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| Document Classification | GIS1 Item Number: | **27.60/35** |  |
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| --- | --- | --- | --- |
| Document Approval | | | |
| Person | Role | Email Confirmation | Date |
|  |  |  |  |
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# Introduction

## Document Purpose

The Feature Implementation Specification (FIS) specifies the deployment of the logical functions of a feature to an electrical architecture. The FIS specifies all interactions between the ECUs of the electrical architecture required for the feature including the technical signals and the interfaces. It also gives interface and integration requirements, which are specific to the feature for the electrical architecture.

To get more information about the concept of feature, function and component level abstraction refer to the [Ford RE Wiki](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Engineering+for+SW+Enabled+Features).

## Document Scope

This FIS describes the deployment of the feature to the following electrical architecture(s):

|  |  |  |
| --- | --- | --- |
| **Electrical Architecture Name** | **Owner** | **Reference** |
| FNV2 |  |  |
| FNV3.0 Can Soa (Composite) |  |  |
| FNV3.0 Can Soa |  |  |
| FNV2.1 |  |  |

Table 1‑1: Electrical Architecture(s) referenced in this document

## Document Audience

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

### Stakeholder List

For the latest list of stakeholder of the feature and their influence refer to:

[Click here to open the latest Stakeholders List.](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=CrvJN9EHx3NrTD)

## Document Organization

### Document Context

Refer to the [Specification Structure page](http://wiki.ford.com/display/RequirementsEngineering/Specification+templates) in the [Ford RE Wiki](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Engineering+for+SW+Enabled+Features) to understand how the FIS relates to other Ford Requirements Documents and Specifications.

### Document Structure

The structure of this document is explained below:

**Section 1** – Introduction – Giving an explanation how to use this document including responsibilities and the scope of the document. Additionally, it contains the revision history and a list of unsettled but known issues that have to be consolidated in future versions. It explains the terminology and gives a clarification of the definitions, concepts and abbreviations used in the document.

**Section 2** – Feature Implementation Description – Giving an overview of the platform and listing assumptions, constraints or dependencies

**Section 3** – Feature Implementation Architecture – Describing 3 Architecture Views:

* Functional Architecture – Showing the logical architecture of functions
* Physical Architecture – Showing the physical architecture (first of all the E/E Architecture), which the Logical Functions get allocated to.
* Software Architecture – Showing the software architecture relevant for the feature (for features with in-house development only)
* Function Deployment – Presenting the allocation of logical functions and signals to the electrical and other components

**Section 4** – Deployment Specific Modeling –Modeling techniques providing additional detail on e.g. interface behavior

**Section 5** – Deployment Specific Requirements – Deployment specific requirements for ECUs, Network Communication, and Process

**Section 6** – List of Open Concerns

**Section 7** – Revision History

**Section 8** – Appendix - Presenting additional data mainly in a tabular form, e.g., a data dictionary

## Document Conventions

### Requirements Templates

Refer to “[How to use the Specification Templates](http://wiki.ford.com/display/RequirementsEngineering/How+to+use+the+Specification+Templates?src=contextnavpagetreemode)” on how to use the specification templates and the VBA macros to create/edit the requirements in the specifications.

The VBA macro enable the import of the specification to VSEM (refer to ["How to import specifications into VSEM as separate requirements"](http://wiki.ford.com/pages/viewpage.action?pageId=104991616&src=contextnavpagetreemode)).

#### Identification of requirements

The unique requirement ID given in the headline of any requirement follows the requirement throughout the development process. The requirement ID format follows a well-defined syntax.

All identifiers in an FIS shall be composed of 4 parts:

* A leading prefix, which indicates the type of requirement (R=Requirement, UC=Use Case, SC=Scenario, …)
* A prefix, which indicates the abstraction level (F=Feature, FNC=Function, CMP = component).
* Followed by a name, indicating the scope, which the requirement belongs to (e.g. feature or function name )
* Ending with the actual requirement number

*Example:*

*R\_CMP\_LockArbitrator\_00004* This is the fourth requirement on component level for the function Lock Arbitrator.

#### Requirements Attributes

Additionally attributes can be added to each requirement. This helps to classify requirements. A [list of available attributes](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes?src=contextnavpagetreemode) is given in the RE Wiki.

## References

### Ford Documents

The list of all Ford internal documents, which are directly related.

No Ford documents specified in model.

### External Documents and Publications

The list of external documents could include books, reports and online sources.

| **Reference** | **Document / Publication** | **Document Location** |
| --- | --- | --- |
| Cybersecurity Plan | Cybersecurity Plan | https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=CnoFxma9x3NrTD |
| Cybersecurity Relevancy | Cybersecurity Relevancy | https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=i9kBYMOdx3NrTD |
| IEEE Std 1012-2004 IEEE Standard for Software Verification and Validation | IEEE Std 1012-2004 IEEE Standard for Software Verification and Validation | https://standards.ieee.org/ieee/1012/3450/ |
| ISO/IEC 19500-2:2003 | ISO/IEC 19500-2:2003 | https://www.iso.org/standard/32619.html |
| UML Testing Profile (UTP), v1.2 | UML Testing Profile (UTP), v1.2 | https://www.omg.org/spec/UTP/1.2/PDF |

Table 1‑2: External documents and publications

## Glossary

### Definitions

| **Definition** | **Description** |
| --- | --- |
| TRANSMISSION SHIFTER | Gear Shift Module |

Table 1‑3: Definitions used in this document

### Abbreviations

| **Abbr.** | **Stands for** |
| --- | --- |
| 2SPD TC | 2 Speed Transfer Case |
| ABS | Anti-lock Braking System (originally from German Antiblockiersystem) |
| ACC | Ignition Accessory Mode |
| AEPB | Alarm Electronic Parking Brake |
| AFS | Aggregated Feature Spec |
| APIM | Accessory Protocol Interface Module (SYNC) SYNC processor |
| ARL | Attribute Requirements List |
| ATCM | All Terrain Control Module |
| CAN | Controller Area Network |
| CFG | Configuration |
| CHCM | Chassis Control Module |
| Cmd | Command |
| DLCM | Drive Line Control Module |
| ECG | Enhanced Central Gateway |
| EOL | End of Line |
| EPS | Electric Powered Steering |
| eRAD | Electric Rear Axle Drive |
| eShifter | Electric Shifter |
| EVCM | Electric Vehicle Control Module |
| FD1 | FD1 CAN Network |
| GSM | Gear Shift Module |
| GWM | Gateway Module |
| HMI | Human-Machine Interface |
| HPCM | Hybrid Powertrain Control module |
| HS1 | High Speed 1 CAN Network |
| HS2 | High Speed 2 CAN Network |
| IPC | Instrument Panel Cluster |
| MPR | Manual Parking Release |
| NFT | Neutral Flat tow |
| NT | Neutral Tow |
| PCM | Powertrain Control Module |
| PSCM | Power Steering Control module |
| S/S | Stop / Start |
| SOBDMC | Secondary On Board Diagnostic Module C Also known as the HPCM (Hybrid Powertrain Control Module) |
| Spec | Specification |
| SWC | Steering Wheel Column |
| TCCM | Transfer Case Control Module |
| TCM | Transmission Control Module |
| VDM | Vehicle Dynamics Module |

Table 1‑4: Abbreviations used in this document.

# Feature Implementation Overview

## Description

Neutral Flat Tow is defined as a feature that allows the customer to tow his vehicle considering all four wheels on the ground behind another vehicle. You might experience two types of Neutral Flat towing:  
Emergency Towing is defined as towing the vehicle with all four wheels on the ground when it becomes inoperable (without access to wheel dollies, car hauling trailer or flat bed transport vehicle), for limited speeds and distances (see below). Your vehicle can be Emergency Towed regardless of the powertrain and transmission configuration, if the following conditions are meet:   
• Your vehicle is facing forward for towing in a forward direction.   
• Place the transmission in neutral (N). If you cannot move the transmission into neutral (N), you may need to override it. If you are in an EV, you will need to enable Emergency Tow feature. See guidelines.   
• Maximum speed is 35 mph (56 km/h).  
• Maximum distance is 50 mi (80 km).   
 Recreational Towing is defined as towing the vehicle with all four wheels on the ground for distances and at speeds that exceed Emergency Towing (50 miles / 80 km, 35 mph / 56 kph). Examples include cross-country trips such as vacations, work fleet vehicle movement, etc. Customer usage is defined as towing the vehicle behind another vehicle without any error states, which include a dead battery, unintended gear state change from neutral, steering column locking, mechanical damage, or other issues that may cause damage to the vehicle during or after recreational towing. The user of the vehicle is able to confirm when the vehicle is correctly placed into or out of recreational tow mode through some form of information display and appropriate warnings and information are given to the driver when the vehicle is in this special mode.   
If you have a need for recreational towing, see guidelines to check compatibility and Neutral Tow enable/disable process.

## Input Requirements/Documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference**  (Reference as listed in ch. “References”) | **Section/Requirement** | **Description** | **Derived Requirement**  (optional – reference to requirement in ch. “Feature Implementation Requirements”) |
| **Feature/Function Requirements** | | | |
|  |  |  |  |
| **Ford Engineering Standards** | | | |
|  |  |  |  |
|  |  |  |  |
| **Legal Regulations** | | | |
|  | Compliance with FMVSS101 | The Feature shall comply with FMVSS101. |  |
|  | Compliance with FMVSS102 | The Feature shall Comply with FMVSS102 |  |
|  | Compliance with FMVSS114 | The Feature shall comply with FMVSS114 |  |
|  |
| **Industry Standards** | | | |
|  | ISO 26262 | The system should be developed according to Ford's implementation of Functional Safety. |  |
|  |
| **Other Sources** | | | |
|  | Absence of hardware modification | User shall not need to make any hardware modification |  |
|  | Absence of mechanical damage | Vehicle shall not experience any mechanical damage |  |
|  | Activation warning | User shall recive a warning from the cluster everytime he awakes the vehicle |  |
|  | Dead battery | User shall not experience a dead battery in the vehicle |  |
|  | Disable alarms | Vehicle shall disable intrusion and inclination alarms |  |
|  | Disable brake assistance | Vehicle shall disabale actuation of brake assistance such as EBB or vacuum |  |
|  | Disable electronic parking brake | Vehicle shall disable actuation of the electronic parking brake by the vehicle security feature |  |
|  | Disable key | Vehicle shall disabale key in vehicle alarms |  |
|  | Disable steering column | Vehicle shall disable the steering column lock |  |
|  | Emergency Tow | When in Emergency Tow mode, user shall be able to tow their vehicle for speeds and distances up to 35mph/ 56 kph & 50 miles/ 80km, without damagin the vehicle transmission |  |
|  | Example AR |  |  |
|  | Recreational Tow | When in Recreational Tow mode, user shall be able to tow their vehicle for speeds and distances greater than 35mph/ 56 kph & 50 miles/ 80km, without damagin the vehicle transmission |  |
|  | Unintended gear change | User shall not experience an unintended gear state change from neutral in the vehicle |  |
|  |

Table 2‑1: Input Requirements/Documents

## Lessons Learned

No lessons learned specified.

## Assumptions

No Assumptions specified.

# Feature Implementation Architecture

## Functional Architecture

### Description

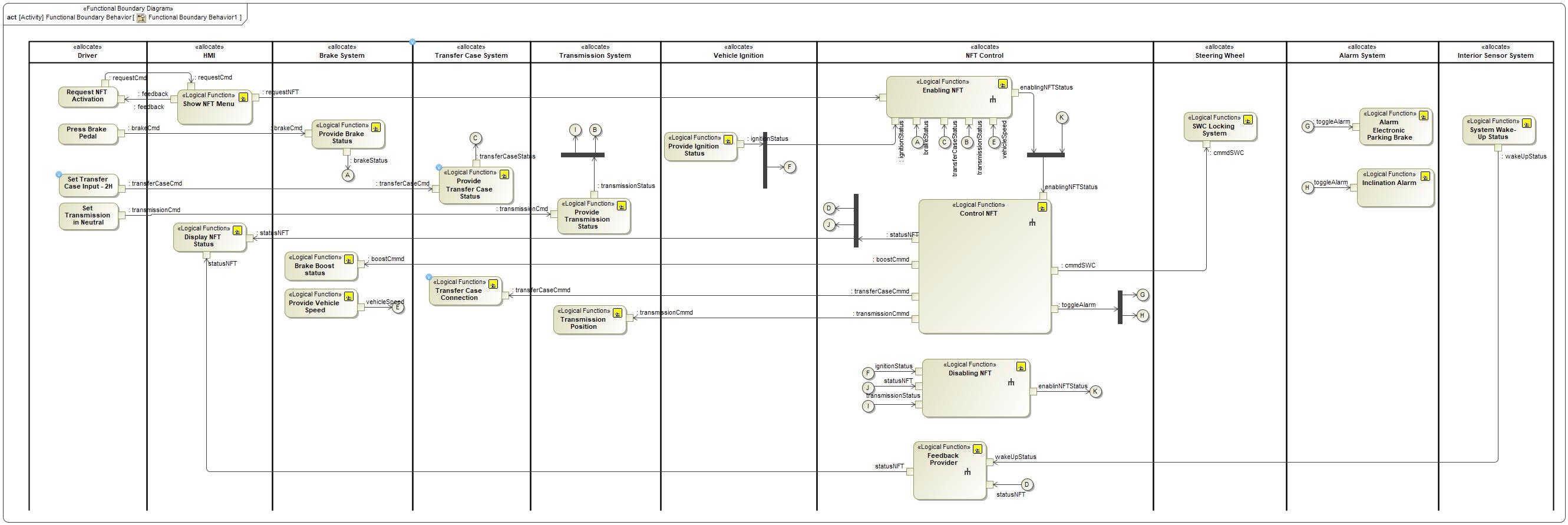


Figure 3‑1: Functional Boundary Behavior1

### Function List

The following functions from the [Global Feature & Function List](https://www.vsemweb.ford.com:443/tc/launchapp?-attach=true&-s=226TCSession&-o=ZmZNi0JHx3NrTDAAAAAAAAAAAAA) are referenced in this Feature Implementation Specification:

| **Function ID** | Function Name | Function Description |
| --- | --- | --- |
| Fn\_NFT\_01 | 278442150.jpg Control NFT | Logical elements who enable or disable the feature |
| Fn\_NFT\_02 | 278442150.jpg Enabling NFT | Elements that verifies if preconditions are met |
| Fn\_NFT\_03 | 278442150.jpg Feedback Provider | Display feedback for the user every time the driver door is opened |
| Fn\_NFT\_04 | 278442150.jpg Disabling NFT | Check feature disable conditions |
| Fn\_NFT\_05 | 278442150.jpg Provide Brake Status | Information about the status of the brake system |
| Fn\_NFT\_06 | 278442150.jpg Alarm Electronic Parking Brake | Disable all alarms who interfere on the feature functionality |
| Fn\_NFT\_07 | 278442150.jpg Transfer Case Connection | Disconnect the driveline from the transmission |
| Fn\_NFT\_08 | 278442150.jpg Display NFT Status | Shows on HMI the status of the feature |
| Fn\_NFT\_09 | 278442150.jpg System Wake-Up Status | Status of the Driver Door |
| Fn\_NFT\_10 | 278442150.jpg Provide Ignition Status | Status of the ignition switch |
| Fn\_NFT\_11 | 278442150.jpg Transmission Position | Command to maintain transmission in neutral while feature is enabled |
| Fn\_NFT\_12 | 278442150.jpg Brake Boost status | Command to avoid brake to change for a boosted state |
| Fn\_NFT\_13 | 278442150.jpg SWC Locking System | Command to unlock the steering wheel column |
| Fn\_NFT\_14 | 278442150.jpg Show NFT Menu | HMI command to show to the driver the feature menu |
| Fn\_NFT\_15 | 278442150.jpg Provide Transfer Case Status | Status of the transfer case |
| Fn\_NFT\_16 | 278442150.jpg Provide Transmission Status | Status of the transmission |
| Fn\_NFT\_17 | 278442150.jpg Inclination Alarm | Inclination Alarm |
| Fn\_NFT\_18 | 278442150.jpg Provide Vehicle Speed | Current Speed of the vehicle, used by the feature in order to allow feature activation. |

