University of South-Eastern Norway

Faculty of Technology, Natural Sciences and Maritime Sciences, Campus Porsgrunn

FMH606 Master's Thesis

Title: Development and Testing of LoRaWan Sensor Network for Internet of Things Applications

USN supervisor: Hans-Petter Halvorsen

External partner: Altibox, Dimension Four

Task background:

LoRaWan is short for Long Range Wide Area Network. LoRaWan is a low power wide area network that uses open-source technology. LoRaWan is designed for the Internet of Things (IoT). LoRaWan provides a far longer range than, e.g., WiFi and Bluetooth. It is also very suitable for outdoor measurements. Some collaboration with another ongoing project may be necessary in order to share sensor data, etc.

Altibox (https://www.altibox.no) offers IoT and LoRaWan services, see https://www.altibox.no/iot/

Task description:

In this project the LoRaWan infrastructure from Altibox and ThingPark will be used for development and testing of a LoRaWan sensor network. Different LoRaWan sensors will be available as part of the project.

The following tasks should be done in this project:

- Explore LoRaWan in depth and in general explore LoRaWan Applications and User Cases. Explore specifically the Altibox LoRaWan service and ThingPark, but you should also explore other providers and other alternatives
- Create/Setup System for Logging and Viewing Sensor data from LoRaWan Sensors using Altibox LoRaWan service
- Application Server: Explore ThingPark X Connections and select 2-3 different types of connections for further implementation and use, some examples are HTTP, MQTT, Azure IoT Hub, and Microsoft Teams
- Explore possibilities to connect to Dimension Four directly from ThingPark
- Explore and if possible, create a personal LoRaWan system with own Gateway, etc.
- Explore LoRaWan Relays. LoRaWan Relays is a new feature that allow signals to go where they physically couldn't go before
- Explore Data Security in context of LoRaWan in general and in context of this project
- Testing, Installation and Deployment of System on a Production Server
- Include necessary scientific aspects, methods, and analysis
- The system needs to be properly documented so it possible for others to maintain and use the system after the project is finished

Student category: IIA, both campus and online, but also for industry master students that want to take a project outside their own company.

The task is suitable for online students (not present at the campus): Yes. Most of the work can be done online.

Practical arrangements: None

Supervision:

As a general rule, the student is entitled to 15-20 hours of supervision. This includes necessary time for the supervisor to prepare for supervision meetings (reading material to be discussed, etc).

Signatures:

Supervisor (date and signature):

Student (write clearly in all capitalized letters):

Student (date and signature):