Gesture Recognition and Control for a Lunar Rover

Justin Cyrus, CEO Lunar Outpost, (justin@lunaroutpost.com)

Company Background:

Lunar Outpost Inc. is an advanced technology company with a focus on developing technologies that have both terrestrial and space applications. Comprised of engineers with experience working on NASA, defense, and commercial programs, Lunar Outpost is engaged in contracts with the U.S. Air Force, NASA, local and state government organizations, and leading research institutions. Other current projects include a prototype life support system for Lockheed Martin's Lunar Habitat module; the Lunar Prospector (MAPP), a rover designed to map resources on the Lunar surface; the Bloomberg Mayor's Challenge; Denver's Smart Cities Initiative and more…

Description of Work to Be Done:

The work to be done is towards implementing gesture control utilizing a Camera and LiDAR. First development will be done utilizing a simulation software called Gazebo on an NVIDIA Jetson Nano Lunar Outpost will provide to the team. Then the students will have a chance to deploy their code on a physical rover if the simulation is successful.
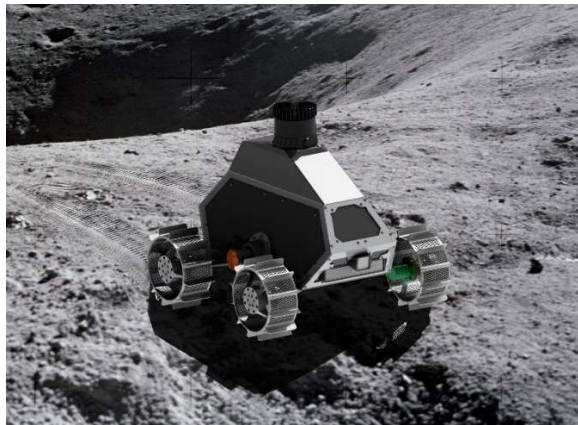
A Rendering of MAPP on the Lunar Surface

The students will be involved in every phase of the project 'from design through implementation'. During the design phase the students will interact with Lunar Outpost engineers to see what will provide value for operation on the lunar surface. From there the project overview will be created and the work divided into tasks.

As a final product, the software will intake data from the camera and LiDAR sensors, process it, and send commands to the MAPP testing platform. This will in turn be expected to stop, go away from, come to, or drive in the direction of a pointing astronaut.

Justin Cyrus, the CEO of Lunar Outpost, will be managing this project on the Lunar Outpost side. Mr. Cyrus has extensive software development and project management experience and can help mentor the student team throughout this course.

MAPP being tested at Colorado School of Mines' Lunar Testbed Facility

Desired Skill Set for Students:

We understand that all the students in the group might not have the desired hard technical skill. As long as they have the ability to problem solve and the willingness to learn then our engineers can help teach some of these hard-technical skills.

- ROS
- C++
- Python
- Familiar with Linux
- Raspberry Pi /Arduino Experience

Preferred Team Size: 3-5 Students

Given the scope of this project a group of 5 students is preferred but 3 students could also excel given they are willing to problem solve and learn.

Internships at the End of The Course:

We are happy to consider offering internships at the end of the course. We have hired students from all three of our previous Field Session Teams.

Intellectual Property:

Lunar Outpost will retain all intellectual property developed as a part of this Field Session.

Location Where Work Should Be Performed:

Depending on the situation, work will be done remotely, from campus, or from Lunar Outpost's office. We have offices in Golden and in Boulder, CO. The office in Golden, CO is located at 17700 S Golden Rd Unit 102 and has space for a student team. This office is less than a 5-minute drive from CSM campus and should provide a convenient location for the students to meet. We also provide free beverages and snacks to keep the team fueled throughout the day.