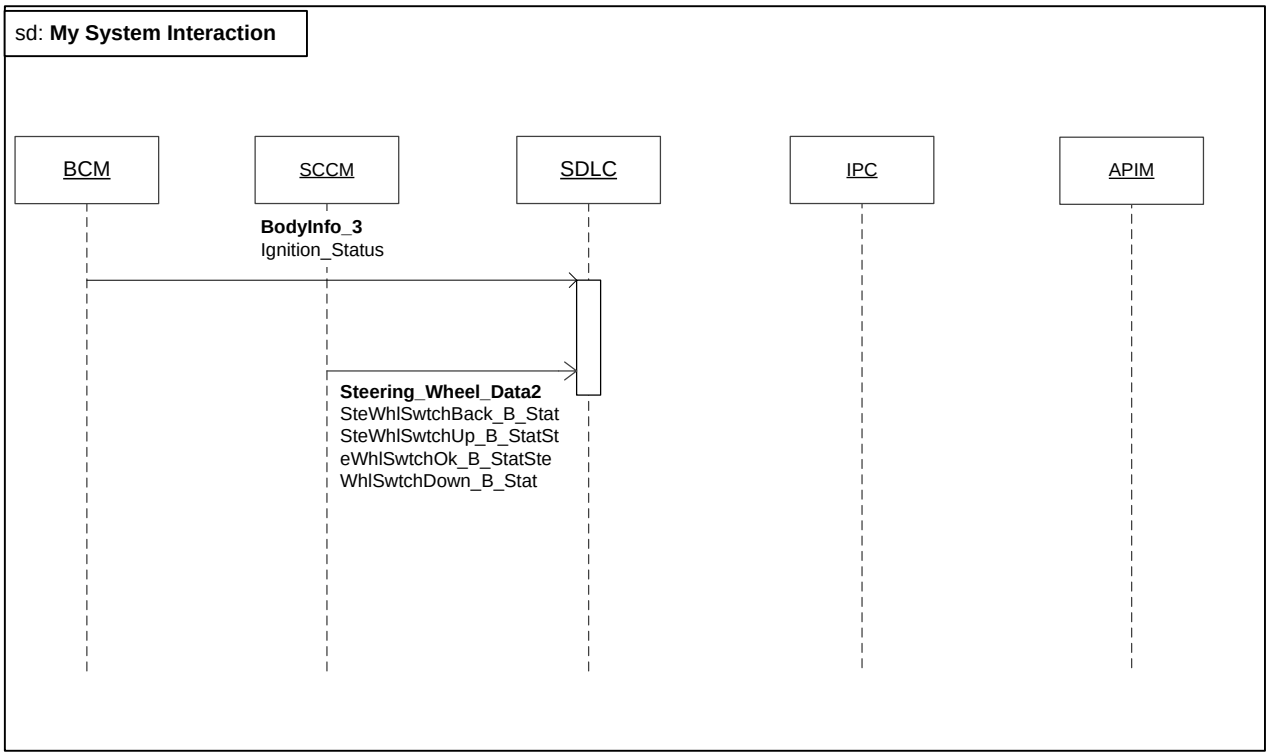

Figure 26: SCCM Interface

4.4.1.3 SDLC

4.4.1.3.1 Interface Requirements

4.4.1.3.1.1 Publisher Signals

Signal ID	Signal Name	Description
0x3B2	Ignition_Status	Determine Ignition Status
0x2A1	ICI_BtnID_A	SCCM Switch requested to displayed warning
	ICI_BtnID_B	
	ICI_BtnID_C	
	ICI_BtnID_D	
	ICI_Coding_BtnID_A	
	ICI_Coding_BtnID_B	
	ICI_Coding_BtnID_C	
	ICI_Coding_BtnID_D	

Table 35: SDLC Publisher Signal

4.4.1.3.1.2 Publisher Requirements

###R_ CSPR _166 ### SDLC HS3-CAN Interface

SDLC shall implement an interface via the HS3-CAN bus to be connected to the IPC module. This interface would be used to publish signals to the IPC

4.4.1.3.1.3 Subscribed Signals

Signal ID	Signal Name	Description
0x3B3	Ignition_Status	Determine the current value of the Ignition state
0x81	SteWhlSwtchBack_B_Stat	SCCM Switch requested to scroll back
	SteWhlSwtchUp_B_Stat	SCCM Switch requested to scroll up
	SteWhlSwtchOk_B_Stat	SCCM Switch requested to scroll OK
	SteWhlSwtchDown_B_Stat	SCCM Switch requested to scroll down

Table 36: SDLC Subscribed Signals

4.4.1.3.1.4 Subscriber Requirements

###R_ CSPR _167 ### SDLC HS1-CAN Interface

SDLC shall implement an interface via the HS1-CAN bus to subscribe signals from the BCM

###R_ CSPR _168 ### SDLC HS2-CAN Interface

SDLC shall implement an interface via the HS2-CAN bus to subscribe signals from the SCCM

