



Lunar Outpost SDE

Jeffrey Stenerson, Software & Electrical Engineer, (jeff@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. Department of Defense, NASA, local and state government organizations, and leading research institutions. Other ongoing projects include development of the MAPP rover, a robotic prospector designed to map resources and carry payloads on the lunar surface; deployment of the Canary environmental monitoring system in the energy sector and municipalities across the continent; and contribution to the Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE) onboard the Perseverance rover.

Description of Work to Be Done:

The goal of this project is to build a software development environment (SDE) that will be utilized to interact with Lunar Outpost's rover. The SDE will be able to visualize telemetry coming in from the rover and be able to create and send commands to the rover. Students will be challenged to create and design a graphical user interface (GUI) implemented using Qt that allows Lunar Outpost's employees to interact with the rover in an easy but efficient manner. This is a multidisciplinary project and will require designing and development of the GUI which will be used to interact with the flight computer of the rover.

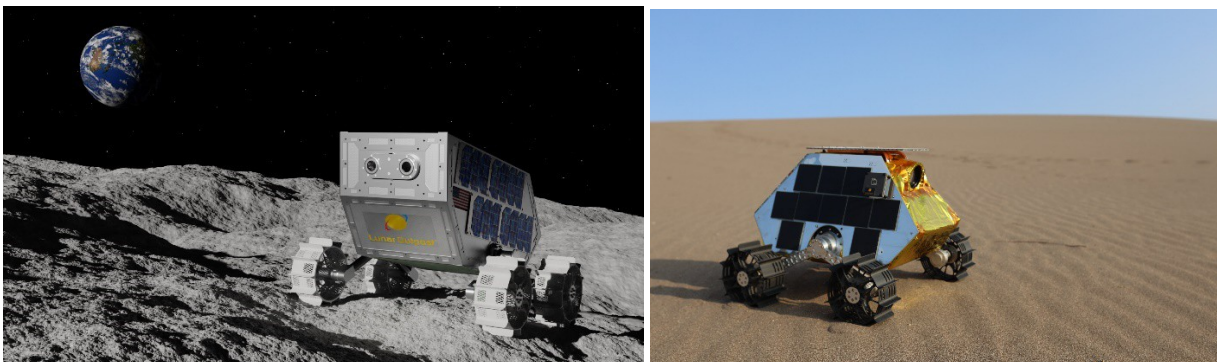


Figure 1: M1 MAPP rover and MAPP being tested at the Great Sand Dunes.

Students will focus their efforts on four specific areas:

1. Create communication interfaces to the rover using Lunar Outpost's internal ZEBCHAT application protocol.
2. Ability to dynamically create commands and accept telemetry from one or multiple Lunar rovers.
3. Ability to interface with physical and simulated rovers simultaneously.
4. Design an intuitive graphical application that engineers can use for both development and testing.

Reach goal:

- Ability to script reproducible test routines.

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. From there, the project overview will be created, and the work divided into tasks. As a final product, the Field Session team will develop a GUI that can interact with the rover.

Desired Skills for Students:

- C/C++
- Application design
- Qt

We understand not all the students in the group might have the desired technical skills. However, if they can problem solve and have a willingness to learn, they can excel in this project with the help of our talented engineers.

Preferred Team Size: 3-4 students

Given the scope of this project a group of 4 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.

Location Where Work Would Be Performed:

We have offices in Arvada, CO. This office is less than a 15-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.