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
3/29/2018	1.0	Hsin-Wen Chang	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?]

We the purpose of this safety plane is to provide an overall framework for the lane assistance item, and assign roles and responsibilities for Functional safety for this 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 alerts the driver that the vehicles have accidentally departed its lane, and attempt to steer the vehicles back toward the center of the lane.

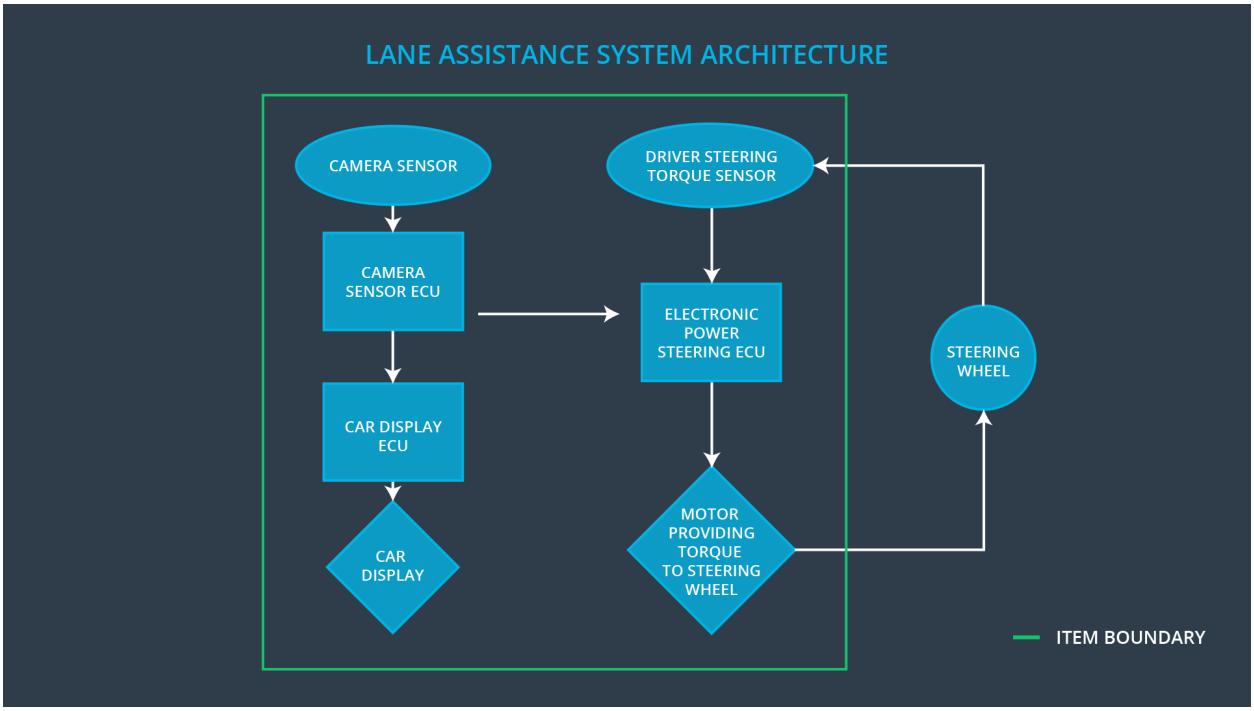
The Lane Assistance System will have two functions:

1. Lane departure warning
2. Lane keeping assistance

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

The Camera subsystem, Electronic Power Steering system and Car Display System are all each responsible for each of the functions.



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?]

ISO 26262 is based on systems engineering principles, defining requirements comes up repeatedly in the standard. ISO 26262 only covers electronic and electrical malfunctions in passenger vehicle systems. The standard provides a framework for reducing risks that could harm people's health. The standard does not cover safety of mechanical, chemical or hydraulic systems. The standard would require preventing malfunctions like if the automatic brakes engaged when there was no emergency.

The ISO 26262 functional safety standard follows the V model. In functional safety these are the four main steps involved in functional safety according to the standard:

- **Requirements engineering** Define what the system is going to do
- **Designing or modifying a system architecture** Design what the system will look like
- **Test the system** to make sure it behaves as expected
- **Integrate the system** into larger systems

Please note that requirements engineering activities are performed at all levels on left side of the V and are described in ISO 26262-8. A safety goal is a type of engineering requirement specifically for vehicle functional safety; for example, "The electronic parking brake system shall always be engaged when the vehicle is in park on a gradient that is greater than 10 degrees". Note that HARA is subjective and different groups may define values differently based on their view of severity, occurrence, and exposure. This may result from geographical or cultural factors. For example in countries where the vast majority of automobile use is in well lit, urban, area, with low speed limits, headlights may not be considered safety critical.

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		Constantly
Coordinate and document the planned safety activities		Constantly
Allocate resources with adequate functional safety competency		Within 2 weeks of start of project
Tailor the safety lifecycle		Within 4 weeks of start of project
Plan the safety activities of the safety lifecycle		Within 4 weeks of start of project
Perform regular functional safety audits		Once every 2 months
Perform functional safety pre-assessment prior to audit by external functional safety assessor		3 months prior to main assessment
Perform functional safety assessment		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 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
]

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.

]

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?**

]

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.