Item definition (Example)

Airbag Control Unit

# Purpose of this document

The purpose of this document is to be the input for the “Hazard Analysis and Risk Assessment” (HARA) needed to comply with the ISO26262 standard. To ensure safety, all activities of the safety life cycle have to be planned to avoid systematic failures.

Therefore, this document describes the assumption on the Airbag Control Unit (ACU) item you should develop.

An additional purpose of this document is to define and describe the item, its functionality, dependencies on, and interaction with, the driver, the environmental conditions, external measure, the boundary of the item and interfaces to other items as well as assumptions concerning other elements at the vehicle level. In this document, the requirements and recommendations for establishing the definition of the item, including its functionality, interfaces, environmental conditions, legal requirements, and known hazards, will be handled.

# Purpose of the item

*Please describe in this chapter the purpose of the item. Consider laws, standards, and regulations in order to explain sufficiently the purpose of the item.*

The purpose of the item is the following:

* Deploy inflatable balloons from the car cockpit to protect occupants in case a crash happens.

## Functional behavior

|  |  |
| --- | --- |
| Function | Operating elements |
| Deploy the balloons | Squid wires (detonators) driver |
| Detect which seat belts are worn | Buckle switch / belt pretensioner |
| Signal to the drive if the airbags are not available | Warning lamp |
| Signal if the front passenger airbag is disabled (in case a child car seat usage) | Airbag off lamp |

# Functional block diagram

*Please describe the interaction with external systems or items and/or interfaces to other elements outside the boundary of your item. Please consider the combination of “sensor-logic-actuator” and choose functional names for these elements regarding your item.*

Diagram

Description automatically generated

Figure 1 Airbag Control Unit Block Diagram - Figure from <https://www.infineon.com/cms/en/applications/automotive/chassis-safety-and-adas/airbag-system/>

|  |  |
| --- | --- |
| System element | Interface to ACU |
| Belt pretensioner | CAN |
| Accelerometer | Internal bus |
| Squib Driver (detonator) | Internal bus |
| Power supply | Internal bus |
| Buckle switch | Discrete |

# Boundaries of the system responsibility and interfaces

*Please describe the boundary of the system responsibility, interaction with external systems or items and interfaces to other elements outside your item in combination with the block diagram above*

The item is in charge of:

* deploy the balloons in case a crash happens.
* determine which seats are occupied.
* determine which seat belts are worn.

# Other sources of hazards, which influence the safety and reliability of the item

*Please describe other sources (not E/E) of hazards, which influence the safety and reliability of the item*

Strong impact on the explosive capsules.

# Functional requirements

*Please describe all already noted functional safety requirements, this is normally output of H&R.*

The item has to determine which airbags is opportune to deploy considering

* the vehicle’s speed.
* the direction of the crash.
* which seats are occupied, and which seat belts are worn. If the seat belt is not worn, the balloon shall not be deployed to avoid worsening the accident consequences.

# Other requirements

*Other environmental requirements which can influence your item*

None

# Law, directive and standard

*List the laws, directives and standard which have to be considered*

Consider the list <https://standards.globalspec.com/topics/airbag-standards>

# External measure to minimizing risks

*Which external measures can be taken in order to minimize the risk:*

* Periodic service of the car as prescribed by the manufacturer.