Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – In Vehicle Software Update (IVSU)

APIM Infotainment Subsystem Part Specific Specification (SPSS)

Version 2.8

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Version Date: May 30, 2019

FORD CONFIDENTIAL

Revision History

Date	Version	Notes	
May 30, 2013	**1.0**	**Initial Release**	
October 17, 2013	**1.1**	**New Use Case**	
	IVSU-GUC-303232-1-SYNC checks for update availability from FMCSS via Bluetooth		<bjohns69> Added new Use Case
March 13, 2014	**1.2**		
	General		<Bcaushi> Added use cases for HMI and power mode
	IVSU-FUR-REQ-051999/A-IVSU System Flow		<bjohns69> Added new requirement
	IVSU-FUR-REQ-052001/A-Display progress for download or install of software by WiFi		<bjohns69> Added new requirement
	IVSU-FUR-REQ-052002/A-Display progress for download or install of software by USB		<bjohns69> Added new requirement
	IVSU-FUR-REQ-052003/A-Notify customer of newly activated software		<bjohns69> Added new requirement
	IVSU-FUR-REQ-052004/A-HMI screen for automatic updates settings		<bjohns69> Added new requirement
	IVSU-FUR-REQ-052005/A-Automatic updates not active in Factory or Transport Mode		<bjohns69> Added new requirement
	IVSU-UC-REQ-051434/A-SYNC checks for battery state of charge		<bjohns69> Modify Use Case
	IVSU-UC-REQ-051471/A-SYNC module shall be stop trying to copy and Install after XX VHM Cycles		<bjohns69> Modify Use Case
	IVSU-REQ-018292/B-Software update process(TcSE ROIN-296071-1)		<bjohns69> Modify Requirement
	IVSU-REQ-018293/B-SYNC updateable areas(TcSE ROIN-296072-1)		<bjohns69> Modify Requirement
	IVSU-REQ-018294/B-SYNC binary download(TcSE ROIN-296073-1)		<bjohns69> Modify Requirement
	IVSU-FUR-REQ-051454/A-Turning WiFi ON automatically when Automatic install is selected ON		<bjohns69> Modify Requirement
	IVSU-FUR-REQ-051455/A-Battery State for automatic installation		<bjohns69> Modify Requirement
	IVSU-FUR-REQ-051457/A-Access Points for automatic installation		<bjohns69> Modify Requirement
	IVSU-FUR-REQ-051463/A-Limitation of Retries During Ignition OFF		<bjohns69> Modify Requirement
	IVSU-FUR-REQ-051464/A-Prompting the customer for WiFi setup when Automatic Updates is ON		<bjohns69> Added new requirement
	IVSU-FUN-REQ-018302/A-WiFi Provisional Plant Mode Software Update WiFi(TcSE ROIN-294122-1)		<bjohns69> Remove Function, replaced with S36 Software Provisioning Specification
January 28, 2015	**1.3**		
	IVSU-UC-REQ-129010/A-HMI displays information about the software update		<Brunilda Caushi> New IVSU Use Case
	IVSU-FUR-REQ-129011/A-EULA HMI		<Brunilda Caushi> New EULA HMI requirement
	IVSU-FUR-REQ-129015/A-Software Update Description in HMI		<Brunilda Caushi> New Software Update Description in HMI requirement
	IVSU-FUR-REQ-129016/A-Error States		<Brunilda Caushi> New Requirement
	IVSU-FUR-REQ-129017/A-Customer Requesting IVSU update		<Brunilda Caushi> New Requirement
	IVSU-UC-REQ-051449/B-Initial Opt-In for Auto-Updates EULA & Terms and Conditions (HMI)		changed from key cycles to trigger cycles

March 5, 2015	**1.4**	
	IVSU-FUR-REQ-129016/B-Error States	bcaushi: Deleted the words that DIL needed to wait for network connection
	IVSU-FUR-REQ-129017/B-Customer Requesting IVSU update	bcaushi: Updated with edge case scenario on when to clear the update and generate a new DIL
March 13, 2015	**1.5**	**Updated two use cases**
	IVSU-UC-REQ-051435/B-IVSU feature votes to keep the module in the VHM state	bcaushi: Deleted reference to AppLink and inserted more description in the scenario
	IVSU-UC-REQ-051471/B-SYNC module shall be stop trying to copy and Install after XX VHM Cycles	bcaushi: Deleted reference to AppLink
May 27, 2015	**1.6**	**Added Functional Requirements**
	FUR-REQ-153563/A-HMI Progress Bar during Install of software downloaded through WiFi or Applink	bcaushi: progress bar detail for installation
	FUR-REQ-153564/A-IVSU Core to Applink SDL Interface Requirements	bcaushi: information for applink interface
	FUR-REQ-156062/A-WiFi Connection Interface Requirements	bcaushi: new flag handshake with WiFi requirements
	FUR-REQ-156063/A-Navigation Update Requirements	bcaushi: added new requirement for nav update
	STR-060531/C-Appendix: Reference Documents (TcSE ROIN-294370)	bcaushi: Added reference "Policies and IVSU Interfaces Specification"
August 24, 2015	**1.7**	
	IVSU-REQ-018290/B-Part number interrogation and response performance (TcSE ROIN-296069-1)	<bgill51 / bcaushi> Revised related to ODL List information minimum DID's and OID requests requirement for DID's
	IVSU-FUR-REQ-051455/B-Battery State for automatic installation	<bgill51 / bcaushi> Updated requirement for downloading or installing during ignition OFF
	IVSU-FUR-REQ-052001/B-Display progress for download or install of software by WiFi	<bgill51 / bcaushi> Updated requirement to clarify to download AND install.
	FUR-REQ-153562/A-HMI Progress Bar during WiFi or Applink	<bgill51 / bcaushi> added clarification for the progress bar text
	FUR-REQ-153563/A-HMI Progress Bar during Install of software downloaded through WiFi or Applink	<bgill51 / bcaushi> added clarification for the progress bar text
December 22, 2015	**1.8**	
	IVSU-FUR-REQ-051464/B-Prompting the customer for WiFi setup	Added requirement that the flag should be shared with HMI so the correct screen is displayed
	FUR-REQ-156062/B-Trigger Requirements	changed title and added truth table based on current requirements to make it more clear.
	IVSU-FUR-REQ-051465/A-Scheduler requirements	added requirement for the scheduler to avoid potential conflicts with WiFi
	IVSU-FUR-REQ-051466/A-WiFi Interface Requirement	pulled this requirement out of another one to make it more clear and stand out
February 10, 2016	**1.9**	
	IVSU-FUR-REQ-207786/A-IVSU Hardware Requirements	bgill51: Added new hardware requirements
	IVSU-UC-REQ-051453/B-SYNC module is notified of a crash	bgill51: Updated Scenario Description.
	IVSU-FUR-REQ-051464/B-Prompting the customer for WiFi setup	Added requirement that the flag should be shared with HMI so the correct screen is displayed
	IVSU-FUR-REQ-153562/B-HMI Progress Bar during WiFi or Applink Download	MBORREL4: Updated FID
	IVSU-FUR-REQ-153563/B-HMI Progress Bar during Install of software downloaded through WiFi or Applink	MBORREL4: Updated FID

	IVSU-FUR-REQ-156062/B-Trigger Requirements	bgill51: changed title and added truth table based on current requirements to make it more clear.
	IVSU-FUR-REQ-051465/A-Scheduler requirements	added requirement for the scheduler to avoid potential conflicts with WiFi
	IVSU-FUR-REQ-051466/A-WiFi Interface Requirement	bgill51: pulled this requirement out of another one to make it more clear and stand out
	IVSU-FUR-REQ-207782/A-Delete Software Part Utility Process	bgill51: new requirements for deleting file to update the system (OTA/USB)
	IVSU-FUR-REQ-207785/A-Delete Software Part Utility Key Cycle request for USB	bgill51: new requirements for deleting file to update the system (OTA/USB)
April 12, 2016	**2.0**	
	IVSU-FUR-REQ-051999/B-IVSU System Flow	bgill51: Updated requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-UC-REQ-213400/A-Delete Gracenotes Utility	bgill51: Add use case to delete gracenotes
	IVSU-FUR-REQ-156063/B-Navigation Update Requirements	bgill51: Updated requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-FUR-REQ-051466/B-WiFi Interface Requirement	bgill51: Updated requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-FUR-REQ-213406/A-CAN signals to support OTA Navigation Updates	bgill51: Added requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-FUR-REQ-213407/A-OTA Navigation Updates configuration	bgill51: Added requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-FUR-REQ-213408/A-OTA Navigation Updates Interrogator File	bgill51: Added requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-FUR-REQ-213409/A-OTA Navigation Updatable Files	bgill51: Added requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-FUR-REQ-213410/A-Update prioritization	bgill51: Added requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-FUR-REQ-213411/A-OTA Navigation Trigger	bgill51: Added requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-FUR-REQ-213412/A-OTA Navigation Update	bgill51: Added requirements to update the navigation map and voice files thru Modem OTA process
August 9, 2016	**2.1**	
	STR-393016/A-Architectural Design	fmunaser: New IVSU Interface for OTA Trigger signal interface between TCU (Server) and APIM (Client)
	MD-REQ-232360/A-OTA_UpdateTrgResp	fmunaser: New method to capture trigger signal response by client
	MD-REQ-232361/A-OTA_Trigger_Cmd	fmunaser: New method to capture trigger signal received by client
	IVSU-FUR-REQ-051999/G-IVSU System Flow	<bgill51> Added new state for OTA Map update
	STR-060524/E-Use Cases (TcSE ROIN-294128)	<bgill51> Removed duplicate use cases (UC-REQ-018316 and UC-REQ-018322) <bgill51> Removed use case "UC-REQ-231952" (duplicate of 227866) <bgill51> Removed use case "UC-REQ-231953" (duplicate of 227867) <bgill51> Removed use case "UC-REQ-231954" (duplicate of 227868) <bgill51> Removed use case "UC-REQ-231955" (duplicate of 227869)
	IVSU-UC-REQ-051468/D-SYNC module switches between WiFi and Applink	bgill51: Applink related Clarification no new requirements. This is just clarifications to avoid issues in implementation
	IVSU-UC-REQ-226587/B-Server ID/Module ID racing scenario in Applink+	Applink related Clarification no new requirements This is just clarifications to avoid issues in implementation
	IVSU-UC-REQ-226588/B-Replay Attack in Applink	Applink related Clarification no new requirements This is just clarifications to avoid issues in implementation
	IVSU-UC-REQ-227865/A-Master Reset during NAV download in progress	<bgill51> New use case for master reset
	IVSU-UC-REQ-231970/A-SYNC module switches between WiFi and Applink	<bgill51> Clarification for AppLink
	IVSU-UC-REQ-231960/A-Navigation License	<bgill51>Navigation License must have Nav Voice and Map part numbers

	IVSU-UC-REQ-231959/A-Download of Nav Voice File Complete	<bgill51>Nav Voice and shall be updated and clear cache
	IVSU-UC-REQ-231958/A-Download of Nav Map File Complete	<bgill51> IVSU Manager shall move files to Telenav and Telenav install new update
	IVSU-UC-REQ-231957/A-The SYNC module is Non-Navigation Hardware module	<bgill51> The Non-Navigation module Shall not contain any Nav files
	IVSU-UC-REQ-231956/A-Manifest Parse	<bgill51> Verify transaction in the manifest
	IVSU-UC-REQ-231951/A-SYNC module is notified of a crash during Navigation update+	<bgill51> Added new use case for SYNC module is notified of a crash during Navigation update
	IVSU-UC-REQ-231950/A-SYNC module is notified of a crash during update when Gracenotes files are Deleted+	<bgill51> Added new use case for SYNC module is notified of a crash during update when Gracenotes files are Deleted
	IVSU-UC-REQ-231949/A-Master Reset during Navigation Update in progress	<bgill51> Added new use case for Master Reset during Navigation Update in progress
	IVSU-UC-REQ-231948/A-Master Reset during Update in progress (Gracenotes are deleted)	<bgill51> Added new use case for Master Reset during Update in progress (Gracenotes are deleted)
	IVSU-UC-REQ-231947/A-Master Reset during download and/or File Transfer in progress	<bgill51>New use case for master reset
	STR-060525/F-Functional Requirements (TcSE ROIN-294129)	< bgill51> Remove obsolete functional req'ts from SPSS (REQ-213407, REQ-213411, REQ-213412, and REQ-226574)
	IVSU-FUR-REQ-231961/A-Timestamp for Update	<bgill51> Modified Timestamp for Update
	IVSU-FUR-REQ-231966/A-Interface with Telenav Agent	<bgill51> New Req for Telenav Agent Interface
	IVSU-FUR-REQ-231967/A-HMI Display System with Navigation	<bgill51> Added new req for HMI Display System with Navigation
	IVSU-FUR-REQ-231968/A-Subscription Notification+	<bgill51> added Subscription Notification
	IVSU-FUR-REQ-231968/B-Subscription Notification	wstephe1: Updated requirement per feature owner
	IVSU-FUR-REQ-232331/A-Navigation Delta File	wstephe1: Added requirement per Feature Owner
	IVSU-FUN-REQ-232353/A-SWUpdateTriggerCmd	fmunaser: Added function for new interface design containing new activity & sequence diagrams for new use cases for new trigger signals
	IVSU-FUR-REQ-213406/C-CAN signals to support OTA Navigation Updates+	<bgill51> Nav data interrogator file and Transaction priority
	IVSU-UC-REQ-227866/A-Internal Timer or Ignition Count as an Update Trigger+	<bgill51> IVSU Manager generating Interrogator File with Nav updates
	IVSU-UC-REQ-227867/A-CAN Signal as an Update Trigger+	<bgill51> Added new use case for CAN signal update trigger
	IVSU-UC-REQ-227868/A-CAN signal trigger while an update is in progress+	<bgill51> CAN signal trigger during update
	UC-REQ-227869/A-CAN signal trigger while no AP connection+	<bgill51> CAN signal trigger while away from AP
	IVSU-ACT-REQ-232341/A-UpdateTriggerMessage	fmunaser: new activity diagram to model signal flow and use case functionality per feature owner
	IVSU-SD-REQ-232342/A-UpdateTriggerMessage	fmunaser: new sequence diagram to model signal flow and usage resulting from new use cases per feature owner
	STR-060531/D-Appendix: Reference Documents (TcSE ROIN-294370)	<bgill51> Added IVSU references
October 14, 2016	**2.2**	
	IVSU-FUR-REQ-226570/B-Oversized putfile operation in the end of each file	Oversized putfile operation in the end of each file
	IVSU-FUR-REQ-235923/A-Status Updates	Added status messages
	IVSU-FUR-REQ-237866/A-Status Message - Updates	Status Message in XML
	IVSU-FUR-REQ-238545/A-Destination File Size Doesn't Match on passive image	<bgill51> added Destination File Size Doesn't Match on passive image.
	IVSU-FUR-REQ-238544/A-After Successful Activation, the differential patch ID will be stored	<bgill51> added After Successful Activation, the differential patch ID will be stored
	IVSU-FUR-REQ-238542/A-Destination Hash Value Doesn't Match on passive image	<bgill51> Added Destination Hash Value Doesn't Match on passive image

	IVSU-FUR-REQ-238541/A-Destination Part Number doesn't match, on passive image	<bgill51> Added Destination Part Number doesn't match, on passive image.
	IVSU-FUR-REQ-238540/A-Out of space while applying differential update.	<bgill51> Added Out of space while applying differential update.
	IVSU-FUR-REQ-238539/A-Source file size Mismatch	<bgill51> Added Source file size Mismatch
	IVSU-FUR-REQ-238538/A-Source Hash Value MisMatch	<bgill51> Added Source Hash Value MisMatch
	IVSU-FUR-REQ-238537/A-Source Part Number Mismatch	<bgill51> Added Source Part Number Mismatch
	IVSU-FUR-REQ-238536/A-Additional content in inf for Differential updates software package:	<bgill51> Added Additional content in inf for Differential updates software package:
	IVSU-FUR-REQ-238535/A-Differential Update Steps	<bgill51>added Differential Update Steps
	IVSU-FUR-REQ-238534/A-Differential Update Definitions	<bgill51> added Definitions of Differential Update
December 5, 2016	**2.3**	
	IVSU-UC-REQ-243577/A-Warning unrecognized parameter	<bgill> Added Diff Update use case Warning unrecognized parameter
	IVSU-UC-REQ-243442/A-Error reported by Differential Library	<asuleim1> Created use case for E15
	IVSU-UC-REQ-243442/A-Error reported by Differential Library	<asuleim1> Created use case for E15
	IVSU-UC-REQ-242615/A-Error in Differential.inf File	< bgill51> Diff update use case Error in Differential.inf File
	IVSU-UC-REQ-242614/A-Destination Part Number does not match, on passive image	< bgill51> Diff update use case Destination Part Number does not match, on passive image
	IVSU-UC-REQ-242613/A-Out of space while applying differential update	< bgill51> Diff update use case Out of space while applying differential update
	IVSU-UC-REQ-242612/A-Required entry missing in Differential.inf	< bgill51> Diff update use case Required entry missing in differential.inf
	IVSU-UC-REQ-242611/A-Destination Hash Value does not match Hash of passive file - partition	< bgill51> Diff update use case Destination Hash Value doesnt match Hash of passive file - partition
	IVSU-UC-REQ-242610/A-Destination Size does not match Size passive file - partition	< bgill51> Diff update use case Destination Size does not match Size passive file - partition
	IVSU-UC-REQ-242609/A-Destination Does not have enough space to store the result of the patch	< bgill51> Diff update use case Destination Doesnt have enough space to store the result of the patch
	IVSU-UC-REQ-242608/A-Source Hash Does not match the hash of the Active partition	< bgill51> Diff update use case Source Hash Does not match the hash of the Active partition
	IVSU-UC-REQ-242607/A-Source Size doesnt match the Active partition	< bgill51> Diff update use case Source Size doesnt match the Active partition
	IVSU-UC-REQ-242605/A-Plugin is not supported	< bgill51> Diff update use case Plugin is not supported
	IVSU-UC-REQ-242604/A-Library Version not supported	< bgill51> Diff update use case Library Version not supported
	IVSU-UC-REQ-242603/A-File references in Differential.inf file does not exist	< bgill51> Diff update use case File references in Differential.inf file does not exist
	IVSU-UC-REQ-242602/A-Source Version Number doesn't match Source Version Number reported on Active Partition.	< bgill51> Diff update use case Source Version Part number doesn't match Source Version Number reported on Active Partition.
	IVSU-UC-REQ-242601/A-Source Ford Part number doesn't match Source Ford Part Number reported on Active Partition.	< bgill51> Diff update use case Source Ford Part number doesn't match Source Ford Part Number reported on Active Partition.
	IVSU-UC-REQ-242600/A-Differential Update on Module	< bgill51> Diff update use case for Differential Update on Module
	IVSU-FUR-REQ-243445/A-Resume installation of Differential update	<bgill51> Differential update resume req
	IVSU-FUR-REQ-243444/A-SYNC 3 Reverse Compatibility	asuleim1: added requirement for maintaining reverse compatability between SYNC 3 and previous versions
	IVSU-FUR-REQ-242619/A-Differential File Type	< bgill51> added Differential File Type
	IVSU-FUR-REQ-242617/A-Differential Library Information	< bgill51> added Diff Library Information

