

## Open Thesis / Project

# Design of an Energy-Efficient MAC Protocol for Ultra-Wideband Systems

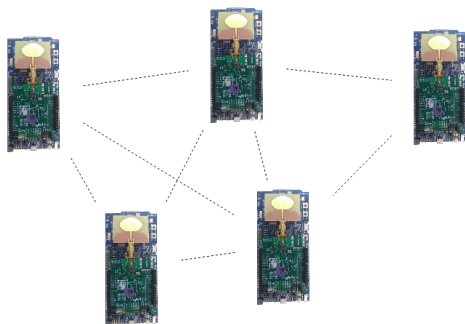
### Thesis Type

Master Project / Master Thesis

### Motivation

Ultra-wideband (UWB) has become one of the most promising technologies for indoor positioning thanks to its robustness and high time-domain resolution. Indeed, UWB devices are nowadays ubiquitous: big players such as Apple, Samsung, and Xiaomi have started to include UWB radios into their high-end smartphones; whereas car manufacturers already rely on this technology to enable secure access to vehicles. As this communication technology becomes pervasive, there is a need to further increase its energy-efficiency, as several location-aware IoT applications running on tiny low-power embedded devices will soon disrupt the market.

To this end, we aim to exploit the latest generation UWB transceivers (e.g., NXP Trimension, Qorvo DW3000) to develop energy-efficient MAC protocols that can offer at the same time a high scalability and a reliable communication performance. In this project, you will hence be focusing on the next-generation UWB transceivers, and investigate new communication paradigms for UWB-based systems, ultimately evaluating the performance of your solution and comparing it to the state of the art.



### Goals and Tasks

Within this context, you will explore several directions and perform different tasks, such as:

- Exploring the features of the new generation UWB transceivers (e.g., the Qorvo DW3000 or the NXP Trimension), implementing a driver supporting them in an embedded OS;
- Developing an energy-efficient MAC protocol for UWB-based systems that can still sustain a high reliability and scalability;
- Evaluating the performance of your protocol and comparing it with other solutions, quantifying its pros and cons.

### Target Group

- Students of ICE/Telematics;
- Students of Computer Science;
- Students of Electrical Engineering.

### Required Prior Knowledge

- Knowledge of networked embedded systems;
- Excellent C programming skills;
- Experience with embedded operating systems such as Contiki, Contiki-NG, MyNewt, and Zephyr is of advantage.

### Contact Person

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