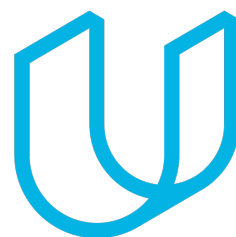




Elektrobit



UDACITY

Safety Plan Lane Assistance

Document Version: **1.1**
Version 1.1, Released on 2018-06-23



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
6/23/2017	V1.1	Aaron Li	First 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]

[Document history](#)

[Table of Contents](#)

[Introduction](#)

[Purpose of the Safety Plan](#)

[Scope of the Project](#)

[Deliverables of the Project](#)

[Item Definition](#)

[Goals and Measures](#)

[Goals](#)

[Measures](#)

[Safety Culture](#)

Safety Lifecycle Tailoring

Roles

Development Interface Agreement

Confirmation Measures

Introduction

Purpose of the Safety Plan

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

A safety plan provides an overall framework for a functional safety project.

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

|

Lane assistance technology is relatively new in the automotive world. A lane assistance system generally has two functions, lane departure warning and lane keeping assistance.

- 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. The system will vibrate the steering (lane departure warning) and also move the steering wheel back towards the lane center (lane keeping assistance).
- Lane keeping assistance— It is an intermediate step on the way to fully autonomous driving, by helping the driver to keep into his lane.

This safety plan does not cover non-functional regimes, for example, under what circumstance should the driver keep in the current lane.

Goals and Measures: discuss the goals of the project and what activities will be included.

Safety LifeCycle Tailoring: mentions which parts of the V model will be included in the project.

Resources Required In Project: defines the different roles on the team.

Supporting Process Management: talks about the systems engineering management methods to be used.

Project Schedule Plan: gives a calendar of when tasks will be completed.

Confirmation Measures: reports what will be done to prove that functional safety has been achieved.

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 is to reduce risk 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

]

A good safety culture includes, but not limits to:

- **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

[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.

|

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.

Here are major sections of a DIA:

- Appointment of customer manager (OEM side: LeBron James) and supplier safety manager (vendor side: Kevin Durant)
- Joint tailoring of the safety lifecycle
- Activities and processes to be performed by the customer (provide requirements); activities and processes to be performed by the 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
- OEM responsibility: provide requirements of the parts provided by tier-1, review and sign off the parts after release/ delivery.
- Tier-1 responsibility: analyze and modify the various sub-systems from a functional safety viewpoint, follow the requirement provided by OEM.

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?

|

Confirmation Measures Purpose

Confirmation measures serve two purposes:

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

Confirmation Measures Definitions

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.