Table 3‑1: List of Functions

### Signal List

| **Signal Name** | **Description** |
| --- | --- |
| -983657045.jpg **boostCmmd** | Signal request to not boost the brakes |
| -983657045.jpg **brakeStatus** | Informational signal about position of the brake pedal |
| -983657045.jpg **cmmdSWC** | Release Steering Wheel Column to tow the vehicle |
| -983657045.jpg **enablingNFTStatus** | Status of the feature |
| -983657045.jpg **feedback** | Visual Feedback from HMI to Driver |
| -983657045.jpg **ignitionStatus** | Status of the ignition |
| -983657045.jpg **requestNFT** | Signal request to enable the feature |
| -983657045.jpg **statusNFT** | Status of the feature |
| -983657045.jpg **toggleAlarm** | Request to enable and disable alarms who interfere with feature |
| -983657045.jpg **transferCaseCmmd** | Signal request to release the driveline from the wheels |
| -983657045.jpg **transferCaseStatus** | Status of the Transfer Case |
| -983657045.jpg **transmissionCmmd** | Signal request to avoid change from neutral |
| -983657045.jpg **transmissionStatus** | Status of the Transmission |
| -983657045.jpg **vehicleSpeed** |  |
| -983657045.jpg **wakeUpStatus** | Status of the wake up door sensor |

Table 3‑2: List of Logical Signals

## Physical Architecture

### E/E Architecture

#### E/E Architecture Variants

*No E/E Architecture Variant found.*

**No E/E variant information found in the SysML Model.**

#### E/E Components

|  |  |
| --- | --- |
| Component Name | **Description** |

Table 3‑3: Electrical Components

#### E/E Connections

*No E/E Connections found.*

#### Signal List

| **Signal Name** | **Description** |
| --- | --- |
| 53080685.jpg **AwdMde\_D\_RqDrv** | Driver Request for changing driveline state. |
| 53080685.jpg **AwdStat\_D\_RqDsply** | Ref: 4x4 Indicator Control v23.  Request to display a 4x4 status message. |
| 53080685.jpg **BpedDrvAppl\_D\_Actl** | Arbitrated indication of whether the brake pedal is being depressed by the driver (except for possible external failures such as an object resting on the pedal) or not.  For cars equipped with Active Booster, the booster release switch shall give the information if driver is braking or not. This signal will inform other ECU's if the driver is braking.  Two bits are used to avoid having to create a separate standardized checksum signal for dependability.  0 = not allowed (treat as fault)  1 = driver not braking  2 = driver braking  3 = not allowed (treat as fault)  Use BPedDrvAppl\_D\_QF (id#1749) for quality factor information. |
| 53080685.jpg **BrkTrnShifLck\_B\_Stat** | Indicates whether shifting from 'Park' is currently allowed by the Brake Transmission Shift Interlock logic. |
| 53080685.jpg **Dimming\_Lvl** | Intensity level of dimmable backlighting. |
| 53080685.jpg **EngAout\_N\_Actl** | Engine speed. Current flywheel speed averaged. |
| 53080685.jpg **GearLvr\_D\_ActlDrv** | This signal shall report the shift lever position as commanded by the driver. |
| 53080685.jpg **GearPos\_D\_Trg** | Information from TCM about which gear is going to be engaged (target gear) by the automatic gear box.  Variability point: used only in automatic transmission. |
| 53080685.jpg **GearSelLck\_D\_Rq** | GearSelLck\_D\_Rq is used to lock an external GSM in either Park or Neutral. This emulates functions such as BTSI, Neutral Tow, etc. while supporting operating modes such as Factory/Transport mode, Park Lock Control, Secure Idle, etc.  For shift-by-wire. |
| 53080685.jpg **Ignition\_Status** | The processed value for current Ignition state. |
| 53080685.jpg **NtrlTowAvail\_B\_Stat** | Used to notify modules when Neutral Tow is available |
| 53080685.jpg **NtrlTowMdeEnbl\_B\_RqDrv** | Indication that the driver has requested Neutral Tow Mode functionality. |
| 53080685.jpg **TrnGear\_D\_RqDrv** | Indicates the gear position requested by the fault-corrected state of all pushbutton banks. |
| 53080685.jpg **TrnGearMsgTxt\_D\_Rq** | Request for display of Shift By Wire system information on the driver. |
| 53080685.jpg **TrnGearNtmAllow\_B\_Stat** | Indication to the cluster that the Neutral Tow option is available for selection by the customer |
| 53080685.jpg **TrnNtrlTowCmd\_D\_Actl** | When a neutral tow command accompanies a valid command into Neutral, the TRCM shall enter a persistant neutral tow state.  Car Wash Mode and Neutral Tow both are used by the GSM for special indication.  In Car Wash / Neutral tow mode this bit remains set until the mode is exited through specified conditions. |
| 53080685.jpg **VehOverGnd\_V\_Est** | Estimated vehicle speed over ground. FSMS:RQT-060900-006151 |

Table 3‑4: List of Technical Signals

### Software Component Architecture

**No Software Component Architecture Diagrams identified.**

## Function Deployment

### Deployment Variants

#### Deployment Vehicle System Behavior

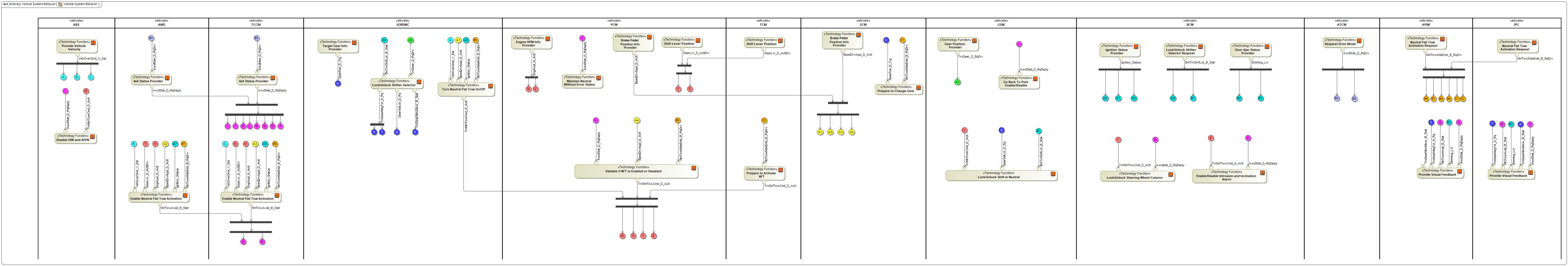


Figure 3‑2: Vehicle System Behavior

### Function Allocation

| Component | Technology Function Name | Logical Function Name |
| --- | --- | --- |
|
| -979271123.jpg ABS | -1998411585.jpg Provide Vehicle Velocity | 278442150.jpg Provide Vehicle Speed |
| -1998411585.jpg Disable EBB and AEPB | 278442150.jpg Alarm Electronic Parking Brake  278442150.jpg Brake Boost status |
| -979271123.jpg APIM | -1998411585.jpg Neutral Flat Tow Activation Request | 278442150.jpg Show NFT Menu |
| -1998411585.jpg Provide Visual Feedback | 278442150.jpg Display NFT Status  278442150.jpg Show NFT Menu |
| -979271123.jpg ATCM | -1998411585.jpg Request Drive Mode | 278442150.jpg Control NFT |
| -979271123.jpg AWD | -1998411585.jpg Enable Neutral Flat Tow Activation | 278442150.jpg Enabling NFT |
| -1998411585.jpg 4x4 Status Provider | 278442150.jpg Provide Transfer Case Status  278442150.jpg Transfer Case Connection |
| -979271123.jpg BCM | -1998411585.jpg Enable/Disable Intrusion and Inclination Alarm | 278442150.jpg Inclination Alarm |
| -1998411585.jpg Ignition Status Provider | 278442150.jpg Provide Ignition Status |
| -1998411585.jpg Door Ajar Status Provider | 278442150.jpg System Wake-Up Status |
| -1998411585.jpg Lock/Unlock Shifter Selector Request | 278442150.jpg Control NFT |
| -1998411585.jpg Lock/Unlock Steering Wheel Column | 278442150.jpg SWC Locking System |
| -979271123.jpg ECM | -1998411585.jpg Prepare to Change Gear | 278442150.jpg Provide Transmission Status |
| -1998411585.jpg Brake Pedal Position Info Provider | 278442150.jpg Provide Brake Status |
| -979271123.jpg GSM | -1998411585.jpg Lock/Unlock Shift in Neutral | 278442150.jpg Control NFT |
| -1998411585.jpg Go Back To Park Enable/Disable | 278442150.jpg Control NFT |
| -1998411585.jpg Gear Position Provider | 278442150.jpg Provide Transmission Status |
| -979271123.jpg IPC | -1998411585.jpg Neutral Flat Tow Activation Request | 278442150.jpg Show NFT Menu |
| -1998411585.jpg Provide Visual Feedback | 278442150.jpg Display NFT Status  278442150.jpg Show NFT Menu |
| -979271123.jpg PCM | -1998411585.jpg Maintain Neutral Without Error States | 278442150.jpg Provide Transmission Status |
| -1998411585.jpg Validate if NFT is Enabled or Disabled | 278442150.jpg Feedback Provider |
| -1998411585.jpg Shift Lever Position | 278442150.jpg Transmission Position |
| -1998411585.jpg Engine RPM Info Provider | 278442150.jpg Provide Transmission Status |
| -1998411585.jpg Brake Pedal Position Info Provider | 278442150.jpg Provide Brake Status |
| -979271123.jpg SOBDMC | -1998411585.jpg Turn Neutral Flat Tow On/Off | 278442150.jpg Control NFT  278442150.jpg Disabling NFT |
| -1998411585.jpg Lock/Unlock Shifter Selector | 278442150.jpg Control NFT |
| -1998411585.jpg Target Gear Info Provider | 278442150.jpg Provide Transmission Status |
| -979271123.jpg TCCM | -1998411585.jpg Enable Neutral Flat Tow Activation | 278442150.jpg Enabling NFT |
| -1998411585.jpg 4x4 Status Provider | 278442150.jpg Provide Transfer Case Status  278442150.jpg Transfer Case Connection |
| -979271123.jpg TCM | -1998411585.jpg Prepare to Activate NFT | 278442150.jpg Enabling NFT |
| -1998411585.jpg Shift Lever Position | 278442150.jpg Transmission Position |

Table 3‑5: Function Allocation Table (Basic)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Component | | Technology Function Name | TSR | |
| Name | ASIL |  | ID | ASIL |

Table 3‑6: Function Allocation Table (Functional Safety Extension)

# Feature Implementation Modeling

## Component Interaction Diagrams

**No Component Interaction Diagrams identified.**

## Component Interface Behavior Diagrams

**No Component Interface Diagrams identified.**

*See Appendix Section 8.1.9 for Technology State Machines*

# Feature Implementation Requirements

## Functional Safety

### ASIL Decomposition of Technical Safety Requirements

ASIL Decompositions not specified.