	IVSU-FUR-REQ-242616/A-Silent Differential updates	< bgill51> Added Silent Differential updates
March 6, 2017	**2.4**	
	IVSU-FUR-REQ-051999/H-IVSU System Flow	bgill51: update state 10
	STR-060524/F-Use Cases (TcSE ROIN-294128)	rpaquet2 - Added 251164 per feature owner
	IVSU-UC-REQ-231959/B-Download of Nav File Chunk Complete	bgill51: IVSU download and install nav files chunks
	IVSU-UC-REQ-231949/B-Master Reset during IVSU Update in progress	bgill51: Update the Master reset behavior
	IVSU-UC-REQ-251164/A-EULA is not accepted after Master Reset during installation Process	bgill51: added new requirement for Master reset
	STR-060525/F-Functional Requirements (TcSE ROIN-294129)	rpaquet2- Added 251161 and 251163.
	IVSU-REQ-018293/C-SYNC updateable areas (TcSE ROIN-296072-1)	<bgill51> added Map License and Voice
	IVSU-FUR-REQ-051459/D-Cancelling download/install during crash	<bgill51> Updated eCall Conditions
	IVSU-FUR-REQ-052001/D-Display progress for download or install of software by WiFi	<bgill51> Move the requirements
	IVSU-FUR-REQ-129015/D-Software Update Description in HMI	bgill51: updated HMI
	IVSU-FUR-REQ-129016/E-Error States	<bgill51> moved to Master Reset section
	IVSU-FUR-REQ-156063/C-Navigation Update Requirements	bgill51: update Nav OTA Req
	IVSU-FUR-REQ-213408/E-Interrogator File with Navigation Data	bgill51: Generate DIL with Nav OTA data
	IVSU-FUR-REQ-213409/D-Download/Install OTA Navigation Files	bgill51: OTA Nav file download/install
	IVSU-FUR-REQ-231961/B-Timestamp for Update	bgill51: when to update timestamp
	IVSU-FUR-REQ-231966/B-Interface with Telenav Agent	bgill51: Interface between TN & IVSU Manager
	IVSU-FUR-REQ-251161/A-Manifest File with Navigation Data	bgill51: NAV OTA Manifest file
	IVSU-FUR-REQ-251163/A-Master Reset	bgill51: Created new section for Master reset
	IVSU-FUR-REQ-156062/F-Trigger Requirements	bgill51: added Crash event as trigger
November 1, 2018	**2.5**	
	IVSU-FRD-REQ-018325/F-In Vehicle Software Update (TcSE ROIN-294522-1)	fmunaser: Update the feature
	IVSU-FUR-REQ-051999/I-IVSU System Flow	<bgill51> Updated State 10 and changed format
	IVSU-FUN-REQ-018313/C-Customer Mode Software Update (TcSE ROIN-294127-1)	fmunaser: VSEM Structure. No Content Change.
	STR-060525/G-Requirements (TcSE ROIN-294129)	fmunaser: VSEM Structure. No Content Change.
	IVSU-FUR-REQ-051457/B-Access Points for automatic installation	<kmahend7>removed interrogator files from this section
	IVSU-UC-REQ-231959/C-Download of Nav File Chunk Complete	<kmahend7>IVSU download and install nav files chunks
	IVSU-FUR-REQ-051459/E-Cancelling download/install during crash	<kmahend7>Clarified OTA requirment for post crash
	IVSU-FUR-REQ-051463/D-Limitation of Retries During Ignition OFF	<kmahend7>Added IVSU for 2min VHM Spec Updates
	IVSU-FUR-REQ-052001/E-Display progress for download or install of software by WiFi	<kmahend7>Updated requirement to clarify to download AND install.
	IVSU-FUR-REQ-052003/D-Notify customer of newly activated software	<kmahend7>Updated activation Notification
	IVSU-FUR-REQ-153562/E-HMI Progress Bar during WiFi or Applink Download	<kmahend7>HMI Progress Bar shall show during OTA Updates including Map/Nav/Lic files
	IVSU-FUR-REQ-153563/E-HMI Progress Bar during Install of software downloaded through WiFi or Applink	<kmahend7>HMI Progress Bar shall show during OTA Updates including Map/Nav/Lic files

	IVSU-FUR-REQ-156063/D-Navigation Update Requirements	<kmahend7>updated this section with the system shall: clear the cache and /or restart
	IVSU-FUR-REQ-213408/F-Interrogator File with Navigation Data	<kmahend7>Updated requirements to update the navigation map and voice files thru Modem OTA process
	IVSU-FUR-REQ-213409/E-Download/Install OTA Navigation Files	<kmahend7>OTA Nav file download/install
	IVSU-FUR-REQ-226567/B-Multiple system requests from Apps	<kmahend7>Multiple system requests from Apps
	IVSU-FUR-REQ-226568/B-Multiple responses from Apps	<kmahend7>Multiple responses from Apps
	IVSU-FUR-REQ-226569/B-BOM file verification	<kmahend7>BOM file verification
	IVSU-FUR-REQ-226570/C-Oversized putfile operation in the end of each file	<kmahend7>Oversized putfile operation in the end of each file
	IVSU-FUR-REQ-226571/B-Offset and file length sync with app	<kmahend7>Offset and file length sync with app
	IVSU-FUR-REQ-226572/B-Additional checksum after each putfile operation (next gen)	<kmahend7>Additional checksum after each putfile operation (next gen)
	IVSU-FUR-REQ-226573/C-Privacy mode	<kmahend7>Privacy mode
	IVSU-FUR-REQ-226576/B-Unexpected stop\request is lost in medium	<kmahend7>Unexpected stop\request is lost in medium
	IVSU-FUR-REQ-251161/B-Manifest File with Navigation Data	<kmahend7>NAV OTA Manifest file
	IVSU-FUR-REQ-251163/B-Master Reset	<kmahend7>Map and IVSU software files are update same way
	IVSU-FUR-REQ-274770/A-IVSU manager shall wait for AP connection	<bgill51> Added WiFi 2min VHM mode requirements
	STR-060524/G-Use Cases (TcSE ROIN-294128)	fmunaser: VSEM Structure. No Content Change.
	IVSU-UC-REQ-292064/A-Download/Install failure of file(s) in the sequence	<bgill51> added new use case for file chunk failure
	IVSU-UC-REQ-018320/C-Software copy from USB (TcSE ROIN-296168-1)	<bgill51> Clarified software copy from USB not sync utility
	IVSU-UC-REQ-051448/B-HMI Acknowledgement when customer inserts USB Media that contains software to be installed on SYNC	<kmahend7>added exception SYNC shall install directly from the USB
	IVSU-UC-REQ-051469/B-SYNC module installing downloaded files	<kmahend7>added exception SYNC shall install directly from the USB
	IVSU-UC-REQ-051994/C-The module continues to download/install while emergency assist was activated	<bgill51> updated exception when module to report errors to FMCSS
	IVSU-UC-REQ-129010/C-HMI displays information about the software update	<kmahend7>Added requirement about software updates
	IVSU-UC-REQ-231949/C-Master Reset during IVSU Update in progress	<kmahend7>Update the Master reset behavior
	IVSU-UC-REQ-231956/B-Manifest Parse	<kmahend7>Verify transaction in the manifest
	IVSU-UC-REQ-251164/B-EULA is not accepted after Master Reset during installation Process	<kmahend7>Updated sections based on Pasa feedback
	IVSU-UC-REQ-266287/A-SYNC module shall Connect to preconfigured AP in 2min VHM Mode	<kmahend7>Added new req for 2min VHM Mode
	IVSU-UC-REQ-231960/B-Navigation License	<kmahend7>Map license verification use case
January 17, 2019	**2.6**	
	IVSU-FRD-REQ-018325/G-In Vehicle Software Update (TcSE ROIN-294522-1)	fmunaser: SPSS updated for release
	IVSU-FUR-REQ-051464/F-Prompting the customer for WiFi setup	fmunaser: removed Wi-Fi prompt if connection is lost for longer than configured time.
April 18, 2019	**2.7**	
	IVSU-FUN-REQ-018313/D-Customer Mode Software Update (TcSE ROIN-294127-1)	fmunaser: VSEM Structure. No content changed.
	STR-060525/H-Requirements (TcSE ROIN-294129)	fmunaser: removed IVSU-FUR-REQ-051464/F-Prompting the customer for WiFi setup and 'IVSU-FUR-REQ-231968/B-Subscription Notification'
	IVSU-FUR-REQ-051457/C-Access Points for automatic installation	fmunaser: VSEM Stucture. No content change.
	IVSU-FUR-REQ-052004/D-HMI Flow	fmunaser: Updated diagram and deleted 3 lines for The IVSU Manager shall have a handshake with HMI to request:.
	IVSU-FUR-REQ-129015/E-Software Update Description in HMI	fmunaser: removed "The IVSU Manager shall have a handshake with HMI to request:.....no feedback to the customer."

	IVSU-FUR-REQ-156063/E-Navigation Update Requirements	fmunaser: removed/edited text.
	IVSU-FUR-REQ-213409/F-Download/Install OTA Navigation Files	fmunaser: VSEM structure. No content change.
	STR-060524/H-Use Cases (TcSE ROIN-294128)	fmunaser: VSEM structure. No content changed.
	IVSU-UC-REQ-231959/D-Download of Nav File Chunk Complete	fmunaser: VSEM Structure. No content change.
	IVSU-UC-REQ-251164/C-EULA is not accepted after Master Reset during installation Process	fmunaser: changed format of table. No content changed.
	IVSU-UC-REQ-227869/C-CAN signal trigger while no AP connection	fmunaser: Modified Post Condition.
May 30, 2019	**2.8**	
	STR-393016/B-Architectural Design	fmunaser: VSEM structure. No content Changed.
	IVSU-IIR-REQ-353031/A-PromptClient_Rx	fmunaser: Added New Signal.
	IVSU-MD-REQ-353032/A-Drv_Bhav_Audio_Alert_Stat	fmunaser: Added New Signal.
	STR-060530/D-Functional Definition (TcSE ROIN-294379)	fmunaser: VSEM structure. No content changed.
	STR-060525/I-Requirements (TcSE ROIN-294129)	fmunaser: VSEM structure. No content changed.
	IVSU-REQ-353026/A-Automatic Software Updates Default Settings	fmunaser: Added New Requirement.
	STR-060524/I-Use Cases (TcSE ROIN-294128)	fmunaser: VSEM structure. No content changed.

Table of Contents

1 General Requirement

1.1 IVSU-REQ-051462/A-General Rule

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 (see http://www.ietf.org/rfc/rfc2119.txt).

1.2 IVSU-FUR-REQ-051999/I-IVSU System Flow

Description:

State 1 – IDLE
The module starts at when it reaches the Ford plant. This state is an idle state where the IVSU feature is not active either because the HMI selection was changed to OFF, or the vehicle is not in Normal car mode or it is configured off as a feature. If the module goes thru reset, it should verify in what the vehicle is so it can transition to the appropriate state.

State 2 – OFF
The module is in a state the feature waits until the vehicle has completed:

a) 260 ignition cycles or
b) 30 days has passed since the last time the back end was searched or
c) A reset happened while download was completed and 4 ignition cycles has passed since then or
d) User presses “Check for Update” button in SYNC HMI or
e) CAN signal is present

If any of the above triggers occurs and the last value heard from the battery state of charge is 75% or more (after ignition goes to OFF and CAN HS1 went to sleep), then the feature will search the backend for any new software versions.

State 3 – ON
When IVSU trigger exists, the module will create the interrogator log and based on the connection that module sees it will call the appropriate process to do the connection to the back end.

This state will be reached after:

a) successful switch of a new software version
b) the vehicle is part of a crash
c) we have reached the hard stop of maximum tries to download
d) Installation of the new software fails
e) Switching to the new software fails

State 4 – INSTALLING
After the module has completed downloading all the files that were listed in the Manifest, it will automatically start installing those files. The new installed software will be switched the next ignition cycle and it will become the new active software. If any failures occurred during installation or switching the module will try to notify the back end server, and log the appropriate diagnostics.

State5 – AppLink Process
It contains all the classes/functions that the module has to interface to the AppLink. The first time it will pass the Interrogator file so the smart phone can use it to grab the Manifest from the backend. However, in case of interruption during a download (from any type of failure), there will be no new interrogator file generated. AppLink will continue to communicate with the smartphone so the same files can continue to download. After the module tries the maximum times of retries then it will go back to state 2, and then it will restart a new cycle.

State 6 – WiFi Process
This is similar state to 5, but will contain all the WiFi APIs. We are trying to show here, that in case of WiFi connection lost, the module should jump to the AppLink connection if available to continue with the download. And vice versa, if the WiFi connection becomes present while the module is downloading thru AppLink, then it will jump to WiFi and continue downloading where it stopped. Only exception happens when WiFi connection has no internet access, the module should jump to AppLink connection if available (check state 8 for more detail).
WiFi always has priority over AppLink.

While the module is waiting for the manifest from the backend (either state 5 or 6), and a customer inserts a USB with a valid manifest, then it will cancel what is doing at the moment and start downloading the software that is present in the USB.

State 7 – Clear Cache
At any time (from any connection), if the module receives a new manifest then it needs to clear its cache before downloading the new software (not overwrite the memory)

The IVSU Manger SHALL be able to distinguish if the new manifest contains a SYNC utility OR SYNC software update before clearing the cache. If the USB contains SYNC utility, then IVSU Manger SHALL not clears the manifest with SYNC software update.

State 8 – Download
Once the module starts downloading, it needs to make sure that it captures all the failures. If there is a loss of connection the module shall just sit in this state and continue the download from where it was paused once the connection is available.
If the module receives/finds a particular error (listed in P04 with details), then it will wait a defined ignition counts (default:4) before it tries again. In this case, the same logic goes: the module shall continue downloading from the same location where it paused the last time it was downloading.

State 9 – Download Retry
If the module started downloading, and the connection is lost; then it will wait until the connection is present to retry retrieving the manifest. There will be no new interrogator created. If the module started downloading, and the connection has no internet connection (receive no response after a long timeout e.g. 3 mins); then it will switch to other available medium. Module will stop retry after configurable maxes retry count (e.g. 6).

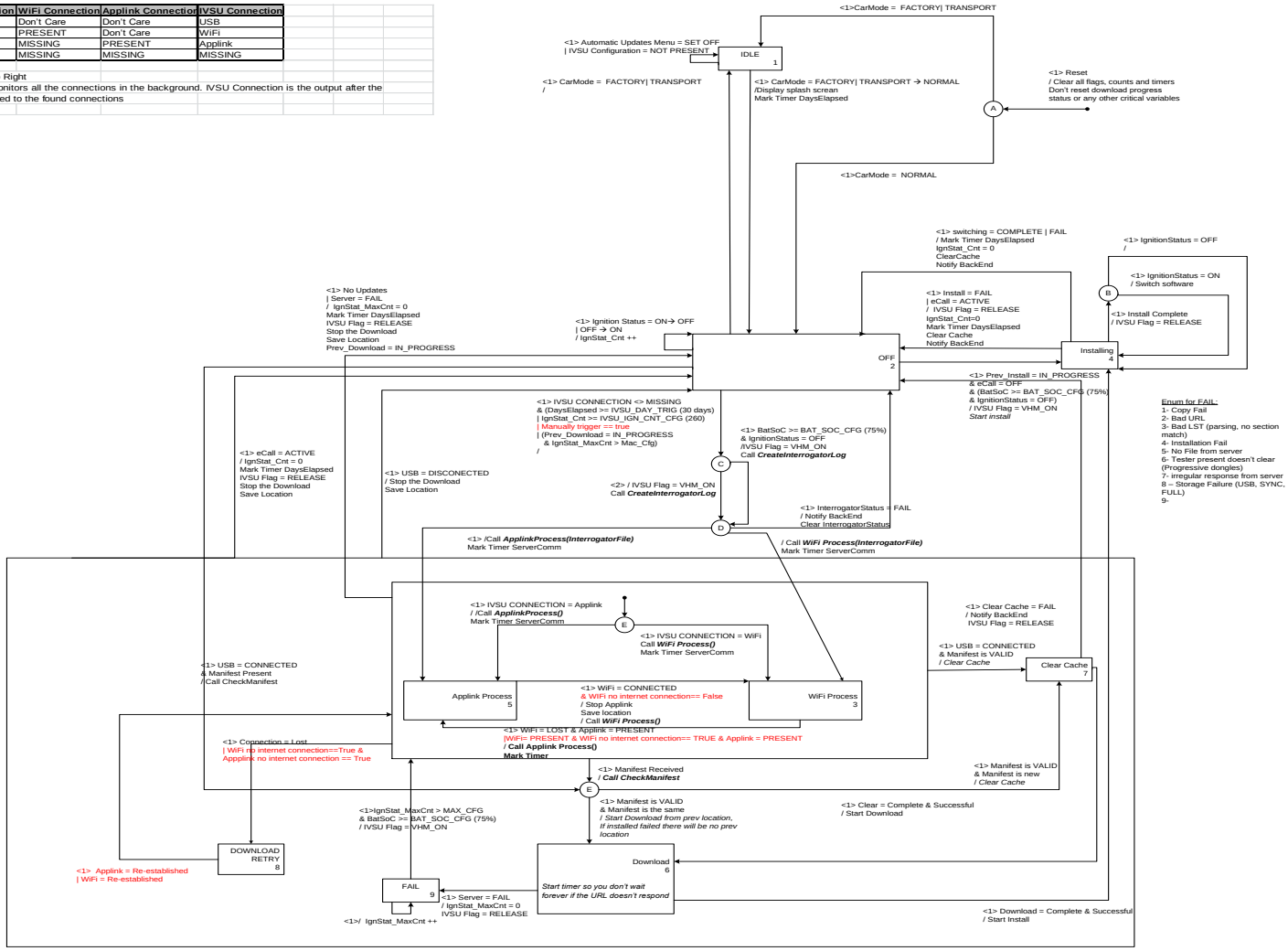
State 10 OTA Map update
It contains all the classes and functions that the module has to interface with TCU. The navigation update command and URL shall be passed to SYNC thru a CAN message. Any errors occurred during navigation update, IVSU manager shall report reported back to the cloud.

