



## **Ram Rover**

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### **Abstract**

Our project's main challenge is to create a "rover" type vehicle to autonomously navigate loose sand terrain with varying obstacles. This is through a competition involving multiple different universities and obstacle courses to navigate and is meant to simulate common terrain a rover would have to navigate on unknown terrain. To achieve this the rover is designed using a "rocker-bogie" motion system, developed by NASA, where two large front legs are fixed to the main body and two rotary smaller legs are attached at the back of the larger legs resulting in a six-wheel system. This design stuck out particularly because of its robust adaptability to varying elevation and terrain with added traction from six wheels as opposed to the common four. All frame and body components, excluding fasteners, are made of PLA printed from a 3D-printer making the design lightweight and highly iterative for easy testing and redesign. We are using a Raspberry Pi 4, an Arduino as a motor controller, and various sensors such as the RP-LiDAR which is a 360-degree 2D lidar, a webcam for slam tracking, and an IMU to help fill in the position when the sensors are in between recording data. After extensive research, we went with ROS as our framework because it is a widely used software platform in the robotics world and all the software components already chosen had drivers written for it drastically cutting down the work needed to get these components from the drawing board to working in the real world. Combining these components shows a new way of solving the problem of navigating unknown terrain. We have yet to perform testing however we are confident our device will be able to traverse most if not all terrain it comes across and we will know after more testing and iterations.