|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | | |  |
|  |  | | |  |
|  | Overhead Lighting (Map/Dome Lights) | | |  |
|  | (ID\_FnG004365) | | |  |
|  |  | | |  |
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| Document Approval | | | | |
| Name | Role | | Email Confirmation | Date |
| Herta Llusho | Core Feature Supervisor | | [hllusho@ford.com](mailto:hllusho@ford.com) | 03/02/2021 |
| Ken Cunningham | Functional Safety Lead | | [Kcunni16@ford.com](mailto:Kcunni16@ford.com) | 03/02/2021 |

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**Important Note**

You need to use the RE specification macros provided by the “RE\_SpecificationMacroTemplate.dotm” (refer to “Utilities” on [page “Specification Templates” in the RE Wiki](http://wiki.ford.com/display/RequirementsEngineering/Specification+templates)) to allow seamless VSEM import of the specification content. **Use only these RE specification macros to create requirements** in this specification. 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 enable and use the macros and the requirements templates in this specification.

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# Introduction

## Document Purpose

The Function Specification (FS) specifies an individual function.

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

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

|  |  |
| --- | --- |
| **Function ID** | **Function Name** |
| FnG004635 | Overhead Lights Control |

## Document Audience

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

**#Hint:** The FS template has the IP Classification “Proprietary” by default. IP Classification “Confidential” might be required in some cases, e.g. by Ford Functional Safety.

**#Macro:** [Add Ins -> Edit Document Properties macro](http://wiki.ford.com/display/RequirementsEngineering/How+to+use+the+Specification+Templates#HowtousetheSpecificationTemplates-EditDocProperties) (select “Proprietary” for “Document Classification”).

### Stakeholder List

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

**#Hint:** Refer to [Ford RE Wiki – Stakeholder List](http://wiki.ford.com/display/RequirementsEngineering/Stakeholder+Analysis) on how to create a stakeholder list. The stakeholder list should be stored in VSEM in the pseudo folder “General Data Artifacts” of the corresponding function.

Table 1 List of Stakeholders

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | |  |  |  |  |  |
| **Name** | **CDSID/phone** | **Description of Stake** | **Contact date** | **Elicitation response** | **Review worksheet** | **Review meeting** |
| Herta Llusho | hllusho | Core Feature Supervisor |  |  |  |  |
| Ken Cunningham | kcunni16 | Body Functional Safety |  |  |  |  |
| Steven Antilla | santilla | Interior Lighting Supervisor |  |  |  |  |
| Dave Bergen | dbergen5 | Interior Lighting D&R |  |  |  |  |
| Elizabeth Wickey | ewickey | Interior Lighting Electrical |  |  |  |  |
| Jason Emrich | jemrich | Optics Engineer |  |  |  |  |
| Bill Crafts | wcrafts1 | OZM D&R |  |  |  |  |
| James Baker | jbake286 | OZM D&R |  |  |  |  |
| Mark Dewitt | Mdewitt9 | BCM D&R |  |  |  |  |
| John Barrs | jbarrs | BCM Software |  |  |  |  |
| Brinda Ganesan | fbrinda | CIED Engineer |  |  |  |  |
| Demetrius Gault | Djohn840 | Sync Wireframe Engineer |  |  |  |  |
| Trupti Masurkar | Tmasurka | SYNC Product Engineer |  |  |  |  |
| Neelima Majjiga | Nmajjiga | SYNC Engineer |  |  |  |  |

## 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 FS relates to other Ford Requirements Documents and Specifications.

### Document Structure

The structure of this document is explained below:

**Section 1** – Introduction 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.

**Section 2** – Function Specifications: Specifies the logical functions of the function group in detail

**Section 3** – List of Open Concerns

**Section 4** Revision 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.

**Section 5** – Appendix: Presenting additional data mainly in a tabular form, e.g., a data dictionary

**#Hint:** All sections are mandatory, unless explicitly marked by the tag “#Classification” as “optional” or as applicable e.g. to certain domains like “Functional Safety”.

