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# Introduction

## Purpose

The purpose of this functional specification is to provide the requirements for in Vehicle Software Update for HMI and flows, during and after software update. This specific includes all HMIs requirements such as user consent, schedule update, HMI notification, and software update details for USB, OTA, and check for updates.

## Scope

The following set of functions is describe in this specification.

|  |  |  |  |
| --- | --- | --- | --- |
| **Function ID** | **Function Name** | **Owner** | **Reference** |
|  | Vehicle HMI |  |  |
|  | Ford Pass HMI |  |  |
|  | Legal User Consent |  |  |
|  | Cloud Consent |  |  |
|  | Consumer Website HMI |  |  |
|  | FMEA |  |  |

Table 1: Functions described in this specification

## Audience

The Function specification defines OTA software update related in Vehicle HMI.

### Stakeholder List

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

|  |  |  |
| --- | --- | --- |
| **Function ID** | **Function Name** | **Owner** |
|  | John Vangelov | IVSU team |
|  | Brunilda Caushi | IVSU team |
|  | Balwinder Gill | IVSU team |
|  | David Kulmaczewski | Vehicle Service |
|  | Christina Michaels | Legal |
|  | Shaymala Prayaga | Vehicle HMI Designer |
|  | Ruth Jones | Vehicle HMI Supervisor |
|  | Jason Mick | Vehicle HMI Designer |
|  | Benjamin Hamacher | CCS Feature Owner |
|  | Micha Kahlen | Vehicle Connectivity |

Table 2: Stakeholder List

## Document Organization

### Document Context

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference** | **Title** | **Doc. ID** | **Revision** |
|  | OTA Manager |  |  |
|  | Install Manager |  |  |
|  | Manifest Manager |  |  |
|  | IVSU Trigger Manager |  |  |

Table 3: Document Context

## References

### Ford Documents

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

|  |  |
| --- | --- |
| Definition | Description |
| H31L | SYNC4 Master Reset |
| H33 | SYNC4 SHMI General Info and App Install |
| H31a | SYNC4 Wi-Fi Prompts |
| H31j | SYNC4 Customer Connectivity Settings |
| H22f | SYNC4 Transient Message Table |
| H31c | SYNC4 InfoBook Supplement |
| H22e | SYNC4 Status Bars ICONs |
| P31a | 15P SYNC4 Settings |
| H31c | SYNC4 InfoBook Supplement |
| H29b | SYNC4 External Navigation |
| A73a | Services Market Behavior Table |
| L31a | Settings |
| H29b | External Navigation |
| H75 | SYNC4 Web Browser |
| A73a | Service Market Behavior Table |

Table 4: Ford Documents

### Abbreviations

|  |  |  |
| --- | --- | --- |
| Abbr. | Stands for | Description |
| FS | Function Requirements Specification /  Function Group Specification | The document describing, collecting and developing the requirements of a function or a group of functions. |
| SDN | Service Delivery Network | Service Delivery Network the non-vehicle based infrastructure by which Connected Services and Solutions are transmit and receive from the Vehicle for processing. |
| ASU | Automatic Software Update | User Consents for automatic software update by enable or disable (there are different levels of user consent depending on software update type) |
| AU | Automatic Updates | User can opt-in/opt-out of the software updates |
| HMI | Human Machine Interface/Interaction |  |
| FordPass | The FordPass App provides takes what you used to do with multiple apps and does it in one. This one-stop mobility |  |
| FCSD | Ford Customer Service Division |  |
| FMC | Ford Motor Company |  |
| MMOTA | Multi Module Over the Air update |  |
| OTA | Over the Air |  |
| IVSU | In vehicle software update |  |
| CS | User Experience |  |

Table 5: Abbreviations used in this document

# Function Group Description

## Overview

The purpose of in vehicle HMI function specific is to provide details of the OTA and USB related HMIs with priorities and default values. This purpose of OTA in vehicle HMI specification is to provide corporate/legal requirements and default values for all region.

The OTA vehicle HMI specification will define safer and reliable user experience with IVSU

* Software types deliver via OTA
  + Recall, regulation, security update, improvements, etc.

This function specific must be followed by all the different HMI layouts.

## Input Requirements

### F-REQ-305324/D-###R\_FNC\_Veh\_HMI\_Input\_001### OTA Policy Table Check – Condition 1

The OTA Policy table defines default setting for the OTA software updates.

The OTA Manager shall define default setting for the IVSU. The IVSU default values are configuration at EOL and/or through OTA/USB.

If policy table is not available, then OTA Manager shall cover minimum logic to support OTA updates.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_001 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### F-REQ-305325/E-###R\_FNC\_Veh\_HMI\_Input\_002### Vehicle Connectivity Settings – Condition 2

Vehicle Connectivity Setting shall be enabled for in the vehicle before vehicle can receive the OTA software updates.

If the Vehicle Connectivity Setting is disable, then in vehicle HMI shall hide all the OTA related prompts and settings.

HMI shall not allow the user to enter the automatic system update settings via ICONs, transient message, and popups etc.

For Example:

If Vehicle Connectivity = ON, then automatic software update is ON

If Vehicle Connectivity = ON, then automatic software update is OFF

1. Automatic software update shall continue with limitation

If Vehicle Connectivity = OFF, then automatic software update is OFF

1. All OTA activates are pause

The HMI logic shall read policy table at EOL configuration, after a Master a Reset, and after a change in policy table.

Note: Vehicle Connectivity Settings are defined in CCS OTA Policy.



**Flow 1: Vehicle Connectivity and ASU Settings**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_002 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### F-REQ-305319/D-###R\_FNC\_Veh\_HMI\_Input\_003### Software Update Details – Condition 3

The Ford Backend shall have a text file containing description of software changes. This text files shall go thru governance and approval process before the software can be deliver thru OTA.

Software updates with improvements and security update shall have detailed description; where as other updates can be brief.

The software update details shall contain all translations include consumer website, mobile app, and service/support websites.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_003 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### F-REQ-305320/C-###R\_FNC\_Veh\_HMI\_Input\_004### Vehicle Connectivity – Condition 4

1. Onboard Modem Data Accounts: there shall be two separate accounts as following: -

1. Consumer Owned Account – consumer pays for this account and if carriages allow consumer shall have access to vehicle hotspot for personal use.
2. FMC Account – consumer does not have access to FMCA; Ford Motor Company pays this account and does not allow the consumer to access hotspot. FMCA account data is restricted to communicate with Ford backend for data transfer and OTA Software updates.

2. Wi-Fi Capability: - the vehicle shall have Wi-Fi capability to download software updates. The User shall have the ability to connect the vehicle to any chosen Wi-Fi access point as specified by WIR functional requirements.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_004 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### F-REQ-305321/D-###R\_FNC\_Veh\_HMI\_Input\_005### USB Parser Shall Notify HMI with Errors - Condition 5

The USB parser shall detect if USB contains OTA Software update file(s) and folder. If any errors occurring during initial parsing of the OTA files, then USB parser shall set a flag for HMI to indicate error.

The USB Parser shall valid the software files and set an appropriate HMI flag.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_005 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### F-REQ-305322/D-###R\_FNC\_Veh\_HMI\_Input\_006### Software Delivery Methods - Condition 6

The OTA Software update shall have delivered thru various channels such as Wi-Fi, cellular connection, and USB.

Vehicle shall follow the rules in the manifest for which connectivity to use for that download or upload thru embedded modem cellular; Wi-Fi AP

The in-vehicle HMI shall have connection settings where user can select connect to available connections.

Connection Setting: -

Wi-Fi Data: - Wi-Fi connection will be defaulted to ON, but user shall configure the Wi-Fi access point. Cellular/Modem: - Allow the user to select Modem settings and connections

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_006 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### F-REQ-305323/C-###R\_FNC\_Veh\_HMI\_Input\_007### Software Update Prioritization - Condition 7

The OTA Manager and USB Function specific has more details about software update priorities for USB and OTA Updates.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_007 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### REQ-326585/B-###R\_FNC\_Veh\_HMI\_Input\_008### OTA Manager input to HMI - Condition 8

The OTA manager shall set, and clear HMI flags related to IVSU, such as user consent, software update notification, reminders, and activation etc.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FUR-REQ-392408/A-###R\_FNC\_Veh\_HMI\_Input\_009### Software Update Details Description (Release Notes) File – Condition 9

With each software update trigger OTA cloud shall include update details description (release notes) file URL.

The update details description (release notes) text file shall go thru approval process before the software can be deliver thru OTA and file shall include all translations to support infotainment systems, consumer website, mobile app, owner’s fleet portal, and service/support websites.

When additional consent is required, OTA cloud shall have the same text for update details description (release notes) as additional/PII consent text.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### REQ-394532/A-###R\_FNC\_Veh\_HMI\_Input\_010### Additional/PII Consent Text File - Condition 10

If an update requires additional/PII consent, then OTA cloud shall include the additional/PII consent file URL with the update.

The text file shall go thru approval process before the software can be deliver thru OTA and file shall include all translations to support infotainment systems, consumer website, mobile app, owner’s fleet portal, and service/support websites.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## Assumptions & Constraints

This specification is not limited to SYNC but also include sub system other **Infotainment Systems** with WiFi capability.

* Users who have appropriate consent for MMOTA updates
* Embedded Modem will use FMS capability for OTA
* Cloud is the overall connectivity master
* USB Updates are included in this specification
* The vehicle has connectivity thru FMS paid cellular connection, Customer Home Wi-Fi or Customer Data Plan
* Assumes that all activations of updated software will only occur on the next ignition cycle

# Functional Architecture



Figure 1: Function Group HMI Overall – Functional Architecture

## Function List

### List of Logical Functions

|  |  |  |
| --- | --- | --- |
| **Function ID** | **Function Name** | **Function Description** |
| <F1> | Software Consent | The authorization is required to update the software under the electronic & communication and privacy rules and product liability. The default setting for OTA Software updates are defined in the Policy table per region and/or country. |
| <F2> | Software Update Scheduler | The update scheduler function is required for all vehicle inhibits and once the schedule is set there is no action needed from the customer, vehicle automatically shall complete the software updates at schedule time. Once the update scheduler in process user cannot abort and shall wait until software update is complete. |
| <F3> | Software Notification | Software notification allows the user to get notification about updates, such as update is pending for activation, upcoming schedule reminder, successful update, and schedule is required etc. |
| <F4> | Check for Updates | HMI shall allow the customer to “Check for Updates” under Automatic software updates settings. Check for Updates button shall allow the customer to check for App updates and provide one time all level user consent to download the latest apps. |
| <F5> | Software Update Details | Software Update Details shall have description of contents of the updates and shall be deliver part of the OTA software update. |
| <F6> | Software Progress Bar | Software progress shall provide the customer the ability to monitor download, install, and activation certain types of software updates. Progress bar shall be capable to have single or multiple progress bars |
| <F7> | 4.1.5.2.2 REQ-347385/A-###R\_FNC\_Veh\_HMI\_Consent\_016### Automatic System Updates Changes | During OTA software updates if vehicle has reduced functionality or vehicle inhibit and USB update, the customer shall be notify in details for errors that occur with any action required from the customer. |

Table 6: List of Logical Functions

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| Signal ID | Signal Name | Description |
|  | LS\_OTAM\_Activation\_Type | Software activation types: (1) No Ignition Cycle (2) Ignition Cycle (3) Inhibit |
|  | LS\_OTAM\_SW\_Update\_State | The signal identify status of the software update as in progress, pending, successful, failed, up to date, none. |
|  | LS\_OTAM\_SW\_Activation\_Fail\_Reason | The signal identify types of failure and action for user such as permanent inhibit, USB failure, warning, partial, none. |
|  | LS\_OTAM\_SW\_Installation\_State | The signal identify each state of the software install for USB or Check for updates as in progress, failed, paused, successful. |
|  | LS\_OTAM\_SW\_Update\_Fail\_Reason | The signal identify error codes for software failure reasons from OTA manager. |
|  | LS\_OTAM\_SW\_Download\_State | The signal identify each state of the software download/transfer for USB or check for updates as in progress, failed, paused, successful. |
|  | LS\_OTAM\_UpdateExpiration\_Time | The signal identify time allowed to update the software. |
|  | LS\_OTAM\_SW\_Update\_Notify | The signal can identify type of user consent required for software update. |
|  | LS\_OTAM\_Release\_Notes\_Info | The signal identify release notes which will be displayed in vehicle HMI. |
|  | LS\_OTAM\_Update\_Percentage\_OverallProgress | This signal identify overall progress of the software update in percentage. |
|  | LS\_OTAM\_Activation\_Schedule\_Type | Identify the range of software update schedule as a week or a day, if automation software update default values is enable, then schedule default value = week. If automation software update default values is disable, then schedule default value is day. |
|  | LS\_OTAM\_Activation\_Time | Identify how long software activation time will take. |
|  | LS\_OTAM\_OTAUSB\_Number\_of\_Files | HMI shall display number of files OTA system processing |
|  | LS\_OTAM\_Update\_Percentage\_Progress\_APP\_x | HMI shall show progress of the each Application update when user request Check for Update. |
|  | LS\_OTAM\_HMI\_OTAUSB\_Clear | Reset all HMIs when software update is cleared |
|  | LS\_OTAM\_No\_ProgSession\_Preconditions\_Supported | If software activation is postponed due to vehicle precondition are not set then this flag is used to notify the customer with action item |
|  | LS\_USBOTA\_SW\_Update\_Status | Details of USB software update during download, File Transfer, and installation |
|  | LS\_USBOTA\_System\_Updating | To determine if USB device contain valid software |
|  | LS\_OTAM\_Update\_Time | HMI shall display data and time after each software activation |
|  | LS\_ASUHMI\_ASU\_Consent | Vehicle Connectivity Settings |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| Signal ID | Signal Name | Description |
| HMI Only | LS\_ASUHMI\_ASU\_Consent | Vehicle Connectivity setting for Automatic software update Feature consent = enabled or disabled. When Vehicle Connectivity has feature = disabled, this signal shall be use to hide all ASU related HMIs. |
|  | LS\_ASUHMI\_Activation\_Consent | Allow the customer chooses to activate time  1. NOW;  2. DATETIME;  3. UNDEFINED |
|  | LS\_ASUHMI\_ASU\_Additional\_Consent | When ASU = OFF and Manage Notification = ON, then this signal can be used to require one-time consent |
|  | LS\_ASUHMI\_ASU\_ScheduleTime | Signal identify scheduled time/day for activation |
|  | LS\_ASUHMI\_ASU\_CheckUpdate | Customer checking for software updates and provided consent. |
| HMI Only | LS\_ASUHMI\_ASU\_ReoccuringSchedule | HMI logic shall keep track of recurring schedule and display to customers as requested |
|  | LS\_ASUHMI\_ASU\_FeatureStatus | Feature enable or disable based on consumer desires or Vehicle Connectivity Settings.  If software update is pending and trigger expires, then HMI shall disable the feature with how to enable prompt. |
|  | LS\_OTAM\_TriggerExpiration\_Time | Each software update is allowed for a period of time, HMI logic shall use to clear the all HMIs and if user input was needed, then educate the user. |
|  | LS\_OTAM\_UpdateReminder\_Time | OTAM sets this flag, then HMI shall reminder the user. Time could come from cloud or user. |
|  | LS\_ASUHMI\_Manage\_Notification | This signal determines if user will get notifications thru HMI when software update is available |
|  | LS\_OTAHMI\_Master\_Reset\_Status | Notify OTA Manager that Master reset is in progress |
|  | LS\_ PARSERUSB\_Conn\_Status | Status of the USB device connection |
|  | LS\_PARSER\_USBSW\_Update\_Detected | To determine when to show Processing Update…transient message |
|  | LS\_PARSER\_USBSW\_Update\_URL | Signal is used to set IVSU trigger with USB content details |

# Logical Functions

## Logical Function Software Consent

### Function Description

Software Updates in the vehicle require user consent, and default values are based on the global regions and/or centuries. For software update types, system require user to accept additional/PII agreement/consent. In very rare cases, if a application update requires PII such as GPS, then the customer additional consent will be required from the user thru in vehicle HMI. The default setting for OTA Software updates are define in the OTA Policy table per region and/or country. HMI shall have one-time reminder after the vehicle is purchase (in Normal mode 1st time) and configurable ignition cycle = true, customer shall see notification to set a recurring schedule for faster updates.

In special cases when vehicles are in Ford Plants, no user consent is required for a software update.

When vehicle connectivity is enabling, then customer shall also have the ability to turn ON and/or OFF IVSU feature. Depending on the region and/or country, HMI will have been configuring for both changeable and/or unchangeable; HMI shall hide all the unchangeable settings.

### Function Scope

******Figure 2: Context Diagram of Function Software Consent**

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | Customer Choice | This is the customer selection of the consent settings that will be shown in the screen |
|  | LS\_OTAM\_SW\_Update\_Notify | Type of Consent needed |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | LS\_ASUHMI\_ASU\_Consent | Vehicle Connectivity setting True/False |
|  | LS\_ASUHMI\_ASU\_FeatureStatus | Automatic software update Feature enable or disable. |
|  | LS\_ASUHMI\_ASU\_Additional\_Consent | Type of consent received from the user |
|  | Vehicle Connectivity Settings | Vehicle Connectivity Settings |

### Function Modeling



Figure 3: State Machine of Function Software Consent

### Function Requirements

#### Functional Requirements

##### F-REQ-305211/C-###R\_FNC\_Veh\_HMI\_Consent\_001### Appropriate User Consent Required for In Vehicle Software Update

In Vehicle Software Updates requires a customer authorization before vehicle can receive latest software form the Ford Backend. The software update shall require appropriate consent from the user thru in vehicle HMI or Ford mobile app or consumer website.

For the regions and/or countries where Automatic Software updates is default to ON.

* Vehicle is able to received software updates and if incremental consent is required, then user will be asked to provide additional consent thru in vehicle HMI or Ford mobile app

For some regions and/or countries where Automatic Software updates is default to OFF.

* Vehicle is not able to receive software updates but vehicle’s ability to communicate with the Ford Backend.
  + Posting the current part numbers in order to get available software information
    - Download of the ODL file
  + Software Update Details
  + Download cloud authorization commands

Software update setting shall allow the user to get notification of software update is available thru in vehicle HMI or Ford mobile app and given option to provide user consent before receiving the software updates.

During software activation vehicle will be inoperable for few minutes and customers shall set a one time or recurring schedule.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_008 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305316/E-###R\_FNC\_Veh\_HMI\_Consent\_002### Feature Enable/Disable

The customer shall have the ability to change automatic system updates enable/disable. This is to allow more flexibility to the customer on how to manage the feature. IVSU feature default settings shall be input to the HMI and Vehicle Connectivity Settings. LS\_ASUHMI\_ASU\_FeatureStatus = Enable/Disable (Reference flow in REQ-305287)

If software update is in progress downloading, installing, or pending for activation and vehicle lost vehicle connectivity then system shall pause all OTA activities.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_013 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305221/E-###R\_FNC\_Veh\_HMI\_Consent\_003### Vehicle Authorization State

The authorization is required to update the software under the electronic & communication and privacy rules and product liability. The default setting for OTA Software updates are define in the Policy table per region and/or country.

