Function Group Spec

Remote Start, Extend Remote Start and Cancel Remote Start

Custom Scope

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1 INTRODUCTION

1.1 Document Purpose

The Function (Group) Specification (FS) specifies an individual function / a group of functions.

To get more information about the concept of feature, function and component level abstraction refer to the Ford RE Wiki.

1.2 Document Scope

The following set of functions from the Global Feature & Function List is described in this specification.

Function ID	Function Name	Owner	Reference
F003414	Cellular Remote Start, Extend Remote Start & Cancel Remote Start	Audriene Bell, abell101	

Table 1: Functions described in this specification

1.3 Document Audience

The FS is authored by the owners of the individual functions. All Stakeholders, i.e., all people who have a valid interest in the functions and their behavior should read and, if possible, review the FS. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the FS.

***#Hint:** The FS template has the IP Classification "Proprietary" by default. IP Classification "Confidential" might be required in some cases, e.g. by Ford Functional Safety.*

1.3.1 Stakeholder List

For the latest list of the feature stakeholder and their roles & responsibilities refer to <Put VSEM Link here>.

***#Hint:** Refer to Ford RE Wiki – Stakeholder List on how to create a stakeholder list. The stakeholder list should be stored in VSEM in the pseudo folder "General Data Artifacts" of the corresponding function.*

1.4 Document Organization

1.4.1 Document Context

Refer to the Specification Structure page in the Ford RE Wiki to understand how the FS 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 terminology. Gives a clarification of the definitions, concepts and abbreviations used in the document.
Section 2 –	Function Group Description. Gives an overview and the purpose of the function group.
Section 3 –	Functional Architecture: Specifies the overall functional architecture of the function group
Section 4 –	Function Specifications: Specifies the logical functions of the function group in detail
Section 5 –	List of Open Concerns
Section 6	Revision history including a list of new or modified requirements. The requirements in this document are tagged, and this section contains different types of tables listing all, new, or changed requirements by their title and page no.
Section 7 –	Appendix: Presenting additional data mainly in a tabular form, e.g., a data dictionary

***#Hint:** All sections are mandatory, unless explicitly marked by the tag "#Classification" as "optional" or as applicable e.g. to certain domains like "Functional Safety".*

1.5 Document Conventions

1.5.1 Requirements Templates

Each requirement, use case or scenario in this specification shall follow the corresponding template given in the document template *Specification_Macros.dotm* at RE Wiki - Specification Templates.

1.5.1.1 Identification of Requirements

1.5.1.2 Requirements Attributes

The templates provided by *Specification_Macros.dotm* define a list of attributes for each requirement. This helps to classify the requirement. The attributes are explained at RE Wiki - Requirements Attributes.

2 FUNCTION GROUP DESCRIPTION

***#Classification:** Function Group only (remove section, if only a single Function is specified in this document)*
***#Hint**: Provide an overview / a description of the Function Group*

This Function Group consists of all functions identified in a custom scope with the MagicDraw project **Remote Start, Extend Remote Start and Cancel Remote Start Function Specification.**

3 FUNCTIONAL ARCHITECTURE

#Classification: *Function Group only (remove section, if only a single Function is specified in this document)*
#Hint: *The Functional Architecture shall reflect the result of the functional decomposition for a given feature or parts of it.*
Refer to the RE Wiki – Functional Decomposition for some guidance on how to decompose a feature into functions, i.e., how to find the right functional partitioning for the function level. The functions shown here are those, which are specified in section 4 "Function Specifications".

3.1 Description

#Hint: *Provide some informal description of the characteristics of the chosen architecture. Also give some graphical representation of the Functional Architecture. Either SysML Internal Block diagrams or Data Flow Diagrams could be used to depict such a Functional Architecture.*
#Link: *SysML – Internal Block Diagrams or RE Wiki - Data Flow Diagrams*

The Cellular Remote Start, Extend Remote Start & Cancel Remote Start functionality is described in this document and is broken down by function. Each function defines a portion of the message structure and how a command is sent from the Mobile App to VSDN/TMC to ECG-App to BCM and the return command response structure. The feature function, Cellular Remote Start calls upon each sub-function described in the function list to detail how the user can manually start, extend or cancel their vehicle.

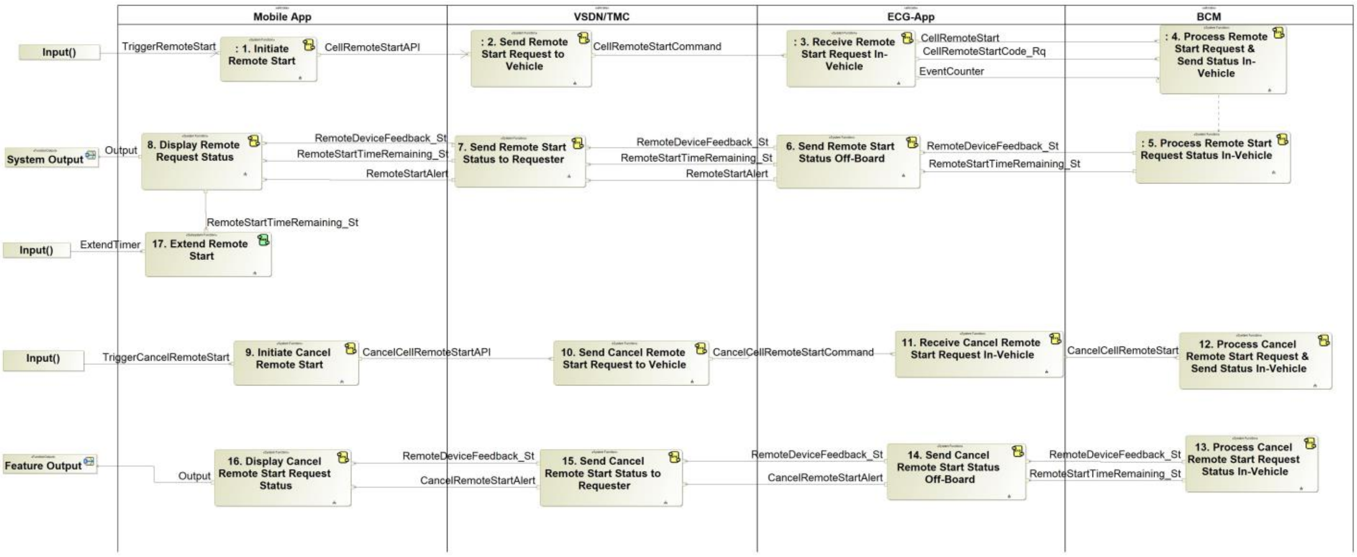

Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 1: Feature Function View

3.2 Function List

Function ID	**Function Name**	**Function Description**	**ASIL**
F003370	Cellular Remote Start <<Feature Function>>	Cellular Remote Start Feature Function	
Fn1	1. Initiate Remote Start <<System Function>>	The Initiate Remote Start function is called when the user selects the Remote Start button on the Mobile App initiating the request	
Fn2	2. Send Remote Start Request to Vehicle <<System Function>>	The Send Remote Start Request to Vehicle function is called when the VSDN/TMC receives the Remote Start request	
Fn3	3. Receive Remote Start Request In-Vehicle <<System Function>>	The Receive Remote Start Request In-Vehicle function is called when the ECG-App receives the Remote Start request from the VSDN/TMC	
Fn4	4. Process Remote Start Request & Send Status In-Vehicle <<System Function>>	The Receive & Process Remote Start Request In-Vehicle is called when the BCM receives the Remote Start request and determines if the conditions are correct to process the request	
Fn5	5. Process Remote Start Request Status In-Vehicle <<System Function>>	The Process Remote Start Request Status In-Vehicle is called when the BCM sends the status to the ECG-App	
Fn6	6. Send Remote Start Status Off-Board <<System Function>>	The Send Remote Start Status Off-Board function is called when the ECG-App receives the Remote Start status from the BCM	
Fn7	7. Send Remote Start Status to Requester <<System Function>>	The Send Remote Start Status to Requester when the VSDN/TMC sends the Remote Start status to the Mobile App	
Fn8	8. Display Remote Request Status <<System Function>>	The Display Remote Request Status function is called when the VSDN/TMC sends the Remote Start status to the Mobile App	
Fn9	9. Initiate Cancel Remote Start <<System Function>>	The Initiate Cancel Remote Start function is called when the user selects the Cancel Remote Start button on the Mobile App initiating the request	
Fn10	10. Send Cancel Remote Start Request to Vehicle <<System Function>>	The Send Cancel Remote Start Request to Vehicle function is called when the VSDN/TMC receives the Cancel Remote Start request	
Fn11	11. Receive Cancel Remote Start Request In-Vehicle <<System Function>>	The Receive Cancel Remote Start Request In-Vehicle function is called when the ECG-App receives the Cancel Remote Start request from the VSDN/TMC	
Fn12	12. Process Cancel Remote Start Request & Send Status In-Vehicle <<System Function>>	The Receive & Process Cancel Remote Start Request In-Vehicle is called when the BCM receives the Cancel Remote Start request and determines if the conditions are correct to process the request	
Fn13	13. Process Cancel Remote Start Request Status In-Vehicle <<System Function>>	The Process Cancel Remote Start Request Status In-Vehicle is called when the BCM sends the status to the ECG-App	
Fn14	14. Send Cancel Remote Start Status Off-Board <<System Function>>	The Send Cancel Remote Start Status Off-Board function is called when the ECG-App receives the Remote Start status from the BCM	
Fn15	15. Send Cancel Remote Start Status to Requester <<System Function>>	The Send Cancel Remote Start Status to Requester when the VSDN/TMC sends the Cancel Remote Start status to the Mobile App	
Fn16	16. Display Cancel Remote Start Request Status <<System Function>>	The Display Remote Request Status function is called when the VSDN/TMC sends the Cancel Remote Start status to the Mobile App	
SFn1	17. Extend Remote Start <<Subsystem Function>>	After a successful Remote Start request, the user shall have the option to increase the engine on duration timer and extend the Remote Start timer	

Table 2: List of Logical Functions

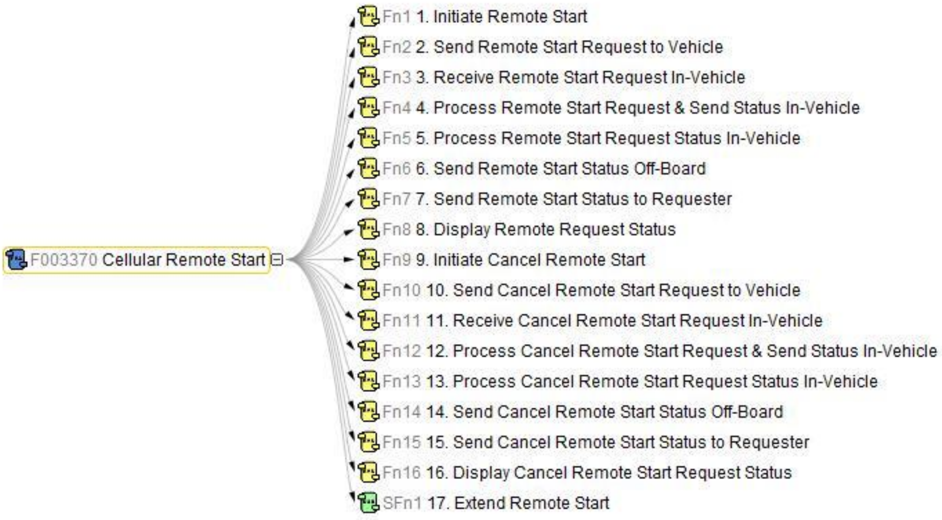

F003370 Cellular Remote Start
Fn1 1. Initiate Remote Start
Fn2 2. Send Remote Start Request to Vehicle
Fn3 3. Receive Remote Start Request In-Vehicle
Fn4 4. Process Remote Start Request & Send Status In-Vehicle
Fn5 5. Process Remote Start Request Status In-Vehicle
Fn6 6. Send Remote Start Status Off-Board
Fn7 7. Send Remote Start Status to Requester
Fn8 8. Display Remote Request Status
Fn9 9. Initiate Cancel Remote Start
Fn10 10. Send Cancel Remote Start Request to Vehicle
Fn11 11. Receive Cancel Remote Start Request In-Vehicle
Fn12 12. Process Cancel Remote Start Request & Send Status In-Vehicle
Fn13 13. Process Cancel Remote Start Request Status In-Vehicle
Fn14 14. Send Cancel Remote Start Status Off-Board
Fn15 15. Send Cancel Remote Start Status to Requester
Fn16 16. Display Cancel Remote Start Request Status
SFn1 17. Extend Remote Start

Figure 2: Functional Decomposition

3.3 Signal List

Refer to the Data Dictionary - Logical Signals.

3.4 Assumptions

- The user has installed and created a valid login account for the FORD/LINCOLN owner mobile app
- The user has registered an eligible vehicle VIN (defined as a VIN which is known to have an ECG installed and has sent a provisioning message to the VSDN / TMC)
- The user has completed the authorization process for the eligible vehicle VIN
- Swapping the ECG shall not affect vehicle remote controls

4 FUNCTION SPECIFICATIONS

4.1 1. Initiate Remote Start

4.1.1 Function Overview

4.1.1.1 Description

Function is allocated to:

- Mobile App <<Logical>>

The Initiate Remote Start function is called when the user selects the Remote Start button on the Mobile App initiating the request

4.1.2 Function Scope

The – **"1. Initiate Remote Start"** function is called by the following functions:

- – "Cellular Remote Start"

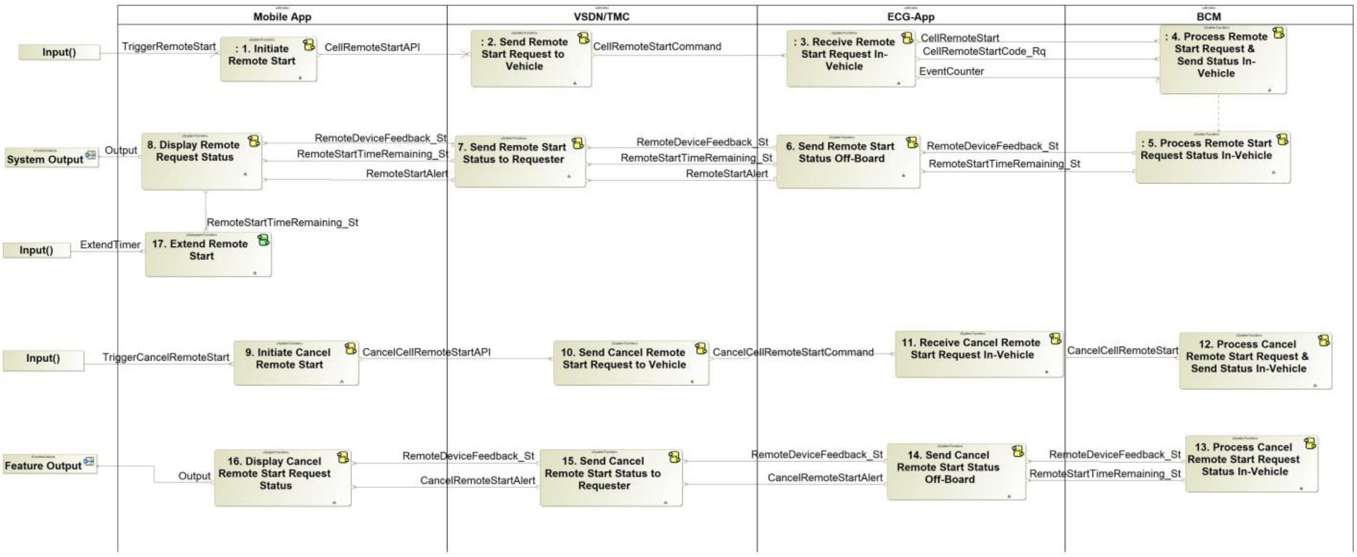

Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 3: Activity Diagram of "Cellular Remote Start" calling "1. Initiate Remote Start"

4.1.3 Function Interfaces

4.1.3.1 Logical Inputs

Signal Name	Description
TriggerRemoteStart	Usage in Function: User selects button on the Mobile App to trigger Remote Start

4.1.3.2 Logical Outputs

Signal Name	Description
CellRemoteStartAPI	Usage in Function: The Mobile App sends a Remote Start API request to VSDN/TMC

