



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
Mar. 24, 18	0.1	L. Chen	Initial version

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[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?]

This safety plan provides an overall framework for the Lane Assistance item. It defines roles and responsibilities for the functional safety of the item.

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?

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

]

The Lane Assistance item should help driver to keep current lane and has following two main functions:

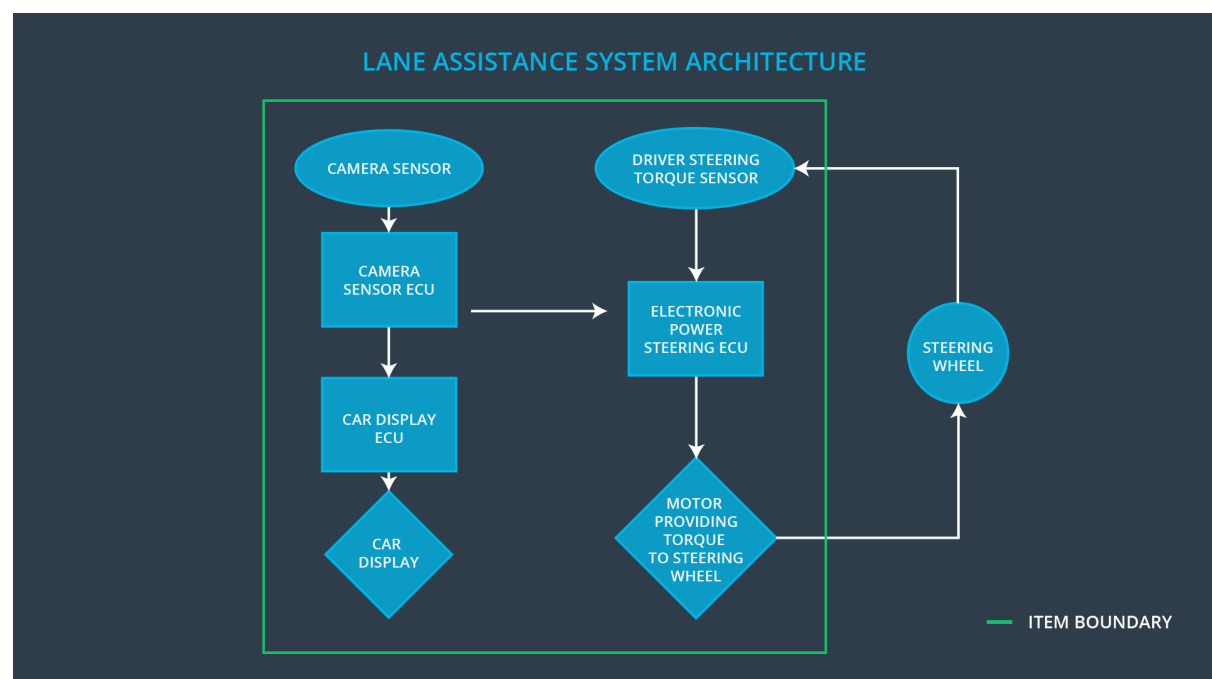
- Lane departure warning
- Lane keeping assistance

When the driver drifts towards edge of the lane, following two functions will be activated:

- Lane departure warning function will vibrate the steering wheel to warn the driver
- Lane keeping assistance function will move the steering wheel so that the car turn towards the center of the lane

The lane departure warning function shall apply an oscillating steering torque to provide the driver a haptic feedback.

the lane keeping assistance function shall apply the steering torque when active in order to stay in ego lane.



As shown in the figure, the Lane Assistance has three subsystems:

- Camera system, which is responsible for detecting lane and determining when the vehicle leaves the ego lane.
- Electric Power Steering system, which is responsible for measuring driver steering torque and adding an appropriate amount of torque requested by the lane keeping assistance function and applying an oscillating steering torque requested by the lane departure warning.
- Car Display system, which is responsible for showing current status of the lane assistance item.

As also shown in the figure, the steering wheel is not a part of the item.

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?]

By analyzing the lane assistance function with ISO 26262, we hope to reduce risks caused by electronic and electrical malfunctions that could harm people's health.

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 Assessor	Conclusion of functional safety activities
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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

]

Following characteristics describe our company's safety culture:

- High priority: safety has the highest priority among other constraints like cost or productivity.
- Accountability: our processes ensure accountability so that design decisions are traceable back to the people and teams who made the decisions.
- Rewards: our company motivates and supports the achievement of functional safety.
- Penalties: our company penalizes shortcuts that jeopardize safety or quality.
- Independence: teams who design and develop a product are teams who audit the work
- Well defined process: design and management processes are 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

[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

]

For this project, following phases of the safety lifecycle 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.

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The development interface agreement (DIA) defines roles and responsibilities between companies involved in developing a product. Our company will be responsible for the functional safety of the components such as camera system or electric power steering system. OEM is responsible of the functional safety on item level and derive functional safety requirements for the components.

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?

]

Confirmation measures ensure that the functional safety project confirms to ISO 26262 (confirmation review) and that the project really does make the vehicle safer.

A functional safety audit makes sure that the actual implementation of the project confirms to safety plan.

A functional safety assessment confirms that 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.