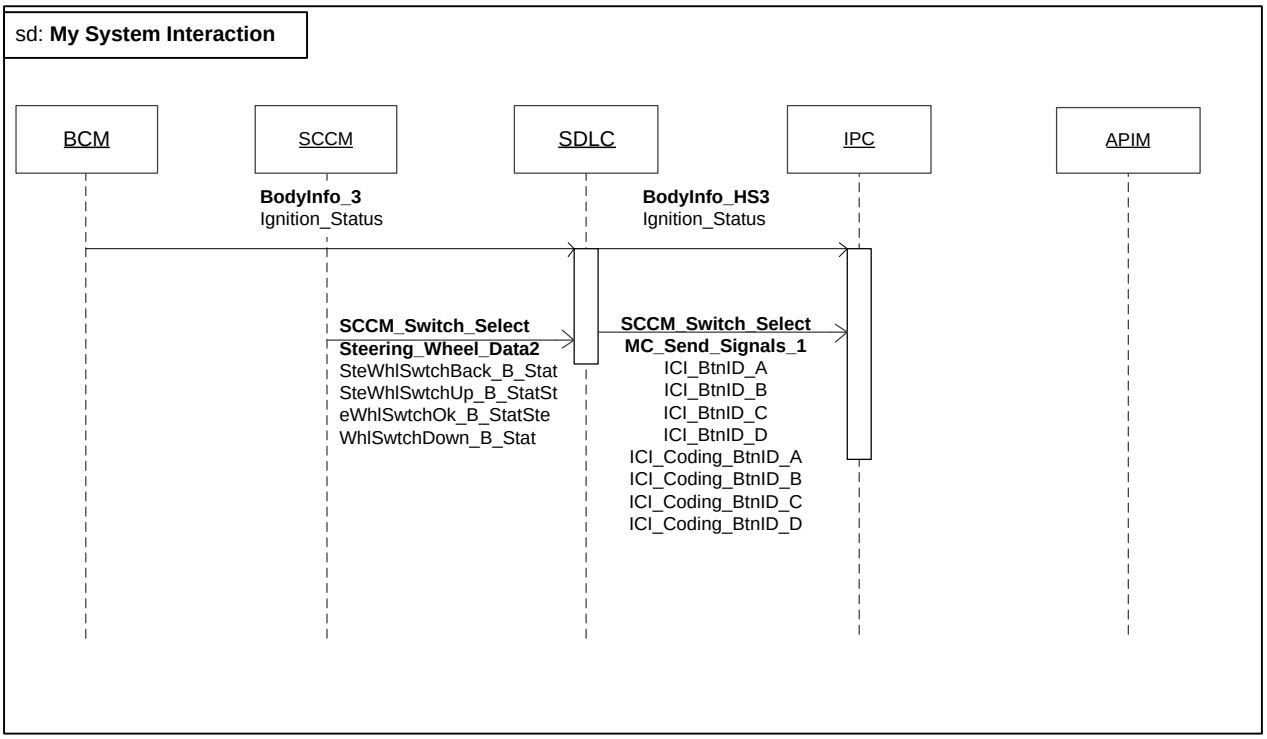

Figure 27: SDLC Interface

4.4.1.4 IPC

4.4.1.4.1 Interface Requirements

4.4.1.4.1.1 Publisher Signals [6]

Signal ID	Signal Name	Description
0x195	LBC1_ActiveListID	Request for warning dependent POI List and Route
	LBC1_ItemIndex	
	LBC1_Opcode	
	LBC1_NbrOfItems	
	LBC1_SetListServ	
	LBC1_StartItemInd	
0x193	DealerCall_B_Rq	Request to call LRA

Table 37: IPC Publisher Signals

4.4.1.4.1.2 Publisher Requirements

###R_ CSPR _169 ### IPC HS3-CAN Interface

IPC shall implement an interface via the HS3-CAN/INFOCAN bus to publish signals to the APIM

4.4.1.4.1.3 Subscribed Signals [6]

Signal ID	Signal Name	Description
0x3B2	Ignition_Status	Determine Ignition Status
0x2A1	ICI_BtnID_A	Receive SCCM Switch requested to warning display
	ICI_BtnID_B	
	ICI_BtnID_C	
	ICI_BtnID_D	
	ICI_Coding_BtnID_A	
	ICI_Coding_BtnID_B	
	ICI_Coding_BtnID_C	
	ICI_Coding_BtnID_D	
0x2EE	EmbedNavActive_D_Stat	Receive Embedded nav availability info
0x2B7	CONMP_MC_WORD_Tx	Receive warning POI List
0x76	LBP1_ItemInfo_Rsp	
0x2EE	WaypointsActive_St	Receive Waypoints active info
0x2EE	RoadsideAsstAvail_D_Stat	Receive Call LRA availability info
0x2EE	LoclFuelEffUnit_D_Stat	Receive unit info for Vehicle's current location
0x2D0	VRM_BTPhoneSts_St	Receives phone pair info

Table 38: IPC Subscribed Signals

4.4.1.4.1.4 Subscriber Requirements

###R_ CSPR _170 ### IPC HS3-CAN Interface

IPC shall implement an interface via the HS3-CAN bus to subscribe signal from the SDLC and APIM

4.4.1.4.2 Functional / Non-Functional Requirements

4.4.1.4.2.1 Option Display and handle on Categorized Warning

4.4.1.4.2.1.1 Inherited Function Level Requirements [5]

Requirement ID	Requirement Title
R_ CSPR _037	Display Warning Close option
R_ CSPR _038	Fuel Warning Display with GO option
	~~EV Charging Warning Display with GO option~~
R_ CSPR _039	Roadside Warning display with CALL option
R_ CSPR _040	Request to Close warning display
R_ CSPR _041	Request to Go Fuel Station
	~~Request to Go EV Charging Station~~
R_ CSPR _042	Request to CALL LRA
R_ CSPR _043	Option display when function is in sleep mode with IGN START/RUN
R_ CSPR _044	Warning Category Reception Error
R_ CSPR _045	Incorrect Warning Category Received
R_ CSPR _046	Warning and Option Language mismatch
R_ CSPR _047	Display Warning with Embedded navigation unavailable
R_ CSPR _048	Display Warning with max waypoints active
	~~Display Location based EV Charging Warning~~
R_ CSPR _049	Display Location based Roadside Warning
R_ CSPR _050	Display Warning when cell phone not paired

R_ CSPR _051	Display Warning in Drive Mode
R_ CSPR _052	Display Warning when Drive Mode goes away
R_ CSPR _053	Options display text
R_ CSPR _054	Warning option highlight
R_ CSPR _055	Display Clear HMI
R_ CSPR _056	Consistency in displaying Warning option
R_ CSPR _057	Warning and options display language

Table 39: IPC Inherited Option Display and handle on Categorized Warning Function

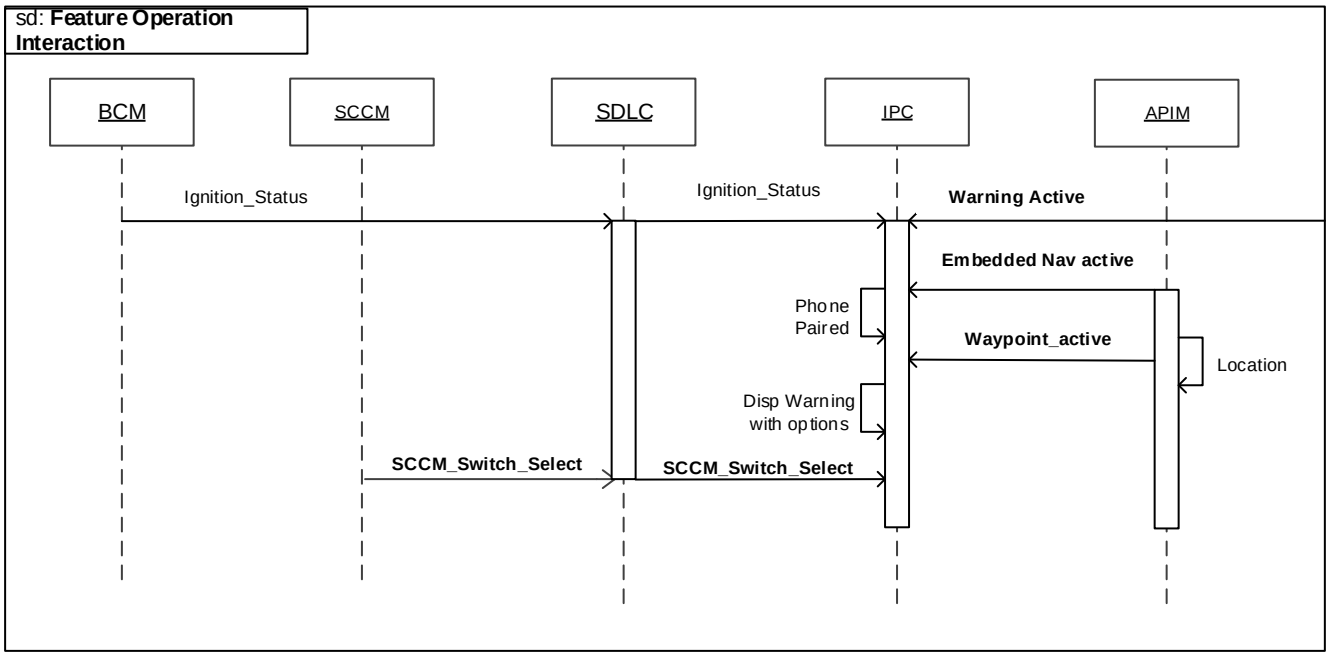

Figure 28: Option Display and handle on Categorized Warning Functional sequence diagram