4.1.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.1.4 Function Modeling

4.1.4.1 State Charts / Activity Diagrams / Sequence Diagrams / Decision Tables

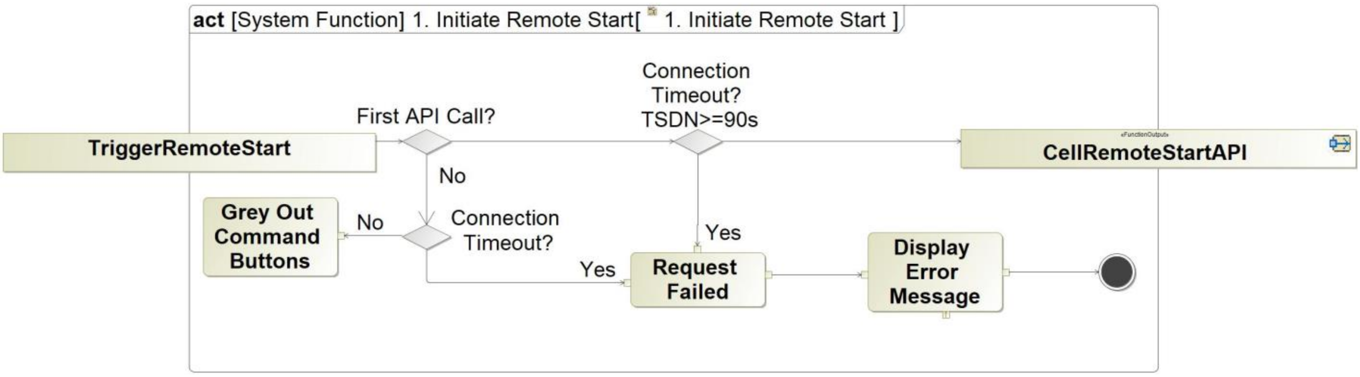

act [System Function] 1. Initiate Remote Start[1. Initiate Remote Start]
TriggerRemoteStart
First API Call?
Connection Timeout? TSDN>=90s
«FunctionOutput»
CellRemoteStartAPI
No
Grey Out Command Buttons
No
Connection Timeout?
Yes
Yes
Request Failed
Display Error Message

Figure 4: 1. Initiate Remote Start

4.1.5 Function Requirements

4.1.5.1 Functional Requirements

4.1.5.1.1 Normal Operation

R_FNC_RS_001 Initiate Remote Start

The mobile app shall display a dedicated Remote Start button on the screen. The user shall press and hold the Remote Start button on the mobile app to initiate the remote start process.

Requirement ID: R_FNC_RS_001					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_002 Remote Start Button HMI

The Remote Start button will be animated clockwise with a white line around the perimeter while being held.

Requirement ID: R_FNC_RS_002					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

R_FNC_RS_003 Gray Out Other Command Buttons

All other remote control buttons shall be grayed out and not selectable when remote start button pressed.

Requirement ID: R_FNC_RS_003

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

R_FNC_RS_004 Remote Start Command Sent to the VSDN/TMC

The mobile app shall send the request to the VSDN/TMC

Requirement ID: R_FNC_RS_004

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.1.5.1.2 Error Handling

R_FNC_RS_005 Mobile App Timeout

The mobile app shall wait for 120 seconds to receive a response from VSDN/TMC

Requirement ID: R_FNC_RS_005

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.2 2. Send Remote Start Request to Vehicle

4.2.1 Function Overview

4.2.1.1 Description

Function is allocated to:

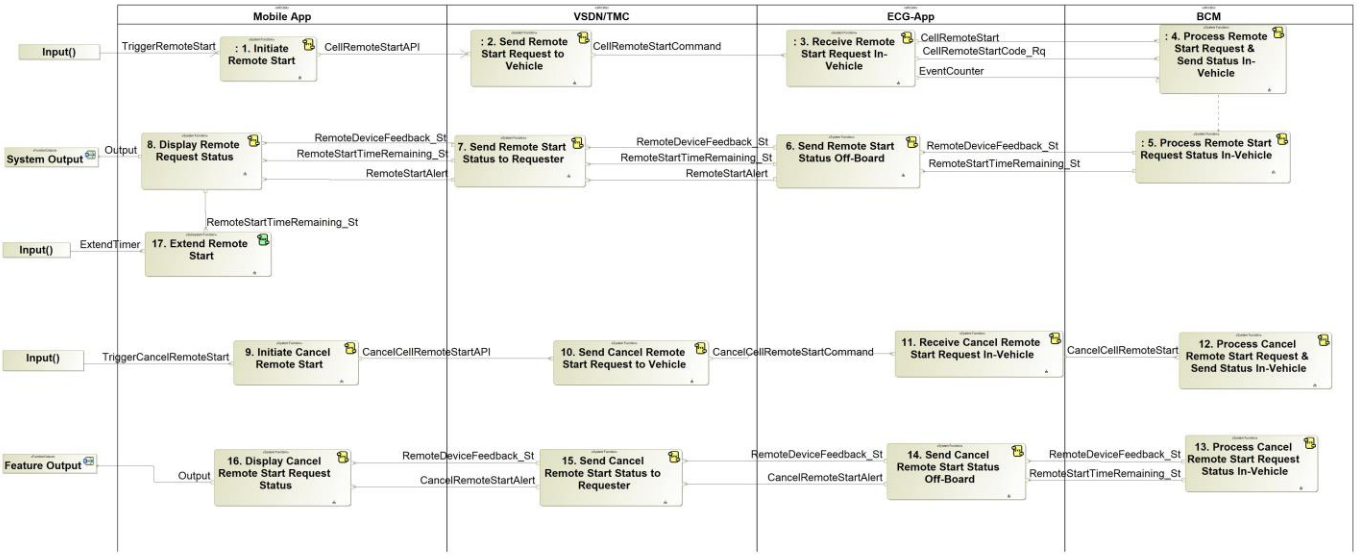
- VSDN/TMC <<Logical>>

The Send Remote Start Request to Vehicle function is called when the VSDN/TMC receives the Remote Start request

4.2.2 Function Scope

The – **“2. Send Remote Start Request to Vehicle”** function is called by the following functions:

- – “Cellular Remote Start”


Mobile App
VSDN/TMC
ECG-App
BCM
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RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
6. Send Remote Start Status Off-Board
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
14. Send Cancel Remote Start Status Off-Board
13. Process Cancel Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St

Figure 5: Activity Diagram of “Cellular Remote Start” calling “2. Send Remote Start Request to Vehicle”

4.2.3 Function Interfaces

4.2.3.1 Logical Inputs

Signal Name	Description
CellRemoteStartAPI	Usage in Function: The Mobile App sends a Remote Start API request to VSDN/TMC

4.2.3.2 Logical Outputs

Signal Name	Description
CellRemoteStartCommand	Usage in Function: Command sent from VSDN/TMC to initiate a Remote Start Sent to: • 3. Receive Remote Start Request In-Vehicle

4.2.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.2.4 Function Modeling

4.2.4.1 Activity Diagrams

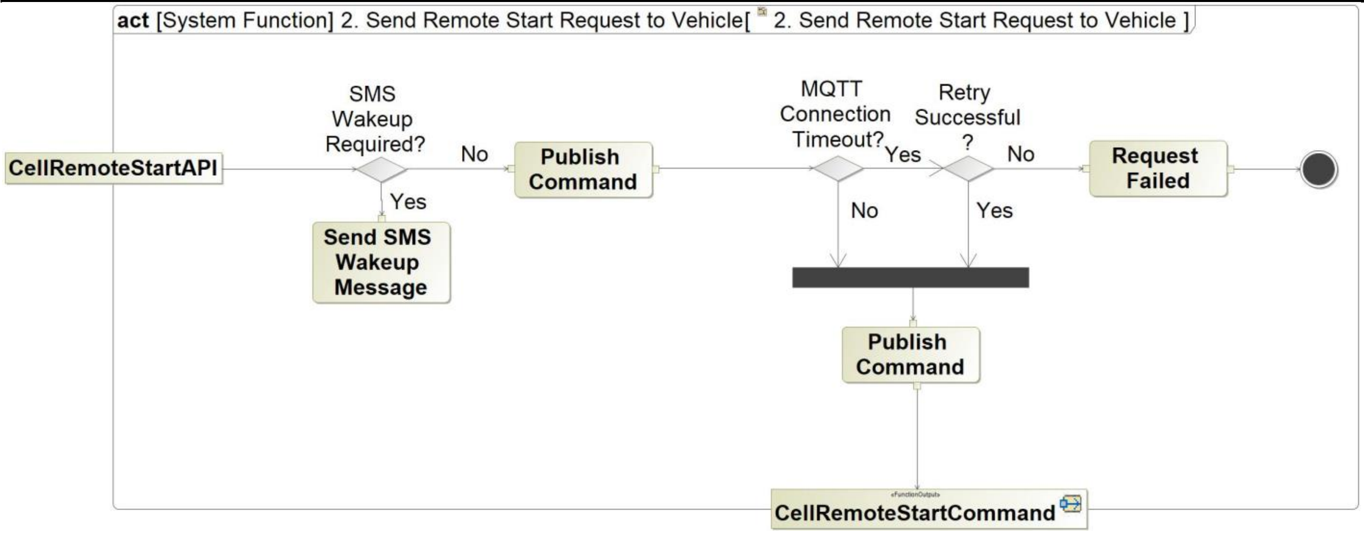
act [System Function] 2. Send Remote Start Request to Vehicle[2. Send Remote Start Request to Vehicle]
CellRemoteStartAPI
SMS Wakeup Required?
No
Yes
Send SMS Wakeup Message
Publish Command
MQTT Connection Timeout?
Yes
No
Retry Successful ?
No
Yes
Request Failed
Publish Command
«FunctionOutput»
CellRemoteStartCommand

Figure 6: 2. Send Remote Start Request to Vehicle

4.2.5 Function Requirements

4.2.5.1 Functional Requirements

4.2.5.1.1 Normal Operation

R_FNC_RS_006 Remote Start Command Sent to the Vehicle

The VSDN/TMC shall send the command to the vehicle

Requirement ID: R_FNC_RS_006					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_007 SMS Message

If the vehicle is in LPR mode, an SMS message is sent to the vehicle to wake the necessary nodes and process the command

Requirement ID: R_FNC_RS_007					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

4.2.5.1.2 Error Handling

R_FNC_RS_0011 Backend Timeout

The Command shall time out after 90 seconds from the moment the backend sent the command to the vehicle. This should be configurable

Requirement ID: R_FNC_RS_0011

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.3 3. Receive Remote Start Request In-Vehicle

4.3.1 Function Overview

4.3.1.1 Description

Function is allocated to:

- ECG-App <<Logical>>

The Receive Remote Start Request In-Vehicle function is called when the ECG-App receives the Remote Start request from the VSDN/TMC

4.3.1.2 Glossary

See Appendix for Definitions and Abbreviations.

4.3.2 Function Scope

The **– “3. Receive Remote Start Request In-Vehicle”** function is called by the following functions:

- – “Cellular Remote Start”

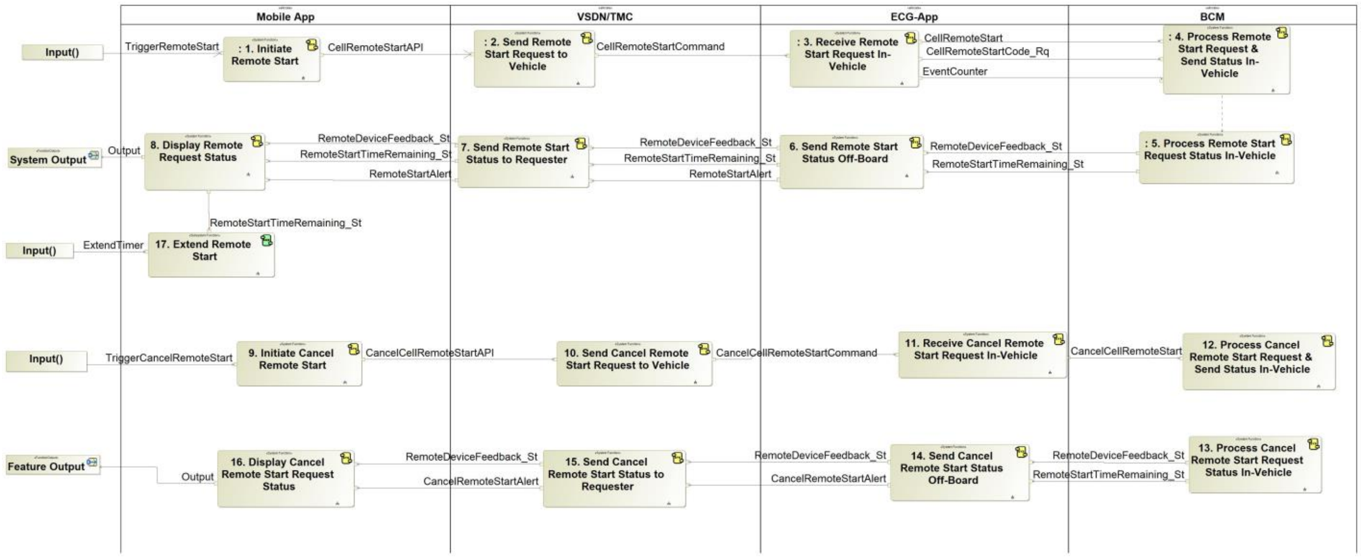
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
6. Send Remote Start Status Off-Board
: 5. Process Remote Start Request Status In-Vehicle
Input()
ExtendTimer
17. Extend Remote Start
RemoteStartTimeRemaining_St
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
14. Send Cancel Remote Start Status Off-Board
RemoteTimeStartRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 7: Activity Diagram of "Cellular Remote Start" calling "3. Receive Remote Start Request In-Vehicle"

4.3.3 Function Interfaces

4.3.3.1 Logical Inputs

Signal Name	Description
CellRemoteStartCommand	Usage in Function: Command sent from VSDN/TMC to initiate a Remote Start Received from: - 2. Send Remote Start Request to Vehicle

4.3.3.2 Logical Outputs

Signal Name	Description
EventCounter	Usage in Function: Event counter for remote start requests from cellular remote device Sent to: - 4. Process Remote Start Request & Send Status In-Vehicle
CellRemoteStart	Usage in Function: CAN signal sent from ECG-App to BCM to initiate a Remote Start request
CellRemoteStartCode_Req	Usage in Function: Network Security Rolling Code for ECG signal requests Sent to: - 4. Process Remote Start Request & Send Status In-Vehicle

4.3.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.3.4 Function Modeling

4.3.4.1 Activity Diagram

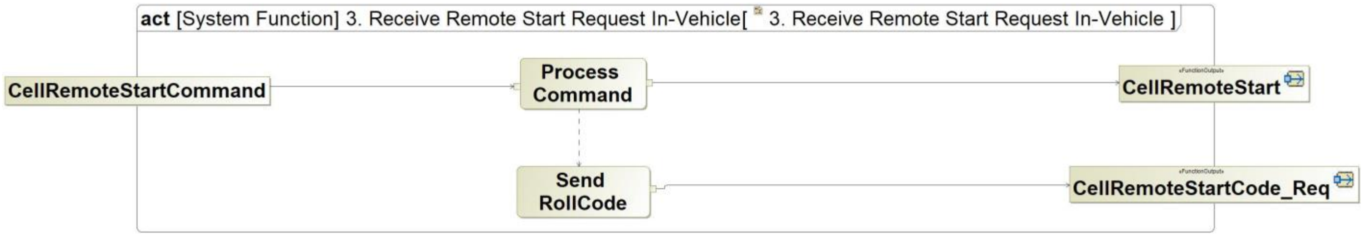
act [System Function] 3. Receive Remote Start Request In-Vehicle[3. Receive Remote Start Request In-Vehicle]
CellRemoteStartCommand
Process Command
Send RollCode
«FunctionOutput»
CellRemoteStart
«FunctionOutput»
CellRemoteStartCode_Req

Figure 8: 3. Receive Remote Start Request In-Vehicle

4.3.5 Function Requirements

4.3.5.1 Functional Requirements

4.3.5.1.1 Normal Operation

R_FNC_RS_008 ECG-App Stores Roll Code When Ignition On

The ECG-App shall store in volatile memory while the ignition is on the roll code received from the BCM

Requirement ID: R_FNC_RS_008					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_009 ECG-App Saves Roll Code While Ignition Off

The ECG-App shall store in non-volatile memory while the ignition is off the the last four roll codes received from the BCM

Requirement ID: R_FNC_RS_009					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0010 Process Command

The ECG-App shall process the command and send it to the BCM along with the roll code and event counter

Requirement ID: R_FNC_RS_0010					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0012 Event Counter

An event counter counts the number of times a digital signal changes. When the ECG receives a request, it shall increment the event counter. When the remote request is sent, the ECG shall transmit the signal to the BCM and the event counter is incremented by one

Requirement ID: R_FNC_RS_0012			
Rationale			
Acceptance Criteria			
Notes			
Source		**Owner**	
Source Req.		**V&V Method**	

4.4 4. Process Remote Start Request & Send Status In-Vehicle

4.4.1 Function Overview

4.4.1.1 Description

Function is allocated to:

- BCM <<Logical>>

The Receive & Process Remote Start Request In-Vehicle is called when the BCM receives the Remote Start request and determines if the conditions are correct to process the request

4.4.1.2 Glossary

See Appendix for Definitions and Abbreviations.

