Elektrobit

UDACITY

Safety Plan Lane Assistance

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Document history

Date	Version	Editor	Description
27.02.2018	1.0	Qingqing Xia	It's a first version of this document.

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Introduction

Purpose of the Safety Plan

It defines roles and responsibilities, as well as outline the steps it will take to achieve the functional safety.

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 item is a simplified version of lane assistance system. It uses camera images as input and consists two functions:

- **Lane departure warning**: The steering wheel vibrates to warn the driver, when the car drifts out toward the edge of the lane.
- **Lane keeping assistance**: When the car drifts out toward the edge of the lane, it will move the steering wheel so that the wheels turn toward back to the center of the lane. It applies steering torque to stay in the lane where the car is.

It includes three sub-systems:
- Camera system
- Electronic Power Steering system
- Car Display system

Goals and Measures

Goals

This project goals are:

- Identify risk and hazardous situations in the Line Assistance system components malfunction causing injuries to a person.
- Evaluate the risks of the hazardous situations.
- Low the risk of the malfunctions to a reasonable level acceptable by current sociality.

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	Project 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

To achieve a good safety culture following aspects are critical:

- **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.

The ultimate goal is to ensure that all parties are developing safe vehicles in compliance with ISO 26262.

1. **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.**

OEM should make a safety plan for the lane assistance system and gives requirement to my company. Based on those requirements my company should have a safety plan for the sub-systems.

Confirmation Measures

1. **What is the main purpose of confirmation measures?**

   Confirmation measures serve two purposes:

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

2. **What is a confirmation review?**

   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.

3. **What is a 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.

4. **What is a functional safety assessment?**

   Confirming that plans, designs and developed products 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.