## Requirements on Components

### ABS

ABS

#### Technology Function -1998411585.jpg Provide Vehicle Velocity

Provide Vehicle Velocity to the System.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| VehOverGnd\_V\_Est | 53080685.jpg VehOverGnd\_V\_Est | -983657045.jpg vehicleSpeed | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑1: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Provide Vehicle Velocity

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_005 - NT preconditions 2speed TC

While BpedDrvAppl\_D\_Actl=pressed and GearLvrPos\_D\_Actl=Neutral and EngAout\_N\_Actl=0 rpm and AwdMde\_D\_RqDrv= Fourbytwo and VehOverGnd\_V\_Est <3kph, the AWD/DLCM/TCCM/RXU10 shall send NtrlTowAvail\_B\_Stat=Available to the IPC

Satisfied by:

* -1998411585.jpg Brake Pedal Position Info Provider
* -1998411585.jpg Enable Neutral Flat Tow Activation
* -1998411585.jpg Engine RPM Info Provider
* -1998411585.jpg Provide Vehicle Velocity
* -1998411585.jpg Request Drive Mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_005 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_006 - NT preconditions HEV & BEV

Where the vehicle has IPC DID values DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0) and APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) &

DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) or IPC DID value DE01 = Neutral Tow: Enabled (0x1) While Ignition\_Status='Accessory' and 'TrnGear\_D\_RqDrv'='Park' and VehOverGnd\_V\_Est <3kph, the HPCM/SOBDMC shall send TrnGearNtmAllow\_B\_Stat=YES to the IPC and APIM

Satisfied by:

* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Ignition Status Provider
* -1998411585.jpg Lock/Unlock Shifter Selector
* -1998411585.jpg Provide Vehicle Velocity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_006 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Disable EBB and AEPB

Function to disable the Electronic Brake Boost and the Alarm Electronic Park Brake.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| AwdStat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnNtrlTowCmd\_D\_Actl | 53080685.jpg TrnNtrlTowCmd\_D\_Actl | -983657045.jpg toggleAlarm  -983657045.jpg transferCaseCmmd  -983657045.jpg transmissionCmmd  -983657045.jpg boostCmmd  -983657045.jpg cmmdSWC | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑2: Input Signal mappings of Function

###### Outputs

(No outputs have been defined)

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Disable EBB and AEPB

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_023 - NT mode ABS

When 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', the ABS shall disable the alarm electronic parking brake functionality and disable Electronic Brake Booster until it receives 'TrnNtrlTowCmd\_D\_Actl'='Normal Mode' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled'

Satisfied by:

* -1998411585.jpg Disable EBB and AEPB

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_023 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_14 Disable Alarm Parking brake * 1653805838.jpg LR\_NFT\_15 Disable Brake Booster | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### APIM

APIM

#### Technology Function -1998411585.jpg Neutral Flat Tow Activation Request

Function send signals to check and change all configurations to enable NFT

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| NtrlTowMdeEnbl\_B\_RqDrv | 53080685.jpg NtrlTowMdeEnbl\_B\_RqDrv | -983657045.jpg requestNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑3: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Neutral Flat Tow Activation Request

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_003 - NT Enable 2-Speed TC confirmation step

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01),

while

- Neutral Tow is not selected in the IPC menu

- or 'NtrlTowAvail\_B\_Stat' != 'Available'

- or (the IPC displays “Hold OK to Initialize Neutral Tow” and the user holds down the 'ok' button on the steering wheel for less than 3 seconds),

the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'No'.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_003 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_004 - NT Enable HEV confirmation step

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0),

while

- Neutral Tow is not selected in the IPC menu

- or 'TrnGearNtmAllow\_B\_Stat' != 'YES'

- or (the IPC displays “Hold OK to Initialize Neutral Tow” and the user holds down the 'ok' button on the steering wheel for less than 3 seconds),

the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'No'.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_004 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_008 - NT Request 2speed TC

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while the IPC displays “Hold OK to Initialize Neutral Tow”, when the user holds down the 'ok' button on the steering wheel for 3 to 5 seconds, the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and display 'initialization complete' for 1-2 seconds.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_008 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** |  | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_013 - NT Request HEV

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) &

DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while the IPC displays “Hold OK to Initialize Neutral Tow”, when the user holds down the 'ok' button on the steering wheel for 3 to 5 seconds, the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and display 'initialization complete' for 1-2 seconds and then display Place Vehicle in Neutral until it receives 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled'.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_013 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_020 - NT enable BEV step 2

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), when the user selects and holds Emergency Tow for 3 to 5 seconds, the APIM shall display 'Initialization complete' for 1-2 seconds [?] and immediately after that it shall display 'Shift vehicle to Neutral' and send the signal 'NtrlTowMdeEnbl\_B\_RqDrv'='Yes' until 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled'

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_020 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_03 Neutral Tow HMI status ON | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Provide Visual Feedback

Inform user about the status of the NFT and the process to activate it.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| AwdStat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| Dimming\_Lvl | 53080685.jpg Dimming\_Lvl | -983657045.jpg wakeUpStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| NtrlTowAvail\_B\_Stat | 53080685.jpg NtrlTowAvail\_B\_Stat | -983657045.jpg statusNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnGearMsgTxt\_D\_Rq | 53080685.jpg TrnGearMsgTxt\_D\_Rq | -983657045.jpg feedback | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnGearNtmAllow\_B\_Stat |  | No logical signals Realized by this Technology signal. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑4: Input Signal mappings of Function

###### Outputs

(No outputs have been defined)

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Provide Visual Feedback

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_001 - NT Enable 2-Speed TC step 1

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while 'NtrlTowAvail\_B\_Stat' = 'Available', when the user selects Neutral Tow, the IPC shall display “Hold OK to Initialize Neutral Tow”.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_001 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_002 - NT Enable HEV step 1

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while 'TrnGearNtmAllow\_B\_Stat' = 'YES', when the user selects Neutral Tow, the IPC shall display “Hold OK to Initialize Neutral Tow”.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_002 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_007 - NT preconditions not Met 2speed TC

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while NtrlTowAvail\_B\_Stat=NotAvailable, if the Customer selects Neutral Tow from IPC, then the IPC shall display Neutral Tow Preconditions Not Met See Manual.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_007 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_02 Neutral Tow preconditions not met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_008 - NT Request 2speed TC

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while the IPC displays “Hold OK to Initialize Neutral Tow”, when the user holds down the 'ok' button on the steering wheel for 3 to 5 seconds, the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and display 'initialization complete' for 1-2 seconds.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_008 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** |  | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_010 - NT Transfer Case Shift Confirmation

When 'AwdStat\_D\_RqDsply'= 'Shift\_In\_Progress', the IPC shall display '4x4 Shift in Progress' until the shift to Neutral is complete.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_010 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** |  | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_012 - NT preconditions not Met HEV

Where the vehicle has IPC DID values DE01 = Neutral Tow: Disabled (0x0) &

DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while TrnGearNtmAllow\_B\_Stat=No, the IPC shall grey-out Neutral Tow activation button and prevent its activation by the Customer.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_012 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_02 Neutral Tow preconditions not met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_013 - NT Request HEV

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) &

DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while the IPC displays “Hold OK to Initialize Neutral Tow”, when the user holds down the 'ok' button on the steering wheel for 3 to 5 seconds, the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and display 'initialization complete' for 1-2 seconds and then display Place Vehicle in Neutral until it receives 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled'.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_013 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_015 - NT Enabled Display

When 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', the IPC shall display 'Neutral Tow enabled, leave transmission in Neutral for Towing'.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_015 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_03 Neutral Tow HMI status ON | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_017 - NT preconditions not Met BEV

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while TrnGearNtmAllow\_B\_Stat=No, the APIM shall grey-out the activation button and prevent its activation by the Customer.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_017 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_02 Neutral Tow preconditions not met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_018 - NT Enable BEV step 1

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while the user selects and holds Emergency Tow soft button on the centerstack display, the APIM shall display 'Initializing' for up to 5 seconds.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_018 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_019 - NT enable BEV confirmation step

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), when the user selects Emergency Tow and release prior to the 'initialization complete' message apears, then the APIM shall cancel the initialization

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_019 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_020 - NT enable BEV step 2

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), when the user selects and holds Emergency Tow for 3 to 5 seconds, the APIM shall display 'Initialization complete' for 1-2 seconds [?] and immediately after that it shall display 'Shift vehicle to Neutral' and send the signal 'NtrlTowMdeEnbl\_B\_RqDrv'='Yes' until 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled'

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_020 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_03 Neutral Tow HMI status ON | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_021 - ET display

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), When 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', the IPC shall display 'Emergency Tow enabled, leave transmission in Neutral for Towing'.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_021 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_03 Neutral Tow HMI status ON | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_026 - NT mode Wake up Display

While 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when the driver door is opened, the IPC shall display the message 'Neutral Tow enabled, leave transmission in Neutral' and illuminate the N in the PRND indicator.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_026 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_07 PRND status Neutral Tow * 1653805838.jpg LR\_NFT\_17 Neutral Tow wake-up status | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_027 - NT go to sleep process

While the vehicle is in Neutral Tow mode 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when the signal 'Ignition\_Status' goes to 'OFF', IPC shall send 'ePRNDL\_MODE'= 'Off' and all modules should go to sleep.

Satisfied by:

* -1998411585.jpg Ignition Status Provider
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_027 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_12 Neutral Tow KOL | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_030 - NT disable Display

Where the vehicle has IPC DID value DE01 = Neutral Tow: Enabled (0x1), When 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled' or 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow Exit', the IPC shall display 'Neutral Tow Disabled'

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_030 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_04 Neutral Tow HMI status OFF | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_031 - ET disable display

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0) When 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow Exit', the IPC shall display 'Emergency Tow Disabled'

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_031 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_04 Neutral Tow HMI status OFF | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### ATCM

ATCM

#### Technology Function -1998411585.jpg Request Drive Mode

Function to request changes in the drive mode.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| AwdMde\_D\_RqDrv | 53080685.jpg AwdMde\_D\_RqDrv | -983657045.jpg transferCaseStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑5: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Request Drive Mode

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_005 - NT preconditions 2speed TC

While BpedDrvAppl\_D\_Actl=pressed and GearLvrPos\_D\_Actl=Neutral and EngAout\_N\_Actl=0 rpm and AwdMde\_D\_RqDrv= Fourbytwo and VehOverGnd\_V\_Est <3kph, the AWD/DLCM/TCCM/RXU10 shall send NtrlTowAvail\_B\_Stat=Available to the IPC

Satisfied by:

* -1998411585.jpg Brake Pedal Position Info Provider
* -1998411585.jpg Enable Neutral Flat Tow Activation
* -1998411585.jpg Engine RPM Info Provider
* -1998411585.jpg Provide Vehicle Velocity
* -1998411585.jpg Request Drive Mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_005 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### AWD

AWD

#### Technology Function -1998411585.jpg Enable Neutral Flat Tow Activation

Check if the preconditions are met and enable the NFT.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| BpedDrvAppl\_D\_Actl | 53080685.jpg BpedDrvAppl\_D\_Actl | -983657045.jpg brakeStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| EngAout\_N\_Actl | 53080685.jpg EngAout\_N\_Actl | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| GearLvr\_D\_ActlDrv | 53080685.jpg GearLvr\_D\_ActlDrv | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| Ignition\_Status | 53080685.jpg Ignition\_Status | -983657045.jpg ignitionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| NtrlTowMdeEnbl\_B\_RqDrv | 53080685.jpg NtrlTowMdeEnbl\_B\_RqDrv | -983657045.jpg requestNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| VehOverGnd\_V\_Est | 53080685.jpg VehOverGnd\_V\_Est | -983657045.jpg vehicleSpeed | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑6: Input Signal mappings of Function

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| NtrlTowAvail\_B\_Stat | 53080685.jpg NtrlTowAvail\_B\_Stat | -983657045.jpg statusNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑7: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Enable Neutral Flat Tow Activation

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_005 - NT preconditions 2speed TC

While BpedDrvAppl\_D\_Actl=pressed and GearLvrPos\_D\_Actl=Neutral and EngAout\_N\_Actl=0 rpm and AwdMde\_D\_RqDrv= Fourbytwo and VehOverGnd\_V\_Est <3kph, the AWD/DLCM/TCCM/RXU10 shall send NtrlTowAvail\_B\_Stat=Available to the IPC

Satisfied by:

* -1998411585.jpg Brake Pedal Position Info Provider
* -1998411585.jpg Enable Neutral Flat Tow Activation
* -1998411585.jpg Engine RPM Info Provider
* -1998411585.jpg Provide Vehicle Velocity
* -1998411585.jpg Request Drive Mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_005 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg 4x4 Status Provider

Provide information about the status of Transfer Case.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| AwdMde\_D\_RqDrv | 53080685.jpg AwdMde\_D\_RqDrv | -983657045.jpg transferCaseStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑8: Input Signal mappings of Function

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| AwdStat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑9: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function 4x4 Status Provider

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_009 - NT Transfer Case shift

When 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes', the AWD/DLCM/TCCM/RXU10 shall command the transfer case to go to Neutral and send the signal 'AwdStat\_D\_RqDsply'= 'Shift\_In\_Progress'.

Satisfied by:

* -1998411585.jpg 4x4 Status Provider

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_009 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_05 Transfer Case Disconnect | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_011 - NT Transfer Case Neutral Confmirmation

When the shift to Neutral is complete, the AWD/DLCM/TCCM/RXU10 shall send the signal 'AwdStat\_D\_RqDsply'= 'Neutral Tow enabled'.

Satisfied by:

* -1998411585.jpg 4x4 Status Provider

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_011 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_05 Transfer Case Disconnect | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_028 - NT disable 2 speed TC

While 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when 'TrnGear\_D\_RqDrv'='Park' or 'GearLvr\_D\_ActlDrv'='Park', the AWD/DLCM/TCCM/RXU10 shall command the Transfer case to 2WD and send the signal 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled'.

Satisfied by:

* -1998411585.jpg 4x4 Status Provider
* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Shift Lever Position

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_028 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_08 Neutral Tow disable functionality * 1653805838.jpg LR\_NFT\_09 Neutral Tow disable process | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### BCM

BCM

#### Technology Function -1998411585.jpg Enable/Disable Intrusion and Inclination Alarm

When feature is enabled, this function disable the intrusion alarm.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| AwdStat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnNtrlTowCmd\_D\_Actl | 53080685.jpg TrnNtrlTowCmd\_D\_Actl | -983657045.jpg toggleAlarm  -983657045.jpg transferCaseCmmd  -983657045.jpg transmissionCmmd  -983657045.jpg boostCmmd  -983657045.jpg cmmdSWC | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑10: Input Signal mappings of Function

###### Outputs

(No outputs have been defined)

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Enable/Disable Intrusion and Inclination Alarm

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_024 - NT mode Steering Wheel

When 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled' , the BCM shall disable the inclination and intrusion alarm and mantain the steering wheel unlocked until it receives 'TrnNtrlTowCmd\_D\_Actl'='Normal Mode' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled'

Satisfied by:

* -1998411585.jpg Enable/Disable Intrusion and Inclination Alarm
* -1998411585.jpg Lock/Unlock Steering Wheel Column

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_024 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_13 Disable Alarm and Chimes | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Ignition Status Provider

Provide the current status of the ignition.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| Ignition\_Status | 53080685.jpg Ignition\_Status | -983657045.jpg ignitionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑11: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Ignition Status Provider

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_006 - NT preconditions HEV & BEV

Where the vehicle has IPC DID values DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0) and APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) &

DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) or IPC DID value DE01 = Neutral Tow: Enabled (0x1) While Ignition\_Status='Accessory' and 'TrnGear\_D\_RqDrv'='Park' and VehOverGnd\_V\_Est <3kph, the HPCM/SOBDMC shall send TrnGearNtmAllow\_B\_Stat=YES to the IPC and APIM

Satisfied by:

* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Ignition Status Provider
* -1998411585.jpg Lock/Unlock Shifter Selector
* -1998411585.jpg Provide Vehicle Velocity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_006 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_027 - NT go to sleep process

While the vehicle is in Neutral Tow mode 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when the signal 'Ignition\_Status' goes to 'OFF', IPC shall send 'ePRNDL\_MODE'= 'Off' and all modules should go to sleep.

