Feature Document (FD)

Cellular Remote Start, Extend Remote Start & Cancel Remote Start

<<Feature>>

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Person	Role	Email Confirmation	Date

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1 INTRODUCTION

1.1 Document Purpose

A Feature Document (FD) document specifies **what** the feature shall do and how it shall behave from customer perspective. It should also provide reasoning and background **why** we have the feature in the vehicle.

The FD also serves as an Item Definition as defined by ISO26262 for those features, which follow the Ford Functional Safety process.

To get more information about the concept of feature, function and component level abstraction refer to the Ford RE Wiki. For details on the Ford Functional Safety (ISO26262) process refer to the Ford Functional Safety Sharepoint.

1.2 Document Scope

This Feature Document (FD) specifies the following features:

Feature ID	Feature Name	Owner	Reference
	Cellular Remote Start, Extend Remote Start & Cancel Remote Start (Program(s): FNV2)	Audriene Bell, abell101	

Table 1: Features described in this FD

1.3 Document Audience

The FD is written by the feature owner of Audriene Bell, abell101. All Stakeholders, i.e., all people who have a valid interest in the feature should read and, if possible, review the FD. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the FD.

#Hint: The FD 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 stakeholder of the feature and their influence 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 feature.

Name	CDSID	Role	Department
Colin Drummond	CDRUMMO8	Feature Owner Supervisor	CVVP
Lalitha Kovuru	LKOVURU	Program Manager	CVVP
Audriene Bell	abell101	Feature Owner Requirements	CVVP
Raad Alhussainy	ralhussa	Feature Owner Requirements	CVVP
Michael Brown	mbrow568	Feature Owner Testing	CVPP
Sally Cherian	scheria2	Feature Owner Core BCM	BCM
Justin Davis	jdavi619	Control My Car ECG Apps Developer	Central Software
Rabindra Basak	rbasak	Manager – ECG Apps	Central Software
Robert Paquette	rpaquet2	FISI Engineer	INFOTAIN&CONNECT ELECTR/A
Gail Cheng	gcheng	Infotain Sys Supervisor	INFOTAIN&CONNECT ELECTR/A
Julian Onuoha	jonuoha	Performance Testing	VSDN / TMC
Dave Gersabeck	dgersabe	CVPP Chief Engineer	CVPP
Michael Martinez	mmart664	Sr. Product Manager	FordPass
Felipe Castrejon	FCASTREJ	EV Feature Owner	CVPP

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1.4 Document Organization

1.4.1 Document Context

Refer to the Specification Structure page in the Ford RE Wiki to understand how the FD 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 – Feature Description. States briefly the background and the purpose of the feature, feature variants and corresponding regions and markets. Also includes input requirements, assumptions and constraints.

Section 3 – Feature Context describes all external entities, which have an influence on the feature.

Section 4 – Feature Modeling. Contains Use Case, Driving Scenarios, State Charts to describe the functional behavior of the feature.

Section 5 – Safety. Lists System Behaviors and Safety Goals of the feature.

Section 6 – Feature Requirements. Lists functional and non-functional requirements of the feature.

Section 7 – Architecture. Shows the coarse architecture, which the feature requirements are deployed to. Describes the elements and the boundary of the feature as well as the decomposition and distribution of associated functions.

Section 8 – List of Open Concerns

Section 9 – Document Change 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 10 – Appendix

> **#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.

1.6 References

1.6.1 Ford Documents

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

Reference	Title	Doc. ID	Document Location	Revision
Original Document	Remote Start and Schedule Remote Start Product Specification Document _v2.6			
SRC1	Control My Car v3 ECG SPSS v1.5			
SRC2	Control My Car Implementation Guide v1.5			
SRC3	ECG Common Functions SPSS v1.1			

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Reference	Title	Doc. ID	Document Location	Revision
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 2: Ford internal Documents

1.6.2 External Documents and Publications

The list of external documents could include books, reports and online sources.
#Hint: You may refer to IEEE Citation Reference on how to format a reference.

Reference	Document / Publication	Document Location

Table 3: External documents and publications *(not specified in SysML model)*

1.7 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

See Appendix for Definitions and Abbreviations.

1.7.1 Parameters / Values

Name	Description	Range / Resolution

Table 4: Parameters / Values used in this document *(Not supported by MagicDraw report generation)*

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2   FEATURE OVERVIEW

2.1   Purpose and Description of Feature

#Hint: Some descriptive text to explain the purpose and functionality of the feature.

In order to deliver an enhanced customer experience and to evolve FORD's connectivity leadership, the FORD mobile application will include a series of command control features developed to provide an expanded suite of remote connectivity to customers.

The purpose of this Feature Document is to explain the functionality of the command and control features, specifically the Remote Start and Schedule Remote Start features, which will be delivered to the customer and provide a series of user requirements needed to achieve this functionality.

2.2   Feature Variants

#Hint: Definitions for different variants of the feature (if applicable). Give each variant a descriptive name by which it can be referenced further on in the document. If no variant exists, state "No Feature Variants".
The Variant Description should give a short informative text which describes the variants of the feature.

Variant Name	Variant Description	Remarks
FNV2	8 Networks: MS CAN (BCM), HS CAN (PCM, Body), FD CAN (ADAS), ETHERNET – UNTRUSTED (SYNC, TCU), ETHERNET – TRUSTED (IPC), LIN, DIAG1 (OBDII), DIAG2 (OBDII)	

Table 5: Feature Variants

2.2.1   Regions & Markets

#Hint: Description of purpose and functionality of the feature. If there is no variant, give feature name in first column.

Market / Region / Variant Name	North America	South America	Europe	Middle East/Africa	Asia / Pacific	China
FNV2	Mandatory	No	Optional	No	Optional	Optional

Table 6: Regions & Markets

2.3   Input Requirements

#Hint: List all input requirements, which are relevant for the feature. Typically, attribute requirements, legal requirements as well as national and international standards have to be considered.

2.3.1   Legal Requirements

- : Compliance with FMVSS102
    - Federal Motor Vehicle Safety Standard – United States
    - Remote Start and Schedule Remote Start feature must be FMVSS-102 compliant.
    - FMVSS-102: Transmission Shift Lever Sequence, Starter Interlock, and Transmission Braking Effect

2.3.2   Trustmark Requirements

No Trustmark Requirements specified.

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2.3.3   Industry Standards

- : ISO 26262
  - The system should be developed according to Ford's implementation of Functional Safety.

2.4 Lessons Learned

#Hint: Additional information and lessons learned from previous development or related features. A typical source for Lessons Learned is the FMA Quality History.
#Functional Safety: In context of Functional Safety Lessons Learned and similar information will be used to check the completeness of the Functional Safety Goals and assumptions in the Hazard Analysis and Risk Assessment (HARA).
#Link: Ford Functional Safety Sharepoint

1. Ensure all stakeholders are notified when any changes occur in CCS settings. Particularly FordPass must be able to support any changes to meta settings and feature settings.

2.5 Assumptions

#Classification: Optional
#Hint: A list of known assumptions concerning the effects of the feature's behavior on other features or elements (i.e., dependencies) as well as assumptions on the behavior expected by the feature (e.g. known limitations). During the course of the feature development most of those assumptions are typically either converted into actual requirements or discarded at some point – such that this chapter remains mostly empty. For assumptions, which are relevant for the Functional Safety process refer to chapter 6.2 "Safety Assumptions"

RS_Assump_1 Valid FordPass Account

The user has installed and created a valid login account for the FORD/LINCOLN owner mobile app

Purpose

RS_Assump_2 Provisioned VIN

The user has registered an eligible vehicle VIN (defined as a VIN which is known to have a ECG installed and has sent a provisioning message to the VSDN / TMC)

Purpose

RS_Assump_3 Authorization

The user has completed the authorization process for the eligible vehicle VIN

Purpose

RS_Assump_4 Shared Access

Shared access allows multiple users to create an account for a vehicle

Purpose

RS_Assump_5 ECG Swap

Swapping the ECG shall not affect vehicle remote controls

Purpose

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3   FEATURE CONTEXT

3.1   Feature Context Diagram

#Hint: High level diagram of feature interactions with the environment, people or other feature or other external entities.
#Link: RE Wiki - Context Diagram
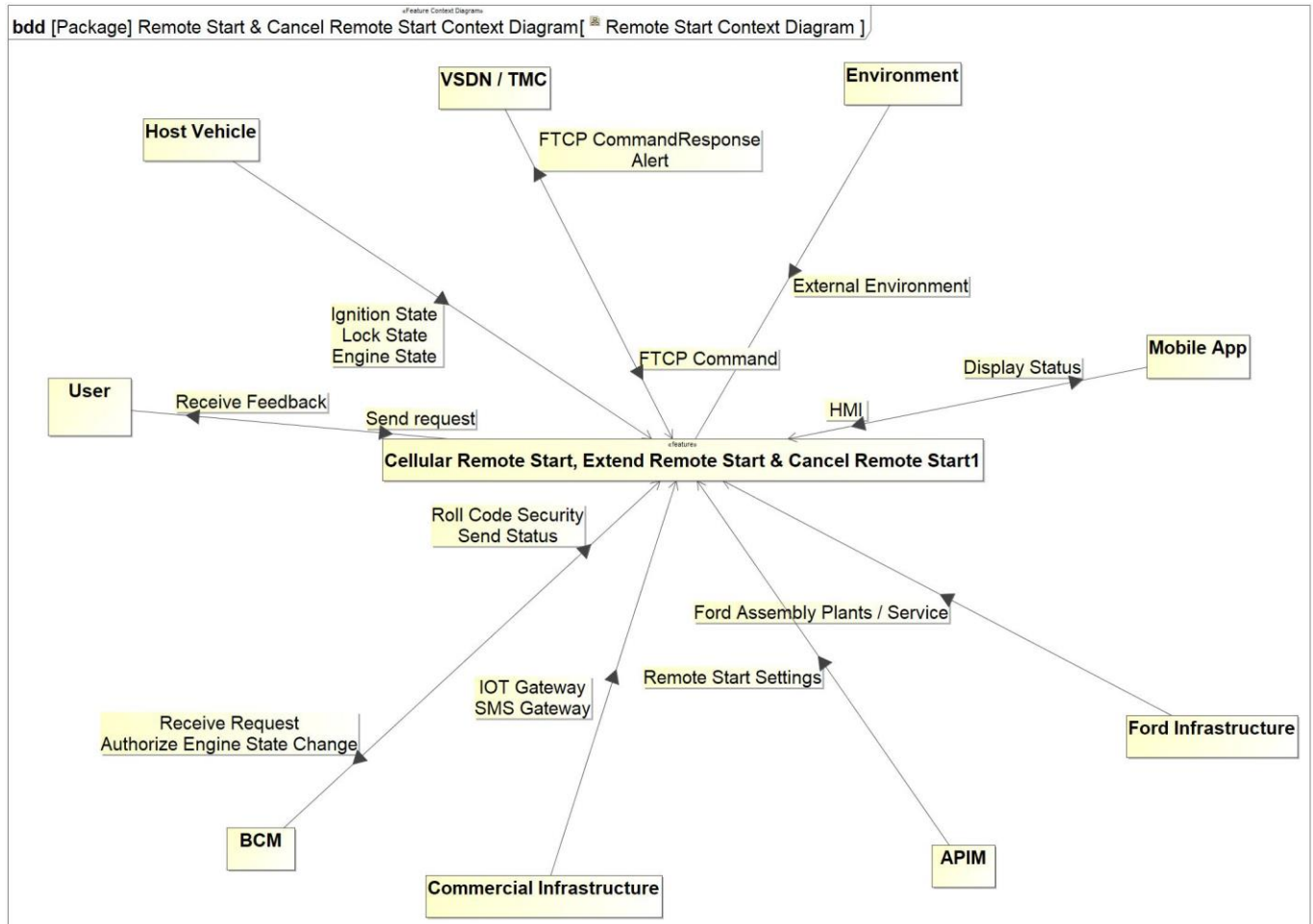
Figure 1: Remote Start Context Diagram

3.2   List of Influences

ID	External Entity	Influence Description
Display Status	Cellular Remote Start, Extend Remote Start & Cancel Remote Start1 To Mobile App	View feature status
External Environment	Environment To Cellular Remote Start, Extend Remote Start & Cancel Remote Start1	External environmental effects: • EMC/ESD effects (consumer devices with LF/UHF) • Radio towers • RF barriers (buildings, vehicles); • Fluid ingress (spill on antennas); ice/snow ingress; Dust/Mud
Ford Assembly Plants / Service	Ford Infrastructure To Cellular Remote Start,	System effects due to manufacturing processes

