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|  |  | | |  |
|  | Stowable Steering and Deployable Tray  <<Feature>>  (F002870) | | |  |
|  |  | | |  |
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|  | | | | |
|  | | | | |
| Document Approval | | | | |
| Person | Role | | Email Confirmation | Date |
|  |  | |  |  |
|  |  | |  |  |

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# Introduction

## Document Purpose

A Feature Document (FD) document defines a Feature on [Concept Level](https://bd101001.pd2.ford.com/stages/#/workspace/209/_vv/(process/activity/_Y6ftAPI2VsW5zd82DgHb6g)). It specifies **what** the feature shall do and how it shall behave from customer perspective. It should also provide reasoning and background **why** we have the feature in the vehicle.

The FD also serves as an Item Definition as defined by ISO26262 for those features, which follow the Ford Functional Safety process. Refer [FFSG01.10 Feature Document Guideline](https://azureford.sharepoint.com/sites/GlobalFunctionalSafety/Released%20Templates%20Guidelines%20and%20Examples/Guidelines/FFSG01.10_FeatureDocument_Guideline.pdf) for how to apply the Feature Doc template for Functional Safety.

## Document Scope

This Feature Document (FD) specifies the following features:

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature ID** | **Feature Name** | **Owner** | **Reference** |
| F002870 | Stowable Steering and Deployable Tray  (Program(s): GE2--MY2024) | Tok Lau (TLAU4),John Moore (jmoor457), Murty Richard (O.) (RMURTY) |  |

Table 1: Features described in this FD

## Document Audience

The FD is written by the feature owner of Tok Lau (TLAU4),John Moore (jmoor457), Murty Richard (O.) (RMURTY). All Stakeholders, i.e., all people who have a valid interest in the feature should read and, if possible, review the FD. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the FD.

### Stakeholder List

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **CDSID** | **Contact Info** | **Role** | **Stakeholder Group** |
| Michael Puleri | mpuleri | mpuleri@ford.com | Manager - Steering Fixed |  |
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| Spencer Dorr | sdorr | sdorr@ford.com | Steering Systems Engineer |  |
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## 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 FD relates to other Ford Requirements Documents and Specifications.

### Document Structure

The structure of this document is explained below:

**Introduction** – Explains how to use this document including responsibilities and requisite documents. Explains the terminology. Gives a clarification of the definitions, concepts and abbreviations used in the document.

**Feature Overview** – States briefly the background and the purpose of the feature, feature variants and corresponding regions and markets. Also includes input requirements, assumptions and constraints.

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

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

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

**Functional Safety** – Lists System Behaviors, Safety Goals and Safety Requirements of the feature.

**Cybersecurity** – Lists Security Goals and Security Requirements of the feature.

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

**Traceability Matrix** – Traceability Matrix.

**Open Concerns** – List of Open Concerns

**Revision History** – Document Change History including a list of new or modified requirements. The requirements in this document are tagged, and this section contains different types of tables listing all, new, or changed requirements by their title and page no.

**Appendix** – Appendix

## Document Conventions

### Classification of Chapters

A chapter is considered mandatory, unless the chapter or its parent chapter(s) are categorized by using the tag:

**#Classification:** Some Condition

If no requirement/other content is known for a mandatory chapter, leave a statement “Not Applicable”

Some chapters have a follow certain rules in context of specific Ford processes, e.g. Functional Safety. This is indicated at the beginning of the corresponding chapter by the tags:

**#Functional Safety:** Some process specific explanation

**#Cybersecurity:** Some process specific explanation

### 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.

#### **Requirements Attributes**

The templates provided by *Specification\_Macros.dotm* define a list of attributes for each requirement. This helps to classify the requirement. The attributes are explained at [RE Wiki - Requirements Attributes](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes?src=contextnavpagetreemode).

## References

### Ford Documents

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

*Ford internal Documents not specified in SysML model*

### External Documents and Publications

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

| **Reference** | **Document / Publication** | **Document Location** |
| --- | --- | --- |
| IEEE Std 1012-2004 IEEE Standard for Software Verification and Validation |  |  |
| ISO/IEC 19500-2:2003 | Information technology -- Open Distributed Processing -- Part 2 |  |
| UML Testing Profile (UTP), v1.2 |  |  |
| Wikipedia |  |  |

Table 6: External documents and publications

## Glossary

See Appendix for Definitions and Abbreviations.

### Definitions

### Abbreviations

### Parameters / Values

| **Name** | **Description** | **Range / Resolution** |
| --- | --- | --- |

Table 8: Parameters / Values used in this document

# Feature Overview

## Purpose and Description of Feature

Stowable Steering wheel with deployable work surface is to enable customers to make use of their fragmented time, to cope with their busy, always changing schedule and allow themselves to enjoy a piece of me-time or manage business needs.

For right now, this does not extend from drive my vehicle because it is covered by an another feature/function

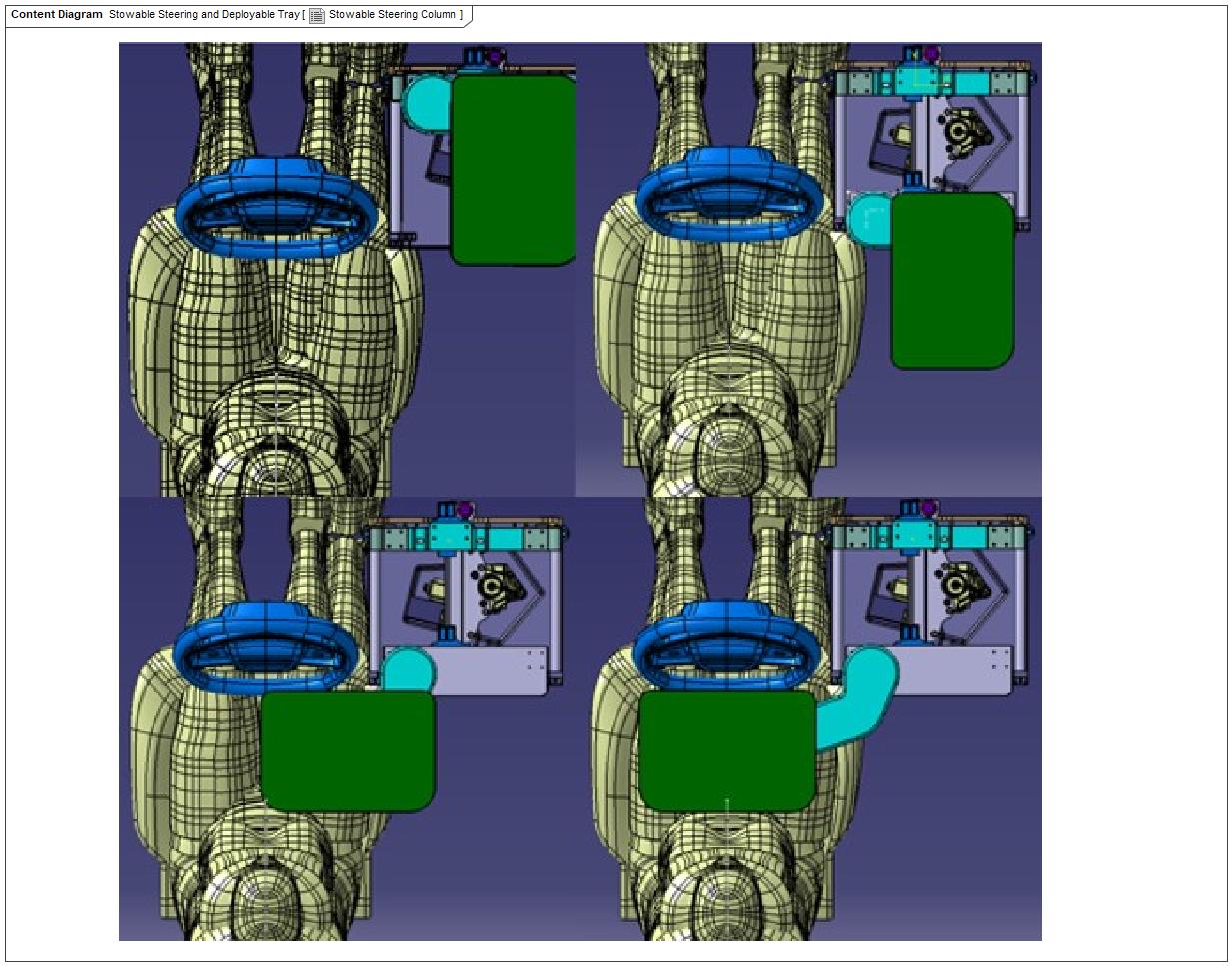


Figure 3: Stowable Steering Column - Folding Tray Concept

## Feature Variants

|  |  |  |
| --- | --- | --- |
| **Variant Name** | **Variant Description** | **Remarks** |
| **Ford Variant** | The Ford Variant varies from the Lincoln Variant in the look and feel and materials used. |  |
| **Lincoln Variant** |  |  |

Table 2: Feature Variants

### Regions & Markets

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Market /**  **Region**  Variant Name | **North America** | **South America** | **Europe** | **Middle East/Africa** | **Asia / Pacific** | **China** |
| **Ford Variant** | Optional | No | Mandatory | No | No | No |
| **Lincoln Variant** | Mandatory | No | No | No | No | Mandatory |

Table 3: Regions & Markets

## Input Requirements/Documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference**  (Reference as listed in ch. “References”) | **Section/Requirement** | **Description** | **Derived Requirement**  (optional – reference to requirement in ch. “Feature Implementation Requirements”) |
| **Attribute Requirements** | | | |
|  | Productivity | The driver shall use the feature to deploy a work surface and move the driver seat position in a timely manner as specified by User Experience guidelines. |  |
|  | Gain Space and Freedom of Movement | The driver shall have the ability to stow the steering column and move the driver seat position in a timely manner as specified by User Experience guidelines. |  |
|  | Unsafe Operating States | Unsafe Operating States shall be identified and mitigated as per ISO 26262 Functional Safety Analysis. |  |
|  | Easy to Understand Controls | The vehicle driver shall have access to easy-to-understand and intuitive controls and status information in close physical proximity to one another concerning the state of the feature. |  |
|  | Example AR |  |  |
|  | System Loudness | The system shall function at less than TBD dB. |  |
|  | Ease of Feature State Movement | The driver shall have the ability to easily move from a current feature state to any other valid state as quickly as possible. States are as follows: Drive, Rest/ Play and Work. |  |
| **Ford Engineering Standards** | | | |
|  | <Example: some SDS (requirement)> |  |  |
| **Legal Regulations** | | | |
|  | Compliance with FMVSS101 | The Feature shall comply with FMVSS101. |  |
| **Industry Standards** | | | |
|  | ISO 26262 | The system should be developed according to Ford's implementation of Functional Safety. |  |
| **Other Sources** | | | |

Table 2‑1: Input Requirements/Documents

## Lessons Learned

1. PAC Number:2C799: V 191- Bosch wiper failure: Software logic needs to be verify when performing harware change.
2. PAC Number:15S10: Motor Wiper Table: Need to ensure electrons are designed to prevent water intrusion. High current draw circuits need to have the ability to turn off in the event of a short condition.
3. PAC Number:15U29: Steering Column Wiring Chafe: Wiring that goes over moving parts needs to be ensure to have proper length to avoid interference.
4. PAC Number:16S02: Kuga - 2016MY - 2.5L iVCT Electrical Steering Column Lock: Need to consider deterioration of the steering wheel positioning mechanicism.

## Assumptions

No Assumptions specified.