4.4.1.4.2.2 Request to Display Warning POI & Route

4.4.1.4.2.2.1 Inherited Function Level Requirements [5]

Requirement ID	Requirement Title
R_ CSPR _058	POI Request
R_ CSPR _059	Receive POI List
R_ CSPR _060	POI List Display
R_ CSPR _061	POI List Display with Close option
R_ CSPR _062	POI List Display Close
R_ CSPR _063	POI Route Request
R_ CSPR _064	POI Route Display
R_ CSPR _065	POI List Request Error
R_ CSPR _066	POI List Reception Error
R_ CSPR _067	POI Route Request Error
R_ CSPR _068	POI List and Route Request frequency
R_ CSPR _069	Transition from POI List display to Warning display
R_ CSPR _070	Display POI List Warning with max waypoints active
R_ CSPR _071	POI item highlight
R_ CSPR _072	POI display HMI
R_ CSPR _073	POI display HMI with multiple active warning

R_ CSPR _074	Follow List Browser Protocol
R_ CSPR _075	Follow Transport Protocol

Table 40: IPC Inherited Request to Display Warning POI & Route Function

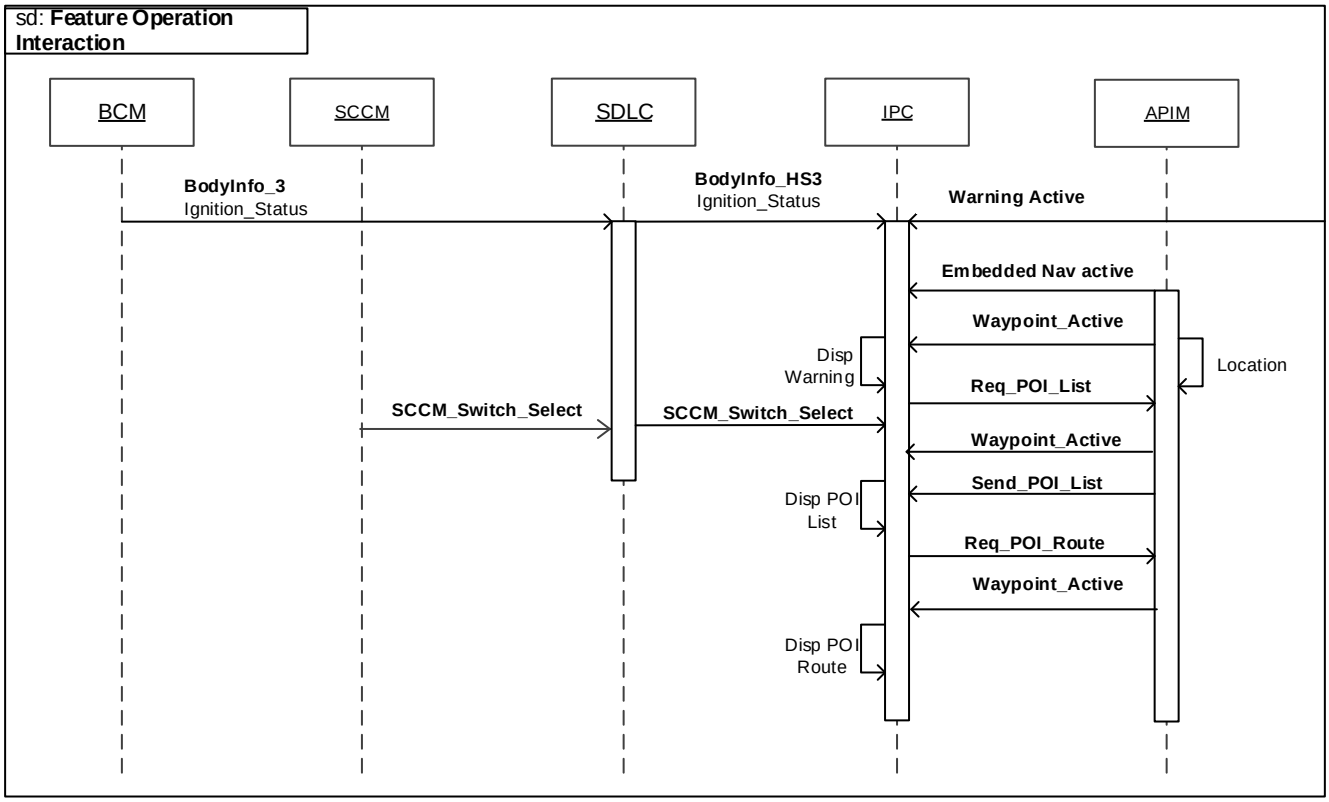

Figure 29: Request to Display Warning POI & Route Functional sequence diagram [6]

4.4.1.4.2.3 Unit Change warning Display and option handle

4.4.1.4.2.3.1 Inherited Function Level Requirements

Requirement ID	Requirement Title
R_ CSPR _108	Unit Change Warning Activation
R_ CSPR _109	Display Unit Change warning
R_ CSPR _110	Unit Change warning display when condition revert
R_ CSPR _111	Display unit change warning close option
R_ CSPR _112	Warning Display with Unit Change option
R_ CSPR _113	Request to close Unit Change display
R_ CSPR _114	Request to Change Unit (English to Metric)
R_ CSPR _115	Request to Change Unit (Metric to English)
R_ CSPR _116	Unit change warning display clear
R_ CSPR _117	Unit Change display when function is in sleep mode with IGN START/RUN
R_ CSPR _118	Location updated Error
R_ CSPR _119	Unit Change Warning Display for North America
R_ CSPR _120	Acceptance in Unit Change warning display latency
R_ CSPR _121	Acceptance in action latency through unit change warning option handler
R_ CSPR _122	Unit Change warning display Strategy
R_ CSPR _123	Consistency in displaying unit change warning
R_ CSPR _124	Consistency in clearing unit change warning display

