# APPLICATION Master Thesis

Provisional working title:

Innovative Integration of Airskin Safety Sensors for Enhanced Human-Robot Interaction in Mobile Manipulators

Initial situation / problem:

Traditional robotic systems commonly deploy safety sensors such as force-torque sensors in joints or lidar/Ladar sensors on moving parts to prevent collisions and ensure user safety. Alternatively, some systems utilize Airskin safety sensors placed on the robot's exterior. However, there is a gap in knowledge regarding the integration of Airskin sensors within the body of the robot, specifically in the arm and manipulator components. This innovative approach seeks to explore the potential advantages and challenges associated with embedding Airskin safety sensors directly into the design of a mobile manipulator.
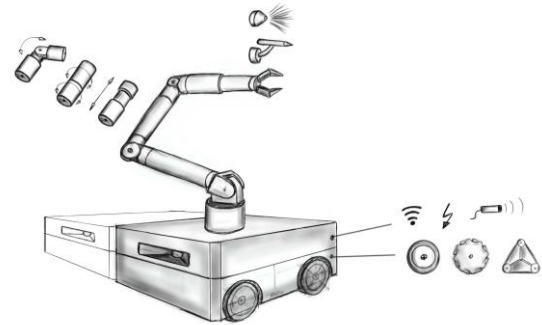
The aim of the work:

The primary goal of this master thesis is to investigate and develop a novel method for integrating Airskin safety sensors within the body of a mobile manipulator. The research aims to enhance safety measures during human-robot interactions by exploring the advantages of having these sensors incorporated directly into the robotic structure. By achieving this, the study intends to contribute to the evolution of robotic systems with improved safety features, paving the way for more seamless and secure collaborative operations.

Main tasks:

1. **Literature Review:** Explore safety sensors in robotics, with a focus on Airskin technology.
2. **Understanding Airskin Safety Sensors:** Investigate principles and applications of Airskin sensors.
3. **Design and Simulation:** Propose integrated Airskin sensor design for mobile manipulator and assess its effectiveness through simulation.
4. **Performance Evaluation:** Evaluate integrated Airskin sensors against traditional safety methods.
5. **Optimization and Recommendations:** Optimize integrated sensor design based on simulation and real-world considerations, providing recommendations for practical implementation.

For additional details, feel free to contact the content supervisors.

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