PreFeature Document (FD)

Vehicle Washing Mode

(Feature ID: TBD)

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Document Approval			
Person	Role	Email Confirmation	Date
Zhang, Jim <jzhan102@ford.com>	Advanced Feature Supervisor	-	-

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DISCLAIMER

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1 INTRODUCTION

1.1 Pre-Feature Team

A contact list of contributors to the content of this document - who to contact for clarification.

CDSID	Name	Role	Reference
JZHU65	Zhu, Jing Yuan (J.)	Pre-Feature Owner	
QXIANG2	Xiang, Cici	Feature Owner	
YDING43	Ding, Yi	DCU D&R	
yliu410	Liu, Yuntai (Y.)	IVI System Engineer	
jzhu101	Zhu, Jiawei (J.)	Porwed Charge Port Door FO	

Table 1: Contributors to this PD

1.2 Target Vehicle Programs (initial)

Global (migration) integration plan drafted for this proposed feature.

Program	Date	Note
CX821 China	<PSC> 23-Mar-2022 <UPV0> 05-Jul-2022	

Table 2: Potential Program List

1.3 Feature Prototype Plan

☒ No prototype
☐ Assess need for prototype
☐ Prototype planned

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2 FEATURE OVERVIEW

2.1 Conceptual Basis for Feature

The Vehicle Washing Mode will provide a softbutton in IVI screen to allow the costomer active the washing mode for Manual wash the vehicle & Non-Free Roll Automatic Car Washing Machine and also the washing mode should provide a speial mode for Free Roll Automatic Car Washing Machine.

In "Manual wash the vehicle & Non-Free Roll Automatic Car Washing Machine" mode, feature should provide following function:
1. Close Charger Door and disable the Charger Door Hard button;
2. Provide the Windows / Doors / Wiper / Sunroof / Gear / Handbrake information in HMI;
3. Provide a soft switch to allow customer fold/unfold exterior mirrors.

In "Free Roll Automatic Car Washing Machine" mode, feature should provide following functions:
1. Close Charge Door and disable the Charge Door Hard button;
2. Close vehicle windows;
3. Disable Auto hold;
4. Fold Exterior Mirror;
5. Change Climate setting to Recirculation;
6. Provide the Windows / Doors / Wiper / Sunroof / Gear information in HMI;

(Manual wash the vehicle & Non-Free Roll Automatic Car Washing Machine)
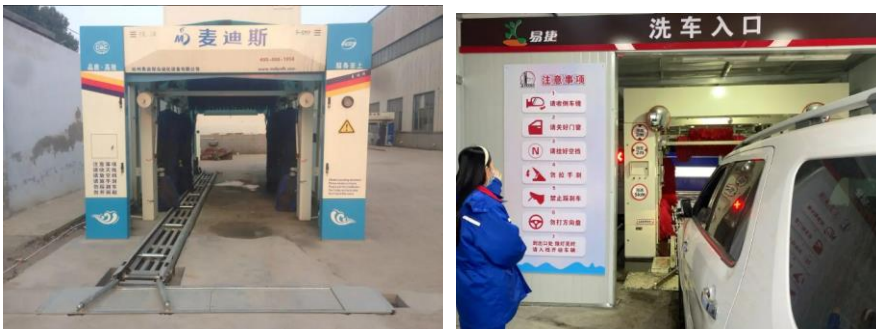
(Free Roll Automatic Car Washing Machine)

2.1.1 Vision Statement 1/30/2023

Statement 1:
For FNV2.1 vehicle provide basic functions:
1. Operate Power Port Charge Door / Windows / Mirrors / Autohold setting / Climate setting;
2. Doors / Wiper / Sunroof / Gear / Handbrake status display;
3. Feature only work during IGN on.

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2.2 Goals

2.2.1 Minimum Viable Product Goals

#	Goals - Minimum Viable Product
	1. Operate Power Port Charge Door / Windows / Mirrors / Autohold setting / Climate setting; 2. Doors / Wiper / Sunroof / Gear / Handbrake status display; 3. Feature only work during IGN on.