Table 41: IPC Inherited Unit Change warning Display and option handle Function

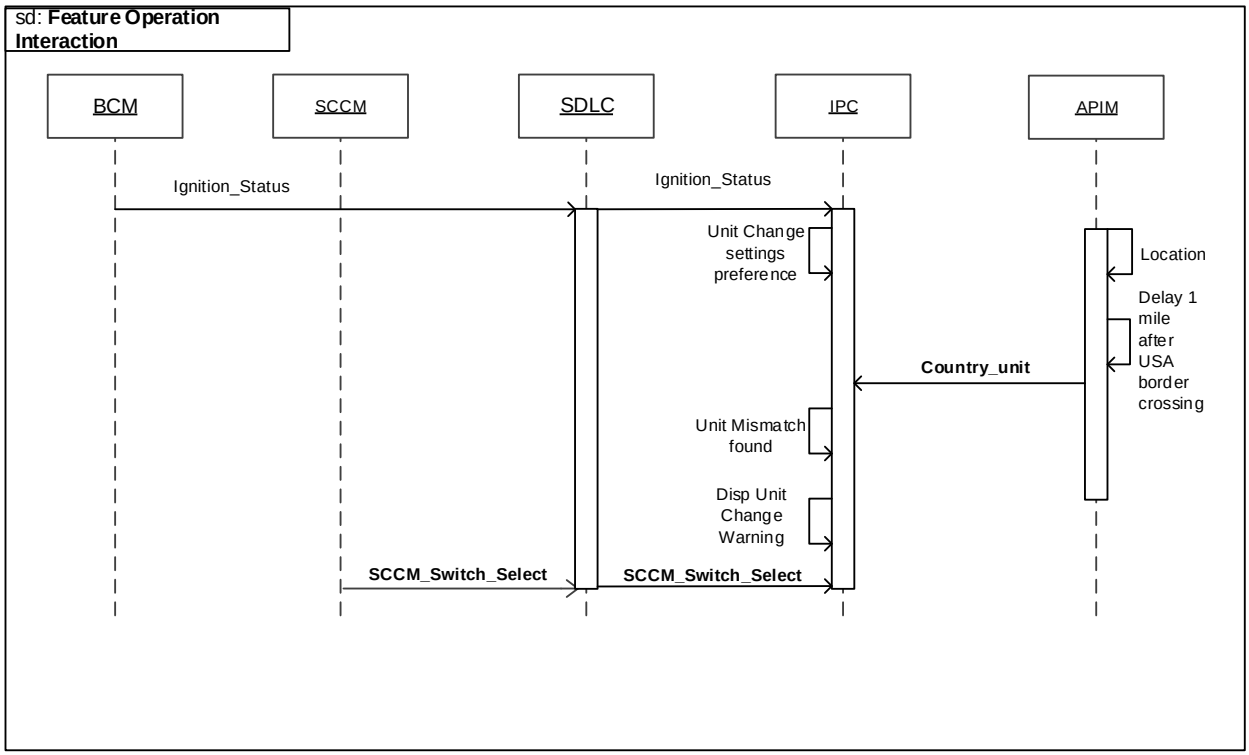

Figure 30: Unit Change warning Display and option handle Functional sequence diagram

4.4.1.4.2.4 Settings

4.4.1.4.2.4.1 Inherited Function Level Requirements

Requirement ID	Requirement Title
R_ CSPR _125	Display option to turn Reminder ON
R_ CSPR _126	Display option to automatic unit change
R_ CSPR _127	Display option to turn Reminder OFF
R_ CSPR _128	Unit Change warning display Reminder ON
R_ CSPR _129	Change unit automatically
R_ CSPR _130	Unit Change warning display Reminder OFF
R_ CSPR _131	Warning display reminder ON request Error
R_ CSPR _132	Automatic unit change request Error
R_ CSPR _133	Warning Display reminder OFF request Error
R_ CSPR _134	Acceptance in action latency through unit change settings
R_ CSPR _135	Default unit change settings
R_ CSPR _136	Unit Change display Settings HMI Strategy
R_ CSPR _137	Consistency in unit change settings display
R_ CSPR _138	Transition to/from main menu

Table 42: IPC Inherited Unit Change warning Function

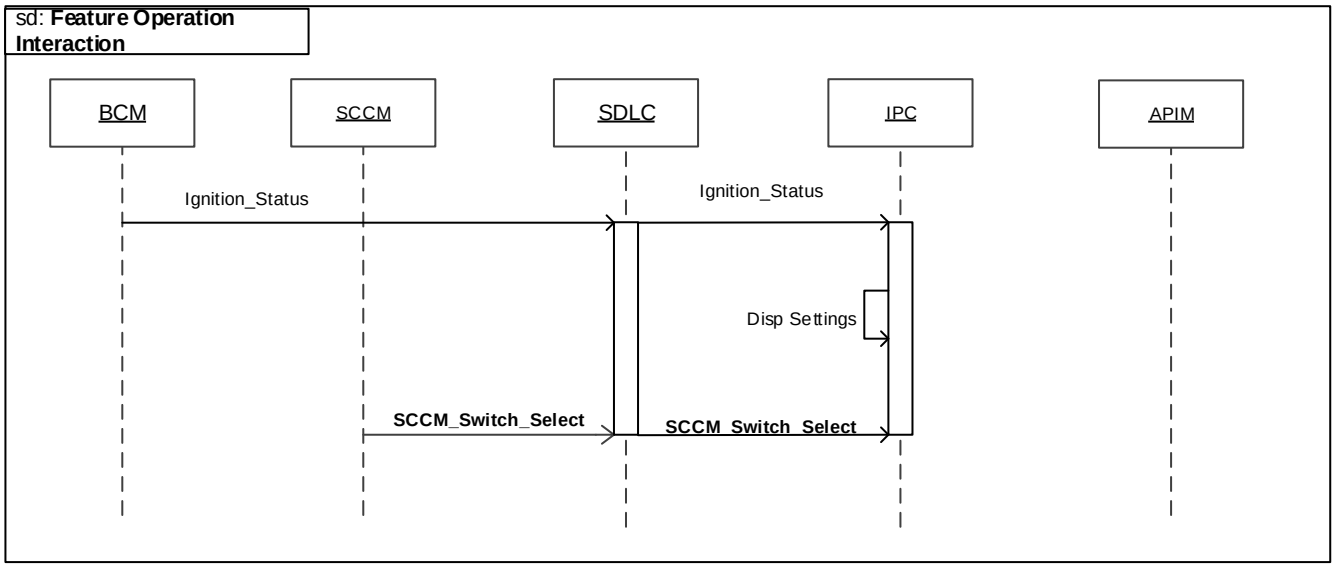

Figure 31: Settings Functional sequence diagram

4.4.1.4.2.5 Unit Change

4.4.1.4.2.5.1 Inherited Function Level Requirements

Requirement ID	Requirement Title
R_ CSPR _125	Receive Unit Change Request
R_ CSPR _126	Change Unit
R_ CSPR _127	Unit Change Request Reception Error
R_ CSPR _128	Unit Change Request Processing Error
R_ CSPR _129	Location update Error
R_ CSPR _130	Acceptance in Unit Change latency
R_ CSPR _131	Unit change Strategy
R_ CSPR _132	Consistency in unit change