## 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 a FS 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\_FNC\_LockArbitrator\_00004* This is the fourth requirement on function level for the function Lock Arbitrator.

#### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Reference** | **Title** | **Doc. ID** | **Revision** | **Document Location** |
|  | Internal Lighting Specification | **RQT-170200-020520** |  | <https://www.fede.ford.com/awc/#/teamcenter.search.search?searchCriteria=ID:RQT-170200-020520&filter=SE4_Req_StandardRevision.se4_RequirementState%3DReleased~~Categorization.category%3DRequirements~~WorkspaceObject.object_type%3DSE4_RequirementRevision> |
|  |  |  |  |  |

Table 2: Ford Documents

### External Documents and Publications

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

**#Hint:** You may refer to [IEEE Citation Reference](http://www.ieee.org/documents/ieeecitationref.pdf) on how to format a reference.

| **Reference** | **Document / Publication** |
| --- | --- |
| **REG-130101-003390** | FMVSS 102 |
|  |  |

Table 3: External Documents and Publications

## Glossary

**#Hint**: Terms, concepts and abbreviations used in the document shall be defined and illustrated here. Note that changes to terms and/or concepts described in this section tend to cause major updates to this document.

The tables below have feature specific definitions and abbreviations. For additional, non-feature specific terms please refer to the [RE Glossary](http://wiki.ford.com/display/RequirementsEngineering/Glossary?src=contextnavpagetreemode)

### Definitions

**#Hint:** The table below has definitions and abbreviations relevant for the functions in this document. For additional terms please refer to the [RE Glossary](http://wiki.ford.com/display/RequirementsEngineering/Glossary?src=contextnavpagetreemode)

|  |  |
| --- | --- |
| Definition | Description |
| Global On/OFF | This switch is a request to TURN ON/OFF all map/dome lamps. Activation of this switch will cause the Master Lamp to toggle between the available states depending upon what state the Master Lamp was in when Global On/Off was activated. |
| Door Defeat/Auto Mode | This switch makes the interior lighting system suppresses the Courtesy & Embrace ramp ON/OFF functions when disabled. This feature is 100% controlled by the driver/passenger. |
| Local On/OFF | These button(s) are a request to TURN ON/OFF individual Map/Dome Lamps. |

Table 4: Definitions relevant for “Logical Function A”

### Abbreviations

|  |  |  |
| --- | --- | --- |
| Abbr. | Meaning | Description |
|  |  |  |
|  |  |  |

Table 5: Abbreviations relevant for “Logical Function A”

# Function Specification

## Function Overview

### Function Description

***#Hint:*** *Some descriptive text to explain the purpose and functionality of the function.*

Function of Dome Light is to illuminate the interior of the vehicle to enhance visibility during dark. Dome Lights are required between first and second row of the vehicle and optional between second and third row. Because of the position and optics of dome light, the target illumination area of dome light is bigger than map light.

Map Lights are reading lights which individual user can use to light up a specific zone. The target area of map light is smaller than dome light. Therefore, it serves the purpose of lighting up a specific zone without disturbing the other passenger present in the vehicle.

### Function Variants

**#Classification**: Mandatory (State “Not applicable”, if not used)

**#Hint:** If different variants of the same function are specified in this section, list those variants in the table below.

Variants on Function level could be driven by e.g. technology or feature content. Example: There could be a “Low Content” and a “High Content” variant of some exterior lighting function. The “Low Content” variant is used for Conventional Headlight technology, the “High Content” variant is used for LED and Xenon technology. In this case we call the different technologies the Variant Options, which the Variant depends on. The optional column “Variant condition” allows to express the dependency of a Variant based on Variant Options. Variant Options should be centrally managed in VSEM.

If requirements/signals are not applicable for all variants/variant options, those requirements should state explicitly, which function variant/variant option they apply to.