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	Extend Remote Start & Cancel Remote Start1	
FTCP Command	VSDN / TMC To Cellular Remote Start, Extend Remote Start & Cancel Remote Start1	Create FTCP command for request
FTCP CommandResponse Alert	Cellular Remote Start, Extend Remote Start & Cancel Remote Start1 To VSDN / TMC	Decode status, create FTCP command response and alert
HMI	Mobile App To Cellular Remote Start, Extend Remote Start & Cancel Remote Start1	Display user options and feature information
Ignition State Lock State Engine State	Host Vehicle To Cellular Remote Start, Extend Remote Start & Cancel Remote Start1	• Ignition Status • Vehicle Locks • Engine State
IOT Gateway SMS Gateway	Commercial Infrastructure To Cellular Remote Start, Extend Remote Start & Cancel Remote Start1	• ATT is the Mobile Network Operator for NA • China Unicom is the Network Operator for China • MNO is the interface between the FordPass/Lincoln Way apps and the VSDN / TMC Cloud
Receive Feedback	Cellular Remote Start, Extend Remote Start & Cancel Remote Start1 To User	Influence Description from Documentation field.
Receive Request Authorize Engine State Change	Cellular Remote Start, Extend Remote Start & Cancel Remote Start1 To BCM	Determine if conditions are correct and if correct authorize engine start
Remote Start Settings	APIM To Cellular Remote Start, Extend Remote Start & Cancel Remote Start1	
Roll Code Security Send Status	BCM To Cellular Remote Start, Extend Remote Start & Cancel Remote Start1	• Send Roll Code • Send Status
Send request	User To Cellular Remote Start, Extend Remote Start & Cancel Remote Start1	User request is an input to trigger the feature functions

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Table 7: List of Influences

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4   FEATURE MODELING

4.1   Operation Modes and States

#Classification: Optional (Mandatory for Functional Safety)
#Link: RE Wiki – State Charts
#Hint: State Charts are a popular means to express feature behavior in terms of states and modes. An advantage of this state machine like approach is that consistency can be easily verified.
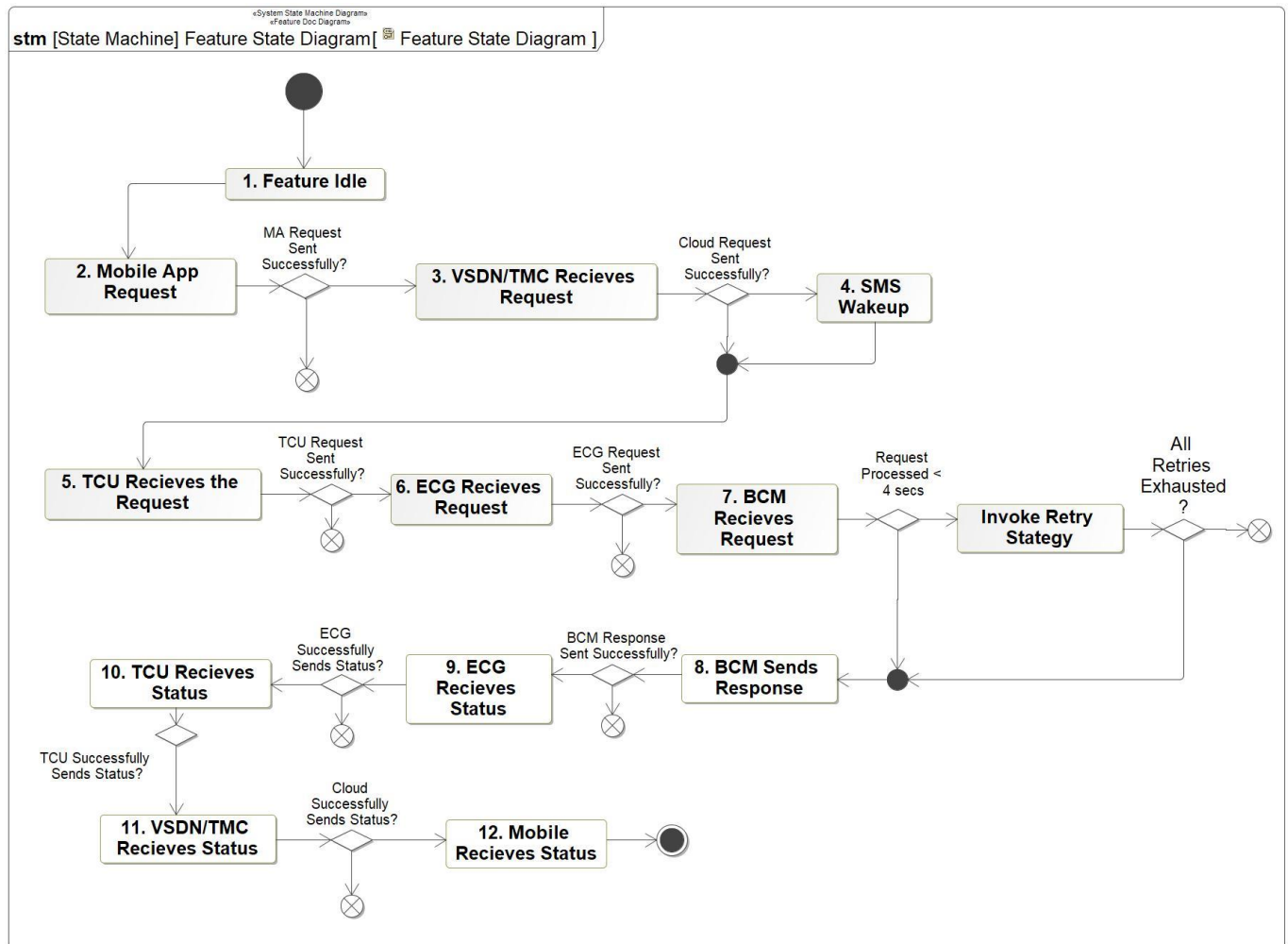
Figure 2: Feature State Diagram

State	Description	Requirements Reference (optional)
1. Feature Idle	No request has been made	
2. Mobile App Request	User initiates the request from the Mobile App	
3. VSDN/TMC Recieves Request	VSDN/TMC receives the request, processes it and sends to the vehicle	
4. SMS Wakeup	SMS Wakeup message sent to vehicle for connection	

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5. TCU Recieves the Request	TCU receives the request and sends to the ECG	
6. ECG Recieves Request	ECG processes the request and sends to the BCM	
7. BCM Recieves Request	BCM receives the request, determines if conditions are correct and processes the request	
8. BCM Sends Response	BCM sends the status of the request to the ECG	
9. ECG Recieves Status	ECG sends the status to the TCU	
10. TCU Recieves Status	TCU sends the status to VSDN/TMC	
11. VSDN/TMC Recieves Status	VSDN/TMC sends the status to the Mobile App	
12. Mobile Recieves Status	Mobile App displays the status of the request	
Invoke Retry Stategy	Two retry requests in total	

Table 8: Operation Modes and States on Feature State Diagram

Transition ID	Description	Requirements Reference (optional)
T1	Name: Send Failure Status to Mobile App	
T2	Name: ECG Successfully Sends Status to TCU	
T3	Name: Send Failure Status to Mobile App	
T4	Name: Send Failure Status to Mobile App	
T5	Name: BCM Processes the Request	
T6	Name: VSDN/TMC Sends Status to Mobile App	
T7	Name: Request Sent to TCU Successfully	
T8	Name: Request Successfully Sent	
T9		
T10	Name: Send Request to VSDN/TMC	
T11	Name: ECG Sends the Request to the BCM	
T12	Name: Request Successfully Sent	
T13	Name: TCU Successfully Sends Status	
T14	Name: TCU Sends Status to VSDN/TMC	
T15		
T16	Name: Vehicle Wakeup Successful	
T17	Name: BCM Successfully Recieves the Request	
T18	Name: Send Failure Status to Mobile App	
T19	Name: Retry Successful	
T20	Name: No Request	
T21	Name: User selects a request on the Mobile App	
T22	Name: Send Failure Status to Mobile App	
T23		
T24	Name: SMS Wakeup	

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T25	Name: Send Failure Status to Mobile App	
T26	Name: ECG Successfully Recieves the Request	
T27	Name: Send request to the vehicle	
T28		
T29	Name: BCM does not process the request within 4 seconds	
T30	Name: BCM Sends Status to ECG	
T31	Name: ECG Sends Status to TCU	
T32	Name: Send Failure Status to Mobile App	
T33	Name: TCU sends the request to the ECG	
T34	Name: Mobile App Displays Status	
T35		

Table 9: Transitions between Operation Modes and States on Feature State Diagram
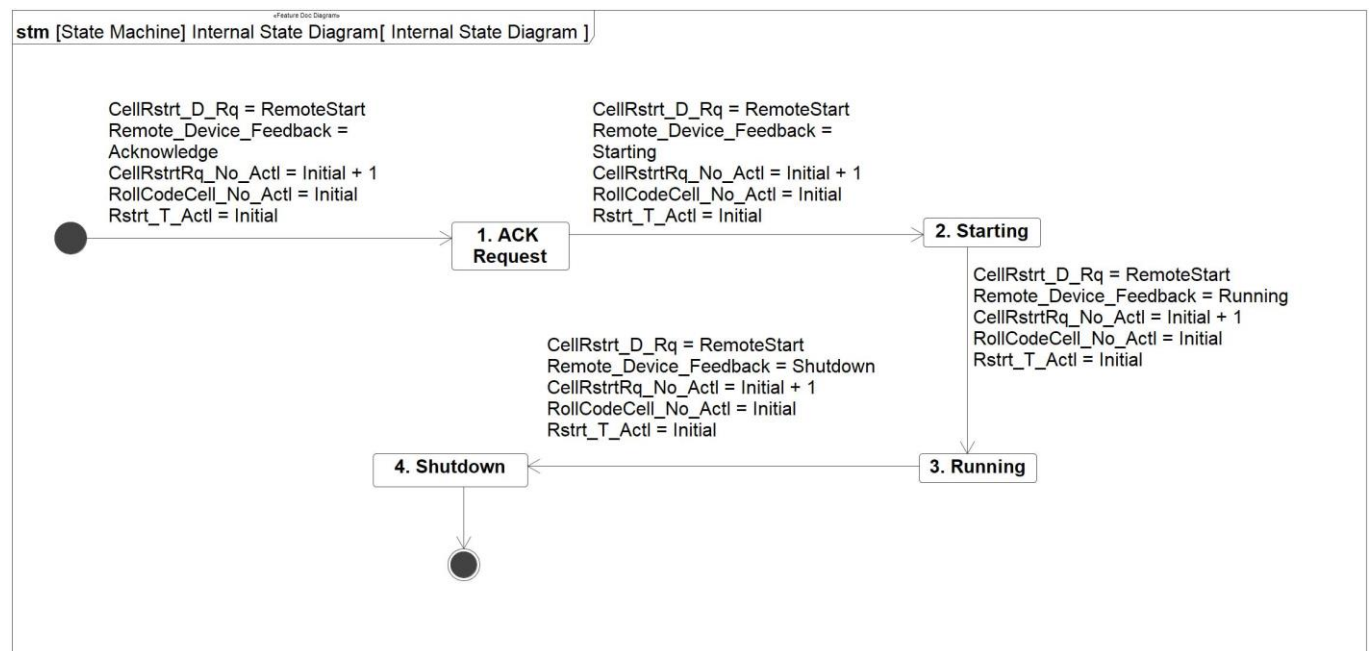
Figure 3: Internal State Diagram

State	Description	Requirements Reference (optional)
1. ACK Request	The request is acknowledged	
2. Starting	Remote_Device_Feedback = Starting	
3. Running	Remote_Device_Feedback = Running	
4. Shutdown	Remote_Device_Feedback = Shutdown	

Table 10: Operation Modes and States on Internal State Diagram

Transition ID	Description	Requirements Reference (optional)
T1	Name: Guard: = Feature status transitions to shutdown	
T2	Name: Guard: = Feature status transitions from starting to running. In this state the vehicle engine is on and the feature is active.	
T3	Name: Guard: = Feature status transitions from running to shutdown. Transition occurs when: a. Remote start timer expires	

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		b. Cancel remote start request is processed and completed	
T4		Name: Remote_Device_Feedback=Acknowledge	
T5		Name: Guard: = Feature status transitions to starting	

Table 11: Transitions between Operation Modes and States on Internal State Diagram

