



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
17/05/2018	1.0	Hitesh	Initial Attempt

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, you can use headings for each section and then go to Insert > Table of Contents. Microsoft Word has similar capabilities]

[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

This document is a framework for the functional safety plan for Lane Assistance System. This defines the steps needed to be taken to ensure a functionally safe system (viz. Lane Assistance system) and it also allocates roles and responsibilities to the relevant personnel.

Scope of the Project

[Instructions: Nothing to do here. This is for your information.]

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

[Instructions: Nothing to do here. This is for your information.]

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 in question here is Lane Assistance System. It performs two major tasks

- Keep vehicle in center of the lane.
- Warn the driver if he drifts towards the edge of lanes without the intent of switching lanes (without the indicator turned on).

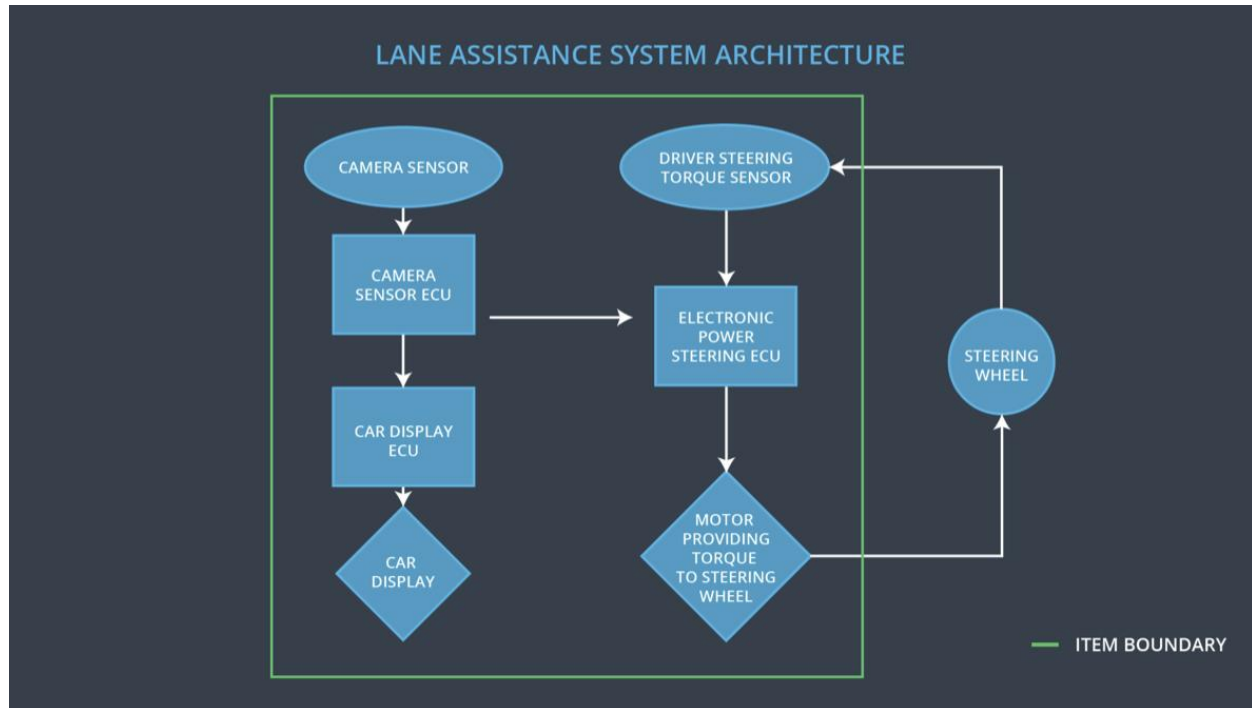


Fig 1: Lane Assistance System

The two major functions performed by the lane assistance system are

- Lane Departure warning: This system warns the driver whenever he steers off the lane. The detection is done by the lane detection subsystem which comprises of camera and image processing modules. On actuation the driver is warned by visual, audible or vibration warnings. Though the most common warning is vibration of steering wheel.
- Lane Keeping Assistance: This helps in keeping the vehicle in center of the lane. So if a car is not in the center of the lane, this functionality moves the steering wheel to bring the vehicle back to the center of the lane.

The following subsystems are responsible for the working of each functions.

- Camera Subsystem

- Car Display subsystem
- Electronic Power Steering subsystem

The item boundary of this subsystem includes the camera subsystem, Car Display Subsystem and the Electronic Power Steering Subsystem. The Steering wheel lies outside the boundary box (Fig 1).

Goals and Measures

Goals

The major goal here is to conform to ISO 26262 Standards and ensure the safe and reliable working of the lane assistance system. We have to identify the potential hazards and assimilate the risks and devise plans to mitigate risks.

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	All Team Members	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

Here are some characteristics of a good safety culture of an organization:

- **High priority:** safety has the highest priority among competing constraints like cost and productivity
- **Accountability:** processes ensure accountability such that design decisions are traceable back to the people and teams who made the decisions
- **Rewards:** the organization motivates and supports the achievement of functional safety
- **Penalties:** the organization penalizes shortcuts that jeopardize safety or quality
- **Independence:** teams who design and develop a product should be independent from the teams who audit the work
- **Well defined processes:** company design and management processes should be clearly defined
- **Resources:** projects have necessary resources including people with appropriate skills
- **Diversity:** intellectual diversity is sought after, valued and integrated into processes
- **Communication:** communication channels 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

[Instructions:

Assume in this project that you work for the tier-1 organization as described in the above roles table. You are taking on the role of both the functional safety manager and functional safety engineer.

Please answer the following questions:

1. What is the purpose of a development interface agreement?

The Development Interface agreement is the single most important document in a functional safety program, it sets forth the expectations from each party. It is a Mutually agreed agreement. Here the parties in question are the OEM, Tier 1 Suppliers and the Tier 2 Suppliers. This is an agreement between either the OEM and Tier 1 Suppliers or Tier 1 Suppliers and Tier 2 Suppliers.

2. What will be the responsibilities of your company versus the responsibilities of the OEM? Hint: In this project, the OEM is supplying a functioning lane assistance system. Your company needs to analyze and modify the various sub-systems from a functional safety viewpoint.

The OEM is our customer, it provides the requirements and design of a lane assistance system, we develop the system in conjugation the system with our

suppliers. We test and modify the system to ensure that the final system conforms to the functional safety guidelines.

Conformation Measures

[Instructions:

Please answer the following questions:

1. What is the main purpose of conformation measures?

The main purpose of conformation measures is to comply with the functional safety standard viz. ISO 26262 standards.

2. What is a conformation review?

The conformation review ensures the compliance with the ISO 26262 standards.

3. What is a functional safety audit?

Functional safety audit is to ensure that there is tangible improvement in the safety of passengers in the vehicle after the implementation of the system and to ensure that the system conforms to the safety plans.

4. What is a functional safety assessment?

The Functional safety assessment is done to establish whether the system conforms to plans, designs and developed products actually achieve functional safety.

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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.