



# Safety Plan Lane Assistance

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# Document history

Date	Version	Editor	Description
20/06/2018	1.0	Sameer Negi	Initial Version of Safety Plan

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# Introduction

## Purpose of the Safety Plan

A safety plan is a document that enumerates the safety culture of an organization, the safety lifecycle, safety management roles and responsibilities, development interface agreements and confirmation measures

## 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

Discuss these key points about the system:

What is the item in question, and what does the item do?

The item in question is Lane Assistant

- It should alert the driver when car departure lane.
- Also it should move the steering wheel to turn towards the lane center

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

The two main function of this item are: \

- **Lane departure warning function:** When the driver drift out toward the edge of the lane, the steering wheel vibrates to warn the driver. The vehicle will move the steering wheel back and forward to create vibration.
- **Lane keeping assistance function:** When the driver drift out toward the edge of the lane, this functionality will move the steering wheel so that the wheels turn toward the center of the lane. It should apply steering torque in order to stay in the ego lane (this is the lane where the car is.)

Which subsystems are responsible for each function?

Sub-systems are

- **Camera system**
  - o Responsible of defining lanes.
  - o After defining lanes it will report the car position with respect to the lanes
- **Electronic Power Steering system**
  - o Responsible of keeping the car centered in a lane.
  - o Will steer to lane center whenever the car departure the lane enter
- **Car Display system**
  - o Alert Driver with changes in car position.
  - o Alert Driver with current steering state/angle.

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

The item boundary was drawn to include three sub-systems:

- Camera system
- Electronic Power Steering system
- Car Display system

Other car subsystems like the steering wheel lie outside of this item

## Goals and Measures

### Goals

The major goal of this safety plan is to determine all the possible risks of the lane assistance system. Based on the risk analysis, we can classify the safety levels and define actions and policies to avoid the risks.

### 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	All Team Members	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

- **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 tailoring the safety lifecycle, 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

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

In the safety plan, there is a section called the DIA (development interface agreement) which delineates the design and production responsibilities between the OEM and the Tier 1 supplier or between the Tier 1 supplier and the Tier 2 supplier

## 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.

The OEM and Tier 1 supplier take on a customer: supplier relationship. The OEM will provide requirements for what a vehicle system needs to do. Then the Tier 1 supplier develops and produces the system for the OEM. The OEM may provide a preliminary product design and then the tier 1 supplier will finish the details. In this case, the OEM will provide our company with the requirements for the lane keeping system and our company will develop and produce the system for the OEM and analyze and modify the various systems from a functional safety standpoint.

# Confirmation Measures

[Instructions:

Please answer the following questions:

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

Confirmation measures serve two purposes:

- Functional safety project conforms to ISO 26262
- The project makes the vehicle safer

## 2. What is a confirmation review?

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

## 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 actually achieve functional safety is called a functional safety assessment.

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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.