# Feature Context

## Feature Context Diagram

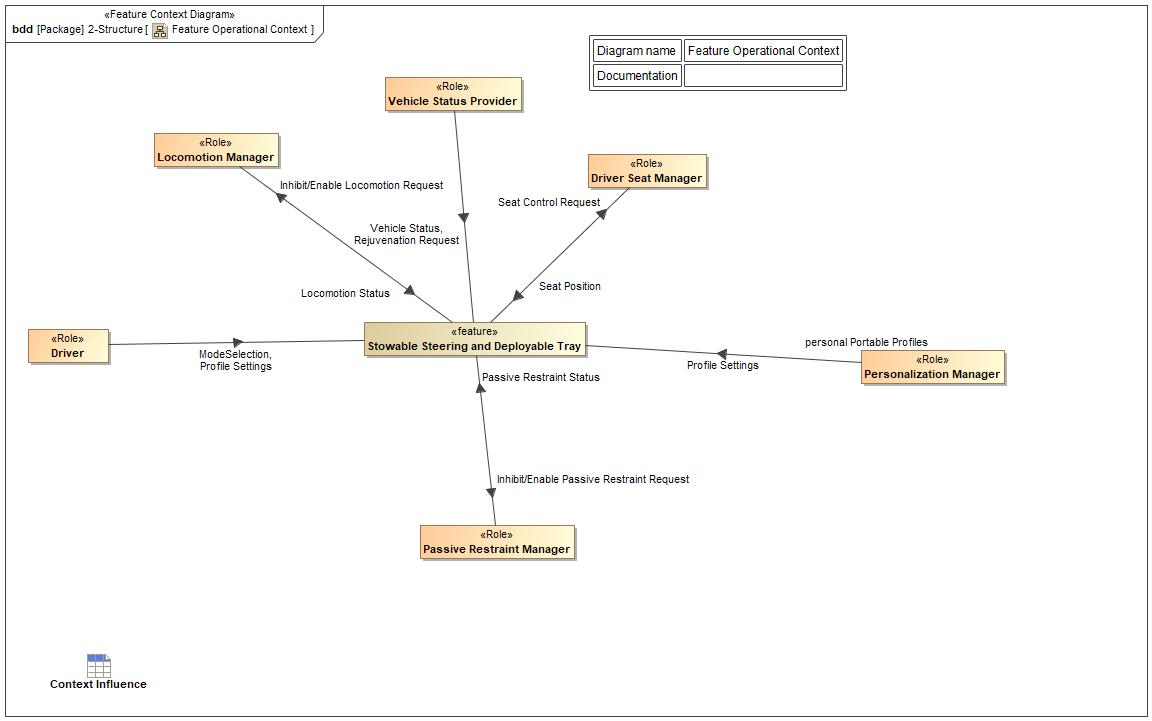


Figure 4: Feature Operational Context

## List of Influences

|  |  |  |
| --- | --- | --- |
| **ID** | **External Entity** | **Influence Description** |
| Inhibit/Enable Passive Restraint Request | Stowable Steering and Deployable Tray To Passive Restraint Manager | Command to Passive Restraint role to disable appropriate passive restraints associated with Stowable Steering Wheel. |
| Inhibit/Enable Locomotion Request | Stowable Steering and Deployable Tray To Locomotion Manager | Prevent the Vehicle from being driven. Vehicle should remain parked while Locomotion is inhibited. |
| Locomotion Status | Locomotion Manager To Stowable Steering and Deployable Tray | Provides the Locomotion Enable or Disable Status to feature. |
| ModeSelection | Driver To Stowable Steering and Deployable Tray | User Mode selection |
| Passive Restraint Status | Passive Restraint Manager To Stowable Steering and Deployable Tray | Current status of the Passive Restraints affecting Stowable Steering Wheel feature. |
| Profile Settings | Driver To Stowable Steering and Deployable Tray | The Driver's pre-defined set points for memory positions supported by Personal Profile feature. |
| Personalization Manager To Stowable Steering and Deployable Tray | The Driver's pre-defined set points for memory positions supported by Personal Profile feature. |
| Rejuvenation Request | Vehicle Status Provider To Stowable Steering and Deployable Tray | Request from the Rejuvenation Feature to support the Rejuvenation Mode. Will move Steering Column only. |
| Seat Control Request | Stowable Steering and Deployable Tray To Driver Seat Manager | Commands issued by Stowable Steering Wheel feature to Seat role to move user/driver seat. |
| Seat Position | Driver Seat Manager To Stowable Steering and Deployable Tray | Current Position and Status of user/driver seat. |
| Vehicle Status | Vehicle Status Provider To Stowable Steering and Deployable Tray | Vehicle Status used by feature to make decisions. Info like Vehicle Speed, PRNDL position, etc. |

Table 9: List of Influences

# Feature Modeling

## Operation Modes and States

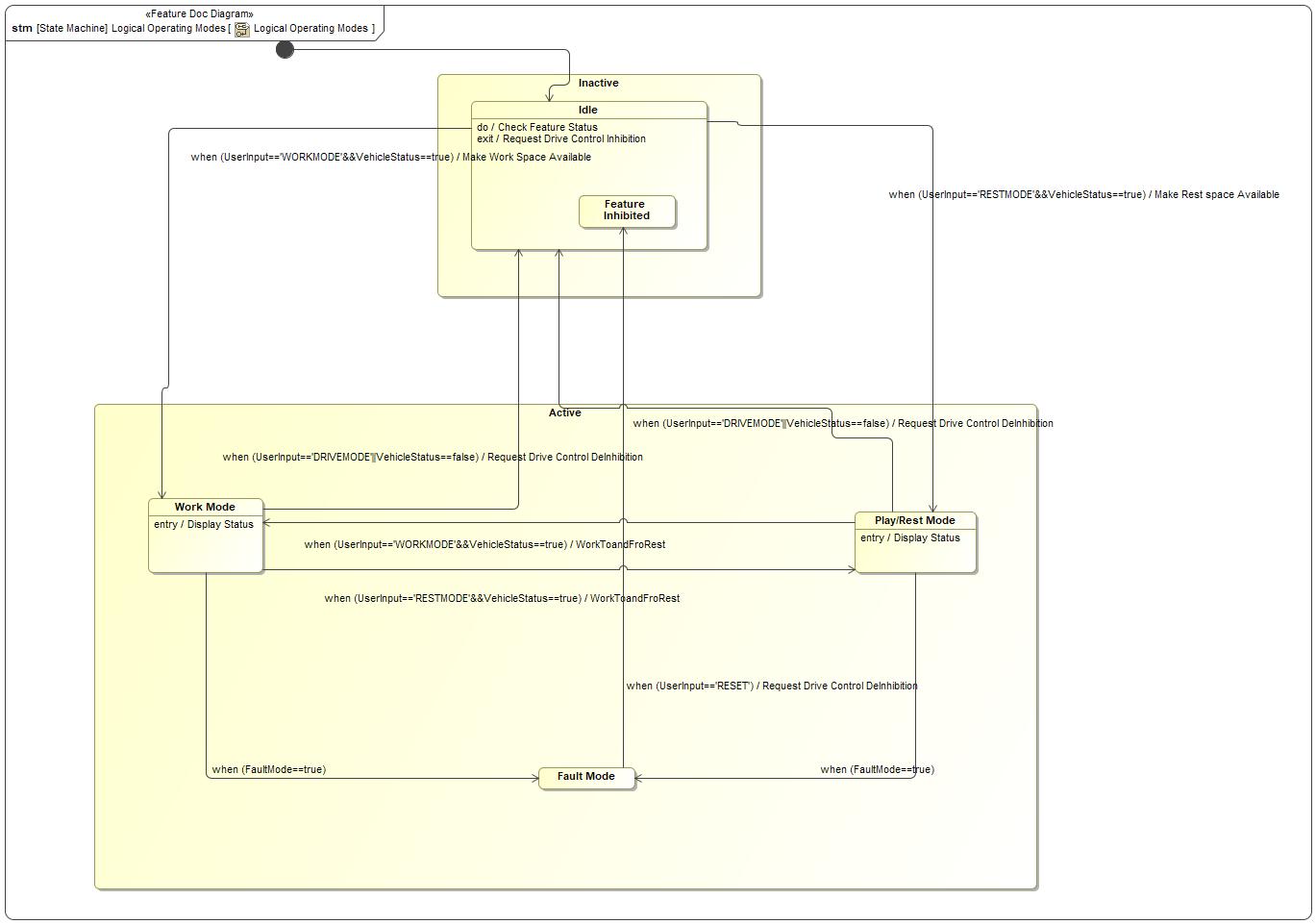


Figure 5: Logical Operating Modes

|  |  |  |
| --- | --- | --- |
| **State** | **Description** | **Requirements Reference** (optional) |
| Active | This is a Super-State for Work Mode, Play/Rest Mode and Fault Mode. This state runs when the feature is active. |  |
| Fault Mode | Upon any failure in Rest ,Play , Work Mode transitions or Actuations , they system shall be in Fault Mode |  |
| Feature Inhibited | This is a safe state for the situation that the vehicle is not in park and the feature activated without requests. The vehicle should slow down and go to idle state. |  |
| Idle | Do behavior: Check Feature Status  Exit behavior: Request Drive Control Inhibition |  |
| Inactive | This is a Super-State for the Idle Mode and Feature Inhibited Mode. This state runs when the feature is inactive. |  |
| Play/Rest Mode | State where user can be in Play /Rest mode , where he can move the seat position accordingly to gain comfort accordingly  Entry behavior: Display Status |  |
| Work Mode | State where user can be in Working mode with a work surface Available  Entry behavior: Display Status |  |

Table 10: Operation Modes and States on Logical Operating Modes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Transition ID** | **Source** | **Destination** | **Description** | **Requirements Reference**  (optional) |
| T1 | Play/Rest Mode | Idle | Name: Rest/Play to drive  Effect: Request Drive Control DeInhibition  ChangeEvent when (UserInput=='DRIVEMODE'||VehicleStatus==false) |  |
| T2 | Play/Rest Mode | Fault Mode | Name: Play / rest to Fault state  ChangeEvent when (FaultMode==true) |  |
| T3 | Play/Rest Mode | Work Mode | Name: Rest / Play to Work  Effect: WorkToandFroRest  ChangeEvent when (UserInput=='WORKMODE'&&VehicleStatus==true) |  |
| T4 | Idle | Play/Rest Mode | Name: Idle to Play / Rest  Effect: Make Rest space Available  ChangeEvent when (UserInput=='RESTMODE'&&VehicleStatus==true) |  |
| T5 | Work Mode | Idle | Name: work to drive  Effect: Request Drive Control DeInhibition  ChangeEvent when (UserInput=='DRIVEMODE'||VehicleStatus==false) |  |
| T6 | Work Mode | Play/Rest Mode | Name: Work to Rest /Play  Effect: WorkToandFroRest  ChangeEvent when (UserInput=='RESTMODE'&&VehicleStatus==true) |  |
| T7 | Work Mode | Fault Mode | Name: Work to Fault state  ChangeEvent when (FaultMode==true) |  |
| T8 | Fault Mode | Feature Inhibited | Name: Fault to Feature Inhibited Mode  Effect: Request Drive Control DeInhibition  ChangeEvent when (UserInput=='RESET') |  |
| T9 |  |  | Name: Initialize |  |
| T10 | Idle | Work Mode | Name: Idle to Work  Effect: Make Work Space Available  ChangeEvent when (UserInput=='WORKMODE'&&VehicleStatus==true) |  |

Table 11: Transitions between Operation Modes and States on Logical Operating Modes