4.4.2 Function Scope

The – **"4. Process Remote Start Request & Send Status In-Vehicle"** function is called by the following functions:

- – "Cellular Remote Start"

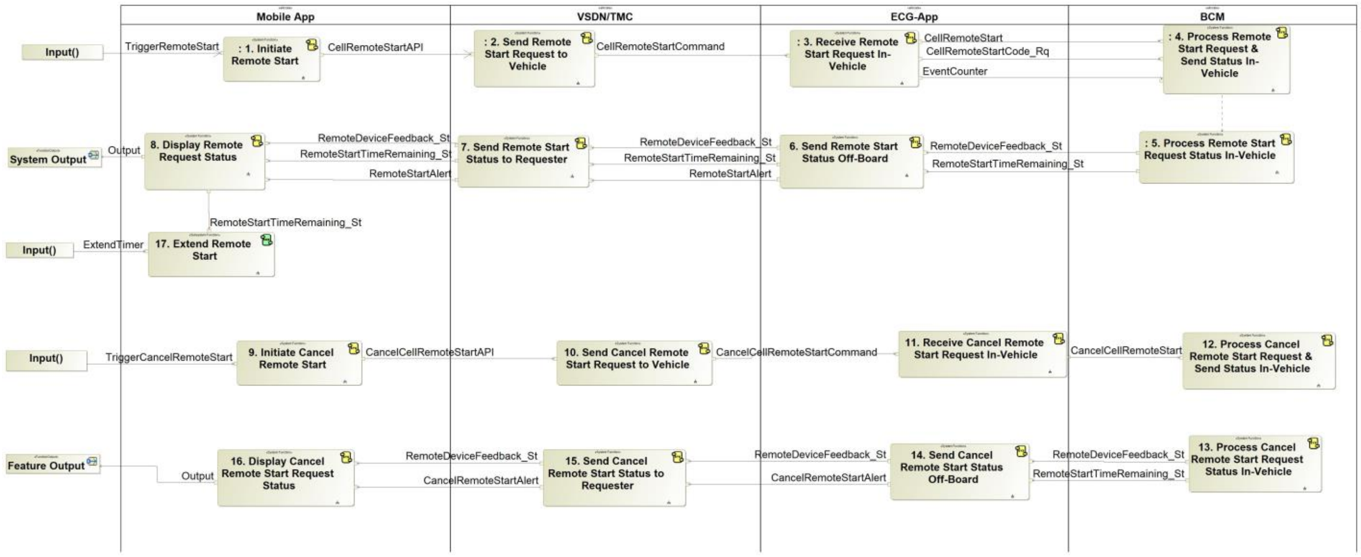
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 9: Activity Diagram of "Cellular Remote Start" calling "4. Process Remote Start Request & Send Status In-Vehicle"

4.4.3 Function Interfaces

4.4.3.1 Logical Inputs

Signal Name	Description
CellRemoteStart	Usage in Function: CAN signal sent from ECG-App to BCM to initiate a Remote Start request

	Received from: • 3. Receive Remote Start Request In-Vehicle

4.4.3.2 Logical Outputs

No Logical Outputs specified.

4.4.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.4.4 Function Modeling

4.4.4.1 Activity Diagram

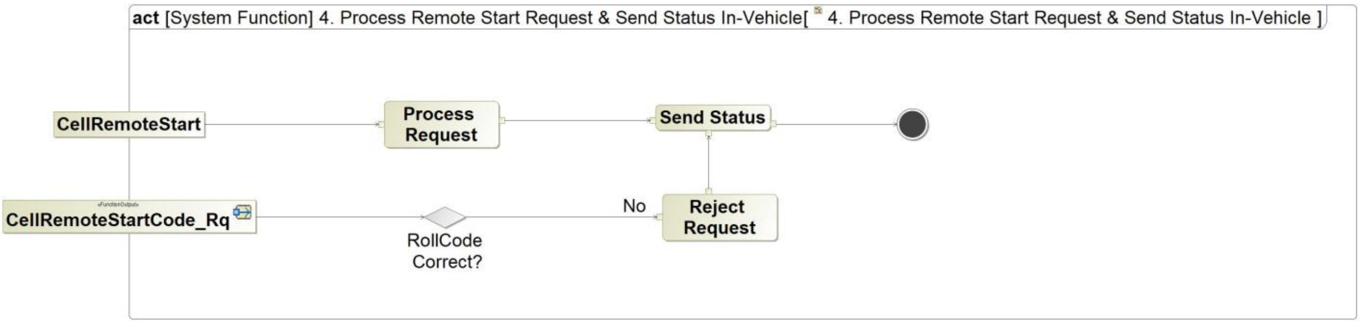
act [System Function] 4. Process Remote Start Request & Send Status In-Vehicle[4. Process Remote Start Request & Send Status In-Vehicle]
CellRemoteStart
Process Request
Send Status
«FunctionOutput»
CellRemoteStartCode_Rq
No
Reject Request
RollCode Correct?

Figure 10: 4. Process Remote Start Request & Send Status In-Vehicle

4.4.5 Function Requirements

4.4.5.1 Functional Requirements

4.4.5.1.1 Normal Operation

R_FNC_RS_0013 Rolling Code

The CAN signal for the rolling code is transmitted to the BCM at a Remote Start request. The CAN signal for rolling code values transmitted by the BCM every one second in ignition on is RollCodeUnlock. The ECG monitors and stores the rolling code in non-volatile memory when the ignition is turned off. When a request to lock the doors is received, the ECG will transmit the rolling code stored in memory to the BCM only if it has been requested from VSDN / TMC. The BCM will then determine if the rolling code matches one of the last four codes that it published

Requirement ID: R_FNC_RS_0013

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.4.5.1.2 Error Handling

R_FNC_RS_0014 Rolling Code Incorrect

If the roll code sent from the ECG-App to the BCM is incorrect, the request shall be rejected

Requirement ID: R_FNC_RS_0014					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Reg. Template Version 6.0					End of Requirement

4.5 5. Process Remote Start Request Status In-Vehicle

4.5.1 Function Overview

4.5.1.1 Description

Function is allocated to:

- BCM <<Logical>>

The Process Remote Start Request Status In-Vehicle is called when the BCM sends the status to the ECG-App

4.5.2 Function Scope

The – **"5. Process Remote Start Request Status In-Vehicle"** function is called by the following functions:

- – "Cellular Remote Start"

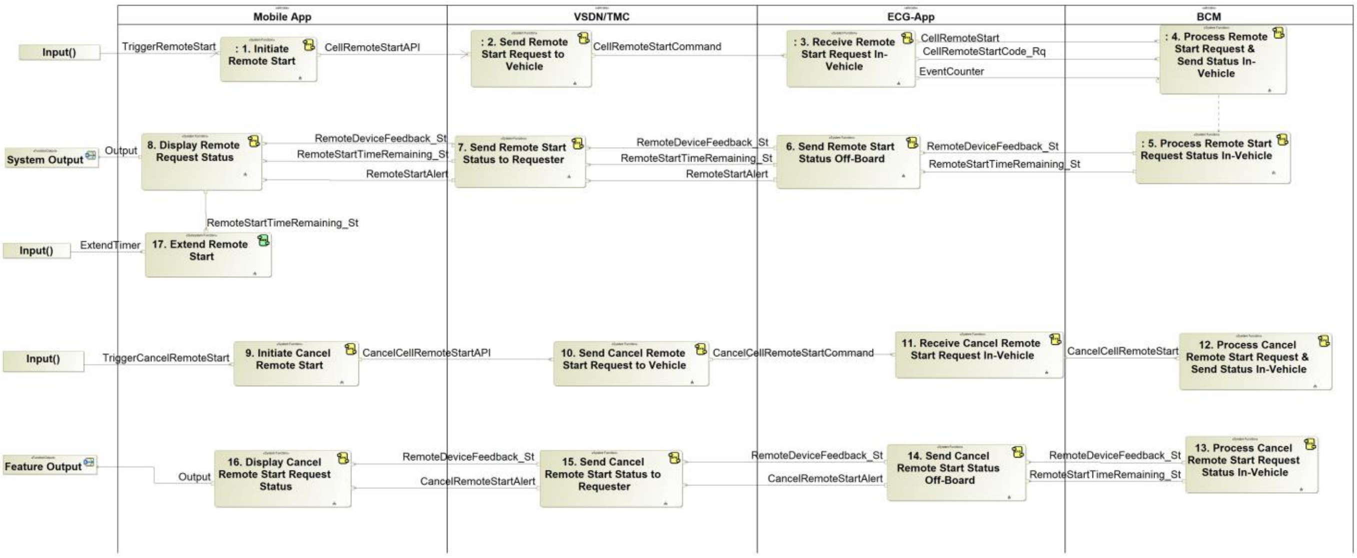
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 11: Activity Diagram of "Cellular Remote Start" calling "5. Process Remote Start Request Status In-Vehicle"

4.5.3 Function Interfaces

4.5.3.1 Logical Inputs

No Logical Inputs specified.

4.5.3.2 Logical Outputs

Signal Name	**Description**
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires Sent to: - 6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St	Usage in Function: Remote start status Sent to: - 6. Send Remote Start Status Off-Board

4.5.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.5.4 Function Modeling

4.5.4.1 State Charts / Activity Diagrams / Sequence Diagrams / Decision Tables

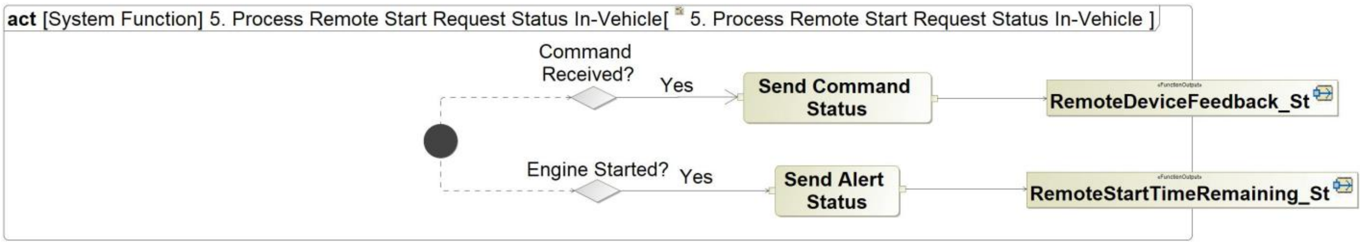
act [System Function] 5. Process Remote Start Request Status In-Vehicle[5. Process Remote Start Request Status In-Vehicle]
Command Received?
Yes
Send Command Status
«FunctionOutput»
RemoteDeviceFeedback_St
Engine Started?
Yes
Send Alert Status
«FunctionOutput»
RemoteStartTimeRemaining_St

Figure 12: 5. Process Remote Start Request Status In-Vehicle

4.5.5 Function Requirements

4.5.5.1 Functional Requirements

4.5.5.1.1 Normal Operation

R_FNC_RS_0015 Duration Timer Sent With Response

The BCM shall send the duration timer in its response to the ECG-App

Requirement ID: R_FNC_RS_0015	
Rationale	
Acceptance Criteria	
Notes	

Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0016 BCM Sends Status of Command to ECG-App

The BCM shall send the status of the command to the ECG-App

Requirement ID: R_FNC_RS_0016					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0017 BCM Sends Status of Engine to ECG-App

The BCM shall send the status of the engine once started to the ECG-App

Requirement ID: R_FNC_RS_0017					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

4.6 6. Send Remote Start Status Off-Board

4.6.1 Function Overview

4.6.1.1 Description

Function is allocated to:

- ECG-App <<Logical>>

The Send Remote Start Status Off-Board function is called when the ECG-App receives the Remote Start status from the BCM

4.6.2 Function Scope

The **– “6. Send Remote Start Status Off-Board”** function is called by the following functions:

- – “Cellular Remote Start”

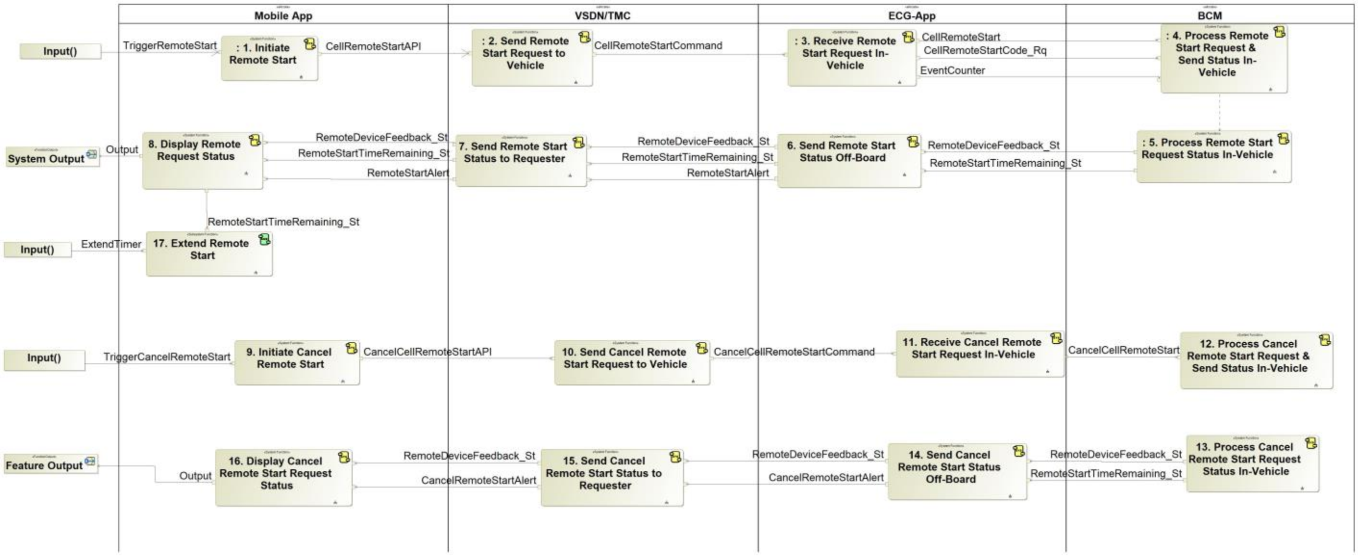
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
6. Send Remote Start Status Off-Board
: 5. Process Remote Start Request Status In-Vehicle
17. Extend Remote Start
ExtendTimer
9. Initiate Cancel Remote Start
TriggerCancelRemoteStart
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
16. Display Cancel Remote Start Request Status
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
14. Send Cancel Remote Start Status Off-Board
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 13: Activity Diagram of “Cellular Remote Start” calling “6. Send Remote Start Status Off-Board”

4.6.3 Function Interfaces

4.6.3.1 Logical Inputs

Signal Name	Description
RemoteDeviceFeedback	Usage in Function: Remote start status Received from: • 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires Received from: • 5. Process Remote Start Request Status In-Vehicle

4.6.3.2 Logical Outputs

Signal Name	Description
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires Sent to: • 7. Send Remote Start Status to Requester
RemoteStartAlert	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Remote Start Sent to: • 7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St	Usage in Function: Remote start status Sent to: • 7. Send Remote Start Status to Requester

