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
23/12/2018	V1.0	Xu YP	Safety plan initial version

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

Before analyzing a system under ISO 26262, we need to create a plan.The safety plan forces us to define roles then outline the steps we will take to achieve the functional safety of a lane assistance system.

Scope of the Project

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

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

The lane assistance item alerts the drivers that the vehicle has accidentally departed its lane, and attempts to steer the vehicle back towards the center of the lane.

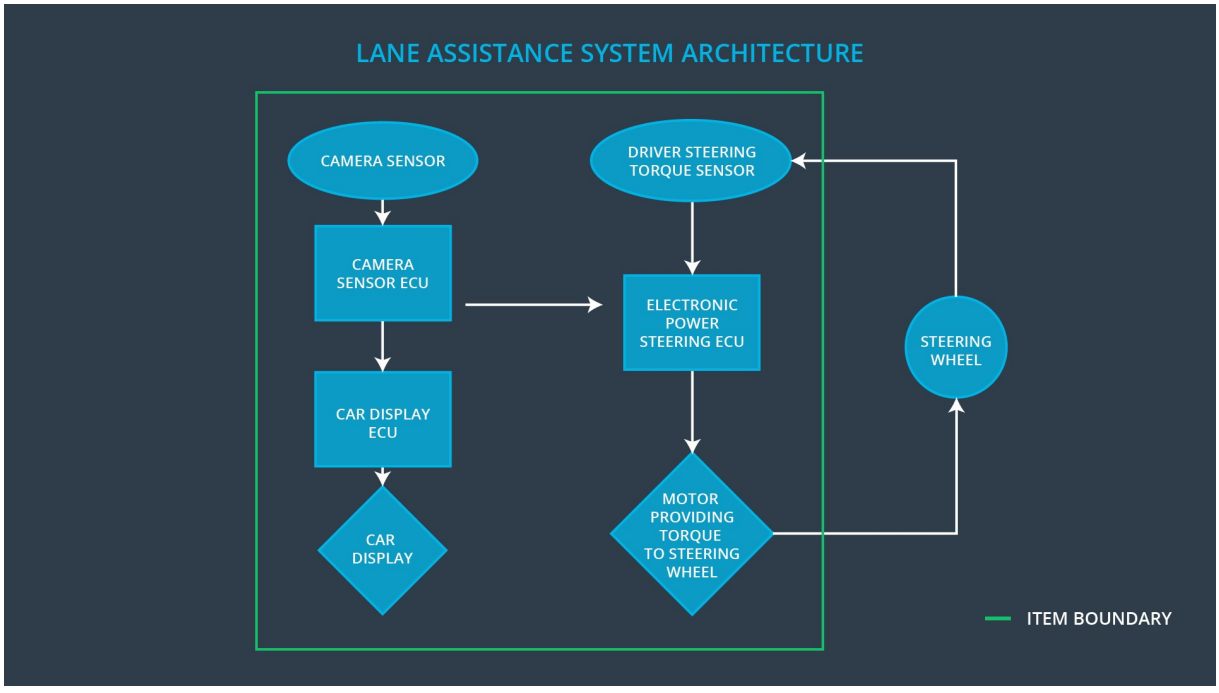
A lane assistance system generally has two functions:

lane departure warning:If a driver departs a lane without using a turn signal, the system assumes that the driver has become distracted and did not mean to leave the lane then alert the driver.

lane keeping assistance:The system will vibrate the steering and also move the steering wheel back towards the lane center.

The boundaries of the item includes three sub-systems which are all responsible for each function:

Camera system
Electronic Power Steering subsystem (EPS)
Car Display subsystem



Goals and Measures

Goals

The goals of this functional safety project are:

Identifying Hazards:Identifying potential problems that could injure people or damage people's health.

Measuring Risk: Evaluating the risks of these hazards.

Low risk to reasonable levels:Using systerms engineering to lower risks to acceptable levels.

Measures

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

Here are some characteristics of a good safety culture:

- **High priority**: safety has the highest priority among competing constraints like cost and productivity
- **Accountability**: processes ensure accountability such that design decisions are traceable back to the people and teams who made the decisions
- **Rewards**: the organization motivates and supports the achievement of functional safety
- **Penalties**: the organization penalizes shortcuts that jeopardize safety or quality
- **Independence**: teams who design and develop a product should be independent from the teams who audit the work
- **Well defined processes**: company design and management processes should be 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

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

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

A DIA (development interface agreement) defines the roles and responsibilities between companies involved in developing a product. All involved parties need to agree on the contents of the DIA before the project begins.

The DIA also specifies what evidence and work products each party will provide to prove that work was done according to the agreement.

As the tier-1 organization of OEM, we would need the following:

1. Appointment of customer and supplier safety managers
2. Joint tailoring of the safety lifecycle
3. Activities and processes to be performed by the customer; activities and processes to be performed by the supplier
4. Information and work products to be exchanged
5. Parties or persons responsible for each activity in design and production
6. Any supporting processes or tools to ensure compatibility between customer and supplier technologies

Confirmation Measures

Confirmation measures serve two purposes:

- that a functional safety project conforms to ISO 26262
- that the project really does make the vehicle safer.

Confirmation review:

Ensures that the project complies with ISO 26262. As the product is designed and developed, an independent person would review the work to make sure ISO 26262 is being followed.

Functional safety audit:

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

Functional safety assessment:

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.