Table 43: IPC Inherited Unit Change Function

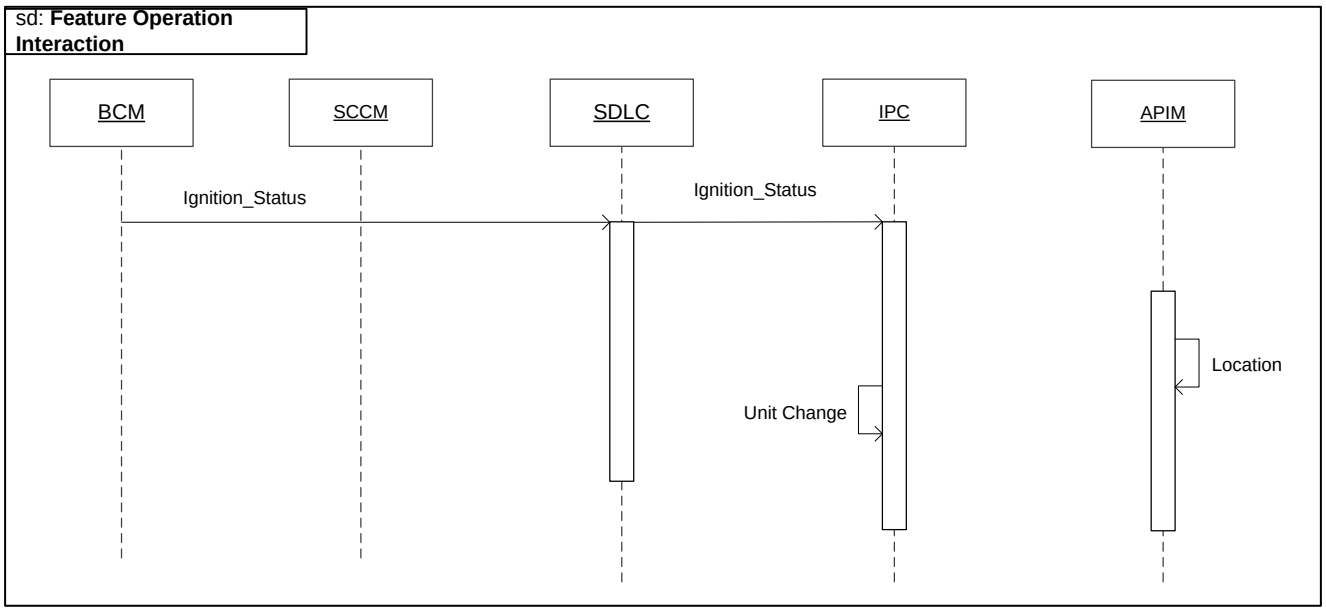

Figure 32: Unit Change Functional sequence diagram

4.4.1.4.2.6 Close Warning Display

4.4.1.4.2.6.1 Inherited Function Level Requirements

Requirement ID	Requirement Title
R_ CSPR _147	Warning Display Closed by request
R_ CSPR _148	Unit Change Warning Closed by request
R_ CSPR _149	POI Warning Closed by request
R_ CSPR _150	Warning Display Clear Error
R_ CSPR _151	Unit Change Display Clear Error
R_ CSPR _152	POI Warning Close request Error
R_ CSPR _153	Latency acceptance on clearing the warning
R_ CSPR _154	Display close Strategy
R_ CSPR _155	Transition to warning display

Table 44: IPC Inherited Close Warning Display Function

4.4.1.4.2.6.2 Inherited Function Level Interface Diagram

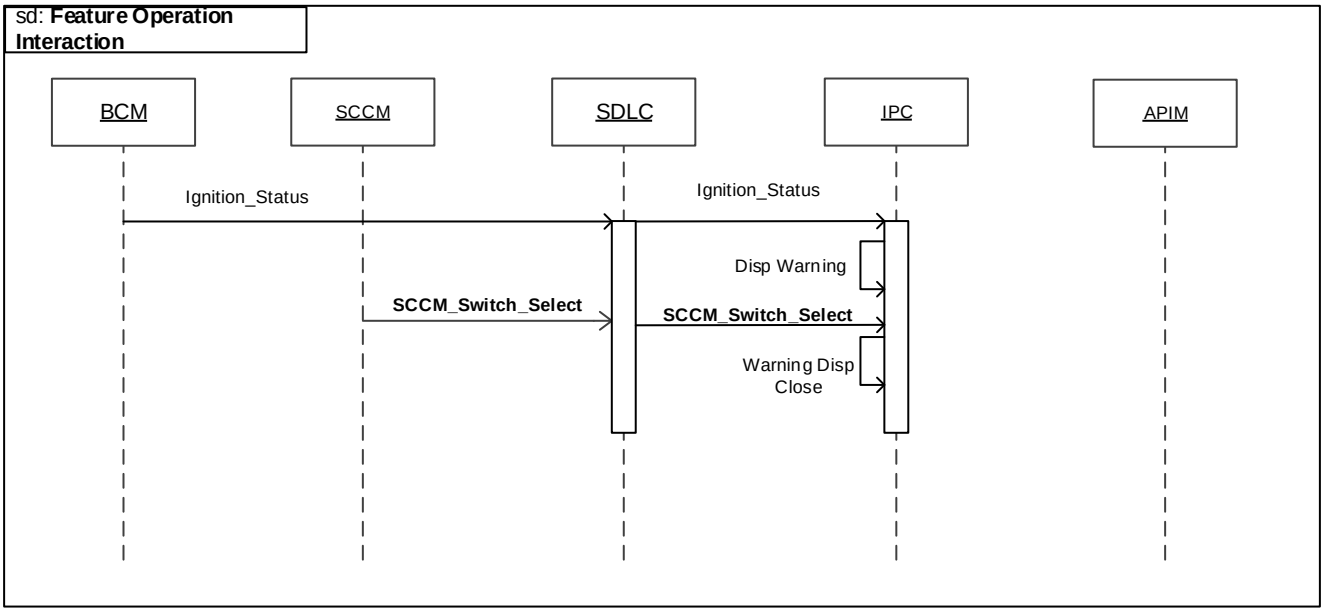

Figure 33: Close Warning Display Functional sequence diagram

4.4.1.5 APIM

4.4.1.5.1 Interface Requirements

4.4.1.5.1.1 Publisher Signals [6]

Signal ID	Signal Name	Description
0x2B7	CONMP_MC_Word_Tx LBP1_ItemInfo_Rsp	Respond to POI list and Route request
0x2EE	EmbedNavActive_D_Stat	Transmit Embedded Nav Active info
0x2EE	WaypointsActive_St	Transmit Waypoint active info

0x2EE	RoadsideAsstAvail_D_Stat	Transmit info of LRA availability
0x2EE	LoclFuelEffUnit_D_Stat	Transmit unit info for Vehicle's current location
0x2D0	VRM_BTPhoneSts_St	Transmit phone pairing info

Table 45: APIM Publisher Signals

4.4.1.5.1.2 Publisher Requirements

###R_ CSPR _171 ### APIM HS3-CAN Interface

APIM shall implement an interface via the HS3-CAN/INFOCAN bus to publish signals to the IPC

4.4.1.5.1.3 Subscribed Signals [6]

Signal ID	Signal Name	Description
0x195	LBC1_ActiveListID	Receive request for warning dependent POI List and Route
	LBC1_ItemIndex	
	LBC1_Opcode	
	LBC1_NbrOfItems	
	LBC1_SetListServ	
	LBC1_StartItemInd	
0x193	DealerCall_B_Rq	Receive Call LRA Request

Table 46: APIM Subscribed Signals

4.4.1.5.1.4 Subscriber Requirements

###R_ CSPR _172 ### APIM HS3-CAN Interface

APIM shall implement an interface via the HS3-CAN bus to subscribe signals from the SDLC and IPC