**#Link:** [RE Wiki – Variant Management](http://wiki.ford.com/display/RequirementsEngineering/Variant+Management).

|  |  |  |
| --- | --- | --- |
| Variant Name | Variant Description | Variant Condition (optional) |
|  | No Variant |  |

### Input Requirements/Documents

***#Hint:***The table below helps the function owner to collect relevant input *(requirements, documents, mails, models, …)* while writing the spec. When finalizing the spec, the function owner should check, if all inputs have been properly considered by derived/outgoing requirements *in chapter “Function Requirements”.*

*Note: It is not required to list each input requirement individually in this table, referencing the input document is enough (if relevant document section is indicated).*

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference**  (Reference as listed in ch. ”References”) | **Section/Requirement** | **Description** | **Derived Requirement**  (optional – reference to requirement in ch. “Function Requirements”) |
| **Feature Requirements** | | | |
| **F000058** | Feature Document |  |  |
| **Ford Engineering Standards** | | | |
| RQT-170200-020520 | Interior Lighting System Specification |  |  |
|  |  |  |  |
| **Legal Regulations** | | | |
| **REG-130101-003390** | FMVSS 101 |  |  |
|  |  |  |  |
| **Industry Standards** | | | |
|  | ISO 26262 | The system should be developed according to Ford's implementation of Functional Safety. |  |
|  |  |  |  |
| **Other Sources** | | | |
|  | <Example: some stakeholder document> |  |  |
|  |  |  |  |

Table 6: Input Requirements/Documents

### Assumptions

**#Classification**: Mandatory (State “Not applicable”, if not used)

**#Hint:** A list of known assumptions concerning the effects of the function’s behavior on other functions or elements (i.e., dependencies) as well as assumptions on the behavior expected by the function (e.g. known limitations). During the development most of those assumptions are typically either converted into actual requirements or discarded at some point – such that this chapter remains mostly empty.

## Function Scope

Figure 1: Functional Architecture Diagram of Overhead Lights

## Function Interfaces

**#Hint:**

* First create a Logical Signal in the ”Logical Signals” section of the “Data Dictionary”. Use [Add Ins -> Add Requirement macro](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Logical+Signal+or+Parameter) (select “Logical Signal” as type).
* Insert just a Word reference to the Signal ID, Name and Description (which are bookmarks in the signal/parameter definition in the section in the Data Dictionary).

**#Link:** [RE Wiki – Adding a Logical Signal or Parameter](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Logical+Signal+or+Parameter)

### Logical Inputs

|  |  |
| --- | --- |
| **Signal Name** | **Description** |
| Global On/Off | Global/All Lights signal from user will either turn ON or turn OFF all Overhead Lights. |
| Local On/Off | Local Signal from user will turn ON or turn OFF individual Overhead Light. |
| Door Defeat Enable/Disable | Door Defeat signal from the user will either enable or disable Door Defeat. |
| Door Ajar Status | Provide cabin/cargo/liftgate door ajar status |
| Ignition Status | Provide vehicle ignition status |
| Lock/Unlock | Provide vehicle lock and unlock status |
| Vehicle Speed | Provide vehicle speed value in KPH. |
| Vehicle Speed Available | Provide status check whether vehicle speed is available or unavailable. |
| Battery Saver | Provide command for turn Off lights if the user forgets to turn them OFF while exiting the vehicle and ignition is OFF. |
| Perimeter Alarm Courtesy Request | Triggers Overhead light to turn ON if the Perimeter Alarm gets activated. |
| Crash Courtesy Request | Triggers Overhead light to turn On post-crash. |
| Silent Mode | Silent mode or Dark Car Mode restricts lights to turn on during courtesy or w/f. It only allows lights to turn on/off when requested by user. |
| Dimming Level |  |
| Light Value |  |

### Logical Outputs

|  |  |
| --- | --- |
| **Signal Name** | **Description** |
| Arbitration | Arbitration commands filters the signal and generates **welcome/farewell output**. Moreover, it also routes remaining signals to Control Light function |
| Control Lights | Control Light commands arbitrates the signal coming from arbitration function and based on the signal priority either perform global on/off or courtesy ramp on/off or local on/off. |
| Light Output | Light illumination feedback to user |