## Use Cases

### Use Case Diagram

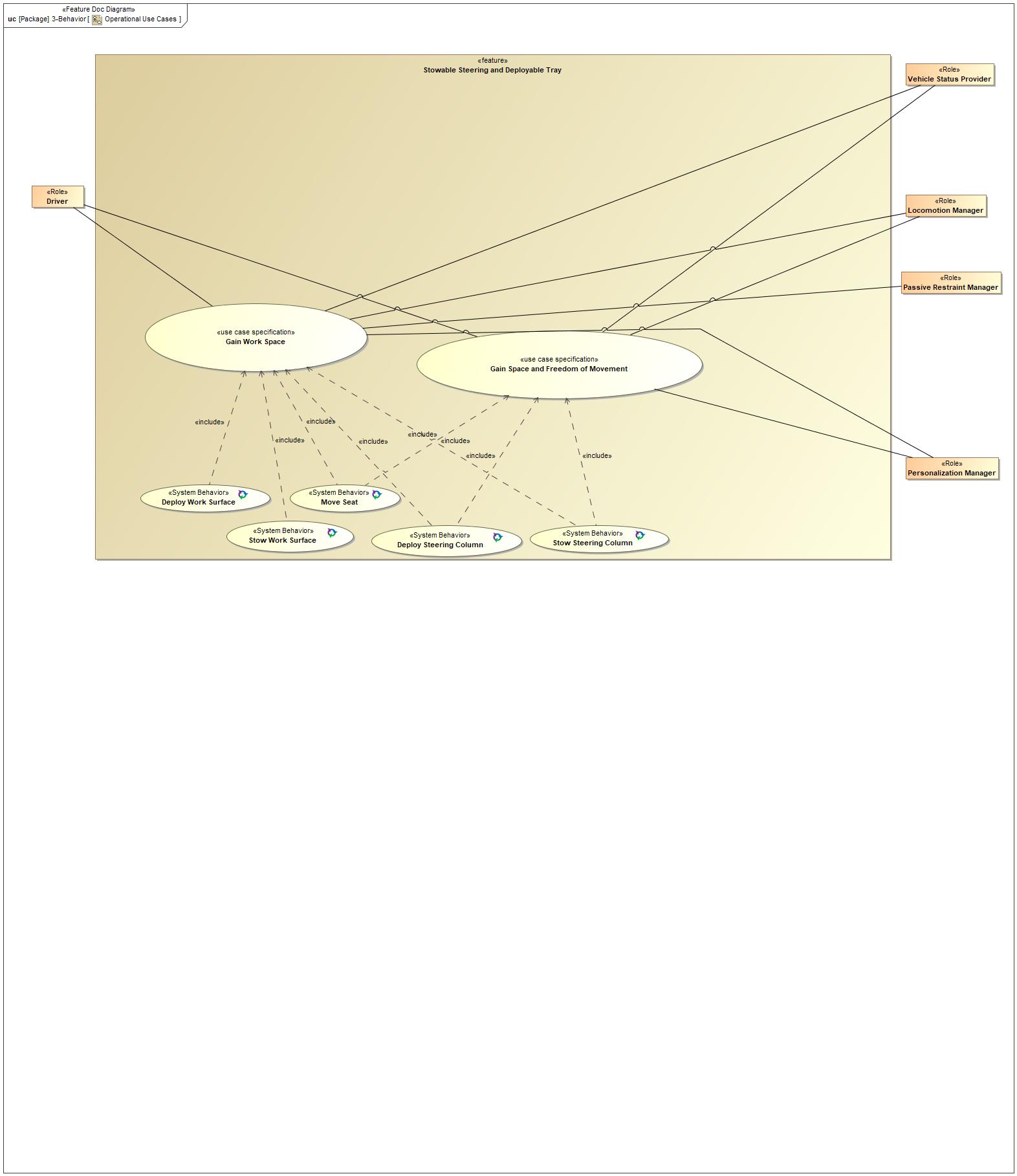


Figure 6: Operational Use Cases

### Actors

| **Actor** | **Description** |
| --- | --- |
| Driver | This is the Driver of the Vehicle using the Stowable Steering Wheel Feature. |
| Locomotion Manager | Inhibit Vehicle Locomotion when Stowable Steering Wheel Feature Deployed. |
| Passive Restraint Manager | The Driver Air Bag (DAB) is the main concern for the Passive Restraint. Other Passive Restraint features may need to be deactivated while Stowable Steering Wheel is active. |
| Personalization Manager | The Personal Portable Profiles Feature stores Memory Seat Positions used by the Stowable Steering Wheel Feature. |
| Vehicle Status Provider | Information needed from Vehicle to support operation of Stowable Steering Wheel Feature. |

Table 12: List of Actors

### Use Case Descriptions

Gain Work Space

|  |  |  |
| --- | --- | --- |
| **Actors** | Primary | Driver |
| Secondary | Locomotion Manager |
| Secondary | Driver Seat Manager |
| Secondary | Passive Restraint Manager |
| Secondary | Vehicle Status Provider |
| Secondary | Steering Column Manager |
| **Subject** |  | Stowable Steering and Deployable Tray |
| **Description** |  |  |
| **Preconditions** | PreC1 | Appropriate Vehicle Status signals indicate the vehicle is parked and not moving. |
| **Triggers** | T1 | User initiates a request to utilize Work Mode of the feature |
| **Main Flow Description** |  | Driver deploys Work State Tray, uses Tray Table and stows Tray once done. |
| **Main Flow** | M1 | Driver selects Mode Operation as work |
| M2 | SSW verifies vehicle status specifically vehicle in park and speed less than 5kph |
| M3 | If vehicle status and Vehicle configuration Valid, Feature requests to Inhibit Locmotion and Driver Airbgas Accordingly |
| M4 | After required Arbitration , SSW Feature requests Steering Column and Driver Seat system accordingly |
| M5 | If driver selects drive mode, feature moves column and seat accordingly |
| M6 | If seat and column are in drive position then loco hold and airbag hold released |
| **Alternative Flow Description** |  | Driver can cancel deployment or stowing operations at any time. |
| **Exceptional Flow Description** |  | Fail to Inhibit Passive Restraints or Vehicle Locomotion. |
| **Exceptional Flow Description** |  | Fail to stow Tray Table or deploy Steering Column or move Driver Seat to Driving Position. |
| **Exceptional Flow Steps** | E1 | If failure to stow Tray Table or deploy Steering Column or move Driver Seat to Driving Position then do not Enable Passive Restraint or Vehicle Locomotion. Inform Driver via HMI of condition and inform Driver what steps are available to return vehicle to a drivable state. |
| E2 | If failure to Inhibt Passive Restraints or Vehicle Locomotion then do not deploy SSW feature. Inform Driver via HMI what steps are available to correct failure if any. |
| **Postconditions** | PostC1 | Vehicle Steering Column, Driver Seat are in driving positions. |

Gain Space and Freedom of Movement

|  |  |  |
| --- | --- | --- |
| **Actors** | Primary | Driver |
| Secondary | Locomotion Manager |
| Secondary | Driver Seat Manager |
| Secondary | Passive Restraint Manager |
| Secondary | Vehicle Status Provider |
| Secondary | Steering Column Manager |
| **Subject** |  | Stowable Steering and Deployable Tray |
| **Description** |  |  |
| **Preconditions** | PreC1 | Appropriate Vehicle Status signals indicate the vehicle is parked and not moving. |
| **Triggers** | T1 | User initiates a request to utilize Rest Mode of the feature |
| **Main Flow Description** |  | Driver stows Steering Column, releaxes after gaining space and freedom of movement and deploys Steering Column once done and ready to drive vehicle. |
| **Main Flow** | M1 | Driver selects Mode Operation as Rest |
| M2 | SSW verifies vehicle status specifically vehicle in park and speed less than 5kph |
| M3 | If vehicle status and Vehicle configuration Valid, Feature requests to Inhibit Locmotion and Driver Airbgas Accordingly |
| M4 | After required Arbitration , SSW Feature requests Steering Column and Driver Seat system accordingly |
| M5 | If driver selects drive mode, feature moves column and seat accordingly |
| M6 | If seat and column are in drive position then loco hold and airbag hold released |
| **Alternative Flow Description** |  | Driver can cancel deployment or stowing operations at any time. |
| **Exceptional Flow Description** |  | Fail to Inhibit Passive Restraints or Vehicle Locomotion. |
| **Exceptional Flow Description** |  | Fail to deploy Steering Column or move Driver Seat to Driving Position. |
| **Exceptional Flow Steps** | E1 | If failure to deploy Steering Column or move Driver Seat to Driving Position then do not Enable Passive Restraint or Vehicle Locomotion. Inform Driver via HMI of condition and inform Driver what steps are available to return vehicle to a drivable state. |
| E2 | If failure to Inhibt Passive Restraints or Vehicle Locomotion then do not deploy SSW feature. Inform Driver via HMI what steps are available to correct failure if any. |
| **Postconditions** | PostC1 | Vehicle Steering Column, Driver Seat are in driving positions. |

## Driving and Operation Scenarios

## Decision Tables

*Not supported by MagicDraw report generation.*

# Feature Requirements

## Functional Requirements

FR01 Simultaneous Actuation

The three degrees of motion (steering wheel rotation, column telescoping and rake angle) can all be performed simultaneously if desired.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR01 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR02 Feature Operating Modes

The Feature shall support the following operating modes: 'Disabled', 'Inactive', 'Work', 'Rest' and 'Fault'.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR02 | | | | | | | |
| **Rationale** | Define basic operating modes available to user. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR03 Feature Availability

The Feature shall be available if all the conditions are met: 1) Ignition Accessory state or Ignition Run state, 2) vehicle in 'Park', 3) power level is not in battery saver mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR03 | | | | | | | |
| **Rationale** | Vehicle should not be driveable and have power available to run the feature. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. Feature functions available only if all conditions met. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR05 Stow Steering Column

The Feature shall request to stow the Steering Column into a stowed position upon driver command.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR05 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR06 Deploy Steering Column

The Feature shall request to deploy the Steering Column to a drivable state upon driver command.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR06 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR07 Deploy Work Surface

The Feature shall provide a deployable work surface area to the driver upon driver command.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR07 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR08 Stow Work Surface

The Feature shall stow the Work Surface to a drivable state upon driver command.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR08 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR09 Automatic Work Surface

The Feature shall deploy the Tray Table to/from fully deployed from/to fully stowed with no intermediate positions.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR09 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed normal movement profile unless movement is interupted by user or detected fault. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR12 Inhibit Locomotion

The Feature shall request the vehicle to inhibit locomotion while in a Rest, Play or Work states or during transition to/ from each of the states.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR12 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR13 Return to Drivable State

To return vehicle to a drivable state, the Feature shall: 1) stow the tray table, 2) Request to deploy steering column, 3) Request to return seat to memory position, 4) request activation of Passive Restraints, 5) request activation of vehicle locomotion

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR13 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** | * 372716563.jpg FR02 Feature Operating Modes | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR15 Adjust Seat Position

The Feature shall allow the driver shall to adjust posture and position of driver seat consistent with supported operating states.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR15 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Noramal seat movement controls work while feature is deployed. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR16 Seat Position Preset Memory

The feature shall have 1 preset memory position for each of the operating states. The operating states are as follows: Rest/ Play and Work.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR16 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR18 Halt Transitional Movements

The Feature shall allow the driver to instantly stop/start the movement of any motorized components associated with the feature for any reason during transitions between different supported operating states.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR18 | | | | | | | |
| **Rationale** | Define basic user operation. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR19 Rejuvenation Feature

The Feature shall request stow the steering column upon request from the Rejuvenation Feature.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR19 | | | | | | | |
| **Rationale** | Define basic user operation and scope of operation for Rejuvenation Feature support. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR20 Portable Profiles Feature

The Feature shall communicate the preset memory positions to the Portable Profiles Feature.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR20 | | | | | | | |
| **Rationale** | Define basic user operation and scope of operation for Portable Profiles Feature. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR21 Drivability of Rake Angles

The feature shall not inhibit the steering ability of the vehicle at any of the rake angles for the steering column

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR21 | | | | | | | |
| **Rationale** | Define the limited range of Rake | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** |  | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR22 Simultaneous Action

The feature shall control the three degrees of motion (steering wheel rotation, column telescoping and rake angle) simultaneously if desired

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR22 | | | | | | | |
| **Rationale** | Define various movements of Sterring Column | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** |  | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR23 Drivability of Telescope Positions

The feature shall no inhibit the generally controllable (C0) nature of the steering column in any of the telescoping positions.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR23 | | | | | | | |
| **Rationale** | Define the Constraint of steering column Tele movement | | | | | | |
| **Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** |  | | | | | **V&V Method** |  |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

### Error Handling

FR04 Inform User of Status

The Feature shall inform the User of Deployment or Stowing Status which shall include success or failure results and may include reasons for failure.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR04 | | | | | | | |
| **Rationale** | Define basic user HMI requirements. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

## Non-Functional Requirements

### Security

No Security Requirements specified.

### Reliability

FR17 Number of Deployment Cycles

The number of complete deployment cycles without mechanical or electrical failure shall equal or exceed TBD.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR17 | | | | | | | |
| **Rationale** | Define basic reliability requirement. | | | | | | |
| **Acceptance Criteria** | No electrical or mechanical failures during specified test run. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Reliability Testing Rig |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

### Performance

FR10 "Work State" Deploy Time

"Work State" shall complete deployment from "Drive State" within 15 seconds of user pressing "Work State" button.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR10 | | | | | | | |
| **Rationale** | Define basic performance requirement. | | | | | | |
| **Acceptance Criteria** | Movement within specified time limit | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR11 Ease of Feature State Movement Time

The maximum transition time from one supported State to another shall be 5 seconds. States are as follows: Rest/ Play and Work.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR11 | | | | | | | |
| **Rationale** | Define scope of a performance requirement. | | | | | | |
| **Acceptance Criteria** | Observed behavior consistent with required operation. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

FR14 Return to Drivable State Time

For deployed Steering Wheel Column, Stow Tray Table and Driver Seat return to a Drivable State shall take no more than 15 seconds.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FR14 | | | | | | | |
| **Rationale** | Define basic performance requirement. | | | | | | |
| **Acceptance Criteria** | Time limit met for completion of required steps | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** | Feature/Doc Owner |
| **Source Req.** |  | | | | | **V&V Method** | Inspection |
| **Type** |  | | | **Priority** |  | **Status** | In-Progress |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

## HMI Requirements

No HMI Requirements specified.

