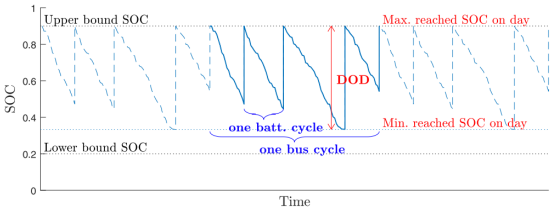
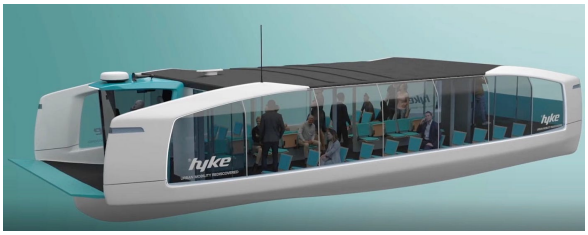
Charging location planning for autonomous waterborne vessels under uncertainty





Problem description

In this thesis, the aim is to plan the charging stations for the homogenous fleet of autonomous vessels under different charging and demand scenarios. There are two layers of decisions to be made 1) the location of charging stations (given different types of services, passenger and logistics) and 2) how to schedule the charging plan based on different charging scenarios. The proposed approach will be applied for a case study in Norway where the service provider Hyke is offering innovative solutions for waterborne logistics and mobility, promising to alleviate congestion, eliminate emissions and enable sustainable waterfront redevelopment. Hyke's solutions include electric ferries, automatic charging jetties, autonomous vessel control, and fleet management solutions. Moreover, Hyke's solutions are designed to enable passenger and logistics operations, enabling economies of scale and increasing vessel utility and revenues.

Assignment

The project will involve the following steps:

- Identify different and charging demand scenarios.
- Design charging station location planning under uncertainty.
- Introduce a real-time operational plan for charging the batteries on board given demand patterns.

Candidate

- Should have: coding skills in Python, knowledge of optimization and heuristics methods.
- Good to have: stochastic programming, reinforcement learning and simulation.

Research group

Sustainable Urban Multimodal mobility (**SUM**) Lab

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hyke

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