

## Student project proposal

*Project title:* Hyperloop reduced scale pod application, Electrical System Engineering

*Project type:* MSc thesis, BA semester project, MSc semester project

*Project responsible and e-mail*

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*Project description*

The Hyperloop transportation system is composed by a constrained space characterized by a low-pressure environment (operated at approximately 50 mbar), that is usually represented by tubes/tunnels that also house a dedicated rail system responsible for the mechanical constraining of energy-autonomous vehicles (called *capsules* or *Pods*) carrying a given payload. Hyperloop capsules are expected to be self-propelled and can use the tube's rail for guidance, magnetic levitation and propulsion purposes. For an average speed in the order of two-three times larger than the one of high-speed electric trains and a maximum speed to the order of the speed of sound, Hyperloop is expected to achieve average energy consumption in the range of: 30-90 Wh/passenger/km and CO<sub>2</sub> emissions in the range of 5-20 g CO<sub>2</sub>/passenger/km.

The EPFL Distributed Electrical System Laboratory (DESL) is currently active in developing optimal sizing methods of the full-scale electrical propulsion system for Hyperloop capsules. The expected performance of the defined propulsions systems will be validated by means of a reduced-scale pod mock-up to be built at the EPFL. Within this context, we are looking for BA/Master EE students interested to work in these specific topics.

*Tasks of the student*

- Create a full electrical schematic of a reduced-scale pod.
- Design and realize the PCBs/electrical board of the reduced-scale pod.
- Integrate various sub-systems like the Battery Energy Management System, the power electronic converter and the linear induction motor.
- Optimize the weight of the electronics along with the wires/cables.

*Requirements*

- Able to work in team, committed and open to learn
- Knowledge of electrical system design is preferred