

## FMH606 Master's Thesis

**Title:** Designing, Implementation and Testing Smart Cities Use Cases with respect to practical Internet of Things Applications

**USN supervisor:** Hans-Petter Halvorsen

**External partner:** Porsgrunn kommune (Porsgrunn municipality), Altibox

### **Task background:**

Since the autumn of 2018, the Altibox and Altibox partnership has expanded the LoRaWAN Sensor Network in Norway and currently has coverage for more than 1,000,000 households in 100 municipalities. The LoRaWAN Sensor Network is a natural extension of the fiber network with major synergies of established infrastructure and the development continues. Altibox and Partners now offer IoT Access as a commercial service, so that more people can use the Sensor Network for their own sensors.

More information: <https://www.altibox.no/iot/>

Porsgrunn kommune (Porsgrunn municipality) is one of the main users of the LoRaWAN Sensor Network by Altibox and they are taking the next step to be a so-called Smart City where they use Internet of Things (IoT) solutions as part of their services for the residents.

More information: <https://www.porsgrunn.kommune.no>

### **Task description:**

Examples of activities that should be performed:

- Get an overview of LoRaWAN, NB-IoT, vision systems and other technologies relevant for smart cities applications.
- How is Porsgrunn municipality focusing on smart cities aspects today? Get an overview. Existing use cases? Some examples may be water temperature monitoring, waste management, air pollution, traffic control and surveillance, parking, etc. Literature study: What is published online regarding this?
- Work with Porsgrunn municipality to find and explore relevant user cases for the residents in Porsgrunn municipality related to this work.
- The user cases should demonstrate the features and possibilities in context of the new Smart Cities era in Porsgrunn municipality. Some examples of use cases may be rainwater and measure and monitoring of storm water from wells, vehicle counting, etc.
- Plan, design, implement and test one or more selected user case(s) that will benefit the residents in Porsgrunn municipality.
- Collaboration with other ongoing LoRaWAN Relay project that are carried out in parallel.
- Microsoft Teams and other relevant systems should be used during project planning and development.
- The system should be properly documented in form of a technical report.

More project details and activities will be discussed when the project starts. You will have great opportunities to influence the content of the project in collaboration with Porsgrunn kommune (Porsgrunn municipality).

**Student category:** IIA

**Is the task suitable for online students (not present at the campus)?** Yes, but is advisable that the student can be present in Porsgrunn and Porsgrunn kommune (Porsgrunn municipality) for some parts of the work.

**Practical arrangements:**

**Supervision:**

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):

Hans-Petter Halvorsen

2024.02.02



Student 2024.02.02:

Gaveen Shamila Ranabahu

2024.02.02

Date