4.2 Use Cases

#Classification: *Optional*
#Link: *RE Wiki – Use Cases*

4.2.1 Use Case Diagram
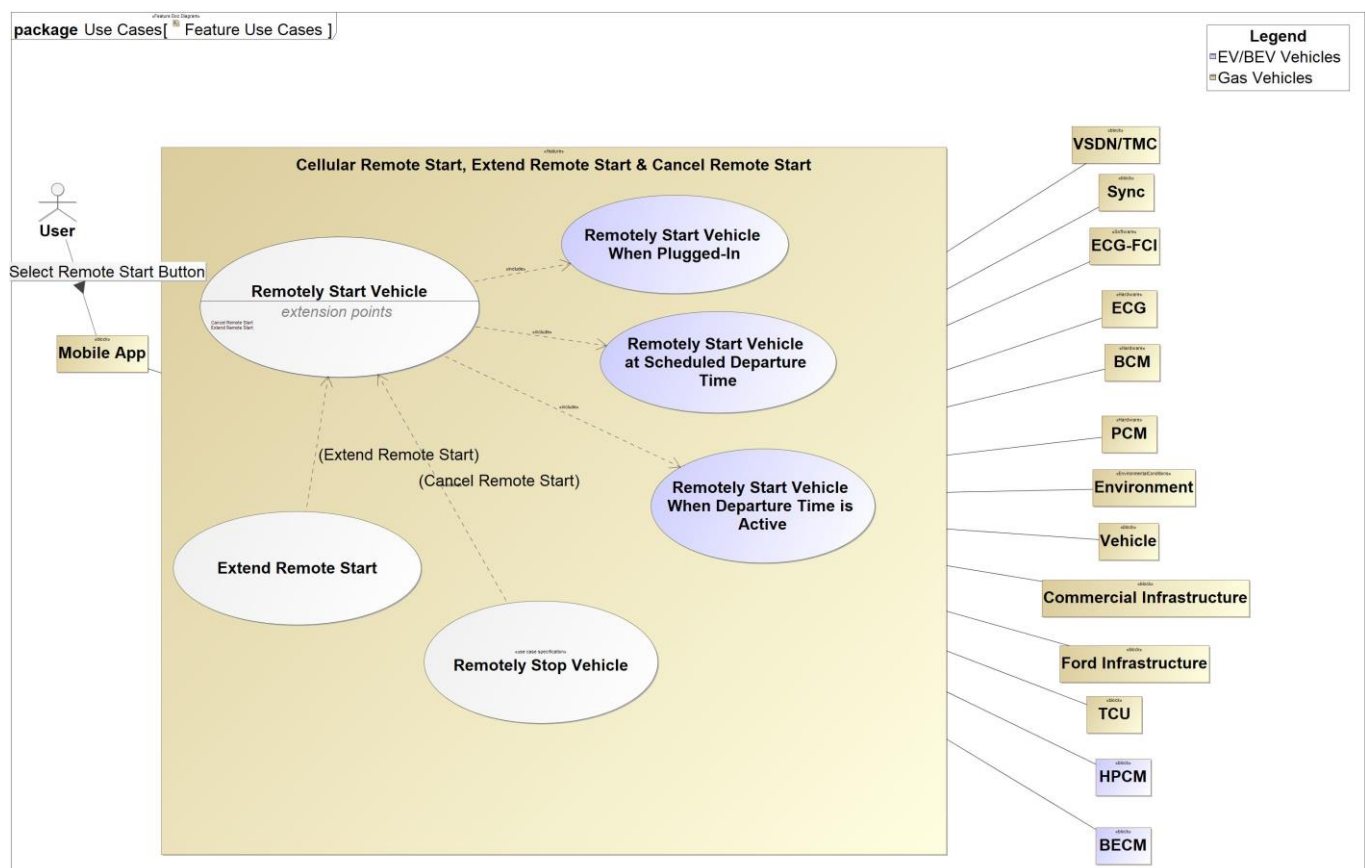
Figure 4: Feature Use Cases

4.2.2 Actors

4.2.3 Use Case Descriptions

#Classification: *Optional*

UC_F_RS_001 Remotely Start Vehicle

Actors		User, Mobile App, VSDN/TMC, ECG, ECG-App, BCM
Subject		Remotely Start Vehicle
Preconditions	PreC1	ECG is authorized
	PreC2	ECG is installed successfully

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	PreC3	ECG is provisioned
	PreC4	User is registered and logged in to the Mobile App
	PreC5	Vehicle engine is off
Triggers	T1	Select Remote Start Button
Main Flow Description		Vehicle engine successfully starts and notification is sent to the user
Main Flow	M1	User selects the Remote Start button on the Mobile App
	M2	Mobile App sends Remote Start request to VSDN / TMC
	M3	VSDN / TMC recieves Remote Start request, processes it, converts to an FTCP Command and publishes the command to the ECG
	M4	ECG subscribes to the command, processes it and sends the request to the ECG-App
	M5	ECG-App processes the request and sends to the BCM
	M6	BCM recieves the request and sends the response back to VSDN / TMC
	M7	BCM determines if conditions are correct to start the vehicle and will authorize the PCM to start the vehicle
	M8	BCM sends the status to the ECG-App
	M9	ECG-App sends the status to the ECG, which decodes the information and creates an alert to publish to VSDN / TMC
	M10	VSDN / TMC sends the status of the request to the Mobile App to display to the user
Alternative Flow Description		User has turned off CCS setting Vehicle Connectivity through Sync
Alternative Flow Description		User has turned off CCS setting Vehicle Data through Sync
Alternative Flow Steps	A1	Cloud Command Processing Service determines vehicle User has turned Cloud connectivity, or Ford Cloud Control OFF through SYNC via CCS settings oVehicle Connectivity Off (Remote Start feature disabled)
	A2	Cloud Command Processing Service determines vehicle User has turned Vehicle Data, or Ford Cloud Control OFF through SYNC via CCS settings Vehicle Data Off (Remote Start feature disabled)
Exceptional Flow Steps	E1	The Mobile App is unable to send the request to VSDN / TMC because there is no cellular or wifi connection
	E2	VSDN / TMC is unable to send the request to the vehicle because the vehicle is in deep sleep mode
	E3	The ECG-App is unable to send the request to the BCM due to a CAN error
	E4	The BCM determines the conditions are not correct to the start the vehicles engine
	E5	The ECG is unable to send the command response to VSDN / TMC due to cellular disconnection between the vehicle and cloud
	E6	The ECG is unable to send the alert to the VSDN / TMC due to cellular disconnection between the vehicle and cloud
	E7	VSDN / TMC determines that that the vehicle has not been put into motive mode after two successful remote start requests and rejects the request (CR 1165)

UC_F_RS_002 Extend Remote Start

Actors		User, Mobile App, VSDN/TMC, ECG, ECG-App, BCM
Subject		Extend Remote Start
Preconditions	PreC1	ECG is authorized
	PreC2	ECG is installed successfully
	PreC3	ECG is provisioned
	PreC4	Remote Start is in progress

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	PreC5	User is registered and logged in to the Mobile App
Triggers	T1	User selects the extend button
Main Flow Description		Remote strart timer is extended
Main Flow	M1	User selects the extend button on the mobile app
	M2	User waits for the duration timer to increase
	M3	User waits for visual confirmation on the mobile app
Alternative Flow Description		The additional remote start request does not have enough time to process before the vehicle turns off
Exceptional Flow Description		Vehicle Data CCS setting is disabled
Exceptional Flow Description		Vehicle Connectivity CCS setting is disabled

UC_F_RS_003 Remotely Stop Vehicle

Actors		User, Mobile App, VSDN/TMC, ECG, ECG-App, BCM
Subject		Cellular Remote Start, Extend Remote Start & Cancel Remote Start
Description		
Preconditions	PreC1	ECG is authorized
	PreC2	ECG is installed successfully
	PreC3	ECG is provisioned
	PreC4	User is registered and logged in to the Mobile App
	PreC5	Vehicle is remotely started
Triggers	T1	Select Cancel Remote Start Button
Main Flow Description		Vehicle engine successfully stops and notification is sent to the user
Main Flow	M1	User selects the Cancel Remote Start button on the Mobile App
	M2	Mobile App sends Cancel Remote Start request to VSDN / TMC
	M3	VSDN / TMC recieves Cancel Remote Start request, processes it, converts to an FTCP Command and publishes the command to the ECG
	M4	ECG subscribes to the command, processes it and sends the request to the ECG-App
	M5	ECG-App processes the request and sends to the BCM
	M6	BCM recieves the request and sends the response back to VSDN / TMC
	M7	BCM determines if conditions are correct to stop the vehicle and will authorize the PCM to start the vehicle
	M8	BCM sends the status to the ECG-App
	M9	ECG-App sends the status to the ECG, which decodes the information and creates an alert to publish to VSDN / TMC
	M10	VSDN / TMC sends the status of the request to the Mobile App to display to the user
Alternative Flow Description		User has turned off CCS setting Vehicle Connectivity through Sync
Alternative Flow Description		User has turned off CCS setting Vehicle Data through Sync
Alternative Flow Steps	A1	Cloud Command Processing Service determines vehicle User has turned Cloud connectivity, or Ford Cloud Control OFF through SYNC via CCS settings oVehicle Connectivity Off (Remote Start feature disabled)
	A2	Cloud Command Processing Service determines vehicle User has turned Vehicle Data, or Ford Cloud Control OFF through SYNC via CCS settings Vehicle Data Off (Remote Start feature disabled)
Exceptional Flow Steps	E1	The Mobile App is unable to send the request to VSDN / TMC because there is no cellular or wifi connection
	E2	VSDN / TMC is unable to send the request to the vehicle because the vehicle is in deep sleep mode

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	E3	The ECG-App is unable to send the request to the BCM due to a CAN error
	E4	The BCM determines the conditions are not correct to the start the vehicles engine
	E5	The ECG is unable to send the command response to VSDN / TMC due to cellular disconnection between the vehicle and cloud
	E6	The ECG is unable to send the alert to the VSDN / TMC due to cellular disconnection between the vehicle and cloud

UC_F_RS_004 Remotely Start Vehicle When Plugged-In

Actors		User, Mobile App, VSDN/TMC, ECG, ECG-App, BECM
Subject		Remotely Start Vehicle When Plugged-In
Preconditions	PreC1	ECG is authorized
	PreC2	ECG is installed successfully
	PreC3	ECG is provisioned
	PreC4	User is registered and logged in to the mobile app
	PreC5	Vehicle is plugged-in
Main Flow Description		Vehicle is remotely started
Main Flow	M1	User selects the remote start button on the mobile app when the vehicle is plugged in
	M2	User waits for the vehicle engine to start
	M3	User waits for visual confirmation on the mobile app
Alternative Flow Description		User has turned off CCS setting Vehicle Connectivity through Sync
Alternative Flow Description		User has turned off CCS setting Vehicle Data through Sync
Alternative Flow Steps	A1	Cloud Command Processing Service determines vehicle User has turned Cloud connectivity, or Ford Cloud Control OFF through SYNC via CCS settings oVehicle Connectivity Off (Remote Start feature disabled)
	A2	Cloud Command Processing Service determines vehicle User has turned Vehicle Data, or Ford Cloud Control OFF through SYNC via CCS settings Vehicle Data Off (Remote Start feature disabled)
Exceptional Flow Steps	E1	The Mobile App is unable to send the request to VSDN / TMC because there is no cellular or wifi connection
	E2	VSDN / TMC is unable to send the request to the vehicle because the vehicle is in deep sleep mode
	E3	The ECG-App is unable to send the request to the BCM due to a CAN error
	E4	The BCM determines the conditions are not correct to the start the vehicles engine
	E5	The ECG is unable to send the command response to VSDN / TMC due to cellular disconnection between the vehicle and cloud
	E6	The ECG is unable to send the alert to the VSDN / TMC due to cellular disconnection between the vehicle and cloud
	E7	VSDN / TMC determines that that the vehicle has not been put into motive mode after two successful remote start requests and rejects the request (CR 1165)

UC_F_RS_005 Remotely Start Vehicle at Scheduled Departure Time

Actors		User, Mobile App, VSDN/TMC, ECG, ECG-App, BECM
Subject		Remotely Start Vehicle at Scheduled Departure Time
Preconditions	PreC1	ECG is authorized

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	PreC2	ECG is installed successfully
	PreC3	ECG is provisioned
	PreC4	User added scheduled departure time
	PreC5	User initiated remote start
	PreC6	User is registered and logged in to the Mobile App
Main Flow Description		Scheduled Departure Time takes Precedence
Main Flow	M1	Scheduled schedule departure time shall not take precedence over active remote start
	M2	User will continue to see vehicle start status until timer expires