4.4.1.5.2 Functional / Non-Functional Requirements

4.4.1.5.2.1 POI Request Receive and List Send

4.4.1.5.2.1.1 Inherited Function Level Requirements

Requirement ID	Requirement Title
R_ CSPR _076	Receive POI List Request
R_ CSPR _077	Response to POI List Request
R_ CSPR _078	POI List Request Reception Error
R_ CSPR _079	Latency acceptance on POI List Response
R_ CSPR _080	POI List generation
R_ CSPR _081	Response Strategy for number of POI items
R_ CSPR _082	Response POI List Request Strategy
R_ CSPR _083	No POI found display
R_ CSPR _084	POI list loading Error

Table 47: APIM Inherited POI Req receive and List send Function

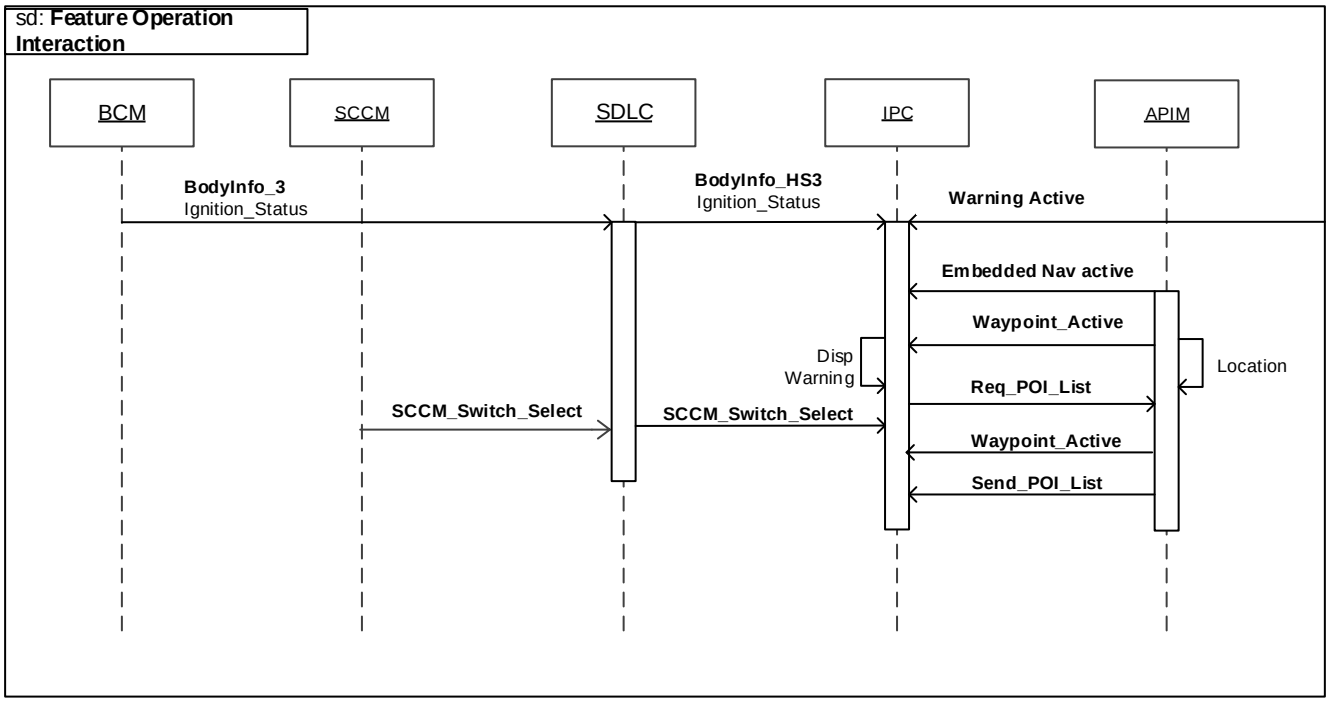

Figure 34: POI Req receive and List send Functional sequence diagram [6]

4.4.1.5.2.2 POI Route request receive and display

4.4.1.5.2.2.1 Inherited Function Level Requirements

Requirement ID	Requirement Title
R_ CSPR _085	Receive POI Route Request
R_ CSPR _086	Response to POI Route Request
R_ CSPR _087	Add POI while navigating to destination
R_ CSPR _088	Add POI while navigating to destination with <max no of waypoints
R_ CSPR _089	Add POI while navigating with max no of POI
R_ CSPR _090	POI Route Request Reception Error
R_ CSPR _091	Latency acceptance on POI Route Response
R_ CSPR _092	POI Route loading error
R_ CSPR _093	No of Max waypoints
R_ CSPR _094	POI route request with Max waypoints