## Other Requirements

### Design Requirements

*Not supported by MagicDraw report generation.*

### Manufacturing Requirements

No Manufacturing Requirements specified.

### Service Requirements

No Service Requirements specified.

#### **Cloud Connectivity Data Analytics Requirements**

### After Sales Requirements

No After Sales Requirements specified.

### Process Requirements

No Process Requirements specified.

# Functional Safety

## System Behaviors for HARA

|  |  |  |
| --- | --- | --- |
| **ID** | **Name** | **Description** |
|  | Enter non-Motive Mode | non-Motive Mode prevents Vehicle Locomotion and is allowed when preconditions are met. |
|  | Stow Work Surface | Stow Work Surface stows the Tray Table when the user is finished using it. |
|  | Move Seat | The Driver Seat is moved to support the different Use Cases of the Feature. |
|  | Stow Steering Column | The Steering Column will only stow when the pre-conditions are met. |
|  | Deploy Steering Column | The Steering Column is returned to a drivable state only after the preconditions are met. |
|  | Deploy Work Surface | Deploy the Tray Table to serve as a working surface. |
|  | Disable Driver Airbag |  |

Table 13: System Behaviors for HARA

## Functional Safety Assumptions

|  |  |  |
| --- | --- | --- |
| ID | Assumption | |
|  | **Name** | Full steerability in stow, un-stow and transitioning |
| **Description** | Full steerability is available to the driver in all positions (un-stowed, while transitioning, stowed). Driver may not be able to reach the steering wheel. Ergonomic review of out of reach assessment is needed to reduce the ratings |
| **Purpose** | Clarification for controllability ratings during transition. |
| **Category** | Controllability |
| **Related Requirement IDs** |  |
| **ASMP05** | **Name** | Externally Commanded Stow/Un-Stow |
| **Description** | An external ECU commands the stowable column module to Stow/Un-Stow. |
| **Purpose** | It is assumed that the request to Stow/Un-Stow represnents the driver intention. |
| **Category** | Behavioral |
| **Related Requirement IDs** |  |
| **ASMP08** | **Name** | Definition of Vehicle Speed Ranges |
| **Description** | Parking Speeds: <12mph (20kph)  City Speeds: 12-36mph (20-58kph)  Hwy Speeds: >36mph (58kph) |
| **Purpose** | Definition of vehicle speed ranges described in HARA. Aligns with "Guidance for ISO 26262 HARA Assessments of Severity, Exposure and Controllability" (Revised 2018/01/17) |
| **Category** | Controllability |
| **Related Requirement IDs** |  |

Table 14: Functional Safety Assumptions

## Safety Goals

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | Goal | | | |
| **SG01** | **Goal Name** | Prevent stowed steering wheel while the vehicle is in motion | | |
| **Description** | SSC shall prevent the steering wheel from being stowed when the vehicle is moving at speed | | |
| **Safety Goal Concept** | Safety Goal Concept: | | |
| **ASIL** | B | **FTTI** |  |
| **Related FSR IDs** | * [FSR00](#_a47ba6b911d24779c0a11ac7a8c2b2b6) * [SG01.FSR01](#_90c8988e2d9b0350fd094b43f24abc93) * [SG01.FSR02](#_fc1d31cf7fd887375d591ca462d2b8ab) * [SG01.FSR03](#_4c6f95d44404fa8880c3e4716610af42) * [SG01FSR04](#_dd737596261add6c30763a51783b32f1) * [SG01FSR05](#_3b66e94fa0b2d15c6400b132d382a767) | | |
| **SG02** | **Goal Name** | Prevent unintended seat movement while the vehicle is in motion | | |
| **Description** | The system shall prevent unintentional enter to rest mode | | |
| **Safety Goal Concept** | Safety Goal Concept: | | |
| **ASIL** | B | **FTTI** |  |
| **Related FSR IDs** | * [FSR00](#_a47ba6b911d24779c0a11ac7a8c2b2b6) * [SG01.FSR01](#_90c8988e2d9b0350fd094b43f24abc93) * [SG01.FSR02](#_fc1d31cf7fd887375d591ca462d2b8ab) * [SG02.FSR01](#_4256e2157ae35341d903200bb73e7b4b) * [SG02.FSR02](#_fa8fac794b9038748a3ab5ca674fc8da) | | |

Table 15: Functional Safety Goals

## Functional Safety Requirements

### Safety Goal: SG01 Prevent stowed steering wheel while the vehicle is in motion

**Name:** Prevent stowed steering wheel while the vehicle is in motion

**Purpose:** Prevent steering wheel to go out of reach of the driver

**Text:** SSC shall prevent the steering wheel from being stowed when the vehicle is moving at speed

**ASIL:** B

#### Safety Goal Concept

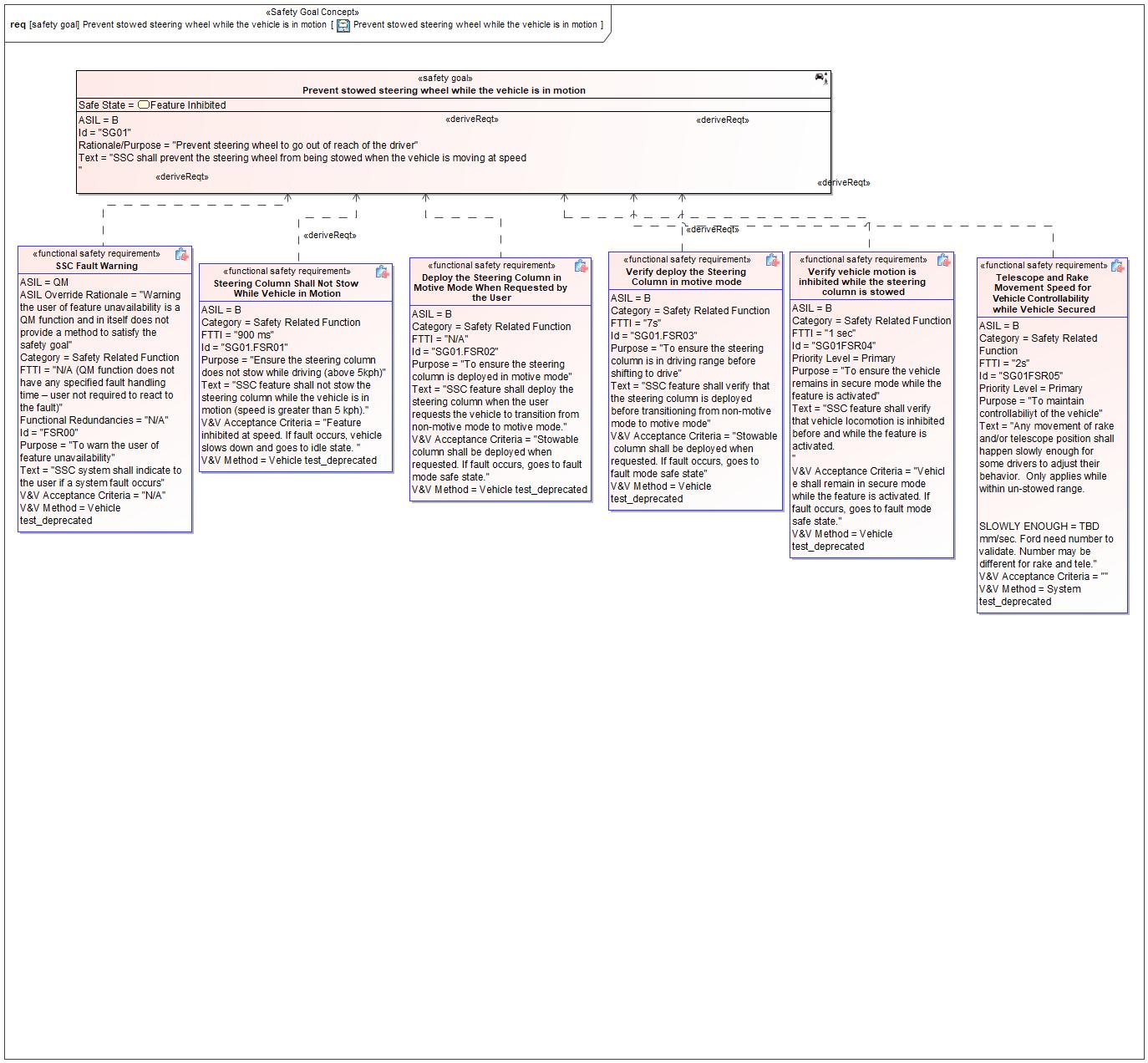


Figure 1: Prevent stowed steering wheel while the vehicle is in motion  
 – Prevent stowed steering wheel while the vehicle is in motion

*Note: The authoritative source for the Safety Goals is document “FFSD 02 Hazard Analysis* *and Risk Assessment”. The documentation of Safety Goals in this chapter (In the Argumentation for Safety Goal achievement) is for information purposes only.*

*The authoritative source for the Functional Safety Requirements is section 2.1.x.3: of this document. The documentation of Functional Safety Requirements in the following chapter (complete or summarised) is for information purposes only.*

#### Warning and Recovery Concept

No Warning and Recovery Concept diagram specified.

#### Functional Safety Requirements without Dedicated Diagram

FSR00 SSC Fault Warning

SSC system shall indicate to the user if a system fault occurs

Satisfied by:

* Logicals:
  + HMI Actuator
  + HMI Controller
  + HMI Sensor
  + HMI System
  + Stowable Feature Controller
  + Stowable Steering and Deployable Tray Feature

Related to:

* Safe States:
  + [Fault Mode](#_50475ccf3436e38022f88a59a6cf9f65)
  + [Feature Inhibited](#_ff8d4472b3f69b939ecb57edae21f817)
* Operating Modes:
  + [Fault Mode](#_50475ccf3436e38022f88a59a6cf9f65)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: FSR00 | | | | | | | |
| **Purpose** | To warn the user of feature unavailability | | | | | | |
| **V&V Acceptance Criteria** | N/A | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 659802686.jpg SG01 [Prevent stowed steering wheel while the vehicle is in motion](#_10414224f8c4d446e7800416ccabe28f) * 659802686.jpg SG02 [Prevent unintended seat movement while the vehicle is in motion](#_8c080842e94b4c095c21236be15db29a) | | | | | **V&V Method** | Vehicle test\_deprecated |
| **Type** | N/A | | **Priority** | | N/A | **Status** | Approved |
| **ASIL** | ASIL Override Rationale - Warning the user of feature unavailability is a QM function and in itself does not provide a method to satisfy the safety goal  QM | | **Category** | | Safety Related Function | **Fault Handling Time** | N/A |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | | End of Requirement | | | |

SG01.FSR01 Steering Column Shall Not Stow While Vehicle in Motion

SSC feature shall not stow the steering column while the vehicle is in motion (speed is greater than 5 kph).

Satisfied by:

* Logicals:
  + Steering Column Controller
  + Steering Column Tele Sensor
  + Stowable Feature Controller
  + Stowable Steering and Deployable Tray Feature
  + Stowable Steering Tele Actuator

Related to:

* Safe States:
  + [Feature Inhibited](#_ff8d4472b3f69b939ecb57edae21f817)
* Operating Modes:
  + [Play/Rest Mode](#_68601398abce8afe1bcdd77d645004b9)
  + [Work Mode](#_87ccaa80516a40313c7cecb76f2badf5)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: SG01.FSR01 | | | | | | | |
| **Purpose** | Ensure the steering column does not stow while driving (above 5kph) | | | | | | |
| **V&V Acceptance Criteria** | Feature inhibited at speed. If fault occurs, vehicle slows down and goes to idle state. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 659802686.jpg SG01 [Prevent stowed steering wheel while the vehicle is in motion](#_10414224f8c4d446e7800416ccabe28f) * 659802686.jpg SG02 [Prevent unintended seat movement while the vehicle is in motion](#_8c080842e94b4c095c21236be15db29a) | | | | | **V&V Method** | Vehicle test\_deprecated |
| **Type** | N/A | | **Priority** | | N/A | **Status** | Approved |
| **ASIL** | B | | **Category** | | Safety Related Function | **Fault Handling Time** | N/A |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | | End of Requirement | | | |

SG01.FSR02 Deploy the Steering Column in Motive Mode When Requested by the User

SSC feature shall deploy the steering column when the user requests the vehicle to transition from non-motive mode to motive mode.