### Logical Parameters

**#Hint**: Put requirements for parameters here, which are implemented as configuration parameters using Method 2 or 3 or as parameters for calibration.

|  |  |
| --- | --- |
| **Parameter Name** | **Description** |
| Vehiclespeed\_Threshold | Overhead Light in courtesy mode shall remain on if the vehicle speed is below 15kph +/- 2kph |
| CourtesyLight\_Timeout | Overhead Light in courtesy mode shall turn OFF after a period of 25 sec +/- 2sec. |
| Batterysaver\_Timeout | Allowable range for battery timeout is 10 to 30 min +/- 10% |
| LE\_Courtesy\_RampUp\_Duration\_Cfg LE\_Courtesy\_RampDn\_Duration\_Cfg NonLE\_Courtesy\_RampUp\_Duration\_Cfg | Ramp rate of time Overhead light can be configured maximum up to 7 sec. |
| BSaveTimeOut\_CourtesyDemand\_Cfg | Battery saver triggers light to turn OFF after the time on parameter has elapsed. The parameter can be configured between 10-30 min. |

## Function Modeling

**#Classification:** Mandatory

**#Hint:** Typical modeling artifacts in this section are State Machines, Activity Diagrams / Flow Charts, Decision Tables, and possibly Sequence Diagrams, which can all be used as techniques to analyze the function requirements.

It is highly recommended to use at least one of the following modeling techniques for modeling and analyzing the Function behavior and derived requirements (refer to sample diagrams below): State Machines, Activity Diagrams / Flow Charts, or Decision Tables

**#Links:** Analyze / Model Requirements: [RE Wiki – Analyze / Model Requirements](http://wiki.ford.com/pages/viewpage.action?pageId=110594919&src=contextnavpagetreemode)

### Use Cases

**#Classification:** Infotainment Only (remove section, if not used)

**#Hint:** Some Domains (e.g. Infotainment) use not only Customer Use Cases (in the Feature Doc), but refine Use Case descriptions down to function level. In general, the RE approach encourages the use of Use Cases on Feature Level but not on Function Level. Activity Diagrams are a more suitable way to express the same on Function Level.

**#Links:** Infotainment – “Harmony Systems Engineering” Approach

### State Charts

**#Classification:** Optional (remove section, if not used)

**#Hint:** State Charts are widely used to describe reactive, event-driven behavior.

**#Links:** State Charts [RE Wiki – State Charts](http://wiki.ford.com/display/RequirementsEngineering/State+Charts?src=contextnavpagetreemode)