UC_F_RS_006 Remotely Start Vehicle When Departure Time is Active

Actors		User, Mobile App, VSDN/TMC, ECG, ECG-App, BECM
Subject		Remotely Start Vehicle When Departure Time is Active
Preconditions	PreC1	ECG is authorized
	PreC2	ECG is installed successfully
	PreC3	ECG is provisioned
	PreC4	Schedule Scheduled departure time active –> Climate control turned ON
	PreC5	User is registered and logged in to the Mobile App
Main Flow Description		Vehicle is remotely started
Main Flow	M1	User schedule departure time is active and same time user clicks on remote start button on the mobile app
	M2	User waits for the vehicle engine to start
	M3	User waits for visual confirmation on the mobile app
Alternative Flow Description		User has turned off CCS setting Vehicle Connectivity through Sync
Alternative Flow Description		User has turned off CCS setting Vehicle Data through Sync
Alternative Flow Steps	A1	Cloud Command Processing Service determines vehicle User has turned Cloud connectivity, or Ford Cloud Control OFF through SYNC via CCS settings oVehicle Connectivity Off (Remote Start feature disabled)
	A2	Cloud Command Processing Service determines vehicle User has turned Vehicle Data, or Ford Cloud Control OFF through SYNC via CCS settings Vehicle Data Off (Remote Start feature disabled)
Exceptional Flow Steps	E1	The Mobile App is unable to send the request to VSDN / TMC because there is no cellular or wifi connection
	E2	VSDN / TMC is unable to send the request to the vehicle because the vehicle is in deep sleep mode
	E3	The ECG-App is unable to send the request to the BCM due to a CAN error
	E4	The BCM determines the conditions are not correct to the start the vehicles engine
	E5	The ECG is unable to send the command response to VSDN / TMC due to cellular disconnection between the vehicle and cloud
	E6	The ECG is unable to send the alert to the VSDN / TMC due to cellular disconnection between the vehicle and cloud

4.3 Driving and Operation Scenarios

#Classification: Optional (Mandatory for Functional Safety)
#Functional Safety: Driving and operating scenarios which impact the functionality of the feature can be used to check, if the situation analysis in the HARA is complete
#Link: RE Wiki – Driving Scenarios

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4.4 Decision Tables

#Classification: Optional
#Link: RE Wiki – Decision Tables.
#Hint: Use decision table, if behavior is not state based (in that case prefer state chart from ch. 4.1) and based purely on current inputs.

Not supported by MagicDraw report generation.

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5   FEATURE REQUIREMENTS

5.1 Functional Requirements

R_F_RS_1 Remote Start Preconditions

• The hood must be securely latched
• The engine should be off
• The battery power is not low
• The vehicle is not in DRx mode
• The vehicle is in an area with good cell reception
• The vehicle does not have any active engine light DTCs
• The vehicle must have an automatic transmission and an immobilizer

Requirement ID: R_F_RS_1				
Rationale				
Acceptance Criteria				
Notes				
Source		Owner		
Source Req.		V&V Method		
Type		Priority	Status	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_2 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_F_RS_2				
Rationale				
Acceptance Criteria				
Notes				
Source		Owner		
Source Req.		V&V Method		
Type		Priority	Status	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_3 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_F_RS_3				
Rationale				
Acceptance Criteria				
Notes				
Source		Owner		
Source Req.		V&V Method		
Type		Priority	Status	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_4 Gray Out Other Command Buttons

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

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Requirement ID: R_F_RS_4					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_5 Remote Start Progress Visual Indicator

While the Remote Start request is in progress, the mobile app shall display a visual indicator of the progress.

Requirement ID: R_F_RS_5					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_6 Switching HMI Screens

The user shall be able to switch between screens on the mobile app or run in background mode at any time without affecting the lifecycle of the request.

Requirement ID: R_F_RS_6					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_7 Remote Start Command Sent to the VSDN/TMC

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

Requirement ID: R_F_RS_7					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_8 Remote Start Polling Status

The mobile app shall poll VSDN/TMC for status of the request

Requirement ID: R_F_RS_8					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		

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Type		Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_9 Remote Start Command Sent to the Vehicle

The VSDN/TMC shall send the command to the vehicle

Requirement ID: R_F_RS_9					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_10 Command Response Sent to VSDN/TMC

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

Requirement ID: R_F_RS_10					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_11 Remote Start Alert

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

Requirement ID: R_F_RS_11					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_12 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_F_RS_12					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_13 Countdown Timer & Button Transformation

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

Requirement ID: R_F_RS_13				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_14 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_F_RS_14				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_15 Duration Timer Settings

###R_F_Remote Start and Schedule Remote Start_00003### 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_F_RS_15				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_16 Duration Timer

When a Remote Start request is successful, the duration timer is displayed on the mobile app. The option to increase the engine on time is also displayed on the mobile app. When the time is increased, the timer value should also increase to reflect the change

Requirement ID: R_F_RS_16				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_17 Maximum Duration Timer

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

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Requirement ID: R_F_RS_17					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**	**Status**	Approved	
[Req. Template](#) Version 6.0					End of Requirement

R_F_RS_18 Countdown Timer Expiry

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

Requirement ID: R_F_RS_18					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**	**Status**	Approved	
[Req. Template](#) Version 6.0					End of Requirement

R_F_RS_19 Cancel Remote Start Pre-Condition

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

Requirement ID: R_F_RS_19					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**	**Status**	Approved	
[Req. Template](#) Version 6.0					End of Requirement

R_F_RS_20 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_F_RS_20					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**	**Status**	Approved	
[Req. Template](#) Version 6.0					End of Requirement

R_F_RS_21 Cancel Remote Start Progress Visual Indicator

While the Cancel Remote Start is in progress, the mobile app shall display a visual indicator of the progress

Requirement ID: R_F_RS_21		
Rationale		
Acceptance Criteria		
Notes		
Source		**Owner**

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Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version 6.0   End of Requirement

R_F_RS_22 Cancel Remote Start Button HMI

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

Requirement ID: R_F_RS_22

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

Req. Template Version 6.0   End of Requirement

R_F_RS_23 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_F_RS_23

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

Req. Template Version 6.0   End of Requirement

R_F_RS_24 Cancel Remote Start Polling Status

The mobile app shall poll VSDN/TMC for status of the request

Requirement ID: R_F_RS_24

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

Req. Template Version 6.0   End of Requirement

R_F_RS_25 Cancel Remote Start Command Sent to Vehicle

The VSDN/TMC shall send the command to the vehicle

Requirement ID: R_F_RS_25

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

Req. Template Version 6.0   End of Requirement

R_F_RS_26 Command Response Sent To VSDN/TMC

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

Requirement ID: R_F_RS_26					
Rationale					
Acceptance Criteria					
Notes					
Source			Owner		
Source Req.			V&V Method		
Type		Priority		Status	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_27 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_F_RS_27					
Rationale					
Acceptance Criteria					
Notes					
Source			Owner		
Source Req.			V&V Method		
Type		Priority		Status	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_28 Cancel Remote Start Alert

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

Requirement ID: R_F_RS_28					
Rationale					
Acceptance Criteria					
Notes					
Source			Owner		
Source Req.			V&V Method		
Type		Priority		Status	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_29 EU Countries with RS

CR 312: Remote Start shall be made available in the following EU countries
a. Britain
b. Germany
c. France
d. Italy
e. Spain
f. Netherlands
g. Sweden
h. Portugal
i. Ireland
j. Denmark
k. Poland
l. Austria
m. Belgium
n. Finland

Requirement ID: R_F_RS_29	
Rationale	
Acceptance Criteria	
Notes	

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Source			Owner	
Source Req.			V&V Method	
Type		Priority	Status	Approved
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R_F_RS_30 Vehicle Plugged-In

The user shall have the ability to do remote start when vehicle is plugged in

Requirement ID: R_F_RS_30

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

R_F_RS_31 Scheduled Departure Time

When there is an active remote start, triggered scheduled departure time shall not impact an active remote start.

Requirement ID: R_F_RS_31

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

R_F_RS_32 Active Scheduled Departure Time and Initiate Remote start

When there is an active scheduled departure time, user shall have the ability to initiate remote start and it shall take precedence over scheduled departure time.

Requirement ID: R_F_RS_32

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

R_F_RS_33 Register Account

When the user registers an account, the Remote Start, Extend Remote Start & Cancel Remote Start feature will be available as part of the FordPass and Lincoln Way features.

Requirement ID: R_F_RS_33

Rationale				
Acceptance Criteria				
Notes				
Source			Owner	
Source Req.			V&V Method	
Type		Priority	Status	Approved
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R_F_RS_34 Feature Enablement

The Remote Start and Schedule Remote Start feature shall be enabled once the vehicle is authorized

Requirement ID: R_F_RS_34				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_35 Master Reset

De-Authorization removes the link between user and vehicle. Upon De-authorization of the vehicle, remote vehicle controls are disabled for that user

Requirement ID: R_F_RS_35				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_36 Clear User Settings

The user shall have the option to clear user settings. When the Brand Connect Master Reset is complete, all user settings are removed and remote vehicle controls will be disabled

Requirement ID: R_F_RS_36				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_37 CCS Privacy Settings

The CCS feature provides the ability to a user to opt-in / opt-out from connectivity settings within the vehicle preventing data from being shared with the cloud. This will allow the user to have greater control of their vehicle settings

Requirement ID: R_F_RS_37				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_38 CCS Meta Entities

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CCS Meta Entities shall be enabled or disabled by individual switches. Remote Start, Extend Remote Start & Cancel Remote Start are affected by only Vehicle Connectivity & Vehicle Data

Requirement ID: R_F_RS_38					
Rationale	Feature Meta Setting has been removed				
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type	New	**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_39 CCS Meta Entities – Enabled/Disabled

If the Meta Entities are enabled, then the feature functions shall be enabled. If any of the Meta Entities are disabled, then the feature function shall be disabled

Requirement ID: R_F_RS_39					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type	New	**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_40 CR 194: Manual Transmissions

Remote Start and Schedule Remote Start is not currently available on vehicles with manual transmissions. UI implementation of the CR will remove the Remote Start button from the vehicle control page of the mobile app when the vehicle has a manual transmission

Requirement ID: R_F_RS_40					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_41 Diesel Vehicles

Remote Start, Extend Remote Start & Cancel Remote Start Shall be available on vehicles with Diesel engines provided that the delay for glow plugs to reach their target temperature is accounted for and the Insta Start System is available

Requirement ID: R_F_RS_41					
Rationale					
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type		**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_42 Stolen Vehicle Services and Remote Functionality

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When Stolen Vehicle Services are in progress, the SVS system will send a start inhibit to the VSDN / TMC. The user shall not be able to send any Remote Start requests on the mobile app,, the HMI shall be greyed out and a message displayed to the user explaining why. Service shall be restored once the start inhibit is removed

Requirement ID: R_F_RS_42				
Rationale				
Acceptance Criteria				
Notes				
Source			Owner	
Source Req.			V&V Method	
Type		Priority	Status	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_43 iOS and Android Devices

Android and iOS wearables shall be supported. The user shall have the following options when using a wearable:
• Initiate Remote Start command
• Initiate Remote Start command
• View Status of Remote Start
• View Status of Remote Start
• Receive notifications upon success or failure of Remote Start commands

Requirement ID: R_F_RS_43				
Rationale				
Acceptance Criteria				
Notes				
Source			Owner	
Source Req.			V&V Method	
Type		Priority	Status	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_44 CR 422: Defined Error Messages

The content of each error message displayed on the mobile app shall be defined

Requirement ID: R_F_RS_44				
Rationale				
Acceptance Criteria				
Notes				
Source			Owner	
Source Req.			V&V Method	
Type		Priority	Status	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_45 Battery Voltage

If the battery fails below the operating threshold, the vehicle will go into DRx mode, in which case the user will not be able to send remote commands

Requirement ID: R_F_RS_45				
Rationale				
Acceptance Criteria				
Notes				
Source			Owner	
Source Req.			V&V Method	
Type		Priority	Status	Approved
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R_F_RS_46 Accessory Mode

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If user initiates remote start while vehicle in accessory mode, the app shall display an appropriate failure message that vehicle failed to start because vehicle is in accessory mode

Requirement ID: R_F_RS_46				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_47 MMOTA Update

MMOTA shall not inhibit vehicle function when remotely started.
When an MMOTA is needed that shall inhibit vehicle function, the vehicle shall send a notification VSDN.
VSDN will send notification to FordPass that the vehicle is inhibited; FordPass shall not allow the user to request any Command & Control functionality

Requirement ID: R_F_RS_47				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_48 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_F_RS_48				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_49 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_F_RS_49				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

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R_F_RS_50 Exiting LPR Mode

An SMS message is required to wake the vehicle and process a Remote Door Lock or Unlock request when the ignition has been off for more than 30 minutes transitioning the vehicle to LPR mode

Requirement ID: R_F_RS_50				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_51 Re-entering LPR Mode

When the Remote Door Lock or Unlock request is processed, the vehicle will transition back to LPR mode

Requirement ID: R_F_RS_51				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_52 DRx Power Mode

If the vehicle is is in DRx mode, remote commands shall not function

Requirement ID: R_F_RS_52				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

5.1.1 Error Handling

R_F_RS_53 Mobile App Timeout

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

Requirement ID: R_F_RS_53				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_54 Backend Timeout

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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_F_RS_54				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_55 VSDN/TMC/Vehicle Error

If there is an error between the VSDN/TMC and vehicle, the Remote Start request will not be processed and a failure notification is sent to the user

Requirement ID: R_F_RS_55				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_56 CR 422: Error Conditions

A Remote Start request shall fail under the below conditions for which better error messaging shall be defined:
• Vehicle in accessory mode
• Vehicle is already running
• Hood is ajar
• Alarm triggered
• No cellular network / airplane mode

Requirement ID: R_F_RS_56				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_57 Mobile App Cellular/Wifi Connection

The users' cellular device must have a connection to the internet to send remote commands. If the cellular device does not have a Wi-Fi nor cellular connection, an error message is displayed on the mobile device

Requirement ID: R_F_RS_57				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_58 VSDN / TMC Errors

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The VSDN / TMC must have an active connection to the vehicle through the ECG and ECG. If the connection between the VSDN / TMC and vehicle is lost, a connection retry strategy will be implemented.

