

# **COMMAND-AND-CONTROL SUBSYSTEM FOR REGOLITH MINING ROBOT**

Test Plan

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**Introduction:** The Command-and-Control subsystem for Project ARES will be the software interface that allows us to move the robot, collect sensor and configuration data, and send it back to the control station. Additionally, the software on the control station will be used to control the ARES robot.

ARES is a robot that will mine lunar soil simulant at NASA's Robotics Mining competition in May 2016.

**Unit Testing:** Unit testing will be done over the course of development using small tests to verify atomic segments of the project's functionality. As software components are built, their functionality will be verified.

**Performance Criteria:** The software will initially be tested on the hardware and test data will be based on communications throughput, input-to-response latency, and stability of the connection/controls. When the robot hardware is finalized, testing will occur using the final hardware to verify robot functionality.

**Beta Testing/acceptance testing:** Beta testing will involve trial runs by mining ordinary sand and ensuring robot control works as expected and responsively. Acceptance testing will happen as required by the project manager or competition faculty sponsor.

**System Testing:** Upon any requirement changes, the software system shall be re-tested for functionality and compliance with new requirements.

## Test Cases:

1. Robot is able to move on (and mine) sand and sand-like material using the command-and-control subsystem software and control station.
  - *Success:* The motors spin and the robot moves
  - *Failure:* No response from the robot
2. Power consumption, communication signal strength, and battery life are able to be measured and shown.
  - *Success:* Power, signal, and battery life are displayed on the control station GUI
  - *Failure:* The GUI's robot information fields are empty or incorrect.
3. The robot is able to orient itself in the arena and know which direction it's facing.
  - *Success:* The orientation of the robot is displayed on the control station GUI.
  - *Failure:* The orientation field of the control station gui is incorrect or blank.

More test cases and information regarding them will be added as the project progresses and performance criteria are identified.