Table 48: APIM Inherited POI Route request receive and display Function

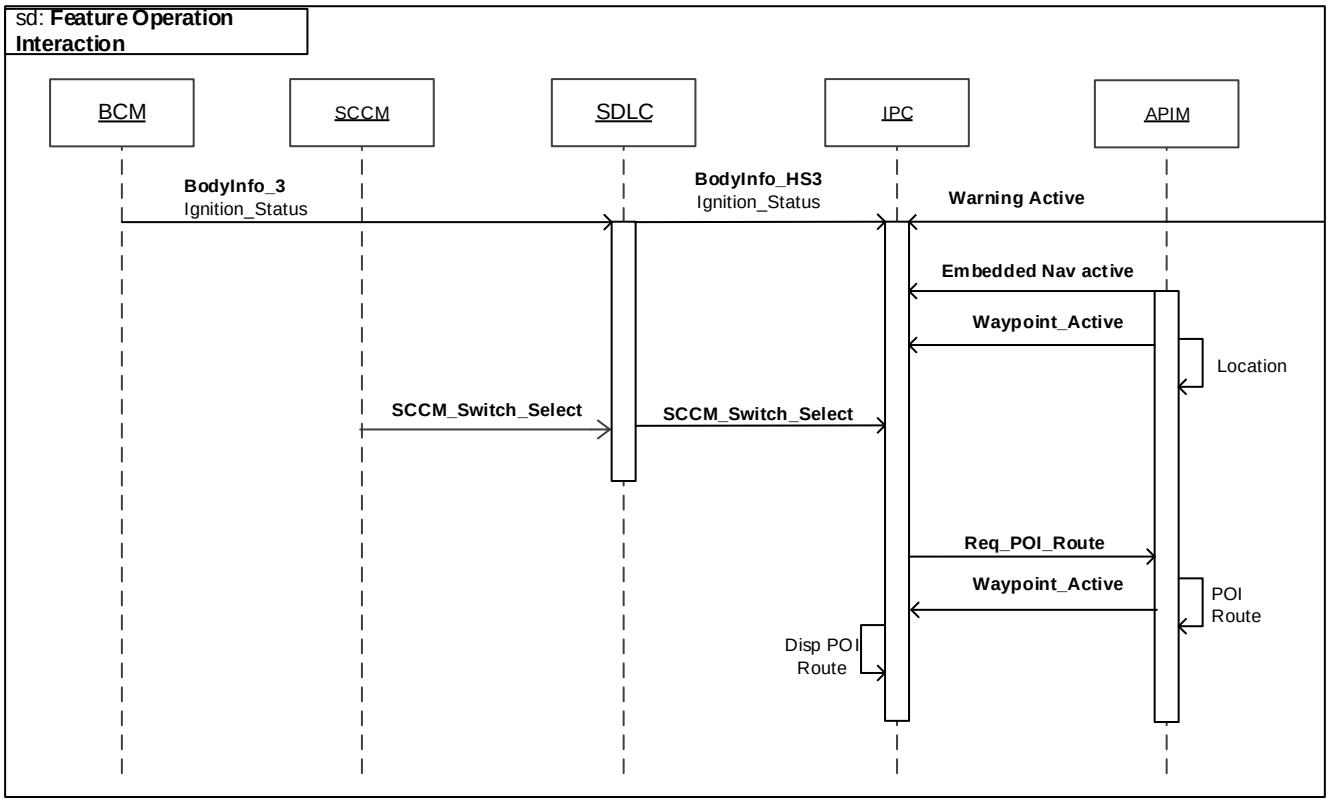

Figure 35: POI Route request receive and display Functional sequence diagram [6]

4.4.1.5.2.3 Call LRA request receive and make call

4.4.1.5.2.3.1 Inherited Function Level Requirements

Requirement ID	Requirement Title
R_ CSPR _095	Receive Call LRA request
R_ CSPR _096	Call LRA USA
R_ CSPR _097	Call LRA Canada
R_ CSPR _098	Call LRA pairing phone
R_ CSPR _099	Call Request Reception Error
R_ CSPR _100	Call Request frequency
R_ CSPR _101	Call LRA while Location updated Error
R_ CSPR _102	Call LRA for North America
R_ CSPR _103	Latency acceptance on Response to Call Request
R_ CSPR _104	Make Call Strategy
R_ CSPR _105	Call LRA when another call is ongoing
R_ CSPR _106	Call LRA unavailable notification
~~R_ CSPR _106~~	~~Call LRA unsuccessful notification~~

Table 49: APIM Inherited Call LRA request receive and make call Function [9]

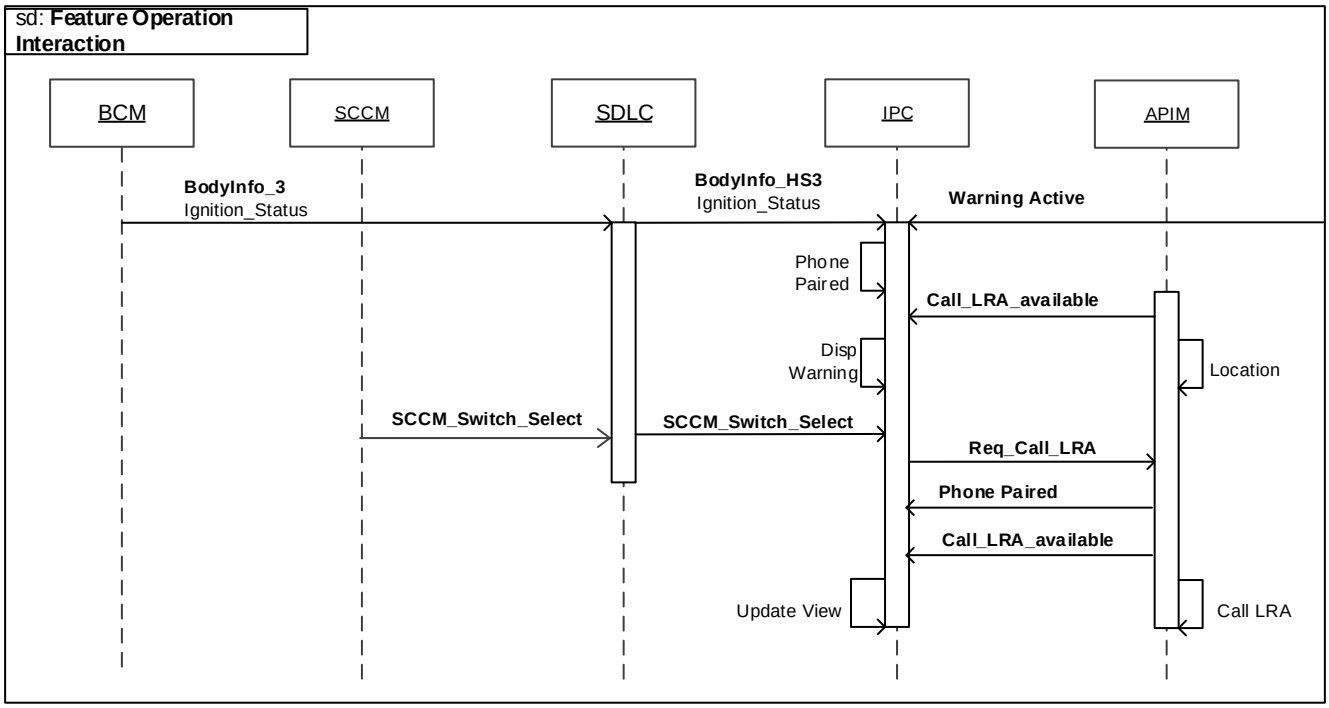

Figure 36: Call LRA request receive and make call Functional sequence diagram [6]

4.4.2 Requirements on Communication Links

4.4.2.1 HS-CAN

###R_ CSPR _173 ### µProcessor Awake

All CAN inputs sampled and processed normally (typically 20 ms FNOS process the message, and 20 ms to process the input)

###R_ CSPR _174 ### µProcessor Asleep

All CAN inputs sampled and processed normally (typically 50 ms NM transmit alive message, 50 ms transmit Application message/perform function, and 20 ms to process the input)

###R_ CSPR _175 ### Signal not updated for <5sec [8]

If a Signal message containing the transmitted signal has an update bit which shows “not updated” for less than a period of time as per “Diagnostic Fault Coverage and DTC Numbers Design Consideration” (typically 5 seconds). Then the subscriber should continue using last known value of the signal

###R_ CSPR _176 ### Signal not updated for >5sec [8]

If a Signal message containing the transmitted signal has an update bit which shows “not updated” for greater than a period of time as per “Diagnostic Fault Coverage and DTC Numbers Design Consideration” (typically 5 seconds). Then the subscriber should use the signal’s default value as listed in the data dictionary

###R_ CSPR _177 ### Message not updated for <5sec [8]

If a message goes missing for less than a period of time as per “Diagnostic Fault Coverage and DTC Numbers Design Consideration” (typically 5 seconds). Then the subscriber should continue using last known value of the signal received in the last message

###R_ CSPR _178 ### Message not updated for >5sec [8]

If a message goes missing for greater than a period of time as per “Diagnostic Fault Coverage and DTC Numbers Design Consideration” (typically 5 seconds). Then the subscriber should use the signal’s default value as listed in the data dictionary

###R_ CSPR _179 ### Error Recovery [8]

If signal massage is received after CAN error is detected as per Diagnostic Fault Coverage and DTC Numbers Design Consideration”, then the subscriber should use most current value of that signal

5 OPEN ISSUES

ID	Issue Description	e-Tracker / Reference	Responsible	Status	Solution
1					
2					
3					
4					
5					
6					
7					
8					
9					

6 REQUIREMENTS TRACEABILITY

6.1 Requirements

No table of contents entries found.