If the VSDN / TMC does not receive a command response from the vehicle, the process will time out and a notification is sent to the mobile app. The failure message can include one of the following:
• No connectivity to network
• Vehicle to VSDN / TMC connection error
• Vehicle in unable to execute the command
• Other failure
• VSDN / TMC is not available
• ECG data invalid
• ECG is not authorized

Requirement ID: R_F_RS_58

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

Reg. Template Version 6.0   End of Requirement

R_F_RS_59 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_F_RS_59

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

Reg. Template Version 6.0   End of Requirement

R_F_RS_60 Configurable Command Response Timeout DID

The configurable time is defined by DIDCode = 0xFD10 and DIDName = Command Response Timeout

Requirement ID: R_F_RS_60

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

Reg. Template Version 6.0   End of Requirement

R_F_RS_61 Alarm Triggered

If user initiates remote start while alarm triggered, the app shall display an appropriate failure message that vehicle failed to start because alarm was triggered

Requirement ID: R_F_RS_61

Rationale			
Acceptance Criteria			
Notes			
Source		**Owner**	

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

R_F_RS_62 Default Error Code

If none of the following conditions are met while initiating remote start
- Vehicle in Accessory
- Vehicle is Running
- Hood Ajar
- Alarm Triggered
Then the app shall use the default error code 411 (Generic failure command response)

Requirement ID: R_F_RS_62					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_63 BCM Response Time

The BCM shall process the request within 4 seconds

Requirement ID: R_F_RS_63					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_64 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_F_RS_64					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved
Req. Template Version 6.0					End of Requirement

5.2 Non-Functional Requirements

#Hint: Non-functional requirements specify some performance criteria in addition to the functional behavior given defined by the functional requirements. Timing (if not already included in the functional requirements), security details (e.g. how secure does an algorithm have to be) reliability (e.g. mean time between failure) or maintainability could be specified in this section.

5.2.1 Safety

#Hint: Only those safety requirements, which are not related to Functional Safety (ISO26262) should go here. For Functional Safety refer to chapter 6 "Functional Safety".

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5.2.2 Vehicle Requirements

R_F_RS_65 REMOTE START VEHICLE CRITERIA

a. All electronic powertrain control systems (eg, PCMs) need to support the Remote Start feature
b. Remote start shall not be offered on on Manual Transmission vehicles or vehicles without an immobilizer.
c. Modules supporting Remote Start, shall provide interface functionality required by the FCSD dealer installed system and/or telematics system (mobile phone application)
d. Remote start architecture to support both uni-directional and bi-direction (if applicable) RF communication
e. A network communication architecture (eg, CAN) will be utilized to indicate Remote Start Mode (non-Motive Start) to electrical community
f. Any vehicle implementing the Remote Start feature shall have the Common Global Electrical Architecture 1.1 or beyond, Power Locks, Remote Entry, Hood Switch, Internal or External Antenna and an Immobilizer.
g. Remote Start instructions shall be provided in the Owner's Manual
h. Feature must be customer, dealer and VO assembly plant configurable
i. While in Remote Start mode, ignition position shall be reported as OFF and the RUN/START bus is powered.
j. Diesel vehicles require the Insta Start System. On Diesel vehicles, the cranking of the engine is delayed for some period from the initial request and should be linked with when the glow plugs reach their target temperature.
k. The Remote Start system shall support the Common Global Electrical Architecture 1.1 and 1.2 vehicles with manual climate modules that are capable to turn on at Run/Start.
l. The Remote Start system shall support the Common Global Electrical Architecture 1.3 and beyond vehicles with manual climate modules.
m. Europe, Australia and New Zealand vehicles shall only have Remote Start supported via Mobile/Phone Application i.e no Key FOB Remote Start
n. Europe, Australia and New Zealand vehicles, phone application shall inform customer that under Remote Start, the vehicle is in reduced guard mode i.e interior motion and inclination sensor are turned off plus doors are central locked not double locked.

Requirement ID: R_F_RS_65				
Rationale	Requirements that must be met in order to have the Remote Start feature on a vehicle			
Acceptance Criteria				
Notes				
Source	RQT-190201-015541-REMOTE START VEHICLE CRITERIA	Owner	Sally Cherian	
Source Req.		V&V Method		
Type	New	Priority	Status	Approved
Req. Template Version 6.0				End of Requirement

5.3 Security

R_F_RS_66 CR 1165: VSDN Logic

The VSDN shall process two consecutive Remote Start request but shall require that the motive mode begin alert is received before further requests are processed

Requirement ID: R_F_RS_66				
Rationale	Address production issue discovered by security team			
Acceptance Criteria				
Notes				
Source		Owner		
Source Req.		V&V Method		
Type	New	Priority	Status	Approved
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R_F_RS_67 CR 1165: Mobile App Notification

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If the user attempts to send a third consecutive Remote Start request without putting the vehicle into motive mode first, the Mobile App shall display a message to user indicating the vehicle must be put into motive mode before further requests are processed

Requirement ID: R_F_RS_67					
Rationale	Address production issue discovered by security team				
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type	New	**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_68 CR 1165: Remote Start Limitation

Remote Start requests shall be limited to two consecutive requests without putting the vehicle in motive mode; after the second request the vehicle must be put into motive mode before further requests are processed

Requirement ID: R_F_RS_68					
Rationale	Address production issue discovered by security team				
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type	New	**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

R_F_RS_69 CR 1165: Sources That Count Toward Limit

There are 3 sources that shall count towards the limit of Remote Start requests sent to the vehicle:
1. Key Fob
2. Manual Remote Start request
3. Scheduled Remote Start request
Any combinations of the above requests shall be limited to two, afterwards the vehicle must be put into motive mode

Requirement ID: R_F_RS_69					
Rationale	Address production issue discovered by security team				
Acceptance Criteria					
Notes					
Source			**Owner**		
Source Req.			**V&V Method**		
Type	New	**Priority**		**Status**	Approved
Req. Template Version 6.0					End of Requirement

5.3.1   Reliability

No Reliability Requirements specified.

5.4 HMI Requirements

#Hint: *Requirements in this section could specify details of e.g. the icons, the GUI or the sounds.*

R_F_RS_70 Paging and Progress Loading

When a user navigates away from the page while remote start or cancel remote start is in progress, coming back to the page should show the progress loading on the remote start or cancel remote start button

Requirement ID: R_F_RS_70

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

Req. Template Version 6.0 | End of Requirement

R_F_RS_71 Mobile App Has No Cellular/Wifi Connection

If there is no network connectivity, the request will not be processed and the mobile app shall display an error message to the user

Requirement ID: R_F_RS_71

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

Req. Template Version 6.0 | End of Requirement

R_F_RS_72 Success Message

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

Requirement ID: R_F_RS_72

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

Req. Template Version 6.0 | End of Requirement

R_F_RS_73 Paging

The user shall be able to page through the mobile app without affecting the Remote Start or Cancel Remote Start request

Requirement ID: R_F_RS_73

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

Req. Template Version 6.0 | End of Requirement

R_F_RS_74 Failure Message

The mobile app will display a failure message when the Remote Start or Cancel Remote Start request fails even if the app is closed

Requirement ID: R_F_RS_74

Rationale	
Acceptance Criteria	
Notes	

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Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version 6.0   End of Requirement

R_F_RS_75 Vehicle Unable to Execute Command

If the vehicle is unable to execute the command, the Remote Start or Cancel Remote Start request will not be processed and a failure notification is sent to the user

Requirement ID: R_F_RS_75					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version 6.0   End of Requirement

R_F_RS_76 Configurable Display Time - Failure Message

The mobile app will display the failure message for a configurable time in seconds before returning to the default state

Requirement ID: R_F_RS_76					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version 6.0   End of Requirement

R_F_RS_77 Reset Buttons

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

Requirement ID: R_F_RS_77					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version 6.0   End of Requirement

R_F_RS_78 Mobile App Error Notifications

Error messaging displayed to the end user in the event that a Remote Start or Cancel Remote Start fails. The FordPass or Lincoln Way app will display pop-up messages and/or push notifications to clearly alert the user that the feature did not act as expected. In addition, steps may be given to guide the user in how to remedy the error

Requirement ID: R_F_RS_78					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version 6.0   End of Requirement

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R_F_RS_79 Engine Running

If user initiates remote start while vehicle engine in run, the app shall display an appropriate failure message that vehicle failed to start because vehicle engine is running

Requirement ID: R_F_RS_79				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_80 Engine Started

If user initiates remote start while vehicle engine is already running, the app shall display an appropriate failure message that vehicle failed to start because vehicle has started

Requirement ID: R_F_RS_80				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_81 Hood Ajar

If user initiates remote start while hood is ajar, the app shall display an appropriate failure message that vehicle failed to start because hood is ajar

Requirement ID: R_F_RS_81				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_82 Remote Start Alert Sent with Failure

If the remote start alert status indicates that the vehicle did not start, the mobile app shall display as error message

Requirement ID: R_F_RS_82				
Rationale				
Acceptance Criteria				
Notes				
Source			**Owner**	
Source Req.			**V&V Method**	
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_83 Remote Start HMI - Failure

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• The app will display a warning if the Remote Start operation fails. The warning message will contain red colored text and will display a red circle around the perimeter of the start button
• User will be notified of remote start failure from a message on the status bar, which will be displayed for 10 seconds before returning to default state
• A notification of the failure is displayed when the app is in background mode

Requirement ID: R_F_RS_83

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

Reg. Template Version   6.0   End of Requirement

R_F_RS_84 Remote Start HMI - Success

• The app will change the text underneath the Start button to "Engine Start"
• User will be notified of remote start success from a message on the status bar, which will be displayed for 10 seconds before returning to default state
• A notification of success is displayed when the app is in background mode

Requirement ID: R_F_RS_84

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

Reg. Template Version   6.0   End of Requirement

R_F_RS_85 Cancel Remote Start HMI - Success

• The app will change the text underneath the Start button to "Engine Stop"
• User will be notified of remote start success from a message on the status bar, which will be displayed for 10 seconds before returning to default state
• A notification of success is displayed when the app is in background mode

Requirement ID: R_F_RS_85

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

Reg. Template Version   6.0   End of Requirement

R_F_RS_86 Cancel Remote Start HMI - Failure

• The app will display a warning if the Cancel Remote Start operation fails. The warning message will contain red colored text and will display a red circle around the perimeter of the start button
• User will be notified of Cancel Remote Start failure from a message on the status bar, which will be displayed for 10 seconds before returning to default state
• A notification of failure is displayed when the app is in background mode

Requirement ID: R_F_RS_86

Rationale		
Acceptance Criteria		
Notes		
Source		Owner

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Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_87 Messaging When Mobile App is Offline

When the mobile app goes into offline mode, a snack bar shall be displayed at the bottom, "We've lost your connection. Please check your device settings and try again"

Requirement ID: R_F_RS_87					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_88 Sync Settings: Enable/Disable Remote Start

Sync HMI shall contain within Vehicle Settings the option to enable or disable Remote Start

Requirement ID: R_F_RS_88					
Rationale	Feature settings have moved from the cluster to Sync				
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type	New	Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_89 Sync Settings: Enable Remote Start in Sync for Duration Settings

Once Remote Start is enabled duration settings shall be visible in the menu

Requirement ID: R_F_RS_89					
Rationale	Feature settings have moved from the cluster to Sync				
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type	New	Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_90 Mobile App HMI Reset

After all requests are processed and the status is displayed, the HMI shall return back to its normal state; the Start button shall be displayed and the duration timer is removed

Requirement ID: R_F_RS_90					
Rationale					
Acceptance Criteria					
Notes					
Source				Owner	
Source Req.				V&V Method	
Type		Priority		Status	Approved

Req. Template Version   6.0   End of Requirement

R_F_RS_91 Requesting Remote Commands in DRx Mode

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If the user requests a remote command while the vehicle is in LPR mode, a message shall be displayed on the Mobile App indicating that they should manually turn on the vehicle to use remote features

Requirement ID: R_F_RS_91				
Rationale				
Acceptance Criteria				
Notes				
Source		**Owner**		
Source Req.		**V&V Method**		
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

R_F_RS_92 CR 422: Appropriate Error Messages Displayed to User

In cases where the remote command has failed, an appropriate error message shall be displayed to the user that is specific to the command requested

Requirement ID: R_F_RS_92				
Rationale				
Acceptance Criteria				
Notes				
Source		**Owner**		
Source Req.		**V&V Method**		
Type		**Priority**	**Status**	Approved
Req. Template Version 6.0				End of Requirement

5.5 Other Requirements

5.5.1 Design Requirements

#Hint: Requirements of a Logical Function should be typically agnostic of their SW/HW implementation. If for specific reasons the function owner needs to define explicitly design constraints on the solution, it can be done in this chapter.