Automatic Software Updates settings can have enabled or disable or ‘Ask me Later’:

1. In some regions and/or countries, the software update **enabled** by default, customer has option to disable thru in vehicle HMI.
2. In some regions and/or countries, the software updates **disabled** by default but customer has option to enable through in vehicle HMI or ASK ME LATER option.
   * If user select ‘Ask me Later’, then HMI shall re-prompt the customer based on Ask me later configuration time = expire OR software update is available
3. FMC Owned vehicles shall have an OVERRIDE Op-Out options to update vehicle while in factory, transport, Ford Fleet, and dealer, and other parking lots without in vehicle HMI inputs.

* Ford backend shall OVERRIDE in vehicle consent
* This update can be completely silent in the background
* Schedule shall come from the Ford backed and share with HMI logic

1. Additional Consent: - Ford backend shall determine if software update requires additional consent from the user.
2. PII Consent: - Ford backend shall determine if software update requires PII consent from the user.
3. Direct Configuration may have special use case for user consent
   * If direct configuration is result of customer subscribing App, then change doesn’t require consent.
4. USB Software update does not require vehicle authorization through in vehicle HMI.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_009 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326624/E-###R\_FNC\_Veh\_HMI\_Consent\_004### Interface Between HMI, OTA, and Vehicle Connectivity Settings

In Vehicle Software Update: then OTA manager shall share automatic software update settings current and update default setting, notify to HMI. HMI logic shall make sure new automatic software update default setting reflect under Vehicle Connectivity settings. LS\_ASUHMI\_ASU\_FeatureStatus = new values.

Vehicle Connectivity Settings: If vehicle connectivity default setting is change, then HMI shall notify OTA Manager with new default values. When automatic software update any of the Vehicle Connectivity setting LS\_ASUHMI\_ASU\_Consent = new value.



**Flow 2: Interface between HMI, OTA, and Vehicle Connectivity**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305287/D-###R\_FNC\_Veh\_HMI\_Consent\_005### OTA and Vehicle Connectivity Settings and Other Default Settings

The OTA Manager shall store default values of vehicle authorization level. OTA default values are updateable through OTA. New default values shall be shared with HMI from OTA Manager.

HMI logic shall read the Vehicle Connectivity Settings (CCS policy table) for default settings per region and/or county.



**Flow 3: OTA and Vehicle Connectivity (CCS) and Other Default Settings**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_011 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305296/F-###R\_FNC\_Veh\_HMI\_Consent\_006### Automatic Software Update Regional or/and Countries User Consent – Vehicle Authorization State

1. Loss of all connection – TCU Ford account is disabled and no Wi-Fi or smartphone parried without mobile app.
2. FMC Owned Vehicles – FMC shall be able to do OTA software update for All FMC owned vehicles without in vehicle HMI input.
3. Vehicle Connectivity Settings – as long as the vehicle has vehicle connection OTA Manager shall continue to do software updates LS\_ASUHMI\_ASU\_Consent = True.
   1. Purchased agreement and if Wi-Fi is available: -
      1. User Base Consent Default = OFF (LS\_ASUHMI\_ASU\_FeatureStatus = Disable)
         * Vehicle has ability to communicate with the Ford Backend in order to get available software information, posting the current part numbers, download of the ODL file, download Software Release Notes, and download cloud authorization commands
         * One-time or recurring User consent is need in order to download the software files.
      2. User Base Consent Default = ON (LS\_ASUHMI\_ASU\_FeatureStatus = Enable)

* Depending on region and/or countries User Consent can be default to ON and in vehicle HMI allow the customer to disable consent.
* In vehicle HMI shall have initial reminder after the vehicle is sold; vehicle mode = Normal && ignition\_cycle\_count = X, then prompt the user with consent reminder and allow to set a recurring schedule.
  + Notification shall have details that the vehicle’s OTA Software updates feature is activated and able to receive software updates automatically, configure AP and set a recurring schedule for faster updates.
    1. Current Base Consent Values – HMI logic shall send a flag to OTA Manager each time it changes.
* If User Consent changes from OFF 🡪 ON
  + Prompt the customer for Wi-Fi connection set recurring schedule for faster updates
* If User Consent changed from ON 🡪 OFF, then HMI shall display:

1. If update is not in progress, then HMI shall show disclaimer that if you turn off ASU, your vehicle won’t receive new features or critical updates automatically.
2. If update is in progress, then HMI shall display update is in progress do you want to continue or wait until update is complete, if user choose to continue HMI shall display disclaimer 3.1.3A.

* If download is NOT complete, then pause the software update and wait for user input before resume the current download or start new download.
* If download is hundred percent complete, then vehicle shall continue processing the current software update until completion based on the previous user consent.
  1. Additional Consent or PII – Ford Motor Company may require additional Consent and/or PII for specification type(s) of software (LS\_ASUHMI\_ASU\_Additional\_Consent = ONE\_TIME or PII\_UPDATE or Additional).
* The OTA Manager shall notify the HMI if additional and/or PII User Consent as needed and it shall store user selection and post it to Ford backend
  1. One-time Consent – Customer can use **“Check Updates**” LS\_ASUHMI\_ASU\_CheckUpdate = True and/or “**Update**” button as one-time consent LS\_ASUHMI\_ASU\_Additional\_Consent = One-time. In order to this option to work vehicle requires network connection.
  2. Direct Configuration may have special use case for user consent
     1. If the change occurs because customer subscribe an App through in vehicle settings, then direct configuration update does not require user consent.
     2. For all direct configuration change occur automatically shall have software update

1. USB Update User Consent – User consent is provided when customer login into consumer website and downloads the software.

Vehicle consent is stored in OTA Manager – HMI logic shall notify OTA manager with all consent related changes and OTA Manager shall notify user consent changes to Ford Backend.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_012 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305317/B-###R\_FNC\_Veh\_HMI\_Consent\_007### User Consent Priority – Vehicle vs Ford Backend

For all non FMC owned vehicles, user consent stored in OTA Manager shall have higher priority, then what is stored in the Ford Backend.

For all FMC owned vehicles, user consent stored in Ford backend shall have higher priority, then what is stored in the OTA Manager.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_014 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305266/E-###R\_FNC\_Veh\_HMI\_Consent\_008### Master Reset when Software Update is NOT in Progress

If customer initiate Master Reset when software update is not in progress and regardless of the IVSU default settings, then HMI shall restore the all Automatic Update settings feature consent to factory/default settings and over write user preference.

After Master reset is complete, HMI shall prompt the customer to remind or accept Automatic Update settings.

* If Automatic Update settings default = OFF, then HMI shall ask the customer to accept the consent.
* If Automatic Update settings default = ON, then No HMI

Example: -

* Default ASU Consent = ON

User selection = On 🡪 OFF

Master Reset shall restore the ASU default = ON

* Default ASU Consent = OFF

User selection = OFF🡪 ON

Master Reset shall restore the ASU default = OFF

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_010 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347785/B-###R\_FNC\_Veh\_HMI\_Consent\_009### Master Reset when Software Update is in Progress and Default ASU Setting is disabled

If default ASU = OFF and software trigger is processing (pre-download) state with any consent level and customer initiate Master Reset, then HMI shall prompt the HMI that update is in progress and if customer continue with master reset, then HMI shall reset all OTA related HMIs to factory/default settings.

.

**Flow 4: Master Reset when system was process trigger and Default ASU = OFF**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347787/A-###R\_FNC\_Veh\_HMI\_Consent\_010###Additional Consent and PII Consent

If software update requires PII data for the update, then OTA Manager shall set a flag LS\_OTAM\_SW\_Update\_Notify = PII\_UPDATE for HMI to prompt the user for PII Consent LS\_ASUHMI\_ASU\_Additional\_Consent = PII\_UPDATE.

If the PII feature or (location sharing) is enabled, then HMI logic shall skip the popup and response OTA manager with consent is given by the user.

HMI shall have dynamic screen to display Additional/PII and other consents.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305210/F-###R\_FNC\_Veh\_HMI\_Consent\_011### OVERRIDE – Vehicle Authorization State

For all FMC vehicle shall have capability to update software updates without user consent through in vehicle HMI.

Ford backend shall OVERRIDE in vehicle all level user consent and some HMI options. Software activation schedule timer come from the Ford backend and HMI shall reflect the choose time LS\_OTAM\_UpdateReminder\_Time = time.



**Flow 5: Override Vehicle Authorization**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_016 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-331790/D-###R\_FNC\_Veh\_HMI\_Consent\_012### One-Time Consent

If software update is pending and requires one-time consent, then HMI shall prompt the user for one-time user consent is needed in order to complete the software update.

If user input is required, then HMI shall continue to display notification until user input is received or software update is expired; once the user input is received or update expire HMI shall clear the notification.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347788/B-###R\_FNC\_Veh\_HMI\_Consent\_013### Automatic Software Updates Settings when Vehicle Connectivity is Off

If vehicle connectivity is off and customer try to access the “system update” then HMI shall prompt the user to enable vehicle connectivity (CCS Entity: MMOTA (ID 33, Type 1)) before continuing with “system update” tile.

* If MMOTA ID 33, Type 1 is off, then do not allow the user to access system updates tile, notify the user that vehicle connectivity is off and popup option shall allow the user to enable the vehicle connectivity.
* If MMOTA ID 33, Type 1 is on, then allow the user to access system updates tile

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-369545/B-###R\_FNC\_Veh\_HMI\_Consent\_017### Software Update is in process and User Change the ASU to OFF

When ASU = ON and Software update is the progress, but customer change the ASU setting to OFF, then software update shall pause and wait for the user input.



**Flow 6: User change the ASU setting when software update is in progress**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-380245/A-###R\_FNC\_Veh\_HMI\_Consent\_018### Prompt the User for Consent

When ASU = ON and additional consent is required && ASU = OFF and Notification is ON, then OTAM shall download the software binaries in the background. HMI shall prompt the customer for required consent once all required files download is complete (including release notes).



**Flow 7: Download Binaries Before Asking for User Input (when possible)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-380372/A-###R\_FNC\_Veh\_HMI\_Consent\_019### Remote Consent Changes

When HMI receives remote consent update from the OTAM, then HMI shall update the current settings to reflect the new setting including all levels of consent.

LS\_OTAM\_HMI\_Remote\_Consent

Value{

00 - ASU Setting On/OFF

01 – One-time Consent

02 – Additional Consent

03 – PII Consent

}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-387747/A-###R\_FNC\_Veh\_HMI\_Consent\_020### Fleet Vehicles User Consent

If vehicle is fleet owned, then fleet owners shall provide the all user consent; HMI shall NOT allow the user to edit the user consent. When update is available fleet owner shall provide the user consent remotely.

LS\_OTA\_Fleet\_Status

Value {

1. None
2. Ford Fleet
3. Commercial Fleet}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-392413/A-###R\_FNC\_Veh\_HMI\_Consent\_020### When ASU = OFF and additional consent is required

When ASU = off and update requires additional consent, the HMI shall notify the user for consent required.

HMI shall allow the user to accept the update when user click update button from popup or from update details screen (ref REQ-394234).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-392414/A-###R\_FNC\_Veh\_HMI\_Consent\_021### ICON enter to System updates when vehicle Connectivity to enable

When vehicle connectivity is disable user shall not be able to enter system update settings from ICON or from settings. System shall pause all OTA updates when vehicle connectivity is disabled.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

###### F-REQ-305202/C-###R\_FNC\_Veh\_HMI\_Consent\_014### Local Default Values

The component that hosts the vehicle HMI logic shall have local default values.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_017 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### Non-Functional Requirements

##### F-REQ-305212/C-###R\_FNC\_Veh\_HMI\_Consent\_015### Screen Refresh

If default values in the Vehicle Connectivity and OTA changes, then an ignition cycle is requiring to reflect the changes and the customer shall not able to visually detect any changes in the vehicle HMI settings.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_018 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347385/A-###R\_FNC\_Veh\_HMI\_Consent\_016### Automatic System Updates Changes

The HMI manager shall provide the OTAMC with the status of the automatic software updates anytime the status is changed.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## Logical Function Software Update Scheduler

### Function Description

The update scheduler function shall allow the user to schedule a time when vehicle in inoperable to complete software update. This specific will cover both types OTA software updates erase and replace update and A/B memory swap. The update schedule function allows configurable day/time, which can be DAY (24hr) or WEEKLY (7days) depending on the default values. The update scheduler function is required for all vehicle inhibits and once the schedule is set there is no action needed from the customer, vehicle automatically shall complete the software updates at schedule time.

Once the software activation is in process user cannot abort but shall wait until software update is complete fail/pass.

In vehicle system shall prompt the user that schedule is required with or without the vehicle inhibit.

### Function Scope



**Figure 4: Context Diagram of Function Software Update Scheduler**

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | CustomerChoice | This is the customer selection of the consent settings that will be shown in the screen |
|  |  |  |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | LS\_ASUHMI\_Activation\_Consent | Allow the customer chooses to activate time   1. NOW; 2. DATETIME; 3. UNDEFINED |
|  | LS\_ASUHMI\_ASU\_ScheduleTime | Value in seconds for the scheduled time |
|  | LS\_ASUHMI\_ASU\_ReoccuringSchedule | Identify if it is a recurring schedule is True or False |
|  | LS\_OTAM\_Activation\_Schedule\_Type | Based on software update priority HMI shall have options set recurring Weekly schedule or select onetimeDefault value is week, defines range of software update schedule as week/day. |
|  | LS\_OTAM\_UpdateReminder\_Time | Reminder Notification for upcoming software update (timer comes from the user or cloud) |

### Function Modeling



Figure 5: State Machine of Function Software Scheduling

### Function Requirements

#### Functional Requirements

##### F-REQ-305213/C-###R\_FNC\_Veh\_HMI\_Sch\_001### OTA Software Update Scheduler Range

The update schedule function is configurable day/time, which can be DAY or Weekly depending on the region’s default values. The OTA Manager shall notify the HMI for the type of the range that it would prefer to display to the customer.

If LS\_OTAM\_Activation\_Schedule\_Type = DAY, then HMI screen shall have a DAY range to choose from. This variable is read and utilized when the customer is notified for a pending activation while the recurring schedule is OFF

If LS\_OTAM\_Activation\_Schedule\_Type = WEEKLY, then HMI shall have WEEKLY range to set day and time. Initial timer shall have increments of 30mins form the current onwards.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_019 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305214/C-###R\_FNC\_Veh\_HMI\_Sch\_002### NOW Activation Options

If OTA software update type is E/R LS\_OTAM\_Activation\_TypeSW\_AB\_ER = ER, then OTA manager shall set a flag for HMI to allow the user to update the software NOW or schedule it for Later LS\_ASUHMI\_Activation\_Consent = NOW or Later.

All USB software update types A/B and/or E/R LS\_OTAM\_Activation\_TypeSW\_AB\_ER = AB and ER, then OTA manager shall set a flag for HMI to allow the user to update the software NOW or schedule it for Later LS\_ASUHMI\_Activation\_Consent = NOW or Later.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_020 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305215/D-###R\_FNC\_Veh\_HMI\_Sch\_003### Set a Recurring Schedule to Complete New Software Update

HMI logic shall be allowing the user to set a recurring schedule to complete software updates. Whenever recurring schedule value change HMI logic shall notify the OTA Manager with change LS\_ASUHMI\_ASU\_ReoccuringSchedule = True/False.

Under settings, HMI shall allow the user to have access to recurring schedule with current value and allow the user to change the current values as many time as needed. If customer decides to unselect the recurring schedule, then HMI logic shall keep track of user selection and update the HMI screen and notify the OTA Manager.

For most software updates vehicle preconditions can be met after 30min of cool down (such as PCM requires proper cool down before switching from memory A to B), so HMI logic shall allow the user to schedule activation 30mins from selection.

Example: Allow the customer to set recurring schedule minimum of 30mins from now onwards.

Now is 11:00 am and customer is trying to set schedule HMI shall only allow first time selection to be 11:30am onward.



**Flow 8: Set Schedule**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_021 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305216/E-###R\_FNC\_Veh\_HMI\_Sch\_004### Set an One Time Schedule to Complete New Software Update

One-time schedule allows the user to complete software updates that requires vehicle inhibit.

If the recurring or one-time schedule is not set (schedule value = null) and OTA Manager required the software activation, then HMI shall set notify the user to set one-time schedule to complete the new software update within LS\_OTAM\_Activation\_Schedule\_Type = DAY. If software update is expired or user provided with day/time, then clear the HMI ICON.

HMI logic shall keep track of software activation is pending and schedule time LS\_ASUHMI\_ASU\_ScheduleTime = null to show the ICON. If customer did not provide the input within 24hours, then HMI shall continue to show the ICON until software update expires LS\_OTAM\_TriggerExpiration\_Time = expire.

When software activation is pending and requires one-time schedule time, then HMI shall prompt popup that schedule time is needed in order to complete the software update. HMI shall allow the user to disable the popup by selecting “Do not show this message again”.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_022 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305217/F-###R\_FNC\_Veh\_HMI\_Sch\_005### Master Reset Clears Schedule Selection

When customer initiate a Master reset, then HMI shall clear the update schedule preferences and notify to OTAM with default values of following signals.

The schedule time shall go to default values of:

LS\_ASUHMI\_Activation\_Consent = UNDEFINED

LS\_ASUHMI\_ASU\_ScheduleTime = NULL

LS\_ASUHMI\_ASU\_ReoccuringSchedule = FALSE

HMI logic shall check default user consent value if LS\_ASUHMI\_ASU\_FeatureStatus = Enable, then prompt the user with reoccurring schedule LS\_OTAM\_Activation\_Schedule\_Type = Weekly otherwise feature is LS\_ASUHMI\_ASU\_FeatureStatus = Disable 🡪 one-time schedule LS\_OTAM\_Activation\_Schedule\_Type = Day.



**Flow 9: Master Reset and Prompt After Schedule is Cleared**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_023 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305218/D-###R\_FNC\_Veh\_HMI\_Sch\_006### Editing Schedule and Software Update expired

The customer shall have ability to change the day/time prior to activation starts. However, each software update shall have an expiration time LS\_OTAM\_TriggerExpiration\_Time = expire.

If customer input was not received within allowed time, then HMI shall prompt the user with “Software update was cancelled because a time was not scheduled. Do you want to set up a recurring schedule for future updates?”

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_024 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305220/C-###R\_FNC\_Veh\_HMI\_Sch\_007### Activate Schedule Priority Recurring vs one time or Software updates

The OTA software activation shall have two options to activate the software. Based on default settings and user selection, HMI shall present the user with two options 24hrs as one-time or 7days as recurring.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_026 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305230/E-###R\_FNC\_Veh\_HMI\_Sch\_008### Software Update Schedule Time & Reminder

HMI shall prompt with pre-activation reminder that the software update scheduled when it receives from the OTAM LS\_OTAM\_UpdateReminder\_Time. HMI shall notify the user with schedule time and allow them to edit the schedule.

If the schedule time in now or schedule time reaches, then HMI shall check the ignition status and if ignition is on than prompt the customer to ignition off or if ignition is off than start the minutes’ countdown and allow the customer to cancel the update.

If user press cancel update, then HMI shall send LS\_OTAM\_HMI\_User\_Press\_Cancel = true to OTAM.