Satisfied by:

* -1998411585.jpg Ignition Status Provider
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_027 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_12 Neutral Tow KOL | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Door Ajar Status Provider

Informs the feature if the vehicle has been woken up after go to sleep.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| Dimming\_Lvl | 53080685.jpg Dimming\_Lvl | -983657045.jpg wakeUpStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑12: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Door Ajar Status Provider

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_025 - NT mode Wake up

While 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when the CAN bus is awaked, the BCM shall send 'Dimming\_Lvl'!= 'ON'.

Satisfied by:

* -1998411585.jpg Door Ajar Status Provider

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_025 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_17 Neutral Tow wake-up status | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Lock/Unlock Shifter Selector Request

Request to lock shifter selector.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| BrkTrnShifLck\_B\_Stat | 53080685.jpg BrkTrnShifLck\_B\_Stat | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑13: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Lock/Unlock Shifter Selector Request

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_016 - NT transmission enabled confirmation

When 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and 'GearSelLck\_D\_Rq'='Neutral', the HPCM / SOBDMC shall send 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow enabled' and 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry'.

Satisfied by:

* -1998411585.jpg Lock/Unlock Shifter Selector Request
* -1998411585.jpg Prepare to Activate NFT
* -1998411585.jpg Turn Neutral Flat Tow On/Off

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_016 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_10 Keep Transmission in Neutral | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Lock/Unlock Steering Wheel Column

Function to unlock steering wheel column.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Awdstat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnNtrlTowCmd\_D\_Actl | 53080685.jpg TrnNtrlTowCmd\_D\_Actl | -983657045.jpg toggleAlarm  -983657045.jpg transferCaseCmmd  -983657045.jpg transmissionCmmd  -983657045.jpg boostCmmd  -983657045.jpg cmmdSWC | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑14: Input Signal mappings of Function

###### Outputs

(No outputs have been defined)

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Lock/Unlock Steering Wheel Column

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_024 - NT mode Steering Wheel

When 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled' , the BCM shall disable the inclination and intrusion alarm and mantain the steering wheel unlocked until it receives 'TrnNtrlTowCmd\_D\_Actl'='Normal Mode' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled'

Satisfied by:

* -1998411585.jpg Enable/Disable Intrusion and Inclination Alarm
* -1998411585.jpg Lock/Unlock Steering Wheel Column

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_024 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_13 Disable Alarm and Chimes | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### ECM

ECM

#### Technology Function -1998411585.jpg Prepare to Change Gear

Function to prepare system for a change in the current gear.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| GearPos\_D\_Trg | 53080685.jpg GearPos\_D\_Trg | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| NtrlTowMdeEnbl\_B\_RqDrv | 53080685.jpg NtrlTowMdeEnbl\_B\_RqDrv | -983657045.jpg requestNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑15: Input Signal mappings of Function

###### Outputs

(No outputs have been defined)

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Prepare to Change Gear

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_033 - Communicate to the GSM that the shift is in progress

When SOBDMC/HPCM is targeting Neutral gear to be engaged, shall send the feedback signal 'GearPos\_D\_Trg'='Neutral' to the ECM

Satisfied by:

* -1998411585.jpg Prepare to Change Gear
* -1998411585.jpg Target Gear Info Provider

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_033 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_10 Keep Transmission in Neutral | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Brake Pedal Position Info Provider

Informs the feature if the driver is pressing the braking pedal.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| BpedDrvAppl\_D\_Actl | 53080685.jpg BpedDrvAppl\_D\_Actl | -983657045.jpg brakeStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑16: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Brake Pedal Position Info Provider

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_005 - NT preconditions 2speed TC

While BpedDrvAppl\_D\_Actl=pressed and GearLvrPos\_D\_Actl=Neutral and EngAout\_N\_Actl=0 rpm and AwdMde\_D\_RqDrv= Fourbytwo and VehOverGnd\_V\_Est <3kph, the AWD/DLCM/TCCM/RXU10 shall send NtrlTowAvail\_B\_Stat=Available to the IPC

Satisfied by:

* -1998411585.jpg Brake Pedal Position Info Provider
* -1998411585.jpg Enable Neutral Flat Tow Activation
* -1998411585.jpg Engine RPM Info Provider
* -1998411585.jpg Provide Vehicle Velocity
* -1998411585.jpg Request Drive Mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_005 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### GSM

GSM

#### Technology Function -1998411585.jpg Lock/Unlock Shift in Neutral

Locks the shift in neutral when NFT is enabled.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| GearSelLck\_D\_Rq | 53080685.jpg GearSelLck\_D\_Rq | -983657045.jpg transmissionCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnNtrlTowCmd\_D\_Actl | 53080685.jpg TrnNtrlTowCmd\_D\_Actl | -983657045.jpg toggleAlarm  -983657045.jpg transferCaseCmmd  -983657045.jpg transmissionCmmd  -983657045.jpg boostCmmd  -983657045.jpg cmmdSWC | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| BrkTrnShifLck\_B\_Stat | 53080685.jpg BrkTrnShifLck\_B\_Stat | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑17: Input Signal mappings of Function

###### Outputs

(No outputs have been defined)

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Lock/Unlock Shift in Neutral

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_022 - NT mode GSM

When 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', the GSM shall mantain the lever position indicator in Neutral and inhibit the auto return to park functionality until the driver request to change the gear while 'Ignition\_Status'='Run' & "BpedDrvAppl\_D\_Actl"="pressed"

Satisfied by:

* -1998411585.jpg Go Back To Park Enable/Disable
* -1998411585.jpg Lock/Unlock Shift in Neutral

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_022 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_10 Keep Transmission in Neutral * 1653805838.jpg LR\_NFT\_11 Neutral Tow Mantainance Key | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_032 - Unlock Electronic shifter

When GSM receives signals 'BrkTrnShifLck\_B\_Stat'= 'shift', then the shifter selector shall be unlocked

Satisfied by:

* -1998411585.jpg Lock/Unlock Shift in Neutral

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_032 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_10 Keep Transmission in Neutral | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Go Back To Park Enable/Disable

When feature is enabled, this function disable automatic go back to park function.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| AwdStat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑18: Input Signal mappings of Function

###### Outputs

(No outputs have been defined)

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Go Back To Park Enable/Disable

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_022 - NT mode GSM

When 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', the GSM shall mantain the lever position indicator in Neutral and inhibit the auto return to park functionality until the driver request to change the gear while 'Ignition\_Status'='Run' & "BpedDrvAppl\_D\_Actl"="pressed"

Satisfied by:

* -1998411585.jpg Go Back To Park Enable/Disable
* -1998411585.jpg Lock/Unlock Shift in Neutral

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_022 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_10 Keep Transmission in Neutral * 1653805838.jpg LR\_NFT\_11 Neutral Tow Mantainance Key | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Gear Position Provider

Provide information to the feature about the position of the gearbox.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| TrnGear\_D\_RqDrv | 53080685.jpg TrnGear\_D\_RqDrv | -983657045.jpg transmissionCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑19: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Gear Position Provider

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_006 - NT preconditions HEV & BEV

Where the vehicle has IPC DID values DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0) and APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) &

DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) or IPC DID value DE01 = Neutral Tow: Enabled (0x1) While Ignition\_Status='Accessory' and 'TrnGear\_D\_RqDrv'='Park' and VehOverGnd\_V\_Est <3kph, the HPCM/SOBDMC shall send TrnGearNtmAllow\_B\_Stat=YES to the IPC and APIM

Satisfied by:

* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Ignition Status Provider
* -1998411585.jpg Lock/Unlock Shifter Selector
* -1998411585.jpg Provide Vehicle Velocity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_006 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_028 - NT disable 2 speed TC

While 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when 'TrnGear\_D\_RqDrv'='Park' or 'GearLvr\_D\_ActlDrv'='Park', the AWD/DLCM/TCCM/RXU10 shall command the Transfer case to 2WD and send the signal 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled'.

Satisfied by:

* -1998411585.jpg 4x4 Status Provider
* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Shift Lever Position

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_028 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_08 Neutral Tow disable functionality * 1653805838.jpg LR\_NFT\_09 Neutral Tow disable process | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_029 - NT disable HEV / BEV

While 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry', when 'TrnGear\_D\_RqDrv'='Park' or 'GearLvr\_D\_ActlDrv'='Park', the HPCM / SOBDMC shall send the signal 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow Exit'.

Satisfied by:

* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Lock/Unlock Shifter Selector
* -1998411585.jpg Shift Lever Position

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_029 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_08 Neutral Tow disable functionality * 1653805838.jpg LR\_NFT\_09 Neutral Tow disable process | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### IPC

IPC

#### Technology Function -1998411585.jpg Neutral Flat Tow Activation Request

Function send signals to check and change all configurations to enable NFT

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| NtrlTowMdeEnbl\_B\_RqDrv | 53080685.jpg NtrlTowMdeEnbl\_B\_RqDrv | -983657045.jpg requestNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑20: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Neutral Flat Tow Activation Request

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_003 - NT Enable 2-Speed TC confirmation step

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01),

while

- Neutral Tow is not selected in the IPC menu

- or 'NtrlTowAvail\_B\_Stat' != 'Available'

- or (the IPC displays “Hold OK to Initialize Neutral Tow” and the user holds down the 'ok' button on the steering wheel for less than 3 seconds),

the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'No'.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_003 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_004 - NT Enable HEV confirmation step

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0),

while

- Neutral Tow is not selected in the IPC menu

- or 'TrnGearNtmAllow\_B\_Stat' != 'YES'

- or (the IPC displays “Hold OK to Initialize Neutral Tow” and the user holds down the 'ok' button on the steering wheel for less than 3 seconds),

the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'No'.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_004 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_008 - NT Request 2speed TC

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while the IPC displays “Hold OK to Initialize Neutral Tow”, when the user holds down the 'ok' button on the steering wheel for 3 to 5 seconds, the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and display 'initialization complete' for 1-2 seconds.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_008 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** |  | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_013 - NT Request HEV

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) &

DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while the IPC displays “Hold OK to Initialize Neutral Tow”, when the user holds down the 'ok' button on the steering wheel for 3 to 5 seconds, the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and display 'initialization complete' for 1-2 seconds and then display Place Vehicle in Neutral until it receives 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled'.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_013 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_020 - NT enable BEV step 2

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), when the user selects and holds Emergency Tow for 3 to 5 seconds, the APIM shall display 'Initialization complete' for 1-2 seconds [?] and immediately after that it shall display 'Shift vehicle to Neutral' and send the signal 'NtrlTowMdeEnbl\_B\_RqDrv'='Yes' until 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled'

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_020 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_03 Neutral Tow HMI status ON | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Provide Visual Feedback

Inform user about the status of the NFT and the process to activate it.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| AwdStat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| Dimming\_Lvl | 53080685.jpg Dimming\_Lvl | -983657045.jpg wakeUpStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| NtrlTowAvail\_B\_Stat | 53080685.jpg NtrlTowAvail\_B\_Stat | -983657045.jpg statusNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnGearMsgTxt\_D\_Rq | 53080685.jpg TrnGearMsgTxt\_D\_Rq | -983657045.jpg feedback | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnGearNtmAllow\_B\_Stat |  | No logical signals Realized by this Technology signal. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑21: Input Signal mappings of Function

###### Outputs

(No outputs have been defined)

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Provide Visual Feedback

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_001 - NT Enable 2-Speed TC step 1

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while 'NtrlTowAvail\_B\_Stat' = 'Available', when the user selects Neutral Tow, the IPC shall display “Hold OK to Initialize Neutral Tow”.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_001 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_002 - NT Enable HEV step 1

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while 'TrnGearNtmAllow\_B\_Stat' = 'YES', when the user selects Neutral Tow, the IPC shall display “Hold OK to Initialize Neutral Tow”.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_002 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_007 - NT preconditions not Met 2speed TC

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while NtrlTowAvail\_B\_Stat=NotAvailable, if the Customer selects Neutral Tow from IPC, then the IPC shall display Neutral Tow Preconditions Not Met See Manual.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_007 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_02 Neutral Tow preconditions not met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_008 - NT Request 2speed TC

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) & DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while the IPC displays “Hold OK to Initialize Neutral Tow”, when the user holds down the 'ok' button on the steering wheel for 3 to 5 seconds, the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and display 'initialization complete' for 1-2 seconds.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_008 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** |  | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_010 - NT Transfer Case Shift Confirmation

When 'AwdStat\_D\_RqDsply'= 'Shift\_In\_Progress', the IPC shall display '4x4 Shift in Progress' until the shift to Neutral is complete.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_010 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** |  | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_012 - NT preconditions not Met HEV

Where the vehicle has IPC DID values DE01 = Neutral Tow: Disabled (0x0) &

DE09 = TCCM Neutral Tow Capable: TCCM Neutral Tow Capable (0x01), while TrnGearNtmAllow\_B\_Stat=No, the IPC shall grey-out Neutral Tow activation button and prevent its activation by the Customer.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_012 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_02 Neutral Tow preconditions not met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_013 - NT Request HEV

Where the vehicle has IPC DID values DE01 = Neutral Tow: Enabled (0x1) &

DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while the IPC displays “Hold OK to Initialize Neutral Tow”, when the user holds down the 'ok' button on the steering wheel for 3 to 5 seconds, the IPC shall send 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and display 'initialization complete' for 1-2 seconds and then display Place Vehicle in Neutral until it receives 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled'.