Not supported by MagicDraw report generation.

5.5.2 Manufacturing Requirements

No Manufacturing Requirements specified.

5.5.3 Service Requirements

#Hint: Requirements in this section could specify, e.g. what needs to be considered, if individual ECUs are replaced or new SW is flashed to ECUs (parameter set in non-volatile memory might get inconsistent and needs also to be updated).

No Service Requirements specified.

5.5.4 After Sales Requirements

#Hint: Requirements in this section could specify, e.g. input for the Owner's Manual could be gathered.

No After Sales Requirements specified.

5.5.5 Process Requirements

#Hint: Requirements in this section are relevant for the development process of the feature, e.g. ISO26262 compliance.

No Process Requirements specified.

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6 FUNCTIONAL SAFETY

#Classification: Functional Safety only
#Hint: This section is dedicated to the Ford Functional Safety (ISO26262) process. For details of this process refer
#Link: Ford Functional Safety Sharepoint
#Contact: RE Wiki Roles & Responsibilites page – Role: Application Functional Safety Engineer

6.1 System Behaviors for HARA

#Classification: Functional Safety only
#Hint: List of selected system behaviors is an input to the Hazard Analysis and Risk Assessment (HARA). There needs to be a rationale why other system behaviors / functions are not considered.
Remote Start devices are rated ASIL QM. The Remote Start feature is rating ASIL B.
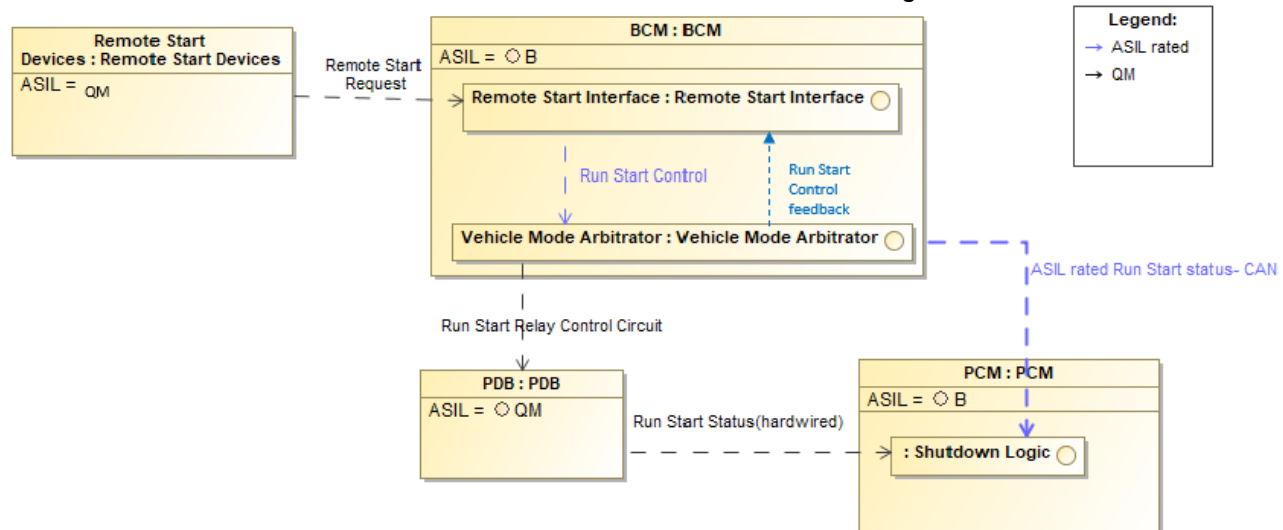
Figure 5: Technical Block Diagram for ASIL Ratings

6.2 Safety Assumptions

#Hint: Copy the assumptions from the document "FFSD 02 Hazard Analysis and Risk Assessment", Tab. "2 - Assumptions" with "Ref/ID", "Name", "Category", "Description", "Purpose". In this document, additionally a reference to the requirement ID is inserted.
#Link: Functional Safety Sharepoint – HARA

No Safety Assumptions specified

6.3 Safety Goals

#Classification: Functional Safety only
#Hint: The list of Functional Safety Goals is an output of the Hazard Analysis and Risk Assessment (HARA) and therefore not required during the initial creation of the Feature Document.
#Link: Functional Safety Sharepoint – HARA

ID	Goal	
	Goal Name	Prevent Accumulation of tailpipe emissions caused by Remote start - ASIL B
	Description	Combustion engine producing tailpipe emissions in closed environment for a longer period can lead to an accumulation of health impairing fumes.

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	Safety Goal Concept	Safety Goal Concept: The accumulation of tail pipe emissions due to Remote start shall be prevented by restricting Engine running time to FS_Remote_Start_Cumulative_ Maximum_NOX_Timeout		
	ASIL	B	**FTTI**	
	Related FSR IDs	FSR 1.1 to FSR 1.7		

Table 12: Functional Safety Goals

6.4 Functional Safety Requirements

#Classification: Functional Safety only
#Hint: The section lists the Functional Safety Requirements (FSRs) derived from
- *a Safety Goal (list in subsections 6.4.1 and following)*
     in this case each FSR should trace back to a safety goal in ch. 6.3
- *and Assumptions (list in subsection 6.4.2).*
     in this case each FSR should trace back to an assumption in ch. 6.2.
In section 6.5Error! Reference source not found. "ASIL Decomposition of Functional Safety Requirements" the initial FSRs from chapters 6.4.1 to 6.4.2 may be decomposed, if required.
#Link: Functional Safety Sharepoint – Functional Safety Concept
     RE Wiki - Requirements Attributes
#Classification: Functional Safety only
#Hint: The section lists the Functional Safety Requirements (FSRs) derived from a Safety Goal and Assumptions. The following should be noted for the use of the attribute fields for FSRs
- The "Source Req" trace link field in each FSR should have a reference to
     - a safety goal in ch. 6.3 "Safety Goals" or
     - an assumption in ch. 6.2 "Safety Assumptions"
#Link: Functional Safety Sharepoint – Functional Safety Concept
     RE Wiki - Requirements Attributes

6.4.1 Safety Goal: Prevent Accumulation of tailpipe emissions caused by Remote start- ASIL B

Name: Prevent Accumulation of tailpipe emissions caused by Remote start- ASIL B
Purpose:
Text: The ASIL rated functionality have been handled by Remote Start function in the BCM. Scheduled Remote start from a mobile app has been decomposed to QM (B) rating.
ASIL: B

6.4.1.1   Safety Goal Concept

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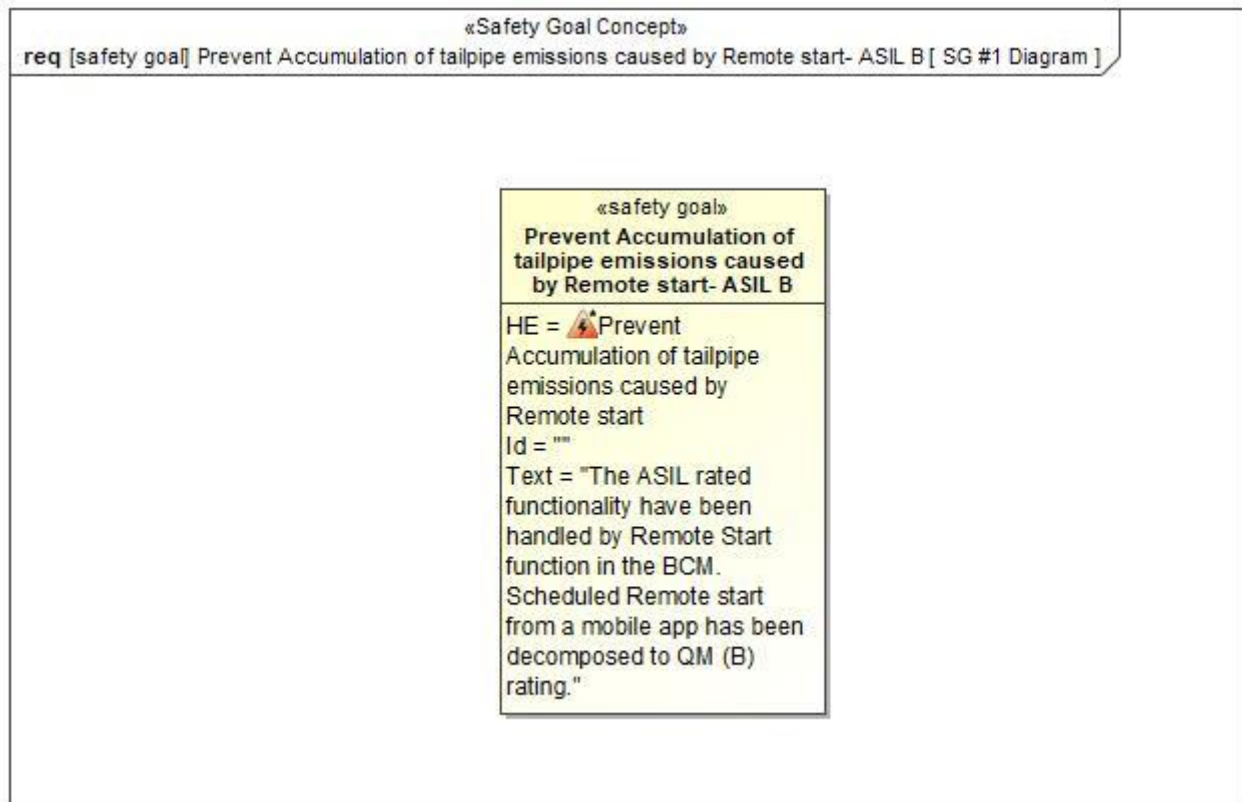*Date Revised: 2020-08-24*

Figure 1: SG #1 Diagram – Prevent Accumulation of tailpipe emissions caused by Remote start- ASIL B

Note: The authoritative source for the Safety Goals is document "FFSD 02 Hazard Analysis and Risk Assessment". The documentation of Safety Goals in this chapter (In the Argumentation for Safety Goal achievement) is for information purposes only.
The authoritative source for the Functional Safety Requirements is section 2.1.x.3: of this document. The documentation of Functional Safety Requirements in the following chapter (complete or summarised) is for information purposes only.

6.4.1.2   Warning and Recovery Concept

No Warning and Recovery Concept diagram specified.

6.4.2   Derivation of Functional Safety Requirements on Assumptions

#Classification: *Functional Safety only*
#Hint: *Derive requirements from the Assumptions (refer to section "Safety Assumptions"*

No Functional Safety Requirements tracing to Assumptions specified.

6.5 ASIL Decomposition of Functional Safety Requirements

#Classification: *Functional Safety Only*
#Hint: *For ASIL D features additional measures like a requirements decomposition might be required. Fill out the following table for each ASIL D decomposition applied in the feature. The decomposition rationale is the reason why the decomposition was performed, whereas the rationale for each requirement expresses the reason and thought behind that particular requirement and should include how the requirement is able to independently fulfill the needs of the parent requirement.*
#Link: *Functional Safety Sharepoint - Functional Safety Concept*

No Functional Safety Requirements with ASIL Decompositions specified.