The download of the map file shall start only when IVSU manager has notified to start the download. If IVSU manager requests the download to pause, then the offset should be saved to be resumed when the flag changes to STAR

1. The following state machine displays the flow of the logic that is captured in the above requirements.

USB Connection	WiFi Connection	Applink Connection	IVSU Connection
PRESENT	Don't Care	Don't Care	USB
MISSING	PRESENT	Don't Care	WiFi
MISSING	MISSING	PRESENT	Applink
MISSING	MISSING	MISSING	MISSING

Priority: Left to Right
The module monitors all the connections in the background. IVSU Connection is the output after the priority is applied to the found connections



1.3 IVSU-FUR-REQ-207786/A-IVSU Hardware Requirements

1. SYNC Cache memory must have space for all OTA files released in IVS plus an additional 20-30% free space to protect for future software updates.
2. Reverse compatibility with each component (VMCU, App & OS, Gracenotes, and Non-Nav voice package)

1.4 IVSU-REQ-226565/B-IVSU Download Speed

1. SYNC should be capable to fully utilize network bandwidth in both Wi-Fi and Applink Scenario
2. SYNC should achieve practical max speed in bluetooth environment (e.g. at least 120kB for bluetooth 2.1)

1.5 IVSU-REQ-226566/B-Bluetooth Profile Requirements

1. Should implement OBEX/SPP and L2CAP Enhanced Retransmission mode to protect Bluetooth data integrity

2 Architectural Design

2.1 IVSU-IIR-REQ-232358/A-IVSU_Interface_Tx

2.1.1 MD-REQ-232360/A-OTA_UpdateTrgResp

Message Type: Status

Used to respond to an update request message from the IVSU Server.

Name	Literals	Value	Description
Type	-	-	Signal is sent by IVSU client to IVSU Server in response to OTA_Trigger_Cmd request signal.
	default	0x0	
	NotAccepted	0x1	
	Accepted	0x2	
	Not Used	0x3	

2.2 IVSU-IIR-REQ-232359/A-IVSU_Interface_Rx

2.2.1 MD-REQ-232361/A-OTA_Trigger_Cmd

Message Type: Request

Sent by IVSU Server to IVSU Client to indicate an update in available.

Name	Literals	Value	Description
Type	-	-	
	default	0x0	
	Nav Update	0x1	
	IVSU Update	0x2	
	Not Used	0x3	

2.3 IVSU-IIR-REQ-353031/A-PromptClient_Rx

Logical Signal Name	Parameter Name	GSDB Signal Name
Drv_Bhav_Audio_Alert_Stat	Type	DrvBhavAudioAlrt_D_Rq
	Type	

2.3.1 IVSU-MD-REQ-353032/A-Drv_Bhav_Audio_Alert_Stat

This message is used to request prompt playback at the PromptClient.

Message Type: Request

Name	Literals	Value	Description
PromptRequest	-	-	
	NoMessage	0x00	See FICC-REQ-351953 for assigned prompt to play
	ExcessiveIdleBegin	0x01	See FICC-REQ-351953 for assigned prompt to play
	ExcessiveSpeedBegin	0x02	See FICC-REQ-351953 for assigned prompt to play
	HardAccelerationBegin	0x03	See FICC-REQ-351953 for assigned prompt to play
	HardBrakingBegin	0x04	See FICC-REQ-351953 for assigned prompt to play
	SeatbeltUnbuckled	0x05	See FICC-REQ-351953 for assigned prompt to play

3 Functional Definition

3.1 IVSU-FUN-REQ-018313/D-Customer Mode Software Update (TcSE ROIN-294127-1)

3.1.1 Requirements

3.1.1.1 IVSU-REQ-018288/A-Attendantless Software Updates (TcSE ROIN-296067-1)

For all non-safety critical modules, software updates to the vehicle SHALL be attendant-less. (Refer to ISO 26262 for the definition of safety-critical and non-safety critical.)

3.1.1.2 IVSU-REQ-018289/A-Update reboot and restore performance (TcSE ROIN-296068-1)

For all non-safety critical modules, software updates where the update is in the application space, the module SHALL reboot and restore in 30 seconds or less.
For all non-safety critical modules, where the update is in the middleware space, the module SHALL reboot and restore in 60 seconds or less.

For all non-safety critical modules where the update is in the OS/BSP space, the module SHALL reboot and restore in 60 seconds or less.

For all non-safety critical modules where there is a combination of the above updates, the module SHALL reboot and restore in two (2) minutes or less.

3.1.1.3 IVSU-REQ-018290/C-Part number interrogation and response performance (TcSE ROIN-296069-1)

When properly interrogated, all (we want all modules, regardless of their role in safety/non-safety) modules SHALL respond with the appropriate software information within 60 seconds or less. For clarity, appropriate software information includes but is not limited to: Electronic Serial Number (ESN) of the module; software version; date loaded; previous software version loaded; installed memory; available memory.

Module SHALL respond with information specified within the Optimized DID List (ODL).). The following DIDs are the minimum required by the Ford's backend:
8033; 8060; 8061; D704; D705; DE00; DE01; DE02; DE03; DE04; DE05; DE06; F110; F111; F113; F124; F141; F162; F163; F188; F18C; F1D0; F1D1
The module should send an OID requests for these DIDs to avoid any interference with other diagnostic requirements.

Module SHALL respond with date activated; snapshot of load/activation from as-built.

3.1.1.4 IVSU-REQ-018291/A-Display of software version (TcSE ROIN-296070-1)

Under the information settings of the vehicle, the vehicle SHALL display software information as outlined in requirement (*Part number interrogation and response performance*).

3.1.1.5 IVSU-REQ-018292/F-Software update process (TcSE ROIN-296071-1)

For all non-safety critical modules, the software update process SHALL be structured as follows: software copy; software installs; and software activate.

The system SHALL take as long as it takes to software copy; install; and then activate on the next appropriate ignition cycle (with the reboot/restore performance #'s stated in Update reboot and restore performance).

Once Started, the module will receive the MD5 checksum from manifest for the content to be downloaded, and will validate the download against the MD5 checksum once the download is complete.

If the module detects that the file downloaded doesn't match the MD5 received in the manifest, an MD5 validation error will be reported to the Ford cloud, and in the log.

The module will attempt to re-copy the manifest file based on a configurable parameter for maximum number of MD5 failures per completed copy.

Once started, the binary copy process SHALL NOT terminate until a successful copy. (Note – this includes persisting across network connectivity types, intervals and ignition cycles (there shall be a max retry count during Ignition OFF).. Also, includes all restart, recovery and suspend/resume mechanisms.)
Once started, the software resume mechanisms SHALL NOT terminate until:
Module get an ODL only response (no update available scenario)
All binary files are successfully installed (IVSU successfully update SYNC)
User manually stop IVSU check for update by EULA = Off.

Once started, the software copy process SHALL NOT terminate until a successful copy.

All modules that are software updateable SHALL only communicate with the FMCSS.

All modules that communicate with FMCSS SHALL interrogate the FMCSS on a frequency not to exceed once per XX vehicle minutes or YY key cycles.

The period of XX vehicle minutes SHALL be updateable by only Ford Motor Company.

The period of YY key cycles SHALL be updateable by only Ford Motor Company.

3.1.1.6 IVSU-REQ-018293/C-SYNC updateable areas (TcSE ROIN-296072-1)

On a SYNC module, the following assets SHALL be updateable: system software; user configuration file; Map (system) including Map License and Voice;; Map (poi); Language pack(s); and Music DB (e.g., Gracenote).

Any update of these assets results in a reboot/restore (e.g., cold boot) triggered by ignition cycle.

The software copy process SHALL be maintained over unlimited ignition cycles during Ignition ON, or the maximum retries during Ignition OFF has been reached.

3.1.1.7 IVSU-REQ-018294/C-SYNC binary download (TcSE ROIN-296073-1)

On the SYNC module, the software copy process SHALL be maintained over unlimited ignition cycles during Ignition ON, or the maximum configurable times of retries during Ignition OFF..

The SYNC module SHALL use any and all available connectivity transport mechanisms for the binary data copy process. For clarity, the connectivity transport mechanisms include but are not limited to: Wi-Fi, embedded modem, brought-in modem, brought-in USB, brought-in SD, Bluetooth, and CAN.

The SYNC module SHALL be capable of switching between different connectivity transport mechanisms during a binary data copy process.

The SYNC module SHALL use the following precedence when choosing an available connectivity transport mechanism: cabled USB; USB card; SD card; Wi-Fi; brought-in modem; embedded modem; Bluetooth; CAN.

The SYNC module SHALL be able to do a binary data copy without impairing normal SYNC function.

The SYNC module SHALL be able to distinguish between USB with software update and USB with SYNC utilities. A USB with a SYNC utility shall not interrupt the OTA update.

3.1.1.8 IVSU-REQ-018295/C-SYNC functionality during software copy (TcSE ROIN-296074-1)

a) The SYNC module SHALL be able to do a software copy without impairing normal SYNC function.
b) The SYNC module SHALL be able to do a software installation without impairing normal SYNC function.

3.1.1.9 IVSU-REQ-018296/A-SYNC software installation (TcSE ROIN-296075-1)

The SYNC module SHALL be able to do a software installation without impairing normal SYNC function.

Once started, a software installation SHALL NOT terminate until a successful install.

On the SYNC module, the software installation process SHALL be maintained over unlimited ignition cycles with a XX vehicle time.

The period of XX time SHALL be updateable by only Ford Motor Company.

3.1.1.10 IVSU-REQ-018297/A-Preserving customer configured information on SYNC (TcSE ROIN-296076-1)

The SYNC module SHALL preserve all customer configured information during the software copy process.

Customer configured information shall include but is not limited to: anything that is cached between ignition cycles (e.g. pairing, wifi configuration); anything that is not automatically generated.

The SYNC module SHALL preserve all customer configured information during the software installation process.

The SYNC module SHALL preserve all customer configured information during the software activation process.

3.1.1.11 IVSU-REQ-018298/A-Protocols for data transfer (TcSE ROIN-296077-1)

The protocol mechanism for transferring digital data (e.g., software) between vehicle and Ford Motor Company SHALL minimize network bandwidth.

The protocol mechanism for transferring digital data (e.g., software) between vehicle and Ford Motor Company SHALL minimize device resource requirements (e.g., radio, memory, and processor).

The protocol mechanism for transferring digital data (e.g., software) between vehicle and Ford Motor Company SHALL ensure reliability of said transfer.

The protocol mechanism for transferring digital data (e.g., software) between vehicle and Ford Motor Company SHALL ensure assurance of delivery of the payload. (see above)

3.1.1.12 IVSU-REQ-018299/A-Activation of previous software load (TcSE ROIN-296078-1)

When properly instructed, all non-safety critical modules SHALL revert to the previous software load.
For all non-safety critical modules, it SHALL NOT be possible for a customer to revert to the previous software load.

3.1.1.13 IVSU-REQ-018300/A-Fail-safe software load (TcSE ROIN-296079-1)

It SHALL NOT be possible to make inoperable a non-safety critical module. For clarity, this requirement is intended to mean that there is a “golden master” software load that is guaranteed to boot when appropriately powered. This means there is a guaranteed “limp home” mechanism.

3.1.1.14 IVSU-REQ-018301/B-Ford Motor Company Software Server (FMCSS) location (TcSE ROIN-296080-1)

The Ford Motor Company Software Server (FMCSS) SHALL be named IVSU software.ford.com/update/.

3.1.1.15 IVSU-FUR-REQ-051454/A-Turning WiFi ON automatically when Automatic install is selected ON

The module shall automatically turn ON the WiFi is the customer selects the automatic install option ON thru HMI. The customer shall be allowed to turn OFF Wi-Fi manually even if automatic updates is ON. The selected setting of the automatic updates feature shall survive a module Reset

3.1.1.16 IVSU-FUR-REQ-051455/C-Battery State for automatic installation

a) The module shall read the battery state of charge signal from CAN (BSBattSOC) and its update bit (BSBattSOC_UB) to understand the state of the battery.

b) The module shall not start downloading or installingduring Ignition OFF if the battery state of charge is below the threshold value and or the value is missing or if the update bit is not refreshed for that key cycle (there should be a missing/present strategy for the CAN signal where the logic for no update and missing is defined. Missing is not the same as not present).

c) The threshold value should be configurable by FMC

d) Sync module will assume that there is no BMS information, if the BSBattSOC is always 0. In this case it will ignore this input and continue with the normal process of download and install

Signal Name	**Condition**					
BSBattSOC = 0	Don't Care	Don't Care	T	F	F	ELSE
BSBattSOC >= SOC_Configurable	Don't Care	Don't Care	F	T	F	
BSBattSOC > 0 &< SOC_Configurable	Don't Care	Don't Care	F	F	T	
BSBattSOC_UB = UPDATED	Don't Care	F	T	T	T	
IVSU_Feature = ACTIVE	F	T	T	T	T	
IVSU_Inhibit_Flag	NULL	NULL	NULL	NULL	INHIBIT	NULL

Table 1 - IVSU_Feature: Assuming there is an internal flag to activate the automatic install feature. When battery state of charge is low, then the feature will be INHIBITED for that key cycle. NULL means that the feature is functioning as in normal conditions

3.1.1.17 IVSU-FUR-REQ-051456/A-Sleep Inhibitor for automatic installation

a) The application shall set a flag to inhibit the module from entering sleep when the trigger for download or install is set

b) The application shall clear the flag when:
- download or installation is complete or,
- if a failure during installation or switching occurs
- if a failure of no operation (no updates) during download occurs
- if there is a crash during download or install

3.1.1.18 IVSU-FUR-REQ-051457/C-Access Points for automatic installation

The module shall not set the sleep inhibit flag if there are no valid access points (refer to Wi-Fi Sync module requirements)

3.1.1.19 IVSU-FUR-REQ-051458/A-Notify server for failures

The module shall send notification to the backend if there is any failure during the process.

Failures may consists of: failure to encrypt, failure to create interrogator file, failure to download, failure to install, failure to switch to the new installed software.

3.1.1.20 IVSU-FUR-REQ-051459/E-Cancelling download/install during crash

The module shall Pause the download or installation if the vehicle is in a crash

The sync module shall monitor the eCall status or post-crash alert signal from CAN, to Pause the download or install and Offset is saved and download is paused.

For OTA, IVSU Manager shall resume the update after an ignition cycle was performed.

3.1.1.21 IVSU-FUR-REQ-051463/D-Limitation of Retries During Ignition OFF

If the module has used the max time of VHM mode for xx amount of consecutive times (configurable) after ignition switches to OFF, then the module cannot continue the download or install during Ignition OFF until next trigger count.

The Module shall NOT count X min VHM mode toward consecutive VHM mode (this is for WiFi chip to connect to preconfigured AP).

3.1.1.22 IVSU-FUR-REQ-052001/E-Display progress for download or install of software by WiFi

The customer shall be able to navigate to the appropriate HMI screen (system menu) where it can view the progress of the download and install.
When a pause occurs, the IVSU feature shall know the offset value and the progress shall be stopped to be continued again the next time.
When a permanent failure occurs, master reset, or the offset is lost, then the progress shall be cleared.
If a USB download starts, then the progress shall be reset to reflect the new download.