LS\_OTAM\_HMI\_User\_Press\_Cancel

Value{

00 - True

01 - False}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_036 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305219/D-###R\_FNC\_Veh\_HMI\_Sch\_009### Schedule Time Reached While Ignition RUN/START and Vehicle is in Park

If the Ignition status is RUN/START and vehicle is Park when the schedule time reaches, then HMI shall have notified then customer that software is ready to activated turn the ignition off or reschedule the software update to later time, then the HMI shall immediately notify the OTA Manager on the change of time.

HMI shall only display if vehicle driver distraction rules apply otherwise postpone the update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_025 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326160/B-###R\_FNC\_Veh\_HMI\_Sch\_010###HMI Display during Programming Session

In vehicle HMI shall have functional display during programming session and shall show progress of the software update with downtime of vehicle inhibit (LS\_OTAM\_Activation\_Time = Seconds).

If OTA Manager set flag LS\_OTAM\_Vehicle\_Inhibit\_Type = ProgrammingSession or ActivatingNow, then HMI shall show programming screen with software activation progress bar. Other HMI notifies and user selections shall wait until software update complete pass or fail.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326157/F-###R\_FNC\_Veh\_HMI\_Sch\_011###Precondition are not Met and Requires User Action

If software activation was postponed due to vehicle conditions not met, then HMI popup shall list the preconditions from below table based on the priority (0 is highest) and prompt the uses to take an action.

HMI Logic shall check to see if schedule is required and prompt the user appropriately.

* If recurring schedule is set, then HMI shall show that when the system will retry.
* If the schedule was one time, then HMI shall allow to user to set a schedule.

HMI shall display the preconditions based on the priority: -



**Flow 10: Priority to display the HMI messages**

If at schedule time following preconditions are not complete, then HMI shall receive a flag LS\_OTAM\_SW\_Update\_Postpone = True with list LS\_OTAM\_PreconditionList = list of the preconditions that are not met.

HMI popup shall have reference to owner manual where user can see full actionable preconditions list.

| System Behavior | | Popup Title | List Text | Priority | HMI Popup Text |
| --- | --- | --- | --- | --- | --- |
|  | User Action | | | | |
| Vehicle Speed Too High/Speed | | System Not Updated | Vehicle Speed | /<5> | The update was postponed because the vehicle was in motion.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| DC Charging (EV & Plug In PHEV) | | System Not Updated |  | /<4> | The update was postponed because the vehicle was charging.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| PRNDL Out of Range/ PRNDL State | | System Not Updated |  | /<8> | The update was postponed because the vehicle was not in park (P).  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Hazards On | | System Not Updated |  | /<4> | The update was postponed because the hazard lights were on.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Alarm Actively Sounding | | System Not Updated |  | /<4> | The update was postponed because the alarm sounded.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Engine RPM Too High (or Torque Available)/Engine Status | | System Not Updated |  | /<6> | The update was postponed because the engine was running.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Liftgate Ajar | | System Not Updated |  | /<8> | The update was postponed because the liftgate was open.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Park Lamps On | | System Not Updated |  | /<8> | The update was postponed because the parking lights were on.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Illuminated Exit Active | | System Not Updated |  | /<6> | The update was postponed because the Illuminated Exit system was on.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Door Ajar | | System Not Updated |  | /<8> | The update was postponed because a door was open.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Brake Pedal Pressed | | System Not Updated |  | /<8> | The update was postponed because the brake pedal was pressed.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Remote Start | | System Not Updated |  | /<5> | The update was postponed because the vehicle was started remotely.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Vehicle Theft | | System Not Updated |  | /<1> | The update was postponed because the anti-theft system was activated.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Remote Park Assist | | System Not Updated |  | /<9> | The update was postponed because the vehicle was being parked remotely.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Neutral Tow Active | | System Not Updated |  | /<9> | The update was postponed because the vehicle was in neutral towing mode.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| Windows Down | | System Not Updated |  | /<8> | The update was postponed because a window was open.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
| 4X4 High/Low Active | | System Not Updated |  | /<9> | The update was postponed because the vehicle was in 4x4 mode.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.}  For more information, see the Owner’s Manual. |
|  | Service Required | | | | |
| Limp Home Active | | System Not Updated |  | /<0> | The update was postponed because the vehicle requires service.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Too Many Confirmed DTCs Active | | System Not Updated |  | /<0> | The update was postponed because the vehicle requires service.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
|  | Automatic process: only display one of the following preconditions | | | | |
| ESCL Lock Pending | | System Not Updated |  | /<3> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| eCall Status  (CAN Signal = value) add details…for example: progress, pending, etc.? | | System Not Updated |  | /<3> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Motor Movement Active | | System Not Updated |  | /<7> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Steering Pension Torque Out of Range | | System Not Updated |  | /<3> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Diagnostic Self-Test Active | | System Not Updated |  | /<3> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Charging Fault | | System Not Updated |  | /<3> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Ignition Status Out of Range | | System Not Updated |  | /<3> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Ignition Off / ACC Functionality Active | | System Not Updated |  | /<3> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Voltage Out of Range (power manager or SOC/ Load Shed) | | System Not Updated |  | /<3> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Park Brake Out of Range or Activation in Progress | | System Not Updated |  | /<3> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |
| Unknown Precondition is not Met | | System Not Updated |  | /<10> | The update was postponed because it was interrupted by another process.  {The vehicle will try again on {schedule date and time}.} / {Schedule a time to retry the update.} |

Table x: List of Precondition with priority

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-329373/B-###R\_FNC\_Veh\_HMI\_Sch\_012### Activation Postponed due to Vehicle Conditions not Met

If the update scheduler is, postpone due to vehicle conditions at time of schedule or vehicle is not ready to complete software activation and customer cannot fix the preconditions, then prompt the customer with a warning that vehicle update is not complete due to vehicle conditions LS\_OTAM\_SW\_Update\_Postpone = True and system shall automatically retry at next schedule time (show day/time).

If recurring schedule time = null, then prompt the user to set time.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326161/A-###R\_FNC\_Veh\_HMI\_Sch\_013###OVERRIDE – HMI Notifications

Override update can be completely silent and does not require a schedule for software update to complete; vehicle shall update at first availability, and user shall not be allowing to interrupt.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-346981/C-###R\_FNC\_Veh\_HMI\_Sch\_014### When User Disable Recurring Schedule: clear the set date/time

If recurring schedule is set and user disables the recurring schedule option, then HMI shall clear the recurring set day/time and send notification to OTAM.

LS\_ASUHMI\_Activation\_Consent = UNDEFINED

LS\_ASUHMI\_ASU\_ScheduleTime = NULL

LS\_ASUHMI\_ASU\_ReoccuringSchedule = FALSE

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347386/B-###R\_FNC\_Veh\_HMI\_Sch\_015### HMI allow the user to select and save the time before setting it to OTAM

HMI shall have a “SAVE” button to save the schedule, if there is not selection then, HMO shall gray the clear button.

HMI shall have a “Clear” button to clear the current schedule, if there is not selection then, HMI shall gray the clear button.

After customer make changes to the schedule, HMI shall show confirmation popup with Day and time.

HMI shall prompt the customer if customer schedule selection is not valid.

If customer try to exit the HMI schedule screen after making changes to the schedule, then HMI shall have prompt to ASK the customer to save the new schedule before exit.

HMI shall send the latest update schedule date/time to OTAM.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347783/B-###R\_FNC\_Veh\_HMI\_Sch\_016### Stolen Vehicle Service is Active

If stolen vehicle service is active OTAM will set flag LS\_SVS\_OTAM\_Active = True, then HMI shall skip all software update related HMI notifications.

If software LS\_SVS\_OTAM\_Active = True && LS\_OTAM\_SW\_Update\_Postpone = True, then HMI shall NOT notify the user the software update has postponed.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-348242/C-###R\_FNC\_Veh\_HMI\_Sch\_017### Stolen Vehicle Service is De-Active

If stolen vehicle service is de-active OTAM will set flag LS\_SVS\_OTAM\_Active = False, then HMI can resume all notification.

If software LS\_SVS\_OTAM\_Active = false && LS\_OTAM\_SW\_Update\_Postpone = True, then HMI shall notify the user the software update has postponed.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-352881/A-###R\_FNC\_Veh\_HMI\_Sch\_018### Update Expired and User Inputs Never Set Schedule

When software update requires a user input to apply the update LS\_OTAM\_Activation\_Type = INHIBIT && LS\_USBOTA\_SW\_Update\_Status = PENDING && LS\_ASUHMI\_ASU\_ScheduleTime = Null and user input was not provides and software update time expired LS\_OTAM\_TriggerExpiration\_Time = Expire, then HMI shall show a popup to allow the user to set a recurring schedule.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-369646/B-###R\_FNC\_Veh\_HMI\_Sch\_019### Allow the User to Clear then Schedule and Get Feedback

HMI shall allow the user to clear the schedule. When user click the clear schedule button, then HMI shall show a transient message with feedback of customer action.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-380373/A-###R\_FNC\_Veh\_HMI\_Sch\_020### Remote Schedule Changes

When HMI receives remote schedule updates from the OTAM, then HMI shall update the current settings to reflect the new setting.

LS\_OTAM\_HMI\_Schedule\_Changes

Value{

00 – Clear the schedule

01 – Update day/time

}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-387746/A-###R\_FNC\_Veh\_HMI\_Sch\_021### Schedule and Update Reminders for Fleet Vehicles

If vehicle is fleet owned, then fleet owners can set a schedule remotely; HMI shall NOT allow the user to edit the time. When update is available and ready for activation, then HMI shall notify the user immediately of the update and the schedule additional to the 24hrs reminder.

LS\_OTA\_Fleet\_Status = Ford or Commercial Fleet

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

###### F-REQ-305203/D-###R\_FNC\_Veh\_HMI\_Sch\_025### Master Reset shall Reset Schedule Values

The schedule time shall go to default values of:

LS\_ASUHMI\_Activation\_Consent = UNDEFINED

LS\_ASUHMI\_ASU\_ScheduleTime = NULL

LS\_ASUHMI\_ASU\_ReoccuringSchedule = FALSE

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_027 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### Non-Functional Requirements

##### REQ-346761/B-###R\_FNC\_Veh\_HMI\_Sch\_024### Count Down Timer when SYNC Display of Off

When HMI is displaying the two minutes of countdown timer and sync display turn off, then HMI logic shall continue to countdown with timer until it two minutes are expires.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## Logical Function Software Notification

### Function Description

Software updates have different types of notifications based on the user consent level.

* Update successful: -
  + When an OTA software updates is successful, in vehicle HMI shall show clickable ICON, user can click this icon for more details about the update.
* Customer initiate software Update – in vehicle HMI shall allow the customer to check for software updates
  + Customer shall be notified if the update is available thru in vehicle HMI and shall be able to see update progress (including initial communication, downloading details such number of files and percentage complete, installation progress, activation and update successful.
* Silent Update
  + If vehicle receives an update with overwrite, then HMI shall not prompt the user for consent, Wi-Fi, and/or schedule but notify the user when update completes.

Customer selection and Ford Backend (thru manifest) shall determine the HMI options for OTA software updates.

### Function Scope



Figure 6: Context Diagram of Function Software Update Notification

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | CustomerChoice | This is the customer selection of the consent settings that will be shown in the screen |
|  |  |  |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | LS\_ASUHMI\_Activation\_Consent | Allow the customer chooses to activate time   1. NOW; 2. DATETIME; 3. UNDEFINED |
|  | LS\_OTAM\_SW\_Update\_Notify | If software update requires Personal Identifier Information or Not Type of consent is requires from the customer, feature enable, one time, and additional. |
|  | LS\_OTAM\_SW\_Update\_State | OTA software update status of the software update as in progress, pending, successful, failed, up to date, none |
|  | LS\_OTAM\_Activation\_Type | Activation Type: -   * Non Ignition Cycle * Ignition Cycle * Inhibit |
|  | LS\_OTAM\_Release\_Notes\_Info | Software Release notes that were downloaded from the URL provided thru the notification |
|  | LS\_OTAM\_UpdateExpiration\_Time | Maximum expiration time that a software is allowed to stay in pending state |
|  | LS\_OTAM\_TriggerExpiration\_Time | Maximum expiration time that is used for one-time consent |

### Function Modeling

N/A

### Function Requirements

#### Functional Requirements

##### F-REQ-305222/E-###R\_FNC\_Veh\_HMI\_Notif\_001### Additional User Consent Notification

If software update requires an additional/PII consent, then OTA Manager shall set a flag LS\_OTAM\_SW\_Update\_Notify = Additional/PII for HMI to prompt the customer to provide additional consent.

If user input is received, then HMI shall notify the OTAM that user input is received LS\_ASUHMI\_ASU\_Additional\_Consent = Additional/PII and HMI shall clear all notification (ICON/popup/button) that consent is needed.

If user input is not received, then HMI shall continue to display the notification (ICON/button/popup) until update is expired or canceled.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_028 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326784/C-###R\_FNC\_Veh\_HMI\_Notif\_002### Vehicle in Private Mode

If customer has elected to be in a private mode, then IVSU shall only update software files that doesn’t require any PII data. HMI shall not prompt the user for software updates that are required PII consent.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-331788/D-###R\_FNC\_Veh\_HMI\_Notif\_003### Wi-Fi Connection Reminder

HMI shall have standard notification to reminder the user to connect to Wi-Fi for faster software update.

HMI shall determine if Wi-Fi status to prompt the user:

If Wi-Fi = OFF, then HMI shall prompt the customer to enable Wi-Fi and connect to AP.

If Wi-Fi = ON and AP is connected, then notify the user to connect to Wi-Fi.

If Wi-Fi = ON and AP is preconfigured and it’s out of range, then notify the user to connect to Wi-Fi.

If Wi-Fi = ON and access point in range, then HMI show the available AP connections and allow the user to connect to Wi-Fi.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305223/D-###R\_FNC\_Veh\_HMI\_Notif\_004### Manage Software Update Notification Options

If vehicle connectivity is enabled user shall be allow the get the software notifications and user shall have not the ability to disable notification.

If user want to disable the notification user has to disable the vehicle connectivity.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_029 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305225/E-###R\_FNC\_Veh\_HMI\_Notif\_005### Details Update Button

If OTA system is waiting for user consent, then OTA Manager shall set a flag LS\_OTAM\_SW\_Update\_Notify = One\_time for HMI to display Update under setting 🡪 details and HMI ICON on main screen, HMI shall show Update button with software release notes (release notes shall be stored locally). If customer click Update button, then HMI shall notify the OTA Manager with flag LS\_ASUHMI\_ASU\_Additional\_Consent = One\_time.

HMI shall clear the HMI ICON when LS\_OTAM\_TriggerExpiration\_Time = Expire and/or LS\_USBOTA\_SW\_Update\_Status = Successful or LS\_OTAM\_SW\_Update\_State = FAILED or LS\_OTAM\_SW\_Update\_State = UP\_TO\_DATE.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_031 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305226/B-###R\_FNC\_Veh\_HMI\_Notif\_006### Preferred Network

Preferred Network: - The customer shall have interface with the vehicle HMI to allow the user to select the preferred network for the software updates. This includes both hotspot and Wi-Fi (Consumer or public network).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_032 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305227/B-###R\_FNC\_Veh\_HMI\_Notif\_007### OTA Software Notification Display Time

Vehicle HMI shall configure specification timers for OTA software popup notification so that the customer has the ability to read all the information displayed in it.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_033 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305228/B-###R\_FNC\_Veh\_HMI\_Notif\_008### HMI ICON Action Notification

HMI logic shall keep displaying the ICON with notifications until the task has been complete or user action is done. HMI shall continue to show IVSU related ICONs even if vehicle is in motion. When user click on the ICON, then HMI shall show notify with detail of the user action.

All IVSU related information should be available for the customer to access under settings.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_034 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305229/B-###R\_FNC\_Veh\_HMI\_Notif\_009### Activation Pending HMI Notification

OTA Manager shall set a flag for HMI to notify the user the software activation is pending LS\_OTAM\_Activation\_Status = pending

If activation shall wait for the user action to complete the update.

* If software activation requires schedule time LS\_OTAM\_Activation\_Type = INHIBIT, then it shall wait until user provide date and time.
* If software activation requires an ignition cycle LS\_OTAM\_Activation\_Type = IGNITIONCYCLE, then is shall wait until user perform an ignition cycle.

If user do not provide input and close the popup, then HMI shall continue to show an ICON until software update expires.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_035 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305231/B-###R\_FNC\_Veh\_HMI\_Notif\_010### OTA Software Activate

All OTA software requires an ignition cycle to activate the software. The user shall have option to schedule a time for activation when vehicle is inhibited more than normal ignition cycle.

The OTA Manager shall have two flags for HMI (A/B swap readiness and E/R timer) before each OTA software activation takes place. LS\_OTAM\_Activation\_Type = inhibit && LS\_OTAM\_Activation\_TypeSW\_AB\_ER = (AB or ER or AB\_and\_ER).

When vehicle is inhibited and customer decides to start the vehicle, then HMI shall warn the user and show software activation progress.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_037 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305232/D-###R\_FNC\_Veh\_HMI\_Notif\_011### Master Reset when Software is in Progress with Base level or One-time Consent & Default Consent ON

If the OTA software is in progress with base level consent (download, install, and activation), HMI shall show ICON if software activation is pending and update requires schedule.

HMI shall prompt for the consent after master reset is complete, if the OTA software is in progress with one-time consent, then OTAM shall notify HMI to prompt the user for consent.



**Flow 11: Master Reset when ASU = ON and update is in progress**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_038 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305234/E-###R\_FNC\_Veh\_HMI\_Notif\_012### Master Reset & SW is in Progress with Additional and/or PII Consent and Default Consent ON

If the OTA software is in progress and user consent level is additional and/or PII, then

HMI shall warn the customer that software update is in progress before continue with master reset or Cancel.

If customer choose to continue with master reset, then HMI shall notify OTA manager with LS\_OTAHMI\_Master\_Reset\_Status = Master Reset and during master reset OTA Manager shall pause software update until system reboot is complete, HMI shall prompt the customer for consent an additional and/or PII before resuming with software update.

**Flow 12: Master Reset when ASU = ON and update is in progress through Additional and/or PII Consent**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_039 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305240/C-###R\_FNC\_Veh\_HMI\_Notif\_013### Master Reset when SW update is pending for activation with Additional and/or PII Consent

If the OTA software activation is pending, then HMI shall warn the customer that software update is in progress before continuing with master reset or Cancel.

If customer choose to continue with master reset, then HMI shall notify OTA manager with LS\_OTAHMI\_Master\_Reset\_Status = Master Reset and if OTA Manager has schedule set time it shall clears the time.

After the system reboot is complete, HMI shall prompt the customer for additional and/or PII consent follow by set a schedule for software activation to complete.

If no selection is received, then HMI shall show ICON on the screen until software update expires or user input is received.



**Flow 13: Master Reset when Software update is pending with Additional Consent**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_042 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305236/E-###R\_FNC\_Veh\_HMI\_Notif\_014### Master Reset when SW update is in process & ASU default OFF without Additional/PII Consent

If software update is in progress (downloading, installing, and waiting for activation) and user consent default setting is OFF, then HMI logic shall prompt the customer for with warning that software update is in progress do you want continue or cancel.