2.2.2 Future Inclusion/OTA

#	Goals - Minimum Viable Product
	Feature not impact hardware, support OTA.

2.3 High Level E2E Block Diagram

2.3.1 Context Diagram

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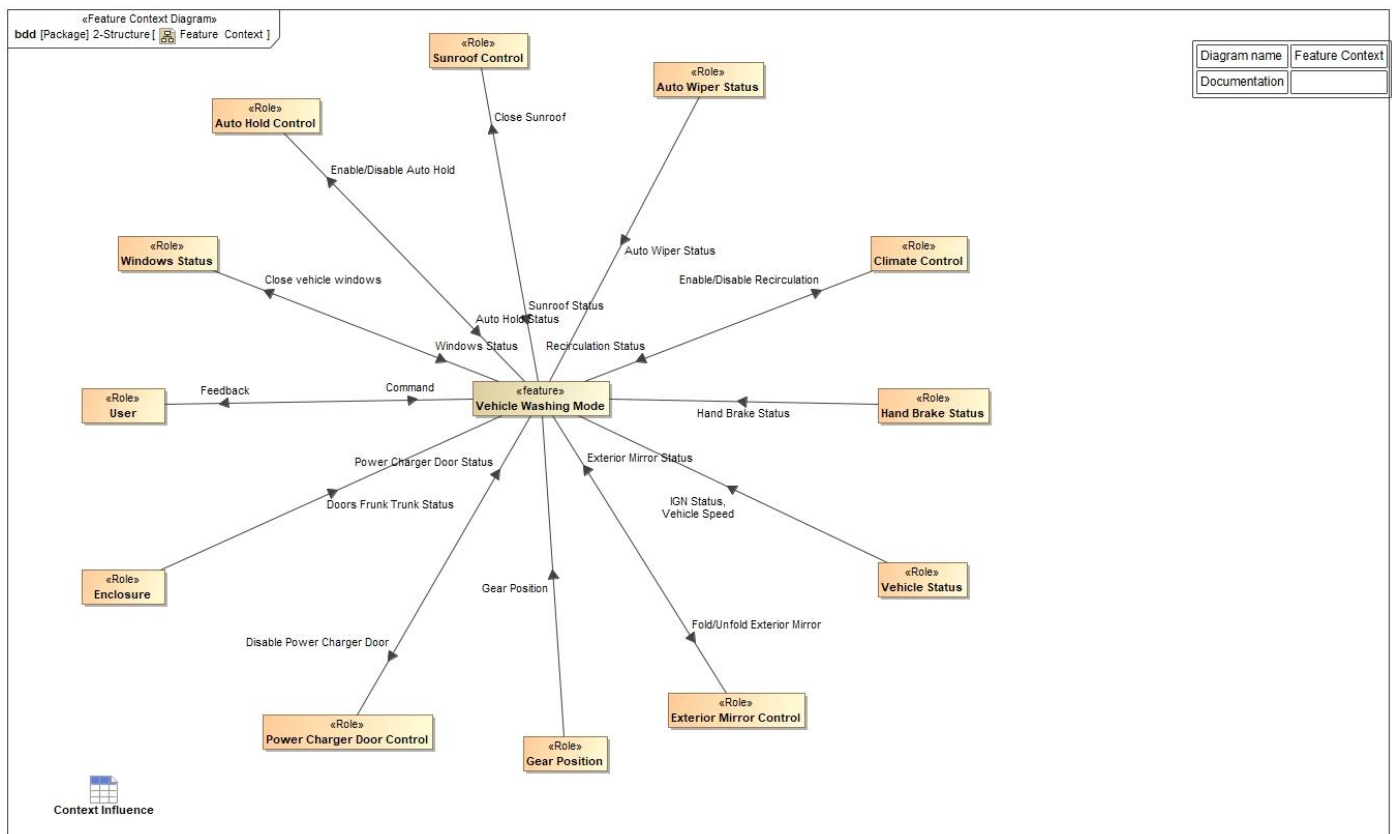
3 FEATURE SCOPING