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_013 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_015 - NT Enabled Display

When 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', the IPC shall display 'Neutral Tow enabled, leave transmission in Neutral for Towing'.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_015 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_03 Neutral Tow HMI status ON | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_017 - NT preconditions not Met BEV

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while TrnGearNtmAllow\_B\_Stat=No, the APIM shall grey-out the activation button and prevent its activation by the Customer.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_017 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_02 Neutral Tow preconditions not met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_018 - NT Enable BEV step 1

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), while the user selects and holds Emergency Tow soft button on the centerstack display, the APIM shall display 'Initializing' for up to 5 seconds.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_018 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_019 - NT enable BEV confirmation step

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), when the user selects Emergency Tow and release prior to the 'initialization complete' message apears, then the APIM shall cancel the initialization

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_019 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_06 Neutral Tow activation security step | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_020 - NT enable BEV step 2

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), when the user selects and holds Emergency Tow for 3 to 5 seconds, the APIM shall display 'Initialization complete' for 1-2 seconds [?] and immediately after that it shall display 'Shift vehicle to Neutral' and send the signal 'NtrlTowMdeEnbl\_B\_RqDrv'='Yes' until 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled'

Satisfied by:

* -1998411585.jpg Neutral Flat Tow Activation Request
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_020 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_03 Neutral Tow HMI status ON | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_021 - ET display

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0), When 'TrnGearMsgTxt\_D\_Rq'= 'Neutral Tow enabled' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', the IPC shall display 'Emergency Tow enabled, leave transmission in Neutral for Towing'.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_021 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_03 Neutral Tow HMI status ON | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_026 - NT mode Wake up Display

While 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when the driver door is opened, the IPC shall display the message 'Neutral Tow enabled, leave transmission in Neutral' and illuminate the N in the PRND indicator.

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_026 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_07 PRND status Neutral Tow * 1653805838.jpg LR\_NFT\_17 Neutral Tow wake-up status | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_027 - NT go to sleep process

While the vehicle is in Neutral Tow mode 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry' or 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when the signal 'Ignition\_Status' goes to 'OFF', IPC shall send 'ePRNDL\_MODE'= 'Off' and all modules should go to sleep.

Satisfied by:

* -1998411585.jpg Ignition Status Provider
* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_027 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_12 Neutral Tow KOL | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_030 - NT disable Display

Where the vehicle has IPC DID value DE01 = Neutral Tow: Enabled (0x1), When 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled' or 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow Exit', the IPC shall display 'Neutral Tow Disabled'

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_030 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_04 Neutral Tow HMI status OFF | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_031 - ET disable display

Where the vehicle has APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) & DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) and IPC DID Value DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0) When 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow Exit', the IPC shall display 'Emergency Tow Disabled'

Satisfied by:

* -1998411585.jpg Provide Visual Feedback

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_031 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_04 Neutral Tow HMI status OFF | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### PCM

PCM

#### Technology Function -1998411585.jpg Maintain Neutral Without Error States

Function to deactivate any alarms that could be activate by left shift in neutral.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| AwdStat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑22: Input Signal mappings of Function

###### Outputs

(No outputs have been defined)

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Maintain Neutral Without Error States

##### Function Requirements

###### Component Specific Requirements

No “Approved” or “Ready for Review” requirements identified for this function.

#### Technology Function -1998411585.jpg Validate if NFT is Enabled or Disabled

Check if the feature is enabled or disabled.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| AwdStat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| BpedDrvAppl\_D\_Actl | 53080685.jpg BpedDrvAppl\_D\_Actl | -983657045.jpg brakeStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| NtrlTowMdeEnbl\_B\_RqDrv | 53080685.jpg NtrlTowMdeEnbl\_B\_RqDrv | -983657045.jpg requestNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑23: Input Signal mappings of Function

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| TrnNtrlTowCmd\_D\_Actl | 53080685.jpg TrnNtrlTowCmd\_D\_Actl | -983657045.jpg toggleAlarm  -983657045.jpg transferCaseCmmd  -983657045.jpg transmissionCmmd  -983657045.jpg boostCmmd  -983657045.jpg cmmdSWC | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑24: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Validate if NFT is Enabled or Disabled

##### Function Requirements

###### Component Specific Requirements

No “Approved” or “Ready for Review” requirements identified for this function.

#### Technology Function -1998411585.jpg Shift Lever Position

Status of the shift lever position

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| GearLvr\_D\_ActlDrv | 53080685.jpg GearLvr\_D\_ActlDrv | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑25: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Shift Lever Position

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_028 - NT disable 2 speed TC

While 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when 'TrnGear\_D\_RqDrv'='Park' or 'GearLvr\_D\_ActlDrv'='Park', the AWD/DLCM/TCCM/RXU10 shall command the Transfer case to 2WD and send the signal 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled'.

Satisfied by:

* -1998411585.jpg 4x4 Status Provider
* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Shift Lever Position

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_028 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_08 Neutral Tow disable functionality * 1653805838.jpg LR\_NFT\_09 Neutral Tow disable process | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_029 - NT disable HEV / BEV

While 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry', when 'TrnGear\_D\_RqDrv'='Park' or 'GearLvr\_D\_ActlDrv'='Park', the HPCM / SOBDMC shall send the signal 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow Exit'.

Satisfied by:

* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Lock/Unlock Shifter Selector
* -1998411585.jpg Shift Lever Position

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_029 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_08 Neutral Tow disable functionality * 1653805838.jpg LR\_NFT\_09 Neutral Tow disable process | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Engine RPM Info Provider

Provide RPM information to the system.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| EngAout\_N\_Actl | 53080685.jpg EngAout\_N\_Actl | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑26: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Engine RPM Info Provider

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_005 - NT preconditions 2speed TC

While BpedDrvAppl\_D\_Actl=pressed and GearLvrPos\_D\_Actl=Neutral and EngAout\_N\_Actl=0 rpm and AwdMde\_D\_RqDrv= Fourbytwo and VehOverGnd\_V\_Est <3kph, the AWD/DLCM/TCCM/RXU10 shall send NtrlTowAvail\_B\_Stat=Available to the IPC

Satisfied by:

* -1998411585.jpg Brake Pedal Position Info Provider
* -1998411585.jpg Enable Neutral Flat Tow Activation
* -1998411585.jpg Engine RPM Info Provider
* -1998411585.jpg Provide Vehicle Velocity
* -1998411585.jpg Request Drive Mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_005 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Brake Pedal Position Info Provider

Informs the feature if the driver is pressing the braking pedal.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| BpedDrvAppl\_D\_Actl | 53080685.jpg BpedDrvAppl\_D\_Actl | -983657045.jpg brakeStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑27: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Brake Pedal Position Info Provider

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_005 - NT preconditions 2speed TC

While BpedDrvAppl\_D\_Actl=pressed and GearLvrPos\_D\_Actl=Neutral and EngAout\_N\_Actl=0 rpm and AwdMde\_D\_RqDrv= Fourbytwo and VehOverGnd\_V\_Est <3kph, the AWD/DLCM/TCCM/RXU10 shall send NtrlTowAvail\_B\_Stat=Available to the IPC

Satisfied by:

* -1998411585.jpg Brake Pedal Position Info Provider
* -1998411585.jpg Enable Neutral Flat Tow Activation
* -1998411585.jpg Engine RPM Info Provider
* -1998411585.jpg Provide Vehicle Velocity
* -1998411585.jpg Request Drive Mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_005 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### SOBDMC

SOBDMC

#### Technology Function -1998411585.jpg Turn Neutral Flat Tow On/Off

Enable or Disable de NFT.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| BpedDrvAppl\_D\_Actl | 53080685.jpg BpedDrvAppl\_D\_Actl | -983657045.jpg brakeStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| Ignition\_Status | 53080685.jpg Ignition\_Status | -983657045.jpg ignitionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| NtrlTowMdeEnbl\_B\_RqDrv | 53080685.jpg NtrlTowMdeEnbl\_B\_RqDrv | -983657045.jpg requestNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| VehOverGnd\_V\_Est | 53080685.jpg VehOverGnd\_V\_Est | -983657045.jpg vehicleSpeed | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑28: Input Signal mappings of Function

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| TrnNtrlTowCmd\_D\_Actl | 53080685.jpg TrnNtrlTowCmd\_D\_Actl | -983657045.jpg toggleAlarm  -983657045.jpg transferCaseCmmd  -983657045.jpg transmissionCmmd  -983657045.jpg boostCmmd  -983657045.jpg cmmdSWC | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑29: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Turn Neutral Flat Tow On/Off

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_016 - NT transmission enabled confirmation

When 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and 'GearSelLck\_D\_Rq'='Neutral', the HPCM / SOBDMC shall send 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow enabled' and 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry'.

Satisfied by:

* -1998411585.jpg Lock/Unlock Shifter Selector Request
* -1998411585.jpg Prepare to Activate NFT
* -1998411585.jpg Turn Neutral Flat Tow On/Off

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_016 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_10 Keep Transmission in Neutral | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Lock/Unlock Shifter Selector

Function to lock shifter selector.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| BrkTrnShifLck\_B\_Stat | 53080685.jpg BrkTrnShifLck\_B\_Stat | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnGear\_D\_RqDrv | 53080685.jpg TrnGear\_D\_RqDrv | -983657045.jpg transmissionCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑30: Input Signal mappings of Function

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| GearSelLck\_D\_Rq | 53080685.jpg GearSelLck\_D\_Rq | -983657045.jpg transmissionCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnGearMsgTxt\_D\_Rq | 53080685.jpg TrnGearMsgTxt\_D\_Rq | -983657045.jpg feedback | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| TrnGearNtmAllow\_B\_Stat | 53080685.jpg TrnGearNtmAllow\_B\_Stat | -983657045.jpg enablingNFTStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑31: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Lock/Unlock Shifter Selector

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_006 - NT preconditions HEV & BEV

Where the vehicle has IPC DID values DE09 = TCCM Neutral Tow Capable: NT Capable TCCM Not Present (0x0) and APIM DID values DE08 = Neutral Tow Setting: Enabled (0x1) &

DE08 = Neutral/Emergency Tow Display Logic: Enabled (0x1) or IPC DID value DE01 = Neutral Tow: Enabled (0x1) While Ignition\_Status='Accessory' and 'TrnGear\_D\_RqDrv'='Park' and VehOverGnd\_V\_Est <3kph, the HPCM/SOBDMC shall send TrnGearNtmAllow\_B\_Stat=YES to the IPC and APIM

Satisfied by:

* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Ignition Status Provider
* -1998411585.jpg Lock/Unlock Shifter Selector
* -1998411585.jpg Provide Vehicle Velocity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_006 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_014 - NT Transmission shift

When 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes', the HPCM / SOBDMC shall send the signal 'GearSelLck\_D\_Rq'='Unlock'.

Satisfied by:

* -1998411585.jpg Lock/Unlock Shifter Selector

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_014 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_10 Keep Transmission in Neutral | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_029 - NT disable HEV / BEV

While 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry', when 'TrnGear\_D\_RqDrv'='Park' or 'GearLvr\_D\_ActlDrv'='Park', the HPCM / SOBDMC shall send the signal 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow Exit'.

Satisfied by:

* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Lock/Unlock Shifter Selector
* -1998411585.jpg Shift Lever Position

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_029 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_08 Neutral Tow disable functionality * 1653805838.jpg LR\_NFT\_09 Neutral Tow disable process | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Target Gear Info Provider

Function to detect the next gear to be selected automatically.

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| GearPos\_D\_Trg | 53080685.jpg GearPos\_D\_Trg | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑32: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Target Gear Info Provider

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_033 - Communicate to the GSM that the shift is in progress

When SOBDMC/HPCM is targeting Neutral gear to be engaged, shall send the feedback signal 'GearPos\_D\_Trg'='Neutral' to the ECM

Satisfied by:

* -1998411585.jpg Prepare to Change Gear
* -1998411585.jpg Target Gear Info Provider

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_033 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_10 Keep Transmission in Neutral | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### TCCM

TCCM

#### Technology Function -1998411585.jpg Enable Neutral Flat Tow Activation

Check if the preconditions are met and enable the NFT.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| BpedDrvAppl\_D\_Actl | 53080685.jpg BpedDrvAppl\_D\_Actl | -983657045.jpg brakeStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| EngAout\_N\_Actl | 53080685.jpg EngAout\_N\_Actl | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| GearLvr\_D\_ActlDrv | 53080685.jpg GearLvr\_D\_ActlDrv | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| Ignition\_Status | 53080685.jpg Ignition\_Status | -983657045.jpg ignitionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| NtrlTowMdeEnbl\_B\_RqDrv | 53080685.jpg NtrlTowMdeEnbl\_B\_RqDrv | -983657045.jpg requestNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |
| VehOverGnd\_V\_Est | 53080685.jpg VehOverGnd\_V\_Est | -983657045.jpg vehicleSpeed | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑33: Input Signal mappings of Function

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| NtrlTowAvail\_B\_Stat | 53080685.jpg NtrlTowAvail\_B\_Stat | -983657045.jpg statusNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑34: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Enable Neutral Flat Tow Activation

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_005 - NT preconditions 2speed TC

While BpedDrvAppl\_D\_Actl=pressed and GearLvrPos\_D\_Actl=Neutral and EngAout\_N\_Actl=0 rpm and AwdMde\_D\_RqDrv= Fourbytwo and VehOverGnd\_V\_Est <3kph, the AWD/DLCM/TCCM/RXU10 shall send NtrlTowAvail\_B\_Stat=Available to the IPC

Satisfied by:

* -1998411585.jpg Brake Pedal Position Info Provider
* -1998411585.jpg Enable Neutral Flat Tow Activation
* -1998411585.jpg Engine RPM Info Provider
* -1998411585.jpg Provide Vehicle Velocity
* -1998411585.jpg Request Drive Mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_005 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_01 Neutral Tow preconditions met | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg 4x4 Status Provider

Provide information about the status of Transfer Case.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| AwdMde\_D\_RqDrv | 53080685.jpg AwdMde\_D\_RqDrv | -983657045.jpg transferCaseStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑35: Input Signal mappings of Function

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| AwdStat\_D\_RqDsply | 53080685.jpg AwdStat\_D\_RqDsply | -983657045.jpg cmmdSWC  -983657045.jpg toggleAlarm  -983657045.jpg boostCmmd | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑36: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function 4x4 Status Provider

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_009 - NT Transfer Case shift

When 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes', the AWD/DLCM/TCCM/RXU10 shall command the transfer case to go to Neutral and send the signal 'AwdStat\_D\_RqDsply'= 'Shift\_In\_Progress'.

Satisfied by:

* -1998411585.jpg 4x4 Status Provider

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_009 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_05 Transfer Case Disconnect | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_011 - NT Transfer Case Neutral Confmirmation

When the shift to Neutral is complete, the AWD/DLCM/TCCM/RXU10 shall send the signal 'AwdStat\_D\_RqDsply'= 'Neutral Tow enabled'.

Satisfied by:

* -1998411585.jpg 4x4 Status Provider

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_011 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_05 Transfer Case Disconnect | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_028 - NT disable 2 speed TC

While 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when 'TrnGear\_D\_RqDrv'='Park' or 'GearLvr\_D\_ActlDrv'='Park', the AWD/DLCM/TCCM/RXU10 shall command the Transfer case to 2WD and send the signal 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled'.