Figure 2: State Machine of Global/Door Defeat

Table 7 State Transition table for Global/DD Configuration

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr.No** | **Signal Number** | **State Transition** | **Description** |
| 1 | T1 | DD Enabled Idle to DD Disabled Idle | DD Disabled by User |
| 2 | T2 | DD Disabled Idle to DD Enabled Idle | DD Enabled by User |
| 3 | T3 | DD Disabled Ramp Active to DD Disabled Idle | Welcome/Farewell |
| 4 | T4 | DD Disabled Idle to DD Disabled Ramp Active | Welcome/Farewell |
| 5 | T5 | DD Disabled Idle to DD Disabled Global ON | Global ON activated by User |
| 6 | T6 | DD Disabled Global ON to DD Disabled Idle | Global OFF activated by User |
| 7 | T7 | DD Disabled Global On to DD Enabled Global On | DD Enabled by User in Global On state. |
| 8 | T8 | DD Enabled Global On to Disabled Global ON | DD Disabled by User in Global On state. |
| 9 | T9 | DD Disabled Global On to DD Disabled Ramp Active Global ON | Welcome/Farewell in Disabled Global On state. |
| 10 | T10 | DD Disabled Ramp Active Global ON to DD Disabled Global ON | Welcome/Farewell in DD Disabled Global ON State. |
| 11 | T11 | DD Disabled Ramp Active Global ON to DD Enabled Ramp Active Global ON | DD Enabled by User in Ramp Active Global ON. |
| 12 | T12 | DD Enabled Ramp Active Global ON to DD Disabled Ramp Active Global ON | DD Disabled by User in DD Enabled Ramp Active Global ON. |
| 13 | T13 | DD Enabled Global ON to DD Enabled Ramp Active Global ON | Welcome/Farewell in DD Enabled Global On State. |
| 14 | T14 | DD Enabled Ramp Active Global On to DD Enabled Global ON | Welcome/Farewell in DD Enabled Ramp Active Global ON |
| 15 | T15 | DD Enabled Global ON to DD Enabled Idle | Global OFF activated by user in DD Enabled Global On State. |
| 16 | T16 | DD Enabled Idle to DD Enabled Global ON | Global On activated by user in DD Enabled Idle State. |
| 17 | T17 | DD Enabled Ramp Active Global On to DD Enabled Ramp Active Idle | Global OFF activated by user in DD Enabled Ramp Active Global On State. |
| 18 | T18 | DD Enabled Ramp Active Idle to DD Enabled Ramp Active Global On | Global On activated by user in DD Enabled Idle State. |
| 19 | T19 | DD Enabled Ramp Active Idle to DD Enabled Idle | Welcome/Farewell in DD Enabled Ramp Active Idle |
| 20 | T20 | DD Enabled Idle to DD Enabled Ramp Active Idle | Welcome/Farewell in DD Enabled Idle. |
| 21 | T21 | DD Enabled Ramp Active Idle to DD Disabled Ramp Active | DD Disabled by user and Courtesy/Embrace Activation. |
| 22 | T22 | DD Disabled Ramp Active to DD Enabled Ramp Active Idle | DD Enabled by user in Ramp Active state. |



Figure 3 State Flow Diagram for ON/OFF/Auto

Table 8 State transition table for On/OFF/Auto Configuration.

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr.No** | **Signal Number** | **State Transition** | **Description** |
| 1 | T1 | OFF to ON | User presses ON button in OFF State. |
| 2 | T2 | ON to OFF | User presses OFF button in ON State. |
| 3 | T3 | ON to Auto | User presses Auto Button in ON state. |
| 4 | T4 | Auto to ON | User presses On button in Auto state. |
| 5 | T5 | Auto to Ramp Active | Welcome/Farewell activate lamps |
| 6 | T6 | Ramp Active to Auto | Courtesy/Embrace deactivate lamps |
| 7 | T7 | Auto to OFF | User presses OFF button in Auto State |
| 8 | T8 | OFF to Auto | User presses Auto button in OFF state |
| 9 | T9 | On to Ramp Active ON | Courtesy/Embrace activation in On state. |
| 10 | T10 | Ramp Active On to ON | Courtesy/Embrace deactivation |
| 11 | T11 | Ramp Active On to Ramp Active | User presses Auto button in Ramp Active On State. |
| 12 | T12 | Ramp Active to Ramp Active On | User presses ON button in Ramp Active State. |
| 13 | T13 | Ramp Active to Ramp Active OFF | User presses OFF button in Ramp Active state. |
| 14 | T14 | Ramp Active OFF to Ramp Active | User presses Auto Button in Ramp Active OFF state. |
| 15 | T15 | Ramp Active Off to Ramp Active On | User presses On button in Ramp Active OFF state. |
| 16 | T16 | Ramp active On to Ramp Active OFF | User presses OFF button in Ramp Active On state. |
| 17 | T17 | Ramp Active OFF to OFF | Courtesy/Embrace deactivate lamps |
| 18 | T18 | OFF to Ramp Active OFF | Courtesy/Embrace activate lamps. |



Figure State Diagram for Local On/Off in DD Enabled and Disabled Mode

Table 9 State Transition Table for Local On/OFF

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr.No** | **Signal Number** | **State Transition** | **Description** |
| 1 | T1 | Local OFF to Local ON | User presses Local On when all lights are OFF in DD Disabled State. |
| 2 | T2 | Local ON to Local OFF | User presses Local Off when individuals’ lights are turned ON in DD Disabled State. Local deactivation becomes inactive if lights are in Global On mode or Courtesy Ramp On mode. |
| 3 | T3 | Local OFF to Local ON | User presses Local On when all lights are OFF in DD Enabled State. |
| 4 | T4 | Local ON to Local OFF | User presses Local Off when individuals’ lights are turned ON in DD Enabled State. |

