

## Objective

The Local Vertical Leveling System (L.V.L.S.) will create a level working environment inside the lunar lander that allows the astronauts to traverse the lander.

## Our System

The L.V.L.S. consists of four (4) linear actuators that can be independently controlled to manipulate the plane of the lander. The system will be fully retracted upon landing and can be leveled by raising and lowering pairs of actuators. The ability to raise and lower the platform decreases the required height displacement to level. The actuators will have ball joints that connect them to the lunar lander to minimize induced torque.

## Future Work

The future work for this project would be to include another leveling system within the legs with similar actuators in order to further increase the level capabilities of the whole lander for stability, instead of just the cabin. From there, the work would be fine tuning the accuracy of the lander system when integrated into the current system to ensure it functions properly.

## Acknowledgements

Team 516 would like to thank Dr. Shayne McConomy, Dr. Dorr Campbell, Rachel McCauley, Andrew Wayne, and Richard Knochelmann for giving us their time and knowledge.

# L.V.L.S.

## Local Vertical Leveling System

### Linear Actuator Leveling

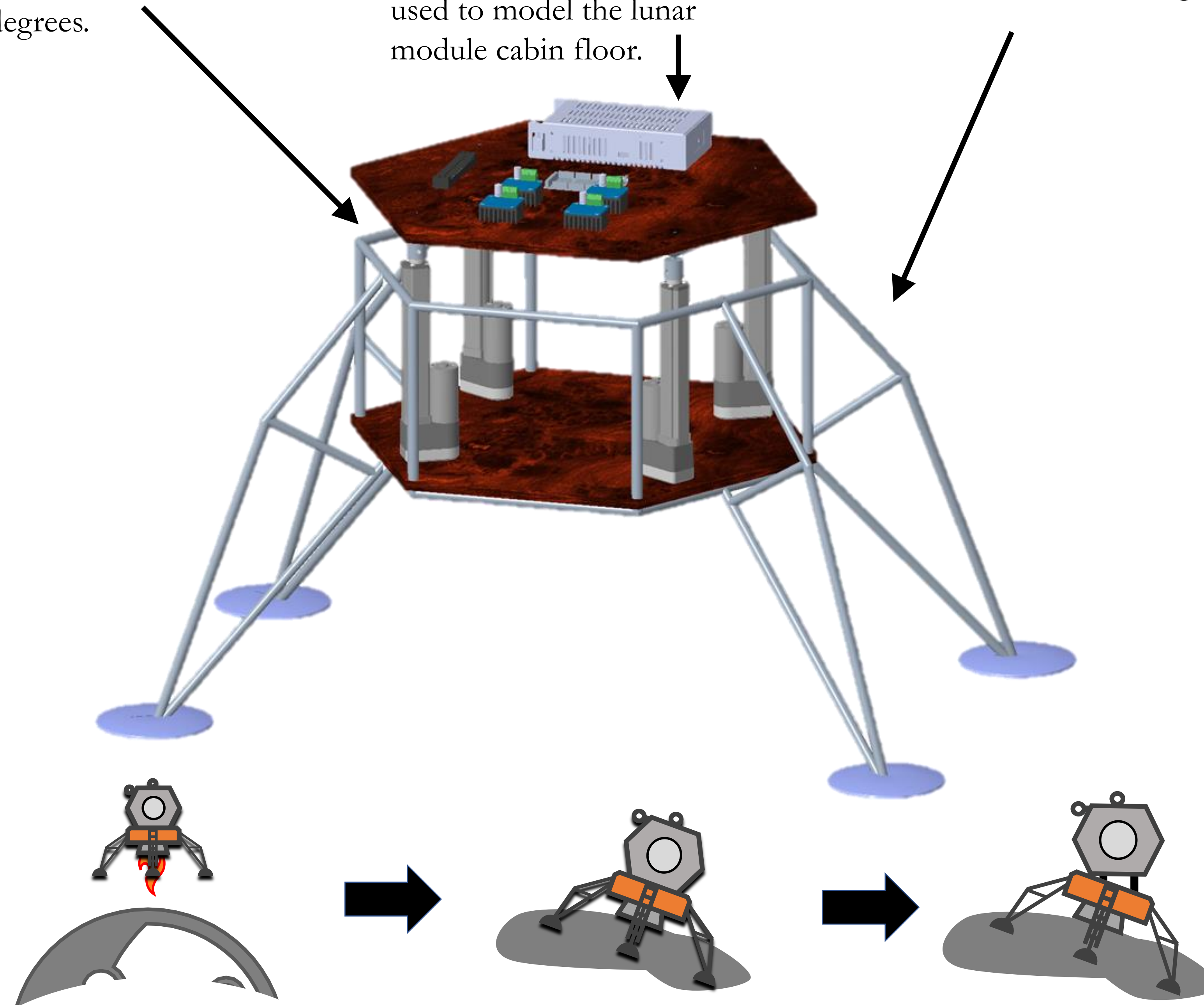
Four linear actuators are placed in an orientation that will give us the most change in angle possible in order to reach the goals of  $\pm 12$  degrees.

### System Logic & Electronics


Half inch wooden platform used to support our IMU, Arduino control system, and power source. Will also be used to model the lunar module cabin floor.


### Sub-frame Assembly


Half inch outer diameter tubing made from aluminum – 6061. Composed of a welded frame and leg assembly. Used to model the lunar module legs.



## Target Goals

 Level a  $\pm 12$  effective slope


 Support 14-16 Metric Tons

 Reusable up to 10 Missions

 Level Within 1 Hour

## Environmental Challenges

 Regolith

 Temperatures from  $-280^{\circ}\text{F}$ - $260^{\circ}\text{F}$

 Radiation

 Cold Welding

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