Satisfied by:

* Logicals:
  + Steering Column Controller
  + Steering Column Tele Sensor
  + Stowable Feature Controller
  + Stowable Steering and Deployable Tray Feature
  + Stowable Steering Tele Actuator

Related to:

* Safe States:
  + [Fault Mode](#_50475ccf3436e38022f88a59a6cf9f65)
* Operating Modes:
  + [Play/Rest Mode](#_68601398abce8afe1bcdd77d645004b9)
  + [Work Mode](#_87ccaa80516a40313c7cecb76f2badf5)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: SG01.FSR02 | | | | | | | |
| **Purpose** | To ensure the steering column is deployed in motive mode | | | | | | |
| **V&V Acceptance Criteria** | Stowable column shall be deployed when requested. If fault occurs, goes to fault mode safe state. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 659802686.jpg SG01 [Prevent stowed steering wheel while the vehicle is in motion](#_10414224f8c4d446e7800416ccabe28f) * 659802686.jpg SG02 [Prevent unintended seat movement while the vehicle is in motion](#_8c080842e94b4c095c21236be15db29a) | | | | | **V&V Method** | Vehicle test\_deprecated |
| **Type** | N/A | | **Priority** | | N/A | **Status** | Approved |
| **ASIL** | B | | **Category** | | Safety Related Function | **Fault Handling Time** | N/A |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | | End of Requirement | | | |

SG01.FSR03 Verify deploy the Steering Column in motive mode

SSC feature shall verify that the steering column is deployed before transitioning from non-motive mode to motive mode

Satisfied by:

* Logicals:
  + Steering Column Controller
  + Steering Column Tele Sensor
  + Stowable Feature Controller
  + Stowable Steering and Deployable Tray Feature

Related to:

* Safe States:
  + [Fault Mode](#_50475ccf3436e38022f88a59a6cf9f65)
* Operating Modes:
  + [Play/Rest Mode](#_68601398abce8afe1bcdd77d645004b9)
  + [Work Mode](#_87ccaa80516a40313c7cecb76f2badf5)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: SG01.FSR03 | | | | | | | |
| **Purpose** | To ensure the steering column is in driving range before shifting to drive | | | | | | |
| **V&V Acceptance Criteria** | Stowable column shall be deployed when requested. If fault occurs, goes to fault mode safe state | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 659802686.jpg SG01 [Prevent stowed steering wheel while the vehicle is in motion](#_10414224f8c4d446e7800416ccabe28f) | | | | | **V&V Method** | Vehicle test\_deprecated |
| **Type** | N/A | | **Priority** | | N/A | **Status** | Approved |
| **ASIL** | B | | **Category** | | Safety Related Function | **Fault Handling Time** | N/A |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | | End of Requirement | | | |

SG01FSR04 Verify vehicle motion is inhibited while the steering column is stowed

SSC feature shall verify that vehicle locomotion is inhibited before and while the feature is activated.

Satisfied by:

* Logicals:
  + Powertrain System
  + Stowable Feature Controller
  + Stowable Steering and Deployable Tray Feature
  + Vehicle Status Provider System

Related to:

* Safe States:
  + [Fault Mode](#_50475ccf3436e38022f88a59a6cf9f65)
* Operating Modes:
  + [Play/Rest Mode](#_68601398abce8afe1bcdd77d645004b9)
  + [Work Mode](#_87ccaa80516a40313c7cecb76f2badf5)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: SG01FSR04 | | | | | | | |
| **Purpose** | To ensure the vehicle remains in secure mode while the feature is activated | | | | | | |
| **V&V Acceptance Criteria** | Vehicle shall remain in secure mode while the feature is activated. If fault occurs, goes to fault mode safe state. | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 659802686.jpg SG01 [Prevent stowed steering wheel while the vehicle is in motion](#_10414224f8c4d446e7800416ccabe28f) | | | | | **V&V Method** | Vehicle test\_deprecated |
| **Type** | N/A | | **Priority** | | N/A | **Status** | Approved |
| **ASIL** | B | | **Category** | | Safety Related Function | **Fault Handling Time** | N/A |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | | End of Requirement | | | |

SG01FSR05 Telescope and Rake Movement Speed for Vehicle Controllability while Vehicle Secured

Any movement of rake and/or telescope position shall happen slowly enough for some drivers to adjust their behavior. Only applies while within un-stowed range.

SLOWLY ENOUGH = TBD mm/sec. Ford need number to validate. Number may be different for rake and tele.

Satisfied by:

* Logicals:
  + Steering Column Controller
  + Steering Column Tele Sensor
  + Stowable Feature Controller
  + Stowable Steering and Deployable Tray Feature
  + Stowable Steering Tele Actuator

Related to:

* Safe States:
  + [Feature Inhibited](#_ff8d4472b3f69b939ecb57edae21f817)
* Operating Modes:
  + [Inactive](#_bcf694d116fd52b7bf1d818e8e4ff408)
  + [Play/Rest Mode](#_68601398abce8afe1bcdd77d645004b9)
  + [Work Mode](#_87ccaa80516a40313c7cecb76f2badf5)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: SG01FSR05 | | | | | | | |
| **Purpose** | To maintain controllabiliyt of the vehicle | | | | | | |
| **V&V Acceptance Criteria** |  | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 659802686.jpg SG01 [Prevent stowed steering wheel while the vehicle is in motion](#_10414224f8c4d446e7800416ccabe28f) | | | | | **V&V Method** | System test\_deprecated |
| **Type** | N/A | | **Priority** | | N/A | **Status** | Approved |
| **ASIL** | B | | **Category** | | Safety Related Function | **Fault Handling Time** | N/A |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | | End of Requirement | | | |

### Safety Goal: SG02 Prevent unintended seat movement while the vehicle is in motion

**Name:** Prevent unintended seat movement while the vehicle is in motion

**Purpose:** If Impaired Access to controls causes the seat to move without request, this may lead to collision hazard while driving

**Text:** The system shall prevent unintentional enter to rest mode

**ASIL:** B

#### Safety Goal Concept

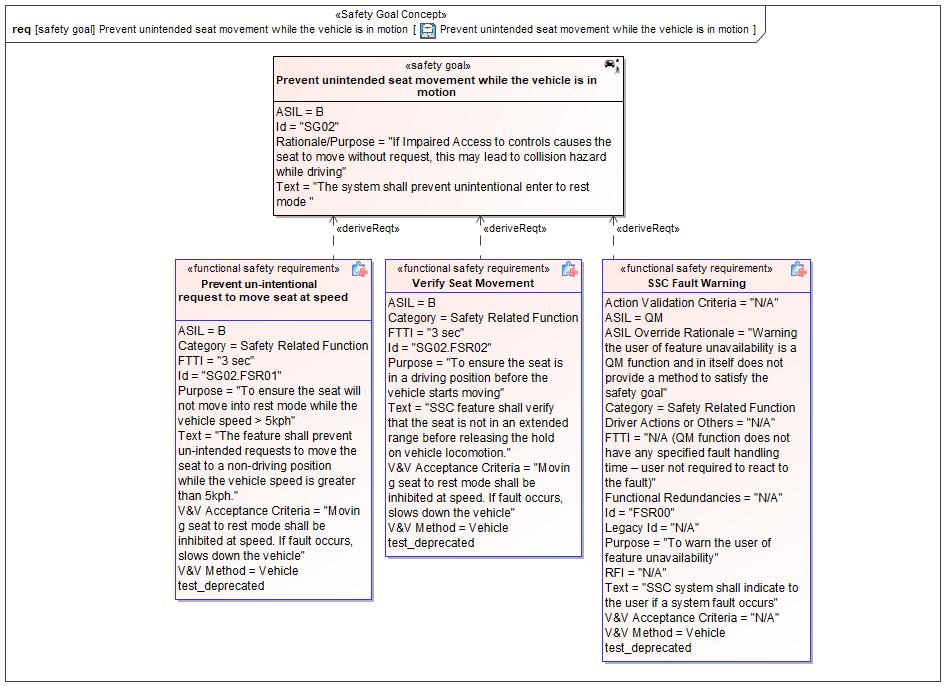


Figure 1: Prevent unintended seat movement while the vehicle is in motion – Prevent unintended seat movement while the vehicle is in motion

*Note: The authoritative source for the Safety Goals is document “FFSD 02 Hazard Analysis* *and Risk Assessment”. The documentation of Safety Goals in this chapter (In the Argumentation for Safety Goal achievement) is for information purposes only.*

*The authoritative source for the Functional Safety Requirements is section 2.1.x.3: of this document. The documentation of Functional Safety Requirements in the following chapter (complete or summarised) is for information purposes only.*

#### Warning and Recovery Concept

No Warning and Recovery Concept diagram specified.

#### Functional Safety Requirements without Dedicated Diagram

FSR00 SSC Fault Warning

*Please see the Functional Safety Requirement table for* [*SSC Fault Warning*](#_92459fa6ed22e932c36fe1309e304f78) *displayed under the Safety Goal SG01.*

SG01.FSR01 Steering Column Shall Not Stow While Vehicle in Motion

*Please see the Functional Safety Requirement table for* [*Steering Column Shall Not Stow While Vehicle in Motion*](#_f8124d249324075d9d622064f9fdaf14) *displayed under the Safety Goal SG01.*

SG01.FSR02 Deploy the Steering Column in Motive Mode When Requested by the User

*Please see the Functional Safety Requirement table for*  [*Deploy the Steering Column in Motive Mode When Requested by the User*](#_c3803c7d4068761d24ca0a7a641afaac) *displayed under the Safety Goal SG01.*

SG02.FSR01 Prevent un-intentional request to move seat at speed

The feature shall prevent un-intended requests to move the seat to a non-driving position while the vehicle speed is greater than 5kph.

Satisfied by:

* Logicals:
  + Driver Seat System
  + Stowable Feature Controller
  + Stowable Steering and Deployable Tray Feature

Related to:

* Safe States:
  + [Feature Inhibited](#_ff8d4472b3f69b939ecb57edae21f817)
* Operating Modes:
  + [Idle](#_7703a35aa48c3ed1581db426801a4c09)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: SG02.FSR01 | | | | | | | |
| **Purpose** | To ensure the seat will not move into rest mode while the vehicle speed > 5kph | | | | | | |
| **V&V Acceptance Criteria** | Moving seat to rest mode shall be inhibited at speed. If fault occurs, slows down the vehicle | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 659802686.jpg SG02 [Prevent unintended seat movement while the vehicle is in motion](#_8c080842e94b4c095c21236be15db29a) | | | | | **V&V Method** | Vehicle test\_deprecated |
| **Type** | N/A | | **Priority** | | N/A | **Status** | Ready for Review |
| **ASIL** | B | | **Category** | | Safety Related Function | **Fault Handling Time** | N/A |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | | End of Requirement | | | |

SG02.FSR02 Verify Seat Movement

SSC feature shall verify that the seat is not in an extended range before releasing the hold on vehicle locomotion.

Satisfied by:

* Logicals:
  + Driver Seat System
  + Stowable Feature Controller
  + Stowable Steering and Deployable Tray Feature

Related to:

* Safe States:
  + [Fault Mode](#_50475ccf3436e38022f88a59a6cf9f65)
  + [Feature Inhibited](#_ff8d4472b3f69b939ecb57edae21f817)
* Operating Modes:
  + [Idle](#_7703a35aa48c3ed1581db426801a4c09)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: SG02.FSR02 | | | | | | | |
| **Purpose** | To ensure the seat is in a driving position before the vehicle starts moving | | | | | | |
| **V&V Acceptance Criteria** | Moving seat to rest mode shall be inhibited at speed. If fault occurs, slows down the vehicle | | | | | | |
| **Notes** |  | | | | | | |
| **Source** |  | | | | | **Owner** |  |
| **Source Req.** | * 659802686.jpg SG02 [Prevent unintended seat movement while the vehicle is in motion](#_8c080842e94b4c095c21236be15db29a) | | | | | **V&V Method** | Vehicle test\_deprecated |
| **Type** | N/A | | **Priority** | | N/A | **Status** | Ready for Review |
| **ASIL** | B | | **Category** | | Safety Related Function | **Fault Handling Time** | N/A |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | | End of Requirement | | | |

### Derivation of Functional Safety Requirements on Assumptions

No Functional Safety Requirements tracing to Assumptions specified.