### Activity Diagrams

**#Classification:** Optional (remove section, if not used)

**#Hint:** Activity diagrams are well suited to describe a flow of actions (e.g. to refine the an use case).

**#Links:** Activity Diagrams: [RE Wiki – Activity Diagram](http://wiki.ford.com/display/RequirementsEngineering/Activity+Diagram?src=contextnavpagetreemode), SysML User Group – Activity Diagram Basics

Figure 5: Activity Diagram of Function A

### Sequence Diagrams

**#Classification:** Optional (remove section, if not used)

**#Hint:** Sequence diagrams may help to analyze the interaction between Functions in specific scenarios.

**#Links:** Sequence Diagrams: [RE Wiki – Sequence Chart](http://wiki.ford.com/display/RequirementsEngineering/Sequence+Chart?src=contextnavpagetreemode), [SysML User Group – Sequence Diagram Basics](https://pd3.spt.ford.com/sites/SystemsEngineering/SEC/sysml-teamsite/SysML%20Wiki/Sequence%20Diagram%20Basics.aspx)

Figure 6: Sequence Diagram of Function A

### Decision Tables

**#Classification:** Optional (remove section, if not used)

**#Hint:** Decision Tables are well suited to describe combinatorial logic

## Function Requirements

#Macro: [Add Ins -> Add Requirement macro](http://wiki.ford.com/display/RequirementsEngineering/How+to+use+the+Specification+Templates#AddNewRequirement) (select “FNC” as ID Prefix, the function name as ID Infix (Short Name) and “Requirement” as type)

#Link: [*RE Wiki – How to write good requirements*](http://wiki.ford.com/display/RequirementsEngineering/How+to+write+better+requirements?src=contextnavpagetreemode)

### Functional Requirements

***#Hint:*** *Please also consider specific situations like Initialization (Startup) and Deinitialization (Shutdown) apart from Normal Operation and Error Handling. E.g. a* state chart or activity diagram in section “*Function Modeling*” might help for better understanding.

#### Normal Operation

###R\_FNC\_Overhead Lights\_00001### Local Functionality during global control

The manual light request via local on/off from the user shall be inactive when the Overhead lights are turned ON using Global Control.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_FNC\_Map/Dome Lights\_00001### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.1a | End of Requirement | | | | |

###R\_FNC\_Overhead Lights\_00002### Local functionality during Courtesy

The manual light request via local on/off from the user shall be inactive during Courtesy ramp on.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_FNC\_Map/Dome Lights\_00002### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.1a | End of Requirement | | | | |

###R\_FNC\_Overhead Lights\_00003### Global Light functionality during Courtesy

The manual light request via global on/off from the user shall be deactivated during Courtesy ramp on state.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_FNC\_Map/Dome Lights\_00003### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.1a | End of Requirement | | | | |

###R\_FNC\_Overhead Lights\_00004### FMVSS 102

The Overhead lights shall have means to turn off as per FMVSS 102. For detailed requirement, please use [Link.](https://www.fedewb.ford.com/#/search/keyword-search?searchCriteria=%22Requirement%20Title%22:%22FMVSS%20101%22&filter=SE4_Req_StandardRevision.se4_RequirementState%3DReleased~~Categorization.category%3DRequirements~~WorkspaceObject.object_type%3DSE4_RegReqmentRevision%5ESE4_RequirementRevision~~)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_FNC\_Map/Dome Lights\_00004### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.1a | End of Requirement | | | | |

###R\_FNC\_Overhead Lights\_00005### Forced Turn Off

The Overhead lights shall be turned off after Battery saver timeout has elapsed via battery saver feature from BCM if the lights are On, the ignition is in OFF state and the vehicle is in OFF state to prevent battery drainage.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_FNC\_Map/Dome Lights\_00005### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.1a | End of Requirement | | | | |

