Elektrobit

UDACITY

Safety Plan Lane Assistance

Document Version: [Version]

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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
04/17/2019	1.0	Chuan Yu	First draft
05/05/2019	2.0	Chuan Yu	Second submission

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]

Introduction

Purpose of the Safety Plan

[Instructions: Answer what is the purpose of a safety plan?]
The purpose of a safety plan is to provide an overall framework for a functional safety project. It serves as a guide to what will be done to achieve functional safety, defines responsibilities between the players involved in the project, and ensures that everybody knows what to do and that somebody is covering every task.

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?

The item in question is the lane assistance system. Lane assistance system is helping driver to maintain driving on intended lane.

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

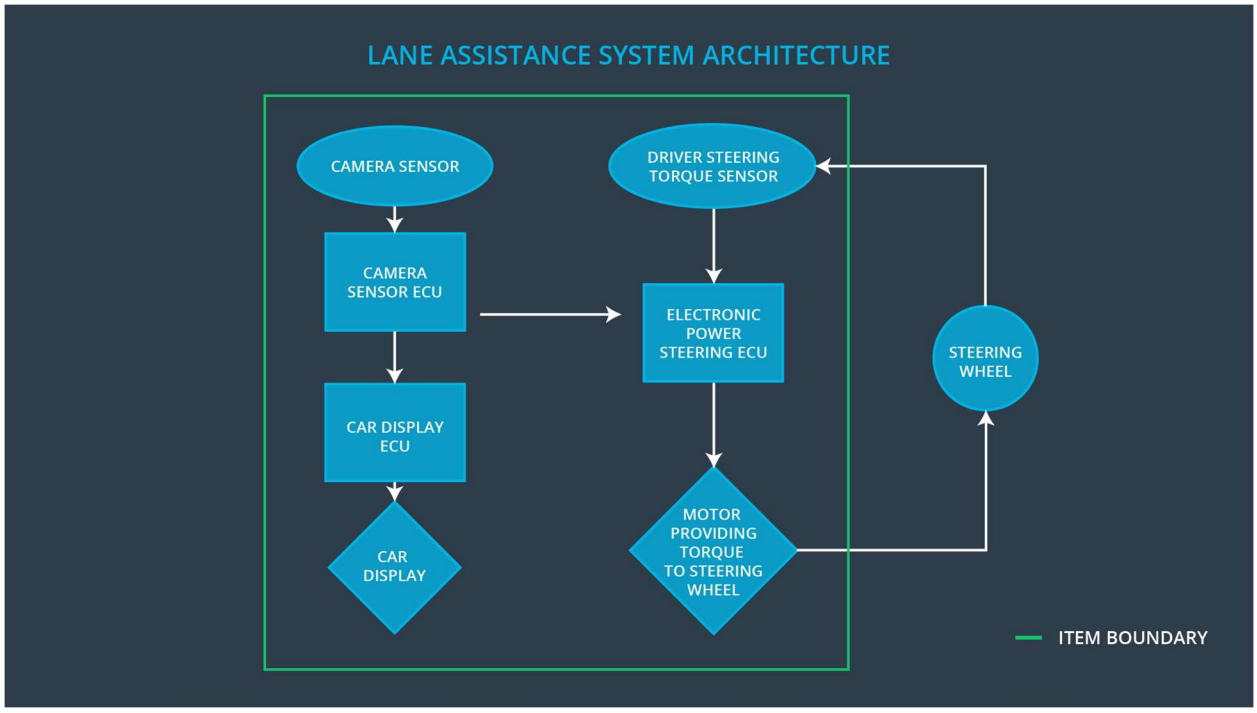
The lane assistance system contains two main functions: lane departure warning and lane keeping assistance. The lane departure warning function will vibrate the steering wheel to warn the driver when the vehicle drifts towards the edge of the lane. The lane keeping assistance function will move the steering wheel so that the wheels turn towards the center of the lane.

Which subsystems are responsible for each function?

Camera system, electronic power steering system, and car display system are responsible for lane departure warning function and lane keeping assistance function.

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

The boundary of lane assistance system is shown below:



The subsystems inside lane assistance system are:

- **Camera system**
- **Electronic Power Steering system**
- **Car Display system**

Steering wheel system is outside of the boundary.

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

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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 define safety requirements specifying what the lane assistance functions need to do in order to avoid hazardous situations.

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

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
]

Here are the characteristics of my company's safety culture and how these characteristics help to maintain our safety culture:

1. **High priority**: safety has the highest priority among competing constraints like cost and productivity
2. **Accountability**: processes ensure accountability such that design decisions are traceable back to the people and teams who made the decisions
3. **Rewards**: the organization motivates and supports the achievement of functional safety
4. **Penalties**: the organization penalizes shortcuts that jeopardize safety or quality
5. **Independence**: teams who design and develop a product should be independent from the teams who audit the work
6. **Well defined processes**: company design and management processes should be clearly defined
7. **Resources**: projects have necessary resources including people with appropriate skills
8. **Diversity**: intellectual diversity is sought after, valued and integrated into processes
9. **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 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

[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.**

]

The purpose of a development interface agreement contains 3 parts:

- Avoid disputes during the planning and development of a product
- If a vehicle has a safety issue after being sold to consumers, a Development Interface Agreement provides clarity about which company is best positioned to fix the system

In this project, our company as Tier 1 supplier has the responsibilities to analyze and modify the various sub-systems from a functional safety viewpoint. OEM has the responsibilities to supply a functioning lane assistance system.

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 main purpose of confirmation measures is to confirm that a functional safety project conforms to ISO 26262 and the project really does make the vehicle safer.

A confirmation review means an independent person would review the work to make sure ISO 26262 is being followed.

Checking to make sure that the actual implementation of the project conforms to the safety plan is called a functional safety audit.

Confirming that plans, designs and developed products actually achieve functional safety is called a functional safety assessment.

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.