### ASIL Decomposition of Functional Safety Requirements

No Functional Safety Requirements with ASIL Decompositions specified.

# CyberSecurity

## Security Goals

|  |  |
| --- | --- |
| ID | Goal |

Table 18: Cybersecurity Goals

## Cybersecurity Requirements

# Architecture

## Functional Decomposition

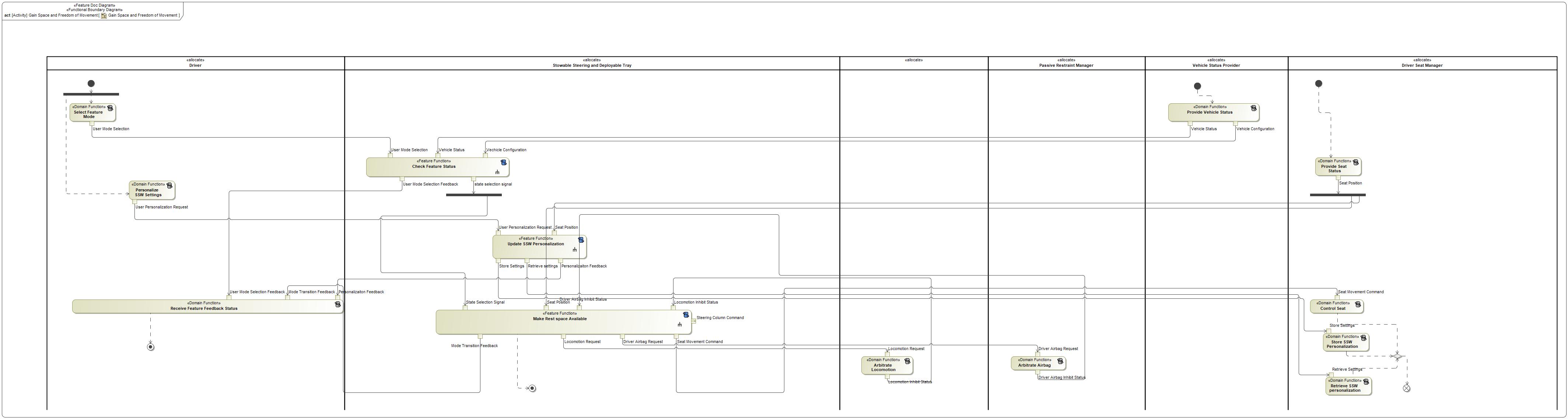


Figure 8: Gain Space and Freedom of Movement

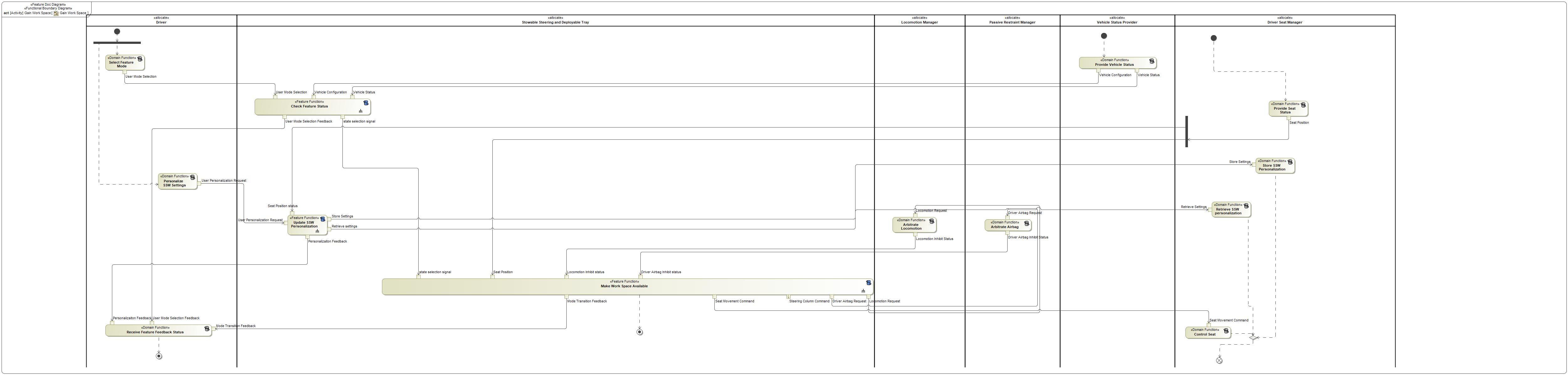


Figure 8: Gain Work Space

### Functions

| **Function Name** | Description | Comments |
| --- | --- | --- |
| *(activity)* Arbitrate Airbag | *(activity)* This Function receives the Airbag requests and Arbitrate the Airbag Accordingly and sends out the Airbag Inhibit Status |  |
| *(activity)* Select Feature Mode | *(activity)* A Domain Function of HMI which is responsible for Accepting User Input and send it to the Feature |  |
| *(activity)* Personalize SSW Settings | *(activity)* Domain function responsible for Driver Personalizing the seat and steering column memory positions |  |
| *(activity)* Provide Vehicle Status | *(activity)* A Domain Function which provides the Vehicle status to the Feature |  |
| *(activity)* Retrieve SSW personalization | *(activity)* Retrieve SSW settings that Driver saved earlier |  |
| *(activity)* Store SSW Personalization | *(activity)* A Domain function responsible for storing settings selected by the Driver |  |
| *(activity)* Receive Feature Feedback Status | *(activity)* A Domain Function of HMI which is responsible for Displaying Modes, Status to the User |  |
| *(activity)* Update SSW Personalization | *(activity)* This function updates the User Personalized requests as per his request |  |
| *(activity)* Arbitrate Locomotion | *(activity)* A Domain Function of Powertrain which is responsible to disable the Locomotion |  |
| *(activity)* Check Feature Status | *(activity)* A Feature Function Which Receives and checks the feature status and send state selection signal to the Feature |  |
| *(activity)* Make Rest space Available | *(activity)* A Feature Function which Allows the User to gain Rest Space and gives him the freedom to move |  |
| *(activity)* Provide Seat Status | *(activity)* A Domain Function which provides the Seat position to the Feature |  |
| *(activity)* Control Seat | *(activity)* A Domain Function Which Actuate the Seat based on the Input Requests |  |

Table 17: List of Functions on Gain Space and Freedom of Movement

| **Function Name** | Description | Comments |
| --- | --- | --- |
| *(activity)* Arbitrate Locomotion | *(activity)* A Domain Function of Powertrain which is responsible to disable the Locomotion |  |
| *(activity)* Store SSW Personalization | *(activity)* A Domain function responsible for storing settings selected by the Driver |  |
| *(activity)* Update SSW Personalization | *(activity)* This function updates the User Personalized requests as per his request |  |
| *(activity)* Receive Feature Feedback Status | *(activity)* A Domain Function of HMI which is responsible for Displaying Modes, Status to the User |  |
| *(activity)* Select Feature Mode | *(activity)* A Domain Function of HMI which is responsible for Accepting User Input and send it to the Feature |  |
| *(activity)* Provide Seat Status | *(activity)* A Domain Function which provides the Seat position to the Feature |  |
| *(activity)* Retrieve SSW personalization | *(activity)* Retrieve SSW settings that Driver saved earlier |  |
| *(activity)* Check Feature Status | *(activity)* A Feature Function Which Receives and checks the feature status and send state selection signal to the Feature |  |
| *(activity)* Make Work Space Available | *(activity)* A Feature Function which Allows the User to gain Work Space. |  |
| *(activity)* Arbitrate Airbag | *(activity)* This Function receives the Airbag requests and Arbitrate the Airbag Accordingly and sends out the Airbag Inhibit Status |  |
| *(activity)* Control Seat | *(activity)* A Domain Function Which Actuate the Seat based on the Input Requests |  |
| *(activity)* Personalize SSW Settings | *(activity)* Domain function responsible for Driver Personalizing the seat and steering column memory positions |  |
| *(activity)* Provide Vehicle Status | *(activity)* A Domain Function which provides the Vehicle status to the Feature |  |

Table 17: List of Functions on Gain Work Space

## Logical Architecture

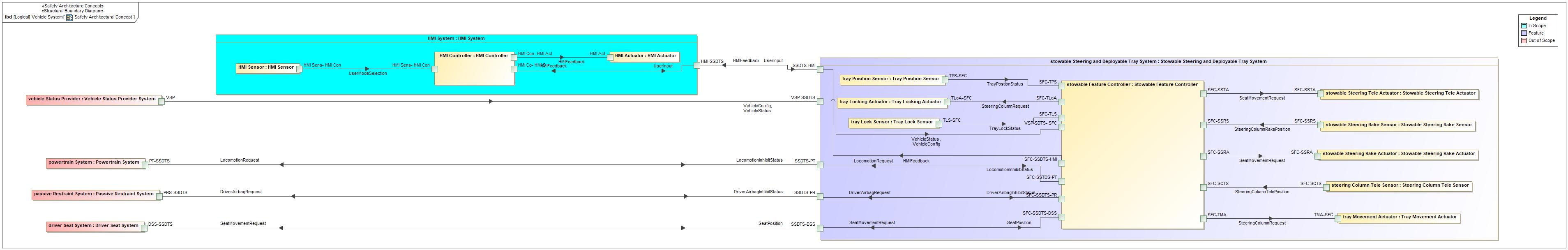


Figure 9: Safety Architectural Concept

### Logical Elements

|  |  |  |  |
| --- | --- | --- | --- |
| **Element Name** | **Description** | **Allocated Functions** | **Comments** |
|  |  |  |  |
| Driver Seat System | A System Logical Entity responsible for the seat control and its Communications |  |  |
| HMI Actuator | Logical system entity responsible for Conveying user necessary information | * Convey Feature status * Convey SSW Feedback |  |
| HMI Controller | Logical system entity responsible for HMI behavior and communicating feedback | * Provide User selection information * Update Feature status * Update SSW Status * Request Personalization Operation * Convey User Personalization Feedback |  |
| HMI Sensor | Logical system entity responsible for receiving user inputs and communicate with the system | * Accept User Selection * Accept User Personalization request |  |
| HMI System | A system used as an interface between the user and the vehicle | * Manage User Selection * Provide ModeSelection Feedback * Manage Feature Arbitration Feedback * Request SSW Personalization Update * Provide Feedback * Seat position memory saving * Steering Column memory saving |  |
| Passive Restraint System | Logical Realization of Passive Restraints Manager | * Provide Airbag Inhibit/ DeInhibit Functionality |  |
| Powertrain System | A system Logical Entity responsible for and controls the Powertrain Controls | * Provide Locomotion Inhibit/Deinhibit Functionality |  |
| Steering Column Tele Sensor | The Sensor which Senses the Steering Column Position in the Tele direction | * Provide steering column Tele position |  |
| Stowable Feature Controller | This controller added for Feature purpose and communicates with the system components and drive control Accordingly | * Check Inhibit status * Request Tray Unlock * Request Tray Deployment * Provide Tray Stow Instructions * Request Tray Lock * Request SteeringColumn Stowing * Request SteeringColumn Deployment * Request to Move Seat * Check Seat position * Check vehicle status * Check Feature Availability * Provide HMI Feedback * Request Locomotion Enabling * Request Airbag Enabling * Request Locomotion Disabling * Request Airbag Disabling * Evaluate Drivability status * Manage seat save request * Store SteeringColumn Memory Position * Check Tray Status * Arbitrate SSC Functionality * provide cause of failure * Issue Termination Signal * Control Tray Functionality * Control Steering Column Functionality |  |
| Stowable Steering and Deployable Tray System | Logical Realization of the Conceptual Feature Entity | * Verify Drive Control Status * Request Tray Arbitration * Request Steering Column Arbitration * Request Seat Arbitration * Verify Feature Status * Request Drive Control DeInhibition * Request Drive Control Inhibition * Check for Transition Termination * Arbitrate SSC Functionality * Control SSC Functionality * Actuate Tray * Actuate Steering Column |  |
| Stowable Steering Rake Actuator | The Actuator which Actuates the Steering Column in the Rake direction | * Move SC in Rake Direction |  |
| Stowable Steering Rake Sensor | The Sensor which Senses the Steering Column Position in the Rake direction | * Provide steering column Rake position |  |
| Stowable Steering Tele Actuator | The Actuator which Actuates the Steering Column in the Tele direction | * Move SC in Tele Direction |  |
| Tray Lock Sensor | This sensor sends the Tray lock status to the system | * Provide Tray Lock status |  |
| Tray Locking Actuator | The Actuator which Locks and Unlocks the Tray Accordingly based on the requests | * Actuate Tray Locking |  |
| Tray Movement Actuator | The Actuator which Actuates the Tray Accordingly based on the requests | * Actuate Tray Movement |  |
| Tray Position Sensor | This sensor sends the Tray current position to the system | * Provide Tray Position |  |
| Vehicle Status Provider System | A Logical Realized Role which provides status of vehicle which feature can verify before changing the feature Mode | * Provide Vehicle Status |  |