###R\_FNC\_Overhead Lights\_00006### Global Control Input

The Overhead light feature shall be able to turn all lights ON, when the user request Global ON/All Lights ON via user interface.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_FNC\_Map/Dome Lights\_00006### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.1a | End of Requirement | | | | |

###R\_FNC\_Overhead Lights\_00007### Local Control Input

The individual overhead light feature shall be able to turn ON individual lights in the first, second and third row based on the user request via user interface.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_FNC\_Map/Dome Lights\_00007### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.1a | End of Requirement | | | | |

###R\_FNC\_Overhead Lights\_00008### Courtesy Lights

The Overhead light shall be able to conduct courtesy ramp on/off during a courtesy trigger in DD Disable Mode only.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_FNC\_Map/Dome Lights\_00008### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.1a | End of Requirement | | | | |

###R\_FNC\_Overhead Lights\_00009### Welcome/Farewell

The Overhead light shall be able to conduct welcome/farewell ramp on/off during w/f trigger in DD Disable Mode only.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_FNC\_Map/Dome Lights\_00009### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.1a | End of Requirement | | | | |

\*\* More functionality to be added based on Lincoln Embrace Use Case due to DCO Change.

#### Error Handling

***#Hint:*** *FMEA counter measures could be considered as requirements in this chapter*

### Non-Functional Requirements

***#Hint:*** *Non-functional requirements specify some performance criteria in addition to the functional behavior given defined by the functional requirements. Timing (if not already included in the functional requirements), security details (e.g. how secure does an algorithm have to be) or reliability (e.g. mean time between failure) could be specified in this section.*

### Functional Safety Requirements

**#Classification**: Functional Safety only – If not used, remove content and state “Not Applicable”

***#Hint:*** *The Functional Safety process does currently not allow to refine FSRs inside the Function Specification. Therefore, the Function Specification just lists the FSRs “inherited” from the features which contribute to this Logical Function. The “inherited” FSRs get cascaded 1:1 as input to the Implemented Functions.*

**#Link:**[RE Wiki – RE Alignment with Functional Safety (ISO26262)](http://wiki.ford.com/pages/viewpage.action?pageId=176397025)

[RE Wiki - Requirements Attributes](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes)

[Functional Safety Sharepoint](https://pd3.spt.ford.com/sites/GlobalFunctionalSafety/Pages/default.aspx) – Functional Safety Concept

|  |  |
| --- | --- |
| **FSR ID**  (from Feature Doc) | **Requirement Title** |
|  |  |
|  |  |
| … |  |

Table 2‑10: Inherited FSRs

### Other Requirements

#### Design Requirements

***#Hint:*** *Requirements of a Logical Function should be typically agnostic of their SW/HW implementation*. If for specific reasons the function owner needs to define explicitly design constraints, it can be done in this chapter.

# Open Concerns

**#Hint:** The following list presents open concerns, which have to be discussed or clarified over the course of the on-going requirements engineering.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ID | Concern Description | e-Tracker / Reference | Responsible | Status | Solution |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |
| 7 |  |  |  |  |  |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |

Table 11: Open Concerns

# Revision History

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Revision | Date | Description | Approved by | Responsible |
| A |  | Initial version |  |  |
|  |  |  |  |  |

