Life Support System Assembly Tool

FAMU-FSU Engineering

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Objective

The life support system (LSS) assembly tool will transport the LSS payload from a lander to the designated location of the lunar base.

Challenges

The moon presents many challenges. Relevant to this project is regolith, the sharp dust that coats the lunar surface. Observing past missions, specialized wheels are utilized to traverse the lunar surface. Other issues include lack of atmosphere, lack of resources, and cost of transportation to the Moon.

Design

The current design, deemed RAPToR (Robotic Arm Payload Transportation Rover), consists of a vehicle with meshed wheels and 5 DoF robotic arm with 3 linkages, including an end effector. The robotic arm will secure the payload throughout loading and unloading.

Future Work

The final hardware design will implement a mechanism that lifts the bed of the vehicle. An image processing subsystem will be used on the robotic arm to grab the payload. Testing can begin once each individual subsystem is assembled. After this, we can begin final product assembly and testing.

Acknowledgements

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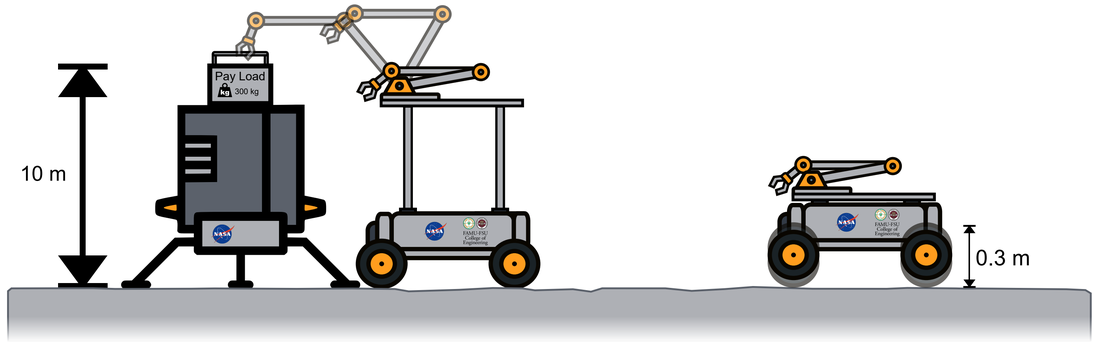

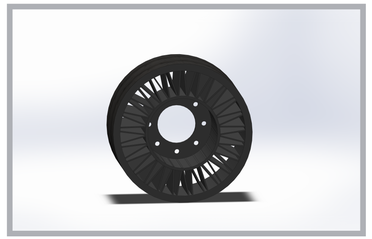

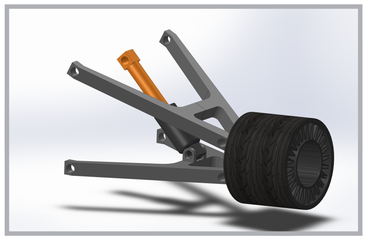

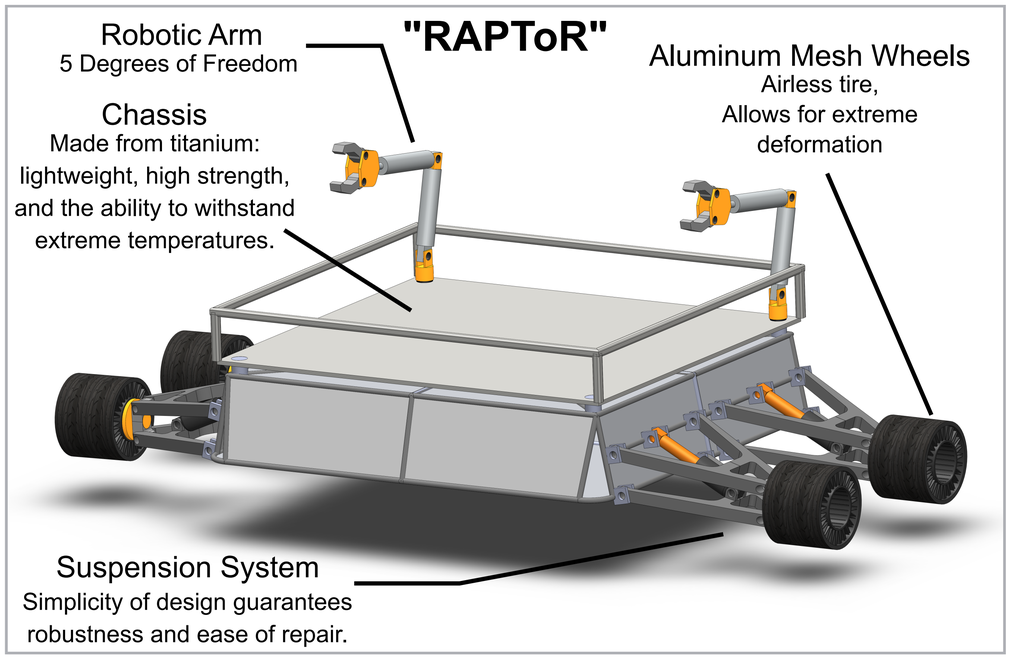

Weight: **~1950 kg**

Height: **~1.7 m**

Objectives:

Traverse **1.5 km**

Lift a **300 kg** payload from a **10 m** high lunar lander

Negotiate up to a **15 degree** incline

Future Design Work:

Develop a scissor lift mechanism to lift payload bed.

Incorporate image processing software and hardware to enable autonomous control of robot arm.

Develop a grappling mechanism that ensures stability of RAPToR during loading process.