



Concept Design Review



NASA Lunabotics Competition Team 15: Hexcavator

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C. Robert Sistare

Devin Walden



The Issue

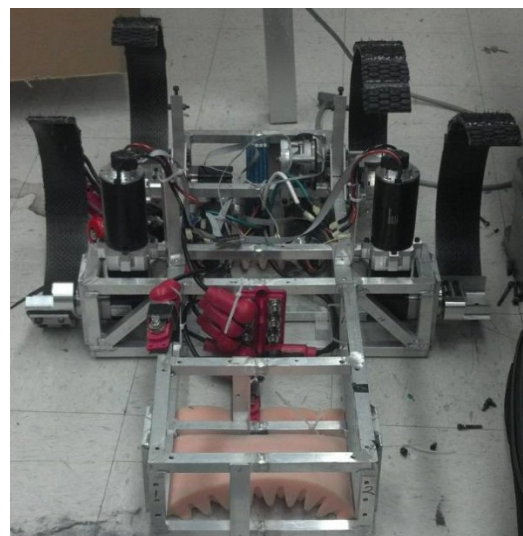
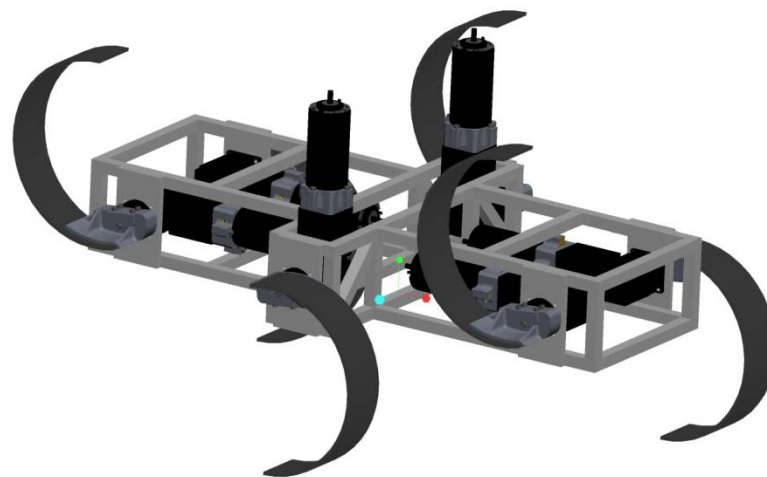
- Moon has un-mined resources
- Resources give insight on moon settlement
- Difficulty involved with excavating remotely





The Task

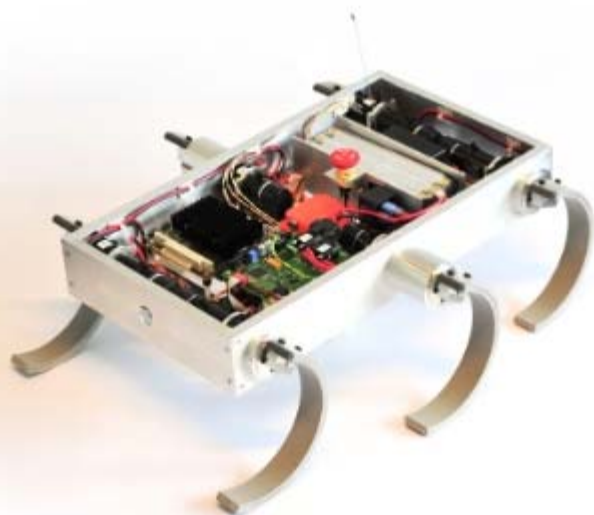
- Last year
- Capable of excavation
- Controlled via WiFi
- Limited size
- Handles an environment with obstacles