3.1 Use Case Diagram
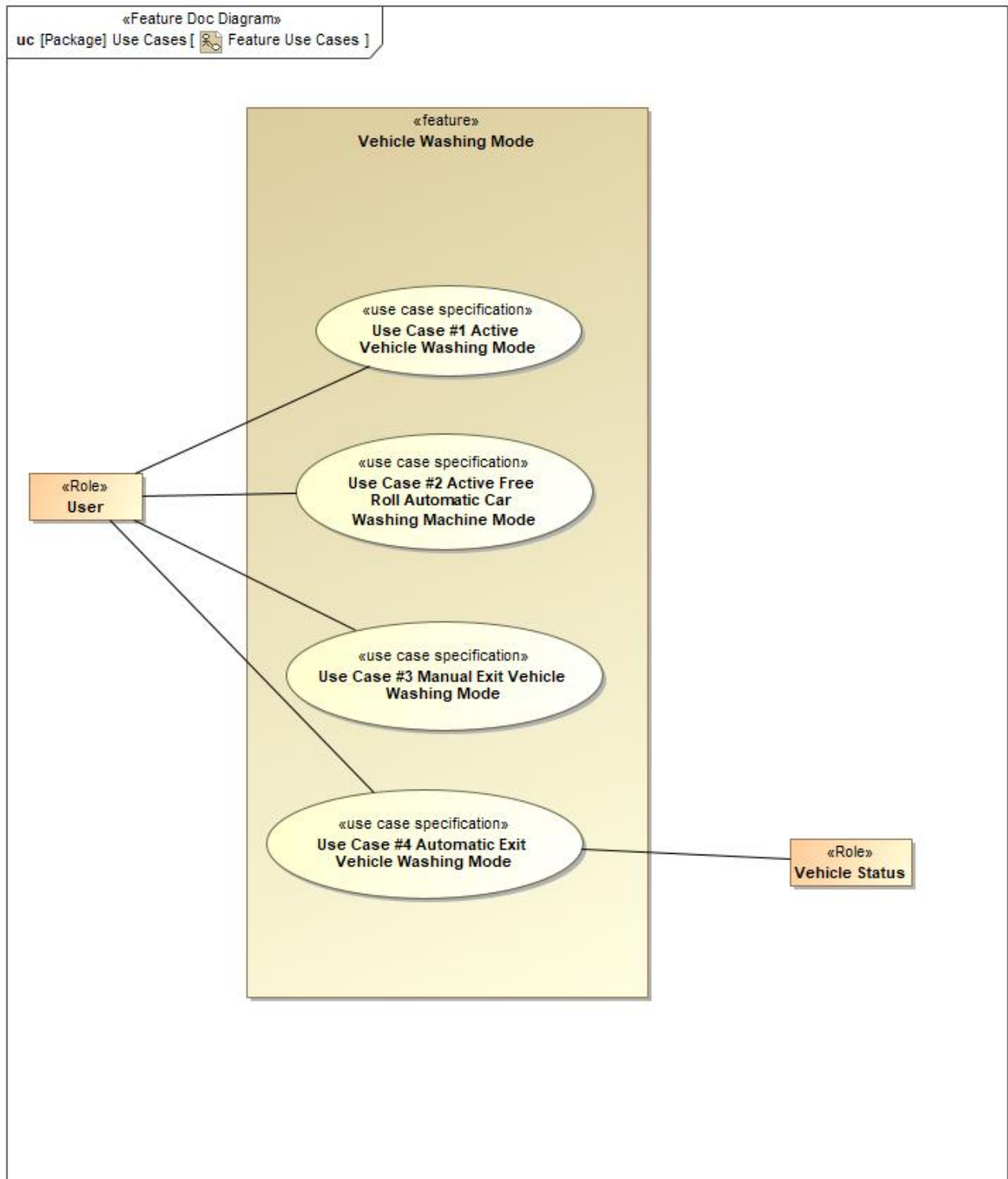
Figure 1: Use Case Diagram

3.2 Use Case 1 - Active Vehicle Washing Mode

Describe one way a user will use the feature. Start with "As a user, I want to…" to list the goal of what the user wants to achieve in this use case. All sections should be addressed.

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As a user, I could active the vehicle wash mode from IVI soft button / voice control to disable the charge port door, to keep it close & disable the push to open function during vehicle washing process. And I also hope the feature display the windows & wiper status during car washing.

3.2.1 User Input

Describe the way in which a (each) user makes their intention known to the feature.

#	User Inputs
1	User active the Vehicle Washing Mode via IVI softbutton / Voice control;
2	User accept the pop-up notice in IVI screen.

3.2.2 Output to User

Describe the way in which a feature meets the user(s) intention.

#	User Outputs
1	Close the powered charge port door;
2	Disable the power charge port door push to open function;
3	Close Windows;
4	IVI HMI display the windows status / doors status / wiper status / handbrake status / gear position;
5	Provide a soft-button to fold / unfold the exterior mirrors.

3.2.3 Functionality of the Feature (Behavior)

Describe the way in which a feature transforms user input into output to user. Include behavior model (state diagram, sequence diagram, etc.) if available.