3.1.1.23 IVSU-FUR-REQ-052002/A-Display progress for download or install of software by USB

The HMI shall display the number of the file currently being downloaded or installed.
The HMI shall display the progress of each individual file while being downloaded or installed.
When a permanent failure occurs, master reset, or the offset is lost, then the progress shall be cleared.
If a WiFi download starts (after USB disconnection), then the progress shall be reset to reflect the new download

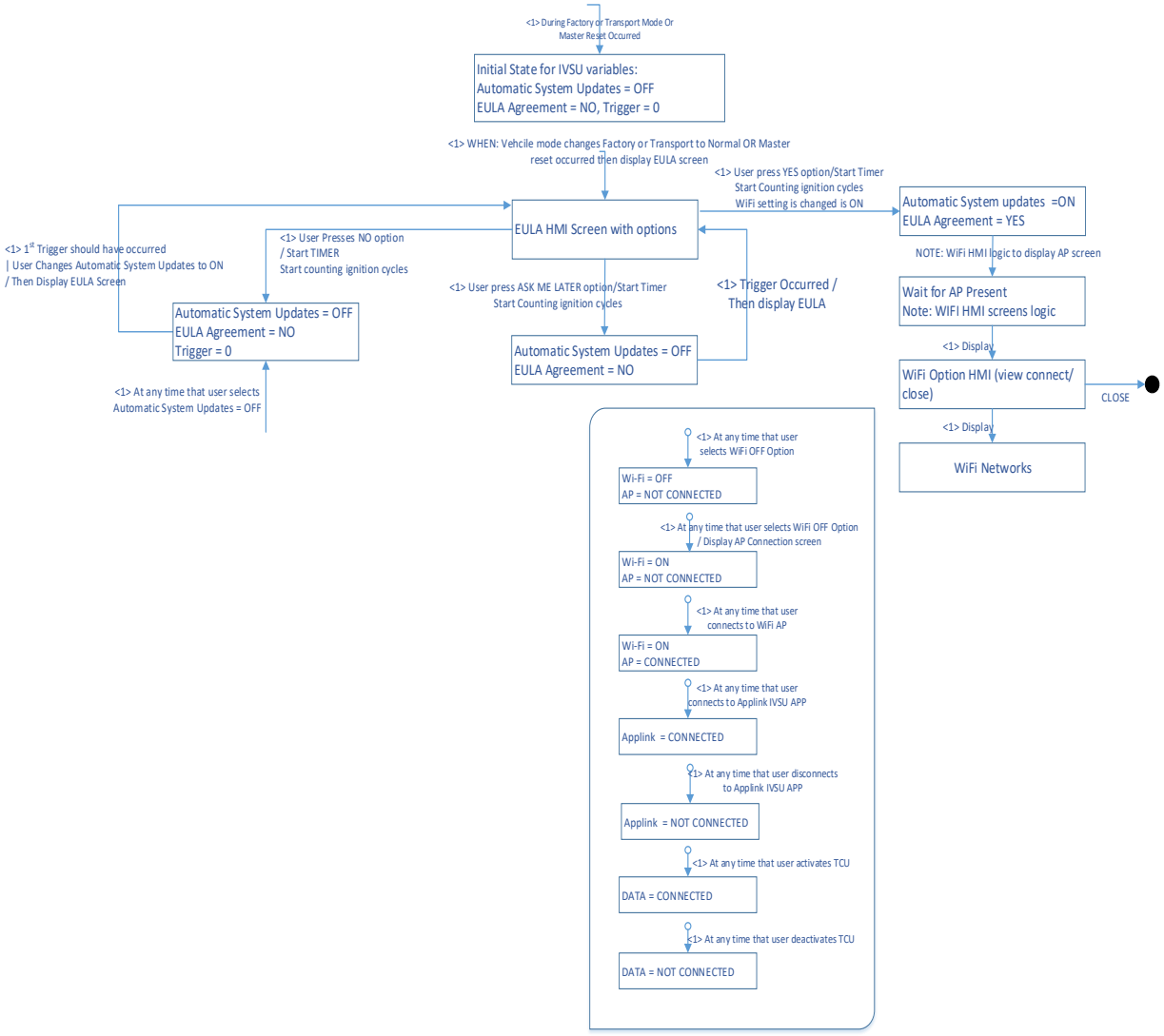
3.1.1.24 IVSU-FUR-REQ-052003/D-Notify customer of newly activated software

The HMI shall notify the customer that new software was activated.
The customer shall be presented with a notification with the ability to access details for the activated software.
The details of the software shall provide the customer with information regarding the software that was activated.
The notification of the newly activated software shall not be present for longer than 3 ignition cycles.

3.1.1.25 IVSU-FUR-REQ-052004/D-HMI Flow

The IVSU Manager shall have a handshake with HMI to request:

a. The first trigger occurred and EULA was not accepted. HMI shall need to display the EULA screen



Below is a state machine to show the logical flow for HMI. You need to cross reference this with the HMI specification to design the actual user interface screens. This diagram only shows the IVSU logic for when to display the EULA screen.

3.1.1.26 IVSU-FUR-REQ-052005/A-Automatic updates not active in Factory or Transport Mode

The automatic update feature shall be active ONLY if the vehicle is in NORMAL mode.

3.1.1.27 IVSU-FUR-REQ-129011/B-EULA HMI

The module shall have a EULA screen with three options for the customer:

a. NO (customer does not want to activate the feature. The EULA screen will be displayed one more time on the first IVSU trigger)
b. ASK ME LATER (what dealers should be using. The EULA screen should be displayed every IVSU trigger until a NO or YES is selected)
c. YES (customer agrees to the terms of conditions and the feature is activated)

The module shall prompt the EULA when the vehicle exits FACTORY or TRANSPORT Mode or after a MASTER RESET occurred.

3.1.1.28 IVSU-FUR-REQ-129015/E-Software Update Description in HMI

The module shall display information about what was updated in the HMI screen that displays after the new software is activated.
The module can execute an installer with the details to populate the HMI screen.

3.1.1.29 IVSU-FUR-REQ-129016/E-Error States

The module shall not create a DIL until the trigger for updates occurs.
The module shall use a base DIL on the first trigger of the feature (coming out of the Factory/Transport mode).
The module shall update the DIL based on the response from the Ford backend and use the updated DIL during further communication with the backend.

After a reset occurs (master, diagnostic, power), the module shall generate a new DIL, that will be used for the updates.
If there is an update in process thru WiFi or Applink, after a power or diagnostic reset; then the module shall verify that the VIN & ESN from the new DIL match with the information received from the cloud.

~~The master reset shall clear all the files listed in the manifest unless all of them were downloaded completely. There shall be the following exceptions to this requirement:~~

- ~~If the Gracenotes files were deleted, then the update shall continue until fully completed~~
1. ~~If the Navigation license is present for a new update, then the update shall continue until fully completed~~

~~The feature shall wait for the customer to accept the EULA before it triggers and updates itself.~~

3.1.1.30 IVSU-FUR-REQ-129017/B-Customer Requesting IVSU update

The HMI shall have a button to allow the customer the ability to request searching for a software update.
If the module is being updated, the search button shall not be available to the customer
If the Automatic System Updates feature is turned OFF in the HMI, then the search button shall not be available to the customer.

If the customer clicks on the search button, but there is no AP connected or no smartphone connected with an IVSU APP, then the customer needs to be informed of the missing connectivity option. IVSU shall cascade to HMI a flag to notify the missing connection scenario.

If the module finds a new software version then it needs to start downloading the software files and reset the IVSU day timer and Ignition Cycle counter. IVSU shall cascade to HMI a flag to notify that the update process started.

If the module does not find any new software version, then the HMI shall only update the date of last check. IVSU shall cascade to HMI a flag to notify that there is no new software to be downloaded.

If the module has connection and starts searching for a new software, but an error occurs; then, IVSU shall cascade to HMI a flag to notify of the error so the customer can be notified.

IVSU shall make sure that the search does not stay in active infinitely. A timeout on WiFi or Applink should be cascaded down as an error to HMI.

Search button state should be persistent thru an ECU Reset or Cold Reset.

3.1.1.31 IVSU-FUR-REQ-153562/E-HMI Progress Bar during WiFi or Applink Download

The module should use the information in the BOM to understand how many files are going to be downloaded and calculate their progress based on the size.

HMI should display a progress bar that is showing the customer the progress of each file.
If the extent of the download task cannot be determined, then an indeterminate progress bar should be displayed.
The IVSU software should cascade to the HMI information on download progress so that the bar can be updated accordingly.
The IVSU software should populate the variable in the HMI to show the task that is being executed (for example: downloading Gracenotes files#; pausing Gracenotes file; the task that should be displayed in the HMI should be downloading, paused)

3.1.1.32 IVSU-FUR-REQ-153563/E-HMI Progress Bar during Install of software downloaded through WiFi or Applink

The module shall show a progress bar during install to notify customers of the update progress.
If the extent of the install task cannot be determined, then an indeterminate progress bar shall be displayed.
The IVSU software shall cascade to the HMI information on install progress so that the bar can be updated accordingly.
The IVSU software shall populate the variable in the HMI to show the task that is being executed (for example: installing Gracenotes files#; pausing Gracenotes file; the task that shall be displayed in the HMI shall be installing, paused)

3.1.1.33 IVSU-FUR-REQ-153564/B-IVSU Core to Applink SDL Interface Requirements

When WiFi connection is lost and Applink is present, the logic shall switch to the later protocol to start/continue the download. Please refer to Policies and IVSU Interfaces Spec for the API call.

When WiFi connection is present while the file is being downloaded to the module using Applink, then IVSU core shall Pause that download, save the offset and resume the download (using the saved offset) using WiFi. Please refer to Policies and IVSU Interfaces Spec for the API call.

IVSU shall wait a configurable amount of time (default 1 second) for Applink to acknowledge the pause command and stop sending putfile data. If Applink continues to send data after the time has expired, then IVSU shall abort the switch to WiFi to avoid the corruption of the file.
Please refer to Policies and IVSU interface Spec for the API call.

3.1.1.34 IVSU-FUR-REQ-153565/B-Diagnostic Interface Requirements

WiFi updates and Applink updates 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.

DID	DID Name / Description	Config_Reqts	Dataflow
$XXX	USB Update Fault Status		IVSU_USB_Fault_EvStack[]
$XXX	WiFi Update Fault Status	Automatic Updates = ON	IVSU_WiFi_Fault_EvStack
$XXX	Applink Update Fault Status	Automatic Updates = ON	IVSU_Applink_Fault_EvStack

Update_IVSU_USB_Fault_EvStack ()

```
{
IVSU_USB_Fault_EvStack[9] = IVSU_USB_Fault_EvStack[8];
IVSU_USB_Fault_EvStack[8] = IVSU_USB_Fault_EvStack[7];
IVSU_USB_Fault_EvStack[7] = IVSU_USB_Fault_EvStack[6];
IVSU_USB_Fault_EvStack[6] = IVSU_USB_Fault_EvStack[5];
IVSU_USB_Fault_EvStack[5] = IVSU_USB_Fault_EvStack[4];
IVSU_USB_Fault_EvStack[4] = IVSU_USB_Fault_EvStack[3];
IVSU_USB_Fault_EvStack[3] = IVSU_USB_Fault_EvStack[2];
IVSU_USB_Fault_EvStack[2] = IVSU_USB_Fault_EvStack[1];
IVSU_USB_Fault_EvStack[1] = IVSU_USB_Fault_EvStack[0];
IVSU_USB_Fault_EvStack[0] = USB_ErrorCode;
```

}

Update_IVSU_USB_Fault_EvStack ()
{
IVSU_WiFi_Fault_EvStack[9] = IVSU_WiFi_Fault_EvStack[8];
IVSU_WiFi_Fault_EvStack[8] = IVSU_WiFi_Fault_EvStack[7];
IVSU_WiFi_Fault_EvStack[7] = IVSU_WiFi_Fault_EvStack[6];
IVSU_WiFi_Fault_EvStack[6] = IVSU_WiFi_Fault_EvStack[5];
IVSU_WiFi_Fault_EvStack[5] = IVSU_WiFi_Fault_EvStack[4];
IVSU_WiFi_Fault_EvStack[4] = IVSU_WiFi_Fault_EvStack[3];
IVSU_WiFi_Fault_EvStack[3] = IVSU_WiFi_Fault_EvStack[2];
IVSU_WiFi_Fault_EvStack[2] = IVSU_WiFi_Fault_EvStack[1];
IVSU_WiFi_Fault_EvStack[1] = IVSU_WiFi_Fault_EvStack[0];
IVSU_WiFi_Fault_EvStack[0] = WiFi_ErrorCode;
}

Update_IVSU_Applink_Fault_EvStack ()
{
IVSU_Applink_Fault_EvStack[9] = IVSU_Applink_Fault_EvStack[8];
IVSU_Applink_Fault_EvStack[8] = IVSU_Applink_Fault_EvStack[7];
IVSU_Applink_Fault_EvStack[7] = IVSU_Applink_Fault_EvStack[6];
IVSU_Applink_Fault_EvStack[6] = IVSU_Applink _Fault_EvStack[5];
IVSU_Applink_Fault_EvStack[5] = IVSU_Applink_Fault_EvStack[4];
IVSU_Applink_Fault_EvStack[4] = IVSU_Applink_Fault_EvStack[3];
IVSU_Applink_Fault_EvStack[3] = IVSU_Applink_Fault_EvStack[2];
IVSU_Applink_Fault_EvStack[2] = IVSU_Applink_Fault_EvStack[1];
IVSU_Applink_Fault_EvStack[1] = IVSU_Applink_Fault_EvStack[0];
IVSU_Applink_Fault_EvStack[0] = Applink_ErrorCode;
}

3.1.1.35 IVSU-FUR-REQ-156063/E-Navigation Update Requirements

The IVSU Manager shall delete in-active Nav Voice to create more space to continue with Navigation update.
Telenav manager shall calculate the chunk names and send chunk sequences to IVSU Manager.

The Navigation OTA Updates, for every part number there shall be a unique matching chunk names for Nav Voice and Map.

3.1.1.36 IVSU-FUR-REQ-051465/A-Scheduler requirements

Because of dependencies between the IVSU logic and WiFi and HMI, the scheduler should call the task of HMI first, then IVSU then WiFi.

This order should avoid any potential delays in the system or risks of never turning the wifi connectivity to on.

3.1.1.37 IVSU-FUR-REQ-051466/D-WiFi Interface Requirement

WiFi logic shall share with IVSU connectivity status (Failure, success, in progress etc).
The IVSU feature shall share with connectivity manager the trigger state so that a connection is established when there is a trigger for an update.

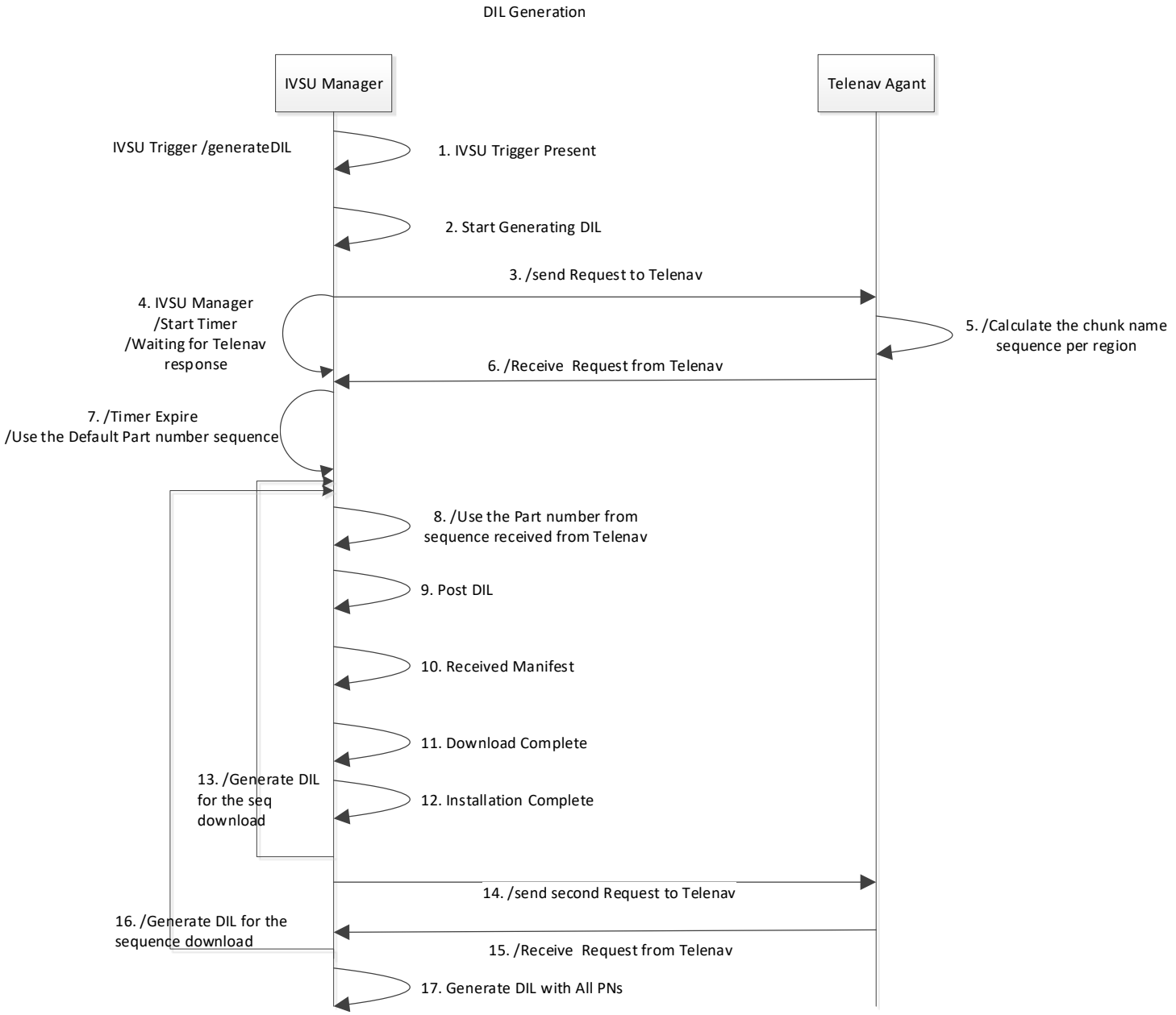
3.1.1.38 IVSU-FUR-REQ-213408/F-Interrogator File with Navigation Data

The navigation interrogator file shall be posted to the configurable URL for the GIVIS proxy

The interrogator file shall populate the Navigation Data attribute when the system support Navigation.

DIL Creation: -

1. IVSU Trigger Present
2. IVSU Start DIL Generation
3. IVSU Sends Request to Telenav
4. IVSU Manager waiting for Telenav response or timeout
5. Telenav calculation the download sequence (API Pasa & TN)
6. IVSU receives response form Telenav Manager
7. DIL Generate by default sequence if timer expire
8. DIL Generate Use the Telenav response
9. POSTs DIL
10. Received Manifest
11. Completes Download
12. Installation complete
13. IVSU Start DIL Generation with next file in the sequence (Back to #8)
14. IVSU Sends Second Request to Telenav
15. IVSU receives response form Telenav Manager
16. Generate DIL with second sequence (Back to #8)
17. Generate and post DIL with all part number once the update is complete



IVSU Manager shall have a default download sequence stored into read only memory.