Satisfied by:

* -1998411585.jpg 4x4 Status Provider
* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Shift Lever Position

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_028 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_08 Neutral Tow disable functionality * 1653805838.jpg LR\_NFT\_09 Neutral Tow disable process | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

### TCM

TCM

#### Technology Function -1998411585.jpg Prepare to Activate NFT

Check preconditions to enable NFT.

##### Function Interfaces

###### Inputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| NtrlTowMdeEnbl\_B\_RqDrv | 53080685.jpg NtrlTowMdeEnbl\_B\_RqDrv | -983657045.jpg requestNFT | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

Table 5‑37: Input Signal mappings of Function

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| TrnNtrlTowCmd\_D\_Actl | 53080685.jpg TrnNtrlTowCmd\_D\_Actl | -983657045.jpg toggleAlarm  -983657045.jpg transferCaseCmmd  -983657045.jpg transmissionCmmd  -983657045.jpg boostCmmd  -983657045.jpg cmmdSWC | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑38: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Prepare to Activate NFT

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_016 - NT transmission enabled confirmation

When 'NtrlTowMdeEnbl\_B\_RqDrv'= 'Yes' and 'GearSelLck\_D\_Rq'='Neutral', the HPCM / SOBDMC shall send 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow enabled' and 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry'.

Satisfied by:

* -1998411585.jpg Lock/Unlock Shifter Selector Request
* -1998411585.jpg Prepare to Activate NFT
* -1998411585.jpg Turn Neutral Flat Tow On/Off

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_016 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_10 Keep Transmission in Neutral | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

#### Technology Function -1998411585.jpg Shift Lever Position

Status of the shift lever position

##### Function Interfaces

###### Inputs

(No inputs have been defined)

###### Outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Output Name** | **Technical Signal Name** | **Logical Signal Name** | **Mapping Details** *(Conditional)* | **Publisher Interface** | **Connection**  (*Optional)* |
| GearLvr\_D\_ActlDrv | 53080685.jpg GearLvr\_D\_ActlDrv | -983657045.jpg transmissionStatus | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. | Not supported by Magicdraw generation. |

**Table 5‑39: Output Signal mappings of Function**

###### Parameters

(No parameters have been defined)

###### Interface Requirements

No Interface Requirements identified for Function Shift Lever Position

##### Function Requirements

###### Component Specific Requirements

410360887.jpg IR\_NFT\_028 - NT disable 2 speed TC

While 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Enabled', when 'TrnGear\_D\_RqDrv'='Park' or 'GearLvr\_D\_ActlDrv'='Park', the AWD/DLCM/TCCM/RXU10 shall command the Transfer case to 2WD and send the signal 'AwdStat\_D\_RqDsply'= 'Neutral\_Tow\_Disabled'.

Satisfied by:

* -1998411585.jpg 4x4 Status Provider
* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Shift Lever Position

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_028 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_08 Neutral Tow disable functionality * 1653805838.jpg LR\_NFT\_09 Neutral Tow disable process | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

410360887.jpg IR\_NFT\_029 - NT disable HEV / BEV

While 'TrnNtrlTowCmd\_D\_Actl'='Neutral Tow Entry', when 'TrnGear\_D\_RqDrv'='Park' or 'GearLvr\_D\_ActlDrv'='Park', the HPCM / SOBDMC shall send the signal 'TrnGearMsgTxt\_D\_Rq'='Neutral Tow Exit'.

Satisfied by:

* -1998411585.jpg Gear Position Provider
* -1998411585.jpg Lock/Unlock Shifter Selector
* -1998411585.jpg Shift Lever Position

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: IR\_NFT\_029 | | | | | | | |
| **Rationale** |  | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 1653805838.jpg LR\_NFT\_08 Neutral Tow disable functionality * 1653805838.jpg LR\_NFT\_09 Neutral Tow disable process | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | Approved |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0c | End of Requirement | | | | |

## Requirements on Connections

### Networks

### HW I/Os

## Requirements on Development Process

No Requirements with “In-Progress” Status identified.

# Open Concerns

| ID | Concern Description | e-Tracker Reference | Status | Solution |
| --- | --- | --- | --- | --- |
|  | Modeling Action Item Example |  | Not Started |  |
| Open Item\_Neutral Tow\_1 | No Concept Level Requirements (Issue Name) | Issue Description Here | In Progress | Next Steps Description |
| Open Item\_Neutral Tow\_2 |  |  |  |  |

Table 6‑1: Open Concerns

# Revision History

| Rev.  (revision) | Date | Description | Approved by | Responsible |
| --- | --- | --- | --- | --- |

## Template Revisions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version | Rev. | Date | Description | Responsible |
| 0 | 2 | 2015-08-05 | * TOC corrected * Document Properties adapted to match needs of VBA macros | Awegman1 |
| 1 | 0 | 2015-11-16 | * Revision History moved to chapter 7 * Table-Styles removed | Awegman1 |
| 1 | 1 | 2016-03-02 | * Rework according to PCL example | Jbaden1 |
| 1 | 2 | 2016-03-22 | * V1.3: Footer formating corrected (Issue 19) * “Constraints” chapter renamed to “Input Requirements” (Issue 20) | Jbaden1 |
| 1 | 3 | 2016-04-20 | * Broken Wiki links repaired | Jbaden1 |
| 2 | 0 | 2016-05-23 | * Prepared for Specification\_Macros.dotm v2.0 * Additional explanations added to ch. 2.2 “Input Requirements” (ARL and SDS requirements often go here) | Jbaden1 |
| 2 | 1 | 2016-07-08 | * Template version added to footer | Jbaden1 |
| 2 | 2 | 2016-07-15 | * Sample SysML diagrams added * Data Dictionary reworked * Alignment with relevant sections in SRD templated | Jbaden1 |
| 3 | 0 | 2016-09-05 | * Lessons learned from IPRB incorporated | Jbaden1 |
| 4 | 0 | 2016-09-27 | * Alignment with QPIP Feature Function Ownership workstream. Platform Spec renamed to Feature Implementation Spec | Jbaden1 |
| 4 | 1 | 2016-11-04 | * Chapters “Purpose” and “Scope” reworked. | Jbaden1 |
| 4 | 1 | 2016-11-10 | * Subsection for “Logical Service Interfaces” added. | Jbaden1 |
| 5 | 0 | 2017-01-13 | * Meta data updated for specification macros, version 3.1 * SW Unit chapter removed for the time being * Green boxes added for user hints | Jbaden1 |
| 5 | 1 | 2017-01-18 | * Minor editorial changes (e.g. hyperlinks highlighted in comments) | Jbaden1 |
| 5 | 1b | 2017-01-20 | * Some editorial corrections * Substructure of old Network Communication (now Connections) moved to Requirements on Connections | Jbaden1 |
| 6 | 0 | 2018-07-24 | * CR53: * Add new cover sheet * Add disclaimer section * Add the following meta-data to the doc properties for the the new cover sheet   + DocGis1ItemNumber   + DocGis2Classification   + DocType   + DocStatus   + DocIssueDate   + DocReleaseDate * CR63: Update FuSa sharepoint references in templates | Jbaden1 |
| 6 | 0 | 2018-08-06 | * CR81: Incorporate lessons learned from System Service Spec pilot (Vehicle Speed) into AFS and FIS | Jbaden1 |
| 6 | 0 | 2018-09-28 | * Broken links to RE Wiki repaired | Jbaden1 |
| 6 | 0 | 2018-10-31 | * Minor corrections on cover sheet and in footer to be more GIS compliant and VSEM aligned * “Overview” and “Description” exchanged in headings (following common sense) | Jbaden1 |
| 6 | 0 | 2018-11-30 | * Update of Functional Safety sections after review by Functional Safety Team * Initial support for variant handling | Jbaden1 |
| 6 | 0 | 2018-12-01 | * Variant condition fields added consistently * Links updated | Jbaden1 |
| 6 | 0 | 2018-12-11 | * Variant condition fields removed from mapping/allocation tables * Mapping tables simplified * Explanatory text for “Variants” sections revised | Jbaden1 |
| 6 | 0a | 2019-01-04 | * Chapter heading “Inherited Function Requirements” removed. Corresponding table renamed to “Requirements not cascaded”. * E/E Connection table got another column for allocated messages * Naming conventions for Implemented Functions corrected (FncName\_CmpName instead of FncName\_on\_CmpName) * Editorial corrections on the cover sheet * Explanatory text added to “Ethernet” section in chapter “Requirements on Connections” * AIS templates updated. Linked to Wiki page | Jbaden1 |
| 6 | 0a | 2019-01-04 | * Minor restructuring in FuSa chapter – after aligning with ECU Functional Spec * Bugfix: table 13 renamed from FTTI table to FHT table, includes a bug fix: each FSR is allocated to only one ECU/component | Jbaden1 |
| 6 | 0b | 2019-02-04 | * Change: Chapter “Interface Requirements” added to “Implemented Function xxx” section (to have a single chapter for to collect subscriber/publisher interface and mapping requirements which to not conform to the corresponding Data Dictionary objects) * Change: “CAN Interface” subsection renamed to “AIS Interfaces” again. Although several Subscriber/Publisher interface attributes are probably CAN bus specific, other attributes seem to be well suited for other networks than CAN. * Change: Chapter “ECU Specific Requirements” renamed to “Component Specific Requirements” in chapter “Implemented Function xxx”. Table “Requirements not cascaded” renamed to “Component Specific Requirements” and refined to describe changes from Logical Function requirements set more formally. This is also to help during VSEM import to identify those requirements of the Logical Function which cannot be simply carried over to the ECU. * Change: Explanatory text in section “Implemented Function xxx” improved. | Jbaden1 |
| 6 | 0c | 2019-02-05 | * Change: Layout of AIS Interfaces in Data Dictionary reworked to enable Excel Import | Jbaden1 |
| 6 | 0c | 2019-02-20 | * Bugfix: In AIS Interfaces none-picklist fields formatted as invisible | Jbaden1 |
| 6 | 1a | 2019-02-05 | Functional Safety related changes:   * Table “Architectural Redundancy Summary” updated * Section “Functional Flows for FTTI ‘xyz’” added to chapter “Component Interaction Diagrams” * Fault Tolerant Time Summary section added to Functional Safety chapter * Chapter “HW Metrics” added | Jbaden1 |
| 6 | 1a | 2019-04-02 | Headings of “Architectural Redundancy Summary” table clarified | Jbaden1 |
| 6 | 1a | 2019-04-10 | * ASIL Decomposition table moved from Function Spec into the Feature Implementation Spec (ASIL Decomposition of Technical Safety Requirements) * 2 alternative versions of the Function Allocation Table (Standard variant vs. Functional Safety variant) placed next to each other. | Jbaden1 |
| 6 | 1a | 2019-05-31 | * Function Allocation Table split into a base (non FuSa) part and a FuSa part to allow a more flexible mapping of MBSE functions (Logical and Technology) to RE functions (Atomic Logical and Implemented). | Jbaden1 |
| 6 | 1a | 2019-05-31 | * “Input Requirement” section reworked (symmetrically to all other templates). * Sections “Functional Flows for FTTI xyz” and “Fault Tolerant Time Summary” removed, because guidance is not available yet. * “Reference” and “Glossary” section moved back to introduction, i.e., to the very beginning of the document (such that also section 2 can already rely on it). * Some mostly editorial changes per request from FuSa team. | Jbaden1 |
| 6 | 1a | 2019-07-02 | * "Important" box added on cover sheet which points to the macros * “Input Requirements” section renamed to Input Information (after discussion with FuSa team) | Jbaden1 |
| 6 | 1a | 2019-07-17 | * Chapter “Message List” removed from CAN and LIN specific chapters of section “Requirements on Connections” | Jbaden1 |
| 6 | 1a | 2019-10-08 | * Chapter “ASIL Decomposition of Technical Safety Requirements”: Input TSRs are specified in the chapter right above the decomposition table. | Jbaden1 |
| 6 | 1a | 2019-10-09 | * Chapter “Service Oriented Communication” moved to section “Messages” in the Data Dictionary. Details from Central SW Wiki about FNV2 SOA added | Jbaden1 |
| 6 | 1a | 2019-10-25 | * Minor updates for HW IOs/Signals * Subsection “Functional Safety” removed from chapter “Feature Implementation Modeling”. Per requrest from FuSa team since no guidance is available how to model e.g. FHT timing diagram. | Jbaden1 |
| 6 | 1a | 2019-05-11 | * Copyright notice shortened and moved to cover sheet and added to footer (to be compliant [with Ford copyright guidelines](http://www.fgti.ford.com/client/NewFGTI/CopyrightNotice.html)) * Term “Disclaimer” no longer used for what is actually only a copyright notice | Jbaden1 |
| 6 | 1a | 2019-22-11 | * Some minor modifications for the SOA APIs/MQTT Messages in the section “Messages” of the Data Dictionary (section references Service Contracts via the API name) * Some minor updates of the Input/Output mapping tables in section “Requirements on Components” for mappings to SOA APIs and EDAS signals. | Jbaden1 |
| 6 | 1a | 2019-12-05 | * Upstream Documents section added to “Input Requirements/Documents” table * Custom style table formatting removed | Jbaden1 |
| 6 | 1a | 2020-01-07 | * Some fine tuning for naming conventions of E/E components and connections. * List of HW I/O signal types reduced to RF-A, RF-D, D, A, Networked and PWM. * Protocol column added to the E/E connection table | Jbaden1 |
| 6 | 1a | 2020-01-07 | * “HW Metric” and “Architecture Redundancy Summary” sections removed per request from the Functional Architecture Team (based on Governance Board decision [FSTGB-97](mailto:TrackLite%20%23%20FSTGB-97:%20https://www.tracklite.ford.com/prweb/PRAuth/TrackLiteSSO?pyActivity=@baseclass.RedirectAndRunWraper&ThreadName=WorkLinkThread&bPurgeTargetThread=true&AccessGroupName=FSTGB:ProjectAdministrators&Location=pyActivity%3DWork-.Open%26Action%3DReview%26HarnessPurpose%3DReview%26InsHandle%3DFORD-FSTGB-WORK+FSTGB-97)) * “Functional Safety” chapter moved to “Feature Implementation Requirements” section. “Function Allocation” chapter seemed no longer appropriate. | Jbaden1 |
| 6 | 1a | 2020-01-07 | * Ordering of fields in AIS interfaces tables modified to conform with the Macro Template and the Importer Sheet * Page Header: no longer in bold letters | Jbaden1 |
| 6 | 1a | 2020-03-09 | * Missing doc property “LatestSigMappingID” and “LatestAisInterfaceID” added * doc property “CopyrightDate” re-formatted to text and copyright date field in footer corrected * Version numbering re-initialized as 0.1 * Init value of version/revision date set to “yyyy/mm/dd” instead of “yyyy-mm-dd” to be in line with the “Edit Document Property” dialog * Type of “Latest….ID” doc properties changed from Text to Number | Jbaden1 |
| 6 | 1a | 2020-03-11 | * “Mapping” table removed from template. Has been migrated to macro. | Jbaden1 |
| 6 | 1a | 2020-03-13 | * Separate chapter “Technical Safety Requirements” removed. Content already covered by Allocation Table in chapter Function Allocation. * “Implemented Function” replaced by term “Technology Function” | Jbaden1 |

