

# Developing a Mobile Server for Monitoring and Assisting Construction Tasks



Technical University of Munich



TUM School of Computation,  
Information and Technology  
(CIT)

Chair of Robotics, Artificial  
Intelligence and Real-time  
Systems

## Background

The shortage of skilled workers, stagnating productivity, lack of digitalization, and worker safety concerns put pressure on the construction industry to adopt autonomous systems [1][3]. However, existing communication infrastructure can generally not be assumed on construction sites. A mobile communication platform that adapts its position based on currently active collaboration areas is a possible solution to this problem.

The **CoCoRo** (Collaborative Construction Robots) project is a cooperation between the **FML** and **AIR** chairs with the goal of developing collaborating robots on construction sites. We are developing a use case in which three autonomous construction vehicle work together with a human on a common task. An autonomous dumper loads, unloads, and transports bulk material, a human worker grades the material, a compactor plate consolidates it, and the mobile server coordinates and overlooks the process. For hosting a mobile wifi network we have a clearpath jackal equipped with an intel NUC10i7 and Linksys MR8300 WiFi Router.



Clearpath Jackal [2]

## Tasks and Objectives

The below points are not in the scope of a single thesis, but rather a range of possible focus points. Additional or alternative ideas are welcome.

- Selecting and integrating an appropriate environment perception sensor (e.g. [livox MID-360](#) lidar)
- Integrating and tuning the [nav2](#) stack
- Building a multi robot Gazebo simulation and setting it up on a local GPU server
- Network and DDS configuration for out-of-the-box reliable multi-robot network hosting
- Autonomous remote control for a compactor (leader-follower control) with obstacle avoidance

## References

- [1] R. Berbner et al. *The construction industry in times of crisis: progress on ESG, standstill on digital transformation*. Study. PwC, 2024.
- [2] *Jackal Clearpath*, LEOBOTICS. URL: <https://de.leobotics.com/comparateur-robot/robot-plateforme-mobile-tout-terrain-jackal-clearpath>.
- [3] C. Liang et al. "Human-Robot Collaboration in Construction: Classification and Research Trends". In: *Journal of Construction Engineering and Management* (2021), 147(10).

---

**Supervisor:**  
Prof. Dr.-Ing. Alois Knoll

**Advisor:**  
Lukas Oehler, M.Sc.

**Research project:**  
CoCoRo

**Type:**  
Bachelor/Semester/Master  
Thesis

**Research area:**  
Mobile Robotics, Networking,  
Simulation

**Programming language:**  
C++, Python

**Required skills:**  
comfortable with ROS2,  
analytical, self motivated

**Language:**  
Englisch/German

**Date of submission:**  
18. Februar 2026

**Start date:**  
Februar 2026

---

**For more information please  
contact us:**

Phone:

E-Mail: [lukas.oehler@tum.de](mailto:lukas.oehler@tum.de)

Internet: [www.ce.cit.tum.de/air](http://www.ce.cit.tum.de/air)