If customer choose to continue with master reset, then HMI shall notify OTA manager with LS\_OTAHMI\_Master\_Reset\_Status = Master Reset and during master reset OTA Manager shall pause software update until system reboot is complete, HMI shall prompt the customer for consent before resuming with software update.



**Flow 14: Master Reset when Software update is in process without Additional Consent**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_040 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305238/B-###R\_FNC\_Veh\_HMI\_Notif\_015### Master Reset when SW update is in process and ASU is OFF with Additional/PII Consent

If software update is in process and user consent default setting is OFF, then HMI shall prompt the customer for with warning that software update is in progress do you want continue or cancel.

If customer choose to continue with master reset, then HMI shall notify OTA manager with LS\_OTAHMI\_Master\_Reset\_Status = Master Reset and during master reset OTA Manager shall pause software update shall pause until system reboot is complete, HMI shall prompt the customer for Base consent and additional and/or PII consent before resuming with software update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_041 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-329375/B-###R\_FNC\_Veh\_HMI\_Notif\_016### HMI Display during Silent OTA Software Updates

If vehicle receives a silent update, then HMI shall not prompt the user for consent, Wi-Fi, and/or schedule. HMI shall not show any progress of the update during the update.

If schedule is required, then HMI shall notify the user for activation: schedule reminder, preconditions not met, update is successful, or update is not successful.

If schedule is not required, then HMI shall notify the user after update is complete: update is successful, or update is not successful.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326177/C-###R\_FNC\_Veh\_HMI\_Notif\_017### Software Update is in Process & Vehicle Lost Additional and/or PII User Consent

If software update is in progress LS\_OTAM\_SW\_Installation\_State = IN\_PROGRESS && LS\_OTAM\_SW\_Download\_State = IN\_PROGRESS && LS\_OTAM\_SW\_Update\_State = IN\_PROGRESS and vehicle lost additional and/or PII consent due to user change the consent ON🡪 OFF then, HMI shall prompt the user with option to continue or cancel.

If user continue with the request, then HMI shall notify the OTA Manager that LS\_ASUHMI\_ASU\_FeatureStatus = Disable.

OTA Manager shall treat this request as loss of One time and PII update consent LS\_ASUHMI\_ASU\_Additional\_Consent = ONE\_TIME or LS\_ASUHMI\_ASU\_Additional\_Consent = PII\_UPDATE and pause the update until user input or software update expires.

HMI shall show ICON until software update expires to notify the user that user consent is needed.

|  |  |  |  |  |  |  |  |  |
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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326178/C-###R\_FNC\_Veh\_HMI\_Notif\_018### Software Update is in Process & Vehicle Lost Base User Consent

If software update is in progress and user change the consent ON🡪 OFF then, HMI shall prompt the user with option to continue or cancel.

If user continue with the request, then HMI shall notify the OTA Manager that vehicle lost user consent LS\_ASUHMI\_ASU\_FeatureStatus = Disable and software update shall pause and wait for the user consent before continuing with software update.

HMI shall show ICON until software update expires to notify the user that user consent is needed.

|  |  |  |  |
| --- | --- | --- | --- |
| Download Status | Update Status | Update type | HMI Prompts |
| Update is in progress | In progress | All | User action ASU ON🡪OFF, HMI shall prompt the customer update was paused |
| Download is less than 100% | Download will pause and wait for the consent or update expire time | All updates | Notify the customer update will pause |
| Download is 100% | Update will continue based on the previous consent | Non-inhibit | Update will complete |
| Download is 100% | update will continue | Inhibit | If schedule is set, then complete per schedule  If schedule is not set, then   1. If notification = ON, then ask for the user schedule 2. If notification = OFF, then HMI shall wait for user input |
| Note: customer is allowed the clear the schedule | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305242/B-###R\_FNC\_Veh\_HMI\_Notif\_019### Software Updates and Activation Types

All types of software updates require vehicle to be in park and some software updates requires an ignition ON/OFF or vehicle inhibit to successfully complete.

OTA software updates types: -

* Vehicle is fully functional – OTA Manager shall set flag LS\_OTAM\_Activation\_Type = NOIGNITIONCYCLE, then HMI shall show ICON that software update is complete.
* Vehicle is fully functional – OTA Manager shall set flag LS\_OTAM\_Activation\_Type = IGNITIONCYCLE, then software update is waiting for auto ignition cycle HMI shall NOT prompt the user.
* Vehicle inhibit is required for few minutes – to complete the software updates it requires to set a schedule when HMI receives flag LS\_OTAM\_Activation\_Type = INHIBIT, then HMI shall prompt the customer with option to set a schedule time when vehicle will not be used, also with warning that vehicle shall not be able start the engine during this time.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_043 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326180/D-###R\_FNC\_Veh\_HMI\_Notif\_020### In Vehicle Clock Time Format

HMI logic shall display the software update date and time LS\_OTAM\_Update\_Time = date/time in bytes. Date and time display to the customer shall be depended on the region and/or user selected format, such as if clock format is 24hrs (army clock), then software update time and date shall be 24hrs.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305246/B-###R\_FNC\_Veh\_HMI\_Notif\_021### HMI Temporary Vehicle Inhibit during Software Activation (Max time)

During OTA software activation, vehicle inhibits crank to prevent the customer from starting the engine.

During A/B swap and erase/replace software updates, the OTA Manager shall set a flag with inoperable max time to HMI LS\_OTAM\_Activation\_Time = time, then HMI shall have a process bar display to show the software activation progress.

When LS\_OTAM\_Activation\_Type = inhibit, then HMI shall display warning of vehicle inhibit and that key fobs will not work until software update is complete; follow by process bar in center stack display.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_045 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305248/D-###R\_FNC\_Veh\_HMI\_Notif\_022### Clear Notification When Software Update Expires

When software update requires a user input to apply the update and user input was not provided and software update time expired, then OTA Manager shall send a flag LS\_OTAM\_TriggerExpiration\_Time = Expire, then HMI shall clear all IVSU related HMIs/ICONs.

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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_046 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305250/C-###R\_FNC\_Veh\_HMI\_Notif\_023### ONE TIME Consent

The customer shall have the option to provide a ONE-TIME Consent thru **“Check Updates**” LS\_ASUHMI\_ASU\_CheckUpdate = True and/or “**Update**” button LS\_ASUHMI\_ASU\_Additional\_Consent = ONE\_TIME.

If customer selects one-time consent ICON, then HMI shall show popup that software update is available and it may take few days to complete the update depending on the vehicle connection speed.



**Flow 15: One Time User Consent**

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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_047 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305252/C-###R\_FNC\_Veh\_HMI\_Notif\_024### Software Update Activation is Successful with latest Software

OTA software update: once the activation is successful LS\_USBOTA\_SW\_Update\_Status = Successful and vehicle is update successfully, HMI shall show a clickable icon where user can see the details of the update. This ICON shall stay on the HMI for configurable ignition cycles or until the user clicks the ICON.

For USB software update is successful LS\_USBOTA\_SW\_Update\_Status = Successful, then

1. Popup Software update is complete remove the USB device with two options Close and Show Details, show details shall now release notes
2. Prompt the customer to remove the USB device when LS\_USBOTA\_SW\_Update\_Status = Successful



**Flow 16: Software Update is Successful**

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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_048 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305224/E-###R\_FNC\_Veh\_HMI\_Notif\_025### Details Software Release Notes

After software update is successful LS\_OTAM\_SW\_Update\_State = SUCCESSFUL OR LS\_USBOTA\_SW\_Update\_Status = SUCCESSFUL and HMI shall notify the customer that update is successfully.

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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_030 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305254/B-###R\_FNC\_Veh\_HMI\_Notif\_026### Erase and Replace Software Installation

If the OTA software type is erase and replace, then HMI shall prompt the customer to turn the key on in order to continue with software update.

HMI shall notify the customer that the vehicle inhibited due to software update, and display a warning message that during software update vehicle will not response to key forbs and lock/unlock commands.

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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_049 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305256/E-###R\_FNC\_Veh\_HMI\_Notif\_027### Dynamic HMIs

In vehicle HMI shall have OTA software update related dynamic screens and OTA Manager shall trigger the HMI dynamic popups by setting a flag.

For additional consent, SYNC shall download and store HMI text locally.

|  |  |  |  |  |  |  |  |  |
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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_050 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305258/B-###R\_FNC\_Veh\_HMI\_Notif\_028### Set DATA Usage Limited

The vehicle HMI shall allow the user to Set Data Usage Limit and Usage cycle reset data to be use for OTA software updates per month.

Set Data Usage Limit: - allow the user to set MB/GB data can be use per usage cycle.

Usage cycle reset data: - allow the user to set cycle.

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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_051 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326785/B-###R\_FNC\_Veh\_HMI\_Notif\_029### Vehicle Inhibit for Software Activation vs. Vehicle Programming Session

Determine vehicle inhibit type if it’s A/B swap software activation and/or Erase and replace programming session.

Vehicle Inhibit for Programming Session: If LS\_OTAM\_Activation\_TypeSW\_AB\_ER = (ER or AB\_and\_ER), then show LS\_OTAM\_Vehicle\_Inhibit\_Type = ProgrammingSession. Vehicle is in programming sessions HMI shall display Software Update in Progress as a progress bar.

Vehicle Inhibit for Software Activation: If LS\_OTAM\_Activation\_TypeSW\_AB\_ER = AB, then show LS\_OTAM\_Vehicle\_Inhibit\_Type = ActivatingNow, Vehicle is activating the software.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305244/D-###R\_FNC\_Veh\_HMI\_Notif\_030### Software Activation Failed and HMI Notification

If software activation failed due to critical failures LS\_OTAM\_SW\_Activation\_Fail\_Reason = PERMANENT\_INHIBIT, then HMI shall notify the user that update has failed and required service and display phone number (for more details reference A73a).

If software activation failed due to partial failures LS\_OTAM\_SW\_Activation\_Fail\_Reason = PARTIAL, then HMI shall notify the user that vehicle has limited functionality and requires service and display phone number (for more details reference A73a).

If software activation failed due to partial failures LS\_OTAM\_SW\_Activation\_Fail\_Reason = warning, then HMI shall notify the user that then vehicle will automatically try to update the software at a later time.

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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_044 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326179/C-###R\_FNC\_Veh\_HMI\_Notif\_031### Software Activation Failed and ASU = OFF or Vehicle Connectivity Settings = OFF

If software activation is failed, then HMI Logic shall make sure prompt the customer for user consent if required.

When LS\_OTAM\_SW\_Activation\_Fail\_Reason = warning or LS\_OTAM\_SW\_Activation\_Fail\_Reason = USB\_FAILURE

And LS\_ASUHMI\_ASU\_FeatureStatus = disable or LS\_ASUHMI\_ASU\_Consent = false, then HMI shall prompt the customer for vehicle connectivity settings.

When LS\_OTAM\_SW\_Activation\_Fail\_Reason = warning or LS\_OTAM\_SW\_Activation\_Fail\_Reason = USB\_FAILURE

And LS\_ASUHMI\_ASU\_FeatureStatus = disable or LS\_ASUHMI\_ASU\_Consent = True, then HMI shall prompt the customer for user consent.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326171/C-###R\_FNC\_Veh\_HMI\_Notif\_032### Software Activation During AC Charging

If software activation requires a vehicle inhibit LS\_OTAM\_Activation\_Type = INHIBIT, then OTA Manager requests charging system to disable PHEV battery charging to activate the software. HMI logic shall keep track of charging system and software update notifications and priorities to notify the customer when battery charging time and software update schedule time overlays.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305262/E-###R\_FNC\_Veh\_HMI\_Notif\_033### Critical Errors during Software Update & Service

Service: -

For Wi-Fi updates aupdates are silent, therefore poses some difficulties for technicians to troubleshoot these errors. The software logic for the updates shall capture each exception and assign an error code to it. This code will be populated into a DID that technicians can look it up. LS\_OTAM\_SW\_Update\_Fail\_Reason = error code

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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_053 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305264/D-###R\_FNC\_Veh\_HMI\_Notif\_034### Reset of Wi-Fi Setings

The Reset options shall allow the user to have an ability to reset system settings selectively e.g. Wi-Fi without de-authorizing the Automatic Software updates etc.

Add capability for user to perform reset without going through de-authorization, and also to select and reset the settings.

* Decouples the settings reset and de-authorization process
* Enhances the user’s ability to select and reset settings
* User doesn’t have to go through authorization process again in case of settings reset e.g. Wi-Fi, Vehicle Connectivity
* Improve user experience

If software update is in progress and downloading software files at a time of customer initiates Reset, then HMI shall notify the customer that continue with reset will impact software update.

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| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_054 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347583/A-###R\_FNC\_Veh\_HMI\_Notif\_035### Crash during software update in progress (OTA/USB)

If vehicle is in crash and CAN signal is present, then USB parser/SFTP Transfer shall clear the software update

LS\_OTAM\_HMI\_OTAUSB\_Clear = ClearHMIs. USB update shall restart from beginning once the CAN signal clears the crash alert.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347584/A-###R\_FNC\_Veh\_HMI\_Notif\_036### eCall during software update in progress (OTA/USB)

If eCall occurs when software is in progress, then system shall pause and resume the software update.

LS\_OTAM\_SW\_Instalation\_State = Pause

LS\_OTAM\_SW\_Download\_State = Pause

LS\_OTAM\_SW\_Update\_State = Pause

LS\_USBOTA\_SW\_Update\_Status = Pause

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-348141/C-###R\_FNC\_Veh\_HMI\_Notif\_037## Double Lock During Software Activation

As a safety precaution, double-locked doors will revert to central lock when the software update starts. Digital Owner’s Manual shall cover this info.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347585/A-###R\_FNC\_Veh\_HMI\_Notif\_038### Software File Size and Channel for Update in Release Notes

Release notes shall include file size (some kind of feedback to the customer how long it will take to download the file) and Channel that update is coming thru

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347586/A-###R\_FNC\_Veh\_HMI\_Notif\_039### Maximum Time Allow for Software Activation

If software will be going to expire less than 7days, then HMI shall only show days left before the software update will expire {LS\_OTAM\_UpdateExpiration\_Time = date/time}.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-380376/A-###R\_FNC\_Veh\_HMI\_Notif\_041### Master Reset During Software Update

If the OTA software is in progress with all level of consent (download, install, and activation), then HMI shall warn the customer that software update is in progress before continue with master reset or Cancel.

If customer choose to continue with master reset, then HMI shall notify OTA manager with LS\_OTAHMI\_Master\_Reset\_Status = MasterReset and during master reset OTA Manager shall pause software update until system reboot is complete and check for user consent or schedule if required.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-369536/B-###R\_FNC\_Veh\_HMI\_Notif\_048### Wi-Fi Connection is Required for OTA Updates

If software update requires Wi-Fi connection LS\_OTAM\_ConenctionType\_WiFi = True, then HMI shall notify the user to connect to Wi-Fi (ref REQ-394235 & REQ-331788).

If vehicle lost Wi-Fi network during download, then HMI shall prompt the user to re-connect to Wi-Fi and HMI shall allow the user to see the download progress.

HMI shall clear the notification once the software download is complete and Wi-Fi is no longer needed.

|  |  |  |  |  |  |  |  |  |
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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-387745/A-###R\_FNC\_Veh\_HMI\_Notif\_050### Update is Canceled

If update was in progress and canceled after notifying the user, then HMI shall notify clear all notification and transition update details (ref REQ-394240)

If update was in progress silently (user was not notified), then HMI shall clear all notification silently without tell the user that update was in progress.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-392411/A-###R\_FNC\_Veh\_HMI\_Notif\_051### HMI ICON and Behavior

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Symbol/ICON | OTAM Logic | HMI Logic |
| P**.1**99 |  | OTAM shall set a flag when update is successful | 1. HMI shall download the update details text file 2. Up on receiving flag from OTAM HMI shall display an ICON that **update is successful** 3. If user click the ICON, then HMI shall show the update details with new text and clear the ICON 4. If user does not click the ICON, then ICON shall continue to show for x ignition cycles. 5. If user enters the update details page, then HMI shall display the new text. |
| P.200 |  | OTAM shall set a flag when update is NOT successful | 1. HMI shall download the update details 2. Up on receiving flag from OTAM HMI shall display an ICON that **update is NOT successful**, and vehicle has reduced functionality 3. If user click the ICON, then HMI shall popup Update is not successful and clear the ICON. 4. If user does not click the ICON, then ICON shall continue to show for x ignition cycles. 5. If user enters the update details page, then HMI shall display update not successful under details for x days. (reference REQ-392410, REQ-394336, REQ-394121, and REQ-393740) |
| P.200 |  | OTAM shall set a flag when update is postponed due to preconditions | 1. HMI shall download the update details 2. Up on receiving flag from OTAM HMI shall display an ICON that update is postponed 3. If user click the ICON & schedule is recurring, then HMI shall show list of **preconditions which were not met**, and HMI shall show the current schedule day/time and clear the ICON (reference REQ-326157). 4. If user click the ICON and schedule is not set, then HMI shall show list of preconditions which were not met and give the option to set a schedule and clear the ICON 5. If user close the popup without setting a schedule, then   (1) HMI shall clear the postpone ICON and (2) show that pending activation and schedule required ICON (3) Update details shall software update is pending, and schedule required until user sets a schedule or update is expired/canceled.   1. If user does not click the ICON and schedule is recurring, then HMI shall continue to show the ICON for 3 ignition cycles. 2. If user does not click the ICON and schedule is not set, then HMI shall continue to show postpone ICON for 3 ignitions cycles. 3. At next ignition cycle (4th ignition cyctel) HMI shall show pending activation ICON until user sets a schedule or update is expired. |
| P.201 |  | When ASU = OFF and Update is available, then OTAM shall set a flag to notify HMI that update is available.  If user accept the update, then OTAM shall resume the update and post the user input to OTA cloud.  Update is expired, OTAM shall notify the HMI. | 1. HMI shall download the update details 2. Up on receiving flag from OTAM HMI shall ICON System Update is available and one-time consent is required. 3. If user click ICON and accepts the update, then HMI shall clear the ICON and notify OTAM 4. If user does not click the ICON or click on the ICON but doesn’t accept the update, then HMI shall continue to display this ICON until user input is receiver or update is expired. 5. If user enters the update details page, then user HMI shall display new text and a button for user to provide input.   (reference REQ-394234) |
| P.206 |  | When schedule time is reached, OTAM shall set a flag to notify HMI for upcoming schedule update with 24hrs (configurable time).  If OTAM receives schedule time change then OTAM shall post the it to OTA Cloud. | 1. HMI shall download the update details 2. Up on receiving flag from OTAM with upcoming schedule in within 24hours, then HMI shall display an ICON. If user click on the ICON, then HMI shall show popup with current schedule and allow the user to change it. 3. If user reschedule the time outside 24hrs, then HMI shall clear the ICON otherwise continue to display it until update is complete. |
| P.207 |  | When OTA update is pending and requires a schedule, then OTAM shall set a flag to notify the HMI  Once the user input is received OTAM shall resume the update and post the user input to OTA cloud.  If OTAM receives schedule time change then OTAM shall post the it to OTA Cloud. | 1. HMI shall download the update details 2. Up on receiving flag from OTAM HMI shall display ICON schedule required. 3. If user click the ICON and set a schedule, then HMI shall clear the ICON 4. If user click the ICON and does not set a schedule, then HMI shall continue to display the ICON until update expires/cancel. 5. If user does not click on the ICON, then HMI shall continue to display the ICON until update expires/cancel. 6. HMI shall share the schedule time with OTAM. |
| P.208 |  | OTAM shall pause the update and set a flag for HMI to notify the user when update requires additional consent.  Once the user input is received OTAM shall resume the update and post the user input to OTA cloud. | 1. HMI shall download the update details 2. Up on receiving flag from OTAM HMI shall display popup additional/PII consent is required. 3. If user close the popup without accepting, then HMI shall convert this popup into ICON and continue to display until user input is received or update is expired/canceled. 4. Is user accept the update from popup, them HMI shall clear the ICON and notify OTAM. |
| P.XXX |  | OATM shall set a flag that update is available and requires Wi-Fi | 1. HMI shall download the update details 2. HMI shall notify the user via ICON that update is available and requires Wi-Fi 3. HMI shall allow the user to view available network by clicking the ICON 4. If Wi-Fi is connected via ICON or settings, then HMI shall clear the ICON |
| P.XXX |  | OATM shall set a flag that update is pause and requires Wi-Fi | 1. HMI shall download the update details 2. If update is paused and requires Wi-Fi to resume, then HMI shall display the ICON 3. HMI shall allow the user to view available network by clicking the ICON 4. If Wi-Fi is connected via ICON or settings, then HMI shall clear the ICON OR if update is resumed then HMI shall clear the ICON |
|  | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-392412/A-###R\_FNC\_Veh\_HMI\_Notif\_052### HMI ICON Priority