The Solution

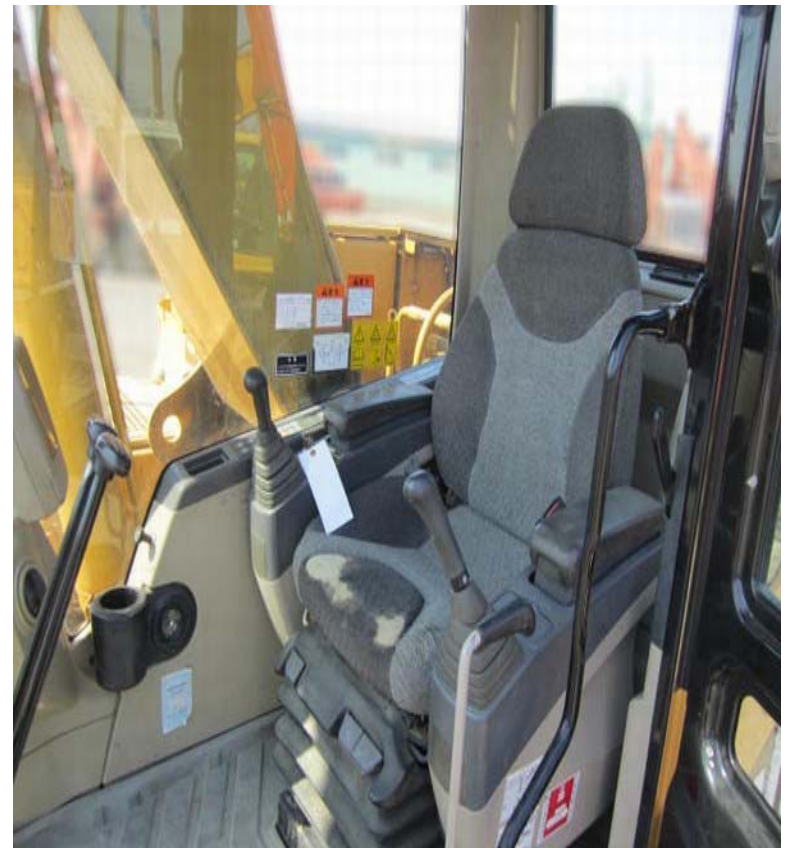
- Hexapedal robot
 - RHex family
- Attach excavation system