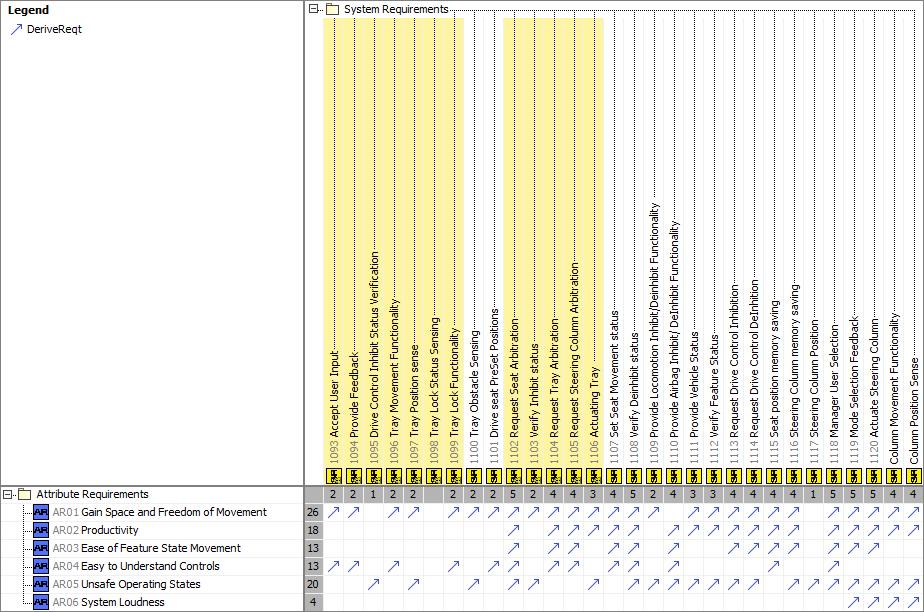
Table 19: Logical Elements

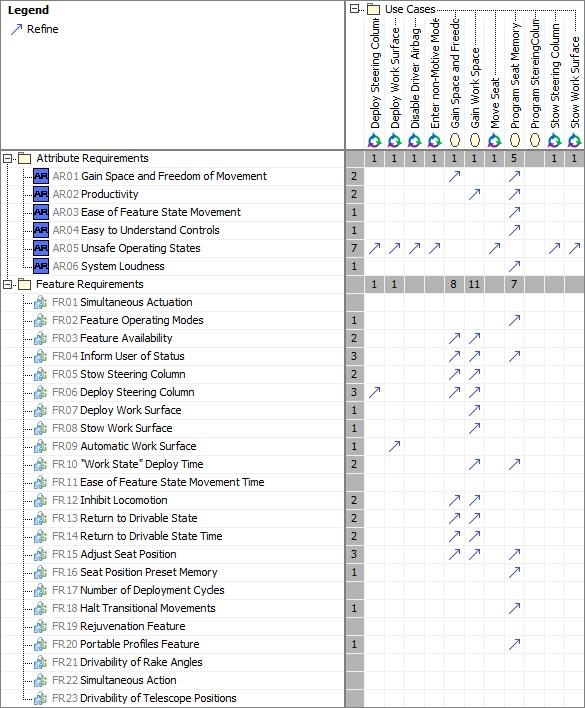
### Logical Interfaces

|  |  |  |  |
| --- | --- | --- | --- |
| **Interface** | **Direction** | **Description** | **Value Range** |
| DriverAirbagInhibitStatus | PRS-SSDTS (Passive Restraint System) To SSDTS-PR (Stowable Steering and Deployable Tray System) | Status of the Driver Airbag Inhibition | INHIBITED  DEINHIBIT |
| SSDTS-PR (Stowable Steering and Deployable Tray System) To SFC-SSDTS-PR (Stowable Feature Controller) | Status of the Driver Airbag Inhibition | INHIBITED  DEINHIBIT |
| DriverAirbagRequest | SFC-SSDTS-PR (Stowable Feature Controller) To SSDTS-PR (Stowable Steering and Deployable Tray System) | Request sent to the Driver Airbag system / Passive Restraint System for either Inhibit or Deinhibit | INHIBIT\_DRIVER\_AIRBAG\_REQUEST  DEINHIBIT\_DRIVER\_AIRBAG\_REQUEST |
| SSDTS-PR (Stowable Steering and Deployable Tray System) To PRS-SSDTS (Passive Restraint System) | Request sent to the Driver Airbag system / Passive Restraint System for either Inhibit or Deinhibit | INHIBIT\_DRIVER\_AIRBAG\_REQUEST  DEINHIBIT\_DRIVER\_AIRBAG\_REQUEST |
| HMIFeedback | HMI Con- HMI Act (HMI Controller) To HMI Act (HMI Actuator) | Feedback given to HMI |  |
| HMI-SSDTS (HMI System) To HMI Co- HMI S (HMI Controller) | Feedback given to HMI |  |
| SFC-SSDTS-HMI (Stowable Feature Controller) To SSDTS-HMI (Stowable Steering and Deployable Tray System) | Feedback given to HMI |  |
| SSDTS-HMI (Stowable Steering and Deployable Tray System) To HMI-SSDTS (HMI System) | Feedback given to HMI |  |
| LocomotionInhibitStatus | PT-SSDTS (Powertrain System) To SSDTS-PT (Stowable Steering and Deployable Tray System) | Status of the Locomotion Inhibition | INHIBITED  DEINHIBTED |
| SSDTS-PT (Stowable Steering and Deployable Tray System) To SFC-SSTDS-PT (Stowable Feature Controller) | Status of the Locomotion Inhibition | INHIBITED  DEINHIBTED |
| LocomotionRequest | SFC-SSTDS-PT (Stowable Feature Controller) To SSDTS-PT (Stowable Steering and Deployable Tray System) | Request to Powertrain / Locomotion to Inhibit /Deinhibit | INHIBIT\_LOCOMOTION\_REQUEST  DEINHIBIT\_LOCOMOTION\_REQUEST |
| SSDTS-PT (Stowable Steering and Deployable Tray System) To PT-SSDTS (Powertrain System) | Request to Powertrain / Locomotion to Inhibit /Deinhibit | INHIBIT\_LOCOMOTION\_REQUEST  DEINHIBIT\_LOCOMOTION\_REQUEST |
| SeatMovementRequest | SFC-SSDTS-DSS (Stowable Feature Controller) To SSDTS-DSS (Stowable Steering and Deployable Tray System) | Command to Move seat which goes to the Driver seat System | WORK  REST  DRIVE  NONE |
| SFC-SSRA (Stowable Feature Controller) To SFC-SSRA (Stowable Steering Rake Actuator) | Command to Move seat which goes to the Driver seat System | WORK  REST  DRIVE  NONE |
| SFC-SSTA (Stowable Feature Controller) To SFC-SSTA (Stowable Steering Tele Actuator) | Command to Move seat which goes to the Driver seat System | WORK  REST  DRIVE  NONE |
| SSDTS-DSS (Stowable Steering and Deployable Tray System) To DSS-SSDTS (Driver Seat System) | Command to Move seat which goes to the Driver seat System | WORK  REST  DRIVE  NONE |
| SeatPosition | DSS-SSDTS (Driver Seat System) To SSDTS-DSS (Stowable Steering and Deployable Tray System) | Current Seat Position from the Driver Seat System | AT\_WORK  AT\_REST  AT\_DRIVE  AT\_PLAY  FAILED\_TO\_MOVE\_WORK  FAILED\_TO\_MOVE\_REST  FAILED\_TO\_MOVE\_DRIVE  FAILED\_TO\_MOVE\_PLAY  MOVING\_TO\_WORK  MOVING\_TO\_REST  MOVING\_TO\_DRIVE  MOVING\_TO\_PLAY |
| SSDTS-DSS (Stowable Steering and Deployable Tray System) To SFC-SSDTS-DSS (Stowable Feature Controller) | Current Seat Position from the Driver Seat System | AT\_WORK  AT\_REST  AT\_DRIVE  AT\_PLAY  FAILED\_TO\_MOVE\_WORK  FAILED\_TO\_MOVE\_REST  FAILED\_TO\_MOVE\_DRIVE  FAILED\_TO\_MOVE\_PLAY  MOVING\_TO\_WORK  MOVING\_TO\_REST  MOVING\_TO\_DRIVE  MOVING\_TO\_PLAY |
| SteeringColumnRakePosition | SFC-SSRS (Stowable Steering Rake Sensor) To SFC-SSRS (Stowable Feature Controller) | Steering Column Position in Rake Position |  |
| SteeringColumnRequest | SFC-TLoA (Stowable Feature Controller) To TLoA-SFC (Tray Locking Actuator) | Request to Move steering Column with respect to selected Mode | DEPLOY  STOW  NONE |
| SFC-TMA (Stowable Feature Controller) To TMA-SFC (Tray Movement Actuator) | Request to Move steering Column with respect to selected Mode | DEPLOY  STOW  NONE |
| SteeringColumnTelePosition | SFC-SCTS (Steering Column Tele Sensor) To SFC-SCTS (Stowable Feature Controller) | Steering Column Position in Tele Position |  |
| TrayLockStatus | TLS-SFC (Tray Lock Sensor) To SFC-TLS (Stowable Feature Controller) | Tray lock status is given by Tray Lock sensor | TRAY\_LOCKED  TRAY\_UNLOCKED  TRAY\_FAILED\_TO\_LOCK  TRAY\_FAILED\_TO\_UNLOCK |
| TrayPostionStatus | TPS-SFC (Tray Position Sensor) To SFC-TPS (Stowable Feature Controller) | Tray Position status is the feedback for Tray position given by Tray position Sensor | DEPLOYED  STOWED  FAILED\_TO\_DEPLOY  FAILED\_TO\_STOW  IN\_MOTION |
| UserInput | HMI Co- HMI S (HMI Controller) To HMI-SSDTS (HMI System) | Input given by user through HMI | WORKMODE  RESTMODE  PLAYMODE  NONE  NOT\_AVAILABLE  RESET  DRIVEMODE |
| HMI-SSDTS (HMI System) To SSDTS-HMI (Stowable Steering and Deployable Tray System) | Input given by user through HMI | WORKMODE  RESTMODE  PLAYMODE  NONE  NOT\_AVAILABLE  RESET  DRIVEMODE |
| UserModeSelection | HMI Sens- HMI Con (HMI Sensor) To HMI Sens- HMI Con (HMI Controller) | Mode selection information from User |  |
| VehicleConfig | VSP (Vehicle Status Provider System) To VSP-SSDTS (Stowable Steering and Deployable Tray System) | Configuration of the Feature and Vehicle Specific |  |
| VSP-SSDTS (Stowable Steering and Deployable Tray System) To VSP-SDTS- SFC (Stowable Feature Controller) | Configuration of the Feature and Vehicle Specific |  |
| VehicleStatus | VSP (Vehicle Status Provider System) To VSP-SSDTS (Stowable Steering and Deployable Tray System) | This Signal is the collectivity approval signal which includes Parking status, battery state of charge and Vehicle Speed |  |
| VSP-SSDTS (Stowable Steering and Deployable Tray System) To VSP-SDTS- SFC (Stowable Feature Controller) | This Signal is the collectivity approval signal which includes Parking status, battery state of charge and Vehicle Speed |  |

Table 18: Feature Interactions

# Traceability Matrix





# Open Concerns

| ID | Concern Description | e-Tracker / Reference | Responsible | Status | Solution |
| --- | --- | --- | --- | --- | --- |
| 1 |  |  |  |  |  |

Table 20: Open Concerns *(Not supported by MagicDraw report generation)*

# Revision History

No Revision History found.

