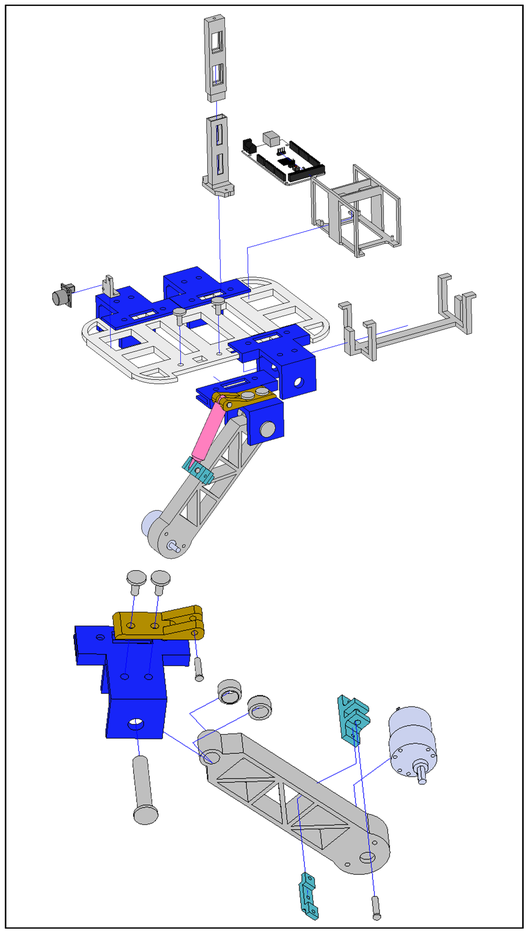
Ares

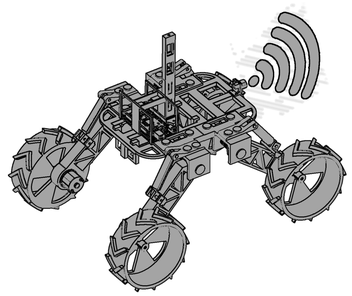
Credit: Bruce Bell, Ryan Wade, Hiram Saucedo, and Raechana Hong

Structural Components



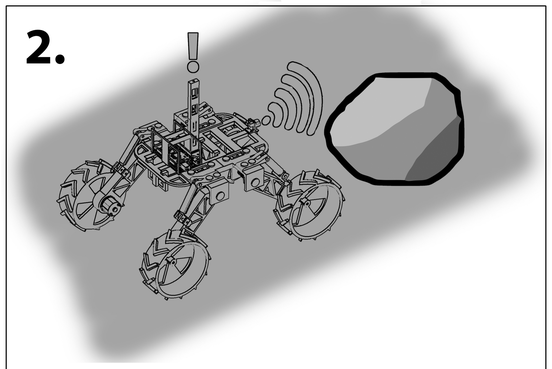
Method of Autonomous Navigation

1.



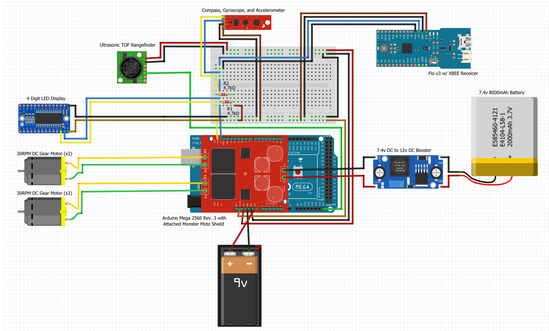
Ares attempts to estimate the heading it should drive by recording the signal strength of a rotating directional antenna on a beacon which is broadcasting the heading of the antenna. Ares begins driving forward turning slowly towards the heading of maximum signal amplitude. All the while Ares is emitting an ultrasonic ping to search for obstacles in its path.

2.



When Ares detects an object closer than 45cm it begins its avoidance subrotuine. Ares will stop in place and execute a zero radius turn to the left untill no objects are detected inside of the minimum range. Ares will then return to its routine in box 1.

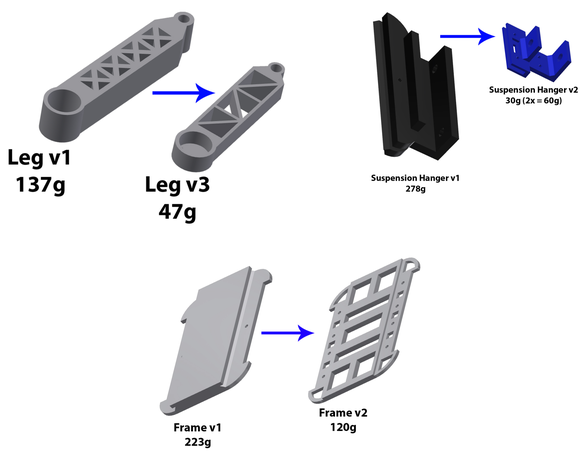
Control Systems



Structural Considerations

- Some parts were revised multiple times for reductions in mass after prints provided more strength than needed
- The majority of the parts were designed to be easily printed with minimal supports or features that are difficult for a 3D printer to replicate accurately
- Design goals were a large ground clearance and a square footprint to allow Ares perdictable skid steer style steering

Mass Reductions



Great Sand Dunes Test

- Ares overall exceeded expectations
- Suspension system functioned beyond expectations and was bale to articualte over objects, allowing for continous wheel contact with a surface for traction
- Ares was able to demonstrate it could detect varous objects, in both size and composistion as expected
- Ares demonstrated that it was correctly receiveing beacon output and calculating a heading
- Unfortuantly Ares' internal compass was malfunctioning, hindering expected navigation