# Appendix

## Data Dictionary

### Logical Signals

-983657045.jpg boostCmmd

Signal request to not boost the brakes

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of boostCmmd

-983657045.jpg brakeStatus

Informational signal about position of the brake pedal

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of brakeStatus

-983657045.jpg cmmdSWC

Release Steering Wheel Column to tow the vehicle

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of cmmdSWC

-983657045.jpg enablingNFTStatus

Status of the feature

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of enablingNFTStatus

-983657045.jpg feedback

Visual Feedback from HMI to Driver

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of feedback

-983657045.jpg ignitionStatus

Status of the ignition

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of ignitionStatus

-983657045.jpg requestNFT

Signal request to enable the feature

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of requestNFT

-983657045.jpg statusNFT

Status of the feature

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of statusNFT

-983657045.jpg toggleAlarm

Request to enable and disable alarms who interfere with feature

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of toggleAlarm

-983657045.jpg transferCaseCmmd

Signal request to release the driveline from the wheels

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of transferCaseCmmd

-983657045.jpg transferCaseStatus

Status of the Transfer Case

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of transferCaseStatus

-983657045.jpg transmissionCmmd

Signal request to avoid change from neutral

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of transmissionCmmd

-983657045.jpg transmissionStatus

Status of the Transmission

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of transmissionStatus

-983657045.jpg vehicleSpeed

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of vehicleSpeed

-983657045.jpg wakeUpStatus

Status of the wake up door sensor

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | -- |
| Value Range | [ - ] |
| Resolution |  |
| Unit |  |

Table: Signal Details of wakeUpStatus

### Logical Parameters

### Technical Signals

53080685.jpg AwdMde\_D\_RqDrv

Driver Request for changing driveline state.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg FourByFourMde\_D\_ET2 |

Table: Signal Details of AwdMde\_D\_RqDrv

53080685.jpg AwdStat\_D\_RqDsply

Ref: 4x4 Indicator Control v23.

Request to display a 4x4 status message.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg AwdStat\_D\_RqDsply\_ET5 |

Table: Signal Details of AwdStat\_D\_RqDsply

53080685.jpg BpedDrvAppl\_D\_Actl

Arbitrated indication of whether the brake pedal is being depressed by the driver (except for possible external failures such as an object resting on the pedal) or not.

For cars equipped with Active Booster, the booster release switch shall give the information if driver is braking or not. This signal will inform other ECU's if the driver is braking.

Two bits are used to avoid having to create a separate standardized checksum signal for dependability.

0 = not allowed (treat as fault)

1 = driver not braking

2 = driver braking

3 = not allowed (treat as fault)

Use BPedDrvAppl\_D\_QF (id#1749) for quality factor information.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg BpedDrvAppl\_D\_Actl\_ET |

Table: Signal Details of BpedDrvAppl\_D\_Actl

53080685.jpg BrkTrnShifLck\_B\_Stat

Indicates whether shifting from 'Park' is currently allowed by the Brake Transmission Shift Interlock logic.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg ShiftNoShift\_ET |

Table: Signal Details of BrkTrnShifLck\_B\_Stat

53080685.jpg Dimming\_Lvl

Intensity level of dimmable backlighting.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg Dimming\_Lvl\_ET |

Table: Signal Details of Dimming\_Lvl

53080685.jpg EngAout\_N\_Actl

Engine speed. Current flywheel speed averaged.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg EngAssyOut\_N\_ET |

Table: Signal Details of EngAout\_N\_Actl

53080685.jpg GearLvr\_D\_ActlDrv

This signal shall report the shift lever position as commanded by the driver.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg GearLvrPos\_D\_Actl\_ET2 |

Table: Signal Details of GearLvr\_D\_ActlDrv

53080685.jpg GearPos\_D\_Trg

Information from TCM about which gear is going to be engaged (target gear) by the automatic gear box.

Variability point: used only in automatic transmission.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg GearPos\_D\_Trg\_ET2 |

Table: Signal Details of GearPos\_D\_Trg

53080685.jpg GearSelLck\_D\_Rq

GearSelLck\_D\_Rq is used to lock an external GSM in either Park or Neutral. This emulates functions such as BTSI, Neutral Tow, etc. while supporting operating modes such as Factory/Transport mode, Park Lock Control, Secure Idle, etc.

For shift-by-wire.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg GearSelLck\_D\_ET |

Table: Signal Details of GearSelLck\_D\_Rq

53080685.jpg Ignition\_Status

The processed value for current Ignition state.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg Ignition\_Status\_ET |

Table: Signal Details of Ignition\_Status

53080685.jpg NtrlTowAvail\_B\_Stat

Used to notify modules when Neutral Tow is available

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg AvailableNotAvailable\_ET |

Table: Signal Details of NtrlTowAvail\_B\_Stat

53080685.jpg NtrlTowMdeEnbl\_B\_RqDrv

Indication that the driver has requested Neutral Tow Mode functionality.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg YesNo\_ET |

Table: Signal Details of NtrlTowMdeEnbl\_B\_RqDrv

53080685.jpg TrnGear\_D\_RqDrv

Indicates the gear position requested by the fault-corrected state of all pushbutton banks.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg TrnGear\_D\_RqDrv\_ET |

Table: Signal Details of TrnGear\_D\_RqDrv

53080685.jpg TrnGearMsgTxt\_D\_Rq

Request for display of Shift By Wire system information on the driver.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg MsgTxt5bit\_D\_RqDsply\_ET |

Table: Signal Details of TrnGearMsgTxt\_D\_Rq

53080685.jpg TrnGearNtmAllow\_B\_Stat

Indication to the cluster that the Neutral Tow option is available for selection by the customer

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg YesNo\_ET |

Table: Signal Details of TrnGearNtmAllow\_B\_Stat

53080685.jpg TrnNtrlTowCmd\_D\_Actl

When a neutral tow command accompanies a valid command into Neutral, the TRCM shall enter a persistant neutral tow state.

Car Wash Mode and Neutral Tow both are used by the GSM for special indication.

In Car Wash / Neutral tow mode this bit remains set until the mode is exited through specified conditions.

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg TrnNtrlTowCmd\_D\_Actl\_ET2 |

Table: Signal Details of TrnNtrlTowCmd\_D\_Actl

53080685.jpg VehOverGnd\_V\_Est

Estimated vehicle speed over ground. FSMS:RQT-060900-006151

|  |  |  |
| --- | --- | --- |
| **ASIL** | |  |
| **Value** | Encoding Name | 53080685.jpg Veh\_V\_IncldQfET |

Table: Signal Details of VehOverGnd\_V\_Est

#### GSDB Signals

*Not supported by MagicDraw report generation.*

#### HW I/Os

*Not supported by MagicDraw report generation.*

#### Diagnostic Interfaces

##### DTCs

<Some Description of the DTC.

Refer to VSEM document “[Diagnostic Fault Coverage and DTC Numbers](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=yAUtrNhnx3NrTDAAAAAAAAAAAAA&servername=Production_Server)

[Design Consideration](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=yAUtrNhnx3NrTDAAAAAAAAAAAAA&servername=Production_Server)”, what to fill into the attributes below>

|  |  |
| --- | --- |
| **Test Period Time** |  |
| **Test Run Criteria,** |  |
| **Enable Criteria (EC)** |  |
| **Applicable** |  |
| **FailureTypeBytes** |  |
| **Test Period Time** |  |
| **Test Run Criteria,** |  |

##### DIDs

*Not supported by MagicDraw report generation.*

### Technical Parameters

### Mappings

910269149.jpg TrnNtrlTowCmd\_D\_Actl - transmissionCmmd

910269149.jpg TrnNtrlTowCmd\_D\_Actl - boostCmmd

910269149.jpg TrnNtrlTowCmd\_D\_Actl - toggleAlarm

910269149.jpg TrnNtrlTowCmd\_D\_Actl - transferCaseCmmd

910269149.jpg TrnNtrlTowCmd\_D\_Actl - cmmdSWC

910269149.jpg TrnGearNtmAllow\_B\_Stat - enablingNFTStatus

910269149.jpg Dimming\_Lvl - wakeUpStatus

910269149.jpg GearPos\_D\_Trg - transmissionStatus

910269149.jpg EngAout\_N\_Actl - transmissionStatus

910269149.jpg TrnGearMsgTxt\_D\_Rq - feedback

910269149.jpg AwdStat\_D\_RqDsply - boostCmmd

910269149.jpg AwdStat\_D\_RqDsply - cmmdSWC

910269149.jpg AwdStat\_D\_RqDsply - toggleAlarm

910269149.jpg TrnGear\_D\_RqDrv - transmissionCmmd

910269149.jpg AwdMde\_D\_RqDrv - transferCaseStatus

910269149.jpg GearSelLck\_D\_Rq - transmissionCmmd

910269149.jpg NtrlTowMdeEnbl\_B\_RqDrv - requestNFT

910269149.jpg VehOverGnd\_V\_Est - vehicleSpeed

910269149.jpg BrkTrnShifLck\_B\_Stat - transmissionStatus

910269149.jpg NtrlTowAvail\_B\_Stat - statusNFT

910269149.jpg GearLvr\_D\_ActlDrv - transmissionStatus

910269149.jpg Ignition\_Status - ignitionStatus

910269149.jpg BpedDrvAppl\_D\_Actl - brakeStatus

### Technical Interfaces

*Not supported by MagicDraw report generation.*

#### AIS Interfaces

##### Publisher Interfaces

##### Subscriber Interfaces

#### AUTOSAR Ports

*Not supported by MagicDraw report generation.*

### Messages/APIs

#### CAN Bus “<Bus Name>”

*Not supported by MagicDraw report generation.*

#### LIN Bus “<Bus Name>”

*Not supported by MagicDraw report generation.*

#### AUTOSAR Interfaces

*Not supported by MagicDraw report generation.*

#### SOA Service Contracts

*Not supported by MagicDraw report generation.*

### Encoding Types

#### Logical Encoding Types

#### Technology Encoding Types

53080685.jpg AvailableNotAvailable\_ET

180726

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | Available | 0x1 |
|  | NotAvailable | 0x0 |
| Units |  | |

53080685.jpg AwdStat\_D\_RqDsply\_ET5

563634

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | \_4wd\_Lock\_Required | 0x1E |
|  | \_4x4\_Auto\_Restored | 0xC |
|  | \_4x4\_Disabled\_Temporarily | 0xB |
|  | \_4x4\_Exiting\_Off\_Road | 0xF |
|  | \_4x4\_Extreme\_Off\_Road\_Mode | 0x10 |
|  | \_4x4\_Locked\_Temporarily | 0xA |
|  | \_4x4\_Mode\_Unavail\_TMS | 0x18 |
|  | \_4x4\_Off\_Road\_Mode | 0xE |
|  | \_4x4\_Off\_Road\_Speed | 0x11 |
|  | AWD\_OFF | 0x12 |
|  | AWD\_PTU\_Oil\_Changed | 0x16 |
|  | Blocked\_Shift\_Assist | 0xD |
|  | Cfg\_Perf\_Redc\_See\_Manual | 0x1D |
|  | Change\_AWD\_PTU\_Oil | 0x15 |
|  | Into\_4Low\_\_Brake | 0x2 |
|  | Into\_4Low\_\_Clutch | 0x4 |
|  | Into\_4Low\_\_Neutral | 0x3 |
|  | Into\_4Low\_\_Speed | 0x1 |
|  | Lkr\_Mode\_Unavail\_TMS | 0x19 |
|  | Neutral\_Tow\_Disabled | 0x14 |
|  | Neutral\_Tow\_Enabled | 0x13 |
|  | Normal\_\_No\_Message | 0x0 |
|  | Out\_of\_4Low\_\_Brake | 0x6 |
|  | Out\_of\_4Low\_\_Clutch | 0x8 |
|  | Out\_of\_4Low\_\_Neutral | 0x7 |
|  | Out\_of\_4Low\_\_Speed | 0x5 |
|  | Out\_of\_4Low\_Crawl | 0x17 |
|  | Rear\_Diff\_Lock\_Not\_Avail | 0x1F |
|  | Shift\_In\_Progress | 0x9 |
|  | Shift\_To\_Neutral | 0x1A |
|  | To\_Engage\_4x4\_Release\_Aped | 0x1C |
|  | To\_Engage\_4x4\_Slow\_To\_3MPH | 0x1B |
| Units |  | |

53080685.jpg BpedDrvAppl\_D\_Actl\_ET

005421

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | driver braking | 0x2 |
|  | driver not braking | 0x1 |
|  | not allowed | 0x3 |
|  | not allowed | 0x0 |
| Units |  | |