#	Pre-conditions
1	IGN on
2	Vehicle Speed < 15 Km/h

#	Main Success Scenario Steps
1	User choose "active vehicle washing mode" in IVI menu;
2	IVI HMI show the notice (include all functions for VWM, e.g. disable the power port charge door);
3	User accept the notice;
4	Close the power port charge door;
5	Disable the power charge port door push to open function;
6	Close Windows;
7	IVI HMI display the windows status / doors status / wiper status / handbrake status / gear position;
8	Provide a soft-button to fold / unfold the exterior mirrors.

#	Exception Flows 1
1	User Not accept the notice in Main Success Scenario Step 2;
2	Vehicle washing mode should not active.

3.2.4 Functional Interfaces

Describe the non-user information and interactions the feature will require to achieve the user intention.

#	Functional Interfaces

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1   HMI
2   Wiper Status
3   Sunroof Status
4   Window Status
5   Doors Frunk Trunk Status
6   Close Vehicle Windows
7   Disable the power charge port door push to open function
8   Close power charge port door
9   Exterior Mirror Status
10 Fold/Unfold Exterior Mirror
11 Gear Position
12 Hand Brake Status
13 IGN Status
14 Vehicle Speed

3.3 Use Case 2- Active Free Roll Automatic Car Washing Machine Mode

Describe one way a user will use the feature. Start with "As a user, I want to…" to list the goal of what the user wants to achieve in this use case. All sections should be addressed.

As a user, I could active the vehicle wash mode from IVI soft button / voice control and find a way to guide me how to use the free roll automatic car washing machine, which will require:

1. Close and disable the power port charge door;
2. Fold the exterior mirrors;
3. Close all windows and doors;
4. Shift the gear to "N";
5. Release hand brake (Turn off auto hold);
6. Close wiper function (turn off auto wiper);
7. Enable Climate Recirculation.

I need the warning show on the IVI screen if any of the items is not OK and the vehicle is not suitable to enter the free roll automatic car washing machine which including gear/wiper/windows/doors/handbrake status.

3.3.1 User Input

Describe the way in which a (each) user makes their intention known to the feature.

#	User Inputs
1	User active the Active Free Roll Automatic Car Washing Machine Mode via IVI softbutton / Voice control;
2	User accept the pop-up notice in IVI screen.

3.3.2 Output to User

Describe the way in which a feature meets the user(s) intention.

#	User Outputs
1	Close the powered charge port door;
2	Disable the power charge port door push to open function;
3	Disable Auto hold;
4	Fold the exterior mirrors;
5	Enable Climate Recirculation;
6	Close windows;
7	IVI HMI display the gear position / wiper status / windows status / doors status / handbrake status, warning the user any status not suitable for free roll car washing machine.

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3.3.3 Functionality of the Feature (Behavior)

Describe the way in which a feature transforms user input into output to user.   Include behavior model (state diagram, sequence diagram, etc.) if available.

#	Pre-conditions
1	Vehicle washing mode is active
2	IGN on
3	Vehicle Speed < 15 Km/h

#	Main Success Scenario Steps
1	User choose "active vehicle free roll automatic car washing machine mode" in IVI menu;
2	IVI HMI show the notice (include all functions for free roll car washing machine);
3	User accept the notice;
4	Close the power charge port door;
5	Disable the power charge port door push to open function;
6	Disable Auto hold;
7	Close the Windows;
8	Fold the exterior mirrors;
9	Enable Climate Recirculation;
10	IVI HMI display the gear position / wiper status / windows status / doors status / handbrake status, warning the user any status not suitable for free roll car washing machine;

#	Exception Flows 1
1	User Not accept the notice in Main Success Scenario Step 2;
2	active vehicle free roll automatic car washing machine mode should not active.

3.3.4 Functional Interfaces

Describe the non-user information and interactions the feature will require to achieve the user intention.

#	Functional Interfaces
1	HMI
2	Wiper Status
3	Sunroof Status
4	Window Status
5	Close Vehicle Windows
6	Disable the power charge port door push to open function
7	Close power charge port door
8	Exterior Mirror Status
9	Fold/Unfold Exterior Mirror
10	Gear Position
11	Hand Brake Status
12	IGN Status
13	Vehicle Speed
14	Auto Hold Status
15	Disable Auto Hold
16	Climate Recirculation Status
17	Enable Climate Recirculation

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3.4 Use Case 3- Manual Exit Vehicle Washing Mode

Describe one way a user will use the feature. Start with "As a user, I want to…" to list the goal of what the user wants to achieve in this use case. All sections should be addressed.