The IVSU Manager SHALL send Telenav Agent First request to generate the Navigation
Maps and voice part numbers chunks; Telenav manager shall response with Navigation Data attribute and with download priority. Create a new rule with IVS limitation

The IVSU Manager shall map the chunk names with current part number.

The IVSU Manger shall generate DIL with Apps package, Core voice package, Gracenotes package before incorporating Navigation data files. At end of software update, IVSU manger shall generate DIL with all the current part numbers and post it to backend.

The IVSU manager shall receive a file from the Telenav agent that shall be used as the value for the new attribute in the DIL XML schema as a string (this attribute is the Navigation Data). IVSU Manager SHALL incorporate Navigation Data attribute in the Interrogator File.

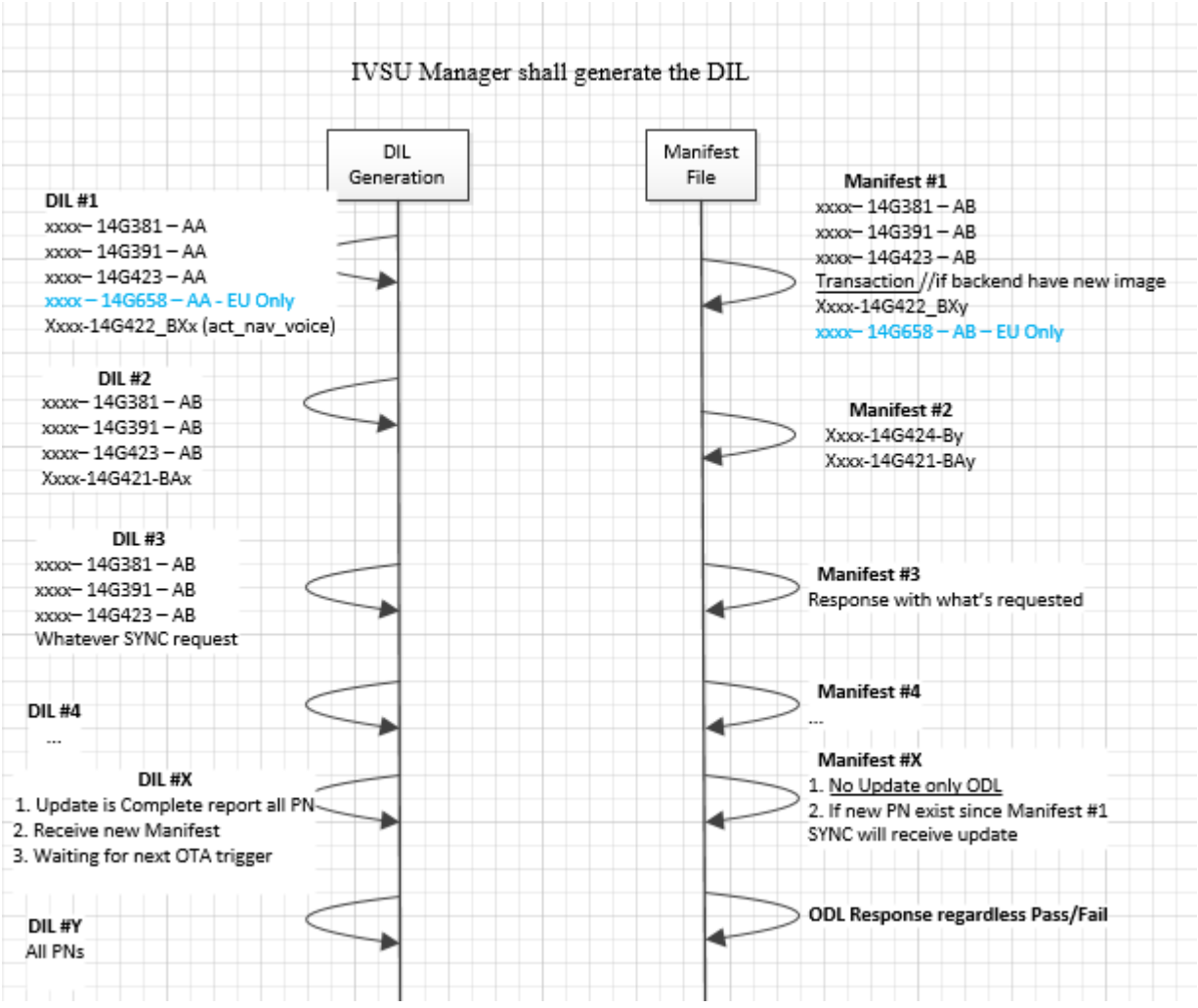
If Telenav agent doesn't response in maximum time, IVSU manager shall incorporate the default Navigation date attributes in the interrogator file.

The IVSU manger shall store the response from the Telenav agent. If IVSU Manager loses the pointer while in processing the sequence file, then IVSU Manger shall send the request to Telenav again and restart the sequence.

At the end of the sequence, IVSU Manager shall send second request to Telenav Agent to generate the Navigation Data attribute and with download priority. The IVSU Manager shall go thru the sequence again until it reaches the end. This could result in the module receiving No Update after every post or backend will have new part number. Second DIL post sequence is needed so backend is updated with latest part numbers.

After processing the second Telenav sequence request, IVSU Manager shall wait for the next trigger. At next trigger IVSU Manger shall send a new request to Telenav prior to generating the DIL.

The IVSU manger shall complete the sequence of $8060 DID the application part numbers by one at a time as following:



The interrogator file will be wrapped in SyncP and posted to the IVSU Cloud.

3.1.1.39 IVSU-FUR-REQ-213409/F-Download/Install OTA Navigation Files

The IVSU download manager shall download and install the Navigation License file.
The IVSU download manager shall download and install the Navigation License, Maps, POIs, and Voice File. Once the update is complete, the IVSU Manger shall update Navigation License, Maps, POIs, and Voice part number.

If IVSU manger encounter download/install failure of file(s) in the sequence, then file shall be skipped after maximum number of retries. The IVSU manger shall notify the backend for any failures.

The IVSU Manager shall store response from Telenav manager and follow the sequence until all the files are downloaded and installation complete. The IVSU manager shall track the progress of each file what was requested from Telenav Manager. If the vehicle region changed while files in process the IVSU manger shall not accept new file priority sequence until all previous files are processed.

Telenav Manger shall make sure all chunks of Nav maps and voice data is backward compatible.

3.1.1.40 IVSU-REQ-329793/A-Pause and resume in Applink

There are multiple scenarios that applink will be interrupted. Thus, there should be designed carefully to make sure IVSU through applink can pause and resume properly after this interruption.

Medium is no longer available scenario (USB cable is unplugged/ Bluetooth connection is manually closed/ Bluetooth is out of range)
User manually disable “auto update” setting
SYNC meets time out scenario (e.g. 3 mins) and it didn’t receive response from medium (Applink can’t forward request to cloud/ no more file cache in phone/ phone is still downloading file from cloud)

What SYNC should be capable of in above scenarios:
Stop “Check for update in progress” status in HMI
If medium is lost
After one putfile operation during file transfer: append last chunk to cache and update offset point
After one putfile operation during different binary file transition: append last chunk to cache, verify current binary file. If current binary file is corrupted, delete current binary file and update offset to beginning of current binary file. If current binary file is correct, update offset to next binary file.
In the middle of one putfile operation: Delete current putfile cache. Update offset to previous putfile point.
User can manually restart IVSU update process within same ignition cycle

3.1.1.41 IVSU-FUR-REQ-213410/C-Update prioritization

OTA manager shall be able to prioritize the updates as the following:
1. CAN reflash
2. USB update
4. IVSU update

IVSU manager shall NOT be interrupted and/or switched between triggers until the current processed trigger is complete. The IVSU manager shall follow the rules of the manifest for the update process.

3.1.1.42 IVSU-FUR-REQ-226567/B-Multiple system requests from Apps

App might send multiple IVSU system requests to SYNC to make sure request is received. In this scenario, SYNC should feedback current on system request (check policy update/ check update request/ file resume request)

3.1.1.43 IVSU-FUR-REQ-226568/B-Multiple responses from Apps

When Cloud meets downgrading performance scenario, Cloud will feedback multiple response at same time. In other words, when SYNC request binary update. The first feedback response SYNC received might still be policy table update. SYNC should identify response type and assign to it correctly function handler. In this scenario, SYNC should continuously update policy table (depends on total number of policy table update response) and wait for binary update response. If SYNC still can’t get binary update response, it will trigger time out scenario and resend binary update request (please check “Unexpected stop\request is lost in medium” section for detail)

3.1.1.44 IVSU-FUR-REQ-226569/B-BOM file verification

In order to compare with SYNC received a new BOM file; SYNC will compare checksum of current BOM file and new BOM from cloud. If checksum doesn't meet each other, we consider it as a new update. (Caution: Unable to precisely copy payload from SyncP message will make checksum of identical BOM file different.)

3.1.1.45 IVSU-FUR-REQ-226570/C-Oversized putfile operation in the end of each file

In the very last putfile of each binary, app might putfile a longer length than total binary length. In this scenario, putfile length plus SYNC cache file is larger than expected binary file length. In this case, SYNC should be capable to delete the very last putfile cache and resends file resume request for last putfile. If SYNC accidently appends last putfile cache and makes cache length larger than expect binary length, SYNC should be capable to delete current binary and restart downloading current binary file. In the meantime, SYNC should indicate "Oversize last putfile operation" Error/ "file length mismatch with expected binary length"

3.1.1.46 IVSU-FUR-REQ-226571/B-Offset and file length sync with app

During downloading process, SYNC will first send 0 offset with 0 file lengths to request file length from app. Once SYNC gets file length from app, it will store that file length for future reference. During putfile stage, SYNC will file resume request with next offset point and total file length to TDK. App will feedback putfile operation with requested offset point and total file length (got from cloud). If file length from app doesn't match from what SYNC stores locally, SYNC will restart check for update process. If file length difference only happens in current binary, erase current binary cache and restart current binary download. Otherwise, clear IVSU cache and restart IVSU process.

3.1.1.47 IVSU-FUR-REQ-226572/B-Additional checksum after each putfile operation (next gen)

Need to be compatible with current framework.
After each putfile, SYNC will feedback an acknowledgement with checksum of previous putfile file. If App tells SYNC it is not valid, SYNC will discard that putfile file.

1. App will provide a checksum before putfile
2. SYNC should tell app it is capable of this optimal mode.

3.1.1.48 IVSU-FUR-REQ-226573/C-Privacy mode

In privacy mode, SYNC is not allowed to send out GPS data. In the meantime, applink service is partially shut down. This change should not impact IVSU through AppLink or Wifi in any means.

3.1.1.49 IVSU-FUR-REQ-226576/B-Unexpected stop\request is lost in medium

In Pause and resume section, we already discussed that SYNC should stop IVSU process after a long timeout (e.g. 3 mins). Before SYNC cease IVSU process, we need to set up a retry scenario to cover unexpected stop and lost request scenario. In this scenario, both app and SYNC might miss last request. In order to deal with this one, SYNC should set up a timer and retry after a shorter timeout (e.g. first retry at 1 min 30 second, second try at 2 min and third retry at 2 min and 30 second). SYNC should be capable to save previous status and re-send system request.

3.1.1.50 IVSU-FUR-REQ-231961/B-Timestamp for Update

There Shall be a The timestamp displayed in HMI once the software update is completed or the module receives a no update from the cloud after posting the interrogator file.
The timestamp in the HMI shall be updated when only if an update was completed or if the backend notifies that there is no update.

For USB Update, Last checked for updates shall update only after IVSU completed the download and install.

For OTA update last checked for updates shall update only after IVSU completed the download and install or with no update

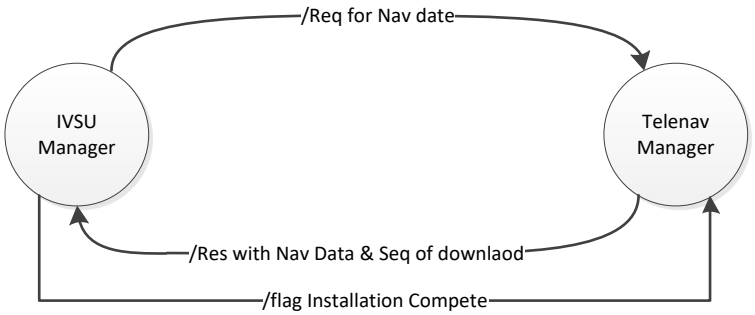
The timestamp shall never display incomplete.

Master Reset shall not affect update/change HMI; the timestamp displayed on shall be preserve from last time software update was complete or the module receives a no update from backend.

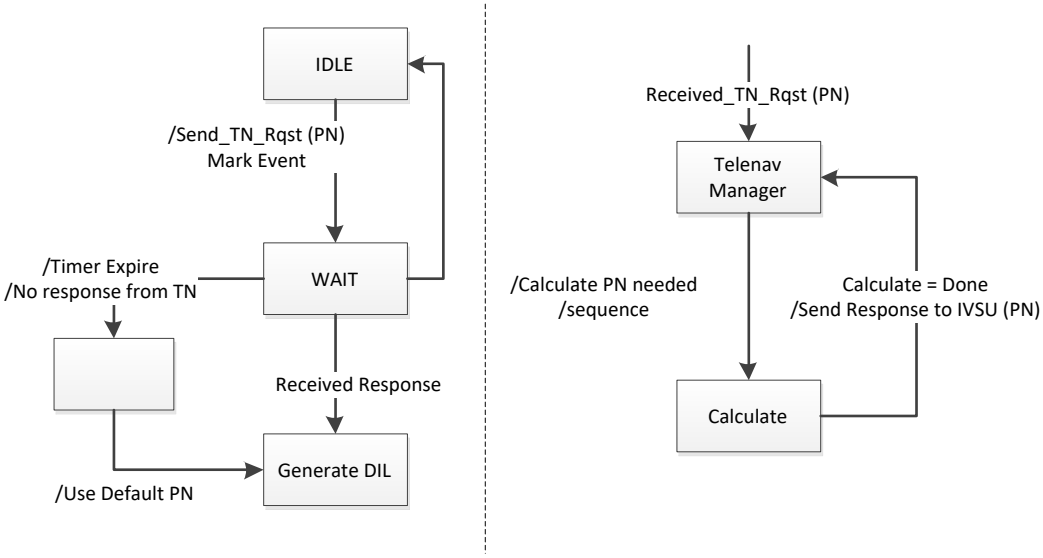
3.1.1.51 IVSU-FUR-REQ-231966/B-Interface with Telenav Agent

The IVSU Manager shall send Telenav Agent a request to generate the Nav maps and voice part numbers chunks. Telenav manager shall response with Navigation Data attribute and with download priority.

The IVSU Manager shall get notified the Telenav Agent after the installation is complete.



API between Telenav and IVSU Manager



Telenav and IVSU Manager Req/Res Process

3.1.1.52 IVSU-FUR-REQ-018241/A-Plant Access Point SSID (TcSE ROIN-294474-1)

When the SYNC module is searching for provisioning sources over Wi-Fi, it shall look for the following:
- Any access point with a name "SYNCPROV0" (This is short for SYNC Provisioning)
- The matching should be done in a case-sensitive fashion.
Note that a mixed-case or lower case SSID will have a different WPA2 Key and should not be used by the access point (or it will not work correctly with WPA2). The module may continue to attempt to connect in either case

3.1.1.53 IVSU-FUR-REQ-237866/A-Status Message - Updates

<Request Number> Status Messages

When connectivity is available status messages shall be sent to the cloud in real time, following the xml schema in the OTA cloud spec, in a single XML for each status update.

When connectivity is unavailable the status messages shall be inserted and queued into an XML.

When connectivity is available, the XML shall be posted to the cloud interface. The XML queue will be cleared once a 200 OK message is received from the cloud, otherwise it will repost following the retry strategy. If there is no response the retry strategy will be followed.

All Status messages shall be reported to the cloud using the schema in the OTA Cloud Specification

3.1.1.54 IVSU-FUR-REQ-251161/B-Manifest File with Navigation Data

The manifest shall have Apps package, Core voice package, Gracenotes package before Navigation data files.

Navigation Manifest file shall have Transaction with following priority: -

Transaction 1
- App Image
- Core Voice
- Gracenotes

Transaction 2
- Map License file
- Navigation Voice file
- POIs
- Navigation Map file

License will be attached to the first Navigation chunk

3.1.1.55 IVSU-FUR-REQ-251163/B-Master Reset

- All personalization settings and selections for the SYNC module will be cleared. The Auto-Update selection for the SYNC module will be cleared in the Master Reset, resulting in the EULA and Terms and Conditions opt-in Use Case to result.
- The feature shall wait for the customer to accept the EULA before it triggers and updates itself.
- IVSU should reset the count of the flag(s) to HMI after a master reset has occurred. When a master reset occurs, then the progress shall be cleared.
- The master reset shall clear the IVSU Cache unless all of files were downloaded completely. After Master Reset IVSU Manage shall continue to process the files in IVSU cache with installation/activation process without EULA acceptance and then wait for next IVSU trigger.
- HMI should look for the IVSU flag that shows the state of the update. If the state is IN-PROGRESS then the customer should be warned before they continue with master reset.

3.1.1.56 IVSU-REQ-329794/A-Map and Nav Voice Files Extract in place for OTA

For all Map and Nav voice files IVSU Manager shall use extract-in-place tool to support this solution for the next three years.
For Wi-Fi Update, irrespective of the package type [i.e. application, core voice, Grace notes, Map chunks, Nav Voice chunks, any other packages or utilities] IVSU manger shall use extract-in-place tool.
For USB updates, IVSU manger shall not use extract-in-place tool.

3.1.1.57 IVSU-FUR-REQ-274770/A-IVSU manager shall wait for AP connection

IVSU manager shall wait for AP connection be to ON before ending the VHM mode request (or x amount of time). Once the AP is, connected IVSU manager shall take over, continue the communication with the backend such as post DIL, and start download.