53080685.jpg Dimming\_Lvl\_ET

005512

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | Day\_1 | 0xD |
|  | Day\_2 | 0xE |
|  | Day\_3 | 0xF |
|  | Day\_4 | 0x10 |
|  | Day\_5 | 0x11 |
|  | Day\_6 | 0x12 |
|  | Invalid | 0xFF |
|  | Night\_1 | 0x1 |
|  | Night\_2 | 0x2 |
|  | Night\_3 | 0x3 |
|  | Night\_4 | 0x4 |
|  | Night\_5 | 0x5 |
|  | Night\_6 | 0x6 |
|  | Night\_7 | 0x7 |
|  | Night\_8 | 0x8 |
|  | Night\_9 | 0x9 |
|  | Night\_10 | 0xA |
|  | Night\_11 | 0xB |
|  | Night\_12 | 0xC |
|  | Not used | 0xE2 |
|  | Not used | 0x35 |
|  | Not used | 0x30 |
|  | Not used | 0xC0 |
|  | Not used | 0xF1 |
|  | Not used | 0x92 |
|  | Not used | 0xD9 |
|  | Not used | 0x2B |
|  | Not used | 0xC7 |
|  | Not used | 0x46 |
|  | Not used | 0x4E |
|  | Not used | 0xE6 |
|  | Not used | 0xD7 |
|  | Not used | 0x16 |
|  | Not used | 0x64 |
|  | Not used | 0xC2 |
|  | Not used | 0x75 |
|  | Not used | 0x68 |
|  | Not used | 0xD1 |
|  | Not used | 0xCA |
|  | Not used | 0x5F |
|  | Not used | 0x44 |
|  | Not used | 0xD8 |
|  | Not used | 0x53 |
|  | Not used | 0xD5 |
|  | Not used | 0x60 |
|  | Not used | 0x1A |
|  | Not used | 0x80 |
|  | Not used | 0x97 |
|  | Not used | 0x50 |
|  | Not used | 0x63 |
|  | Not used | 0x20 |
|  | Not used | 0x2F |
|  | Not used | 0x28 |
|  | Not used | 0xF0 |
|  | Not used | 0x94 |
|  | Not used | 0x4C |
|  | Not used | 0x29 |
|  | Not used | 0xF4 |
|  | Not used | 0x4B |
|  | Not used | 0x37 |
|  | Not used | 0x66 |
|  | Not used | 0x2A |
|  | Not used | 0x77 |
|  | Not used | 0x2D |
|  | Not used | 0x48 |
|  | Not used | 0x9B |
|  | Not used | 0xE4 |
|  | Not used | 0x39 |
|  | Not used | 0x84 |
|  | Not used | 0xD0 |
|  | Not used | 0x98 |
|  | Not used | 0xCD |
|  | Not used | 0xC8 |
|  | Not used | 0x61 |
|  | Not used | 0x57 |
|  | Not used | 0xDD |
|  | Not used | 0xDB |
|  | Not used | 0x9D |
|  | Not used | 0x24 |
|  | Not used | 0x5B |
|  | Not used | 0x3C |
|  | Not used | 0x9A |
|  | Not used | 0x67 |
|  | Not used | 0x15 |
|  | Not used | 0x54 |
|  | Not used | 0x40 |
|  | Not used | 0x95 |
|  | Not used | 0xB6 |
|  | Not used | 0xA3 |
|  | Not used | 0x25 |
|  | Not used | 0xE7 |
|  | Not used | 0xFB |
|  | Not used | 0xBA |
|  | Not used | 0x59 |
|  | Not used | 0x58 |
|  | Not used | 0x8F |
|  | Not used | 0x5A |
|  | Not used | 0x4F |
|  | Not used | 0x6E |
|  | Not used | 0x8E |
|  | Not used | 0x31 |
|  | Not used | 0xEF |
|  | Not used | 0xFC |
|  | Not used | 0xAC |
|  | Not used | 0x85 |
|  | Not used | 0x3E |
|  | Not used | 0xCC |
|  | Not used | 0x93 |
|  | Not used | 0x1D |
|  | Not used | 0x89 |
|  | Not used | 0xAF |
|  | Not used | 0x2C |
|  | Not used | 0x41 |
|  | Not used | 0xBF |
|  | Not used | 0xF5 |
|  | Not used | 0xEC |
|  | Not used | 0x1B |
|  | Not used | 0x3F |
|  | Not used | 0x7B |
|  | Not used | 0x7C |
|  | Not used | 0xA0 |
|  | Not used | 0x87 |
|  | Not used | 0x47 |
|  | Not used | 0xF2 |
|  | Not used | 0xBD |
|  | Not used | 0x7F |
|  | Not used | 0xD2 |
|  | Not used | 0x69 |
|  | Not used | 0x27 |
|  | Not used | 0x49 |
|  | Not used | 0xC4 |
|  | Not used | 0xBB |
|  | Not used | 0x8C |
|  | Not used | 0xAD |
|  | Not used | 0x2E |
|  | Not used | 0x96 |
|  | Not used | 0xDC |
|  | Not used | 0xCF |
|  | Not used | 0x88 |
|  | Not used | 0xA2 |
|  | Not used | 0xFD |
|  | Not used | 0x7A |
|  | Not used | 0xE0 |
|  | Not used | 0xE9 |
|  | Not used | 0xE8 |
|  | Not used | 0x5D |
|  | Not used | 0xDE |
|  | Not used | 0x45 |
|  | Not used | 0x9C |
|  | Not used | 0xB1 |
|  | Not used | 0xB4 |
|  | Not used | 0x3A |
|  | Not used | 0xDA |
|  | Not used | 0x23 |
|  | Not used | 0xF8 |
|  | Not used | 0xC6 |
|  | Not used | 0xAB |
|  | Not used | 0xB7 |
|  | Not used | 0xC5 |
|  | Not used | 0xB3 |
|  | Not used | 0xF6 |
|  | Not used | 0xB2 |
|  | Not used | 0x6B |
|  | Not used | 0xE5 |
|  | Not used | 0x51 |
|  | Not used | 0x65 |
|  | Not used | 0xA8 |
|  | Not used | 0x99 |
|  | Not used | 0xF9 |
|  | Not used | 0x5C |
|  | Not used | 0xE1 |
|  | Not used | 0x1E |
|  | Not used | 0x4D |
|  | Not used | 0xA5 |
|  | Not used | 0xD6 |
|  | Not used | 0x72 |
|  | Not used | 0x78 |
|  | Not used | 0xA7 |
|  | Not used | 0x3D |
|  | Not used | 0xE3 |
|  | Not used | 0xF7 |
|  | Not used | 0x6A |
|  | Not used | 0x76 |
|  | Not used | 0xB5 |
|  | Not used | 0xB8 |
|  | Not used | 0x56 |
|  | Not used | 0x82 |
|  | Not used | 0x83 |
|  | Not used | 0xC9 |
|  | Not used | 0x34 |
|  | Not used | 0xA9 |
|  | Not used | 0x21 |
|  | Not used | 0xBC |
|  | Not used | 0xA1 |
|  | Not used | 0xD3 |
|  | Not used | 0x5E |
|  | Not used | 0x4A |
|  | Not used | 0x18 |
|  | Not used | 0x22 |
|  | Not used | 0x38 |
|  | Not used | 0x91 |
|  | Not used | 0x74 |
|  | Not used | 0xBE |
|  | Not used | 0x9F |
|  | Not used | 0xCB |
|  | Not used | 0xDF |
|  | Not used | 0xEB |
|  | Not used | 0x86 |
|  | Not used | 0x71 |
|  | Not used | 0x19 |
|  | Not used | 0xA6 |
|  | Not used | 0x3B |
|  | Not used | 0x90 |
|  | Not used | 0x52 |
|  | Not used | 0x8B |
|  | Not used | 0xB9 |
|  | Not used | 0xEE |
|  | Not used | 0x8A |
|  | Not used | 0x42 |
|  | Not used | 0x17 |
|  | Not used | 0x26 |
|  | Not used | 0x7E |
|  | Not used | 0xC3 |
|  | Not used | 0x6C |
|  | Not used | 0x7D |
|  | Not used | 0x79 |
|  | Not used | 0x8D |
|  | Not used | 0x70 |
|  | Not used | 0xCE |
|  | Not used | 0x6F |
|  | Not used | 0xEA |
|  | Not used | 0x32 |
|  | Not used | 0x43 |
|  | Not used | 0x6D |
|  | Not used | 0xD4 |
|  | Not used | 0x1F |
|  | Not used | 0xF3 |
|  | Not used | 0x1C |
|  | Not used | 0xB0 |
|  | Not used | 0xC1 |
|  | Not used | 0x81 |
|  | Not used | 0x9E |
|  | Not used | 0xED |
|  | Not used | 0xFA |
|  | Not used | 0x55 |
|  | Not used | 0x62 |
|  | Not used | 0x33 |
|  | Not used | 0xAA |
|  | Not used | 0xA4 |
|  | Not used | 0x73 |
|  | Not used | 0xAE |
|  | Not used | 0x36 |
|  | Off | 0x0 |
|  | Unknown | 0xFE |
| Units |  | |

53080685.jpg EngAssyOut\_N\_ET

005572

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - 16382.0] | |
| Resolution |  | |
| Interpretation |  | |
|  | 0 to 16382 rpm | 0 |
| Units | rpm | |

53080685.jpg FourByFourMde\_D\_ET2

161852

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | Faulty | 0x7 |
|  | FourByFourAuto | 0x1 |
|  | FourByFourHigh | 0x2 |
|  | FourByFourLow | 0x3 |
|  | FourByTwo | 0x0 |
|  | Neutral | 0x4 |
|  | NoRequest | 0x5 |
|  | NotUsed\_2 | 0x6 |
| Units |  | |

53080685.jpg GearLvrPos\_D\_Actl\_ET2

341295

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | Drive | 0x3 |
|  | Fault | 0xF |
|  | Low | 0x5 |
|  | Neutral | 0x2 |
|  | NotUsed\_1 | 0xC |
|  | NotUsed\_2 | 0xD |
|  | Park | 0x0 |
|  | Range1\_M1\_L1 | 0x6 |
|  | Range2\_M2\_L2 | 0x7 |
|  | Range3\_M3\_L3 | 0x8 |
|  | Range4 | 0x9 |
|  | Range5 | 0xA |
|  | Range6 | 0xB |
|  | Reverse | 0x1 |
|  | Sport\_DriveSport\_Mposition | 0x4 |
|  | UnknownPosition | 0xE |
| Units |  | |

53080685.jpg GearPos\_D\_Trg\_ET2

024920

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | eighth | 0x8 |
|  | fifth | 0x5 |
|  | first | 0x1 |
|  | fourth | 0x4 |
|  | neutral | 0x0 |
|  | ninth | 0x9 |
|  | reverse | 0xE |
|  | second | 0x2 |
|  | seventh | 0x7 |
|  | sixth | 0x6 |
|  | tenth | 0xA |
|  | third | 0x3 |
|  | undefined | 0xC |
|  | undefined | 0xD |
|  | undefined | 0xB |
|  | unknown | 0xF |
| Units |  | |

53080685.jpg GearSelLck\_D\_ET

050045

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | Lock | 0x1 |
|  | Null | 0x0 |
|  | PreventionBlocker | 0x3 |
|  | Unlock | 0x2 |
| Units |  | |

53080685.jpg Ignition\_Status\_ET

005729

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | Accessory | 0x2 |
|  | Invalid | 0xF |
|  | Off | 0x1 |
|  | Run | 0x4 |
|  | Start | 0x8 |
|  | Unknown | 0x0 |
| Units |  | |

53080685.jpg MsgTxt5bit\_D\_RqDsply\_ET

005796

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | Message 1 | 0x1 |
|  | Message 2 | 0x2 |
|  | Message 3 | 0x3 |
|  | Message 4 | 0x4 |
|  | Message 5 | 0x5 |
|  | Message 6 | 0x6 |
|  | Message 7 | 0x7 |
|  | Message 8 | 0x8 |
|  | Message 9 | 0x9 |
|  | Message 10 | 0xA |
|  | Message 11 | 0xB |
|  | Message 12 | 0xC |
|  | Message 13 | 0xD |
|  | Message 14 | 0xE |
|  | Message 15 | 0xF |
|  | Message 16 | 0x10 |
|  | Message 17 | 0x11 |
|  | Message 18 | 0x12 |
|  | Message 19 | 0x13 |
|  | Message 20 | 0x14 |
|  | Message 21 | 0x15 |
|  | Message 22 | 0x16 |
|  | Message 23 | 0x17 |
|  | Message 24 | 0x18 |
|  | Message 25 | 0x19 |
|  | Message 26 | 0x1A |
|  | Message 27 | 0x1B |
|  | Message 28 | 0x1C |
|  | Message 29 | 0x1D |
|  | Message 30 | 0x1E |
|  | Message 31 | 0x1F |
|  | No message | 0x0 |
| Units |  | |

53080685.jpg ShiftNoShift\_ET

005925

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | No shift | 0x0 |
|  | Shift | 0x1 |
| Units |  | |

53080685.jpg TrnGear\_D\_RqDrv\_ET

005981

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | Drive | 0x8 |
|  | Fault | 0x1F |
|  | Manual | 0x10 |
|  | Neutral | 0x4 |
|  | No\_Gear | 0x0 |
|  | Not used | 0x19 |
|  | Not used | 0xB |
|  | Not used | 0x13 |
|  | Not used | 0x14 |
|  | Not used | 0x1B |
|  | Not used | 0x9 |
|  | Not used | 0x1A |
|  | Not used | 0xF |
|  | Not used | 0x16 |
|  | Not used | 0x1E |
|  | Not used | 0x18 |
|  | Not used | 0x5 |
|  | Not used | 0x1C |
|  | Not used | 0x7 |
|  | Not used | 0xA |
|  | Not used | 0x12 |
|  | Not used | 0x11 |
|  | Not used | 0x1D |
|  | Not used | 0x6 |
|  | Not used | 0xC |
|  | Not used | 0x17 |
|  | Not used | 0xE |
|  | Not used | 0xD |
|  | Not used | 0x3 |
|  | Park | 0x1 |
|  | Return to Park | 0x15 |
|  | Reverse | 0x2 |
| Units |  | |

53080685.jpg TrnNtrlTowCmd\_D\_Actl\_ET2

006900

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | Car Wash Mode | 0x1 |
|  | Neutral Tow Entry | 0x2 |
|  | No Data Exists | 0x3 |
|  | Normal Mode | 0x0 |
| Units |  | |

53080685.jpg Veh\_V\_IncldQfET

006069

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - 655.33] | |
| Resolution |  | |
| Interpretation |  | |
|  | 0 to 655.33 kilometers / hour | 0 |
|  | Faulty | 0xFFFF |
|  | No data exists | 0xFFFE |
| Units | kilometers / hour | |

53080685.jpg YesNo\_ET

006105

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | No | 0x0 |
|  | Yes | 0x1 |
| Units |  | |

53080685.jpg YesNo\_ET

006105

|  |  |  |
| --- | --- | --- |
| Value Range | [0.0 - ] | |
| Resolution |  | |
| Interpretation |  | |
|  | No | 0x0 |
|  | Yes | 0x1 |
| Units |  | |

### Technology State Machines

Document ends here.