As a user, I could exist the vehicle wash manually from soft button / voice control, the power charge port door will functional. If the Free Roll Automatic Car Washing Machine Mode is active, system will unfold the exterior mirrors, and set the Auto Hold and Climate settings to previous customer design.

3.4.1 User Input

Describe the way in which a (each) user makes their intention known to the feature.

#	User Inputs
1	User Exit the Active Free Roll Automatic Car Washing Machine Mode via IVI softbutton / Voice control;

3.4.2 Output to User

Describe the way in which a feature meets the user(s) intention.

#	User Outputs
1	Enable the power charger port door push to open function;
2	Unfold the exterior mirror (if required);
3	Set the Auto hold setting to previous status;
4	Set Climate Recirculation to previous status.

3.4.3 Functionality of the Feature (Behavior)

Describe the way in which a feature transforms user input into output to user. Include behavior model (state diagram, sequence diagram, etc.) if available.

#	Pre-conditions
1	Vehicle washing mode is active
2	IGN on
3	Vehicle Speed < 15 Km/h

#	Main Success Scenario Steps
1	User choose "Exist vehicle washing mode" in IVI menu;
2	Enable the power charger port door push to open function;
3	Unfold the exterior mirror (if required);
4	Set the Auto hold setting to previous status;
5	Set Climate to Recirculation previous status.

#	Exception Flows 1
	N/A

3.4.4 Functional Interfaces

Describe the non-user information and interactions the feature will require to achieve the user intention.

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#	Functional Interfaces
1	HMI
2	Enable the power charge port door push to open function
3	Exterior Mirror Status
4	Unfold Exterior Mirror
5	IGN Status
6	Vehicle Speed
7	Auto Hold Status
8	Enable Auto Hold
9	Climate Recirculation Status
10	Disable/Enable Climate Recirculation

3.5 Use Case 4- Automatic Exit Vehicle Washing Mode

Describe one way a user will use the feature. The user wants to achieve in this use case. *Start with "As a user, I want to…" to list the goal of what the All sections should be addressed.*

As a user, I could exist the vehicle wash automatically when the IGN status change to Off or Vehicle speed > 15KM/h. If the Free Roll Automatic Car Washing Machine Mode is active, system will unfold the exterior mirrors, and set the Auto Hold and Climate settings to previous customer design.

3.5.1 User Input

Describe the way in which a (each) user makes their intention known to the feature.

#	User Inputs
1	IGN status change to Off
2	Vehicle speed > 15KM/h

3.5.2 Output to User

Describe the way in which a feature meets the user(s) intention.

#	User Outputs
1	Enable the power charger port door push to open function;
2	Unfold the exterior mirror (if required);
3	Set the Auto hold setting to previous status;
4	Set Climate Recirculation to previous status.

3.5.3 Functionality of the Feature (Behavior)

Describe the way in which a feature transforms user input into output to user. Include behavior model (state diagram, sequence diagram, etc.) if available.

#	Pre-conditions
1	Vehicle washing mode is active

#	Main Success Scenario Steps
1	The IGN status change to Off or vehicle speed > 15Km/h;
2	The HMI provide Warning message and Chime;
3	Enable the power charger port door push to open function;
4	Unfold the exterior mirror (if required);
5	Set the Auto hold setting to previous status;
6	Set Climate to Recirculation previous status.

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3.5.4 Functional Interfaces

Describe the non-user information and interactions the feature will require to achieve the user intention.

#	Functional Interfaces
1	HMI
2	Enable the power charge port door push to open function
3	Exterior Mirror Status
4	Unfold Exterior Mirror
5	IGN Status
6	Vehicle Speed
7	Auto Hold Status
8	Enable Auto Hold
9	Climate Recirculation Status
10	Disable/Enable Climate Recirculation
11	Chime

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4 BLOCK DIAGRAM (BOUNDARY/CONTEXT)

