

## Bachelor's/Master's thesis

# Safety & security analysis for a control system

### Scope:

Future material handling and production systems will be open and adaptive, posing challenges for all layers, from the high-level IT-systems down to the machine control systems. A new integrated mixed-criticality controller is being developed in the ZIM-Project FOLSA ("Future oriented logistics safety application") by IFL together with project partners. The controller is aimed as an embeddable device for various material handling equipment, enabling safety functionality combined with IoT-communication capabilities in a compact form.

### Problem statement:

Due to the increasing interconnectivity of machines and systems, security plays an increasingly important role in analyzing system safety. New methods for security-aware safety analyses have been suggested in scientific literature, such as FMVEA or STPA-SafeSec. These new methods, however, have not yet been utilized in machinery. The aim of this thesis work is to study various existing analysis methods and perform a safety and security analysis with selected methods for the controller under development.

### Tasks:

- Literature study: State-of-the-art in machinery safety and security-aware safety analysis methods
- Case study: Analysis for the FOLSA Controller
- The depth and breadth of the thesis work can be adjusted for both Master's and Bachelor's thesis.

### Required:

- Interest in safety-related machine control systems
- Independent and structured way of working

### Offered:

Possibility to work in the interesting field of safety-related machine control systems, with a view into current research problems.

The thesis can be written in either English or German.

### Field of study:

Safe mechatronic systems in intralogistics

### Thesis focus:

- ☒ Safety technology
- ☐ Experimental
- ☒ Theoretical
- ☒ Practical
- ☐ Simulation
- ☐ Construction
- ☐ Graphical design

### Study programme:

- ☒ Mechanical engineering
- ☒ Mechatronics
- ☒ Electrical engineering
- ☒ Computer science
- ☐ Infonomics
- ☒ Industrial engineering

**Begin:** As soon as possible

### Announcement date:

02/2018

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