

Rover Project

Colorado State University

Daiana Bilbao¹, Logan Dahlgren², Huanjia Liu³, Miles Wood¹
¹Computer Science, ²Mechanical Engineering, ³Electrical Engineering

Overview:

The goal of this project was to design and build a fully functioning rover that would be able to navigate through the obstacles presented at the Great National Sand Dunes in Alamosa. We largely considered the terrain and obstacles we might encounter on the course.

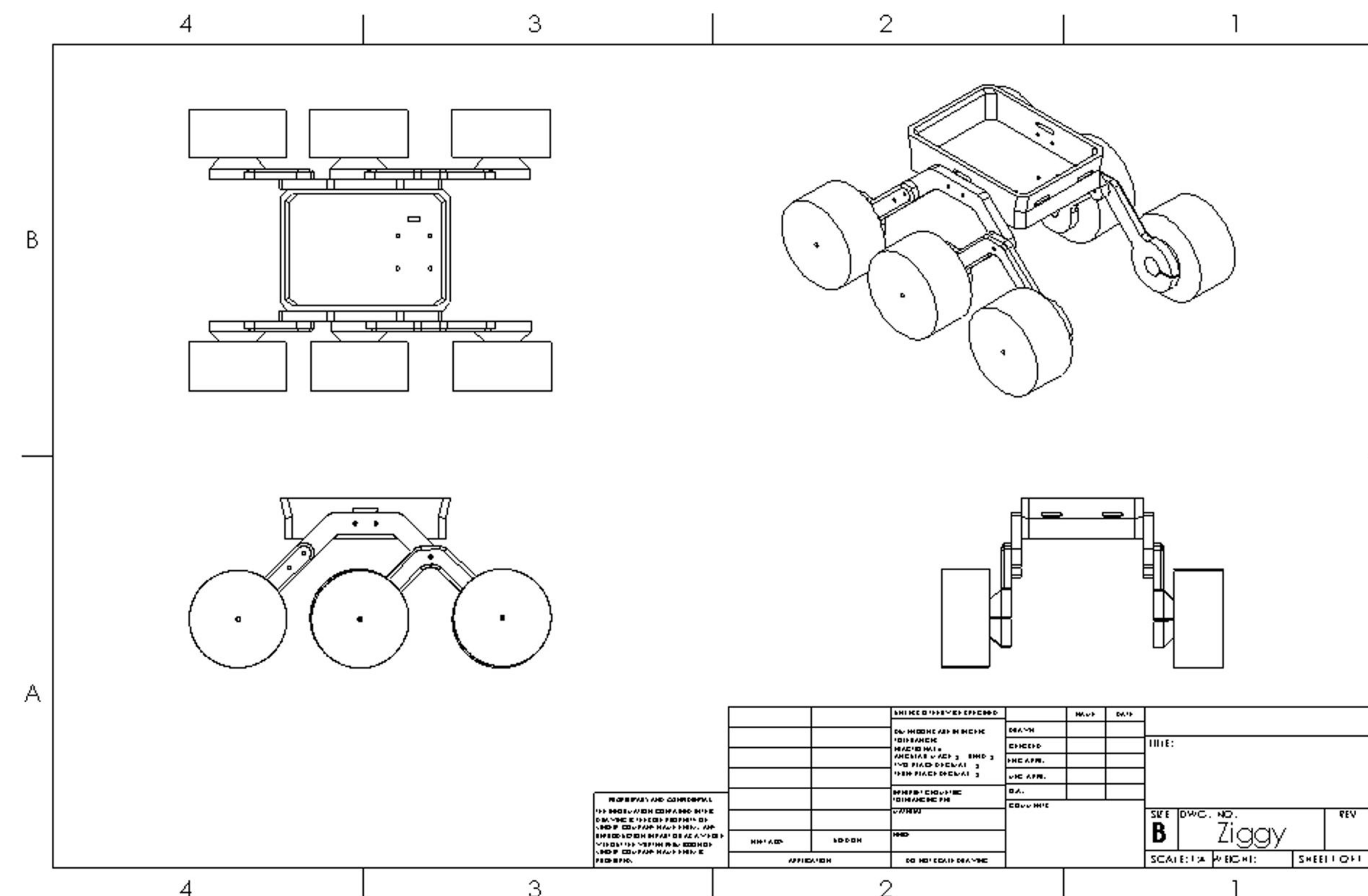


Electronics:

Arduino Romeo
2 ultrasonic sensors for object avoidance;
Compass
Xbee: Determine robot heading by beacon
Motor driver
Motor: 98 RPM DC motor
Battery: two 3000mAh 3.7V battery in series
Voltage booster: booster converter module to amplified voltage to 12V

Hardware design

For the body of the rover we chose to use a rocker bogie design, which allowed us to gain much more maneuverability when compared to a body that uses traditional shocks. The material that the body is made of is a 3D printed PLA plastic, which was chosen due to its lightweight, rigid properties. This also allowed us to rapidly change our design and prototype more easily.



Software

Simultaneous processing of beacon direction and motor control.
Successfully tracked beacon and was able to direct the robot towards it.

Problems Encountered:

1. Insufficient battery capacity
2. Six-wheel structure is inconvenient to turn

Future improvements:

1. Use more power tolerance wires
2. Use deep learning to learn to control the robot through experimentation



Results

Our robot did not successfully complete the robotics challenge at the sand dunes due to issues with our battery and power tolerance of our wires. We also concluded that using six drive wheels was not a practical decision.

Overall, it was a success in terms of learning more about robot development and now know how we would approach this project differently next year.