Elektrobit

UDACITY

Safety Plan Lane Assistance

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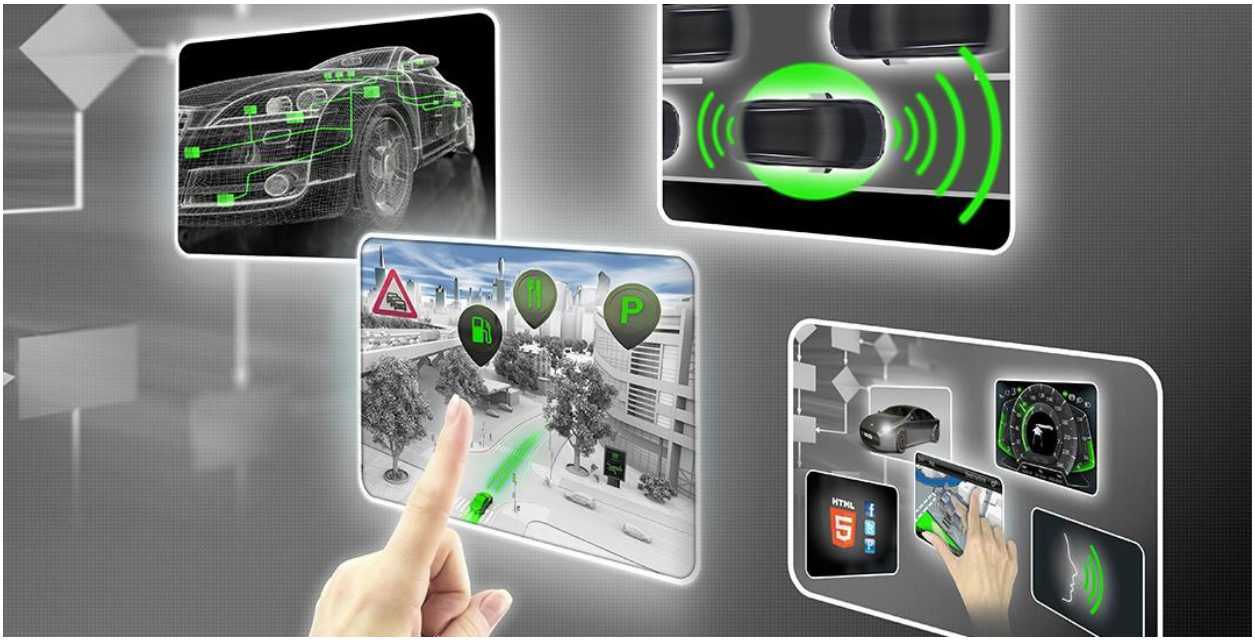

Document history

Date	Version	Editor	Description
5/21/18	1.0	Yue	First attempt

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Introduction

Purpose of the Safety Plan

The purpose of this safety plan is to provide a comprehensive framework for the Lane Assistance item, and to define roles for this item to be under analysis.

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 system attempts to keep the vehicle in the canter of the lane and alerts the driver when the vehicle has departed the lane.

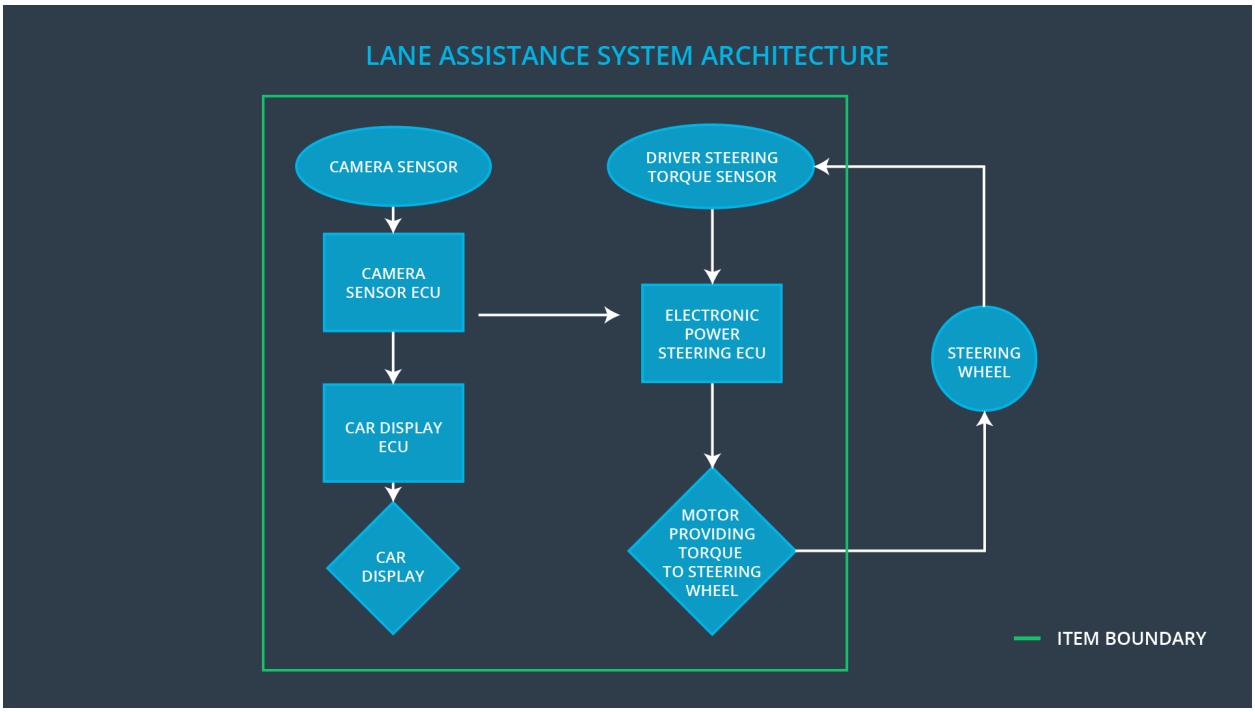
The Lane Assistance system will have to functions:

1. Lane departure warning
2. Lane keeping assistance

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

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

The Camera system, the Electronic Power Steering system and the Car Display system are all responsible for both of the functions.



Goals and Measures

Goals

Ensure the Lane Assistance system safety.
Analyze various electronic and electrical system malfunctions to prevent accident.

Measures

Measures and Activities	Responsibility	Timeline
Follow safety processes	All Team Member	Constantly
Create and sustain a safety culture	All Team Member	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

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

The purpose of the development interface agreement is to assign responsibilities to OEM and Tier-1.

Functional Safety Manager- Item Level

- 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

Functional Safety Engineer- Item Level

- Item development
- Integration
- Testing at the hardware, software and item levels

Project Manager - Item Level

- Item management
- Acquires and allocates resources needed for the functional safety activities
- Appoints safety manager or might act as safety manager

Functional Safety Manager- Component Level

- 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

Functional Safety Engineer- Component Level

- Component development
- Integration
- Testing at the hardware, software and component levels

Functional Safety Auditor

- Ensures that the design and production implementation conform to the safety plan and ISO 26262.
- Must be independent from the team developing the project

Functional Safety Assessor

- Independent judgement as to whether functional safety is being achieved via a functional safety assessment
- Must be independent from the team developing the project

Confirmation Measures

Confirmation measures serve two purposes:
- A functional safety project conforms to ISO 26262
- The project really does make the vehicle safer.

The Confirmation Measures has three parts:
- 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.