7 REVISION HISTORY

Rev. (revision)	Vers.	Date	Description	Approved by	Responsible
001	*1*	*02/06/17*	*Feature Owner peer review*		
002	*1*	*02/17/17*	*Requirements Engineering review*		
003	*1*	*02/22/17*	*Requirements Engineering review*		
004	*1*	*03/07/17*	*Navigation Review*		
005	*1*	*03/14/17*	*Cluster Review*		
006	*1*	*04/04/17*	*Cluster Review*		
007	*1*	*04/24/17*	*Requirements Engineering review*		
008	*1*	*06/08/17*	*Requirements Engineering review*		
009	*1*	*06/14/17*	*Cluster Review*		
010	*1*	*06/23/17*	*Requirements Engineering review*		

8 APPENDIX

8.1 Data Dictionary [7][10]

8.1.1 Physical Signals

###SIG_00001### Ignition_Status

Description
Ignition Status from BCM to Gateway Module

Data Type	Init Value	Default Value (missing signal)
HS1 CAN	Off (0x1)	Follow Initial Value in signal requirements
Transmit Model	**Send Type**	**E2E Latency**
BCM	Event Periodic	500ms

###SIG_00002### Ignition_Status

Description
Ignition Status from Gateway Module to IPC

Data Type	Init Value	Default Value (missing signal)
HS3 CAN	Off (0x1)	Follow Initial Value in signal requirements
Transmit Model	**Send Type**	**E2E Latency**
GWM	Event Periodic	500ms

###SIG_00003### SteWhlSwtchBack_B_Stat

Description
Steering wheel switch toggle info from SCCM to GWM

Data Type	Init Value	Default Value (missing signal)
HS2 CAN	Not_Pressed (0x0)	Not_Pressed (0x0)
Transmit Model	**Send Type**	**E2E Latency**

SASM SCCM	Event Periodic	1000ms

###SIG_00004### SteWhlSwtchUp_B_Stat

Description		
Steering wheel switch toggle info from SCCM to GWM		
Data Type	**Init Value**	**Default Value** (missing signal)
HS2 CAN	Not_Pressed (0x0)	Not_Pressed (0x0)
Transmit Model	**Send Type**	**E2E Latency**
SASM SCCM	Event Periodic	1000ms

###SIG_00005### SteWhlSwtchOk_B_Stat

Description		
Steering wheel switch toggle info from SCCM to GWM		
Data Type	**Init Value**	**Default Value** (missing signal)
HS2 CAN	Not_Pressed (0x0)	Not_Pressed (0x0)
Transmit Model	**Send Type**	**E2E Latency**
SASM SCCM	Event Periodic	1000ms

###SIG_00006### SteWhlSwtchDown_B_Stat

Description		
Steering wheel switch toggle info from SCCM to GWM		
Data Type	**Init Value**	**Default Value** (missing signal)
HS2 CAN	Not_Pressed (0x0)	Not_Pressed (0x0)
Transmit Model	**Send Type**	**E2E Latency**
SASM SCCM	Event Periodic	1000ms

###SIG_00007### ICI_BtnID_A

Description
SCCM Switch request from GWM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
GWM	Event Periodic	100ms

###SIG_00008### ICI_BtnID_B

Description
SCCM Switch request from GWM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
GWM	Event Periodic	100ms

###SIG_00009### ICI_BtnID_C

Description
SCCM Switch request from GWM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
GWM	Event Periodic	100ms

###SIG_00010### ICI_BtnID_D

Description

SCCM Switch request from GWM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
GWM	Event Periodic	100ms

###SIG_00011### ICI_Coding_BtnID_A

Description
SCCM Switch request from GWM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
GWM	Event Periodic	100ms

###SIG_00012### ICI_Coding_BtnID_B

Description
SCCM Switch request from GWM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
GWM	Event Periodic	100ms

###SIG_00013### ICI_Coding_BtnID_C

Description
SCCM Switch request from GWM to IPC

Data Type	Init Value	Default Value

		(missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
GWM	Event Periodic	100ms

###SIG_00014### ICI_Coding_BtnID_D

Description		
SCCM Switch request from GWM to IPC		
Data Type	**Init Value**	**Default Value** (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
GWM	Event Periodic	100ms

###SIG_00015### LBC1_ActiveListID

Description		
POI List and route request from IPC to APIM		
Data Type	**Init Value**	**Default Value** (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
IPC	No Send Type	

###SIG_00016### LBC1_ItemIndex

Description		
POI List and route request from IPC to APIM		
Data Type	**Init Value**	**Default Value** (missing signal)

INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
IPC	No Send Type	

###SIG_00017### LBC1_Opcode

Description		
POI List and route request from IPC to APIM		
Data Type	**Init Value**	**Default Value** (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
IPC	No Send Type	

###SIG_00018### LBC1_NbrOfItems

Description		
POI List and route request from IPC to APIM		
Data Type	**Init Value**	**Default Value** (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
IPC	No Send Type	

###SIG_00019### LBC1_SetListServ

Description		
POI List and route request from IPC to APIM		
Data Type	**Init Value**	**Default Value** (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**

IPC	No Send Type	

###SIG_00020### LBC1_StartItemInd

Description
POI List and route request from IPC to APIM

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
IPC	No Send Type	

###SIG_00021### CONMP_MC_WORD_Tx

Description
POI List and route response from APIM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
IPC	No Send Type	

###SIG_00021### WaypointsActive_St

Description
Waypoint active status from APIM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
IPC	Event Periodic	1000ms

###SIG_00021### EmbedNavActive_D_Stat [6]

Description
Embedded Nav active status from APIM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~Follow missing signal strategy~~
Transmit Model	**Send Type**	**E2E Latency**
APIM	Event Periodic	1000ms

###SIG_00021### DealerCall_B_Rq [6]

Description
Request to call Roadside Assistance from IPC to APIM

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~Follow missing signal strategy~~
Transmit Model	**Send Type**	**E2E Latency**
IPC		

###SIG_00021### LoclFuelEffUnit_D_Stat [6]

Description
Unit info from APIM to IPC

Data Type	Init Value	Default Value (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~missing strategy~~
Transmit Model	**Send Type**	**E2E Latency**
APIM	Event Periodic	1000ms

###SIG_00021### RoadsideAsstAvail_D_St [6]

Description		
Roadside Assistance available country info from APIM to IPC		
Data Type	**Init Value**	**Default Value** (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~Follow missing signal strategy~~
Transmit Model	**Send Type**	**E2E Latency**
APIM	Event Periodic	1000ms

###SIG_00021### VRM_BTPhoneSts_St [6]

Description		
Phone pair info from APIM to IPC		
Data Type	**Init Value**	**Default Value** (missing signal)
INFOCAN	0x0	Follow Initial Value in signal requirements~~Follow missing signal strategy~~
Transmit Model	**Send Type**	**E2E Latency**
APIM	Event Periodic	1000ms