



WASP Project Course 2021

**Analytics and data visualization for large
traffic scenario**

Background

Large systems containing large sets of mixed vehicles where behaviour partly automated are very difficult to observe in order to understand, validate and verify. Methods for data analytics and visualization can show states, communication and decisions not observable and understandable for human eye.

Challenges to investigate

A scenario for air traffic will be provided containing real drones and simulated drones (or other vehicles). Data will be available to explore and develop a solution that can be tested on recorded and live data together. Test environments can be in Västervik/Gränsö and also in other locations. Development environment and simulators can be provided as well as support to make this project successful. Equipment for VR and AR (eg HoloLens 2) will be available.

Identify, visualize and provide support to solve traffic situations including collision avoidance and optimized route planning. Visualize for humans to understand behaviour of autonomous systems when vehicles react on exceptions occurred by weather, system failures and limitations in communication. Depending on students interest this project can address different topics: Behaviour classification and tracking, anomaly detection

The scenario for this project is within air traffic management for small drones (or other vehicles) but we would also like to see traffic management for boats.

The work can be seen as a stepwise progress, three of these steps could be:

1. Visualize simulated vehicles together with real vehicles in AR (create a demonstrator)
2. Visualize information flow and states for the autonomous system
3. Analyze and visualize potential incidents or predicted scenarios for decision support.

Resources

- Drones: Matrice 100 & Matrice 600
- Remote Tower & simulator
- Private network
- HoloLens 2 (or other device)

Deliverables

- Knowledge increase related to LMDS (Last Mile Delivery System). Använda utvecklingsmiljön och prova någon del av scenariot
- Experimentation and demonstration
- Media material for presentation of work and demonstration

- Project report

Participants

Industrial partner: Combitech (Per Åkesson), Surveillance: Ulf M (f.d Saab Avionics), Lars Järnberger (f.d Traffic Management), LFV (Luftfartsverket), Sjöfartsverket, LiU Norrköping

Industrial supervisor: Combitech: Per Åkesson (per.akesson@combitech.com)

Academic supervisor: Jonas Lundberg LiU Patric Ljung LiU (MIT)

Coordinating WARA representative: Emma Jonsson (emma.jonsson@combitech.com)

Suggested WASP PhD students (Competence requirements): <optional>

Keywords

Collision avoidance, visualization, data analytics, decision support, traffic management, UTM-airspace, behaviour tracking, LVC (Live, Virtual and Constructive)