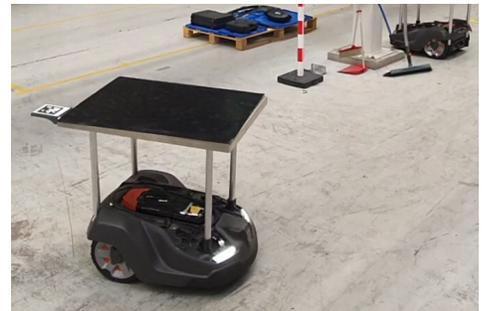
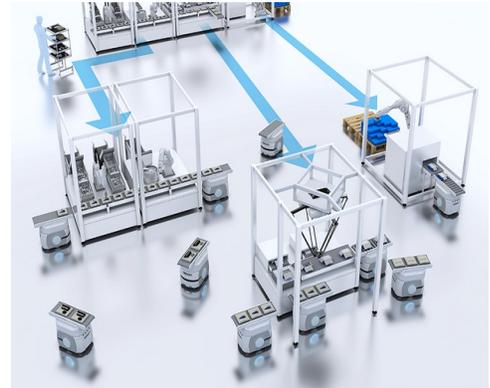


## Projektförslag för kandidatarbete inom Elektroteknik (E2) EENX15:

### Vimcore – Design of an Open Architecture Control for an ATR based on ROS2

#### Background

Factories of the future (I4.0) require the development of heterogeneous systems, where robots and humans work in shared spaces. In particular, the production lines in the automotive sector can profit from this type of system since they manufacture cars or trucks with many variations, e.g., combustion and electric engines. One problem to solve in these scenarios is the Autonomous Transport Robots (ATR), which mission is to move materials from the storage room to the production line. The control architecture for an ATR usually is composed of different modules. In general, it contains three main modules: 1) a coordinator whose principal task is to generate a general path based on global information; 2) a Trajectory Generator to produce trajectories taking into account fixed and dynamic obstacles; 3) a local controller embedded in the ATR, which commands the actuators on the robot to follow the desired trajectory. This project focus on the design and implementation of an advanced controller in an ATR. This project is in collaboration with Volvo, and it is part of a larger project **Generic Photogrammetry-based Sensor System (GPSS)** project.



#### Problembeskrivning

In this thesis, the students will implement a robust controller based on fluid mechanics as potential fields to drive an ATR and track a desired trajectory while avoiding collisions with obstacles. The thesis includes the preparation of the ATR based on the Husqvarna HRP robot, i.e., embedded computer (Raspberry Pi 4), electronics, and Ubuntu OS. The implementation of the Open Architecture Control will be based on ROS2. The system will be evaluated in simulation and the real ATR.

**Målgrupp:** TKAUT, TKMAS, TKELT, TKDAT, TKTFY,

**Gruppstorlek:** 4-6

**Antal grupper:** 1

**Förkunskapskrav:** Basics of Automatic Control, and Programming (C++,Python)

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