Excavators

- Compact/Mini Excavator
- Dragline Excavator
- Long Reach Excavator





Compact Excavator

- Definition
- Pros
- Cons





Dragline Excavator

- Definition
- Pros
- Cons





Long Reach Excavator

- Definition
- Pros
- Cons





Artemis FSU Lunabot





MSU Lunabot 2010



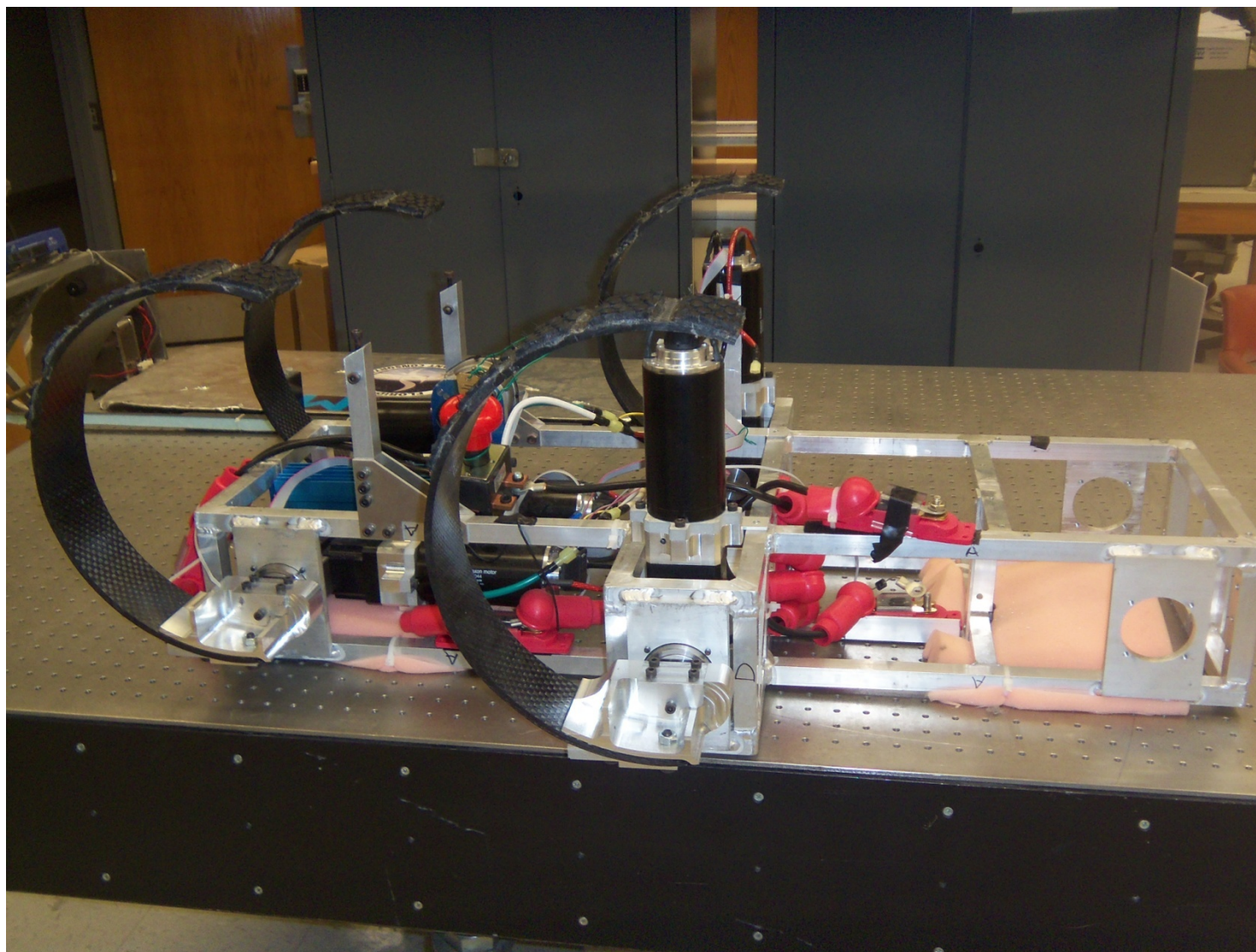


Laurentian University Lunabot 2011



