

Software Safety Requirements and Architecture

Lane Assistance

**Document Version: [Version]**

**Template Version 1.0, Released on 2017-06-21**



# Document history

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Version | Editor | Description |
| 3/2/18 | 1.0 | Ken Overholt | Initial draft |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# 

# Table of Contents

Table of Contents

[Document history 2](#_Toc507834698)

[Table of Contents 2](#_Toc507834699)

[Purpose 2](#_Toc507834700)

[Inputs to the Software Requirements and Architecture Document 3](#_Toc507834701)

[Technical safety requirements 3](#_Toc507834702)

[Refined Architecture Diagram from the Technical Safety Concept 4](#_Toc507834703)

[Software Requirements 4](#_Toc507834704)

[Refined Architecture Diagram 9](#_Toc507834705)

# Purpose

The purpose is to develop requirements and metrics against which the items can be verified that will ensure its functional safety.

# Inputs to the Software Requirements and Architecture Document

**[Instructions:**

**REQUIRED:**

**You are only required to develop this document for the LDW (lane departure warning) amplitude malfunction. So here, provide the technical safety requirements for the LDW amplitude malfunction as well as the refined system architecture diagram from the technical safety concept.**

**OPTIONAL:**

**Expand this document to include software safety requirements for the LDW frequency malfunction as well. Go even further and document software safety requirements for the Lane Keeping Assistance (LKA) function as well.**

**]**

## Technical safety requirements

Technical Safety Requirements related to Functional Safety Requirement 01-01 are:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Technical Safety Requirement** | **ASIL** | **Fault Tolerant Time Interval** | **Architecture Allocation** | **Safe State** |
| Technical  Safety  Requirement  01 | From 18.4 | C | 50 ms |  | LDW shall set the oscillating torque to 0. |
| Technical  Safety  Requirement  02 |  |  |  |  |  |
| Technical  Safety  Requirement  03 |  |  |  |  |  |
| Technical  Safety  Requirement  04 |  |  |  |  |  |
| Technical  Safety  Requirement  05 |  |  |  |  |  |

## Refined Architecture Diagram from the Technical Safety Concept

A screenshot of a video game

Description generated with high confidence

# Software Requirements

**Lane Departure Warning (LDW) Amplitude Malfunction Software Requirements:**

**[Instructions: Fill in the software safety requirements for the LDW amplitude malfunction technical safety requirements. We have provided the associated technical safety requirements. Hint: The software safety requirements were discussed in the text from the software and hardware lesson.**

**OPTIONAL:**

**CHALLENGE ONE**

**Develop software safety requirements for the Lane Departure Warning (LDW) frequency function and modify the system architecture as needed.**

**CHALLENGE TWO**

**Develop software safety requirements for the Lane Keeping Assistance (LKA) function and modify the system architecture as needed.**

**]**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Technical Safety Requirement** | **ASIL** | **Fault Tolerant Time Interval** | **Allocation to Architecture** | **Safe State** |
| Technical  Safety  Requirement  01 | The LDW safety component shall ensure that the amplitude of the LDW\_Torque\_Request sent to the Final Electronic Power Steering Torque component is below Max\_Torque\_Amplitude |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | Software Safety Requirement | ASIL | Allocation Software Elements | Safe State |
| Software  Safety  Requirement  01-01 |  |  |  |  |
| Software Safety Requirement 01-02 |  |  |  |  |
| Software Safety Requirement 01-03 |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Technical Safety Requirement** | **ASIL** | **Fault Tolerant Time Interval** | **Allocation to Architecture** | **Safe State** |
| Technical  Safety  Requirement  02 | The validity and integrity of the data transmission for LDW\_Torque\_Request signal shall be ensured |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Software Safety Requirement** | **ASIL** | **Allocation Software Elements** | **Safe State** |
| Software Safety Requirement 02-01 |  |  |  |  |
| Software Safety Requirement 02-02 |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Technical Safety Requirement** | **ASIL** | **Fault Tolerant Time Interval** | **Allocation to Architecture** | **Safe State** |
| Technical  Safety  Requirement  03 | As soon as a failure is detected by the LDW function, it shall deactivate the LDW feature and the LDW\_Torque\_Request shall be set to zero |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Software Safety Requirement** | **ASIL** | **Allocation Software Elements** | **Safe State** |
| Software Safety Requirement03-01 |  |  |  |  |
| Software Safety Requirement03-02 |  |  |  |  |
| Software Safety Requirement03-03 |  |  |  |  |
| Software Safety Requirement03-04 |  |  |  |  |
| Software Safety Requirement03-05 |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Technical Safety Requirement** | **ASIL** | **Fault Tolerant Time Interval** | **Allocation to Architecture** | **Safe State** |
| Technical  Safety  Requirement  04 | As soon as the LDW function deactivates the LDW feature, the LDW Safety software block shall send a signal to the car display ECU to turn on a warning light |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Software Safety Requirement** | **ASIL** | **Allocation Software Elements** | **Safe State** |
| Software Safety Requirement 04-01 |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Technical Safety Requirement** | **ASIL** | **Fault Tolerant Time Interval** | **Allocation to Architecture** | **Safe State** |
| Technical  Safety  Requirement  05 | Memory test shall be conducted at start up of the EPS ECU to check for any faults in memory |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Software Safety Requirement** | **ASIL** | **Allocation Software Elements** | **Safe State** |
| Software Safety Requirement 05-01 |  |  |  |  |
| Software Safety Requirement 05-02 |  |  |  |  |
| Software Safety Requirement 05-03 |  |  |  |  |
| Software Safety Requirement 05-04 |  |  |  |  |

# 

# Refined Architecture Diagram

**[Instructions: Include the refined system architecture. Hint: The refined system architecture should include the system architecture from the end of the software and hardware lesson, including all of the ASIL labels.]**