



# Safety Plan Lane Assistance

**Document Version: 1.1**

Version 1.1, Released on 2018-05-22



# Document history

Date	Version	Editor	Description
2018-05-18	1.0	Navin Rawther	First Draft
2018-05-22	1.1	Navin Rawther	Updated DIA

## Table of Contents

[Document history](#)

[Table of Contents](#)

[Introduction](#)

[Purpose of the Safety Plan](#)

[Scope of the Project](#)

[Deliverables of the Project](#)

[Item Definition](#)

[Goals and Measures](#)

[Goals](#)

[Measures](#)

[Safety Culture](#)

[Safety Lifecycle Tailoring](#)

[Roles](#)

[Development Interface Agreement](#)

[Confirmation Measures](#)

# Introduction

## Purpose of the Safety Plan

The Safety Plan defines the steps that are to be taken to achieve functional safety. It defines the goals and measures and roles and responsibilities to ensure that important safety design steps are not missed.

## 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

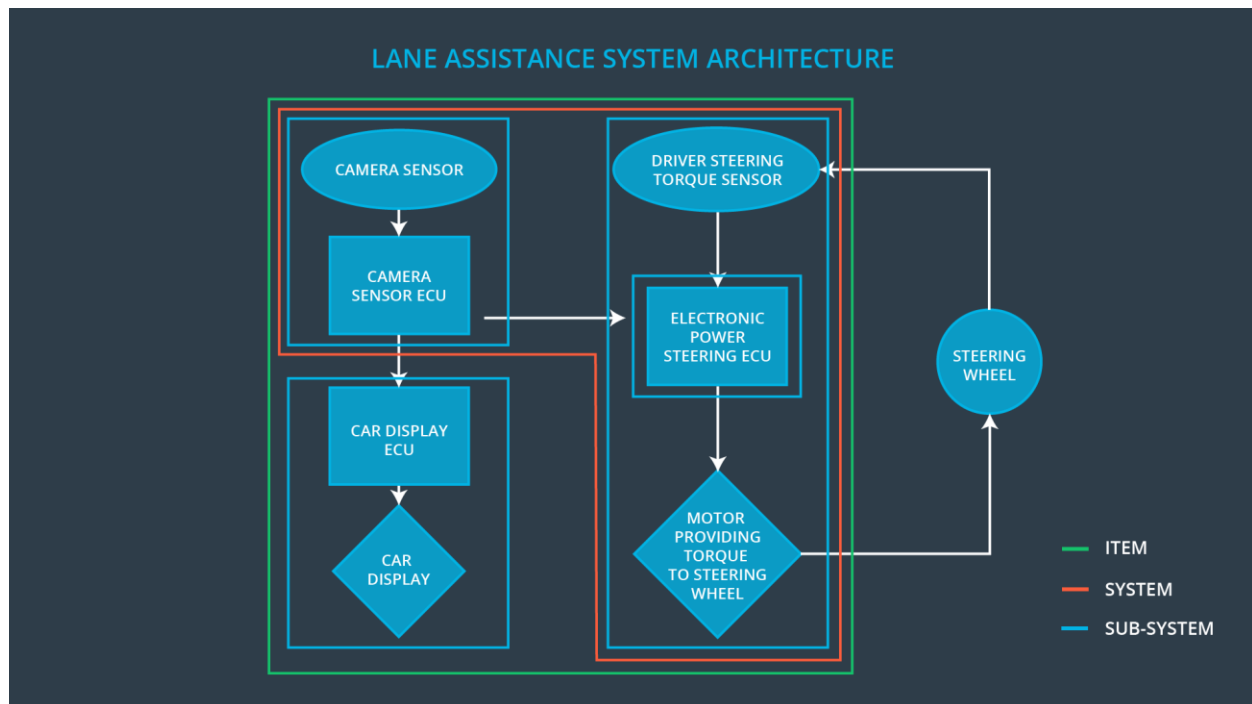
# Item Definition

The item under consideration for this safety plan is the lane assistance system. This system makes sure that the vehicle stays in the current lane unless the driver has turned the indicator lanes on. It provides warning when vehicle is moving out of the lane and assists to bring the vehicle back to the center of the lane.

The Lane Assistance system has two functions:

1. Lane Departure Warning – will vibrate the steering wheel when the car drifts towards the edge of the lane. The lane departure warning function shall apply an oscillating steering torque to provide the driver a haptic feedback.
2. Lane keeping assistance – will move the steering wheel so that the wheels turn towards the center of the lane when car drifts away from the center of the lane. The lane keeping assistance function shall apply the steering torque when active in order to stay in ego lane.

The camera subsystem, the car display subsystem and the steering subsystem are responsible for each of these functions. The camera subsystem identifies the lane lines and warns when the car drifts away from the center of the lane. The car display subsystem shows the warning when this happens. The steering subsystem provides haptic feedback and turns such that the wheels turn towards the center of the lane when this happens.



The above image shows the lane assistance item and its systems and subsystems. The main system of the item contains the camera subsystem and the steering subsystem with a display subsystem outside of the system. The steering wheel lies outside the item.

## Goals and Measures

### Goals

The Goal of this Safety Plan is to reduce risks to reasonable levels by identifying hazards that could lead to accidents, evaluating the risks associated with each hazard and using systems engineering to lower risks to acceptable levels.

### 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

Safety is the highest priority for our company among other constraints such as cost and productivity. We have incorporated the following to ensure this:

- **Accountability** in processes such that design decisions are traceable back to the people and teams who made the decisions
- **Rewards** that motivates and supports the achievement of functional safety
- **Penalties** that penalizes shortcuts that jeopardize safety or quality
- **Independence** between teams who design and develop a product and the teams who audit the work
- **Well defined processes** for design and management
- **Resources** in projects by including people with appropriate skills
- **Diversity** integrated into processes as they are highly valued
- **Communication** channels to encourage disclosure of problems

## 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) defines the roles and responsibilities between the OEM and the Tier-1 company involved in developing the lane assistance system.

The OEM is responsible for providing a functional lane assistance system. The Functional Safety Manager and Engineer in the OEM will be responsible for providing the same. The Tier-1 company is responsible for analyzing and modifying the sub-systems of the lane assistance system from a functional safety viewpoint. The Tier-1 company will be responsible for finding and fixing the safety problems in the lane assistance system. The Safety Manager in the Tier-1 company will ensure all safety practices are followed. The Safety Engineer in the Tier-1 company will be responsible for each activity in the design and production. An external Functional Safety Auditor and Functional Safety Assessor will be appointed by the OEM to assess and audit the work done by Tier-1.

## Confirmation Measures

The confirmation measures ensure:

- that the functional safety project conforms to ISO 26262, and
- that the project does make the vehicle safer.

The confirmation review ensures that the project complies with ISO 26262. As the product is designed and developed, an independent person would review the work to make sure ISO 26262 is being followed.

The functional safety audit checks to make sure that the actual implementation of the project conforms to the safety plan.

The functional safety assessment is the process of confirming that plans, designs and developed products actually achieve functional safety.

---