

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]**

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| 05/05/2019 | 0.1 | Maanadoona | First draft |
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**[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**](https://support.google.com/docs/answer/116338?co=GENIE.Platform%3DDesktop&hl=en)**, you can use headings for each section and then go to Insert > Table of Contents.** [**Microsoft Word**](https://support.microsoft.com/en-us/help/285059/how-to-create-a-table-of-contents-by-marking-text-in-word) **has similar capabilities]**

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# Introduction

## Purpose of the Safety Plan

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

Our the purpose of this safety plan is to provide an overall framework for the Lane Assistance item, and to assign roles and responsibilities for functional safety for this item.

## 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 lane Assistance Item alerts the driver that the vehicle has accidentally departed its lane, and attempts to steer the vehicle back toward the center of the lane.

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

1. Lane departure warning

The lane departure warning function shall apply an oscillating steering torque to provide the driver a haptic feedback

1. Lane keeping assistance

The lane keeping assistance function shall apply the steering torque when active in order to stay in ego lane.

**Which subsystems are responsible for each function?**

The camera subsystem, the electronic power steering subsystem, and the car display system are all responsible for each of the functions.

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

The camera subsystem, the electronic power steering subsystem, and the car display system are inside the item. But Steering Wheel is 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**

# 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 major goal of this project is to make the lane assistance system in safe. To make the system in safe, we define the items, analyze HARA and make functional safety concepts. Finally we apply these safety concepts to system.

## 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 | 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

**[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**

**]**

To make a good safety culture, followings are needed.

1. Safety is Highest Priority.
2. Documented and Traceable Design Decisions
3. Reward Safety
4. Penalize Shortcuts

# 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**](#_sh22j99mm02k) **of this document**

**]**

Actually, There are three phases of the safety lifecycle

1. Concept Phase
   1. Item Definition
   2. Initiation of the Safety Lifecycle
   3. Hazard Analysis and Risk Assessment
   4. Functional Safety Concept
2. Product Development
   1. Product Development: System Level (HW / SW)
   2. Safety Validation
   3. Functional Safety Assessment
   4. Release for Production
3. After the Release for Production
   1. Production
   2. Operation, Service and Decommissioning

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.**

**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.**

**]**

1. 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.

2. The OEM gives the requirements to Tier1 as original equipment manufacturer. The Tier 1 has responsibility for development and production.

Especially, As a 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

And As a Safety Engineer:

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

# 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?**

**]**

1. Confirmation measures serve two purposes:

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

2. Confirmation review ensures that the project compiles with ISO26262. As the product is designed and developed, an independent person would review the work to make sure ISO 26262 is being followed.

3. Functional safety audit means the checking to make sure that the actual implementation of the project conforms to the safety plan is called a functional safety audit.

4. Functional safety assessment means the 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.