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Conditions for icons available | | | | | | | | | | | Result | ICON Priority |
| No conditions Present | Upcoming Schedule Reminder | | Update Available | | Additional Consent | System Activate | System Update Successful | Update not Successful | Wi-Fi Required | Wi-Fi Pause |  | More than one ICON |
| X |  | |  | |  |  |  |  |  |  | None |  |
|  | X | |  | |  |  |  |  |  |  | Upcoming Schedule Reminder | Priority 2 |
|  |  | | X | |  |  |  |  |  |  | Update system is available but required Wi-Fi | Priority 3 |
|  |  | |  | | X |  |  |  |  |  | System update is pending, additional consent required | Priority 4 |
|  |  | |  | |  |  |  |  | X |  | Update is available and requires Wi-Fi and/or Consent(one-time/additional/PII) | Priority 3 |
|  |  | |  | |  |  |  |  |  | X | Wi-Fi Download is Pause | Priority 4 |
|  |  | |  | |  | X |  |  |  |  | System update is pending, and schedule is required | Priority 2 |
|  |  | |  | |  |  | X |  |  |  | System update successful | Priority 1 |
|  |  | |  | |  |  |  | X |  |  | Update is not successful | Priority 1 |
|  | |  | | Note: Priority 1 – 4 (highest – low) | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

###### F-REQ-305204/C-###R\_FNC\_Veh\_HMI\_Notif\_042### Power Reset

Power reset shall not affect any OTA software settings and values. After a power reset, all the settings shall be re-stored to the values that they were prior to the power reset.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_055 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-395173/A-###R\_FNC\_Veh\_HMI\_Notif\_35### HMI shall clear the notification after user input is received

HMI shall clear notification after user input is received and/or update is canceled.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### Non-Functional Requirements

##### F-REQ-305267/C-###R\_FNC\_Veh\_HMI\_Notif\_043### Icon Design

The status bar icon shall design to be intuitive to the customer so they can understand the difference between a pending activation and a one-time consent

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_056 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-344157/A-###R\_FNC\_Veh\_HMI\_Notif\_044### Display Release Notes

In vehicle HMI shall display the release notes with in 500ms of the software activation complete. Or allow the user to see the release notes when consent is needed.

|  |  |  |  |  |  |  |  |  |
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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347388/B-###R\_FNC\_Veh\_HMI\_Notif\_046### Reference to Owner's Manual

Some of the popups DO NOT cover the details of the software update behavior when asking for user input, for more information HMI shall have link to Owner's Manual.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-347839/B-###R\_FNC\_Veh\_HMI\_Notif\_047### Do Not Show this Popup Again

For all non-critical notification popup is displayed instead of notification ICON, then HMI shall allow the user to disable the popup by selecting “Do not show this message again”.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## Logical Function Software Update Details

### Function Description

Each software update shall have the update details (release notes) file with description of the software changes; it shall be approved by legal and translated to all the required languages.

The update details file shall be release in the Ford Backend.

Update details file shall be able to include the detail description with images and URLs.

The software release description shall be delivering with the software update. The only exception to this rule is if an update is completely silent to the customer. The owner website shall have more details and history of the software updates that were push to the vehicle.

HMI shall allow the user to see software update status under Update Details settings.

### Function Scope

**Figure 8: Context Diagram of Function Software Update Details**

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | CustomerChoice | This is the customer selection of the consent settings that will be shown in the screen |
|  |  |  |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | LS\_OTAM\_Release\_Notes\_Info | Software update release notes text |
|  | LS\_OTAM\_ConenctionType\_WiFi | Software update requires Wi-Fi connection |
|  | LS\_OTAM\_Activation\_Status | Software activation schedule day/time |
|  | LS\_OTAM\_SW\_Update\_State | Software update status |
|  | LS\_OTAM\_SW\_Download\_Pause\_Reason | Reason why software download pause |
|  | LS\_OTAM\_SW\_Download\_State | Software download status |
|  | LS\_OTAM\_SW\_Installation\_State | Software installation status |
|  | LS\_OTAM\_HMI\_OTAUSB\_Clear | Clear all HMIs |
|  | LS\_OTAM\_Activation\_Time | Identify how long software activation time will take |
|  | LS\_ASUHMI\_Activation\_Consent | Software update requires schedule |

### Function Modeling



**Figure 9: State Machine of Function Software Update Details**

### Function Requirements

#### Functional Requirements

##### F-REQ-305283/D-###R\_FNC\_Veh\_HMI\_SW\_Details\_001### Software Update Details Settings

HMI shall allow to customer to access the update details from system update settings and from HMI ICONs to check the software update status, such as: -

* + Software Update is available or software update in pending for user action
  + Update is downloading
  + Update is preparing in install
  + Update is installing
  + Update is pending
  + Update is canceled
  + Update in not successful
  + Update is successful
  + Vehicle is up to date

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_072 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### FUR-REQ-392409/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_002### Download the Update Details Text before Notify the User for Action

HMI shall download the update details description (release notes) file before notifying the user that update is available, such as consent required, Wi-Fi is required, schedule is required, and update is successful etc.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394121/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_003### System is Unsuccessful to Download the Additional/PII Consent File

If additional/PII consent is required and system failed to download the file, then after x retries HMI shall have standard text when notifying the user that update is available and redirect the customer to mobile app and/or consumer website for release notes.

For example: A System Update is Available, to read more details, access mobile app or consumer website.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305285/C-###R\_FNC\_Veh\_HMI\_SW\_Details\_004### Software Update Pending and Schedule is Not Set

If software activation is pending and schedule is required but not set, then update details HMI shall display that new update details description and system update is pending and requires a schedule. Update details screen shall provide a button to schedule, which shall allow the user to access the schedule setup screen.

If user provides schedule or update canceled or expired, then HMI shall transition the update details screen to next state.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_074 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-393740/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_005### System is Unsuccessful to Download the Release Notes file after Max Reties

When vehicle receive an update, HMI logic shall download the update details description file as soon as URL becomes available and if it fails to download the file, then after x reties HMI shall notify the user that update is available with standard text and HMI shall continue to retry to download file until campaign is complete.

After maximum retries HMI shall display standard text when notifying the user that update is available and redirect the customer to mobile app and/or consumer website for release notes.

|  |  |
| --- | --- |
| Update is Available but requires Wi-Fi connection | A system update is available. To download the update, connect to a Wi-Fi network.  For more info access mobile app or consumer website. |
| Update is available | A system update is available  For more info access mobile app or consumer website. |
| Update Requires Schedule | A system update is pending  For more info access mobile app or consumer website. |
| Update activation is pending for schedule time | A system update is pending. The update is scheduled for: {date} at {time}.  For more info access mobile app or consumer website. |
| No Update is in progress | Continue to show previous state |
| If no release notes file available (current or previous) | Your system is up-to-date |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394235/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_007### Software Update is available and requires Wi-Fi Connection

If software update is available and requires Wi-Fi network connection, then HMI shall notify the user to connect to Wi-Fi and after vehicle is connected to Wi-Fi HMI shall clear the notification.

1. HMI shall prompt the user to connect to Wi-Fi via ICON, by clicking the ICON user shall be able to access the Wi-Fi settings.
2. Under update detail, HMI shall display that an update is available with new release notes with Connect button, if user clicks on the connect button it shall allow the user to view Wi-Fi settings.
3. User shall be able to connect to Wi-Fi via Wi-Fi settings

If Wi-Fi is disable, then ICON/Connect button shall allow the user to turn the Wi-Fi to ON before connected to access point. Once the system is connected to Wi-Fi, then HMI shall display transient message that Wi-Fi successfully connected, and update details shall transition to next state and clear the ICON notification.



**Flow 17: Software Update is available and requires Wi-Fi**

Note: HMI shall have a standard text that depending on connection, multiple connections may be needed to complete the download. Once you set up your Wi-Fi, your vehicle will automatically connect and resume the download when in range of that Wi-Fi.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394243/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_006### Software Update Expired Because it Required Wi-Fi Connection and Connection was not Made

Software update was available and required Wi-Fi and vehicle was not connected to Wi-Fi access point and update expires, then update details shall display that update was canceled because vehicle was not connected to Wi-Fi.

After user connect to Wi-Fi and no new update is pending, update details shall when available, a new update will be pushed to the vehicle and/or if new state becomes available.

If new update available, then update details shall transition to new state.



**Flow 27: Software update expired while waiting for Wi-Fi connection**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394961/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_028### Software Update is available and requires Wi-Fi Connection, Vehicle is Connected to Wi-Fi

If software update is available and requires Wi-Fi connection and vehicle is connected to Wi-Fi, then HMI shall not notify the user and system will continue to download the software silently.

After the download is complete and vehicle requires consent and/or schedule, then HMI shall notify the user.

**Flow 18: Wi-Fi Required & vehicle is connected to Wi-Fi**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394825/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_008### Software Update is Available and Required Wi-Fi And User Consent (one-time/Additional/PII)

When automatic system update is disable and software update is available and requires Wi-Fi connection, user the required to provide consent(one-time/additional/PII) and connect to Wi-Fi. HMI shall prompt the user that by clicking Connect you are accepting the update (providing consent)

A system update is available. To accept the update, connect the vehicle to a Wi-Fi network.

OR

A system update is available. If you agree to accept the update, connect the vehicle to a Wi-Fi network.

**Flow: 19 Wi-Fi and Consent Required and Wi-Fi is not Connected**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394329/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_009### Software Update is Downloading

If user was notified that software update is available and user provided Wi-Fi connection and/or Consent and download started, then HMI shall display transient message download started… and update details shall display that update is downloading with release notes.

When software is downloading over Wi-Fi, update details shall display download progress and notify for customer that download will continue after ignition off and depending on the connection it may require multiple ignition cycles to complete the download.

During download HMI shall display the download progress (%). Once download is complete update details shall transition the state.

**Flow 28: Software Downloading**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394963/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_027### Software Download Pause Due to System Condition is not Met

If software download was in progress and vehicle lost Wi-Fi connection, then HMI shall notify the user that update is pause and required Wi-Fi connection to resume the download, HMI shall only prompt the user, if user action will result in resuming the download.

If user was notified about the update and update pause LS\_OTAM\_SW\_Download\_State = pause and pause reason is other than connectivity, then HMI shall display the update is taking longer than expected.

LS\_OTAM\_SW\_Download\_Pause\_Reason

Values{  
01 – USB Update,  
02 – Master Reset,  
03 - eCall,  
04 – Loadshed,  
05 – no connectivity

06 – unknown,

07 – none  
}

**Flow 20: Update required Wi-Fi and Update is Pause**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-348831/D-###R\_FNC\_Veh\_HMI\_SW\_Details\_010### Software Update is Pending but Waiting for Schedule Time Shall Show on Update Details Display

When software update is pending and requires a schedule, then HMI shall display the set schedule date and time and show a button to reschedule, which shall allow the user to access schedule input screen.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394330/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_011### Software Update is Preparing to Install

User was notifying that update is available and software download is complete and installation in progress LS\_OTAM\_SW\_Download\_State = SUCCESSFUL && LS\_OTAM\_SW\_Installation\_State = IN\_PROGRESS, then update details shall display that update is preparing to install. (flow reference REQ-394329)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394242/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_012### Update Expired Because Consent Was not Provided

If software update was pending for consent (additional/PII/One-time), then update details shall display that update was cancel because update consent wasn’t provided, if ASU is disable then guide the customer how to enable ASU.

If user enables ASU, then update details shall transition to your vehicle is waiting for its next update.

If new update becomes available, then update details shall transition to new state.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394234/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_013### Software Update is Available but Requires Consent

If software update is available and requires user consent, then HMI shall notify the user:

1. Additional or PII consent is required and ASU is enable/disable, then update details shall display that update is available with new update details text and update button, allow the user to accept the update by clicking the update button.
2. If base consent is required and ASU is disabled, then update details shall display that update is available with new update details text and update button, allow the user to accept the update by clicking the update button. HMI shall also transition the update details screen if user enable ASU.

One the user input is received, then HMI shall show transient message system updating... and transition the update details state.

**Flow 21: Update Requires User Consent over cellular Connection**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394814/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_014### Software Update is Pending and Does not requires schedule

If user was notified that update was available and update is non-schedule update, then update details shall show that update is pending with no button and waiting for an ignition cycle.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394237/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_015### Update is Not Successful because Software Download Failed

If software download fails LS\_OTAM\_SW\_Download\_State = failed after notifying the user (Wi-Fi/Consent/Schedule), then update detail shall display that your vehicle is waiting for it’s next update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394239/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_016### Update is Not Successful because update was canceled due to collision

Software update was in progress and user was notified about the update (consent/Wi-Fi/schedule) but vehicle had collision, then update will cancel, and update details shall display that update was canceled due to collision for x ignition cycles.

After x ignition cycles, then update details shall transition your vehicle is waiting for its next update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394240/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_017### Software Update is Not Successful because software update was canceled by Ford Motor Company

Software update was in progress and user was notified about the update (consent/Wi-Fi/schedule) and update was canceled by Ford, then update details shall display that update was canceled by Ford Motor Company and will be re-push at later time for x ignition cycles.

After x ignition cycles, then update details shall transition your vehicle is waiting for its next update. OR if vehicle receives new release notes with cancel trigger, then HMI shall display the new text.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394241/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_018### Update Expired Because Schedule was Required and Not Set

Software update was pending for schedule and user input was not received and update expires, then update details shall display that update was cancel because schedule wasn’t set.

Once the user set the recurring schedule, update details shall transition to your vehicle is waiting for its next update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394238/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_019### Update Failed while is Progress and User was Not notified

If software update failed while in progress and user was not notified about update, then update shall fail silently without notifying the user

Update details shall continue to display the previous release notes and last successful update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305284/E-###R\_FNC\_Veh\_HMI\_SW\_Details\_021### Software Update is Successful Update

After software update successful, update details HMI shall display the new release notes text and notify the user that update was successful.

* User shall be able to access the update details by clicking the update successful ICON
* If customer does not click the ICON then, HMI shall clear the ICON after x ignition cycles.
* If customer clicks on the ICON, HMI shall show update details or popup that update was successful and clear the ICON.
* User can access the update details screen via automatic system update settings

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_073 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-394336/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_022### Software Update Details After Update is Unsuccessful Ford will Re-Push the Update

If software update is not successful and failure is warning LS\_OTAM\_SW\_Activation\_Fail\_Reason = warning, then update details shall display failure popup text that Ford shall re-push the updates for x ignition system (x = 3) (reference REQ-305244/C).

If user access the update details before x ignition cycles, HMI shall Update is Unsuccessful Ford will Re-Push the Update.

If user access the update details after the x ignition cycle, then update detail shall display last successful update release notes.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### FUR-REQ-392410/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_023### Software Update Details after Update is Unsuccessful and Vehicle Requires Service

If software update is not successful and failure is LS\_OTAM\_SW\_Activation\_Fail\_Reason = PARTIAL vehicle has limited functionality, then under update details HMI shall continue to display vehicle requires service failure popup text until service is complete (reference REQ-305244/C).

After vehicle is serviced, HMI shall display default screen your vehicle is up to date.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-395060/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_029### Vehicle is Up-to-Date

If HMI receives LS\_OTAM\_HMI\_OTAUSB\_Clear = ClearHMIs OR at EOL OR no release notes available after successful update, then update details shall display vehicle is up-to-date.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326576/C-###R\_FNC\_Veh\_HMI\_SW\_Details\_024### Software Update Date and Time

After each software activation HMI shall display date and time flag LS\_OTAM\_Update\_Time = date/time received from OTA Manager. Master Reset shall not affect date and time.

Date and time display to the customer shall be depended on the region and/or user selected format, such as if clock format is 24hrs, then software update time and date shall be 24hrs.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

###### F-REQ-305205/D-###R\_FNC\_Veh\_HMI\_SW\_Details\_025### No Blank Display for Software Details

There shall never be a blank display for the customer. If there are no release notes present, then the display shall display a default text such as “Your system is up to date and there is no software available for your system”

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_076 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### Non-Functional Requirements

##### F-REQ-305288/D-###R\_FNC\_Veh\_HMI\_SW\_Details\_026### Software Update Details Display Time Out

Display screen of release notes should not timeout but have an option to close or go back. Customers can read at different speeds and depending on the length of the release notes, we might have undesired timeouts.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_077 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## Logical Function Software Update Progress Bar

### Function Description

Software updates thru a USB and/or in vehicle HMI “Check for Updates” option in setting shall provide the customer the ability to monitor the progress of the download, install and activation.

When user initiates OTA software updates thru USB or by in vehicle HMI then the progress bar shall show the software update details.

An OTA update is a silent update; meaning that there shall be no display to the customer in regards to the progress of the download or install.

### Function Scope



Figure 10: Context Diagram of Function Software Update Progress

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | CustomerChoice | This is the customer selection of the consent settings that will be shown in the screen |
|  |  |  |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | LS\_OTAM\_SW\_Update\_State | The activation status of the software update |
|  | LS\_OTAM\_SW\_Instalation\_State | The installation status of the software update. During a USB update, the OTA Manager shall provide installation status per each parallel software file that is occurring. |
|  | LS\_OTAM\_SW\_Download\_State | The download status of the software update. During a USB update, the OTA Manager shall provide download status per each parallel software file that is occurring. |
|  | LS\_OTAM\_Update\_Percentage\_OverallProgress | This signal shall show overall progress of the software update. |
|  | LS\_OTAM\_OTAUSB\_Number\_of\_Files | This signal shall show total and remaining number of files |

### Function Modeling

N/A

### Function Requirements

#### Functional Requirements

##### F-REQ-305289/B-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_001### Progress Bar for USB and Application Updates

When user initiates OTA software updates thru USB or by in vehicle HMI, then the progress bar shall show the software update details.

