Video script.

Hi, I’m Dan from Team 10 and I’m going to explain the main features of our rover.

Structure

The frame of the rover is made from Plywood. Plywood is light, strong and easy to machine. The frame was designed to be simple and strong. Structural members are multi-functional. For example, the floor of the regolith container has three functions. It is the main structural member; it contains the regolith and the electronics are mounted on the underside. The rover is fabricated with nuts and bolts, allowing easy assembly and disassembly for maintenance and transport.

Drive system.

Our rover has for wheel independent direct drive. Each wheel has its own motor and gear box with full proportional speed control. This system was simple to implement as each motor/gearbox combination mounts directly to the frame. Four-wheel drive gives superior performance on sand. The skid steering allows precise manoeuvring as the rover can spin on its own vertical axis.

Control

The rover is controlled remotely by a 2.4GHz transmitter. The control interface is intuitive with direction control by the right two-axis joystick. The regolith scoop is controlled by a left-hand single axis joystick. The regolith is dumped via a switch on the transmitter.

Microprocessor & electronics

The brain of the rover is an Arduino Mega 2560. The control software easy to update and test via a programming port on the rover. This means the scoop and directional control can be customised to different environments easily. The electronic system includes a current sensor so energy use can be monitored in real time. The electronic system is modular and easily accessible. Any component can be replaced in minutes.

Regolith collection

The regolith is collected in the scoop which can be raised or lowered to any position. When the scoop is fully raised the regolith is dumped into the container. Regolith is easily dispatched by a simple gravity fed system. The scoop and collection bay have a replaceable liner. Maximum capacity is 3 kg with a working load of 2.5 kg. The rover has a demonstrated regolith collection rate of 500 grams per minute.

Power & Energy Efficiency.

Power is provided by a lightweight, energy dense rechargeable 1450 mAh Lipo-Batteries. The rover can operate continuously for 20 minutes on a single charge. The rover has a demonstrated energy use of approximately 4.6 kJ per kilogram of regolith collected.