2015

Mars Rover - URC

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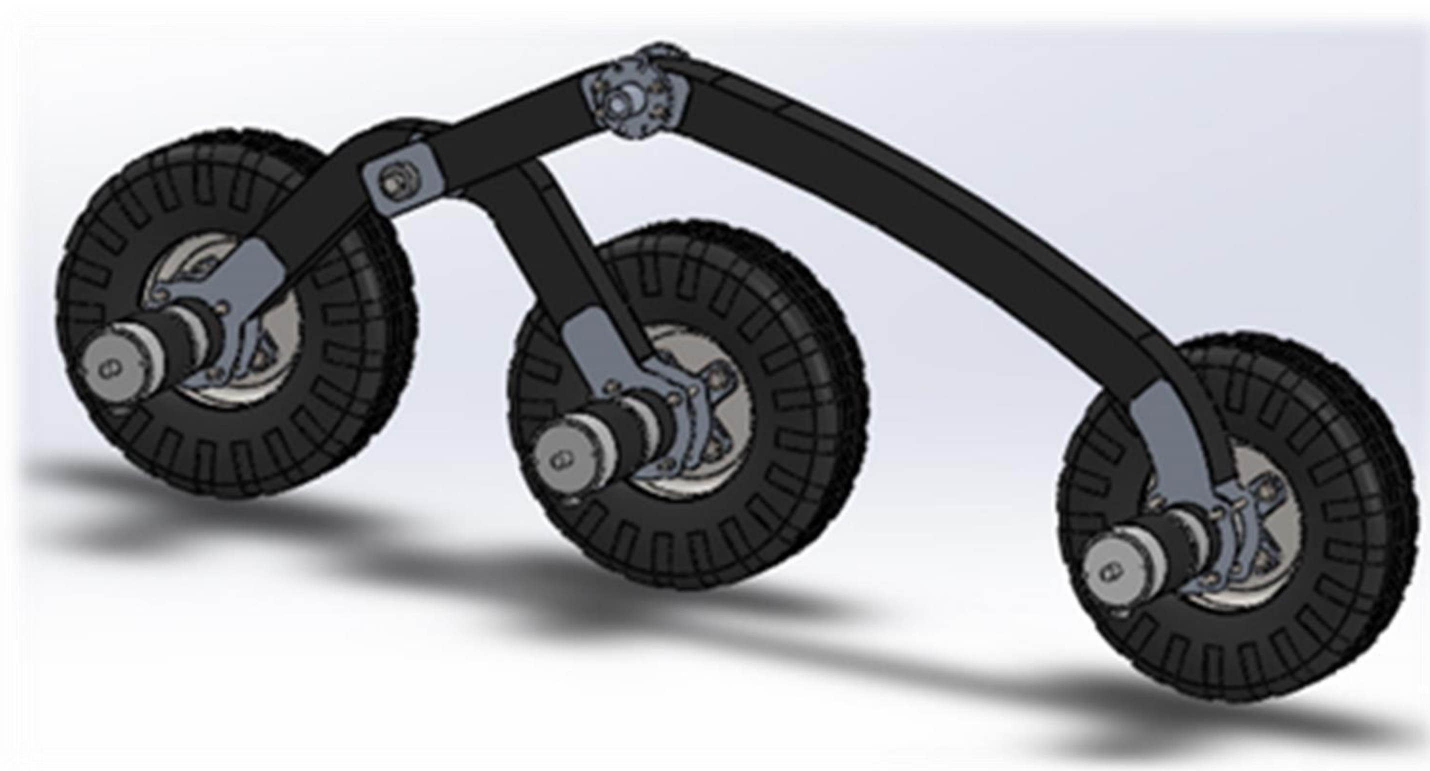
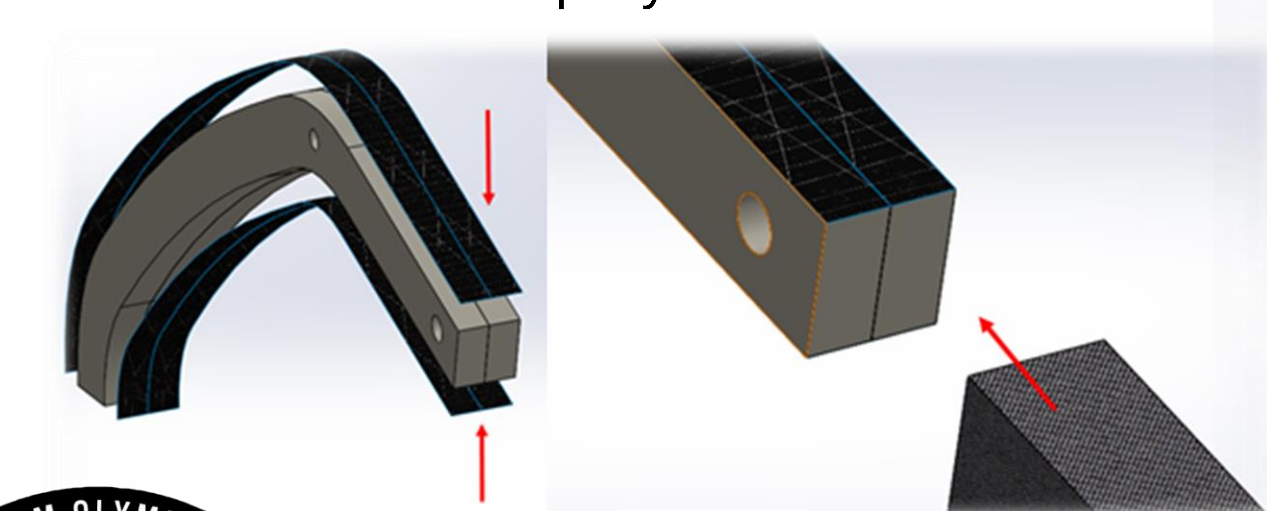
Design Criteria

