



# Mars Mining Robot Team

# C.E.R.E.S.

Computerized and Enhanced Robotic Excavation System



# Milestone 5

- Networking - We developed a UDP server that runs on startup and closes on shutdown of the Jetson TX1. It listens from a port (2356) for the workstation to send it a command. These commands will either be for it to work autonomously or manually. If it runs manually, this server will also be used to send the commands on what the robot should do. We ran into a minor problem parsing standard input from the UDP server to a python program. The python program is designed to run whichever function is passed to it. The code is a small while loop that is always listening unless the message “shutdown” is passed to it. For some reason, the while loop is refusing the break when it is told to.
- Software to interact with hardware - We have decided to use I2C to interact with the arduino chips in order to control the movements of the robot. Our current obstacle is getting the libraries for I2C working on the specialized operating system of our embedded machine (Tegra for Ubuntu).
- Autonomous Functionality - We have not made much progress on the autonomy functionality due to the obstacle encountered with the networking and I2C. We plan on working on this over the next few weeks.
- Poster - The poster was completed by the whole Nasa Robotic Mining Team.

# Milestone 5

Tasks	Completion	Catherine	Nicholas	To Do
Finish implementing and testing Networking functions	90%	90%	10%	Finish writing a program to talk to the UDP server, and finish writing a program that will take the messages sent to the server and parse them to the necessary functions.
Finish implementing and testing Software that controls hardware	70%	50%	50%	Finish ironing out the bugs with the I2C software on Tegra for Ubuntu.
Continue/finish design, implement, and test autonomous functionality	30%	50%	50%	Develop software to control the movement of the robot autonomously.
Create poster for Senior Design Showcase	100%	20%	80%	N/A

# Milestone 6

Task	Catherine	Nicholas
Finish implementing and testing Networking functions	Finish developing a program that will receive the messages from the UDP server.	Continue to test video feeds from one computer to another.
Finish implementing and testing Software that controls hardware	Continue to implement I2C on the embedded system and synchronize it with the arduino chips.	Continue trouble shooting the camera and work on integrating the software onto the embedded system
Continue/finish design, implement, and test autonomous functionality	Continue to get the python program functioning, and write the functions to control the different arduino chips.	Continue to work on verifying the localization system.
Develop a User Manual	Develop a user manual for someone else to understand.	Develop a user manual for someone else to understand.
Develop a Demo Video	Develop a Demo Video	Develop a demo video

## Milestone 6

- Networking Functions - Once the python program is finished and receives the messages from the UDP server, another server will be set up on the robot's workstation in order to pass messages back and forth. After these servers and messages have been established, video feed will be passed from the robot to the workstation so that those monitoring/controlling the robot will have visual on the robot.
- Software that controls the hardware - After the issues have been worked out running I2C on Tegra for Ubuntu, programs will be developed in order to control the different arduino chips. These chips will control the movement of the robot. After these programs are developed, a program will be developed to either control it manually or autonomously.
- Autonomy - The next steps for autonomy will be to develop a program that will control the arduinos autonomously. Once that is developed, we plan on working with the video feeds in order for the robot to navigate the terrain without a user. Plus, the robot will send this video feedback to the workstation in order for people manning the station to see what the robot "sees".
- User Manual - A user manual will be developed in order for someone besides us to man the robot. This user manual will be developed in sequence with the rest of the Robotic Mining Team. It will entail how to run the software autonomously or manually.
- Demo Video - A demo video will be developed. This video will be used in order to demo the system. This video will be provided on our website.

