

# Open Thesis / Project

## Enabling Highly Safe and Secure BLE Communication

### Thesis Type

Master Project / Master Thesis

### Motivation

Bluetooth Low Energy (BLE) is increasingly used to exchange vital and critical data in time- and safety-critical applications, such as hospital patient monitoring systems and for coordinating fleets of industrial autonomous robots. In such systems, it is important that each message reliably and securely reaches its destination in real time. In current BLE systems, however, messages may get delayed or lost due to interference or fading effects. Such problems may lead to significant economic losses, such as production downtime in industrial settings, or human harm, such as delayed critical medical interventions.

New BLE versions propose a new way to exchange wireless data: so-called isochronous (ISO) streams, that promise better reliability, efficiency, and security. There is an urgent need to understand how to use these ISO streams efficiently in real-world applications, such as industrial automation systems, and how to adapt the different parameters of ISO streams at runtime to changing application conditions. In this thesis, you will build a safe and secure communication protocol based on BLE ISO streams that fits the needs of time- and safety-critical applications. You will design and evaluate new approaches to optimize the communication metrics (e.g., latency, throughput, reliability, efficiency) at runtime under various conditions. Your work is a leap towards using BLE in new and innovative applications that require the highest safety and security. Get ready and contact us today.

For more information about innovative BLE applications visit [dewinelabs.com](http://dewinelabs.com).



### Goals and Tasks

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

- Investigate the performance of BLE ISO streams in real-world applications;
- Design and evaluate different approaches to enhance aspects of BLE ISO communication (e.g., efficiency, latency, scalability);
- Elevate your BLE expertise as you tackle real-world challenges, bridging the gap between theory and practical application.

We offer the **possibility to pay** you for your work.

### Target Group

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

### Required Prior Knowledge

- Basic knowledge of Bluetooth Low Energy (BLE) and wireless communication;
- Experience with embedded system development in C (e.g., in Zephyr RTOS).

### Contact Person

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