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# Safety in Modular Robotics

## Masterthesis

**This thesis aims to create a metadata model for safety considerations of modular robotics.**

## Motivation

In today's fast-paced manufacturing environment, modular robotics offer a solution to address the challenges of short production life cycles and increasing product variations. These adaptable systems can be quickly reconfigured to accommodate new designs and production requirements, significantly reducing downtime and enhancing flexibility.
When implementing modular robotics in manufacturing, safety considerations are paramount. The interaction between different modules introduces complexities that must be carefully managed to prevent accidents and ensure smooth operations. Each module's integration and coordination need thorough risk assessment to identify potential hazards.
Information modeling is particularly valuable for managing the combinatory aspects of modular robotics. By digitally representing each module and their potential configurations, manufacturers can identify potential safety issues. Consequently, this reduces the effort required for risk assessments.

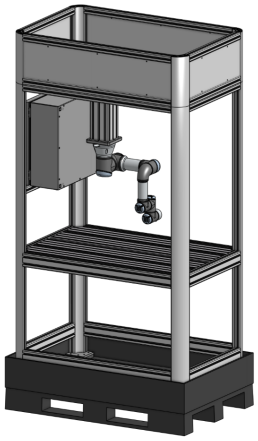

Abbildung 1: Robot Module

## Aims

The aim of this thesis is to conduct a comprehensive analysis of current safety engineering procedures, information models, and standards for risk assessment used in robotics. It will identify strengths and weaknesses in existing practices, focusing on how they address the complexities of module interactions. An additional aim is the design of a new safety information model tailored to enhance the integration and safety of modular robotics systems. This model will aim to streamline risk assessments and improve overall safety management. Ultimately, the goal is to provide a robust framework that supports safer and more efficient deployment of modular robotics in manufacturing environments.

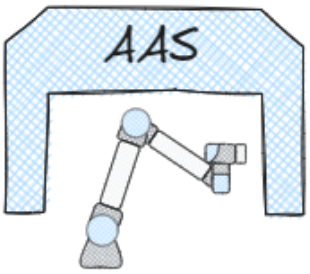


Abbildung 2: Robot AAS

## Helpful previous knowledge

- Knowledge about metadata modelling
- Knowledge about robotic systems
- Lecture Cyber-Physical Production Systems

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**Thesis:** Masterthesis
**Starting Date:** ASAP
**Tags:** *Robotics, Safety, Metadata Modelling*