6.5.1   Selection of Functions for HARA

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For the purposes of Functional Safety the feature as described in this document does not constitute an Item per ISO 26262, but rather a service or function used by other Items in the vehicle. As such, Functional Safety for this feature shall not include a unique HARA, but will instead rely on the Functional Safety Analysis of the Items that make use of this feature. Towards that ends, any ASIL rated Item that makes use of this feature to realize its behaviors shall cascade any and all relevant FSR/TSRs required to be fulfilled by this feature. These requirements shall then be further developed in the appropriate Functional Safety work product by the team responsible for this feature. At the time of this authoring the list of Items making use of this feature is as follows:

Item/Feature Name	Documentation Reference (e.g. VSEM ID)	Contact Information (e.g. Feature Owner name)	# FSRs Cascaded	# TSR Cascaded	Highest Rating Cascaded (e.g. QM, A, etc.)
Remote Start	VDOC075937/A – FFSD02_HARA_Remotestart_AT	Sally Cherian	FSR 1.1 to FSR 1.7	TSR 1.1.1 to TSR 1.7.2	B
Remote Start	VDOC075936/A – FFSD01.1_Item Definition_Remotestart_AT	Sally Cherian	FSR 1.1 to FSR 1.7	TSR 1.1.1 to TSR 1.7.2	B
Remote Start	VDOC084585/A – FFSD03_FSC_AT_RemoteStart_v2.0	Sally Cherian	FSR 1.1 to FSR 1.7	TSR 1.1.1 to TSR 1.7.2	B

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7 ARCHITECTURE

7.1 Functional Architecture
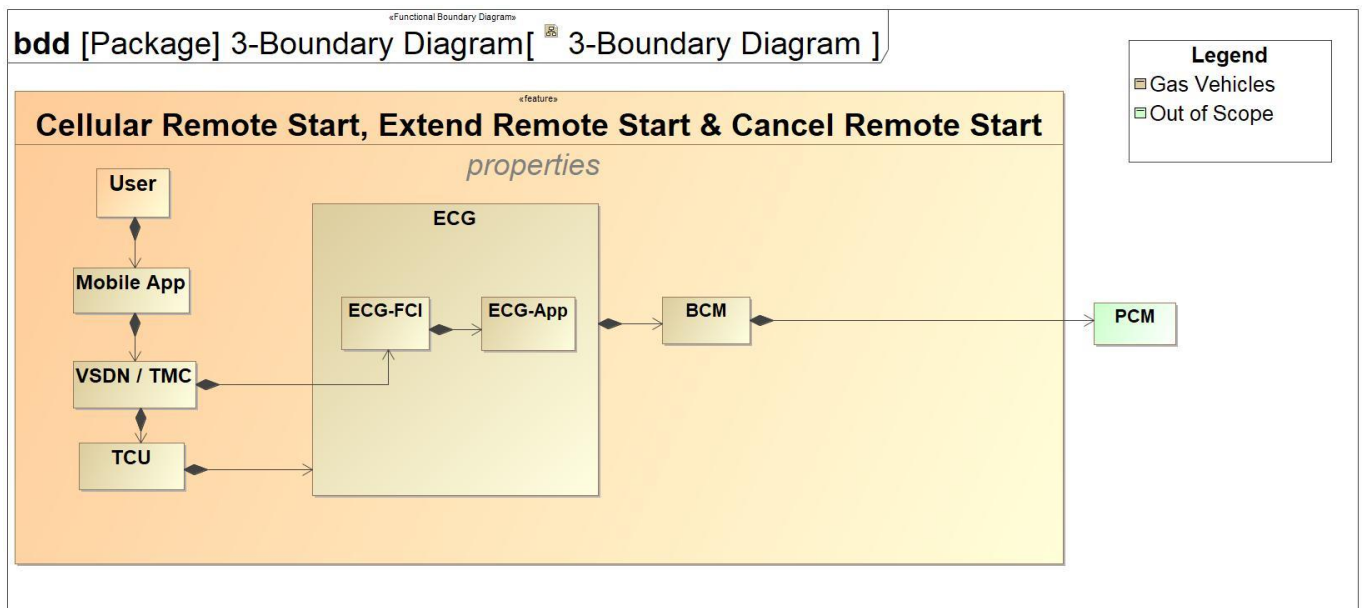
Figure 6: 3-Boundary Diagram

Element Name	Description	Allocated Functions	Comments
BCM	The BCM receives the Remote Start, Extend Remote Start or Cancel Remote Start requests, processes the requests and sends the responses to the ECG		
ECG	Serves as a central controller in FNV to manage information and serve as a central computing resource		
Mobile App	The Mobile Apps displays HMI to the user to select a request and send to the VSDN/TMC		
Off-Board Systems	Systems used to process requests and responses outside of the vehicle: Mobile App and VSDN/TMC		
On-Board Systems	Systems used to process requests and responses inside of the vehicle: TCU, ECG, BCM, PCM, Sync		
PCM	The PCM sends feedback to the BCM that the engine was started or stopped		

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Sync	Sync contains settings to enable/disable Remote Start functionality and adjust remote start duration settings			
TCU	The TCU acts as a pass-through for commands, responses and alerts			
VSDN/TMC	VSDN/TMC is the gateway between the Mobile App and the vehicle, is responsible for decoding APIs and converting to FTCP messages and contains logic for some feature functionality			

Table 13: Logical Elements

7.1.1 List of Functions

7.2 Logical Architecture

#Classification: *Functional Safety Analysis only*
#Hint: *FS Analysis requires a description of the boundary of the feature and its elements. A simple block diagram or a SysML Internal Block Diagram could be used to depict the Logical Architecture*
#Link: *Ford Functional Safety Sharepoint*
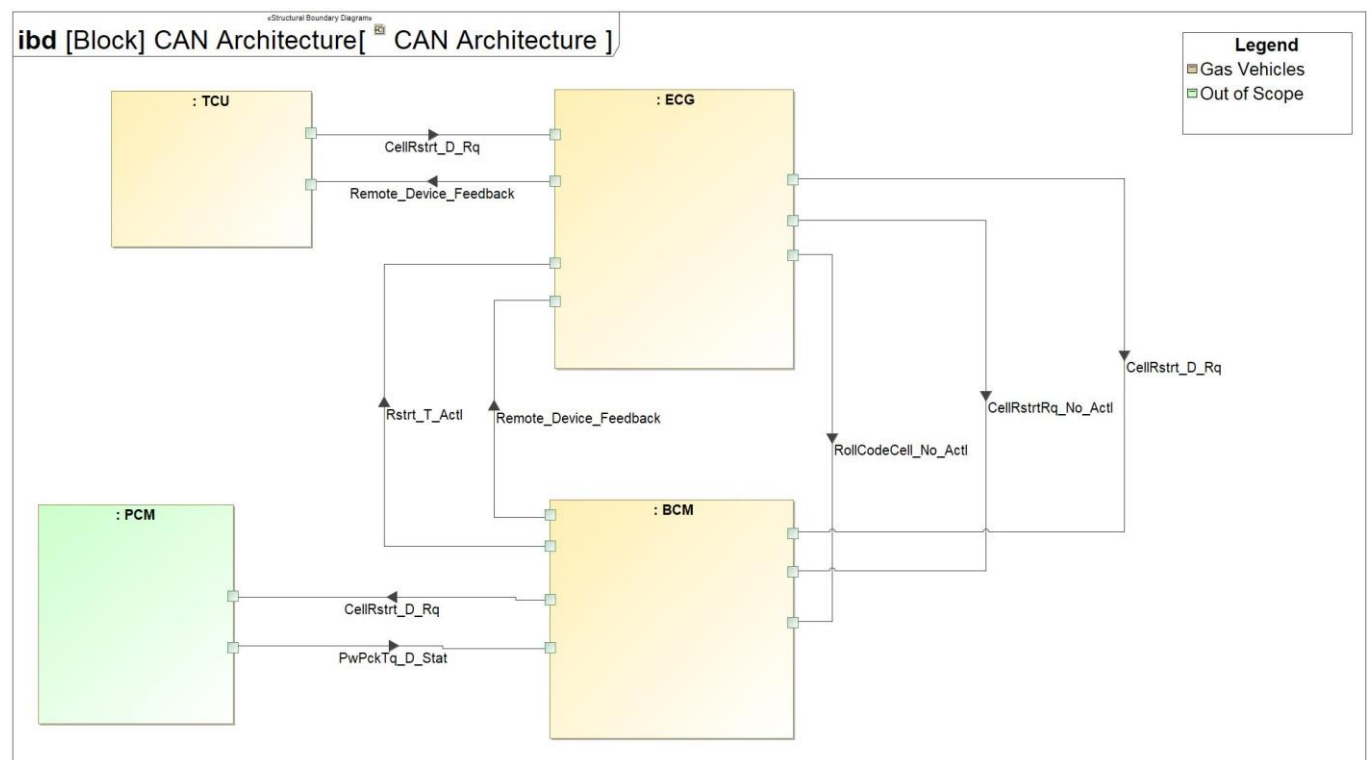
Figure 7: CAN Architecture

Interface	Direction	Description	Value Range
CellRstrtRq_No_Actl	CellLockRq_No_Actl (ECG) To (BCM)	Event counter for remote start requests from cellular remote device	

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CellRstrt_D_Rq	CellRstrt_D_Rq (BCM) To (PCM)	Signal from a cellular device requesting initiation or cancellation of remote start	
	CellRstrt_D_Rq (ECG) To p1 (BCM)	Signal from a cellular device requesting initiation or cancellation of remote start	
	CellRstrt_D_Rq (TCU) To (ECG)	Signal from a cellular device requesting initiation or cancellation of remote start	
PwPckTq_D_Stat	p1 (PCM) To p2 (BCM)	Indicates if the power pack is a motive (wheel torque producing) or non-motive (non-wheel torque producing) mode. It also indicates to if a transition from a non-motive to a motive mode is in progress.	
Remote_Device_Feedback	(BCM) To (ECG)	Signal providing status information about Remote Start device	
	p2 (ECG) To p2 (TCU)	Signal providing status information about Remote Start device	
RollCodeCell_No_Actl	RollCodeCell_No_Actl (ECG) To (BCM)	Network Security Rolling Code for ECG signal requests; signal transmitted from ECG to BCM	
Rstrt_T_Actl	p3 (BCM) To p3 (ECG)	Countdown timer representing time in seconds remaining until Remote Start expires (times out). Starting time is variable depending on the customer setting for duration	

Table 14: Feature Interactions on CAN Architecture

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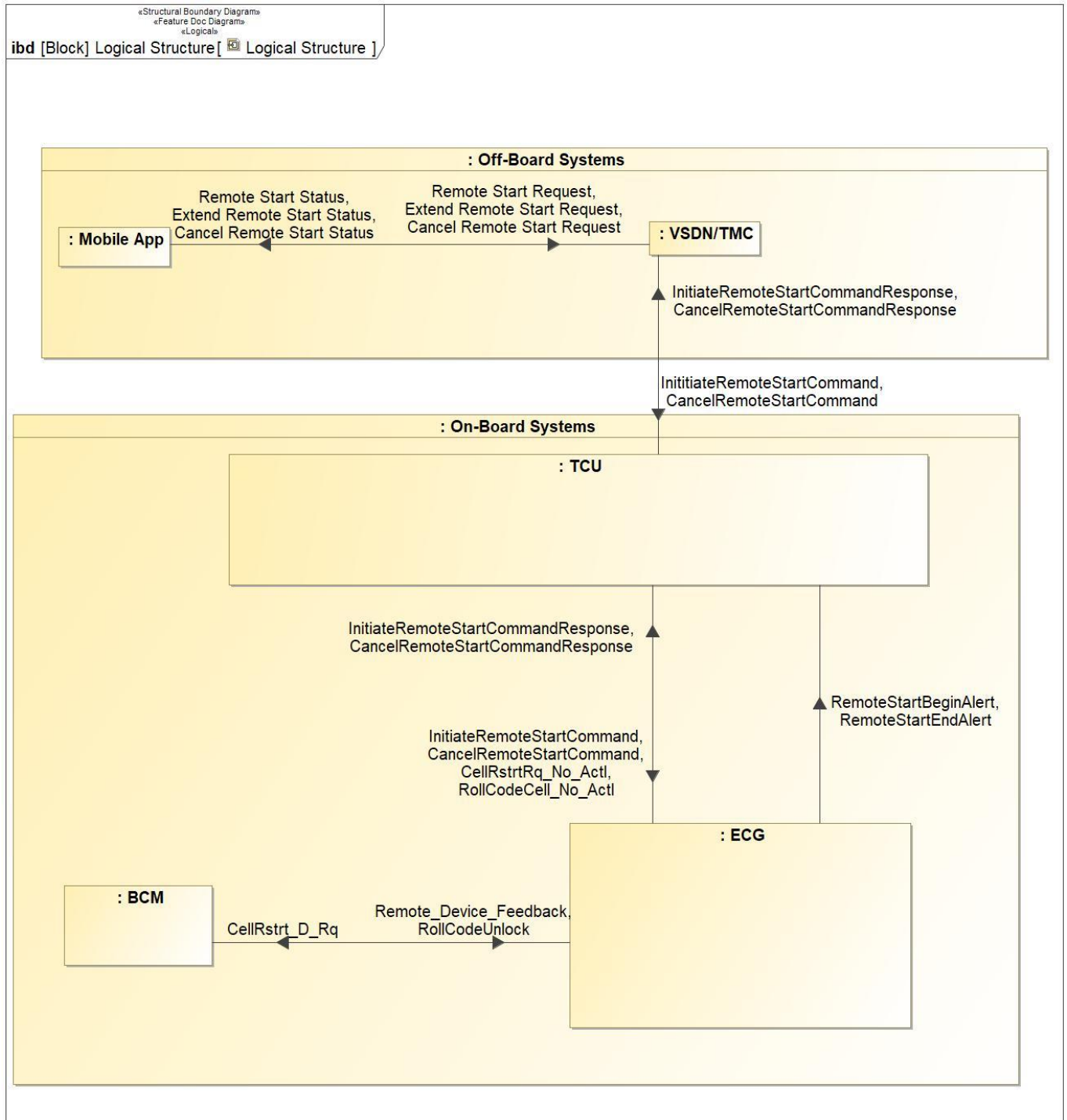
Figure 8: Logical Structure