4.1 Block Diagram

Vehicle Washing Mode
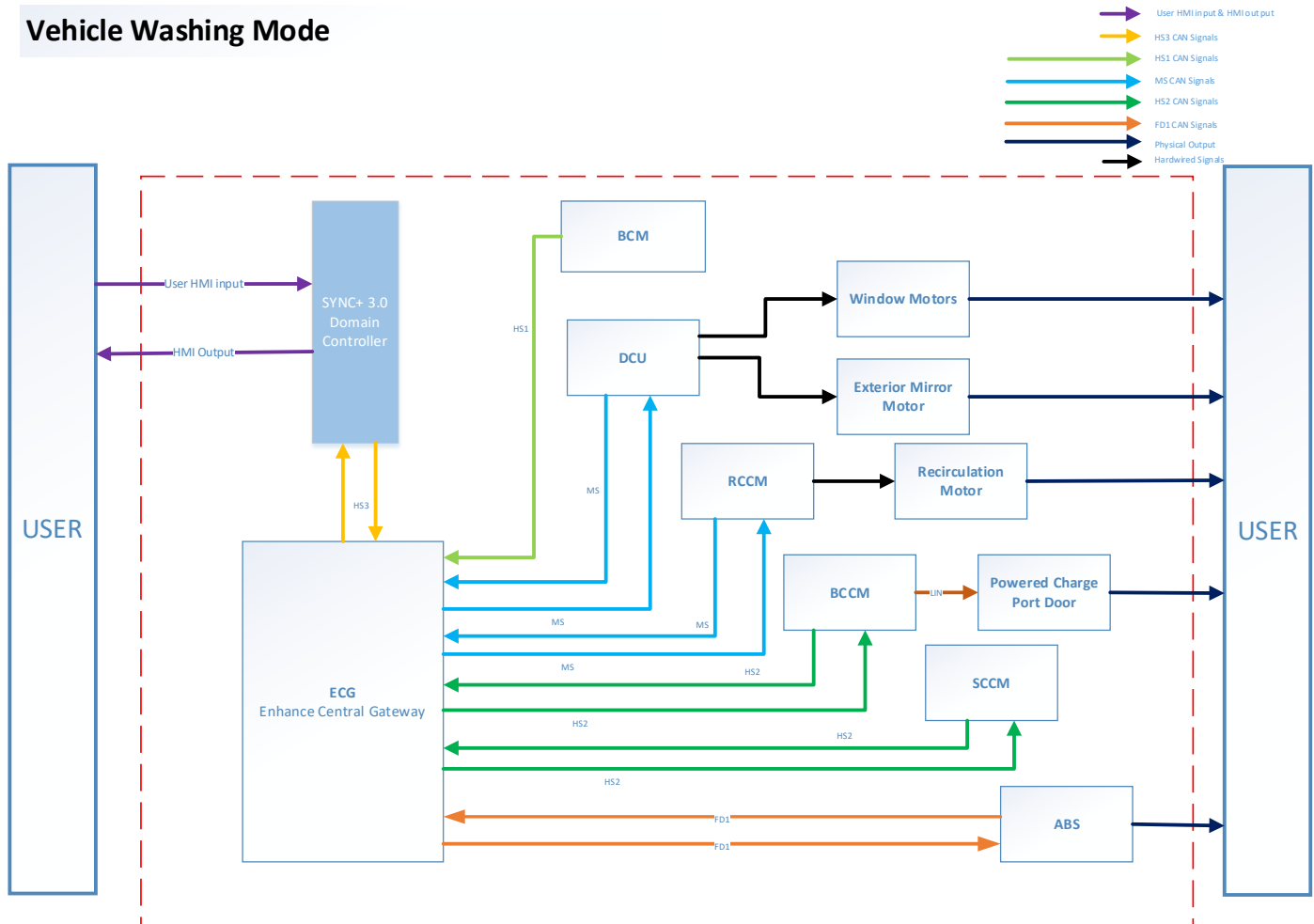
4.2 Potential Impacted Domains

Domain	Stakeholder	Note
IVI		
HMI		
BCM		
DCU		
BCCM		
RCCM		
SCCM		
ABS		
ECG		

Table 3: Potential Impacted Domain List

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5 FEATURE RESOURCE ESTIMATE

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6 KEY RISKS AND OPEN CONCERNS

ID	Concern Description	e-Tracker / Reference	Responsible	Status	Solution

Table 2: Open Concerns

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7 REVISION HISTORY

Rev. (revision)	Date	Description	Approved by	Responsible
1.0	2023-June-03	Initial version for Pre-Feature		Zhu,Jing Yuan

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8   TEMPLATE REVISION HISTORY

Rev. (revision)	Date	Description	Approved by	Responsible
1.0		*Initial version*		
2.0		*Updated to add Functional Architecture Input, and resource estimate.*		
3.0	*10/31/19*	*Included review feedbacks from Functional Architecture team.*		
4.0	*2/19/2020*	*Added this separate section for TEMPLATE revision history*		*m.gabel*
4.1	*2/20/2020*	*Updated to include feedback from various reviewers*		*m.gabel*

Template ends here.

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