

Project proposal

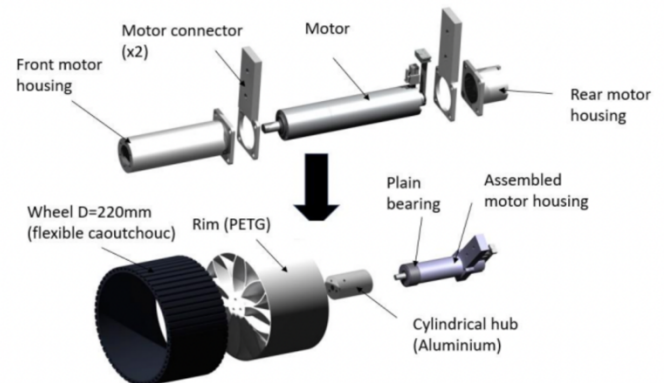
Title: Design of custom drivetrain for rover mobility
 Supervisor: ...
 Timeframe: Spring 2022

EPFL Xplore is an interdisciplinary project whose aim is to design and develop a Rover to participate in international competitions, namely The University Rover Challenge and the European Rover Challenge. As a rolling machines, rovers rely on 4 to 6 wheels to navigate through all types of terrain. Therefore, we are looking to develop our own gearbox system to reduce the rotational speed and increase torque between our motor and our wheels.

Project description

The student will be given one or a few very specific motors that will suffice to fulfill the given application in terms of power.

The student will then conduct a brief, in depth market and engineering analysis of planetary, cycloidal and harmonic gearboxes. This will let him decide, based on a detailed scientific argumentation, which drivetrain is the most suited to a hub gearbox that will directly drive an external wheel. This should be completed and presented to the teacher and the team before the end of the second week of the semester project.



The student will focus exclusively on their first iteration of the design, completely in CAD (fusion 360).

After reviewing the design with the team and professor, the testing phase will begin by construction of a prototype which will help improve the CAD model in parallel.

By the second part of the semester (week 9), the student is expected to have a final design and to start its manufacturing which will last until the end of the semester.

Optional Goal 1: The student will integrate an encoder to the gearbox that will communicate with the main rover computer.

+1 bonus point out of 6 on the project.

Optional Goal 2: The student will integrate an encoder and set up a fully closed encoder feedback loop through a microcontroller inside every single gearbox.

+3 bonus points out of 6 on the project.

Requirements

- Prior knowledge of Fusion360 and advanced CAD skills
- Basics in FEA Analysis (static and dynamic)
- Basic Additive Manufacturing and polymer knowledge
- Experience reading and understanding industrial supplier's datasheets

Contact

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