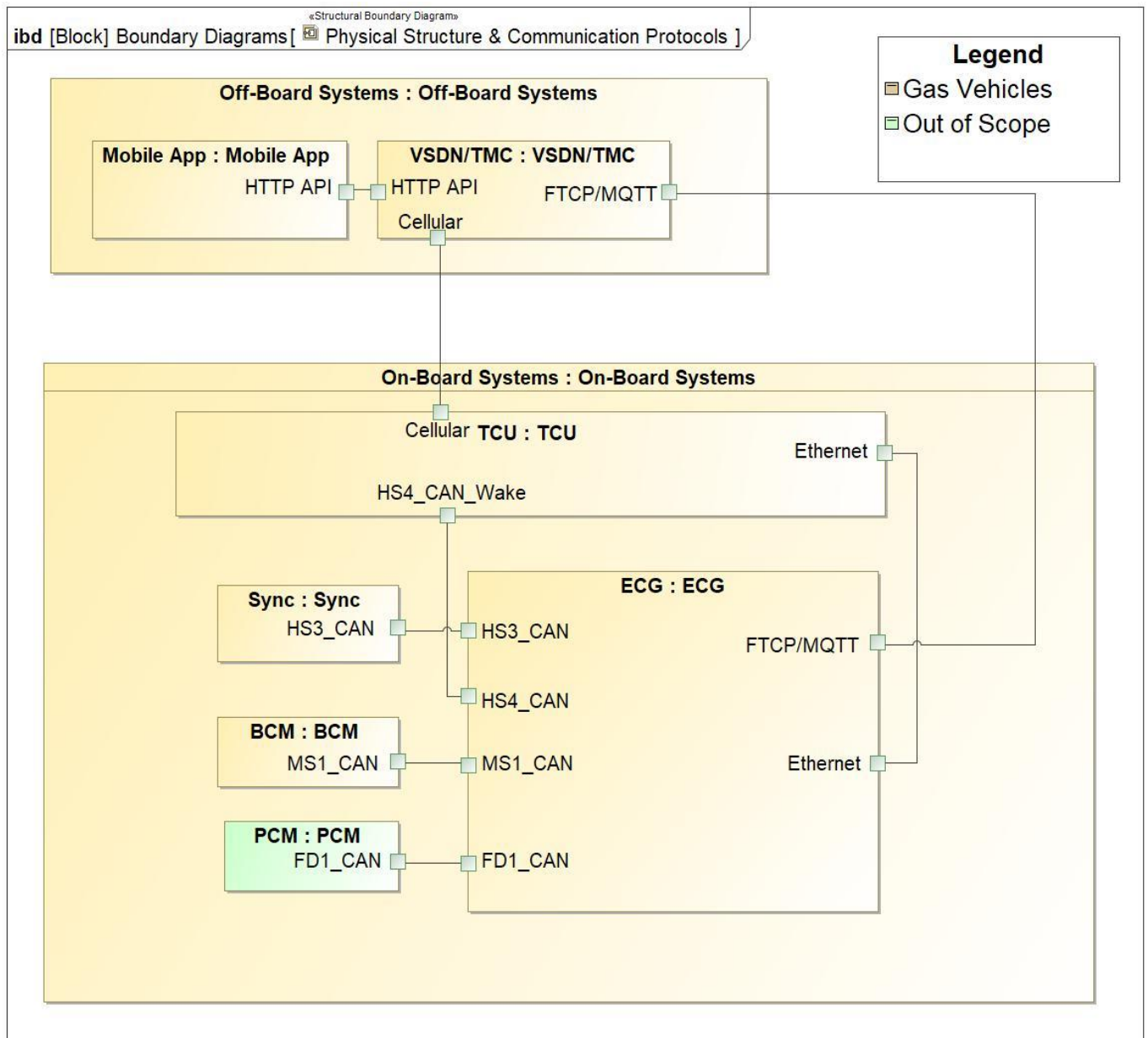| Interface	Direction	Description	Value Range
CancelRemoteStartCommand	VSDN/TMC To TCU	Command sent to the vehicle to remotely stop the vehicle engine	
CellRstrt_D_Rq	ECG To BCM	Signal from a cellular device requesting initiation or cancellation of remote start	
Extend Remote Start Status	VSDN/TMC To Mobile App	Status of the extend remote start request	

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InitiateRemoteStartCommand	TCU To ECG	Command sent to the vehicle to remotely start the vehicle engine	
InitiateRemoteStartCommandResponse	TCU To VSDN/TMC	Command response indicating the status of the remote start request	
InitiateRemoteStartCommandResponse	ECG To TCU	Response from the vehicle whether the remote start request was accepted or rejected	
InititiateRemoteStartCommand	VSDN/TMC To TCU	Command sent to the vehicle to remotely start the vehicle engine	
Remote Start Request	Mobile App To VSDN/TMC	Command sent from the Mobile App to the cloud to remotely start the vehicle engine	
Remote Start Status	VSDN/TMC To Mobile App	Status of the remote start request	
RemoteStartBeginAlert	ECG To TCU	Correlated alert sent to the cloud to indicate the vehicle engine has started	
Remote_Device_Feedback	BCM To ECG	Signal providing status information about Remote Start device	
RollCodeUnlock	BCM To ECG	The 16 bit Rolling Code that is generated by Network Security and transmitted over CAN; transmitted from BCM to ECG	

Table 15: Feature Interactions on Logical Structure

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Figure 9: Physical Structure & Communication Protocols

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Figure 10: Swimlane Diagram

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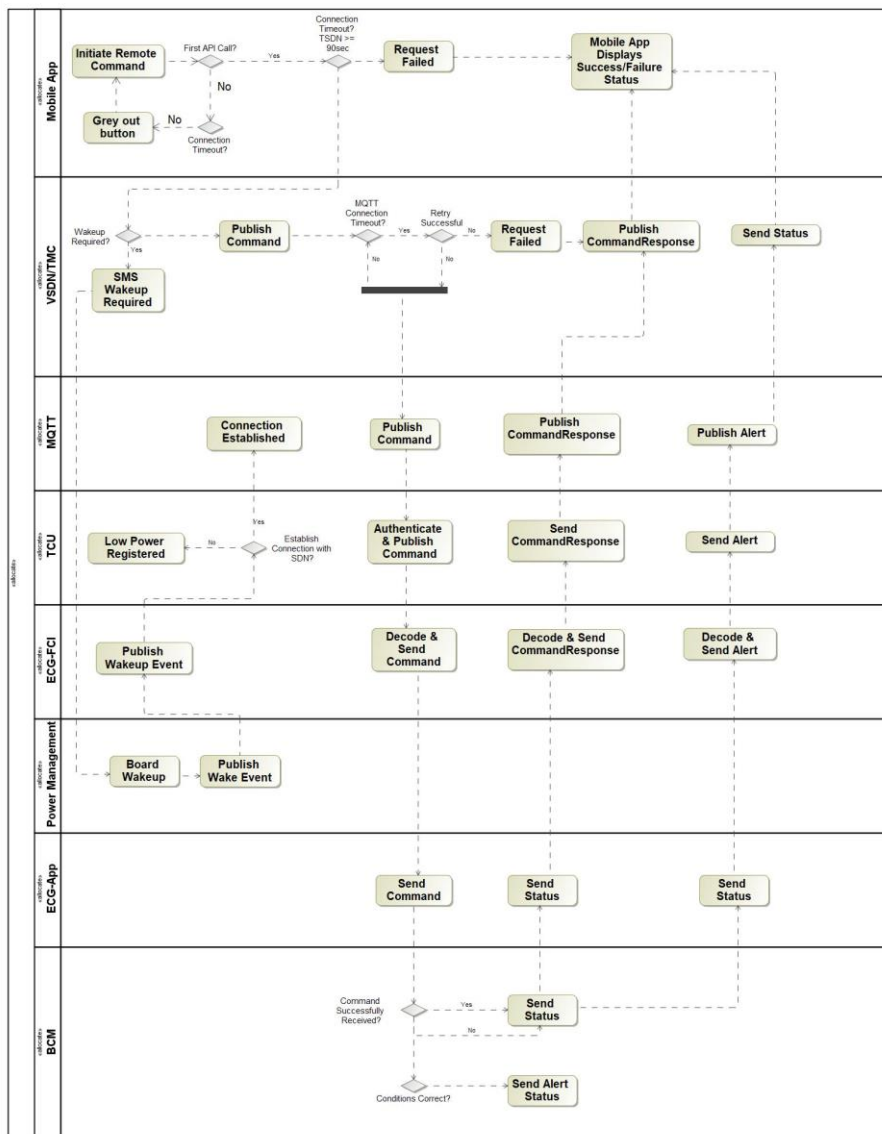
8 OPEN CONCERNS

#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 16: Open Concerns *(Not supported by MagicDraw report generation)*

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9 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.

No Revision History found.

Revision	Author	Description	Sections Affected	Release Date
1.0	Audriene Bell	- Creation of MagicDraw Feature Document -Requirement number changed to accomadate new document structure -New Requirements <u>CCS Settings Changes</u> R_F_RS_38 R_F_RS_39 <u>Vehicle pre-conditions for feature - information for vehicle programs</u> R_F_RS_65 <u>Changes for CR 1165</u> R_F_RS_66 R_F_RS_67 R_F_RS_68 R_F_RS_69 <u>Cluster Settings Move to Sync</u> R_F_RS_88 R_F_RS_89	All	5/26/2020
1.1	Audriene Bell	Added Functional Safety related information	Section 6	8/24/2020

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10 APPENDIX

10.1 Definitions

Definition	Description
Authorization	Authorization is the process of verifying that the requester has permission to submit the request
BCM	Body Control Module
CAN	Controller Area Network
Cancel Remote Start	A request from the mobile app to stop the vehicle engine
CCS	Customer Connectivity Settings
ECG	Enhanced Central Gateway
ECG-App	Binary application on the ECG; App used for Command & Control is ControlMyCar App
Extend Remote Start	A request from the mobile app to increase the time the vehicle engine is remotely started
FordPass Mobile App	Mobile app used to present information, configure and command Ford vehicles
FTCP	Ford Transmission Communication Protocol
FTTI	Fault Tolerance Time Interval
Meta Entities	Vehicle Connectivity and Vehicle Data CCS privacy settings within Sync HMI
PCM	Powertrain Control Module
Remote Start	A request originated from the mobile app to start the vehicle engine.
System	System refers to the overall eco-system from the cloud to the vehicle
TCU	Telematics Control Unit
TMC	Transportation Mobility Cloud
User	An individual or group that benefits from a system during its utilization
VIN	Vehicle Identification Number
VSDN	Vehicle Service Delivery Network

Table 17: Definitions used in this document

10.2 Abbreviations

No acronyms specified.

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