ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

swissloop

euroTUBE

Design and Development of a Modular Vehicle Control Unit for Hyperloop Pods

Short Description

Global rise in mobility brings traditional modes of transport to their limits. Vacuum Transportation enables an efficient and safe way of transport. Vehicles, so-called pods, travel at high speeds on a rail through a low-pressure tube in order to minimize drag.

ETH Zurich's Hyperloop Team Swissloop participated with other university teams in Elon Musk's Hyperloop Pod Competition for three consecutive years. While so far the focus has been maximum acceleration for the competitions, Swissloop aims to shift research focus on more viable prototypes. This approach includes the development of components that achieve the required performance, but also work reliably and safe.

The goal of this thesis is to develop a modular Vehicle Control Unit (VCU) which can be incorporated into various prototype vehicles. By abstracting vehicle control the development overhead of future prototypes can significantly be reduced, which ultimately results in lower costs and engineering resources being freed.

The results of this thesis aims to build a robust, configurable and modular control unit used to power future pod prototypes developed at Swissloop. This thesis is conducted at the Institute of Integrated Systems (IIS) in collaboration with Swissloop.

Type	Semester thesis
Partner	ETHZ, Swissloop
Start date	tbd
End date (planned)	tbd
Student(s)	tbd
Internal supervisors	Nathalie Nick, nathalie.nick@swissloop.ch Yvan Bosshard, yvan.bosshard@swissloop.ch
External supervisors	Dr. Michele Magno, Prof. L. Benini

Work packages

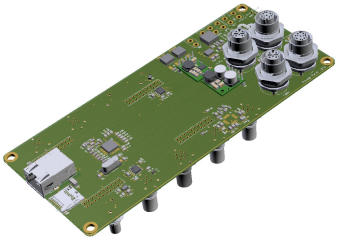
- Literature review including study of sensor and actor systems from related work
- Hardware Design of the VCU with focus on
  - Modularity (multi-protocol compliance)
  - Safety (hardware level mechanisms)
  - Configurability (interconnections independent of functionality)
- Basic Software Design
- Documentation and writing of report

Requirements

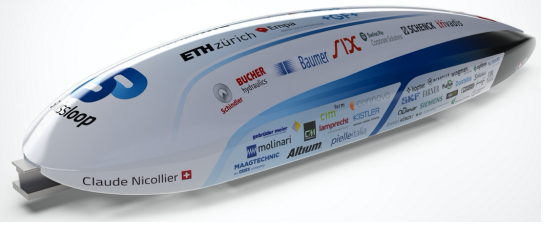
- High motivation and interest in the topic
- Able to work independently and be creative
- Basic skills in Hardware design (Altium)
- Basic skills in Software design (C/C++)
- Experience with embedded/integrated systems and communications standards are beneficial

Application

Please email your CV and transcript to tbd



Main Control Unit of the Swissloop Pod 2020



Swissloop Pod *Claude Nicollier* (2019)