4.6.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.6.4 Function Modeling

4.6.4.1 Activity Diagram

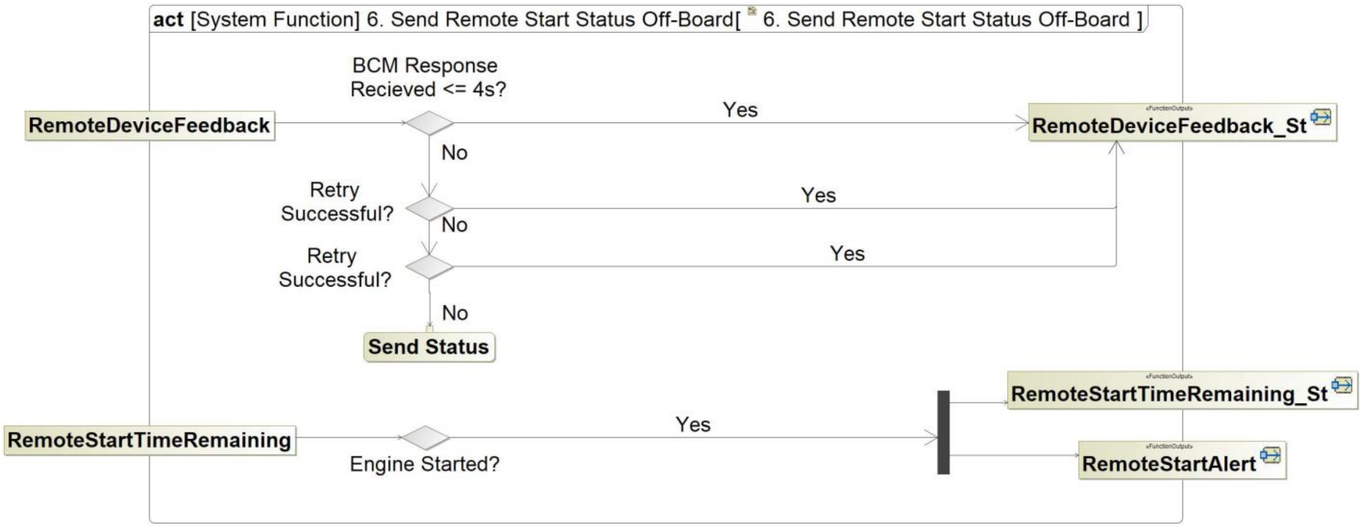
act [System Function] 6. Send Remote Start Status Off-Board[6. Send Remote Start Status Off-Board]
BCM Response Recieved <= 4s?
RemoteDeviceFeedback
Yes
RemoteDeviceFeedback_St
No
Retry Successful?
Yes
No
Retry Successful?
Yes
No
Send Status
RemoteStartTimeRemaining_St
RemoteStartTimeRemaining
Yes
Engine Started?
RemoteStartAlert

Figure 14: 6. Send Remote Start Status Off-Board

4.6.5 Function Requirements

4.6.5.1 Functional Requirements

4.6.5.1.1 Normal Operation

R_FNC_RS_0019 ECG-App Sends Status to VSDN/TMC

The ECG-App shall send the status of the command response and alert to VSDN/TMC

Requirement ID: R_FNC_RS_0019

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.6.5.1.2 Error Handling

R_FNC_RS_0018 Retry Strategy

When the ECG-App sends the Remote Start/Cancel Remote Start request to the BCM, the ECG-App shall wait for 4 seconds (configurable time) to receive a response. If a response is not received within 4 seconds, the ECG-App shall send the request twice more

Requirement ID: R_FNC_RS_0018					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

4.6.5.2 Non-Functional Requirements

R_FNC_RS_0020 BCM Response Time

The BCM shall process the request within 4 seconds

Requirement ID: R_FNC_RS_0020					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0021 Retry Due to No Response from BCM

If the BCM does not process the request within 4 seconds, the ECG shall retry sending the request 2 more times

Requirement ID: R_FNC_RS_0021					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

4.7 7. Send Remote Start Status to Requester

4.7.1 Function Overview

4.7.1.1 Description

Function is allocated to:

- VSDN/TMC <<Logical>>

The Send Remote Start Status to Requester when the VSDN/TMC sends the Remote Start status to the Mobile App

4.7.1.2 Glossary

See Appendix for Definitions and Abbreviations.

4.7.2 Function Scope

The – **“7. Send Remote Start Status to Requester”** function is called by the following functions:

- – “Cellular Remote Start”

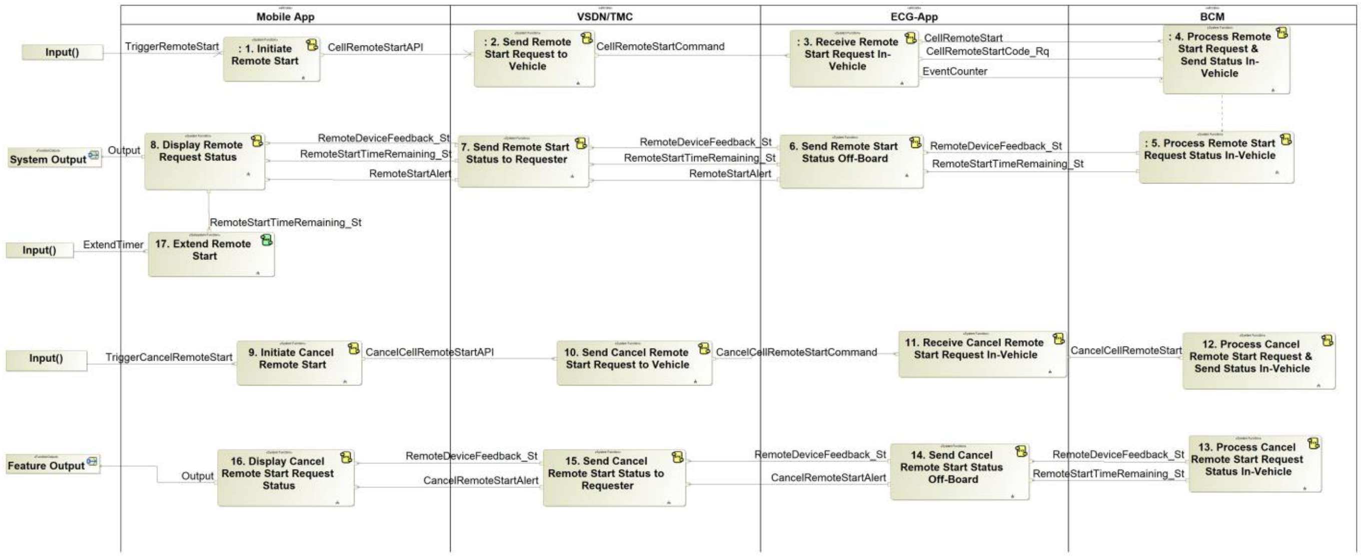
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 15: Activity Diagram of “Cellular Remote Start” calling “7. Send Remote Start Status to Requester”

4.7.3 Function Interfaces

4.7.3.1 Logical Inputs

Signal Name	Description
RemoteDeviceFeedback_St	Usage in Function: Remote start status Received from: • 6. Send Remote Start Status Off-Board
RemoteStartAlert	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Remote Start Received from: • 6. Send Remote Start Status Off-Board
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires Received from: • 6. Send Remote Start Status Off-Board

4.7.3.2 Logical Outputs

Signal Name	Description
RemoteStartAlert()	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Remote Start Sent to:

	- 8. Display Remote Request Status
RemoteDeviceFeedback_St()	Usage in Function: Remote start status Sent to: - 8. Display Remote Request Status
RemoteStartTimeRemaining_St()	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires Sent to: - 8. Display Remote Request Status

4.7.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.7.4 Function Modeling

4.7.4.1 Activity Diagram

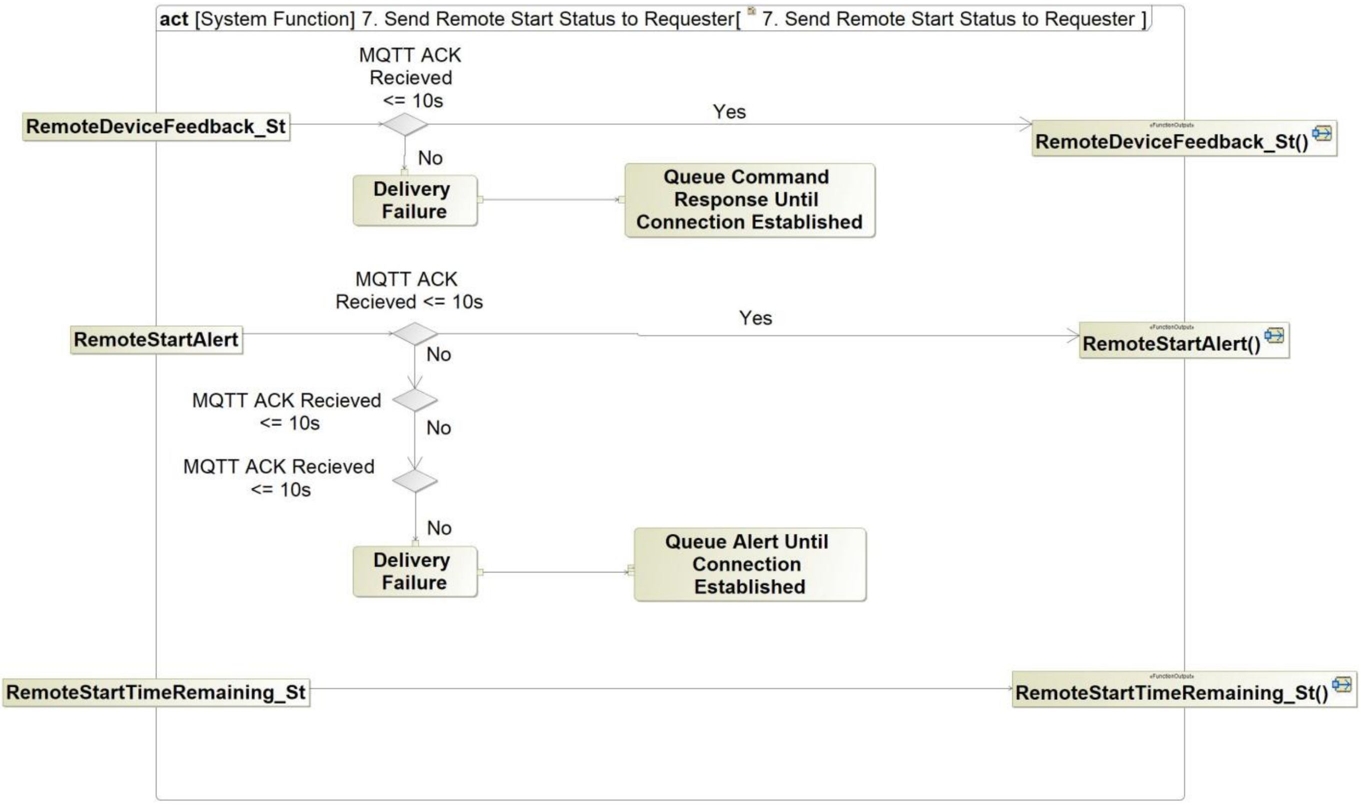
act [System Function] 7. Send Remote Start Status to Requester[7. Send Remote Start Status to Requester]
MQTT ACK Recieved <= 10s
RemoteDeviceFeedback_St
Yes
RemoteDeviceFeedback_St()
No
Delivery Failure
Queue Command Response Until Connection Established
MQTT ACK Recieved <= 10s
RemoteStartAlert
Yes
RemoteStartAlert()
No
MQTT ACK Recieved <= 10s
No
MQTT ACK Recieved <= 10s
No
Delivery Failure
Queue Alert Until Connection Established
RemoteStartTimeRemaining_St
RemoteStartTimeRemaining_St()

Figure 16: 7. Send Remote Start Status to Requester

4.7.5 Function Requirements

4.7.5.1 Functional Requirements

4.7.5.1.1 Normal Operation

R_FNC_RS_0022 Remote Start Alert

If the vehicle engine is started, the vehicle shall send an alert to the VSDN/TMC

Requirement ID: R_FNC_RS_0022					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0023 VSDN/TMC Sends Remote Start Status to Mobile App

VSDN/TMC shall send the status of the mobile app to indicate to the user that the vehicle has successfully remote started

Requirement ID: R_FNC_RS_0023					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

4.8 8. Display Remote Request Status

4.8.1 Function Overview

4.8.1.1 Description

Function is allocated to:
- Mobile App <<Logical>>

The Display Remote Request Status function is called when the VSDN/TMC sends the Remote Start status to the Mobile App

4.8.2 Function Scope

The **– "8. Display Remote Request Status"** function is called by the following functions:
- – "Cellular Remote Start"

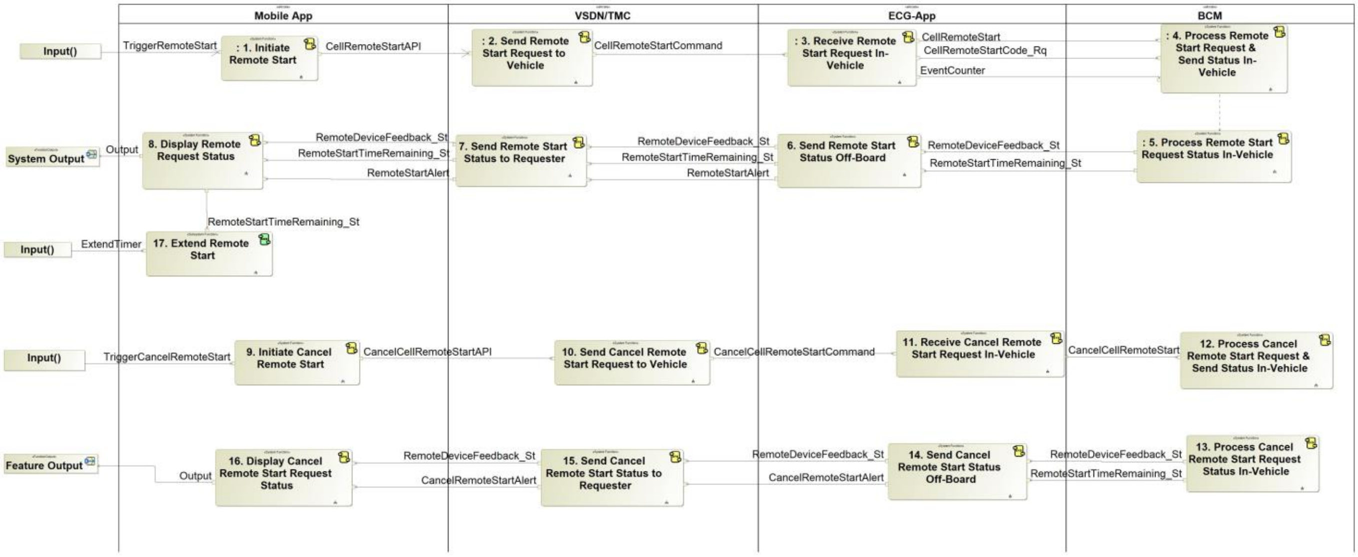
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 17: Activity Diagram of "Cellular Remote Start" calling "8. Display Remote Request Status"

4.8.3 Function Interfaces

4.8.3.1 Logical Inputs

Signal Name	Description
RemoteDeviceFeedback_St	Usage in Function: Remote start status Received from: • 7. Send Remote Start Status to Requester
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires Received from: • 7. Send Remote Start Status to Requester
RemoteStartAlert	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Remote Start Received from: • 7. Send Remote Start Status to Requester

4.8.3.2 Logical Outputs

Signal Name	Description
Output	Usage in Function: Mobile App messages displayed to the user
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires Sent to: • 17. Extend Remote Start

