

Robotic Mining Competition

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Client: Robotic Mining Competition team, NASA

Meeting Times: Wednesdays, 4:00pm - 5:00pm; Fridays, 3:00pm - 3:30pm

The goal of this project is to provide the client, RMC, with working software subsystems that will guide the movement and mining of their robot, both manually and autonomously. As the rest of the team is made up of aerospace and engineering students, they do not have the same depth of knowledge in implementing the software needed, specifically for the autonomous movements of the robot. I will help bring Software systems to ensure stable traversal over lunar terrain, both manually and autonomously. Software systems to ensure stable mining of lunar material, both manually and autonomously. This software should also be able to communicate how and when lunar material should be excavated and deposited.

Features:

- Base software allowing for use of traversal and mining capabilities.
- Automated maneuvering software, should be able to correct any difficulties in navigating terrain.
- Automated mining software, should be able to determine when material should be mined, how much has been mined, and when to stop.

Technical challenges: I have little experience creating an autonomous system. However, there will be a much better understanding on them as classes are being taken this semester over these exact topics, and there are several good resources at the school I can go to for help.

Milestone 1 (Oct 2): itemized tasks:

- Review the code level and select the language in which to use for developing the subsystems
- Provide small demos within selected language
- Create Requirement Document
- Create design document
- Create test plan

Milestone 2 (Oct 30): itemized tasks:

- Implement a simulator
- Design test vectors for main requirements that can be verified by simulator
- Look up documentation of involved hardware
- Research relevant algorithms for autonomous tasks

Milestone 3 (Nov 27): itemized tasks:

- Implement code in simulator that passes test vectors
- Implement unit tests for verifying simulated code
- Look up libraries for selected algorithms from task 2
- Implement/adjust any missing or existing techniques

Faculty Advisor Approval

"I have discussed with the team and approve this project plan. I will evaluate the progress and assign a grade for each of the three milestones."

- Signature: _____ Date: _____