

Safety Plan Lane Assistance

**Document Version: [Version]**

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



# Document history

**[Instructions: Fill in the date, version and description fields. You can fill out the Editor field with your name if you want to do so. Keep track of your editing as if this were a real world project.**

**For example, if this were your first draft or first submission, you might say version 1.0. If this is a second submission attempt, then you'd add a second line with a new date and version 2.0]**

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Version | Editor | Description |
| 24/12/2018 | 1.0 | Manjunath Gasthi | Initial safety plan |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# Table of Contents

**[Instructions: We have provided a table of contents. If the table of contents is not showing up correctly in your word processor of choice, please update it. The table of contents should show each section of the document and page numbers or links. Most word processors can do this for you. In** [**Google Docs**](https://support.google.com/docs/answer/116338?co=GENIE.Platform%3DDesktop&hl=en)**, you can use headings for each section and then go to Insert > Table of Contents.** [**Microsoft Word**](https://support.microsoft.com/en-us/help/285059/how-to-create-a-table-of-contents-by-marking-text-in-word) **has similar capabilities]**

[Document history](#_1t3h5sf)

[Table of Contents](#_ktt3lgighckp)

[Introduction](#_zakt536q9xt3)

[Purpose of the Safety Plan](#_52ybytyytfvs)

[Scope of the Project](#_sh22j99mm02k)

[Deliverables of the Project](#_fzzlhwsfq6ys)

[Item Definition](#_t6m96u2v69wo)

[Goals and Measures](#_km1cu1hyl182)

[Goals](#_ww7fqc274i9y)

[Measures](#_v2rbrzjrkt9b)

[Safety Culture](#_b23s6orj91gm)

[Safety Lifecycle Tailoring](#_pqn9poe0nvtc)

[Roles](#_xlicd1ijavb7)

[Development Interface Agreement](#_swj0emygbhrm)

[Confirmation Measures](#_lllavvxrxrdy)

# Introduction

## Purpose of the Safety Plan

Safety Plan provides an overall framework for a functional safety "Lane Assistance System". This includes project schedule plan, deliverables, confirmation measures, assign roles and responsibilities.

## Scope of the Project

For the lane assistance project, the following safety lifecycle phases are in scope:

Concept phase

Product Development at the System Level

Product Development at the Software Level

The following phases are out of scope:

Product Development at the Hardware Level

Production and Operation

## Deliverables of the Project

The deliverables of the project are:

Safety Plan

Hazard Analysis and Risk Assessment

Functional Safety Concept

Technical Safety Concept

Software Safety Requirements and Architecture

# Item Definition

This safety plan covers the Lane Assistance System (item) which is an Advanced Driver Assistance System (ADAS). The Lane Assistance System alerts the driver to potentially dangerous situations and takes control over the vehicle to prevent accidents from occurring.

To do this the item has two main functions:

• Lane departure warning

• Lane keeping assistance

The two main function of this item are:

• **Lane departure warning function:** The lane departure warning function shall apply an oscillating steering torque to provide the driver a haptic feedback if the car drifts towards the edge of the ego lane.

• **Lane keeping assistance function:** When the driver drift out toward the edge of the

lane, this functionality will move the steering wheel so that the wheels turn toward the

center of the lane. It should apply steering torque in order to stay in the ego lane.

Both functions will act automatically and additionally to the vibrating steering wheel a warning light shall be displayed on in the car display dashboard.

The item functionalities are implemented by the following subsystem:

• **Camera subsystem** : This subsystem is composed by two components:

- Camera sensor

- Camera sensor ECU (Electronic Control Unit)

• **Electronic Power Steering subsystem:** This subsystem is composed by three components:

- Driver Steering Torque Sensor.

- Electronic Power Steering ECU.

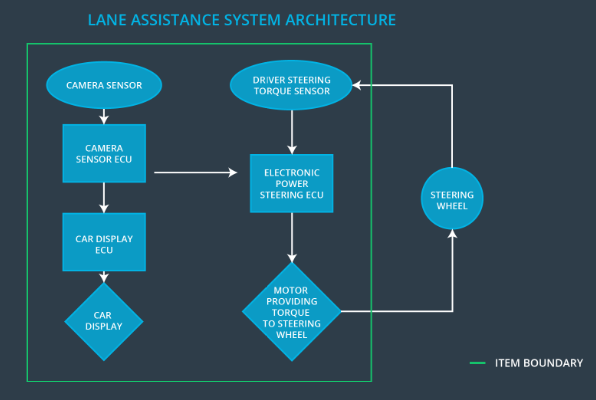
- Motor Proving Torque to Steering Wheel.