4.8.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.8.4 Function Modeling

4.8.4.1 Activity Diagram

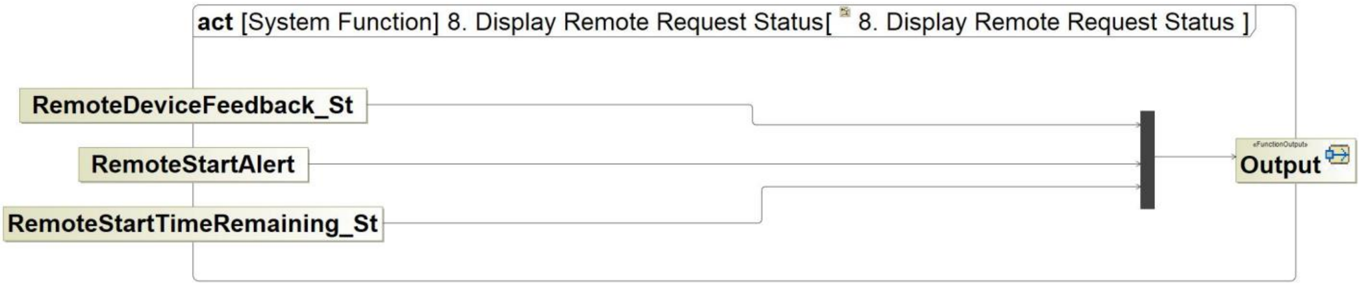
act [System Function] 8. Display Remote Request Status[8. Display Remote Request Status]
RemoteDeviceFeedback_St
RemoteStartAlert
RemoteStartTimeRemaining_St
«FunctionOutput»
Output

Figure 18: 8. Display Remote Request Status

4.8.5 Function Requirements

4.8.5.1 Functional Requirements

R_FNC_RS_0027 Countdown Timer & Button Transformation

The mobile app Start button shall change to Cancel, the extend button shall visible and the duration timer shall be shown

Requirement ID: R_FNC_RS_0027

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

R_FNC_RS_0028 Success Message

The mobile app will display a success message when the Remote Start or Cancel Remote Start request is successful

Requirement ID: R_FNC_RS_0028

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.9 9. Initiate Cancel Remote Start

4.9.1 Function Overview

4.9.1.1 Description

Function is allocated to:

- Mobile App <<Logical>>

The Initiate Cancel Remote Start function is called when the user selects the Cancel Remote Start button on the Mobile App initiating the request

4.9.2 Function Scope

The **– "9. Initiate Cancel Remote Start"** function is called by the following functions:

- – "Cellular Remote Start"

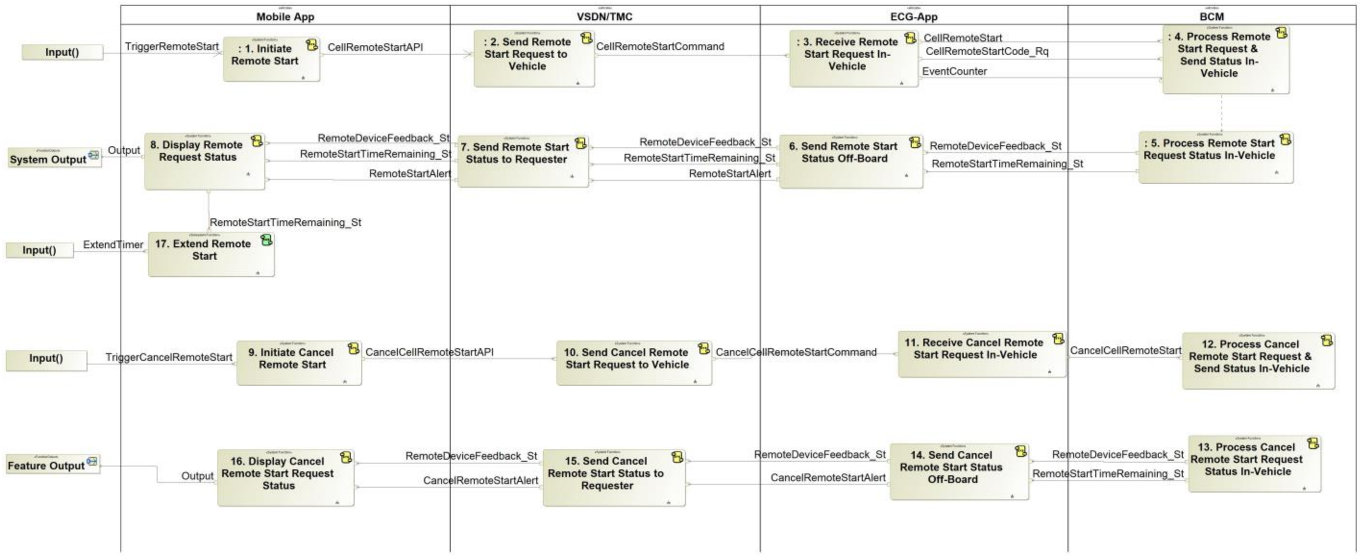
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 19: Activity Diagram of "Cellular Remote Start" calling "9. Initiate Cancel Remote Start"

4.9.3 Function Interfaces

4.9.3.1 Logical Inputs

Signal Name	Description
TriggerRemoteStart	Usage in Function: User selects button on the Mobile App
TriggerCancelRemoteStart	Usage in Function: User selects button on the Mobile App to trigger Cancel Remote Start Received from: • Activity Parameter Node: Input()

4.9.3.2 Logical Outputs

Signal Name	Description
CellRemoteStartAPI	Usage in Function: The Mobile App sends a Remote Start API request to VSDN/TMC
CancelCellRemoteStartAPI	Usage in Function: The Mobile App sends a Cancel Remote Start API request to VSDN/TMC Sent to: - 10. Send Cancel Remote Start Request to Vehicle

4.9.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.9.4 Function Modeling

4.9.4.1 Activity Diagram

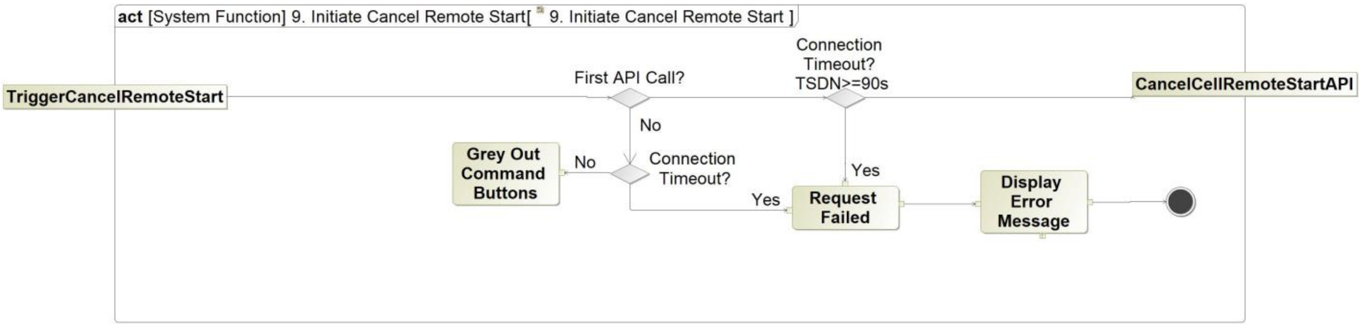
act [System Function] 9. Initiate Cancel Remote Start[9. Initiate Cancel Remote Start]
TriggerCancelRemoteStart
First API Call?
Connection Timeout? TSDN>=90s
CancelCellRemoteStartAPI
No
Grey Out Command Buttons
No
Connection Timeout?
Yes
Yes
Request Failed
Display Error Message

Figure 20: 9. Initiate Cancel Remote Start

4.9.5 Function Requirements

4.9.5.1 Functional Requirements

4.9.5.1.1 Normal Operation

R_FNC_RS_0029 Cancel Remote Start Pre-Condition

The vehicle should be started remotely in order to send a Cancel Remote Start request

Requirement ID: R_FNC_RS_0029					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0030 Countdown Timer Expiry

The Remote Start shall be canceled by allowing the duration timer to expire

Requirement ID: R_FNC_RS_0030

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

R_FNC_RS_0031 Initiate Cancel Remote Start

The user shall press and hold the Cancel Remote Start button on the mobile app to initiate the cancel remote start process

Requirement ID: R_FNC_RS_0031

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

R_FNC_RS_0032 Cancel Remote Start Request Sent to VSDN/TMC

The mobile app shall send the Cancel Remote Start request to the VSDN/TMC

Requirement ID: R_FNC_RS_0032

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.9.5.1.2 Error Handling

R_FNC_RS_005 Mobile App Timeout

The mobile app shall wait for 120 seconds to receive a response from VSDN/TMC

Requirement ID: R_FNC_RS_005

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.10 10. Send Cancel Remote Start Request to Vehicle

4.10.1 Function Overview

4.10.1.1 Description

Function is allocated to:

- VSDN/TMC <<Logical>>

The Send Cancel Remote Start Request to Vehicle function is called when the VSDN/TMC receives the Cancel Remote Start request

4.10.2 Function Scope

The **– "10. Send Cancel Remote Start Request to Vehicle"** function is called by the following functions:

- – "Cellular Remote Start"

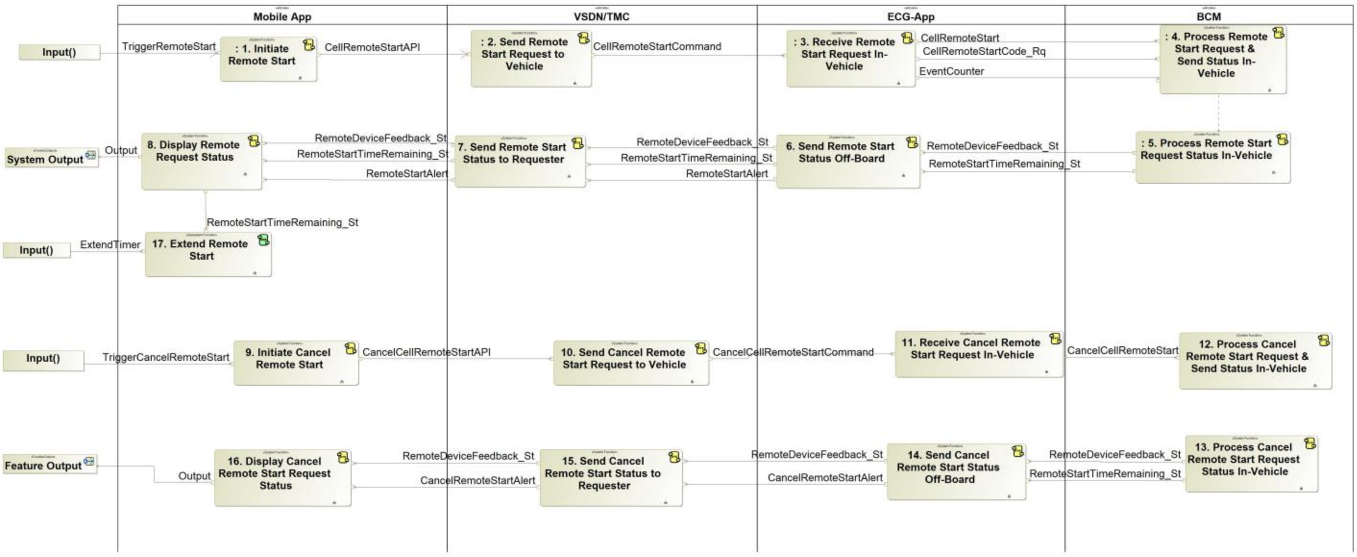
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 21: Activity Diagram of "Cellular Remote Start" calling "10. Send Cancel Remote Start Request to Vehicle"

4.10.3 Function Interfaces

4.10.3.1 Logical Inputs

Signal Name	Description
CancelCellRemoteStartAPI	Usage in Function: The Mobile App sends a Cancel Remote Start API request to VSDN/TMC Received from: • 9. Initiate Cancel Remote Start

4.10.3.2 Logical Outputs

Signal Name	Description

CancelCellRemoteStartCommand	Usage in Function: Command sent from VSDN/TMC to initiate Cancel Remote Start Sent to: - 11. Receive Cancel Remote Start Request In-Vehicle
CellRemoteStartCommand	Usage in Function: Command sent from VSDN/TMC to initiate a Remote Start

4.10.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.10.4 Function Modeling

4.10.4.1 Activity Diagram

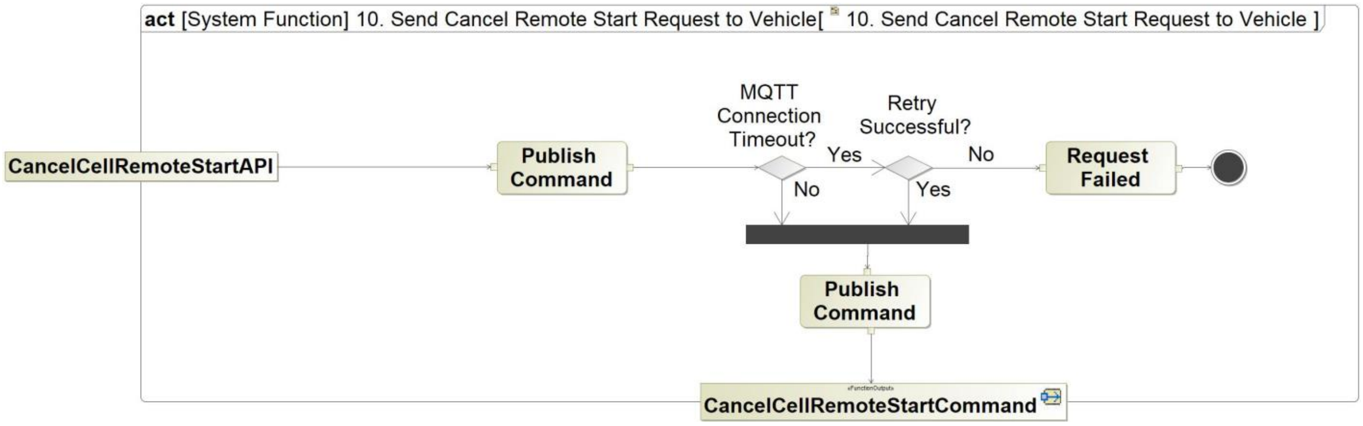
act [System Function] 10. Send Cancel Remote Start Request to Vehicle[10. Send Cancel Remote Start Request to Vehicle]
CancelCellRemoteStartAPI
Publish Command
MQTT Connection Timeout?
Yes
No
Retry Successful?
No
Yes
Request Failed
Publish Command
«FunctionOutput»
CancelCellRemoteStartCommand

Figure 22: 10. Send Cancel Remote Start Request to Vehicle

4.10.5 Function Requirements

4.10.5.1 Functional Requirements

4.10.5.1.1 Normal Operation

R_FNC_RS_0033 Cancel Remote Start Command Sent to Vehicle

The VSDN/TMC shall send the command to the vehicle

Requirement ID: R_FNC_RS_0033

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

R_FNC_RS_0034 Backend Timeout for Cancel Command

The Cancel Command shall time out after 90 seconds from the moment the backend sent the command to the vehicle. This should be configurable

Requirement ID: R_FNC_RS_0034

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.11 11. Receive Cancel Remote Start Request In-Vehicle

4.11.1 Function Overview

4.11.1.1 Description

Function is allocated to:
- ECG-App <<Logical>>

The Receive Cancel Remote Start Request In-Vehicle function is called when the ECG-App receives the Cancel Remote Start request from the VSDN/TMC

4.11.2 Function Scope

The **– "11. Receive Cancel Remote Start Request In-Vehicle"** function is called by the following functions:
- – "Cellular Remote Start"