HMI shall display the number of total files with details of downloading and programming, paused, and pending for activation.

During USB update, system is updating do not unplug the USB until update is complete.

Progress bar shall be capable to have multiple progress as following: -

1. Target ECUs (connected thru Ethernet port): - OTA Manager shall provide the feedback to the HMI with progress of the download and file transfer to target ECUs
2. Client ECU (that has direct connection with USB port): - Client ECU shall provide the feedback to HMI with progress of the OTA software update.
3. OTA Manager shall provide over all progress time estimation of the software update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_078 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305290/B-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_002### Progress Bar Accuracy

The progress bar accuracy shall be very detailed so that the customer can understand how much data has been downloaded, the status of the installation and how much time is left until the completion of the update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_079 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305291/B-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_003### Master Reset during Check for Updates in process

If the OTA software is in progress, then warn the customer that software update is in progress before continue with master reset.

If customer chooses to continue with Master reset and software update is downloading, install, and activating

and HMI shall not reset progress bar

if user default consent = on, then continue with software updates after the system restart is complete.

if user default consent = off, then pause the software update and HMI shall show an ICON if Manage notification are ON until software update expires or user input is received.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_080 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305292/B-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_004### Reset Progress Bar

If the USB update is incomplete due to customer unplugged the USB, then prompt the customer to insert USB; the system shall allow 24hrs for the customer to re-plug the same USB but after 7day OTA manager shall clear the software and HMI shall reset the progress bar to default.

When an error occurs during USB update, the progress bar shall reset to default.

If a USB software update interpret current OTA software update, then the HMI progress bar shall reset to reflect the new software update process.

Example: - if OTA update is downloading, Apps for SYNC and user plugged in USB device with SYNC update, then OTA Manager shall clear the OTA update and continue with USB update and reflect the changes in progress bar.

When in progress software is erase by service and/or engineering tools, then the progress bar shall reset.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_081 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305293/B-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_005### Progress Bar for Check for Update is in Process

Under setting, if system is processing previous Check for Updates request and customer again pressed check for updates, then customer shall see the progress bar.

If software update is in process and customer clicks Check for Updates, then it shall take the customer to progress bar.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_082 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305294/C-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_006### Progress Bar during USB update

During USB update progress, HMI shall show a allow the user to review the progress bar by clicking the transient message system updating… and allow the user to click the transient message to access the progress bar.

HMI shall continue to display the progress bar until USB update is complete (successful/failed).

****

**Flow 22: Progress Bar for USB Software update**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_083 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305295/B-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_007### Progress Bar when System is Checking for Updates

When customer click for Check for Updates then OTA Manager shall provide a feedback within 60 seconds, with details of system is updating, up to date or start downloading.

Updating: 60 seconds in percentage

Up to date: LS\_OTAM\_SW\_Update\_State = UP\_TO\_DATE

Progress of the download

LS\_OTAM\_Update\_Percentage\_Progress\_APP\_x, HMI shall show progress bar of each APP

LS\_OTAM\_OTAUSB\_Number\_of\_Files = number of file(s), for example 1 of 5

LS\_OTAM\_Update\_Percentage\_OverallProgress = Over all percentage

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_106 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326187/A-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_008### Reset Progress Bar when software update Failed

If software update is incomplete or failed and system clear the software update, then system shall reset the HMI progress bar. When Check for updates or USB software update LS\_USBOTA\_SW\_Update\_Status = Failed, then HMI shall show failed on progress bar for configurable value = three ignition cycles.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326188/A-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_009### Master Reset

During USB software update in progress, HMI shall not reset progress bar

LS\_OTAM\_Update\_Percentage\_OverallProgress = overall progress && LS\_OTAM\_OTAUSB\_Number\_of\_Files = show number of files.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-368885/B-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_010### Progress Bar During OTA Updates

HMI shall show software update is in progress with progress bar and percentage complete when software is activating; on same display HMI also shall display vehicle in installing the update with show maximum inhibit time.

For OTA, 100% = Max Time {LS\_OTAM\_Activation\_Time = Domain: 2 bytes (In seconds)}.

Customer shall NOT be able to access any other screen from the software activation progress bar and after the update is complete, SYNC shall go back to default state.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-368889/A-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_011### Download and File Trasnfer Progress Bar

During USB update, in vehicle HMI shall show a progress bar that system to transferring the files from USB to sync/ECG and another progress bar to shoe ECG to target ECU.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-395035/A-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_014### Is User was Notify for Software Download over Wi-Fi HMI shall show Progress Bar with Percentage

If software update requires Wi-Fi and user was notified, then HMI shall display download progress status during the software download from cloud to ECG.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

###### F-REQ-305206/C-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_012### Reset while in update in progress is displayed

The HMI screen shall synchronize with the progress of the update from the OTA Manager within 500 ms of the screen powering up. The progress display shall pick up on that state that it was prior to a reset (either power or master reset)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_084 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### Non-Functional Requirements

##### F-REQ-305297/C-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_013### Progress Bar Details

The HMI team shall design a progress bar that is always able to display some progress. Even though, it might be difficult to calculate the exact percentage of completion some progress on estimation. The customer should not feel like the progress bar is stuck in a particular task.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_085 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## Logical Function Software Failures

### Function Description

During software updates via USB the customer shall be notified in details for errors that occur. For software updates via OTA, the customer shall be notified only for failures that occurred after a scheduled activation.

### Function Scope



Figure13: Context Diagram of Function Software Update Failures

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | CustomerChoice |  |
|  |  |  |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | LS\_OTAM\_SW\_Activation\_Fail\_Reason | WARNING  PARTIAL  PERMANENT\_INHIBIT |
|  | LS\_OTAM\_SW\_Update\_State | Failed |
|  | LS\_OTAM\_SW\_Download\_State | Failed |
|  | LS\_OTAM\_SW\_Installation\_State | Failed |

### Function Modeling

N/A

### Function Requirements

#### Functional Requirements

##### F-REQ-305298/C-###R\_FNC\_Veh\_HMI\_SW\_Failure\_001### Software Activation is Not Successful and FMC will re-push the Update as it becomes available

If software update failed during activation LS\_OTAM\_SW\_Activation\_Fail\_Reason = WARNING; then HMI shall notify the user that update is not successful and vehicle will automatically retry, no user action is required (reference REQ-392411/A).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_086 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305299/D-###R\_FNC\_Veh\_HMI\_SW\_Failure\_002### Software Activation is Not Successful and Vehicle Requires Service

If software update failed during activation LS\_OTAM\_SW\_Activation\_Fail\_Reason = PARTIAL; then HMI shall notify the user that update is not successful, and vehicle has limited functionality and requires service (reference REQ-392411/A).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_087 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-330195/B-###R\_FNC\_Veh\_HMI\_SW\_Failure\_003### Update is Not Successful after it Notify the Customer that New Update is Available

If user was notified that update is available and update is not successful LS\_OTAM\_SW\_Update\_State = Failed &&/OR LS\_OTAM\_SW\_Download\_State = Failed &&/OR LS\_OTAM\_SW\_Installation\_State = Failed, then HMI shall notify the user that update is not successful (reference REQ-392411/A).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-393676/A-###R\_FNC\_Veh\_HMI\_SW\_Failure\_007### Software Activation is Not Successful and Vehicle in not Drivable

If software update failed during activation LS\_OTAM\_SW\_Activation\_Fail\_Reason = PERMANENT\_INHIBIT; then HMI shall notify the user that update is not successful, and vehicle is not drivable and requires service has limited functionality and have your vehicle checked as soon as possible (reference REQ-392411/A).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

#### Non-Functional Requirements

##### F-REQ-305300/B-###R\_FNC\_Veh\_HMI\_SW\_Failure\_004### HMI Failure

If the vehicle HMI fails to display any of the required messages/pop ups/settings than the errors should be logged in the status logger and send to the cloud for evaluation.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_088 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305301/B-###R\_FNC\_Veh\_HMI\_SW\_Failure\_005### USB Progress after a Check for Update

The HMI shall immediately (within 100 ms) display progress for the USB update even if it is currently displaying progress for the check for update.

After the USB update is complete, it shall synchronize with OTA Manager to immediately display any progress for the previous ‘Check for Update’ task.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_089 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-380375/A-###R\_FNC\_Veh\_HMI\_SW\_Failure\_006### Clear the Failure ICON

If software update is failed but no user action is required, then HMI shall clear the ICON when user clicks on it or after configurable ignition cycles but if vehicle requires service, then HMI ICON shall stay on the status bar until service is complete.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## Logical Function USB Software Updates

### Function Description

For USB software update progress, in vehicle HMI shall provide detailed step by step feedback to the customer, unless the manifest file explicitly disables notifications. HMI shall provide status update with percentage of the download, install, activation, and errors occur during the USB update.

When the vehicle detects an USB with OTA software, then HMI shall provide feedback that OTA USB is detect with valid OTA software packages. If USB is disconnecting during software copying (transfer the software file from USB or writing to USB), then HMI shall prompt the customer to reconnect the USB to proceed with the software update.

USB Function spec have more details about USB Update.

### Function Scope



**Figure14: Context Diagram of Function USB Software Update**

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | LS\_USBOTA\_System\_Updating | Valid Manifest– Invalid Manifest Files Re-Download Files  – same manifest file which was updated late time System update to date  – Valid manifest |
|  | LS\_USBOTA\_SW\_Update\_Status | USB software update status |
|  | LS\_OTAM\_Activation\_Type | Activation Type: -  No Ignition Cycle  Ignition Cycle  Inhibit |
|  | LS\_OTAM\_Release\_Notes\_InfoValue | Software Release Notes |
|  | LS\_ASUHMI\_Activation\_Consent | NOW  DATETIME |
|  | LS\_OTAM\_SW\_Update\_Fail\_Reason | Error Code |
|  | LS\_OTAM\_SW\_Activation\_Fail\_Reason | Software activation failed reasons |
|  | LS\_OTAM\_Update\_Percentage\_OverallProgress | Overall software update progress |
|  | LS\_OTAM\_OTAUSB\_Number\_of\_Files | This signal shall show total and remaining number of files. |
|  | LS\_OTAM\_Activation\_Schedule\_Type | Day or Week |
|  | LS\_OTAM\_Activation\_Time | Progress of activation |
|  | LS\_OTAM\_HMI\_OTAUSB\_Clear | USB update is paused and USB configuration time expire or OTA Manager abort the update, then set this signal to clear progress bar and other USB related HMIs. |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | LS\_ PARSERUSB\_Conn\_Status | Maintain USB connection status (plugged, unplugged, and re-plugged (same or different) USB device. |
|  | LS\_PARSER\_USBSW\_Update\_Detected | The USB Parser shall notify the Event trigger with files types and location of software files and VIL folder.  USB parser shall provide an initial flag to HMI when validating the USB for OTA software updates.  True/URLs/VIL upload location (VIL Folder creation or default location) |
|  | LS\_OTAHMI\_Master\_Reset\_Status | Master Reset or No Master Reset |

### Function Modeling

N/A

### Function Requirements

#### Functional Requirements

##### REQ-395061/A-###R\_FNC\_Veh\_HMI\_USB\_SW \_001### System Detected USB with SYNC Utilities

If system detects the utility/logs USB device, then HMI shall show the prompts of the utility/logs request. If software update is in progress, then system shall not cancel the ongoing software update, however if it cannot continue it may pause it. Once the utility request is complete system shall resume software update and HMI shall display the software update prompts.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326788/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_002### USB Parser Detects Software Files On the USB Device

If software update is invalid and HMI received a set flag, then HMI shall prompt the user shall try again after re-downloading the latest software files from consumer website.

USB parser shall detect USB software update:

* If system detects valid manifest file, then HMI shall show transient message that system is updating.
* If system detects manifest file is with correct VIN but invalid, then HMI shall notify the user to redownload the files before trying for update.
* If system detects invalid manifest file (such as older and/or non-Ford or corrupted) software files on USB device, then HMI shall prompt the user shall download the latest files from consumer website before continuing.
* If system detects manifest file but device does not contain a manifest file for this vehicle, then HMI shall notify the user to redownload the files before trying the update.
* If system detects no manifest file but *FordSoftwareUpdates* folder, then HMI shall notify the user to redownload the files before trying for update.
* If software update is same as previously update, then HMI shall prompt the user “System is up to date and try later with latest files from consumer website

LS\_USBOTA\_System\_Updating

Values{

01 - Older\_Software

02 - Valid Manifest

03 - Redownload Files

04 - Sys\_to\_update\_date

}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326789/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_003### Software Update is in Progress and Lost USB Connection

During USB software update if update status LS\_USBOTA\_SW\_Update\_Status = Paused and USB device status is PARSERUSB\_Conn\_Status = USB\_Unplug, then HMI shall pause the update progress and prompt the user that to re-insert USB device to continue with software update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-329660/A-###R\_FNC\_Veh\_HMI\_USB\_SW \_004### Download Software Files Keep USB Plugged in until Update is Complete

When OTA Manager finds LS\_USBOTA\_System\_Updating = Valid Manifest && LS\_USBOTA\_SW\_Update\_Status = Updating, then HMI shall display “keep USB plugged in until software update is complete”.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-329661/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_005### Clear HMIs when Update When USB lost Connection during Download/ File Transfer

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305314/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_006### Master Reset During USB Update

If the USB software update is in progress and customer initiate Master reset, then HMI shall prompt the customer that software update is in progress, do you want to continue or cancel. If customer choose to continue, then software update shall pause and resume, and HMI shall NOT reset USB related HMIs.



**Flow 23: Master Reset during USB Update**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_107 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305306/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_007### Errors during USB Software Update

If any errors occur during USB software update LS\_USBOTA\_SW\_Update\_Status (updating, pending\_activation, and/or pause), then HMI shall display the failure reason with error code LS\_OTAM\_SW\_Update\_Fail\_Reason = Error Code.

LS\_USBOTA\_SW\_Update\_Status

Values{  
01 - Updating (Downloading/Installing/Resumed)  
02 - Failed  
03 - PENDING\_Activation,  
04 - SUCCESSFUL,  
05 - Paused  
}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_094 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### FUR-REQ-326791/A-###R\_FNC\_Veh\_HMI\_USB\_SW \_008### USB Software Files Are Corrupted

If any of the software file(s) are corrupted, then OTA Manager shall set flag LS\_OTAM\_SW\_Activation\_Fail\_Reason = SW CORRUPTED; and HMI shall prompt the customer to re-download the software files and retry.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326192/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_009### USB Software Activation Requires Schedule

If HMI update is required schedule, then HMI shall notify the user that USB update requires user input. If schedule is already set, then HMI shall the current schedule and allow the user to edit it.

- If customer choose schedule for later, then HMI shall show schedule options.

- If reoccurring schedule is set, then show the date/time and allow the user to change it.

- If one-time schedule is required then prompt the user to set one-time schedule.

If LS\_OTAM\_Activation\_TypeSW\_AB\_ER = AB, then software is A/B swap

If LS\_OTAM\_Activation\_TypeSW\_AB\_ER = ER, then software is erase and replace

If LS\_OTAM\_Activation\_TypeSW\_AB\_ER = AB and ER, then software update is coordinated with A/B swap and erase and replace.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305307/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_010### Software Activation requires an Ignition Cycle

If USB software update is ready for activation and requires ignition cycle LS\_OTAM\_Activation\_Type = IGNITIONCYCLE, then HMI shall prompt the user that update requires an ignition cycle or system restart.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_095 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305309/C-###R\_FNC\_Veh\_HMI\_USB\_SW 017### USB Software Activation with Vehicle Inhibit

##### Self-install ECU shall report the progress to OTA Manager and HMI shall receive software update progress from the OTA Manager LS\_OTAM\_Update\_Percentage\_OverallProgress = Overall

LS\_OTAM\_OTAUSB\_Number\_of\_Files = remaining out of total.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_097 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305310/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_012### USB Update for same ECU that is currently being updating through OTA and files are 100% DW

If USB update is for the same ECU that is currently being updated through OTA and software package is 100% downloaded and installation started, then HMI shall prompt the user that OTA update is in progress with following option:

(1) Wait until OTA update is complete OR

(2) Cancel the OTA update before continuing with USB update.

Note: If USB update is for different ECU then system shall pause the OTA update and complete the USB update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_098 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305311/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_013### USB Update Detected During Pending for Software Activation

If USB update is detected when previous software update is pending for activation, then HMI shall prompt the user that OTA update is pending for activation with following option:

(1) waiting for ignition cycle and allow the user to do ignition cycle OR

(2) waiting for schedule day and time and allow the user to change the schedule OR

(3) waiting for schedule and allow the user to set schedule OR

(4) Cancel the OTA update before continuing with USB update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_099 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-368887/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_014### Update is Not Successful Notification

If USB update activation is not successful, then HMI shall display USB update failed, please confirm the failure using the diagnostic tool.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### FUR-REQ-324904/B-###R\_FNC\_Veh\_HMI\_USB\_SW\_015### Software Download Failure

If software download failed, then HMI shall display message with details of the failure codes and next steps for the customer.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-304779/C-###R\_FNC\_Veh\_HMI\_USB\_SW\_016### Master Reset when USB update is in Process

If USB software is downloading or installing or pending activation and customer initiate a master reset, then HMI shall prompt the user that update is in progress, would you like to continue with master reset.

During master reset OTA system shall continue to update until completion, but if system cannot continue, then it shall pause the update during system restart and resume after the system restart is complete.

LS\_Master\_Reset\_Status = MasterReset

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_USB\_OTA\_00026 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305309/C-###R\_FNC\_Veh\_HMI\_USB\_SW 017### USB Software Activation with Vehicle Inhibit

##### Self-install ECU shall report the progress to OTA Manager and HMI shall receive software update progress from the OTA Manager LS\_OTAM\_Update\_Percentage\_OverallProgress = Overall

LS\_OTAM\_OTAUSB\_Number\_of\_Files = remaining out of total.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_097 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

#### Non-Functional Requirements

## Logical Function Check for Updates

### Function Description

HMI shall allow the customer to “Check for Updates” under Automatic software updates settings. Check for Updates button shall allow the customer to check for App updates and provide one time all level user consent to download the latest apps.

In order to use “Check for Updates” option vehicle requires on board modem and/or WiFi connection; if no connection is found prompt the user to connect to WiFi or make sure vehicle has network connection.

When user request for new software then OTA system shall response in timely manner. Check for software updates shall be limited to software delivery that can download and installed in reasonable time.

