École Polytechnique Fédérale de Lausanne
Distributed Electrical Systems Laboratory
EPFL-STI-DESL-ELL, Station 11, CH-1015 Lausanne

http://desl-pwrs.epfl.ch

Student project proposal

Project title
Sensors Integration and Main Electronics Design for an Hyperloop Pod Prototype

Project type ☐ MSc thesis ☒ BA semester project ☒ MSc semester project

Project responsible and e-mail
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Project description
The proposed project is part of the EPFLoop team's research into the experimental validation of a reduced-scale prototype. This prototype is an autonomous vehicle containing an energy storage system, a controller, electromagnetic propulsion devices and sensors.
The aim of the project is first to establish the specifications of the main electronics of the prototype, then to select the appropriate components that fulfill the specifications and finally to design, build and test the final circuit.
As an active member of the EPFLoop team, the students will be supposed to collaborate with other team members and to participate to the team regular update meetings.

Tasks of the student
- Establish specifications of the main electronics:
  - Needs in terms of sensors.
  - Identify working environment (pressure, temperature, available volume for integration).
  - Identify energy requirements (expected total energy consumption, available power supplies).
- Select components (sensors, power supplies, …) according to specifications.
  - Weight, volume and energy consumption of the components must all be kept to a minimum.
- Order.
- Assemble components to build the main electronics.
- Design PCBs if needed, order, assemble, test.
- Size the energy storage system (battery) according to specifications, build, test.
  - Experimentally characterize the battery.

The design of the main electronics must take potential EMC problems into account and avoid them.
The target is to have an operating device by summer 2024.

Requirements
- Excellent with hands-on work.
- Work in team with people from different university.
- PCB design skills.
- Knowledge of standards and good practices in electronics.