3.1.1.58 IVSU-REQ-353026/A-Automatic Software Updates Default Settings

when CCS Vehicle Connectivity is configured ON by default, *initial setting of Automatic software update shall be tied with vehicle connectivity but customer can change Automatic Software Updates and/or vehicle connectivity independent of each other.*

when CCS Vehicle Connectivity is configured OFF by default, *initial setting of Automatic software update shall be determined by the EULA HMI flow.*

3.1.2 Use Cases

3.1.2.1 IVSU-UC-REQ-018314/C-Software Install on a SYNC module (TcSE ROIN-296162-1)

Actors	SYNC Module
Pre-conditions	New software package resident on the SYNC module. Headunit ON
Scenario Description	SYNC module will unpackage and install the SYNC SW package.
Post-conditions	New software installed on head unit. Software activate on a SYNC module via WIFI or Software activate on a SYNC module via AppLink.
List of Exception Use Cases	E1 – Software activate on a SYNC module via WIFI E2 – Software activate on a SYNC module via Bluetooth E3 - Failure to install (see IVSU-REQ-018292-Software Update Process)
Interfaces	

3.1.2.2 IVSU-UC-REQ-018315/C-Software activate on a SYNC module with AppLink via Bluetooth (TcSE ROIN-296163-1)

Actors	SYNC Module, AppLink
Pre-conditions	- New software package installed on the SYNC module. - Smartphone with Ford-built AppLink-enabled app. - Headunit ON - Smartphone paired - AppLink available on headunit
Scenario Description	SYNC module will activate the new software load on an ignition cycle. Via AppLink, SYNC module will notify Ford-built app of successful activation (said notification will include timestamp).
Post-conditions	New software activated on the head unit. Notification by Smartphone to FMCSS of software activation.
List of Exception Use Cases	E1 - Failure to activate (see IVSU-REQ-018292-Software Update Process) E2 - Software activate without WIFI or AppLink connectivity to FMCSS E3 - Notification by Smartphone to FMCSS of software activation
Interfaces	Smartphone Ford-built IVSU App Interface BT Interface

3.1.2.3 IVSU-UC-REQ-018317/C-SYNC checks for update availability from FMCSS via WIFI (TcSE ROIN-296165-1)

Actors	SYNC module, FMCSS
Pre-conditions	SYNC module is connected to WIFI
Scenario Description	SYNC module connects to FMCSS and sends the current SYNC module firmware version including all DIDs required by Cloud in DIL.

	The FMCSS then determines if the SYNC module should be upgraded and sends the appropriate package identifier to which SYNC should upgrade to.
Post-conditions	SYNC module has package identifier to download from FMCSS, and begins Software copy from FMCSS.
List of Exception Use Cases	E1 – Failure to retrieve package information (see IVSU-REQ-018292-Software Update Process) E2 – Failure to connect to FMCSS (see IVSU-REQ-018292-Software Update Process) E3 - Software copy from FMCSS
Interfaces	WIFI Interface FMCSS Interface

3.1.2.4 IVSU-UC-REQ-018318/B-SYNC Software copy from FMCSS via WIFI (TcSE ROIN-296166-1)

Actors	SYNC module, FMCSS
Pre-conditions	SYNC module is connected to WIFI SYNC module has package identifier manifest file that is download from FMCSS
Scenario Description	SYNC module connects to FMCSS and retrieves the indicated package.
Post-conditions	New software package resident on SYNC module
List of Exception Use Cases	E1 - Failure to connect to FMCSS (see IVSU-REQ-018292-Software Update Process) E2 – Failure to download (see IVSU-REQ-018292-Software Update Process) E3 – Software package failed MD5 Check (see IVSU-REQ-018292-Software Update Process)
Interfaces	WIFI Interface FMCSS Interface

3.1.2.5 IVSU-UC-REQ-018319/B-Software activated on a SYNC module via WIFI (TcSE ROIN-296167-1)

Actors	SYNC Module, FMCSS
Pre-conditions	New software package installed on the SYNC module.HeadunitON WIFI Connection available with connection to FMCSS.
Scenario Description	SYNC module activates the new installed software load on an ignition cycle. Via WIFI, SYNC module will notify FMCSS of successful activation (said notification will include timestamp).
Post-conditions	New software activation and timestamp communicated to FMCSS
List of Exception Use Cases	E1 - Failure to activate (see IVSU-REQ-018292-Software Update Process) E2 - Software activate without WIFI or AppLink connectivity to FMCSS
Interfaces	WIFI Interface FMCSS Interface

3.1.2.6 IVSU-UC-REQ-018321/B-Software activate without WIFI or AppLink connectivity to FMCSS (TcSE ROIN-296169-1)

Actors	SYNC module
Pre-conditions	New software package activated on the SYNC module without connectivity to AppLink services via Bluetooth or WIFI Interface to FMCSS.

Scenario Description	SYNC module activated the new software load on an ignition cycle. The SYNC module stores the current activation details in order to communicate a successful activation with FMCSS via WIFI or AppLink via Bluetooth (when they become available).
Post-conditions	Activated software is running on SYNC module
List of Exception Use Cases	E1-IVSU-GUC-296170 - Transmit pending Software Activation Notification to FMCSS with WIFI E2-IVSU-GUC-296171 - Transmit pending Software Activation Notification to FMCSS FMCSS with AppLink via Bluetooth.
Interfaces	

3.1.2.7 IVSU-UC-REQ-018323/B-Transmit pending Software Activation Notification to FMCSS with AppLink via Bluetooth (TcSE ROIN-296171-1)

Linked Elements
IVSU-UC-REQ-018321/B-Software activate without WIFI or AppLink connectivity to FMCSS (TcSE ROIN-296169-1)

Actors	SYNC module, AppLink, Smartphone, FMCSS
Pre-conditions	Pending Software Activation Notification for FMCSS. Smartphone with Ford-built applink-enabled app. Headunit ON Smartphone paired AppLink available on Headunit
Scenario Description	SYNC module activated the new software load on a previous ignition cycle, without the ability to communicate the activation to FMCSS via WIFI or AppLink via Bluetooth. Via AppLink, SYNC module will notify Ford-built app of successful activation. (said notification will include timestamp).
Post-conditions	Pending Software Activation Notification is transmitted. Activation recorded by FMCSS.
List of Exception Use Cases	E1 - Failure to communicate software activation to FMCSS (see IVSU-REQ-018292-Software Update Process)
Interfaces	BT Interface Smartphone Ford-built IVSU App Interface BT Interface

3.1.2.8 IVSU-UC-REQ-018324/A-SYNC checks for update availability from FMCSS via Bluetooth (TcSE ROIN-303232-1)

Actors	SYNC module, AppLink, Smartphone, FMCSS
Pre-conditions	Smartphone with Ford-built applink-enabled app. Headunit ON Smartphone paired AppLink available on headunit
Scenario Description	Via AppLink, SYNC module will check for update from FMCSS, by providing metadata related to the current software levels available on the SYNC module. The FMCSS then determines if the SYNC module should be upgraded and sends the appropriate package identifier to which the Smartphone with Ford-built applink-enabled app will download.
Post-conditions	SYNC module has package identifier to download from FMCSS

List of Exception Use Cases	E1-IVSU-GUC-296159-Software Download to Ford Customer Smartphone
Interfaces	BT Interface Smartphone Ford-Built IVSU App Interface

3.1.2.9 IVSU-UC-REQ-051439/A-Software Download to Ford Customer Smartphone

Actors	Smartphone, Ford-built app, FMCSS
Pre-conditions	Customer has a smartphone with Ford-built app supporting IVSU installed.
Scenario Description	Ford-built app contacts FMCSS and learns of a new version of SW for the SYNC module. Ford-built app downloads the properly indicated SYNC module update release to the smartphone.
Post-conditions	SYNC module SW package resident on the smartphone
List of Exception Use Cases	E1 – Software Copy from Smartphone E2 - Failure to download to Ford Customer Smartphone (see requirement ### of Ford-built App)
Interfaces	WIFI Interface Cellular Network Ford-built IVSU App Interface FMCSS Interface

3.1.2.10 IVSU-UC-REQ-051440/A-Failure to download to Ford Customer Smartphone

Actors	Vehicle, Smartphone, Ford-built app
Pre-conditions	Failed download attempt from a customer smartphone using Ford-built app supporting IVSU installed.
Scenario Description	The Ford-built app is in the process of downloading the properly indicated SYNC module software and the download fails.
Post-conditions	Reference Ford-Built App specification
List of Exception Use Cases	N/A
Interfaces	Smartphone Ford-built IVSU App Interface

3.1.2.11 IVSU-UC-REQ-051441/A-Software Copy from Smartphone

Actors	Vehicle, Smartphone, Ford-built app
Pre-conditions	Customer has a smartphone, a Ford-built AppLink-enabled app installed on the smartphone, and a SYNC module SW package resident on the smartphone. Headunit ON, Customer smartphone Bluetooth paired, and AppLink present.
Scenario Description	Via AppLink, head unit interrogates the brought-in smartphone to see if there is new SYNC module software on the smartphone. If yes, the head unit initiates a software package copy action from the smartphone to the head unit.
Post-conditions	New software resident on the head unit
List of Exception Use Cases	E1 - New software not resident on brought-in smartphone
Interfaces	Smartphone

	Ford-built IVSU App Interface BT Interface

3.1.2.12 IVSU-UC-REQ-051449/C-Initial Opt-In for Auto-Updates EULA & Terms and Conditions (HMI)

Actors	SYNC module
Pre-conditions	Headunit ON Factory and Transport Mode is OFF Initial Auto-Update selection has not been selected
Scenario Description	When the vehicle exits Factory or Transport mode, the SYNC module shall present to the customer the EULA & Terms and conditions screen that will allow for the SYNC module to perform Auto-Updates to software. This HMI shall have the Opt-in for Auto-Updates selected by default. This HMI shall be presented to the customer on each trigger cycle until the customer makes a selection.
Post-conditions	SYNC Module stores the customer's selection for Auto-Updates for use in IVSU processing logic
List of Exception Use Cases	N/A
Interfaces	HMI

3.1.2.13 IVSU-UC-REQ-051450/A-Menu access to enable/disable Auto-Update setting (HMI)

Actors	SYNC module
Pre-conditions	Headunit ON Factory and Transport Mode is OFF Initial Auto-Update selection has been selected
Scenario Description	A customer that has chosen to either opt-in or opt-out of Auto-Updates of software to the SYNC module accesses the Auto-Update setting from within the SYNC System Menu. Through this menu selection, the customer can see the current setting for this selection, and modify the setting.
Post-conditions	Module stores the customer's selection for Auto-Updates for use in IVSU processing logic
List of Exception Use Cases	N/A
Interfaces	HMI

3.1.2.14 IVSU-UC-REQ-051451/A-Auto enable WiFi thru Auto-Update setting (HMI)

Actors	SYNC module
Pre-conditions	Headunit ON Factory and Transport Mode is OFF Initial Auto-Update selection has been selected
Scenario Description	When the customer selects to turn ON Auto-Updates thru HMI the WiFi will automatically be turned ON.
Post-conditions	When the customers goes thru HMI screens to check the status of WiFi, it should be turned ON
List of Exception Use Cases	

Interfaces	HMI

3.1.2.15 IVSU-UC-REQ-051452/A-Master Reset clearing of Auto-Update selection (HMI)

Actors	SYNC module
Pre-conditions	Headunit ON Customer has initiated a Master Reset of the SYNC module
Scenario Description	A customer has chosen to initiate a Master Reset of the SYNC module. All personalization settings and selections for the SYNC module will be cleared. The Auto-Update selection for the SYNC module will be cleared in the Master Reset, resulting in the EULA and Terms and Conditions opt-in Use Case to result.
Post-conditions	Auto-Update setting is null, Customer will be presented with EULA and Terms and Conditions Opt-In HMI.
List of Exception Use Cases	
Interfaces	HMI

3.1.2.16 IVSU-UC-REQ-051434/A-SYNC checks for battery state of charge

Actors	SYNC module, AppLink
Pre-conditions	Ignition Status changed to OFF
Scenario Description	Sync Module shall receive the following signals from HS1: BSBattSOC BSBattSOC_UB The signal has to have an refreshed UB and state of charge less or equal a configurable value (initial value should be set to 75%; min value should be set to 30%, ~~max value should be set to 100%)~~ before allowing the IVSU feature to search for any updates.
Post-conditions	SYNC module read a correct state of charge to continue with any actions
List of Exception Use Cases	xxx- If the UB is not refreshed or the signal is missing; the sync module cannot verify the battery SOC, therefore it should not assert VHM in order to search for updates. For vehicles without the BSBattSOC and BSBattSOC_UB signals available for SYNC, IVSU shall proceed with asserting VHM.
Interfaces	P04 Interface Power Mode Specification

3.1.2.17 IVSU-UC-REQ-051435/B-IVSU feature votes to keep the module in the VHM state

Actors	SYNC module, ~~AppLink,~~ USB, WiFi
Pre-conditions	Ignition Status changed to OFF Ignition Cycle count has reached the desired count Battery State of Charge is equal or more of the configurable value A configured WiFi access point has been detected~~, OR an IVSU capable Smartphone Application with file being delivered,~~ OR a USB with software update is being processed, OR the IVSU feature is in the process states of COPY or INSTALLATION.
Scenario Description	IVSU application will set a flag to hold the SYNC module in the VHM mode. The module will stay in the mode until the flag is cleared or the max time has been reached The module shall not assert VHM if the software download is occurring using Applink
Post-conditions	

List of Exception Use Cases	E1 – If the max time is reached before the download or install is complete, the module need to save the last point of download/install
Interfaces	P04 Specification Sync Power Mode Specification

3.1.2.18 IVSU-UC-REQ-051468/D-SYNC module switches between WiFi and Applink

Actors	SYNC module, AppLink Enabled IVSU Smartphone App
Pre-conditions	Module has started download through WiFi or AppLink enabled IVSU app and the original delivery transport is no longer available
Scenario Description	When downloading a file from WiFi or AppLink interface, the SYNC module SHALL keep track of what location of the file has last been appended to the file in the download area. The SYNC module SHALL use this file location information to generate an offset for its request to resume the download via either WiFi or AppLink interface. If SYNC lost WiFi connection and has found a valid AppLink enabled IVSU Smartphone app, the SYNC module shall process the request for the file that was previously being downloaded from the last offset location. When the download is completed to the IVSU capable smartphone app, and SYNC requests the file from a given offset, the app shall pass the file from the requested offset location through Applink for copy onto the SYNC. When that copy is complete, the phone shall clear its cache. If SYNC lost connection with a valid AppLink enabled IVSU enabled Smartphone app, the SYNC module shall process the request for the file that was previously being downloaded from the last offset location via WiFi if a configured Wireless Access Point is available. If SYNC is connected to a WiFi with no internet access and a valid AppLink IVSU enabled Smartphone app, the SYNC SHALL first try with WiFi, once it meets retry timeout, then SYNC shall jump to Applink. If both mediums have no internet access, SYNC shall meet time out scenario.
Post-conditions	
List of Exception Use Cases	E1 – If the WiFi connection is re-established while waiting for the phone to get the files, then the module shall resume downloads from the server using the WiFi connection E2 – If the WiFi connection is re-established while download is in progress thru Applink, then the module shall interrupt the AppLink download, and resume downloading at the same interrupted location. E3- If the WiFi receives a new manifest then it shall clear cache and start downloading the new files E4- If the WiFi connection/ Applink connection is re-established while SYNC is previously connected to no internet access WiFi and applink medium, SYNC SHALL resume downloads from new connected medium.
Interfaces	P04 Specification Applink Specification

3.1.2.19 IVSU-UC-REQ-051470/A-SYNC module activates new software (HMI)

Actors	SYNC module, HMI
Pre-conditions	The install of the new software was successfully completed
Scenario Description	The module shall activate the new software upon the next ignition cycle. The HMI shall have the configurable option to present an Icon that a customer can select to provide more details about the recently activated software on the SYNC module.
Post-conditions	Activation Icon is presented to the HMI
List of Exception Use Cases	E1 – if the activation fails, the module shall still be fully functional with the previous existing software E2 – Customer Interacts with the Activation Icon
Interfaces	P04 Specification

3.1.2.20 IVSU-UC-REQ-051471/B-SYNC module shall be stop trying to copy and Install after XX VHM Cycles

Actors	SYNC module, ~~Applink Enabled IVSU Smartphone App,~~ WiFi, USB
Pre-conditions	The module is connected to USB or WiFi ~~or Applink~~ and is trying to copy or install software
Scenario Description	The module has had a successful connection to the FMCSS, or is connected to a USB device with software for download/install, and has asserted the flag to hold the VHM mode for 30 min to try and complete the download. The download stops after the 30 min max time in the VHM mode, and the module resumes it the next cycle. After XX 30 minute VHM attempts, the module shall attempt to try again only during Ignition ON.
Post-conditions	After the module has asserted the VHM for the max time of 30 min (configurable variable), for XX consecutive attempts, then it shall not continue the download or install during Ignition OFF. This count will be reset when a new download starts.
List of Exception Use Cases	N/A
Interfaces	P04 Specification

3.1.2.21 IVSU-UC-REQ-051472/A-SYNC module shall prompt for a WiFi connection

Actors	SYNC module, HMI
Pre-conditions	Customer has Accepted EULA enabling Automatic Software Updates The customer has not programmed any AP, and there is no pre-configured AP
Scenario Description	Automatic Software Updates is ON. After the first 30days (configurable variable)/260 ignition cycle (configurable variable) has passed, the module shall try to ping the server for any software updates. If the module doesn't find any programmed AP, then it will prompt the customer thru the HMI screen so they can setup up an AP. The prompt will only be presented to the customer once after having accepted the EULA enabling Automatic Software Updates AND the first 30days (configurable variable)/260 key cycles (configurable variable) has been met AND the module hasn't received a customer programmed Access Point.
Post-conditions	HMI Prompts the Customer
List of Exception Use Cases	
Interfaces	P04 Specification

