Elektrobit

UDACITY

Safety Plan Lane Assistance

Document Version: [001]

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
01/18/2019	1.0	Vern Francisco	Homework for SDC NanoDegree

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]

Development Interface Agreement

Confirmation Measures

Introduction

Purpose of the Safety Plan

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

The Safety Plan defines roles and outlines the steps needed to achieve functional safety

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 is a Lane Assistance System. In Adavanced Driver Assistance Systems (ADAS), the system will alert the driver to potentially dangerous situations and take over the vehicle to prevent accidents from occuring. The Lane Assistance System is a simplified ADAS system

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

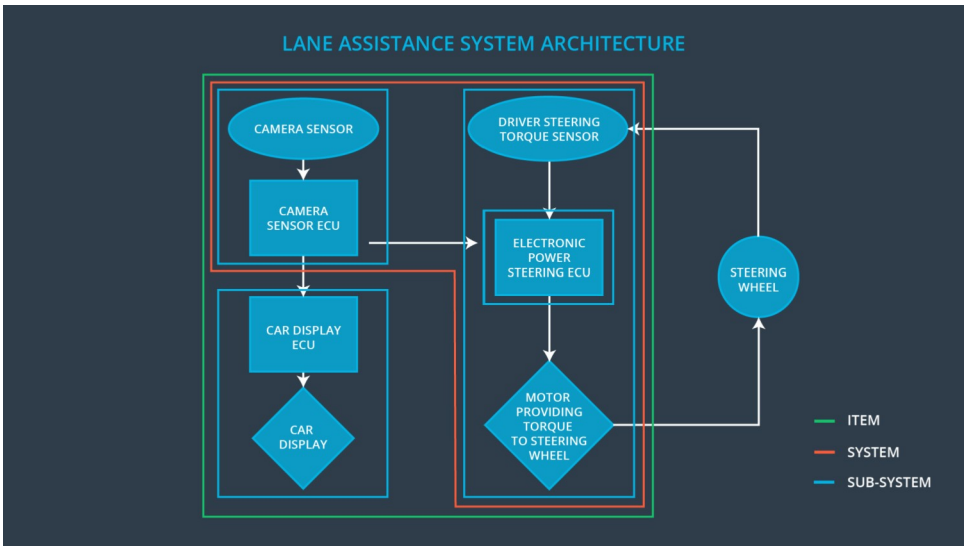
The Lane Assistance System will have two functions:

1. **Lane departure warning**
2. **Lane keeping assistance**

When the driver drifts towards the edge of the lane, two things will happen:

- the **lane departure warning function** will vibrate the steering wheel
- 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?



To summarize the functionality, the camera system detects lane departures and tells the steering wheel how hard to turn. The driver receives a warning on the vehicle display and also receives a warning via a steering wheel vibrating. Simultaneously, the wheel adds extra steering torque to help the driver move back towards the center of the lane.

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

In this case, the item is the lane assistance system

The three sub-systems are:

- Camera system

    - A Camera ECU
    - A Camera Sensor
- Electronic Power Steering system
    - The electronic power steering ECU
    - The steering motor
- Car Display system
    - Warning lights
    - Car Display ECU

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 main goal in analyzing the lane assistance functions with ISO 26262 is to reduce risk of lane assistance functions to acceptable levels

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
]

The characteristics of the company's safety culture are the following:
High priority- The company puts safety as its highest priority over controlling cost and increased productivity
Accountability-The processes in place ensure accountability and decisions can be traced back to the people and teams taht made the decisions
Rewards-The organization rewards the achievement of functional safety
Penalties-The organization penalizes shortcuts that jeopardize safety or quality
Independence-Teams who design and develop are independent from the teams who audit the work
Well defined processes-Company design and management processes are clearly defined
Resources-Projects have necessary resources as well as people with appropriate skills
Diversity-Intellectual diversity is sought after, valued and integrated into company processes
Communication-The company encourages disclosure of problems through its communications channels

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
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- 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.

Safety Manager

- **Planning**, **coordinating** and **documenting** of the development phase of the safety lifecycle
- **Tailors** the safety lifecycle
- Maintains the safety plan
- Monitors progress against the safety plan
- Performs pre-audits before the safety auditor

Safety Engineer

- Product development
- Integration
- Testing at the hardware, software and system levels

Please answer the following questions:

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

The purpose of a development interface agreement is to define the roles and responsibilities between companies involved in developing a product

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.**
    - Appointment of customer and supplier safety managers
    - Joint tailoring of the safety lifecycle
    - Activities and processes to be performed by the customer; activities and processes to be performed by the supplier
        - Customer: **Supply a functioning lane assistance system**
        - Supplier: **Analyze and modify the various sub-systems from a functional safety viewpoint**
    - Information and work products to be exchanged
    - Parties or persons responsible for each activity in design and production
    - Any supporting processes or tools to ensure compatibility between customer and supplier technologies

Confirmation Measures

[Instructions:
Please answer the following questions:

1. What is the main purpose of confirmation measures?
- Ensure processes comply with the functional safety standard
- Ensure project execution is following the safety plan
- Ensure that the project really does make the vehicle more safe
2. What is a confirmation review?
- An independent person ensures that the project complies with ISO 26262.
3. What is a functional safety audit?
- Checks to make sure that the actual implementation of the project conforms to the safety plan
4. What is 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.