## Implementation of a Control Strategy for a Distributed Inverter on FPGA

### 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.

Previous work has shown the benefits of a distributed inverter for supplying high power induction drives. The goal of this thesis is to implement a control strategy for power control of such a distributed inverter. An FPGA is used to increase performance and allow for maximum customizability. Simulations should consolidate the employed strategy and be used as a comparison to tests performed on a real inverter.

The results of this thesis will greatly advance development of a distributed inverter used to drive high power induction motors. These motors could power the next generation of Hyperloop pod prototypes and will greatly increase the performance of those pods. This thesis is conducted at the Institute ??? in collaboration with Swissloop.

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| Type | Semester thesis / Master 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 | ??? |

### Work packages

- Literature review of power inverters and control methods
- Hardware selection
- Simulation
- Implementation
- Measurements and comparison with simulation
- Documentation and writing of report

### Requirements

- High motivation and interest in the topic
- Able to work independently and be creative
- Understanding of power systems and power electronics
- Basic understanding of control theory
- Basic skills in FPGA design (SystemVerilog, VHDL, etc.)

### Application

Please email your CV and transcript to tbd



Planned AlphaTube Infrastructure, Collombey-Muraz, Switzerland



Swissloop Pod *Claude Nicollier* (2019)