### Function Scope

Figure 12: Context Diagram of Function Check for Updates

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | CustomerChoice | This is the customer selection of the consent settings that will be shown in the screen |
|  |  |  |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | Check for updates | HMI button to request application updates |

### Function Modeling

N/A

### Function Requirements

#### Functional Requirements

##### REQ-326181/A-###R\_FNC\_Veh\_HMI\_CheckUpdates\_001### Direct Configuration Update

When customer request to change the direct configuration thru in vehicle HMI, then update shall not require consent. The customer request does not require any additional consent; this shall be treated as one-time consent.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305268/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_002### Application List Display

HMI shall display a list of all the active applications in the vehicle. The application name displayed shall the marketing name of that application.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_057 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305269/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_003### Check for Updates

HMI shall be configurable to Check for all applications at the same time or for each application independently.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_058 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305270/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_004### User Check for Updates during OTA software APP(s) Update is in Process

Vehicle is updating APP(s) thru OTA and customer “Check for Updates”, then prompt the customer that an OTA update is in progress and try again after sometime LS\_OTAM\_ECU\_App\_reside = APP\_ECU\_Updating.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_059 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305271/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_005### User Check for Updates during OTA software Update is in Process (non-APPs)

If OTA software update is in process (non-APPs) and customer "Check for Updates", then vehicle shall check for updates and provide the feedback to the customer with status LS\_OTAM\_ECU\_App\_reside = None

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_060 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305272/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_006### User Check for Updates during OTA software Update is in Process Where APPs Reign

If OTA software is updating APPs ECU and customer "Check for Updates", then HMI notify the customer that that an OTA update is in progress and try again after sometime once the current update is complete LS\_OTAM\_ECU\_App\_reside = APP\_ECU\_Updating.

For Example:

1. SYNC and ECG has apps
2. OTA software Updating SYNC and ECG

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_061 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305273/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_007### User Check for Updates during USB APP Update is in Process

If USB software update in is progress (downloading/installing/activating) and customer "Check for Updates”, then the HMI shall have a pop up to inform the customer that USB update is in progress LS\_USBOTA\_SW\_Update\_Status = updating retry after the USB update is complete.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_062 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305274/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_008### User Check for Updates during USB non-APP Update is in Process

If USB software update is paused LS\_USBOTA\_SW\_Update\_Status = pause and customer "Check for Updates”, then HMI shall have a popup to inform the customer that USB update is paused due to USB device is unplugged please re-plug LS\_ PARSERUSB\_Conn\_Status = USB\_unPlug the USB and retry after the USB update is complete.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_063 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305275/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_009### User Check for Updates during APPs OTA Activation is pending & ACT Schedule is NOT Set

If OTA software activation is pending LS\_USBOTA\_SW\_Update\_Status = pending for activation and an activation schedule is NOT set and customer “Check for Updates”, then the HMI shall notify the customer that software update is in process and waiting to set a schedule time to complete the software update and retry again after the software activation is complete.

* Prompt to set schedule a time to complete the update that is in process

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_064 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305276/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_010### User Check for Updates during non-APPs OTA Activation is pending & Act Sch is NOT

If OTA non-APP software activation is pending and an activation schedule is NOT set and customer “Check for Updates”, prompt the customer to set an activation schedule before continue with the request and then vehicle shall check for updates and provide the feedback to the customer with status.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_065 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305277/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_011### User Check for Updates during APPs OTA Activation is pending and Act Sch is Set

If APPs OTA software activation is pending at a set time and customer “Check for Updates”, then the HMI shall notify the customer that activation is already schedule at set time and you can retry again after the software is complete.

* Show the time and day for pending activation

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_066 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305278/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_012### User Check for Updates during non-APPs OTA Activation is pending & Act Sch is Set

If non-APPs OTA software activation is pending at a set time and customer “Check for Updates”, then vehicle shall check for updates and provide the feedback to the customer with status.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_067 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305279/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_013### Customer Check for Updates when NO APP is enabled

Check for update is only for APPs and requires the APP(s) to be enable before it can update. If customer “Check for Updates” and all APPs are disable, then HMI shall prompt the customer to enable APPs before checking for update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_068 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305280/B-###R\_FNC\_Veh\_HMI\_CheckUpdates\_014### Timestamp HMI for Check for OTA Software Updates

HMI shall have timestamp display for OTA software update, which have display the following: -

* When last software activation was complete for both OTA and USB updates.
* Customer check for updates and cloud response back with no updates OTA Manage shall send flag to HMI and HMI shall display this time.

The OTA Manager shall send a timestamp of software activation time or clouds response time with no updates to HMI.

Master Reset shall not affect update and/or change the timestamp display.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_069 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305281/C-###R\_FNC\_Veh\_HMI\_CheckUpdates\_015### Master Reset when User Check for Update & SW download started but Consent Default is OFF

When software update is in progress with one-time consent and customer indicate Master reset, then HMI shall prompt the customer that software Update will pause if you continue with the Master Reset. LS\_OTAM\_HMI\_Master\_Reset = Pause

If the “Check for Update” trigger activity is in the downloading files stage or after, then the OTA \_SM shall pause the update If the vehicle is in a region where IVSU default values of ASU is “OFF”.

And if no consent received after, the OTAM shall delete the files and the clear the HMI icon display when the trigger expires.

If the vehicle is in a region where IVSU default values of ASU is “ON” and the trigger does not require another consent (PII consent), thenMaster reset shall not affect “Check for Update” trigger activities (May pause during the master reset and resume after) and shall continue as dictated in the manifest. (Ref OTAM spec REQ-305522)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_070 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326182/A-###R\_FNC\_Veh\_HMI\_CheckUpdates\_016### Master Reset when User Check for Update when SW download has NOT started

When software update is in progress with one-time consent and customer indicate Master reset, then HMI shall prompt the customer that software update will cancel if you continue with the Master Reset. LS\_OTAM\_HMI\_Master\_Reset = Cancel

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326183/A-###R\_FNC\_Veh\_HMI\_CheckUpdates\_017### Master Reset when User Check for Update & SW download started but Consent Default is ON

Prompt the customer that software update is in progress continue or cancel but customer choose to continue, then update shall resume after the system restart is complete, HMI shall show the progress of the software update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

#### Non-Functional Requirements

##### F-REQ-305282/C-###R\_FNC\_Veh\_HMI\_CheckUpdates\_018### Progress after a user click Check for Updates

Progress of the search shall be display within 1-2 seconds after the customer has clicked on the Check for Update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_071 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

# HMI Functions

## HMI Function in Vehicle HMI

### Function Description

The function specification will cover in OTA related Vehicle HMI flows, default values.

### Function Requirements

#### Functional Requirements on HMI

##### REQ-326786/A-###R\_FNC\_Vehicle\_HMI\_001### Type of messaging ICON vs. Transient Message

HMI shall notify the customer with user required action for software update and these messages can be done thru ICON and/or transient messages.

This documents reference as an ICON but HMI shall make sure software update has highest priority in messaging other can use transient message instead.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-326787/A-###R\_FNC\_Vehicle\_HMI\_002### Hide unchangeable HMI options

In Vehicle HMI shall hide all the OTA related HMIs that are unchangeable.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305315/B-###R\_FNC\_Vehicle\_HMI\_003### Setting Layer Depth

The ASU Setting should be on the first layer of settings for easy access to the consumer.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_102 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### REQ-329380/A-###R\_FNC\_Vehicle\_HMI\_004### Extend Display

Software activation shall override the extended display when customer selects NOW options

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305207/B-###R\_FNC\_Vehicle\_HMI\_006### Automatic Software Updates Setting

The automatic software update setting should be on the first layer of settings for easy access to the consumer.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_103 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### F-REQ-305208/D-###R\_FNC\_Vehicle\_HMI\_007### Legal Consent

HMI shall have a cohesive flow with Vehicle Connectivity Setting and ASU so that the consumer does not get confused on what is providing consent for per region/country.



**Flow 24: Vehicle Connectivity and ASU Settings**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_104 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### Other Requirements

##### F-REQ-305318/C-###R\_FNC\_Vehicle\_HMI\_008### Privacy Mode

Privacy Mode shall disconnect all connection types (Wi-Fi, Modem etc.). If vehicle losses connection due to privacy mode and required software files are 100% downloaded, the software update shall continue until complete.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | | R\_FNC\_Vehicle\_HMI\_105 | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | | F - Functional | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### Function Scope

Figure 13: Overall In vehicle HMI

### Function Modeling

### OTA Software Update Requirements

### Function Requirements

**

**Figure 14: IVSU HMI**

#### Requirements on HMI Views

##### Automatic Updates for Software



**Flow 25: IVSU Prompts**

##### Notifications Subscription when User Consent = ON



**Flow 26: User Consent = ON**

##### Notifications Subscription when User Consent = OFF



**Flow: 27: User Consent = OFF**

##### Connection Preferred Network Settings



**Flow 28: Connection Settings**

##### Check Updates



**Flow 29: Check for Updates**

##### Software Version



**Flow 30: Software Version**

##### Set DATA Usage Limited



**Flow 31: Set Data Limit**

##### Update Schedule



**Flow 32: Set Schedule**

##### Manage Software Update Notification Options



**Flow 33: User Consent Prompts**

### Non-Functional Requirements

#### REQ-352126/A-###R\_FNC\_Vehicle\_HMI\_009### User Input Shall be Captured by Designed Buttons

HMI shall not dismiss the popup while user is touching the screen anywhere outside the borders of the popup. Popup shall capture the desired input from the user before dismissing the popup or allow the user to back out of the display.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

# Open Concerns

| ID | Concern Description | e-Tracker / Reference | Responsible | Status | Solution |
| --- | --- | --- | --- | --- | --- |
| 1 | Check for updates |  |  | Post Job1 |  |
| 2 | Preferred network |  |  | Post Job1 |  |
| 3 | Set Data limit |  |  | Post Job1 |  |
| 4 | PII Consent |  |  | Post Job1 |  |
| 5 | Update Now |  |  | Post Job1 |  |
| 6 | One-time Schedule |  |  | Post Job1 |  |
| 7 | REQ-305266/E |  | DCR SYNC-99175 |  |  |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |

Table 2: Open Concerns

# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Rev.  (revision) | Date | Description | Responsible |
| *1.0* | *3/15/18* | *Initial version* | *BGill51* |
| *1.9.9* | *8/31/18* | *Erase and Replace* | *BGill51* |
|  |  | *PHEV Battery charging during software activation* |  |
|  |  | *Added logical signals inputs and outputs from HMI* |  |
|  |  | *Type of messaging ICON vs. Transient Message* |  |
|  |  | *Extend Display* |  |
|  |  | *Software Activation Failed and HMI Notification* |  |
|  |  | *Master Reset – if type of consent is lost then HMI shall ask for same type of consent again* |  |
|  |  | *Added details how HMI logic shall make decisions* |  |
|  |  | *Clarification for eCall and Crash* |  |
|  |  | *HMI shall display date and time after activation is complete* |  |
|  |  | *Separate some of the requirements to clarify the signals* |  |
|  |  | *Add warning of key fobs and door unlock/lock won’t work during E/R* |  |
|  |  | *Reschedule prompt shall be clear when to display 24hrs or 7days* |  |
|  |  | *ASU can be enable/disable thru HMI* |  |
|  |  | *Vehicle connectivity settings are tried with ASU – OTA Manager, HMI, and CCS shall have interface* |  |
|  |  | *Inhibit types Programming Session vs software activation*  *Added flows to clarify* |  |
|  |  | *Triggers during update in progress* |  |
|  |  | *FMC owned vehicle – no HMIs needed schedule comes from the cloud* |  |
|  |  | *OTA manager can share with HMI and allow to change it* |  |
| *2.0* | *10/12/18* | *Updated section 8.1.1* | *BGILL51* |
|  |  | *LS\_ASUHMI\_ASU\_ScheduleTime*  *LS\_OTAM\_Update\_Time*  *LS\_OTAM\_HMI\_Master\_Reset*  *LS\_OTAM\_Activation\_Status*  *LS\_OTAM\_SW\_Exceeded\_Limit*  *LS\_OTAM\_SW\_Update\_Notify* |  |
|  |  | *Added Popup for Consent and Schedule reminder, additional to ICON*  *REQ-331790 One-Time Consent Reminder* |  |
| *2.1* | *12/03/18* | *Updated based on HMI team feedback: F-REQ-331790/B, F-REQ-305214/C, F-REQ-305216/C, REQ-326157/B, REQ-326784/B, REQ-331788/B, F-REQ-305225/C, REQ-329658/B, REQ-326171/B, F-REQ-305262/C, F-REQ-305264/B, REQ-326180/B, REQ-326576/B*  *Removed F-REQ-305260/B,*  *Added New Requirements FUR-REQ-336400/A & FUR-REQ-336401/A* |  |
| *3.0* | *3/12/19* | Updated the education display REQ-305248 |  |
|  | *3/19/19* | *Updated* REQ-*527060,* REQ-*305221*, REQ-305217, REQ-305218, REQ-305230, REQ-326157, REQ-346981, REQ-305222, REQ-305225, REQ-305224, REQ-347587, REQ-347387, REQ-347388, and  527295 Added three new signals  LS\_OTAM\_APP\_Update\_DOWN  LS\_OTAM\_APP\_UPDATE\_Timer  LS\_ASUHMI\_APP\_DOWN  *Added SVS REQ-*347783 |  |
| *3.1* | *4/9/2019* | Added a signal for unknown preconditions |  |
| *3.7* | *5/6/2019* | Show reminder button on Release notes display  Disable Recurring Schedule: clear the set date/time  Stolen Vehicle Service is Active  Stolen Vehicle Service is De-Active  APP Updates that Requires User Consent |  |
| *3.8* | *10/21/2019* | Added clarification Manage notifications, HMI shall not show any HMI when manage notification is disabled.  Added clarification if software update is in progress and customer disable ASU than software update behavior.  Removed the yellow highlights  Added clarification about system update progress bar |  |
| *3.9* | *03/26/2020* | Remove all requirement and signals for Nav app updates. OTA Nav updates do not require to Nav to be offline, USB updates will require Nav to be offline  Req-347587/B && Req-368888  LS\_ASUHMI\_APP\_DOWN  LS\_OTAM\_APP\_UPDATE\_Timer  LS\_OTAM\_APP\_Update\_DOWN |  |
| *4.0* | *7/20/20* | 527043/D-Ford Documents  527044/C-Abbreviations  527046/C-Overview  527047/C-Input Requirements  F-REQ-305324/D-###R\_FNC\_Veh\_HMI\_Input\_001### OTA Policy Table Check – Condition 1  F-REQ-305325/E-###R\_FNC\_Veh\_HMI\_Input\_002### Vehicle Connectivity Settings – Condition 2  F-REQ-305319/D-###R\_FNC\_Veh\_HMI\_Input\_003### Software Update Details – Condition 3  F-REQ-305320/C-###R\_FNC\_Veh\_HMI\_Input\_004### Vehicle Connectivity – Condition 4  F-REQ-305321/D-###R\_FNC\_Veh\_HMI\_Input\_005### USB Parser Shall Notify HMI with Errors - Condition 5  F-REQ-305322/D-###R\_FNC\_Veh\_HMI\_Input\_006### Software Delivery Methods - Condition 6  F-REQ-305323/C-###R\_FNC\_Veh\_HMI\_Input\_007### Software Update Prioritization - Condition 7  REQ-326585/B-###R\_FNC\_Veh\_HMI\_Input\_008### OTA Manager input to HMI - Condition 8  FUR-REQ-392408/A-###R\_FNC\_Veh\_HMI\_Input\_009### Software Update Details Description (Release Notes) File – Condition 9  REQ-394532/A-###R\_FNC\_Veh\_HMI\_Input\_010### Additional/PII Consent Text File - Condition 10  527056/C-Functional Architecture  527059/E-Logical Inputs  527060/F-Logical Outputs  701911/B-Logical Functions  527063/D-Function Description  527064/C-Function Scope  527068/C-Function Modeling  701914/D-Functional Requirements  F-REQ-305221/E-###R\_FNC\_Veh\_HMI\_Consent\_003### Vehicle Authorization State  REQ-326624/E-###R\_FNC\_Veh\_HMI\_Consent\_004### Interface Between HMI, OTA, and Vehicle Connectivity Settings  F-REQ-305287/D-###R\_FNC\_Veh\_HMI\_Consent\_005### OTA and Vehicle Connectivity Settings and Other Default Settings  F-REQ-305296/F-###R\_FNC\_Veh\_HMI\_Consent\_006### Automatic Software Update Regional or/and Countries User Consent – Vehicle Authorization State  F-REQ-305266/E-###R\_FNC\_Veh\_HMI\_Consent\_008### Master Reset when Software Update is NOT in Progress  REQ-347785/B-###R\_FNC\_Veh\_HMI\_Consent\_009### Master Reset when Software Update is in Progress and Default ASU Setting is disabled  F-REQ-305210/F-###R\_FNC\_Veh\_HMI\_Consent\_011### OVERRIDE – Vehicle Authorization State  REQ-331790/D-###R\_FNC\_Veh\_HMI\_Consent\_012### One-Time Consent  REQ-369545/B-###R\_FNC\_Veh\_HMI\_Consent\_017### Software Update is in process and User Change the ASU to OFF  REQ-380245/A-###R\_FNC\_Veh\_HMI\_Consent\_018### Prompt the User for Consent  REQ-380372/A-###R\_FNC\_Veh\_HMI\_Consent\_019### Remote Consent Changes  REQ-387747/A-###R\_FNC\_Veh\_HMI\_Consent\_020### Fleet Vehicles User Consent  REQ-392413/A-###R\_FNC\_Veh\_HMI\_Consent\_020### When ASU = OFF and additional consent is required  REQ-392414/A-###R\_FNC\_Veh\_HMI\_Consent\_021### ICON enter to System updates when vehicle Connectivity to enable  527085/D-Function Description  527086/C-Function Scope  527090/B-Function Modeling  527092/F-Functional Requirements  F-REQ-305215/D-###R\_FNC\_Veh\_HMI\_Sch\_003### Set a Recurring Schedule to Complete New Software Update  F-REQ-305217/F-###R\_FNC\_Veh\_HMI\_Sch\_005### Master Reset Clears Schedule Selection  F-REQ-305230/E-###R\_FNC\_Veh\_HMI\_Sch\_008### Software Update Schedule Time & Reminder  F-REQ-305219/D-###R\_FNC\_Veh\_HMI\_Sch\_009### Schedule Time Reached While Ignition RUN/START and Vehicle is in Park  REQ-326157/F-###R\_FNC\_Veh\_HMI\_Sch\_011###Precondition are not Met and Requires User Action  REQ-347386/B-###R\_FNC\_Veh\_HMI\_Sch\_015### HMI allow the user to select and save the time before setting it to OTAM  REQ-369646/B-###R\_FNC\_Veh\_HMI\_Sch\_019### Allow the User to Clear then Schedule and Get Feedback  REQ-380373/A-###R\_FNC\_Veh\_HMI\_Sch\_020### Remote Schedule Changes  REQ-387746/A-###R\_FNC\_Veh\_HMI\_Sch\_021### Schedule and Update Reminders for Fleet Vehicles  F-REQ-305203/D-###R\_FNC\_Veh\_HMI\_Sch\_025### Master Reset shall Reset Schedule Values  REQ-346761/B-###R\_FNC\_Veh\_HMI\_Sch\_024### Count Down Timer when SYNC Display of Off  527105/B-Function Description  527106/B-Function Scope  527110/B-Function Modeling  527112/H-Functional Requirements  F-REQ-305222/E-###R\_FNC\_Veh\_HMI\_Notif\_001### Additional User Consent Notification  REQ-326784/C-###R\_FNC\_Veh\_HMI\_Notif\_002### Vehicle in Private Mode  REQ-331788/D-###R\_FNC\_Veh\_HMI\_Notif\_003### Wi-Fi Connection Reminder  F-REQ-305232/D-###R\_FNC\_Veh\_HMI\_Notif\_011### Master Reset when Software is in Progress with Base level or One-time Consent & Default Consent ON  F-REQ-305234/E-###R\_FNC\_Veh\_HMI\_Notif\_012### Master Reset & SW is in Progress with Additional and/or PII Consent and Default Consent ON  F-REQ-305240/C-###R\_FNC\_Veh\_HMI\_Notif\_013### Master Reset when SW update is pending for activation with Additional and/or PII Consent  F-REQ-305236/E-###R\_FNC\_Veh\_HMI\_Notif\_014### Master Reset when SW update is in process & ASU default OFF without Additional/PII Consent  REQ-329375/B-###R\_FNC\_Veh\_HMI\_Notif\_016### HMI Display during Silent OTA Software Updates  REQ-326180/D-###R\_FNC\_Veh\_HMI\_Notif\_020### In Vehicle Clock Time Format  F-REQ-305250/C-###R\_FNC\_Veh\_HMI\_Notif\_023### ONE TIME Consent  F-REQ-305252/C-###R\_FNC\_Veh\_HMI\_Notif\_024### Software Update Activation is Successful with latest Software  F-REQ-305264/D-###R\_FNC\_Veh\_HMI\_Notif\_034### Reset of Wi-Fi Setings  REQ-348141/C-###R\_FNC\_Veh\_HMI\_Notif\_037## Double Lock During Software Activation  REQ-380376/A-###R\_FNC\_Veh\_HMI\_Notif\_041### Master Reset During Software Update  REQ-369536/B-###R\_FNC\_Veh\_HMI\_Notif\_048### Wi-Fi Connection is Required for OTA Updates  REQ-387745/A-###R\_FNC\_Veh\_HMI\_Notif\_050### Update is Canceled  REQ-392411/A-###R\_FNC\_Veh\_HMI\_Notif\_051### HMI ICON and Behavior  REQ-392412/A-###R\_FNC\_Veh\_HMI\_Notif\_052### HMI ICON Priority  REQ-395173/A-###R\_FNC\_Veh\_HMI\_Notif\_35### HMI shall clear the notification after user input is received  527142/D-Non-Functional Requirements  527171/B-Function Description  527172/C-Function Scope  527175/C-Logical Outputs  527176/C-Function Modeling  527178/G-Functional Requirements  F-REQ-305283/D-###R\_FNC\_Veh\_HMI\_SW\_Details\_001### Software Update Details Settings  FUR-REQ-392409/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_002### Download the Update Details Text before Notify the User for Action  REQ-394121/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_003### System is Unsuccessful to Download the Additional/PII Consent File  F-REQ-305285/C-###R\_FNC\_Veh\_HMI\_SW\_Details\_004### Software Update Pending and Schedule is Not Set  REQ-393740/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_005### System is Unsuccessful to Download the Release Notes file after Max Reties  REQ-394235/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_007### Software Update is available and requires Wi-Fi Connection  REQ-394243/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_006### Software Update Expired Because it Required Wi-Fi Connection and Connection was not Made  REQ-394961/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_028### Software Update is available and requires Wi-Fi Connection, Vehicle is Connected to Wi-Fi  REQ-394825/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_008### Software Update is Available and Required Wi-Fi And User Consent (one-time/Additional/PII)  REQ-394329/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_009### Software Update is Downloading  REQ-394963/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_027### Software Download Pause Due to System Condition is not Met  REQ-348831/D-###R\_FNC\_Veh\_HMI\_SW\_Details\_010### Software Update is Pending but Waiting for Schedule Time Shall Show on Update Details Display  REQ-394330/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_011### Software Update is Preparing to Install  REQ-394242/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_012### Update Expired Because Consent Was not Provided  REQ-394234/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_013### Software Update is Available but Requires Consent  REQ-394814/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_014### Software Update is Pending and Does not requires schedule  REQ-394237/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_015### Update is Not Successful because Software Download Failed  REQ-394239/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_016### Update is Not Successful because update was canceled due to collision  REQ-394240/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_017### Software Update is Not Successful because software update was canceled by Ford Motor Company  REQ-394241/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_018### Update Expired Because Schedule was Required and Not Set  REQ-394238/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_019### Update Failed while is Progress and User was Not notified  F-REQ-305284/E-###R\_FNC\_Veh\_HMI\_SW\_Details\_021### Software Update is Successful Update  REQ-394336/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_022### Software Update Details After Update is Unsuccessful Ford will Re-Push the Update  FUR-REQ-392410/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_023### Software Update Details after Update is Unsuccessful and Vehicle Requires Service  REQ-395060/A-###R\_FNC\_Veh\_HMI\_SW\_Details\_029### Vehicle is Up-to-Date  REQ-326576/C-###R\_FNC\_Veh\_HMI\_SW\_Details\_024### Software Update Date and Time  F-REQ-305205/D-###R\_FNC\_Veh\_HMI\_SW\_Details\_025### No Blank Display for Software Details  F-REQ-305288/D-###R\_FNC\_Veh\_HMI\_SW\_Details\_026### Software Update Details Display Time Out  527189/B-Function Scope  527195/D-Functional Requirements  F-REQ-305294/C-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_006### Progress Bar during USB update  REQ-368885/B-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_010### Progress Bar During OTA Updates  REQ-395035/A-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_014### Is User was Notify for Software Download over Wi-Fi HMI shall show Progress Bar with Percentage  F-REQ-305206/C-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_012### Reset while in update in progress is displayed  F-REQ-305297/C-###R\_FNC\_Veh\_HMI\_Prog\_Bar\_013### Progress Bar Details  527209/B-Function Scope  527212/C-Logical Outputs  527215/C-Functional Requirements  F-REQ-305298/C-###R\_FNC\_Veh\_HMI\_SW\_Failure\_001### Software Activation is Not Successful and FMC will re-push the Update as it becomes available  F-REQ-305299/D-###R\_FNC\_Veh\_HMI\_SW\_Failure\_002### Software Activation is Not Successful and Vehicle Requires Service  REQ-330195/B-###R\_FNC\_Veh\_HMI\_SW\_Failure\_003### Update is Not Successful after it Notify the Customer that New Update is Available  REQ-393676/A-###R\_FNC\_Veh\_HMI\_SW\_Failure\_007### Software Activation is Not Successful and Vehicle in not Drivable  527219/B-Non-Functional Requirements  REQ-380375/A-###R\_FNC\_Veh\_HMI\_SW\_Failure\_006### Clear the Failure ICON  527239/C-Function Scope  527245/E-Functional Requirements  REQ-395061/A-###R\_FNC\_Veh\_HMI\_USB\_SW \_001### System Detected USB with SYNC Utilities  REQ-326788/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_002### USB Parser Detects Software Files On the USB Device  REQ-326789/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_003### Software Update is in Progress and Lost USB Connection  REQ-329661/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_005### Clear HMIs when Update When USB lost Connection during Download/ File Transfer  F-REQ-305314/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_006### Master Reset During USB Update  F-REQ-305306/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_007### Errors during USB Software Update  REQ-326192/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_009### USB Software Activation Requires Schedule  F-REQ-305307/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_010### Software Activation requires an Ignition Cycle  F-REQ-305309/C-###R\_FNC\_Veh\_HMI\_USB\_SW 017### USB Software Activation with Vehicle Inhibit  F-REQ-305310/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_012### USB Update for same ECU that is currently being updating through OTA and files are 100% DW  F-REQ-305311/C-###R\_FNC\_Veh\_HMI\_USB\_SW \_013### USB Update Detected During Pending for Software Activation  REQ-368887/B-###R\_FNC\_Veh\_HMI\_USB\_SW \_014### Update is Not Successful Notification  FUR-REQ-324904/B-###R\_FNC\_Veh\_HMI\_USB\_SW\_015### Software Download Failure  F-REQ-304779/C-###R\_FNC\_Veh\_HMI\_USB\_SW\_016### Master Reset when USB update is in Process  F-REQ-305309/C-###R\_FNC\_Veh\_HMI\_USB\_SW 017### USB Software Activation with Vehicle Inhibit  527146/B-Function Scope  527261/C-Functional Requirements on HMI  F-REQ-305208/D-###R\_FNC\_Vehicle\_HMI\_007### Legal Consent  527268/B-Function Scope  527271/C-Function Requirements  527273/C-Automatic Updates for Software  527274/C-Notifications Subscription when User Consent = ON  527275/C-Notifications Subscription when User Consent = OFF  527276/C-Connection Preferred Network Settings  527277/C-Check Updates  527278/C-Software Version  527281/C-Set DATA Usage Limited  527282/C-Update Schedule  527288/C- Manage Software Update Notification Options  527289/E-Open Concerns  527291/H-Revision History  527295/H-Logical Signals | *Bgill51* |