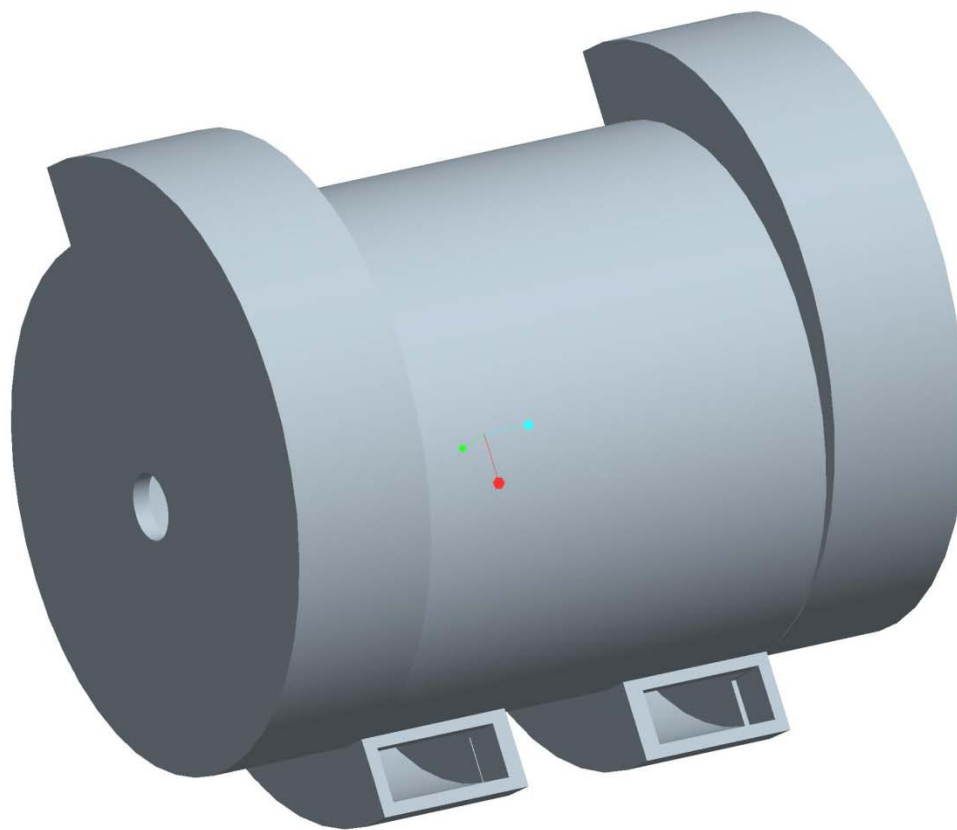


Hexcavator



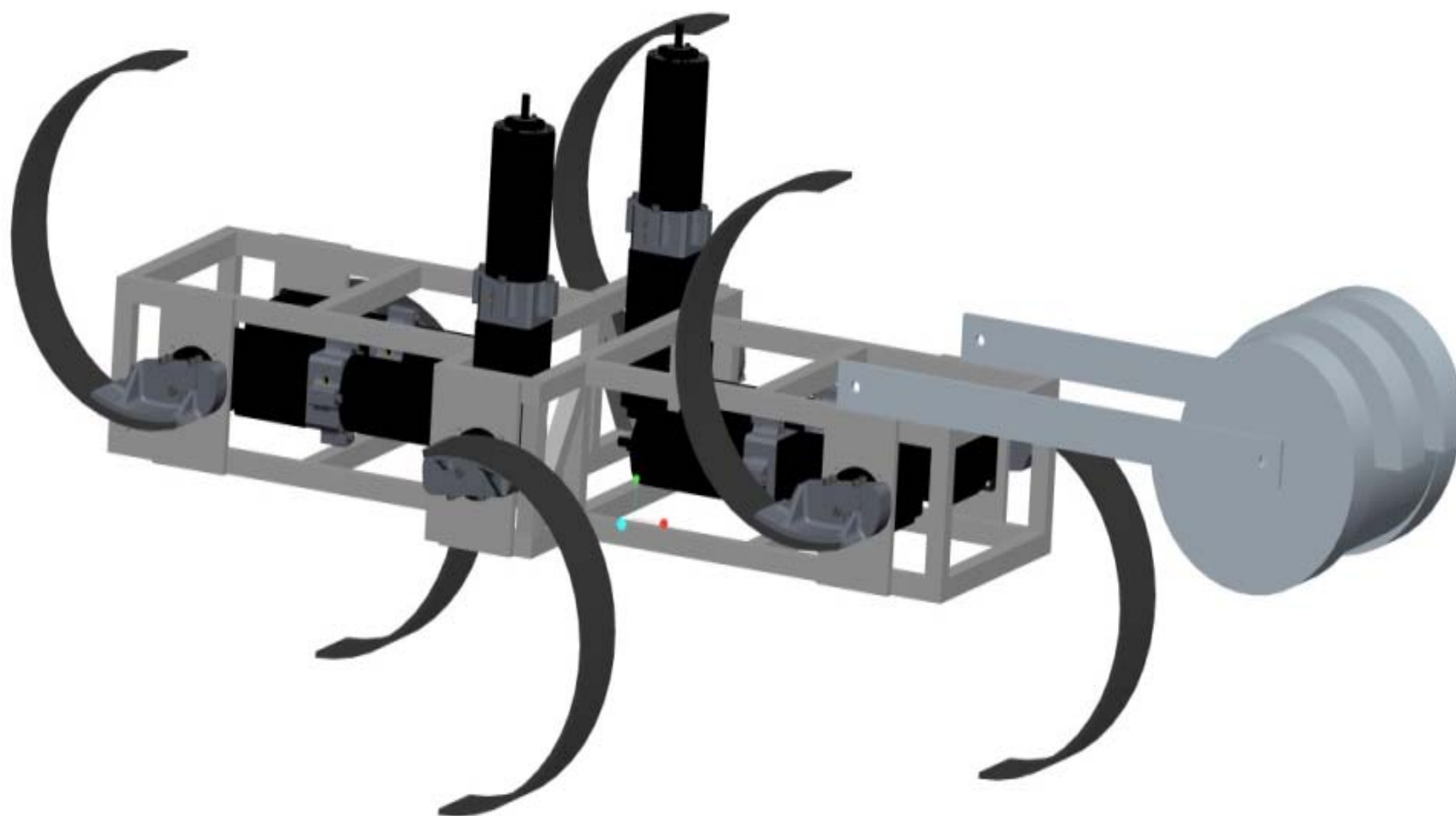


Design 1: Excavation Drum



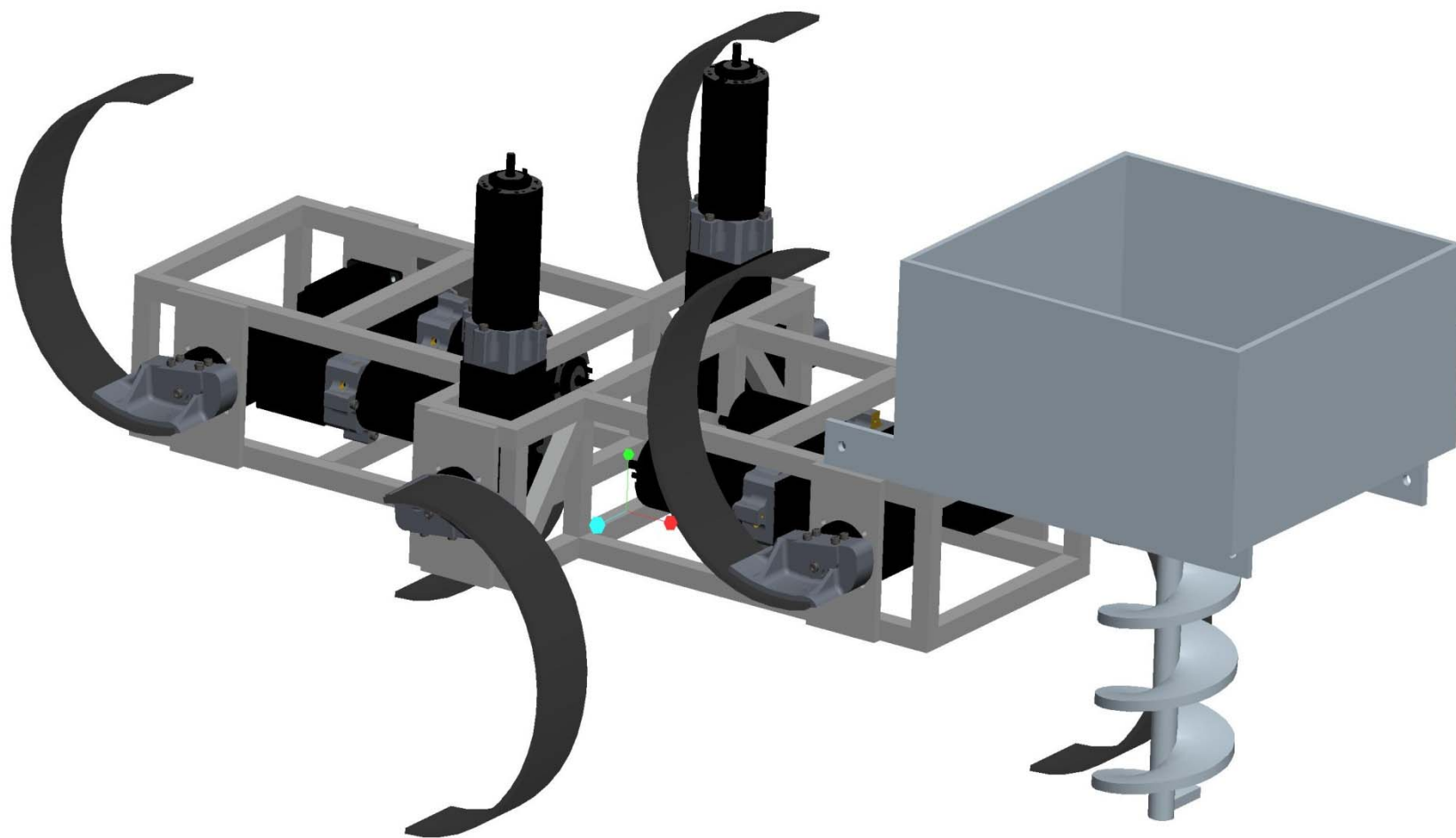