The Rover's key design components that will allow it to overcome the tasks in the competition are the suspension, differential, and motors. The suspension was designed to overcome a 60 cm tall flat vertical face without tipping or falling back on itself. The suspension was run through a SolidWorks simulation and numerous iterations to help in testing the suspension's limitations. This will be especially useful in the competition's terrain traversal task, and allow us to overcome numerous obstacles.



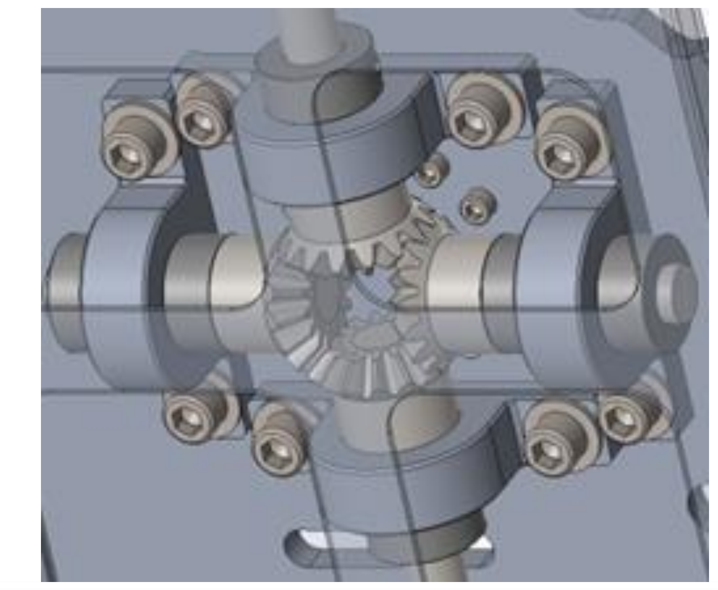
Composite Structure

The core of the Rover's composite suspension is composed of structural PVC foam. The foam was then glued together and received a layer of unidirectional carbon fiber on the top and bottom surfaces. Once cured, the whole assembly was put inside a composite sleeve and coated in epoxy.



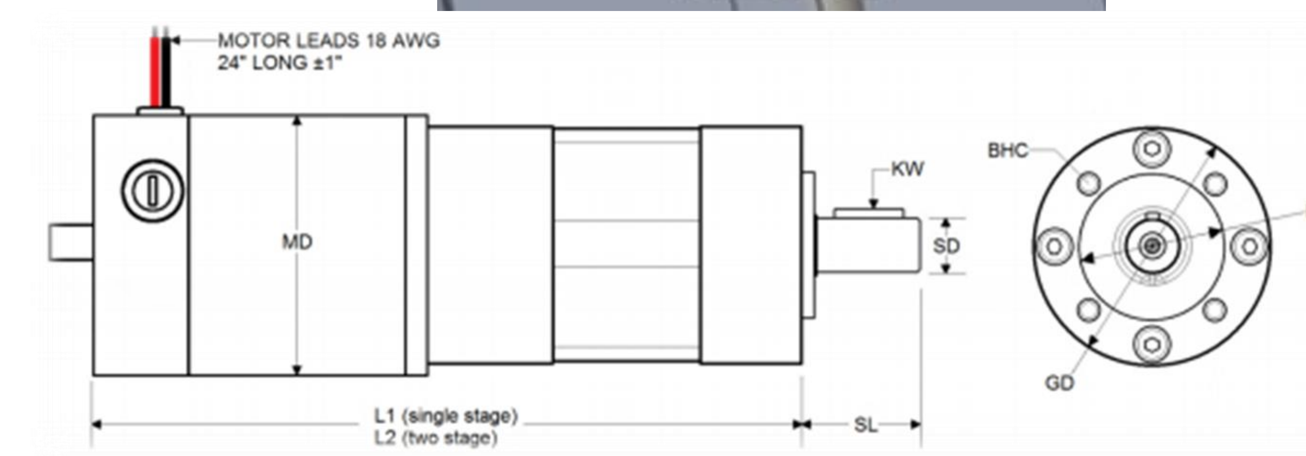
Passive Differential

The differential allows for the top plate of the rover to remain level across any rough terrain it may encounter, while assisting the suspension in navigating rough terrain. This component will be essential for the astronaut assistant task, tool retrieval, and the science task. The differential is also mounted on the rover's undercarriage to optimize the space available on the main body plate for the robotic arm, controls hardware, and the science tools needed for the competition.