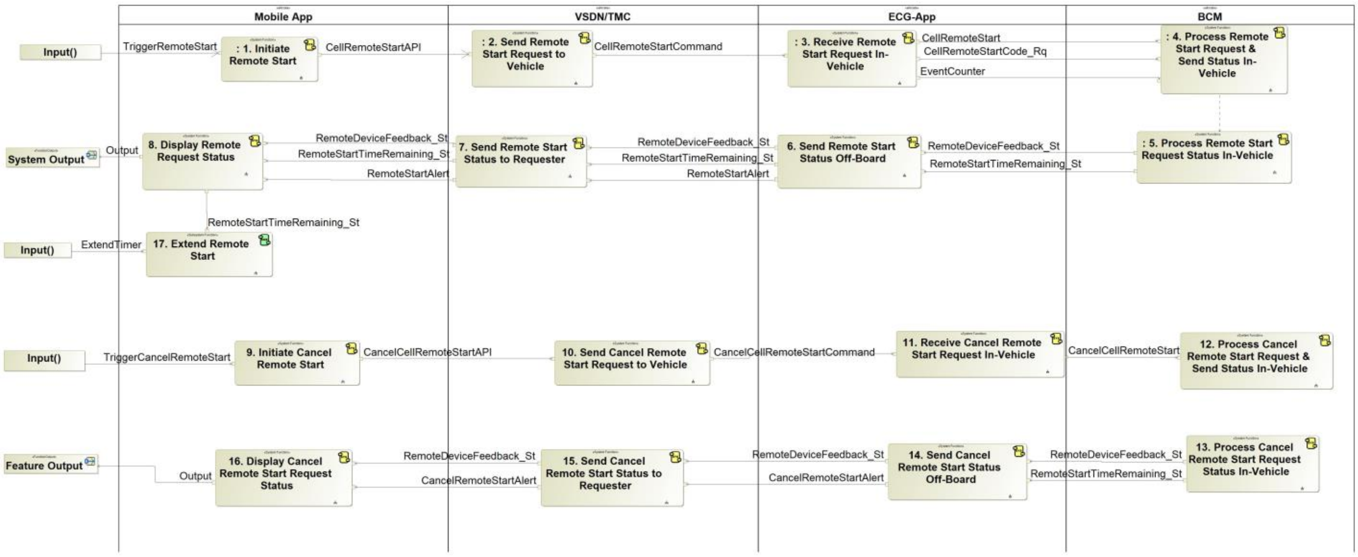
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
6. Send Remote Start Status Off-Board
: 5. Process Remote Start Request Status In-Vehicle
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
14. Send Cancel Remote Start Status Off-Board
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 23: Activity Diagram of "Cellular Remote Start" calling "11. Receive Cancel Remote Start Request In-Vehicle"

4.11.3 Function Interfaces

4.11.3.1 Logical Inputs

Signal Name	Description
CancelCellRemoteStartCommand	Usage in Function: Command sent from VSDN/TMC to initiate Cancel Remote Start Received from: • 10. Send Cancel Remote Start Request to Vehicle

4.11.3.2 Logical Outputs

Signal Name	Description
CancelCellRemoteStart	Usage in Function: CAN signal sent from the ECG-App to the BCM to cancel remote start Sent to: • 12. Process Cancel Remote Start Request & Send Status In-Vehicle

4.11.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.11.4 Function Modeling

4.11.4.1 Activity Diagram

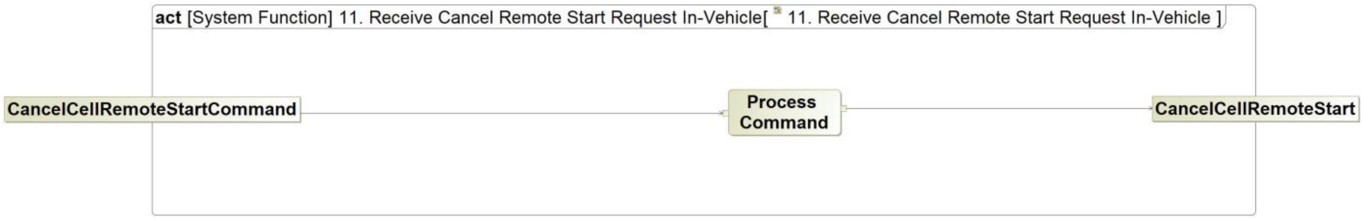
act [System Function] 11. Receive Cancel Remote Start Request In-Vehicle[11. Receive Cancel Remote Start Request In-Vehicle]
CancelCellRemoteStartCommand
Process Command
CancelCellRemoteStart

Figure 24: 11. Receive Cancel Remote Start Request In-Vehicle

4.11.5 Function Requirements

4.11.5.1 Functional Requirements

4.11.5.1.1 Normal Operation

R_FNC_RS_0036 Process Cancel Command

The ECG-App shall process the command and send it to the BCM along with the roll code and event counter

Requirement ID: R_FNC_RS_0036			
Rationale			
Acceptance Criteria			
Notes			
Source		**Owner**	
Source Req.		**V&V Method**	

Type		**Priority**		**Status**	

[Req. Template](#) Version 6.0 End of Requirement

R_FNC_RS_0037 Event Counter: Cancel Remote Start

An event counter counts the number of times a digital signal changes. When the ECG receives a request, it shall increment the event counter. When the remote request is sent, the ECG shall transmit the signal to the BCM and the event counter is incremented by one

Requirement ID: R_FNC_RS_0037

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

[Req. Template](#) Version 6.0 End of Requirement

4.12 12. Process Cancel Remote Start Request & Send Status In-Vehicle

4.12.1 Function Overview

4.12.1.1 Description

Function is allocated to:

- BCM <<Logical>>

The Receive & Process Cancel Remote Start Request In-Vehicle is called when the BCM receives the Cancel Remote Start request and determines if the conditions are correct to process the request

4.12.2 Function Scope

The **– "12. Process Cancel Remote Start Request & Send Status In-Vehicle"** function is called by the following functions:

- – "[Cellular Remote Start](#)"

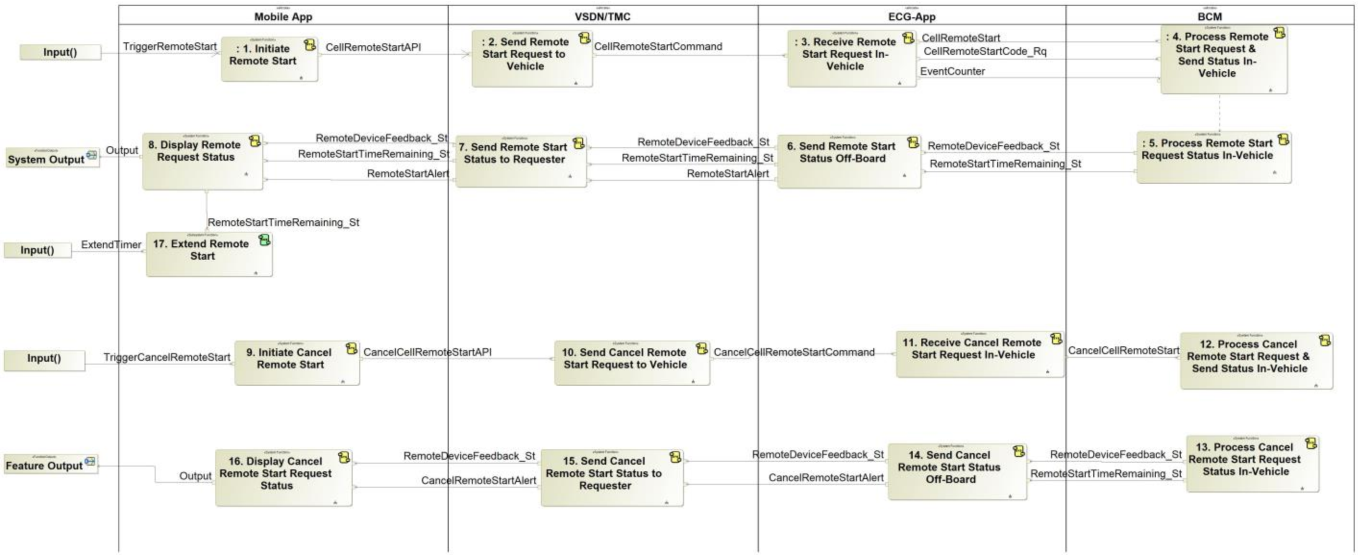
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 25: Activity Diagram of “Cellular Remote Start” calling “12. Process Cancel Remote Start Request & Send Status In-Vehicle”

4.12.3 Function Interfaces

4.12.3.1 Logical Inputs

Signal Name	Description
CancelCellRemoteStart	Usage in Function: CAN signal sent from the ECG-App to the BCM to cancel remote start Received from: • 11. Receive Cancel Remote Start Request In-Vehicle

4.12.3.2 Logical Outputs

No Logical Outputs specified.

4.12.3.3 Activity Diagram

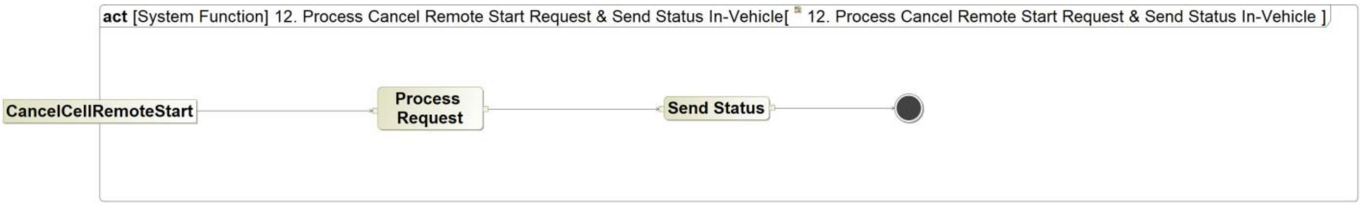
act [System Function] 12. Process Cancel Remote Start Request & Send Status In-Vehicle[12. Process Cancel Remote Start Request & Send Status In-Vehicle]
CancelCellRemoteStart
Process Request
Send Status

Figure 26: 12. Process Cancel Remote Start Request & Send Status In-Vehicle

4.12.4 Function Requirements

4.12.4.1 Functional Requirements

4.12.4.1.1 Normal Operation

R_FNC_RS_0038 BCM Receives Cancel Request from ECG-App

The BCM shall determine if conditions are correct to process the cancel request

Requirement ID: R_FNC_RS_0038

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.13 13. Process Cancel Remote Start Request Status In-Vehicle

4.13.1 Function Overview

4.13.1.1 Description

Function is allocated to:
- BCM <<Logical>>

The Process Cancel Remote Start Request Status In-Vehicle is called when the BCM sends the status to the ECG-App

4.13.2 Function Scope

The **– "13. Process Cancel Remote Start Request Status In-Vehicle"** function is called by the following functions:
- – "Cellular Remote Start"

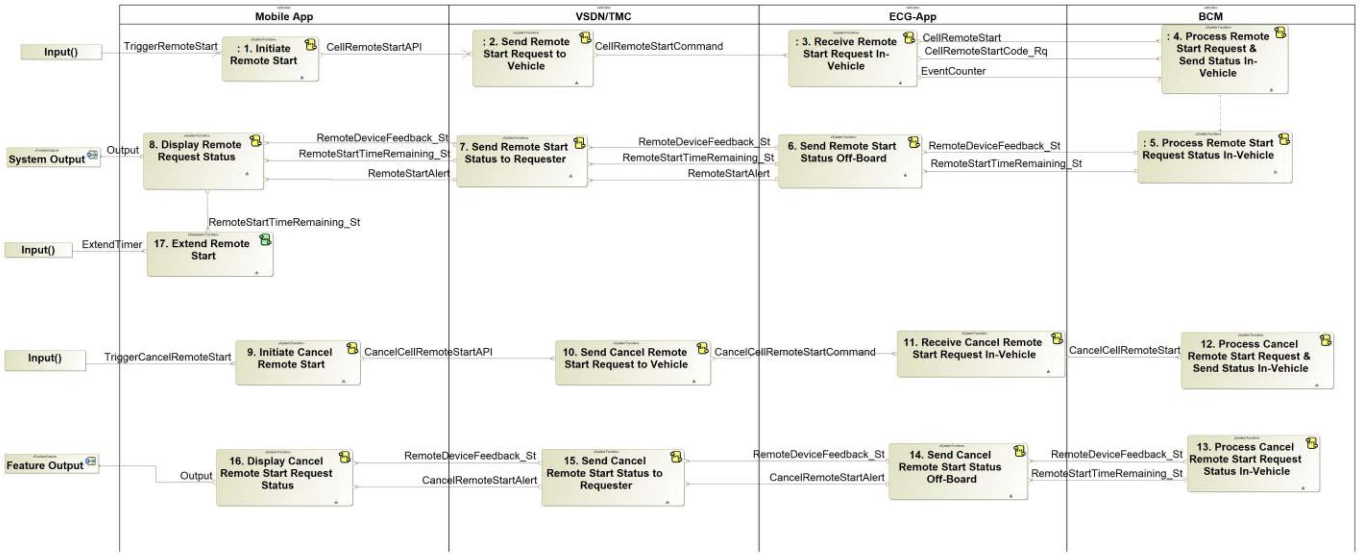
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
6. Send Remote Start Status Off-Board
: 5. Process Remote Start Request Status In-Vehicle
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
14. Send Cancel Remote Start Status Off-Board
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 27: Activity Diagram of "Cellular Remote Start" calling "13. Process Cancel Remote Start Request Status In-Vehicle"

4.13.3 Function Interfaces

4.13.3.1 Logical Inputs

No Logical Inputs specified.

4.13.3.2 Logical Outputs

Signal Name	Description
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires Sent to: • 14. Send Cancel Remote Start Status Off-Board

RemoteDeviceFeedback_St	Usage in Function: Remote start status Sent to: • 14. Send Cancel Remote Start Status Off-Board

4.13.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.13.4 Function Modeling

4.13.4.1 Activity Diagram

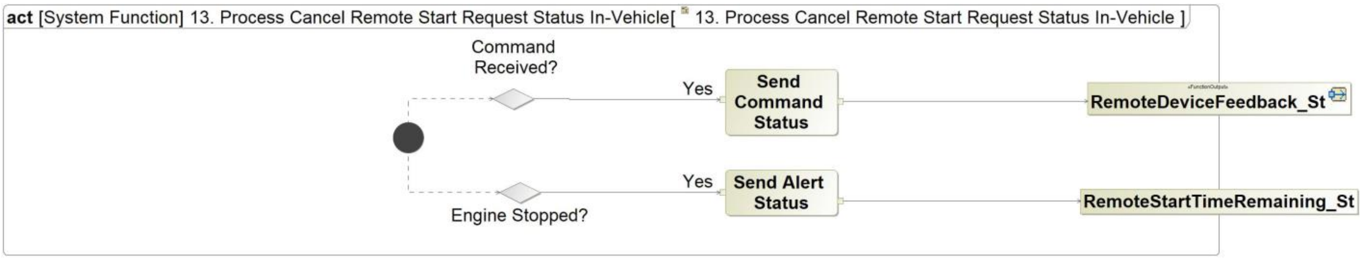
act [System Function] 13. Process Cancel Remote Start Request Status In-Vehicle[13. Process Cancel Remote Start Request Status In-Vehicle]
Command Received?
Yes
Send Command Status
RemoteDeviceFeedback_St
Yes
Send Alert Status
RemoteStartTimeRemaining_St
Engine Stopped?

