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# Container-2-Container Communication Study

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<b>Prerequisites:</b>	- Good knowledge of wireless communication technologies, e.g. LoRa. - Good understanding of wireless signal propagation - Experience with Python and/or C programming - Willingness to learn new topics and to experiment with real hardware
<b>Level:</b>	This topic is appropriate for Master Students
<b>Language:</b>	German or English

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## INTRODUCTION

The goal of this master thesis is to explore experimentally wireless communication between logistical containers. The project is a cooperation between the BIBA institute and the ComNets department. Communication between containers is an important topic for future research and implementation projects, as containers consist of mostly steel, which largely disturbs wireless communications. At the same, positioning antennas outside of the container might prohibit their proper stacking and is uncertain whether it will function correctly with stacked containers.

## PROJECT DESCRIPTION

The objective of this work is to experimentally evaluate three different communication technologies in different scenarios. The considered communication technologies are LoRa, acoustic communications and RFID communications. The experimental scenarios consist of at least the following:

- Two nodes in the same closed container
- One node in the closed container, one outside
- One node per container for two neighbouring containers

For all scenarios, different placements of the nodes and their antennas have to be taken into consideration. Depending on the success of these experiments, a larger experiment with several stacked containers will also be necessary.

The work packages of this thesis are as follows:

- Study the documentation of all three communication technologies, understand their principles and how to parametric them and optimise their work
- Identify the application requirements and general regulations for container transportation and storage (stacking, interference with other systems, etc.)
- Make a state of the art survey of existing container-2-container wireless communication solutions, including different antenna designs
- Perform the above described experiments and document them in a systematic way
- Compare the solutions in terms of their technical performance, costs and application requirements for the logistic domain and identify the best option

## CONTACT

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