## Template Revisions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version | Rev. | Date | Description | Responsible |
| 0 | 6 | 2015-05-26 | * Chapter “Feature Overview” and made a 2nd level heading. * Chapter “Feature Modeling” divided into 3 subchapter (“Scenarios”, “Use Cases”, “State Machines”) for different modeling methods | Jbaden1 |
| 0 | 7 | 2015-05-27 | * Table of Content updated * Template Revision History chapter added | Jbaden1 |
| 0 | 8 | 2015-07-02 | * Section “Unsettled Issues” added | Alevin7 |
| 0 | 9 | 2015-08-04 | * Section “Feature Variants” added * Section “Feature Boundary Diagram” renamed to “Feature Context Diagram” * Document Properties adapted to match needs of VBA macros | Jbaden1, Awegman1 |
| 1 | 0 | 2015-09-11 | * Section “Feature Variants” reworked * Feature Goals removed. Only “Safety Goals“ chapter remains. * Heading 2 formatting issues corrected. * Requirements / Use Cases Listing removed from traceability chapter. * Formatting of attribute table in Notation chapter corrected * Open Topics / Known Issues chapter moved to the end | Jbaden1 |
| 1 | 1 | 2015-11-16 | * Table-Styles removed (for smooth VSEM import) * Some clean-up of sections “Purpose” and “Audience” | Awegman1, jbaden1 |
| 1 | 2 | 2016-02-26 | * Minor corrections based on lessons learned from CC and PCL pilot (e.g. section market/regions) and discussion with Functional Safety Team (purpose of feature) * Footer corrected * Boundary diagram interface chapter renamed to influences. | Jbaden1 |
| 1 | 3 | 2016-02-26 | * Minor corrections after review with Whitney Keith from Functional Safety team | Jbaden1 |
| 1 | 4 | 2016-03-10 | * Some cleanup of meta-data in Word Properties | Jbaden1 |
| 1 | 5 | 2016-03-10 | * Footer formatting corrected (Issue 19) * Results from review with Functional Safety Team incorporated (Issue 20). | jbaden1 |
| 1 | 6 | 2016-04-18 | * Scenario Template added | Jbaden1 |
| 1 | 7 | 2016-04-18 | * Chapter “Operation Modes and States” moved before “Use Case” section. | Jbaden1 |
| 1 | 8 | 2016-04-18 | * Broken Wiki links repaired. | Jbaden1 |
| 2 | 0 | 2016-05-19 | * Adapted to Specification\_Macros.dotm V2.0 * Requirements Templates chapter (ch. 1.7.1) no longer has an attribute table, but refers directly to the Wiki.. | Jbaden1 |
| 2 | 1 | 2016-06-10 | * Table for Context Diagram modified (lists external entities and Influence Description only) | Jbaden1 |
| 2 | 2 | 2016-07-08 | * Template version added to footer * Several hints added to the various sections * Findings from Functional Safety Team incorporated. * RE\_SafetyRequirement style added | Jbaden1 |
| 2 | 3 | 2016-09-21 | * Update from Functional Safety Team incorporated (“Lessons Learned”, “System Behaviors for HARA”) | Jbaden1 |
| 2 | 4 | 2016-11-15 | * Update from Functional Safety Team incorporated (“Lessons Learned”, “System Behaviors for HARA”) * Explanatory notes made more formal | Jbaden1 |
| 3 |  |  | Skipped to synchronize with Specification\_Macros.dotm |  |
| 4 |  |
| 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 | Jbaden1 |
| 6 | 0 | 2017-02-03 | * CR48: Chapter 6 renamed from “Safety” to “Functional Safety”. New sub-chapter “Safety” introduced in Non-Functional Requirements section | Jbaden1 |
| 6 | 0 | 2017-04-28 | * CR7: “RequirementsTraceability” chapter removed | Jbaden1 |
| 6 | 0 | 2017-11-15 | * CR32/53: New Cover Sheet + Disclaimer replaces FAP-150 like ones. * CR75: Some rewording -> Terminology to Glossary, Notation -> Document Conventions * CR49: Rename “Assumptions & Constraints” to “Assumptions” * CR74: Safety Assumptions added to chapter 6. * CR58: Add function allocation column to Logical Architecture chapter | Jbaden1 |
| 6 | 0 | 2018-01-31 | * CR63: Updated links to Functional Safety Sharepoint | Jbaden1 |
| 6 | 0 | 2018-07-24 | * CR69: Add FSR to FeatureDoc * CR64: Add new section "Design Requirements" to Function Spec and Feature Spec | Jbaden1 |
| 6 | 0 | 2018-08-06 | * CR53: some corrections for metada and formatting | Jbaden1 |
| 6 | 0 | 2018-09-28 | * Broken links to RE Wiki repaired | Jbaden1 |
| 6 | 0 | 2018-10-31 | * Cover sheet and footer more GIS like. Functional Safety team feedback incorporated:   + New subsections “Functional Safety Requirements, (Decomposed) FSRs and Parameters / Values   + Removal of “Logical Architecture” | Jbaden1 |
| 6 | 0 | 2018-12-12 | * FSR template removed, now as a macro in the Specification\_Macros.dotm | Jbaden1 |
| 6 | 0a | 2019-05-23 | * Re-introduce “Logical Architecture” (for Functional Safety) | Jbaden1 |
| 6 | 0b | 2019-06-26 | * Chapter “Logical Elements” in “Logical Architecture” section added (FuSa CR 15136240) | Jbaden1 |
| 6 | 0c | 2019-03-22 | * Chapter “Decomposed FSRs” renamed to “ASIL Decomposition of Functional Safety Requirements” and moved beneath Chapter “Functional Safety Requirements”. Explanatory text improved. | Jbaden1 |
| 6 | 0c | 2019-04-05 | * Some wording in ASIL decomposition table modified. Description of fields in that table improved. | Jbaden1 |
| 6 | 0c | 2019-06-24 | * “Input Requirements” section modified (table approach as for the other RE templates). * “References” and “Glossary” chapter moved to the “Introduction” chapter. | Jbaden1 |
| 6 | 0c | 2019-07-02 | * "Important" box added on cover sheet which points to the macros | Jbaden1 |
| 6 | 0c | 2019-07-02 | * Subsection “Error Handling” removed form chapter “Feature Requirements”->”Functional Requirements” (teams are free to create their own substructure of that section). Note tells author not to forget about error handling. * Hint for chapter “Feature Variants” improved reworded upon request from Functional Safety Team. | Jbaden1 |
| 6 | 0c | 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 | 0c | 2019-22-11 | * Chapter “Input Requirements/Documentst: minor modifications (examples added), Word comment removed” | Jbaden1 |
| 6 | 0c | 2019-12-05 | * Upstream Documents section added to “Input Requirements/Documents” table * Custom style table formatting removed * Hint on system behaviors modified as requested from FuSa team | Jbaden1 |
| 6 | 0c | 2019-12-09 | * Term “Upstream Documents” replaced by “Attribute Requirements” in “Input Requirements/Documents” table * ASIL Decomposition table replaced by a version, which get not corrupted during VSEM import. | Jbaden1 |
| 6 | 0c | 2019-12-10 | * In ch. “Functional Safety Requirements” Word reference Id by Word reference text replaced.. | Jbaden1 |
| 6 | 1a | 2020-02-12 | * New chapter “Cybersecurity” added. | Jbaden1 |
| 6 | 1a | 2020-03-03 | * All User Hints formatted using style “RE\_UserHint” to enable automatic removal by a macro. | Jbaden1 |
| 6 | 1a | 2020-03-04 | * Chapter “Cloud Connectivity Data Analytics Requirements” added upon request by D. Crockett/J. Rawlings | 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 document property for latest IDs changed to number instead of text | Jbaden1 |
| 6 | 1b | 2020-03-17 | * Chapter “Functional Architecture” renamed to “Functional Decomposition” * New MBSE terminology introduced: “Feature Level”, “Function Level” and “Component Level” renamed to “Concept Level”, “Logical Level” and “Technology Level” | Jbaden1 |
| 6 | 1b | 2020-07-03 | * CR31: Chapter “Traceability Matrix” added. | Jbaden1 |
| 6 | 1b | 2020-23-09 | * CR28: Alignment to [*FFSG01.10 Feature Document Guideline*](https://azureford.sharepoint.com/sites/GlobalFunctionalSafety/Released%20Templates%20Guidelines%20and%20Examples/Guidelines/FFSG01.10_FeatureDocument_Guideline.pdf) for how to apply the Feature Doc template for Functional Safety. New section “Classification of Chapters” added. “Active Tilt Control” Example in section “Logical Architecture” updated based on input from HARA training. | Jbaden1 |
| 6 | 1b | 2020-25-11 | * Reference to process definition in Stages added to “How to Use” section on cover sheet. User hints removed from “Document Purpose” chapter. * RE-Wiki links mostly replaced by Stages links, links to Functional Safety Sharepoint updated | Jbaden1 |

# Appendix

## Definitions

| **Definition** | **Description** |
| --- | --- |
| ABS | Automatic Breaking System |
| APIM | Accessory Protocol Interface Module (SYNC) |
| BCM | Body Control Module |
| BMS | Battery Management System |
| DAB | Driver Air Bag or one version of a Passive Restraint. |
| DC | Drive Control ( Locomotion and Passive restraint (Air Bag) Control) |
| Deploy | Come out / Move away from Dashboard or Instrument Panel Cluster |
| Drivability Status | Status to make sure all the component's status are good before allowing the drivability to user for safe drive |
| Drive Control | Drive Control is the Control status of Locomotion and Passive Restraint ( Drive Airbag)) |
| Drive Mode | The original Mode of the Vehicle in which the work surface for productivity is inside the instrument panel assembly ( stowed and locked) and the Driver seat is at drive seat position and Steering Column is Deployed |
| Drive state | The original Mode of the Vehicle in which the work surface for productivity is inside the instrument panel assembly ( stowed and locked) and the Driver seat is at drive seat position and Steering Column is Deployed |
| DSM | Driver Seat Module or Seat Controller. |
| ECM | Engine Control Module. |
| ECU | Electronic Control Module |
| EPAS | Electronic Power Assisted Steering |
| FuSa | Functional Safety |
| High speed | Approximately more than 52 mph (83 kph) |
| Low speed | Approximately 12 to 36 mph (19 to 58 kph ) |
| Medium speed | Approximately 36 mph to 52 mph (58 to 83 kph) |
| PCM | Powertrain Control Module |
| PSCM | Power Steering Control Module |
| RCM | Restraint Control Module or Seatbelt Controller |
| Rest Mode | The mode in which driver will have Driver seat is moved back (Work mode seat position) and Steering Column is stowed inside( Work Surface will not be Arbitrated) |
| Rest state | The mode in which driver will have Driver seat is moved back (Work mode seat position) and Steering Column is stowed inside( Work Surface will not be Arbitrated) |
| Stow | Move in / Move towards to Dashboard or Instrument Panel Cluster |
| term | A representation of a Concept expressed in Natural Language. In the vocabulary of a Domain of Discourse a term enables common understanding of domain concepts. |
| term glossary | A term glossary is a table of agreed upon definitions for terms used in project development that may provide clarity or avoid confusion to stakeholders. |
| TLA | Three Letter Acronym |
| Tray | Work surface where a User / Driver can use |
| Very Low Speed | Approximately 0 to 12 mph (0 to 19 kph) |
| Work Mode | The mode in which driver will have a work surface for productivity and the Driver seat is moved back (Work mode seat position) and Steering Column is stowed inside. |
| Work state | The mode in which driver will have a work surface for productivity and the Driver seat is moved back (Work mode seat position) and Steering Column is stowed inside. |

Table 21: Definitions used in this document

## Abbreviations

| **Abbr.** | **Stands for** |
| --- | --- |
| ATLA | Another Three Letter Acronym |

Table 22: Abbreviations used in this document

Document ends here.