Figure 28: 13. Process Cancel Remote Start Request Status In-Vehicle

4.13.5 Function Requirements

4.13.5.1 Functional Requirements

4.13.5.1.1 Normal Operation

R_FNC_RS_0039 BCM Sends Status of Cancel Command to ECG-App

The BCM shall send the status of the cancel command to the ECG-App

Requirement ID: R_FNC_RS_0039					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0040 BCM Sends Engine Off Status to ECG-App

The BCM shall send the status of the engine once started to the ECG-App

Requirement ID: R_FNC_RS_0040					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

4.14 14. Send Cancel Remote Start Status Off-Board

4.14.1 Function Overview

4.14.1.1 Description

Function is allocated to:

- ECG-App <<Logical>>

The Send Cancel Remote Start Status Off-Board function is called when the ECG-App receives the Remote Start status from the BCM

4.14.2 Function Scope

The **– "14. Send Cancel Remote Start Status Off-Board"** function is called by the following functions:

- – "Cellular Remote Start"

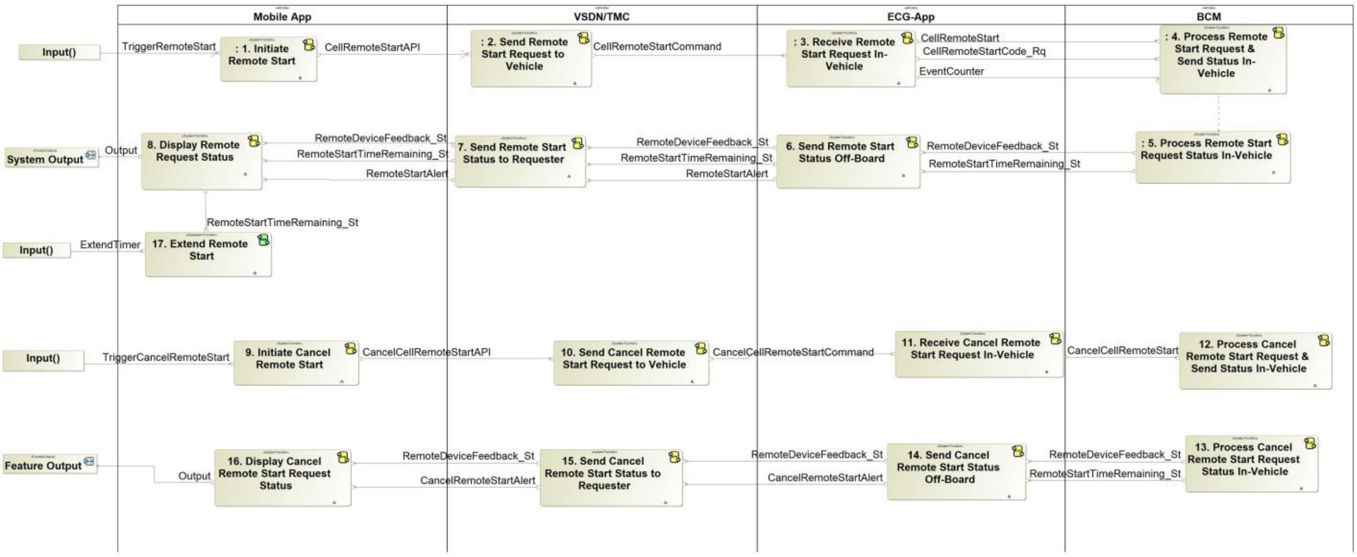
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 29: Activity Diagram of "Cellular Remote Start" calling "14. Send Cancel Remote Start Status Off-Board"

4.14.3 Function Interfaces

4.14.3.1 Logical Inputs

Signal Name	Description
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires Received from: • 13. Process Cancel Remote Start Request Status In-Vehicle
RemoteDeviceFeedback	Usage in Function: Remote start status

RemoteStartTimeRemaining	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires
RemoteDeviceFeedback_St	Usage in Function: Remote start status Received from: • 13. Process Cancel Remote Start Request Status In-Vehicle

4.14.3.2 Logical Outputs

Signal Name	**Description**
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires
RemoteDeviceFeedback_St	
RemoteStartAlert	
RemoteDeviceFeedback_St	Usage in Function: Remote start status Sent to: • 15. Send Cancel Remote Start Status to Requester
CancelRemoteStartAlert	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Cancel Remote Start Sent to: • 15. Send Cancel Remote Start Status to Requester

4.14.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.14.4 Function Modeling

4.14.4.1 Use Cases

Not supported by MagicDraw report generation.

4.14.4.2 Activity Diagram

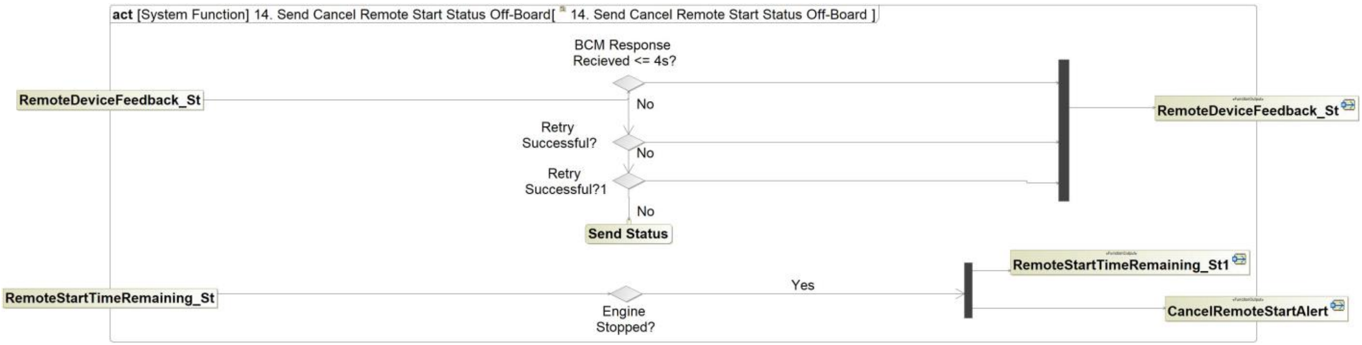
act [System Function] 14. Send Cancel Remote Start Status Off-Board[14. Send Cancel Remote Start Status Off-Board]
BCM Response Recieved <= 4s?
RemoteDeviceFeedback_St
No
Retry Successful?
No
Retry Successful?1
No
Send Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St1
RemoteStartTimeRemaining_St
Yes
Engine Stopped?
CancelRemoteStartAlert

Figure 30: 14. Send Cancel Remote Start Status Off-Board

4.14.5 Function Requirements

4.14.5.1 Functional Requirements

R_FNC_RS_0041 Send Cancel Remote Start Status Off-Board

The status of the request shall be sent from the vehicle to VSDN/TMC

Requirement ID: R_FNC_RS_0041

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.14.5.1.1 Error Handling

R_FNC_RS_0018 Retry Strategy

When the ECG-App sends the Remote Start/Cancel Remote Start request to the BCM, the ECG-App shall wait for 4 seconds (configurable time) to receive a response. If a response is not received within 4 seconds, the ECG-App shall send the request twice more

Requirement ID: R_FNC_RS_0018

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

R_FNC_RS_0042 Retry Due to No Response from BCM - Cancel Request

If the BCM does not process the request within 4 seconds, the ECG shall retry sending the request 2 more times

Requirement ID: R_FNC_RS_0042

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

R_FNC_RS_0043 Retry Strategy for Cancel Request

When the ECG-App sends the Remote Start/Cancel Remote Start request to the BCM, the ECG-App shall wait for 4 seconds (configurable time) to receive a response. If a response is not received within 4 seconds, the ECG-App shall send the request twice more

Requirement ID: R_FNC_RS_0043

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

R_FNC_RS_0044 Cancel Remote Start Failure - Timer Non Zero Value

If the timer value is greater than zero, then the vehicle engine has not stopped and an error message shall be displayed on the Mobile App

Requirement ID: R_FNC_RS_0044

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

4.15 15. Send Cancel Remote Start Status to Requester

4.15.1 Function Overview

4.15.1.1 Description

Function is allocated to:

- VSDN/TMC <<Logical>>

The Send Cancel Remote Start Status to Requester when the VSDN/TMC sends the Cancel Remote Start status to the Mobile App

4.15.1.2 Glossary

See Appendix for Definitions and Abbreviations.

4.15.2 Function Scope

The **– "15. Send Cancel Remote Start Status to Requester"** function is called by the following functions:

- – "Cellular Remote Start"

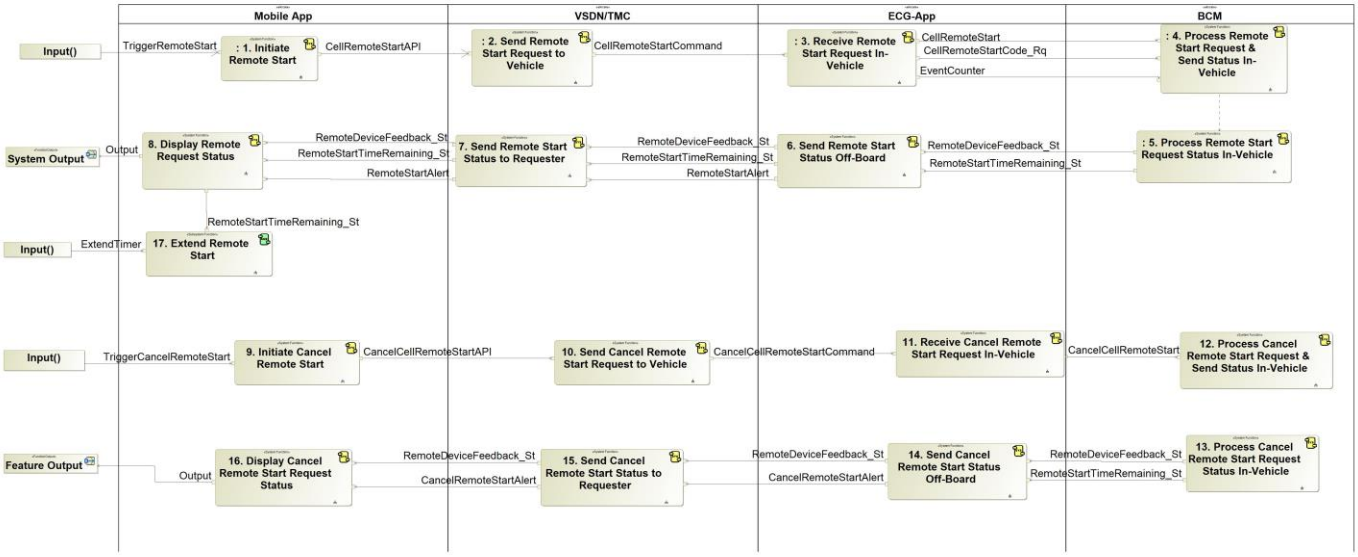
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 31: Activity Diagram of "Cellular Remote Start" calling "15. Send Cancel Remote Start Status to Requester"

4.15.3 Function Interfaces

4.15.3.1 Logical Inputs

Signal Name	Description
RemoteDeviceFeedback_St	Usage in Function: Remote start status
CancelRemoteStartAlert	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Cancel Remote Start Received from: • 14. Send Cancel Remote Start Status Off-Board
RemoteStartAlert	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Remote Start
RemoteDeviceFeedback_St	Usage in Function: Remote start status Received from: • 14. Send Cancel Remote Start Status Off-Board
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires

4.15.3.2 Logical Outputs

Signal Name	Description
RemoteDeviceFeedback_St	Usage in Function: Remote start status
CancelRemoteStartAlert	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Cancel Remote Start Sent to:

	- 16. Display Cancel Remote Start Request Status
RemoteStartAlert	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Remote Start
RemoteStartTimeRemaining_St	Usage in Function: Countdown timer representing time in seconds remaining until Remote Start expires
RemoteDeviceFeedback_St	Usage in Function: Remote start status Sent to: - 16. Display Cancel Remote Start Request Status

4.15.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.15.4 Function Modeling

4.15.4.1 Activity Diagram

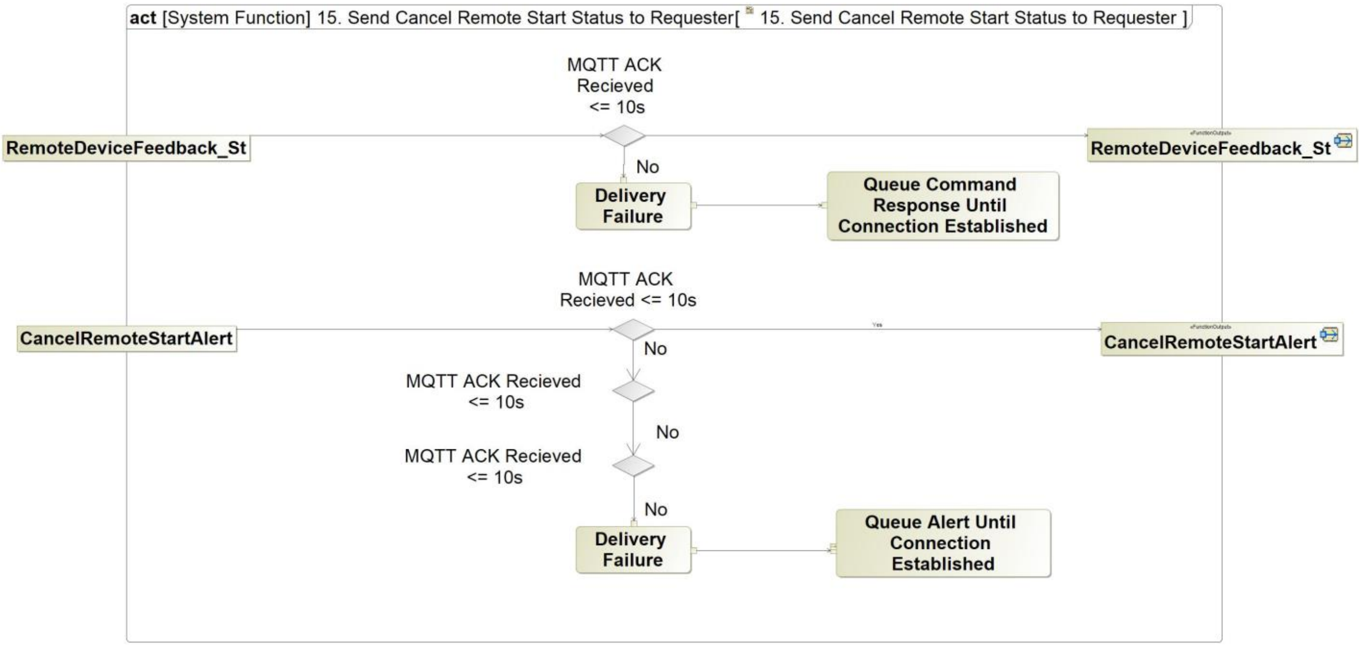
act [System Function] 15. Send Cancel Remote Start Status to Requester[15. Send Cancel Remote Start Status to Requester]
MQTT ACK Recieved <= 10s
RemoteDeviceFeedback_St
«FunctionOutputs»
RemoteDeviceFeedback_St
No
Delivery Failure
Queue Command Response Until Connection Established
MQTT ACK Recieved <= 10s
CancelRemoteStartAlert
Yes
«FunctionOutputs»
CancelRemoteStartAlert
No
MQTT ACK Recieved <= 10s
No
MQTT ACK Recieved <= 10s
No
Delivery Failure
Queue Alert Until Connection Established

Figure 32: 15. Send Cancel Remote Start Status to Requester

4.15.5 Function Requirements

4.15.5.1 Functional Requirements

4.15.5.1.1 Normal Operation

R_FNC_RS_0045 ECG-App Sends Status of Cancel Request to VSDN/TMC

The ECG-App shall send the status of the command response and alert to VSDN/TMC

Requirement ID: R_FNC_RS_0045					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0046 Cancel Command Response Sent to VSDN/TMC

The vehicle shall process the request and send the cancel command response back to TMC/VSDN

Requirement ID: R_FNC_RS_0046					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0047 Cancel Remote Start Alert

If the vehicle engine has stopped, the vehicle shall send an alert to the VSDN/TMC

Requirement ID: R_FNC_RS_0047					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

R_FNC_RS_0048 VSDN/TMC Sends Cancel Remote Start Status to Mobile App

VSDN/TMC shall send the status of the mobile app to indicate to the user that the vehicle has successfully remotely stopped

Requirement ID: R_FNC_RS_0048					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

4.16 16. Display Cancel Remote Start Request Status

4.16.1 Function Overview

4.16.1.1 Description

Function is allocated to:

- Mobile App <<Logical>>

The Display Remote Request Status function is called when the VSDN/TMC sends the Cancel Remote Start status to the Mobile App

4.16.2 Function Scope

The – **"16. Display Cancel Remote Start Request Status"** function is called by the following functions:

- – "Cellular Remote Start"

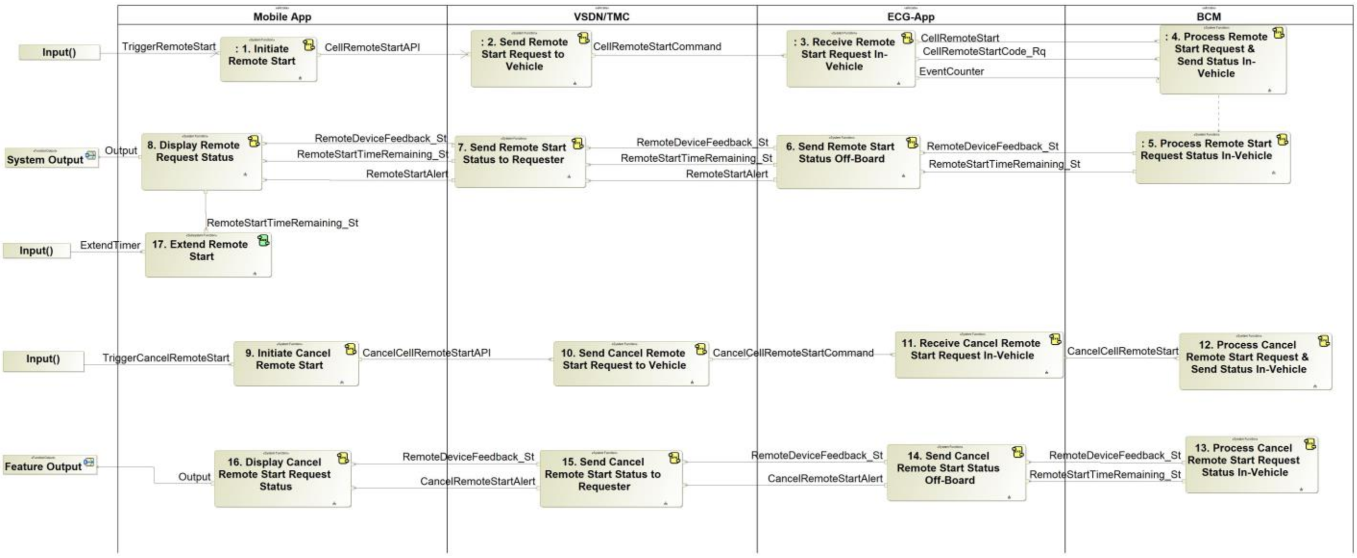
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 33: Activity Diagram of "Cellular Remote Start" calling "16. Display Cancel Remote Start Request Status"

4.16.3 Function Interfaces

4.16.3.1 Logical Inputs

Signal Name	Description
CancelRemoteStartAlert	Usage in Function: Signal sent from the VSDN/TMC to the vehicle to initiate Cancel Remote Start Received from: • 15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St	Usage in Function: Remote start status Received from: • 15. Send Cancel Remote Start Status to Requester

4.16.3.2 Logical Outputs

Signal Name	Description
Output	Usage in Function: Mobile App messages displayed to the user

4.16.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.16.4 Function Modeling

4.16.4.1 Use Cases

Not supported by MagicDraw report generation.