# Appendix

## Data Dictionary

### Logical Signals

| **fLogical Signal Name** | **Value** | **OUTPUT** | **Description** |
| --- | --- | --- | --- |
| LS\_OTAM\_Update\_Percentage\_Progress\_APP\_x | Value {percentage} | OTA | Check for Update progress |
| LS\_ASUHMI\_ASU\_ReoccuringSchedule | Value{ 01 - FALSE; 02 - TRUE} | HMI | Input to OTA Manager |
| LS\_ASUHMI\_ASU\_CheckUpdate | Value{ 01 - True  02 - False } | HMI | One time consent |
| LS\_OTAM\_TriggerExpiration\_Time | Values{ 01 - Not\_expired 02 - Expire } | OTA | Software update expired clear all HMIs |
| LS\_OTAM\_UpdateReminder\_Time | Values{ date/time } | OTA | SW Activation Reminder and timer from the manifest  Input from user or cloud |
| LS\_OTAM\_UpdateExpiration\_Time | Value { date/time } | OTA | Max time shown in the schedule screen, if expire time is 3days from now then HMI shall only show 3days to activation the software because 4th day SW is not available. |
| LS\_ASUHMI\_Manage\_Notification | Value{TRUE, FALSE} | HMI |  |
| LS\_ASUHMI\_ASU\_FeatureStatus | Values{ 01 - Enable 02 - Disable } | HMI/OTA | HMI Automatic software updates enable or disable OTA After Master reset or OTA default values change |
| LS\_ASUHMI\_ASU\_Consent | Value{TRUE, FALSE} | HMI | Vehicle Connectivity settings True or False |
| LS\_OTAM\_SW\_Update\_Postpone | Value{TRUE, FALSE} | OTA |  |
| LS\_OTAM\_SW\_Update\_Notify | Value {  01 - PII\_UPDATE; 02 – Additional  03 – One-Time } | OTA | HMI to display for consent |
| LS\_OTAM\_ECU\_App\_reside | Value {  01 - APP\_ECU\_Updating } | OTA | Customer check for update when App ECU is updating then HMI shall prompt the customer try later |
| LS\_ASUHMI\_ASU\_Additional\_Consent | Value{ 00 - Additional; 01 - ONE\_TIME; 02 - PII\_UPDATE; } | HMI | OTA: One time skip additional but may need PII |
| LS\_ASUHMI\_ASU\_ScheduleTime | Values{  00 – Null  01 – Bytes - date/time } | HMI | Signal identify scheduled time/day for activation. Comes from the user |
| LS\_OTAM\_Update\_Time | Values{  00 – None  01 – Bytes - date/time  } | OTA | OTA manager Last SW update time and date. Update HMI after every activation |
| LS\_OTAHMI\_Master\_Reset\_Status | Value{ 00 - NONE 01 - MasterReset  02 - NoMasterReset } | HMI | HMI shall notify OTA Manager for Master Reset |
| LS\_ PARSERUSB\_Conn\_Status | Values{ 01 - USB\_Plug 02 - USB\_unPlug (download) } | HMI | USB device status |
| LS\_PARSER\_USBSW\_Update\_Detected | Values{ 01 - False 02 - True } | HMI | True: Processing Update…transient message |
| LS\_PARSER\_USBSW\_Update\_URL | Values { URLs/VIL Folder Location } | HMI | if LS\_PARSER\_USBSW\_Update\_Detected = true, then  Set IVSU trigger with content |
| LS\_USBOTA\_System\_Updating | Values{ 01 - Older\_Software 02 - Valid Manifest 03 - Redownload Files 04 - Sys\_to\_update\_date } | OTA | Determine if USB device is with valid software |
| LS\_USBOTA\_SW\_Update\_Status | Values{ 01 - Updating (Downloading/Installing/Resumed) 02 - Failed 03 - PENDING\_Activation, 04 - SUCCESSFUL, 05 - Paused } | OTA | If updating (download/install) failed then use "Failed" for USB Software update Status |
| LS\_ASUHMI\_Activation\_Consent | Value{ 00 - UNDEFINED 01 - NOW;  02 - DATETIME; } | HMI | One time schedule and NOW |
| LS\_OTAM\_Update\_Percentage\_OverallProgress | Value {percentage} | OTA | OTA/USB overall progress bar |
| LS\_OTAM\_OTAUSB\_Number\_of\_Files | Value { 01 - file remaining 02 - total files } | OTA | Total number of files in the manifest |
| LS\_OTAM\_Activation\_Schedule\_Type | Value { 01 - WEEKLY; 02 - DAY; } | HMI | Schedule weekly or daily share with OTA Manager |
| LS\_OTAM\_SW\_Activation\_Fail\_Reason | Values{ 00\_ NONE 01 - SW CORRUPTED; 02 - PERMANENT\_INHIBIT; 03 - USB\_FAILURE; 04 - WARNING; 05 - PARTIAL } | OTA | IF USB software activation failed then Use "USB\_Failure" |
| LS\_OTAM\_SW\_Update\_Fail\_Reason | {ErrorCode; } | OTA | USB Software update failed reason |
| LS\_OTAM\_Release\_Notes\_Info | Value {text} | OTA | Release Notes |
| LS\_OTAM\_Activation\_TypeSW\_AB\_ER | Value{  01- AB 02- ER 03 - AB and ER } | OTA | OTA Manage sharing type of software update |
| LS\_OTAM\_Activation\_Type | Value{  01- NOIGNITIONCYCLE 02- IGNITIONCYCLE 03- INHIBIT } | OTA | Activation Type |
| LS\_OTAM\_Vehicle\_Inhibit\_Type | Value{  00 - NONE 01 - ProgrammingSession 02 - ActivatingNOW } | OTA | Vehicle in Programming Mode or activating the software HMI Logic shall make decision if LS\_OTAM\_Activation\_TypeSW\_AB\_ER = AB-ER  then show LS\_OTAM\_Vehicle\_Inhibit\_Type = ProgrammingSession   if LS\_OTAM\_Activation\_TypeSW\_AB\_ER = AB  then show LS\_OTAM\_Vehicle\_Inhibit\_Type = ActivatingNow   if LS\_OTAM\_Activation\_TypeSW\_AB\_ER = ER  then show LS\_OTAM\_Vehicle\_Inhibit\_Type = ProgrammingSession |
| LS\_OTAM\_Activation\_Time | Domain: 2 bytes (In seconds). | OTA | Activation for both E/R and/or AB Time range (2min to Xmins) |
| LS\_OTAM\_HMI\_OTAUSB\_Clear | Values{ 01 - Pending 02 - ConfigtimeExpire 03 - ClearHMIs } | OTA | USB update is paused and OTA Manager shall clear cache after 7days |
| LS\_OTAM\_SW\_Installation\_State | Values{ 01 - IN\_PROGRESS 02 - PENDING, 03 - FAILED, 04 - PAUSED, 05 - SUCCESSFUL } | OTA | Software installation in progress |
| LS\_OTAM\_SW\_Download\_State | Values{ 01 - IN\_PROGRESS, 02 - PENDING, 03 - PAUSED, 04 - FAILED, 05 - SUCCESSFUL } | OTA | Software download in progress |
| LS\_OTAM\_SW\_Update\_State | Values{ 00 - Clear\_HMI 01 - IN\_PROGRESS 02 - Pending, 03 - FAILED, 04 - SUCCESSFUL; 05 - UP\_TO\_DATE; } | OTA | OTA Software update Status |
| LS\_OTAM\_No\_ProgSession\_Preconditions\_Supported | $D04F (Ref GMRDB for DID bit mapping) | OTA | If software activation is postponed then set a flag for HMI and next action |
| LS\_OTAM\_HMI\_Master\_Reset | Values{ 01 - Cancel  02 - Pending, 03 - Pause, } |  | 1. ASU = OFF Cancel the pre-download for only one-time  2. ASU = ON Pending for consent, with additional consent  3. ASU = ON Pause during master reset and resume after it’s complete without additional consent |
| LS\_OTAM\_Activation\_Status | Values{ 01 - Expired  02 - Pending, 03 - Pause, } | OTA | Software Activation status |
| LS\_SVS\_OTAM\_Active | Value{  00 - True  01 - False} | OTA | Stolen vehicle service |
| LS\_OTAM\_ConenctionType\_WiFi | Value{  00 - True  01 - False} | OTA |  |
| LS\_OTAM\_HMI\_User\_Press\_Cancel | Value{  00 - True  01 - False} | HMI | User pressed cancel update |
| LS\_OTA\_Fleet\_Status | Value {  00- None  01- Ford Fleet  02- Commercial Fleet  03- Not Fleet} | OTA | Fleet owned vehicle, HMI shall not allow the user to edit the ASU and schedule settings. |
| LS\_OTAM\_HMI\_Remote\_Consent | Value{  00 -  ASU Setting On/OFF  01 – One-time Consent  02 – Additional Consent  03 – PII Consent  } | OTA | OTAM shall set this flag when it receives remote consent changes and notify HMI. |
| LS\_OTAM\_HMI\_Remote\_Notification | Value{  00 – Default  01 – Notification On/Off} | OTA | OTAM shall set this flag when it receives remote notification settings change and notify HMI. |
| LS\_OTAM\_HMI\_Schedule\_Changes | Value{  00 – Clear the schedule  01 – Update day/time  } | OTA | OTAM shall set this flag when it receives remote schedule and notify HMI. |
| LS\_OTAM\_HMI\_ClearHMIsPrompts | Value  {  00 – Service tool  01 – OTA cancel trigger  02 – Clear failures ICONs by service tool } | OTA | Update is cancelled |
| LS\_OTAM\_ConenctionType\_WiFi | Value{  00 - True  01 - False} | OTA |  |
| LS\_OTAM\_SW\_Download\_Pause\_Reason | Values{ 01 – USB Update, 02 – Master Reset, 03 - eCall, 04 – Loadshed, 05 – no connectivity  06 – unknown,  07 – none } | OTA | If LS\_OTAM\_SW\_Download\_State = pause, OTAM shall send pause reason |
| LS\_OTAM\_download\_progress\_percentage | Value {percentage} | OTA | Software is downloading over Wi-Fi |

### Vehicle Connectivity Settings Data Reference

CCS Entity MMOTA – Entity ID 33, Type 1

CCS Entity VehicleConnectivity  – Entity ID 1, Type 0

CCS Entity LocationSharing – Entity ID 4, Type 0

CCS Entity EmbeddedWifiConnectivity – Entity ID 23, Type 0

CCS Entity CellularConnectivity – Entity ID 24, Type 0