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RAPID PROTOTYPING FOR PLANETARY EXPLORATION: APPLYING FAB ACADEMY'S DIGITAL FABRICATION TECHNIQUES TO SPACE ROBOTICS

Abstract

As part of the Fab Academy Final Project, this research focuses on developing an autonomous rover to combat desertification by creating half-moon patterns in the soil. These patterns help retain water and support vegetation growth. Inspired by NASA's Perseverance Rover, the robot operates using ROS (Robot Operating System) for navigation, without relying on GPS. Built with digital fabrication techniques such as 3D printing, aluminum milling, and PCB milling, the rover integrates sensors, wheel encoders, and an IMU for precise movement. It is designed to operate continuously, reducing reliance on manual labor for land restoration. This project demonstrates how space robotics and digital fabrication can provide scalable, autonomous solutions for desert restoration, contributing to sustainable environmental recovery.