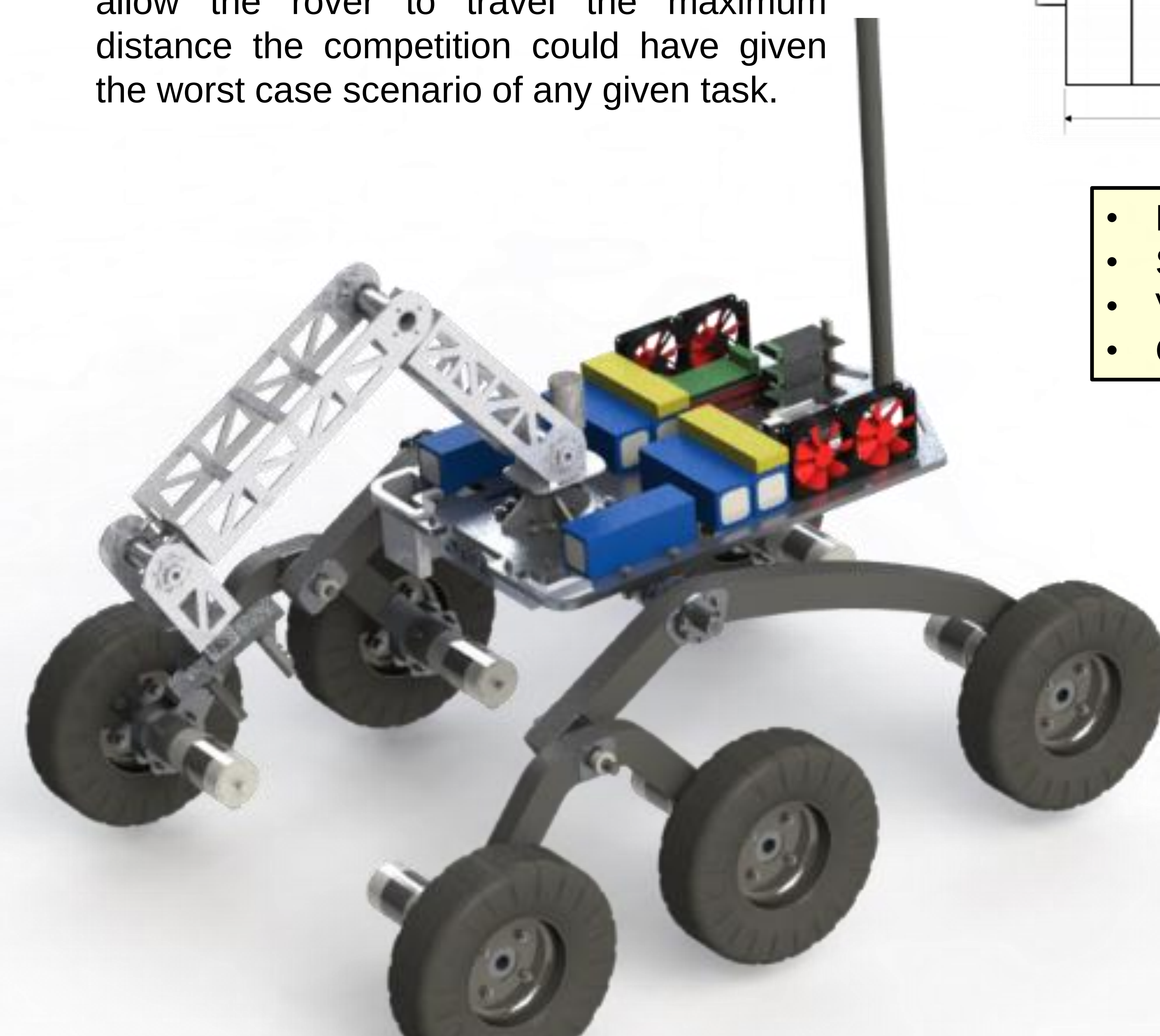


Motors

The motors were selected to provide enough torque to lift the rover over a 60deg slope and still have enough RPM to allow the rover to travel the maximum distance the competition could have given the worst case scenario of any given task.



• Peak Torque	89 In-Lbs
• Shaft Output Speed	194 RPM
• Voltage	24 DC Volts
• Current	3.5 A



University Rover Challenge

The Mars Society created the University Rover Challenge (URC), which challenges universities in designing and building revolutionary rover systems capable of completing various tasks:

1. Astronaut Assistance
2. Equipment Servicing
3. Terrain Traversal
4. Sample Analysis

University Rover Challenge

These tasks are fundamental for any rover that would operate in close contact with astronauts on Mars. This is the first year that Florida Tech submitted a proposal to participate at this international competition.

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