3.1.2.22 IVSU-UC-REQ-051474/A-Customer interacts with Activation Icon (HMI)

Actors	SYNC module, HMI
Pre-conditions	User selects Activation Icon
Scenario Description	The module has activated a new software load on an ignition cycle. If the configurable Activation Icon setting is ON, and the Activation Icon was selected by User, an HMI screen shall be presented to the customer, with configurable text to provide details for the recently activated installation.
Post-conditions	HMI screen is presented to the customer Activation Icon is cleared
List of Exception Use Cases	
Interfaces	P04 Specification

3.1.2.23 IVSU-UC-REQ-051475/A-Progress of Download (HMI)/ Install using WiFi

Actors	SYNC module, HMI
Pre-conditions	The SYNC module is provided with the size for an update from the FMCSS SYNC module is downloading the update from FMCSS
Scenario Description	The HMI shall present a progress status to the customer indicating the progress of the download.
Post-conditions	
List of Exception Use Cases	
Interfaces	

3.1.2.24 IVSU-UC-REQ-051991/A-Progress of Download/Install using USB (HMI)

Actors	SYNC module, HMI
Pre-conditions	The SYNC module is provided with the number of files and size for an update from the manifest residing in the USB SYNC module is downloading the update from USB
Scenario Description	The HMI shall indicate the number of the file being installed or downloaded (Ex: Downloading File X out of Y) The HMI shall show the progress of each file while downloading/installing
Post-conditions	
List of Exception Use Cases	
Interfaces	

3.1.2.25 IVSU-UC-REQ-051992/A-New software not resident on brought-in smartphone

Actors	SYNC module, Applink, FMCSS
Pre-conditions	
Scenario Description	The module sends the URL for the file or the file name. The file is not resident on the smartphone. The expected response will timeout
Post-conditions	

List of Exception Use Cases	
Interfaces	

3.1.2.26 IVSU-UC-REQ-051993/B-The module loses location of paused download/install

Actors	SYNC module, Applink, FMCSS
Pre-conditions	The module was interrupted while downloading/installing the new software and module was unable to save the offset.
Scenario Description	The connection is resumed again, but the module starts downloading/installing from the beginning of the file.
Post-conditions	
List of Exception Use Cases	Note: this is an error state scenario
Interfaces	P04 Specification

3.1.2.27 IVSU-UC-REQ-051995/C-Module receives new Manifest after resuming to download

Actors	SYNC module, Applink, FMCSS
Pre-conditions	The module was interrupted while downloading because of a failure
Scenario Description	When the module resumes the connection and finds a new manifest, it will clear the cache before it starts downloading the new files
Post-conditions	
List of Exception Use Cases	
Interfaces	P04 Specification

3.1.2.28 IVSU-UC-REQ-226588/B-Replay Attack in Applink

Actors	SYNC module, AppLink Enabled IVSU Smartphone App, smart phone
Pre-conditions	Headunit ON Factory and Transport Mode is OFF Initial Auto-Update selection has been selected
Scenario Description	It happens when server ID/Module ID is not synced with cloud. SYNC should be capable to update server ID/Module ID and check with server again. Once SYNC is sync with cloud, SYNC should immediately resume previous IVSU progress. • If previous progress is checking policy table update/ Binary update: Resend request to check policy/binary update • If previous progress is putfile/file transfer: Resend request to check for binary update, if received BOM file indicating binary is same as current file. Resume putfile progress. Otherwise, clear IVSU cache and restart downloading new file.
Post-conditions	
List of Exception Use Cases	

Interfaces	P04 Specification Applink Spec

3.1.2.29 IVSU-UC-REQ-231970/A-SYNC module switches between WiFi and Applink

Actors	SYNC module, AppLink Enabled IVSU Smartphone App
Pre-conditions	Module has started download through WiFi or AppLink enabled IVSU app and the original delivery transport is no longer available
Scenario Description	When downloading a file from WiFi or AppLink interface, the SYNC module SHALL keep track of what location of the file has last been appended to the file in the download area. The SYNC module SHALL use this file location information to generate an offset for its request to resume the download via either WiFi or AppLink interface. If SYNC lost WiFi connection and has found a valid AppLink enabled IVSU Smartphone app, the SYNC module shall process the request for the file that was previously being downloaded from the last offset location. When the download is completed to the IVSU capable smartphone app, and SYNC requests the file from a given offset, the app shall pass the file from the requested offset location through Applink for copy onto the SYNC. When that copy is complete, the phone shall clear its cache. If SYNC lost connection with a valid AppLink enabled IVSU enabled Smartphone app, the SYNC module shall process the request for the file that was previously being downloaded from the last offset location via WiFi if a configured Wireless Access Point is available. If SYNC is connected to a WiFi with no internet access and a valid AppLink IVSU enabled Smartphone app, the SYNC SHALL first try with WiFi, once it meets retry timeout, then SYNC shall jump to Applink. If both mediums have no internet access, SYNC shall meet time out scenario.
Post-conditions	
List of Exception Use Cases	E1 – If the WiFi connection is re-established while waiting for the phone to get the files, then the module shall resume downloads from the server using the WiFi connection E2 – If the WiFi connection is re-established while download is in progress thru Applink, then the module shall interrupt the AppLink download, and resume downloading at the same interrupted location. E3- If the WiFi receives a new manifest then it shall clear cache and start downloading the new files E4- If the WiFi connection/ Applink connection is re-established while SYNC is previously connected to no internet access WiFi and applink medium, SYNC SHALL resume downloads from new connected medium.
Interfaces	P04 Specification Applink Specification

3.1.2.30 IVSU-UC-REQ-226587/C-Server ID/Module ID racing scenario in Applink

Actors	SYNC module, AppLink Enabled IVSU Smartphone App, smart phone, FMCSS
Pre-conditions	Headunit ON Factory and Transport Mode is OFF

	Initial Auto-Update selection has been selected
Scenario Description	SYNC needs to sync Server ID and Module ID before SYNC set up communication channel with Cloud. Policy server begins with sending a server ID (e.g. X) and module ID (e.g. N) to SYNC. SYNC will set server ID and Module ID as server requests. Next message SYNC sends back to cloud will have a server ID X and Module ID N+1. Next message SYNC get from cloud will have a server ID X+1 and Module ID N+1. The server ID is internal shared between policy server/updater servers. Ideally, SYNC only need to sync server ID once in each wireless connection. In worse scenario, server ID is not same between policy server and update server. In this scenario, Policy sever will request to set server ID as X and Module ID as Y. SYNC successfully set server ID + Module ID and finish policy server update. When SYNC communicates to update server, update server will ask SYNC to set server ID as X2 and Module ID as Y2. After synchronization, SYNC will restart policy table update. When SYNC turns back to policy server, the server ID will be reset to X. In this scenario, SYNC should try 5 times and throw an error in its log indicating server ID racing issue. Server ID from policy server and update server should be both included in the log.
Post-conditions	
List of Exception Use Cases	Note: this is an error state scenario
Interfaces	P04 Specification Applink spec

3.1.2.31 IVSU-UC-REQ-231957/A-The SYNC module is Non-Navigation Hardware module+

Actors	SYNC Module
Pre-conditions	SYNC Module is Non-Navigation hardware
Scenario Description	If the SYNC module is Non-Nav then IVSU Manager shall make sure that there are no Nav files exist on the module including (Nav license, Nav Voice, Nav Map)
Post-conditions	SYNC module shall not contain any Navigation Files
List of Exception Use Cases	
Interfaces	IVSU Manager, IVSU Cloud

3.1.2.32 IVSU-UC-REQ-292064/A-Download/Install failure of file(s) in the sequence

Actors	
Pre-conditions	
Scenario Description	
Post-conditions	
List of Exception Use Cases	
Interfaces	

3.1.2.33 IVSU-UC-REQ-018320/C-Software copy from USB (TcSE ROIN-296168-1)

Actors	SYNC module, USB Device
Pre-conditions	Ignition is in RUN or ACC USB Device with new software package valid for download connected to SYNC module.
Scenario Description	SYNC module copies contents of new software package from USB onto SYNC module. SYNC module shall verify that USB has new software not logs and/or SYNC utility.
Post-conditions	New software package resident on SYNC module. Software Install on SYNC module.
List of Exception Use Cases	E1 - Failure to copy from USB (see IVSU-REQ-018292-Software Update Process) E2 - Software Install on a SYNC module E3 - SYNC module shall not copy contents of Map packages/Chunks and Nav Voice packages/chunks from USB onto SYNC module, It shall install directly from the USB.
Interfaces	USB Interface

3.1.2.34 IVSU-UC-REQ-051448/B-HMI Acknowledgement when customer inserts USB Media that contains software to be installed on SYNC

Actors	SYNC module, USB Interface
Pre-conditions	USB Device with new software package valid for download connected to SYNC module.
Scenario Description	Customer attaches USB Media that contains a software installation to the SYNC module. The SYNC module determines that there is a software package on the USB media that needs to be copied onto its internal memory. The HMI shall provide the customer feedback that the SYNC module has found a valid software package. The HMI shall indicate that the software is being copied from USB media until the copying has been completed.
Post-conditions	After software copy from USB is complete, HMI for USB Software Copy is no longer displayed.
List of Exception Use Cases	E1 - SYNC module shall not copy contents of Map packages/Chunks and Nav Voice packages/chunks from USB onto SYNC module, It shall install directly from the USB.
Interfaces	USB Interface HMI

3.1.2.35 IVSU-UC-REQ-051469/B-SYNC module installing downloaded files

Actors	SYNC module, AppLink enabled IVSU Smartphone App, WiFi, USB
Pre-conditions	Sync module downloaded all files thru one or more communication methods
Scenario Description	Sync will start automatically to install the software after all the files listed in the manifest have completed successfully downloaded
Post-conditions	
List of Exception Use Cases	E1 – If all files are not downloaded, the module shall not start the installation E2 - SYNC module shall not copy contents of Map packages/Chunks and Nav Voice packages/chunks from USB onto SYNC module, It shall install directly from the USB.
Interfaces	P04 Specification

3.1.2.36 IVSU-UC-REQ-051994/C-The module continues to download/install while emergency assist was activated

Actors	SYNC module, Applink, FMCSS
Pre-conditions	The vehicle is in an emergency situation.
Scenario Description	The emergency assist is active (or post-crash alert) and if module is Downloading:- 1. Downloading of package paused. 2. After eCall ends and in next ignition cycle downloading should resume Installing:- 1. Package installation stopped. 2. All files cleared from /fs/images/ivsu_installcache and /fs/images/ivsu_installcache/.extract_images paths. After eCall ends and in next ignition cycle update restarted (from downloading of packages).
Post-conditions	Log an error in the FMCSS.
List of Exception Use Cases	Note: this is an error state use case
Interfaces	P04 Specification

3.1.2.37 IVSU-UC-REQ-129010/C-HMI displays information about the software update

Actors	SYNC module,
Pre-conditions	The module has activated a new software
Scenario Description	The module will execute the installer which will populate the HMI screen with details about the software update.
Post-conditions	Once the HMI window is closed, the information is not available anymore
Interfaces	HMI Specification, Sync Debug Tool Specification

3.1.2.37.1 IVSU-UC-REQ-231959/D-Download of Nav File Chunk Complete

Actors	SYNC Module
Pre-conditions	Download of Navigation Voice was in progress
Scenario Description	Download completed successfully IVSU Manager shall install the Navigation Chunk The Nav Chunk part number shall be updated Once installation is complete, the file shall be erased from IVSU cache
Post-conditions	Navigation chunk is successfully installed and deleted from IVSU cache
List of Exception Use Cases	
Interfaces	IVSU Manager, IVSU Cloud, Telenav Agent

3.1.2.38 IVSU-UC-REQ-231949/C-Master Reset during IVSU Update in progress

Actors	SYNC module
Pre-conditions	Ignition is in RUN or ACC Customer has initiated a Master Reset of the SYNC module during IVSU update in progress and all files download is 100% complete

Scenario Description	A customer has chosen to initiate a Master Reset of the SYNC module during update in progress. The master reset should Not clear IVSU cache because download completely 100%. The IVSU Manger shall continue until fully completed/installed/activated.
Post-conditions	IVSU Manager shall continue with installation and activation regardless of EULA = off/on.
List of Exception Use Cases	IVSU Manager shall not download software files without EULA is expected.
Interfaces	IVSU Manager, Telenav

3.1.2.39 IVSU-UC-REQ-231956/B-Manifest Parse

Actors	SYNC Module
Pre-conditions	Manifest was received from the cloud
Scenario Description	1. Navigation voice shall be the 2nd transaction in the first manifest 2. All Navigation MAP chunks will be provided in separate manifest 3. License will be included in the 2nd manifest along with the common map chunk/fist map chunk request
Post-conditions	Each transactionshall be install and activated prior to next transaction.
List of Exception Use Cases	E1. The SYNC module is Non-Navigation Hardware module
Interfaces	IVSU Manager, IVSU Cloud

3.1.2.40 IVSU-UC-REQ-231959/D-Download of Nav File Chunk Complete

Actors	SYNC Module
Pre-conditions	Download of Navigation Voice was in progress
Scenario Description	Download completed successfully IVSU Manager shall install the Navigation Chunk The Nav Chunk part number shall be updated Once installation is complete, the file shall be erased from IVSU cache
Post-conditions	Navigation chunk is successfully installed and deleted from IVSU cache
List of Exception Use Cases	
Interfaces	IVSU Manager, IVSU Cloud, Telenav Agent

3.1.2.41 IVSU-UC-REQ-251164/C-EULA is not accepted after Master Reset during installation Process

Actors	SYNC Module
Pre-conditions	Ignition is in RUN or ACC A customer has chosen EULA = Off thru HMI and/or after master reset EULA is not accepted. IVSU in process of installing the completely downloaded files.
Scenario Description	IVSU Manger shall complete the installation and activation for all files from IVSU cache.
Post-conditions	New software is activated IVSU Manger is idle waiting for EULA = ON

List of Exception Use Cases	
Interfaces	HMI, IVSU feature

3.1.2.42 IVSU-UC-REQ-266287/A-SYNC module shall Connect to preconfigured AP in 2min VHM Mode

Actors	SYNC module, WiFi
Pre-conditions	The module has IVSU trigger is Present and AP is preconfigured
Scenario Description	The module has IVSU trigger is Present and AP is preconfigured. The module shall hold the VHM mode for 2 mins to allow WiFi to connect to pre-configure AP after each key cycle. The Module shall NOT count 2 min VHM mode toward consecutive VHM mode (this is for WiFi chip to connect to preconfigured AP). IVSU manager shall wait for AP connection be to ON before ending the VHM mode request. Once the AP is connected IVSU manager shall take over and continue the communication with the backend such as post DIL and start download.
Post-conditions	SYNC is connected to WiFi: - The IVSU Manger Shall extend the VHM mode ~28mins to download the software. SYNC is NOT connected to WiFi: - VHM mode shall expire after 2mins.
List of Exception Use Cases	N/A
Interfaces	P04 Specification WiFi SPSS

3.1.2.43 IVSU-UC-REQ-329790/A-MAP Update nth sequence of DIL & Manifest file

Actors	SYNC Module
Pre-conditions	SYNC shall generate DIL with Core Image, Grace notes, Core Voice and all NAV chunk & NAV_Voice part numbers
Scenario Description	An ODL will be received. SYNC shall end the update process.
Post-conditions	Map update completed
List of Exception Use Cases	
Interfaces	IVSU Manager, IVSU Cloud

3.1.2.44 IVSU-UC-REQ-329789/A-MAP Update 3rd sequence of DIL & Manifest file

Actors	SYNC Module
Pre-conditions	SYNC shall generate DIL with Core Image, Grace notes, Core Voice and one of the NAV chunk and post to IVSU cloud.

Scenario Description	1. If NAV update is available, then SYNC shall receive Manifest containing NAV chunk or Nav_voice chunk. 2. If NAV update is not available then sync shall receive ODL only response
Post-conditions	Sync is updated with NAV chunk SYNC will generate post-update DIL and send to IVSU cloud Post-update DIL will contain: Core Image, Grace notes, Core Voice and one of the NAV chunk. If all Nav chunks are updated, post-update DIL will contain all NAV chunk & NAV_voice part numbers along with APPs, Gracenotes and Core Voice
List of Exception Use Cases	
Interfaces	IVSU Manager, IVSU Cloud

Note: Update sequence# 3 will be repeated until all NAV chunks are updated. Order of the amp chunk update will varies based on location.

