

Project proposal



<https://mars.nasa.gov/resources/7438/looking-up-at-mars-rover-curiosity-in-buckskin-selfie/>

Title: **Science Drilling Mechanism**
 Supervisor: Maren Katterbach (LMS)
 Timeframe: Fall 2020

EPFL Xplore is an interdisciplinary project whose aim is to design and develop a Rover to participate in two international competitions: the University Rover Challenge and the European Rover Challenge. According to the competitions requirements, one of the four main tasks that will have to be achieved is the science task: its goal is to collect a soil sample and conduct in-situ measurements to detect life underneath the surface. To do so, we need to recover a soil sample by using a drilling mechanism.

Project description

Problematic

The students will design a drilling mechanism capable of drilling up to 30cm. The soil sample is supposed to be undamaged, namely the different layers of the soil from the surface to the deepest point reached shall be unmixed.

The project can be made by 2 or 3 students from the ENAC faculty.

Requirements

The drilling mechanism shall be able to extract samples from the surface and the subsurface of the soil. The drilling mechanism shall be able to drill through different levels of soil cohesion and hardness (loose soil to hard gypsum).

The reaction forces from drilling shall be separated from the rover body.

The drill shall be robust and be able to repeat the task numerous times.

The drill shall follow an automatic procedure.

The energy consumption of the drill should be optimized.

The drill should be scalable.

The operation time of the drill shall be optimized.

3 surface samples and 1 deep sample (15-30 cm below the surface) shall be collected.

Contact

EPFL Xplore thomas.manteaux@epfl.ch

Laboratory (LMS) maren.katterbach@epfl.ch