4.16.4.2 Activity Diagram

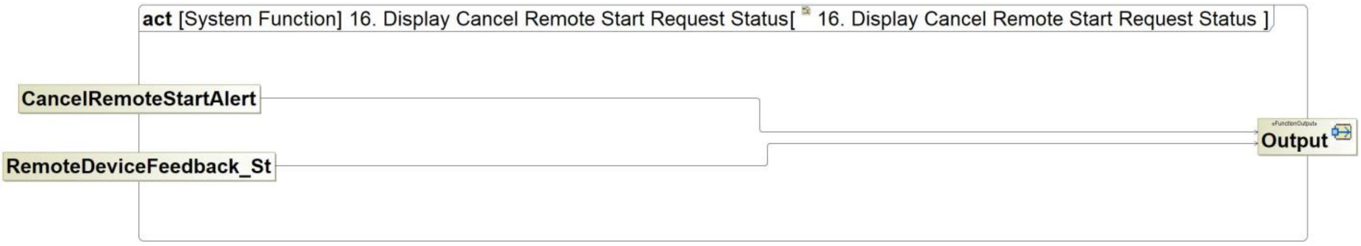
act [System Function] 16. Display Cancel Remote Start Request Status[16. Display Cancel Remote Start Request Status]
CancelRemoteStartAlert
RemoteDeviceFeedback_St
«FunctionOutput»
Output

Figure 34: 16. Display Cancel Remote Start Request Status

4.16.5 Function Requirements

4.16.5.1 Functional Requirements

4.16.5.1.1 Normal Operation

R_FNC_RS_0049 Reset Buttons

All other remote buttons shall become available after the request is complete

Requirement ID: R_FNC_RS_0049					
Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	C5266070 https://www.testrail.ford.com/index.php?/cases/view/5266070&group_by=cases:section_id&group_order=desc&group_id=455386
Type		**Priority**		**Status**	
Req. Template Version 6.0					End of Requirement

4.17 17. Extend Remote Start

4.17.1 Function Overview

4.17.1.1 Description

Function is allocated to:

- Mobile App <<Logical>>

After a successful Remote Start request, the user shall have the option to increase the engine on duration timer and extend the Remote Start timer

4.17.2 Function Scope

The – **"17. Extend Remote Start"** function is called by the following functions:

- – "Cellular Remote Start"

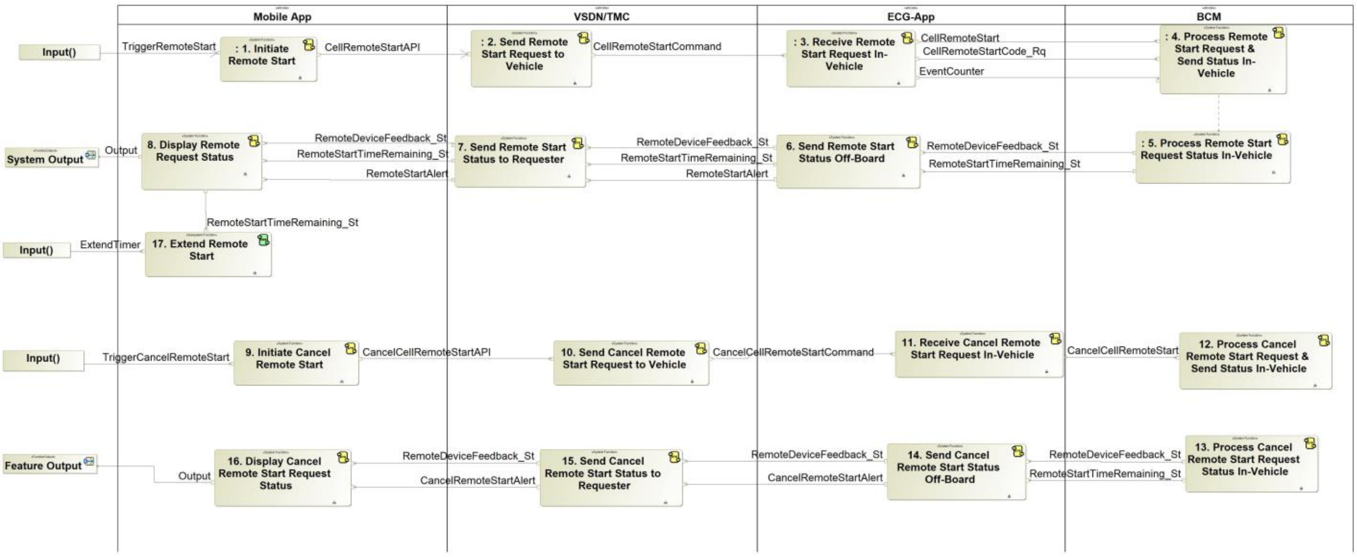
Mobile App
VSDN/TMC
ECG-App
BCM
Input()
TriggerRemoteStart
: 1. Initiate Remote Start
CellRemoteStartAPI
: 2. Send Remote Start Request to Vehicle
CellRemoteStartCommand
: 3. Receive Remote Start Request In-Vehicle
CellRemoteStart
CellRemoteStartCode_Rq
EventCounter
: 4. Process Remote Start Request & Send Status In-Vehicle
System Output
Output
8. Display Remote Request Status
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
7. Send Remote Start Status to Requester
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
RemoteStartAlert
6. Send Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
: 5. Process Remote Start Request Status In-Vehicle
RemoteStartTimeRemaining_St
Input()
ExtendTimer
17. Extend Remote Start
Input()
TriggerCancelRemoteStart
9. Initiate Cancel Remote Start
CancelCellRemoteStartAPI
10. Send Cancel Remote Start Request to Vehicle
CancelCellRemoteStartCommand
11. Receive Cancel Remote Start Request In-Vehicle
CancelCellRemoteStart
12. Process Cancel Remote Start Request & Send Status In-Vehicle
Feature Output
Output
16. Display Cancel Remote Start Request Status
RemoteDeviceFeedback_St
CancelRemoteStartAlert
15. Send Cancel Remote Start Status to Requester
RemoteDeviceFeedback_St
CancelRemoteStartAlert
14. Send Cancel Remote Start Status Off-Board
RemoteDeviceFeedback_St
RemoteStartTimeRemaining_St
13. Process Cancel Remote Start Request Status In-Vehicle

Figure 35: Activity Diagram of "Cellular Remote Start" calling "17. Extend Remote Start"

4.17.3 Function Interfaces

4.17.3.1 Logical Inputs

Signal Name	Description
RemoteStartTimeRemaining_St	Received from: • 8. Display Remote Request Status
ExtendTimer	Received from: • Activity Parameter Node: Input()

4.17.3.2 Logical Outputs

No Logical Outputs specified.

4.17.3.3 Logical Parameters

Not supported by MagicDraw report generation.

4.17.4 Function Modeling

4.17.4.1 Activity Diagrams

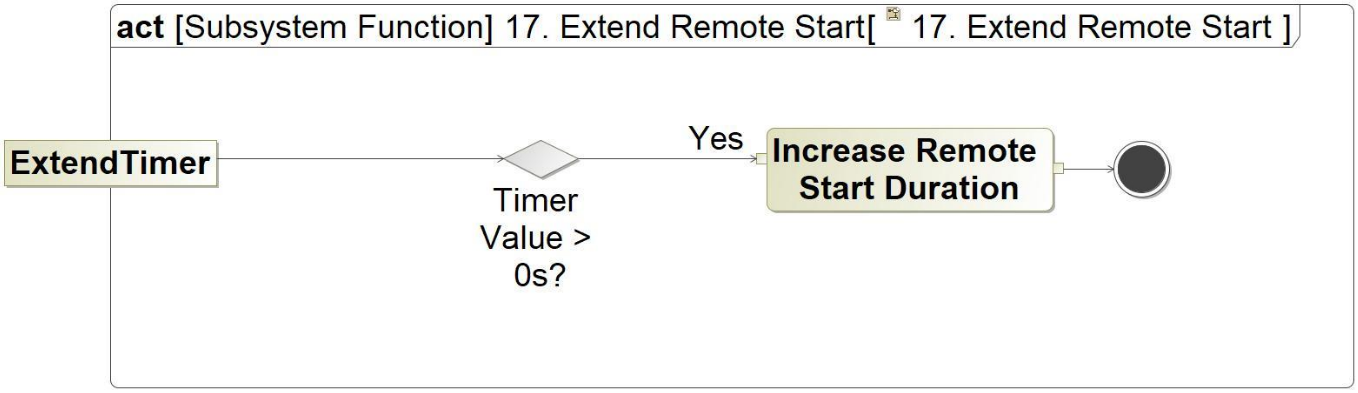
act [Subsystem Function] 17. Extend Remote Start[17. Extend Remote Start]
ExtendTimer
Timer Value > 0s?
Yes
Increase Remote Start Duration

Figure 36: 17. Extend Remote Start

4.17.5 Function Requirements

4.17.5.1 Functional Requirements

4.17.5.1.1 Normal Operation

R_FNC_RS_0024 Extend Duration Timer

While the duration timer is still active, the user shall have the option to extend the engine on time before shutoff by selecting the extend button

Requirement ID: R_FNC_RS_0024

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Reg. Template Version 6.0 End of Requirement

R_FNC_RS_0025 Duration Timer Settings

The duration timer shall be increased by a user-selected number of minutes. The user shall be able to set the value to 5, 10 or 15 minutes in Sync HMI

Requirement ID: R_FNC_RS_0025

Rationale					
Acceptance Criteria					
Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Reg. Template Version 6.0 End of Requirement

R_FNC_RS_0026 Maximum Duration Timer

The user shall be able to extend the remote start duration timer for a total of 30 minutes

Requirement ID: R_FNC_RS_0026

Rationale	
Acceptance Criteria	

Notes					
Source				**Owner**	
Source Req.				**V&V Method**	
Type		**Priority**		**Status**	

Req. Template Version 6.0 End of Requirement

5 OPEN CONCERNS

***#Hint:** The following list presents open concerns, which have to be discussed or clarified over the course of the on-going requirements engineering.*

ID	Concern Description	e-Tracker / Reference	Responsible	Status	Solution
1					

Table 3: Open Concerns *(Not supported by MagicDraw report generation.)*

6 REVISION HISTORY

***#Hint:** A new version number is assigned to a document with a given revision each time it is checked in to Team Center (TCSE). After release of a revision, the document cannot be edited and no new versions can be created on that revision. When updating the document after that, a new revision has to be created and new versions on that revision will be created upon checking in.*

Revision	Author	Description	Sections Affected	Release Date
1.0	Audriene Bell	- Creation of MagicDraw Function Specification	All	5/28/2020

7 APPENDIX

7.1 Data Dictionary

7.1.1 Technical Signals

###TSG_RS_00001### CellRstrt_D_Rq

Signal from a cellular device requesting initiation or cancellation of remote start

Init Default Value		No_Request
Encoding Type Name		Remote_Start_Req_ET
Value (Discrete Encoding)	0x0	No_Request
	0x1	Remote_Start
	0x2	Remote_Cancel
	0x3	Not used
Unit		

###TSG_RS_00002### Remote_Device_Feedback

Signal providing information about Remote Start device

Init Default Value		Null
Encoding Type Name		Remote_Device_Feedback_ET
Value (Discrete Encoding)	0x0	Null
	0x1	Acknowledge
	0x2	Starting
	0x3	Running
	0x4	Shutdown
	0x5	Not Used
	0x6	Not Used
	0x7	Not Used
Unit		

###TSG_RS_00003### CellRstrtRq_No_Actl

Event counter for remote start requests from cellular remote device

Init Default Value		0 unitless
Encoding Type Name		UnitlessValue8bit_ET
Value (Continuous Encoding)	Min Value	0
	Max Value	255
	Resolution	1
	Offset	0
Unit		

###TSG_RS_00004### RollCodeCell_No_Actl

Network Security Rolling Code for TCU signal requests

Init Default Value	0 Unitless

Encoding Type Name		UnitlessValue8bit_ET
Value (Continuous Encoding)	Min Value	0
	Max Value	65535
	Resolution	1
	Offset	0
Unit		

###TSG_RS_00005### Rstrt_T_Actl

Countdown timer representing time in seconds remaining until Remote Start expires (times out). Starting time is variable depending on the customer setting for duration

Init Default Value		0 seconds
Encoding Type Name		Time16bit_ET
Value (Continuous Encoding)	Min Value	0
	Max Value	65535
	Resolution	1
	Offset	0
Unit		

###TSG_RS_00006### PtWakeupActv1_B_Rq

This is a request from the CPP module to the Body control module to request that the PCM hardwire wake-up is activated. This allows the PCM to wake-up and provide data to support the remote data request

Init Default Value		Off
Encoding Type Name		OnOff_ET
Value (Discrete Encoding)	0x0	Off
	0x1	On
Unit		

7.1.2 Logical Signals

***#Macro:** Add Ins -> Add Requirement macro (select "Logical Signal" as type)*

7.1.3 Logical Parameters

***#Macro:** Add Ins -> Add Requirement macro (select "Logical Parameter" as type)*

7.1.4 Encoding Types

***#Macro:** Add Ins -> Add Requirement macro (select "Encoding Type" as type)*

7.2 Glossary

***#Hint**: Terms, concepts and abbreviations used in the document shall be defined and illustrated here. Note that changes to terms and/or concepts described in this section tend to cause major updates to this document.*
The tables below have feature specific definitions and abbreviations. For additional, non-feature specific terms please refer to the RE Glossary

7.2.1 Definitions

***#Hint:** The table below has definitions and abbreviations relevant for the functions in this document. For additional terms please refer to the RE Glossary*

7.2.2 References

7.2.2.1 Ford Documents

List here all Ford internal documents, which are directly related to the feature.

Reference	Title	Doc. ID	Document Location	Revision
SRC1	Control My Car v3 ECG SPSS v1.5			
SRC2	Control My Car Implementation Guide v1.5			
SRC3	ECG Common Functions SPSS v1.1			
SRC4	ECG-TCU Interface Power State Management ECG SPSS v1.0			
SRC5	Power Management ECG SPSS v2.0			
SRC6	Stolen Vehicle Services OnBoardClient SPSS v1.9			
SRC7	Embedded Modem Reset Server v2 SPSS v1.5			
SRC8	Body Control Module Functional Specification FS-LU5T-14B476-AAC			
SRC9	Control My Car FTCP Protofile			

Table 4: Ford internal Documents

Document ends here.