• **Car Display subsystem** : This subsystem is composed by two components:

- Car Display ECU

- Car Display

Boundaries include the 3 subsystems which were mentioned previously (Camera system, Electronic Power Steering system, Car Display system) and the Steering Wheel system. Only the Steering Wheel system is outside the Lane Assistance item as per the system architecture attached below.



# Goals and Measures

## Goals

The project goals are:

• Identify risk and hazardous situations in the Line Assistance System components

malfunction causing injuries to a person.

• Evaluate the risk of hazardous situations.

• Low the risk of the malfunctions to reasonable levels acceptable by current society.

## Measures

|  |  |  |
| --- | --- | --- |
| Measures and Activities | Responsibility | Timeline |
| Follow safety processes | All Team  Members | Constantly |
| Create and sustain a safety culture | All Team  Members | Constantly |
| Coordinate and document the planned safety activities | Safety  Manager | Constantly |
| Allocate resources with adequate functional safety competency | Project  Manager | Within 2 weeks of start of project |
| Tailor the safety lifecycle | Safety  Manager | Within 4 weeks of start of project |
| Plan the safety activities of the safety lifecycle | Safety  Manager | Within 4 weeks of start of project |
| Perform regular functional safety audits | Safety Auditor | Once every 2 months |
| Perform functional safety pre-assessment prior to audit by external functional safety assessor | Safety  Manager | 3 months prior to main assessment |
| Perform functional safety assessment | Safety  Assessor | Conclusion of functional safety activities |

# Safety Culture

To increase functional safety our organization provides a safety culture.

This includes the following characteristics:

• High priority: Safety is highest priority

• Well defined processes: Clearly defined management processes and company design

• Accountability: Decisions are documented and traceable

• Diversity: People with different skills and backgrounds work together

• Resources: projects have necessary resources including people with appropriate skills.

• Rewards: the organization motivates and supports the achievement of functional safety.

• Communication: Potential safety problems have to be reported immediately to the

developers for further investigations

# Safety Lifecycle Tailoring

For the lane assistance project, the following safety lifecycle phases are in scope:

* Concept phase
* Product Development at the System Level
* Product Development at the Software Level

The following phases are out of scope:

* Product Development at the Hardware Level
* Production and Operation

# Roles

|  |  |
| --- | --- |
| Role | Org |
| Functional Safety Manager- Item Level | OEM |
| Functional Safety Engineer- Item Level | OEM |
| Project Manager - Item Level | OEM |
| Functional Safety Manager- Component Level | Tier-1 |
| Functional Safety Engineer- Component Level | Tier-1 |
| Functional Safety Auditor | OEM or external |
| Functional Safety Assessor | OEM or external |

# Development Interface Agreement

The Development Interface Agreement (DIA) helps to avoid disputes during planning and

development of the lane assistance system as it defines the above roles and responsibilities

between the involved parties.

Describe the work products that each company will provide & Help avoid disputes between companies. Clarifies who will be responsible for any safety issues in post-production.

The Tier-1 Supplier is accountable for the lane assistance component and not the other parts of

the vehicle. Therefore the Tier-1 Supplier will analyze and modify various sub-systems of the

lane assistance component from a functional safety viewpoint.

The Tier-1 company will act and fix all bugs which apply to the lane assistance system. All other

issues have to be investigated by the OEM.

# Confirmation Measures

The confirmation measures ensures that the processes comply with the functional safety

standard, project execution is following the safety plan and that the design improves functional

safety. Therefore a confirmation review, functional safety audit and functional safety assessment will be executed.

The confirmation review ensures that the project complies to ISO 26262 and will be performed

by a person which is independent from the design team.

The functional safety audit checks that the actual implementation of the projects conforms to the safety plan.

The functional safety assessment confirms that project plans, designs and development actually to achieve functional safety.

A safety plan could have other sections that we are not including here. For example, a safety plan would probably contain a complete project schedule.

There might also be a "Supporting Process Management" section that would cover "Part 8: Supporting Processes" of the ISO 26262 functional safety standard. This would include descriptions of how the company handles requirements management, change management, configuration management, documentation management, and software tool usage and confidence.

Similarly, a confirmation measures section would go into more detail about how each confirmation will be carried out.