



Elektrobit



UDACITY

Safety Plan Lane Assistance

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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
Apr. 29, 19	1.0	Norihito Tohge	First 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]

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Introduction

Purpose of the Safety Plan

[Instructions: Answer what is the purpose of a safety plan?]

The purpose of the Safety Plan is to define roles and outline steps to achieve functional safety of Lane Assistance system.

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

[Instructions:

REQUIRED

Discuss these key points about the system:

What is the item in question, and what does the item do?

What are its two main functions? How do they work?

Which subsystems are responsible for each function?

What are the boundaries of the item? What subsystems are inside the item? What elements or subsystems are outside of the item?

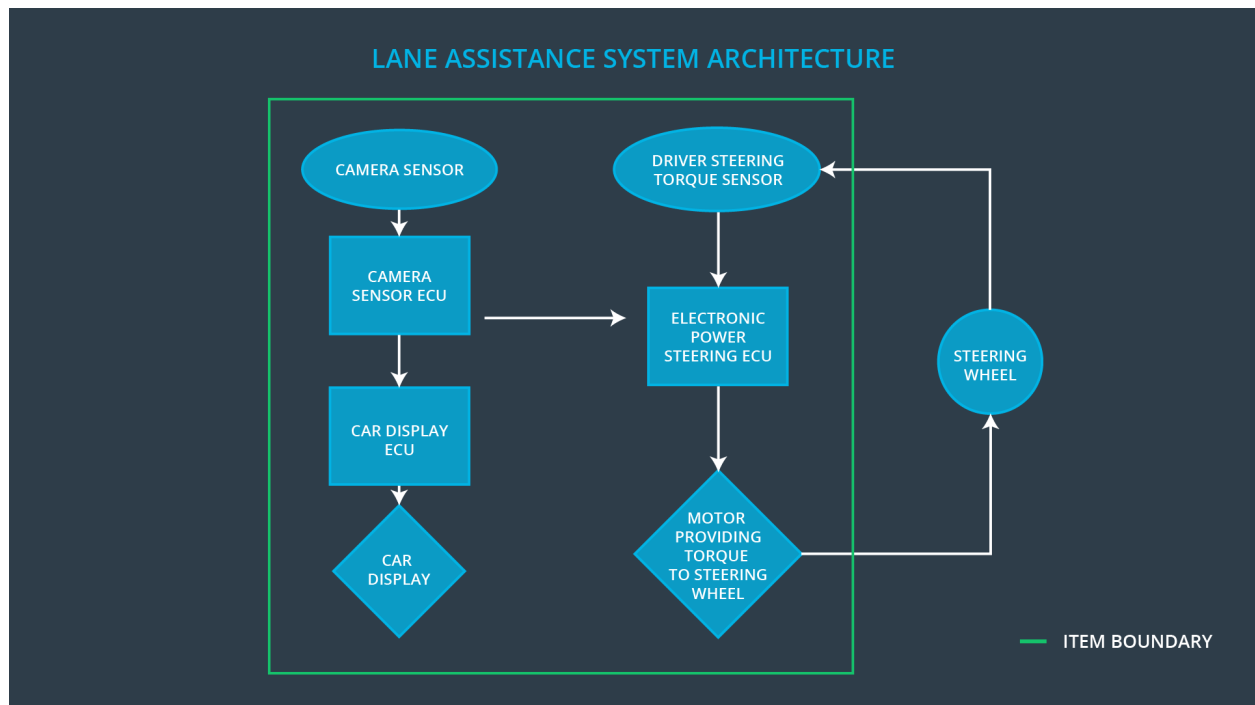
In this document, we will cover the Lane Assistance system which is consisted of two functions, the Lane Departure Warning Function which gives alert to the driver when the vehicle is going out of the lane and the Lane Keeping Assistance Function which automatically moves the steering wheel to keep the vehicle at the center of the lane.

The system is consisted of three subsystems, Camera system, Electronic Power Steering system and Car Display system.

For the Lane Departure Warning Function, Camera subsystem is responsible for detecting lane lines and determining when the vehicle leaves the lane by mistake. Electronic Power Steering subsystem is responsible for giving the haptic feedback to the driver by vibrating the steering wheel. Car Display subsystem is responsible for giving a warning to the driver by showing a warning.

For the Lane Keeping Assistance Function, Camera subsystem is responsible for detecting lane lines and measuring the deviation from the center of the lane. Electronic Power Steering subsystem is responsible for measuring the torque provided by the driver and then adding an appropriate amount of torque based on a Lane Assistance system torque request. Car Display subsystem is responsible for showing the status.

The system architecture is described as below.



Camera subsystem is consisted of camera sensor and camera sensor ECU. Electronic Power Steering subsystem is consisted of driver steering torque sensor, electronic power steering ECU. Car Display subsystem is consisted of Car Display ECU and Car Display.

OPTIONAL

Optionally, include information about these points as well. These were not included in the lectures, but you might be able to find this information online:

- Operational and Environmental Constraints. This could especially be limited to camera performance; lane lines are difficult to detect in snow, fog, etc
- Legal requirements in your country for lane assistance technology
- National and International Standards Related to the Item
- Records of previously known safety-related incidents or behavioral shortfalls

Goals and Measures

Goals

[Instructions:

Describe the major goal of this project; what are we trying to accomplish by analyzing the lane assistance functions with ISO 26262?]

The goal of this project is to achieve functional safety of Lane Assistance system. To ensure that, these documents helps methodically planning and execution the project.

Measures

[Instructions:

Fill in who will be responsible for each measure or activity. Hint: The lesson on Safety Management Roles and Responsibilities.

The options are:

All Team Members

Safety Manager

Project Manager

Safety Auditor

Safety Assessor

]

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 Assesor	Conclusion of functional safety activities

Safety Culture

[Instructions:

Describe the characteristics of your company's safety culture. How do these characteristics help maintain your safety culture. Hint: See the lesson about Safety Culture

]

Safety should always be first prioritized. Design decisions should be well documented and always be traceable back to the people who made those decisions. The company should reward achieving safe systems and penalize taking shortcuts.

Safety Lifecycle Tailoring

[Instructions:

Describe which phases of the safety lifecycle are in scope and which are out of scope for this particular project. Hint: See the [Intro section](#) of this document

]

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

[Instructions:

This section is here for your reference. You do not need to do anything here. It is provided to help with filling out the development interface agreement section.

]

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?
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.

]

A DIA defines the roles and responsibilities between companies involved in developing a product.

In this project, the tier-1 is responsible for functional safety in each subsystems and the OEM is responsible for functional safety in system level.

Confirmation Measures

[Instructions:

Please answer the following questions:

1. What is the main purpose of confirmation measures?
2. What is a confirmation review?
3. What is a functional safety audit?
4. What is a functional safety assessment?

]

The purpose of Confirmation Measures is to ensure that this functional safety project conforms to ISO 26262 and the project makes the vehicle safer.

By executing Confirmation Review, the independent review team will review the project while design and development to ensure the project complies with ISO 26262.

Functional Safety Audit will finally make sure that the actual implementation of the project conforms to the safety plan.

Functional Safety Assessment confirms the plans, designs and developed products actually 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.