3.1.2.45 IVSU-UC-REQ-329731/A-MAP Update 2nd sequence of DIL & Manifest file

Actors	SYNC Module
Pre-conditions	SYNC shall generate DIL with Core Image, Grace notes, Core Voice and Nav Common chunk.
Scenario Description	1. If update is available then SYNC shall receive Manifest containing map license file and Nav common chunk. 2. If update is not available then sync shall receive ODL only response
Post-conditions	Sync is updated with License and Nav Common chunk
List of Exception Use Cases	If the Core Image installation failed in the 1st sequence, 2nd manifest will also contain the Core Image.
Interfaces	IVSU Manager, IVSU Cloud

Note: Nav Common Chunk Example: kkkk-14G421-yAz
(Prefix = kkkk - don't care; Base number – should never change; Suffix (3 letters): Middle letter "A" must never change. 1st letter "y" specify the region (C=NA, B=Europe) and third letter "z" controls the Map data version number)

3.1.2.46 IVSU-UC-REQ-329730/A-MAP Update 1st sequence of DIL & Manifest file

Actors	SYNC Module
Pre-conditions	SYNC shall generate DIL with Core Image, Grace notes, Core Voice and DAB App(for EU only) and Active Nav_Voice
Scenario Description	1. SYNC shall receive Manifest with Core Image, Grace notes, Core Voice on 1st transection and DAB App(EU Only) & Active Nav_Voice on 2nd transection 2. SYNC will download and install the files listed in manifest
Post-conditions	Sync is updated with Core Image, Grace notes, Core Voice, DAB App(for EU only) and Active NAV_Voice
List of Exception Use Cases	
Interfaces	IVSU Manager, IVSU Cloud

3.1.2.47 IVSU-UC-REQ-231960/B-Navigation License

Actors	SYNC Module
Pre-conditions	Download of navigation license has occurred
Scenario Description	Navigation License shall have: - Installer shall verify only the Map license part numbers - The new Nav Map part number - The new Nav Map version number
Post-conditions	The license shall be checked prior to the download of the files from OTA or USB
List of Exception Use Cases	
Interfaces	IVSU Manager, IVSU Cloud

3.1.2.48 IVSU-UC-REQ-231959/D-Download of Nav File Chunk Complete

Actors	SYNC Module
Pre-conditions	Download of Navigation Voice was in progress
Scenario Description	Download completed successfully IVSU Manager shall install the Navigation Chunk The Nav Chunk part number shall be updated Once installation is complete, the file shall be erased from IVSU cache
Post-conditions	Navigation chunk is successfully installed and deleted from IVSU cache
List of Exception Use Cases	
Interfaces	IVSU Manager, IVSU Cloud, Telenav Agent

3.2 IVSU-FUN-REQ-232353/A-SWUpdateTriggerCmd

3.2.1 Requirements

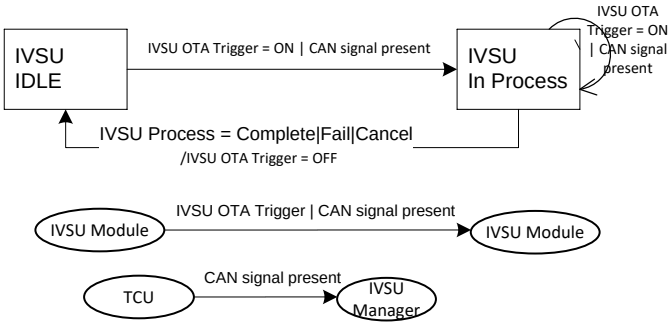
3.2.1.1 IVSU-FUR-REQ-156062/F-Trigger Requirements

IVSU will consider these events as trigger for an update:

1. USB stick with software files
2. Day count is equal or higher than the configurable value
3. Ignition cycle count is equal or higher than the configurable value
4. Customer presses the button on HMI to search for updates
5. After a successful update thru a USB, a trigger for OTA will occur
6. CAN signal present
7. After a final failure of an update
8. After the authorization is given to the system
9. After eCall is cleared
10. After crash event is clear

Day Count ≥ Elapsed_Days	TRUE	—	—	—	—	—	—	ELSE
Ignition Count ≥ Elapsed_Igniton_Checks	—	TRUE	—	—	—	—	—	
HMI Press = SCAN FOR UPDATES	—	—	TRUE	—	—	—	—	
USB Update Status = Complete	—	—	—	TRUE	—	—	—	
OTA_Update = FAILED	—	—	—	—	TRUE	—	—	
OTA_TriggerCmd = IVSU	—	—	—	—	—	TRUE	—	
CAN Signal = Present	—	—	—	—	—	—	TRUE	
IVSU OTA Trigger	ON	ON	ON	ON	ON	ON	ON	OFF

If 2 thru 6 occurs, the IVSU feature shall set the IVSU OTA Trigger to ON and cascade it to WiFi process so that connection can occur.



Description: IVSU OTA Trigger shall be a variable that is set to ON when one of the methods of triggering IVSU occur. This flag should be set to OFF if the IVSU process is complete with success or complete with a failure. However, if a failure requires a retry that means that the IVSU is still in process and not complete. If no authorization or loss of it occurs, that means the process should fail and the flag cleared.

While the IVSU feature is in progress, this flag shall remain set to ON.

If the download is completed, then this flag shall be set to OFF.

If the download fails with a scenario that requires a new trigger event to occur before communicating with the back end again, then this flag shall be set to OFF.

If the update gets cancelled (based on other requirements), then the flag IVSU OTA Trigger should be set to OFF.
If a Master Reset occurs, the IVSU OTA Trigger shall be set to OFF and the individual triggers should be reset to default values.

3.2.1.2 IVSU-FUR-REQ-213406/D-CAN signals to support OTA Navigation Updates

SYNC shall receive a CAN signal from the TCU that will act as a trigger for an updateThe CAN signal will be: OTATrg_D_Rq. The values of the signal shall be:

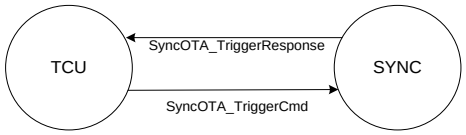
OTATrg_D_Rq
0x0 = Null (default value)
0x1 = Nav (for navigation map/voice updates)
0x2 = IVSU (for image and application updates)
0x3 = NotUsed

SYNC shall send a CAN signal to TCU for the command response, if the trigger received was accepted or not. The name of the CAN signal shall be (signal scaling 2 bits): OTATrg_D_Stat(2bits). The values shall be:

OTATrg_D_Stat
0x0 = Null (default value)
0x1 = NotAcceptedwhen the command is not accepted to start the download)
0x2 = Accepted (when the command is accepted to start the download)
0x3 = NotUsed

CAN SIGNAL Name	Literals	Value	Description
OtaTrg_D_Rq	NULL	0x0	Default
	NAV	0x1	NAV Update
	IVSU	0x2	IVSU Update
	NotUsed	0x3	Not used
OtaTrg_D_Stat	NULL	0x0	Default

	NotAccepted	0x1	when the command is not accepted to start the download
	Accepted	0x2	when the command is accepted to start the download
	NotUsed	0x3	Not used



The command shall not be accepted when:

- The EULA was not accepted
- Or, there is an update in progress
- Or, the vehicle is in a crash state
- Or, the vehicle is in a diagnostic state

3.2.2 Use Cases

3.2.2.1 IVSU-UC-REQ-227866/B-Internal Timer or Ignition Count as an Update Trigger

Actors	SYNC Module
Pre-conditions	Ignition is in RUN or ACC Update trigger has occurred from expired timer or ignition count
Scenario Description	The module internal time/ignition count has expired to search for an update
Post-conditions	IVSU Manager will wait for Cloud Response
List of Exception Use Cases	
Interfaces	IVSU Manager, Telenav Agent

3.2.2.2 IVSU-UC-REQ-227867/B-CAN Signal as an Update Trigger

Actors	TCU Module, SYNC Module
Pre-conditions	Ignition is in RUN or ACC CAN signal was received from the TCU to notify for an update
Scenario Description	IVSU Manager shall check to see if there is an update in progress. If there is not then the response from OTATrg_D_Stat should be send that the command was ACCEPTED
Post-conditions	IVSU Manager will wait for Cloud Response
List of Exception Use Cases	CAN signal trigger while an update is in progress
Interfaces	IVSU feature, Can Signal, HMI

3.2.2.3 IVSU-UC-REQ-227868/B-CAN signal trigger while an update is in progress

Actors	TCU Module, SYNC Module
Pre-conditions	Ignition is in RUN or ACC

	CAN signal was received from the TCU to notify for an update
Scenario Description	IVSU Manager shall check to see if there is an update in progress. If there is then the response from OTATrg_D_Stat should be send that the command was NOT ACCEPTED
Post-conditions	IVSU Manager will continue with the update in progress
List of Exception Use Cases	
Interfaces	IVSU feature, CAN Signal, HMI

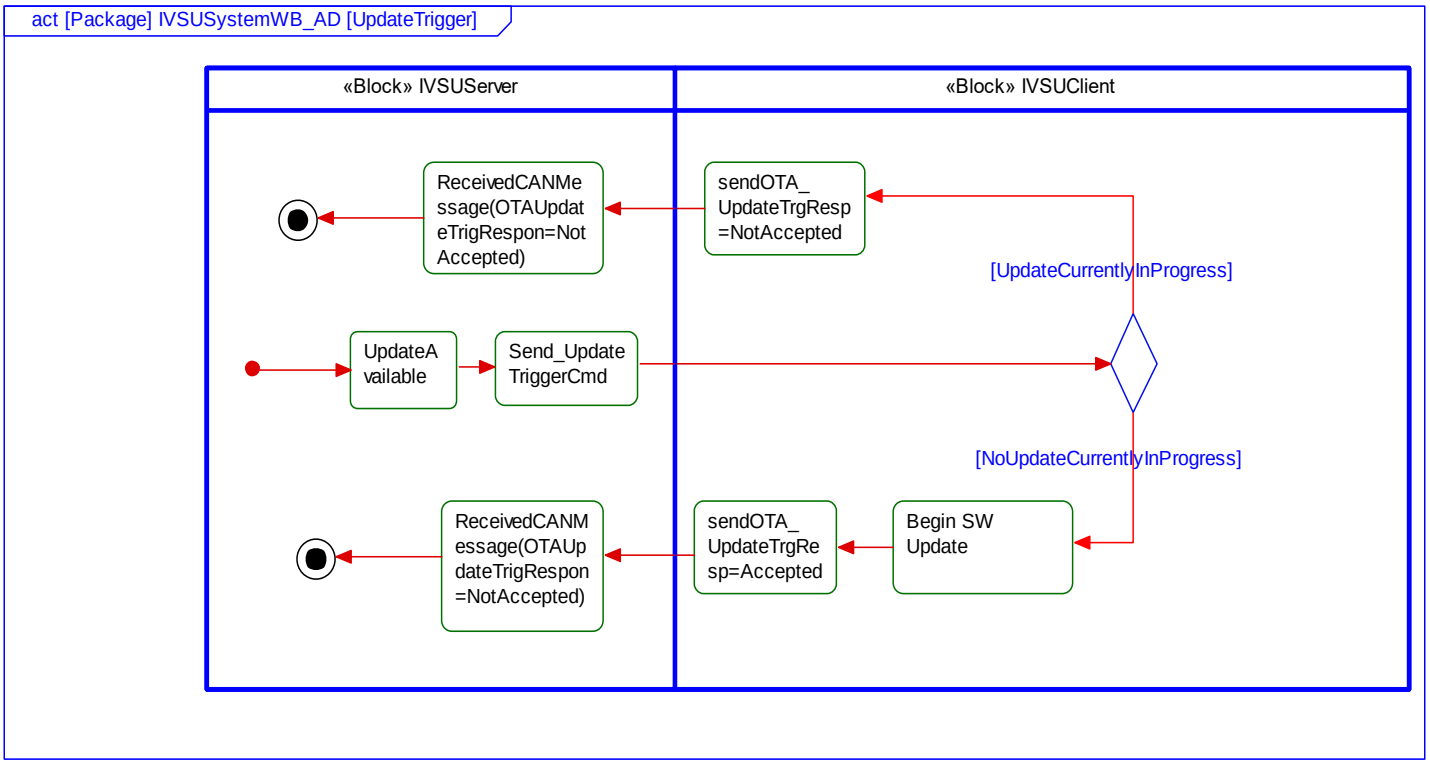
3.2.2.4 IVSU-UC-REQ-227869/C-CAN signal trigger while no AP connection

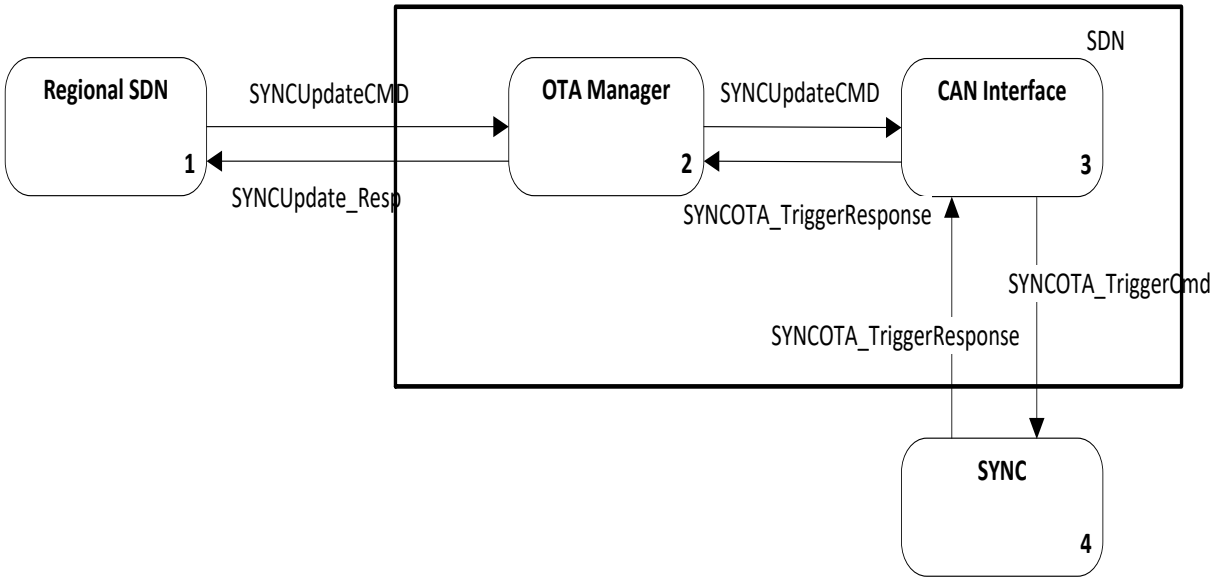
Actors	TCU Module, SYNC Module
Pre-conditions	Ignition is in RUN or ACC CAN signal was received from the TCU to notify for an update
Scenario Description	IVSU Manager shall check to see if there is a connection to WIFi The response should be send that the command was ACCEPTED IVSU Manager shall request HMI to display a notification that CONNECTIVITY is needed for the update
Post-conditions	IVSU will wait for WiFi connectivity
List of Exception Use Cases	
Interfaces	IVSU feature, Can Signal, HMI

3.2.3 White Box Views

3.2.3.1 ActivityDiagrams

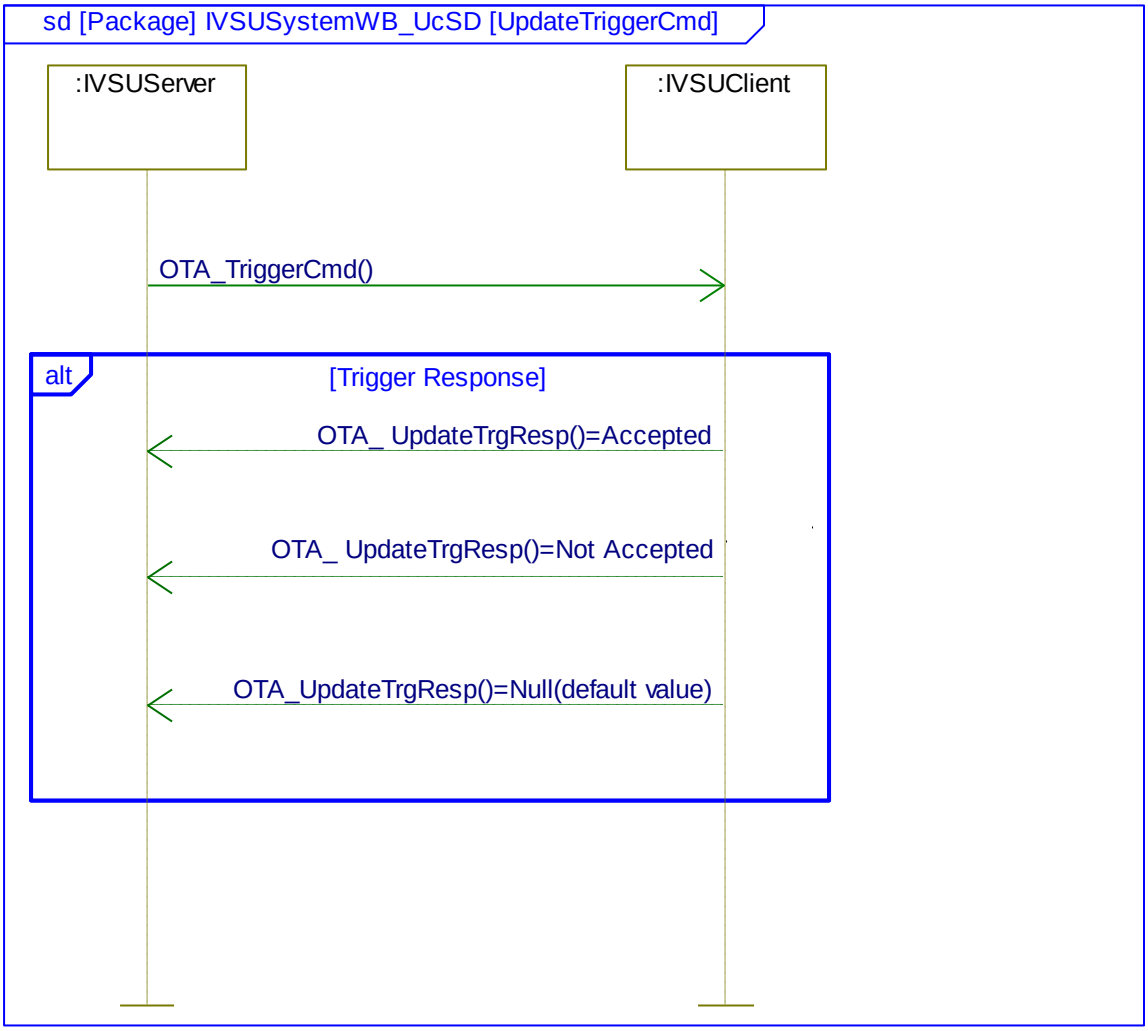
3.2.3.1.1 IVSU-ACT-REQ-232341/A-UpdateTriggerMessage





3.2.3.2 Sequence Diagrams

3.2.3.2.1 IVSU-SD-REQ-232342/A-UpdateTriggerMessage



4 Appendix: Reference Documents

Reference #	Document Title
1	Reference: P04 Image Update Specification
2	Reference: S13e SyncP Network Installation
3	Reference: S36 Software Provisioning Specification
4	Reference: Policies and IVSU Interfaces Specification
5	Reference: S23e IPC Inbound Diagnostics Specification
6	Reference: OTA Map Updates
7	Reference: TCU SPSS
8	Reference: Cloud Interface Specification
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