## Template Revisions

*#Important: Do not change this section*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version | Rev. | Date | Description | Responsible |
| 1 | 0 | 2016-02-26 | Initial version, derived form FDS | Jbaden1 |
| 1 | 1 | 2016-02-26 | Word properties corrected | Jbaden1 |
| 1 | 2 | 2016-03-10 | Clean up of ocument meta data (Word properties) | Jbaden1 |
| 1 | 3 | 2016-03-22 | * Footer formating corrected (Issue 19) * “Constraints” chapter renamed to “Input Requirements” (Issue 20) | Jbaden1 |
| 1 | 4 | 2016-04-20 | * Broken Wiki links repaired | Jbaden1 |
| 2 | 0 | 2016-06-10 | * Document metadata adapted. Prepared for new macros * DTC table removed * HMI function added as a chapter (details still to be refined) * Signal / Parameter IDs column deleted interface tables | Jbaden1 |
| 2 | 1 | 2016-07-14 | * Converted to SysML diagrams * HMI section further elaborated * Template version added to footer * Dedicated Startup / Shutdown sections removed (only hints added) * Data Dictionary reworked and Signal / Parameter IDs column re-introduced | Jbaden1 |
| 2 | 2 | 2016-12-07 | * Minor formatting changes | 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 | * Some additional hints. * Hyperlinks highlighted in hints | Jbaden1 |
| 6 | 0 | 2017-04-28 | * Editorial change. Hints added to chapter 4.1.4 * Chapter “Traceability Matrix” removed | Jbaden1 |
| 6 | 0 | 2018-04-28 | * CR69/63: New chapters added for Functional Safety (FTTI and Technical Safety Requirements) * CR53: New coversheet + additional meta-data * CR76: merge sections for configuration and for calibration parameters into one on Function Level | Jbaden1 |
| 6 | 0 | 2018-08-06 | * CR66: Fix version numbering in footer of Function Spec | 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 | 2018-11-12 | * Explanatory text in Variants” section revised * Functional Safety modifications as agreed with FuSa core team (Baseline: November 2018 Dearborn On-Site) | Jbaden1 |
| 6 | 0b | 2019-01-02 | * Editorial changes (in “Variants” section) | Jbaden1 |
| 6 | 0b | 2019-01-21 | * Template Id set to 2 | Jbaden1 |
| 6 | 0b | 2019-03-22 | * Chapter “Decomposed FSRs” renamed to Functional Safety Requirements” A new chapter “ASIL Decomposition of of Functional Safety Requirements” added as a subsection to that chapter. | Jbaden1 |
| 6 | 0b | 2019-04-05 | * Some wording in ASIL decomposition table modified. Description of fields in that table improved. | Jbaden1 |
| 6 | 0b | 2019-04-05 | * ASIL decomposition table removed (ASIL decomposition only allowed on Feature Level or on Component Level in the FIS or ECU Functional Spec) | Jbaden1 |
| 6 | 0b | 2019-07-02 | * "Important" box added on cover sheet which points to the macros * Chapters “References” and “Glossary” moved back up to section “Introduction * Chapter “Inputs Requirements”” reworked | Jbaden1 |
| 6 | 0b | 2019-09-09 | * Function Spec derived from Function Group Spec, version 6.b by removing those sections, which make no sense when specifying a single function (driven by AV team request). * Chapter 2.4 has now one section per modeling technique again. This is to allow more intuitive tailoring of the section (driven by AV team request). | 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 | 2019-12-05 | * Upstream Documents section added to “Input Requirements/Documents” table * Custom style table formatting removed | Jbaden1 |
| 6 | 1a | 2019-12-10 | * Refinement of FSRs no longer supported by Function Specification (as requested by Functional Safety team). FSR chapter just forwards FSRs from the Feature Docs 1:1 to the Implemented Function(s). * Version number renamed from 6.0c to 6.1 due to Functional Safety changes | Jbaden1 |
| 6 | 1a | 2020-03-09 | * Missing document 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 * Copyright date field on cover sheet corrected | Jbaden1 |

# Appendix

## Data Dictionary

### Logical Signals

**#Macro:** [Add Ins -> Add Requirement macro](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Logical+Signal+or+Parameter) (select “Logical Signal” as type)

### Logical Parameters

**#Macro:** [Add Ins -> Add Requirement macro](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Logical+Signal+or+Parameter) (select “Logical Parameter” as type)

### Encoding Types

**#Macro:** [Add Ins -> Add Requirement macro](http://wiki.ford.com/display/RequirementsEngineering/Adding+an+Encoding+Type) (select “Encoding Type” as type)

Document ends here.