Design 1: Excavation Drum



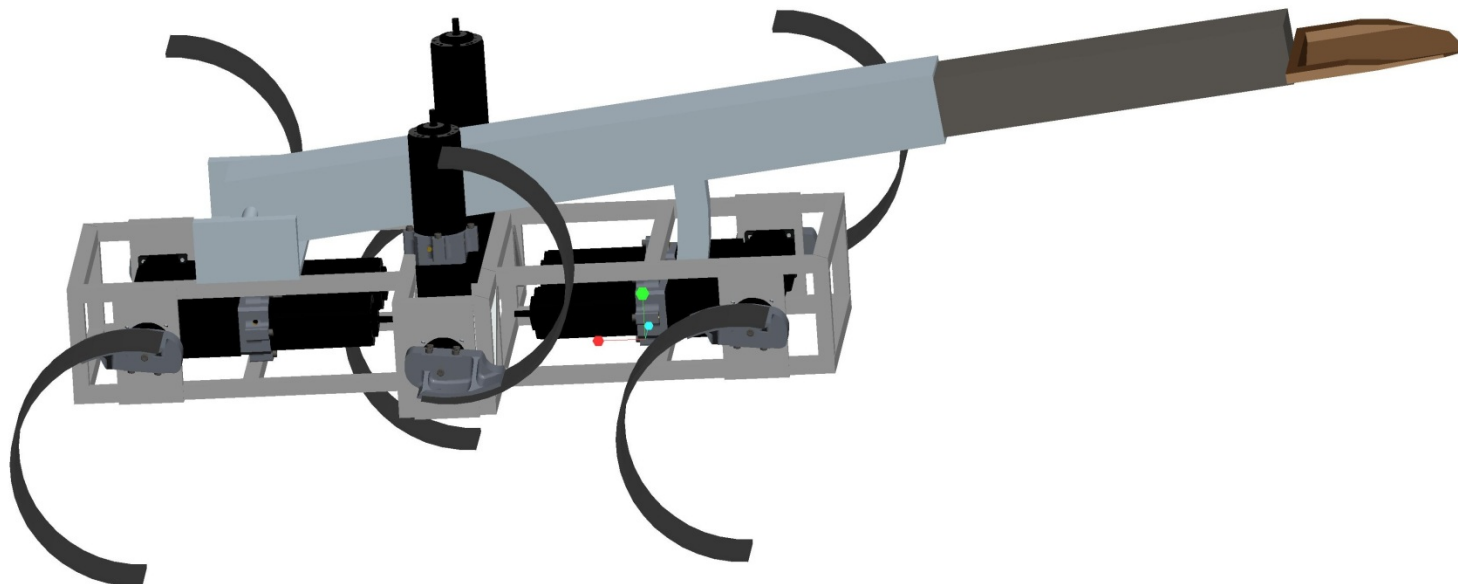


Design 2: Auger





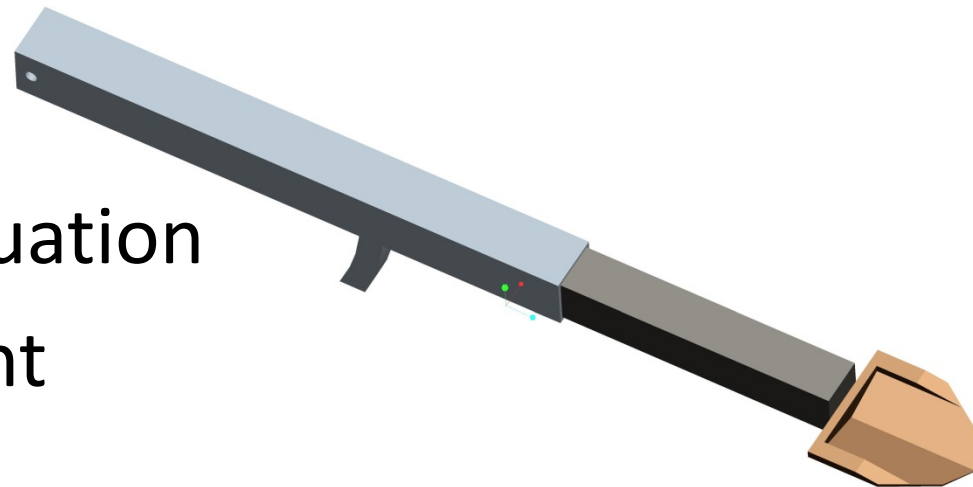
Design 3: Shovel and “Screw Jack”





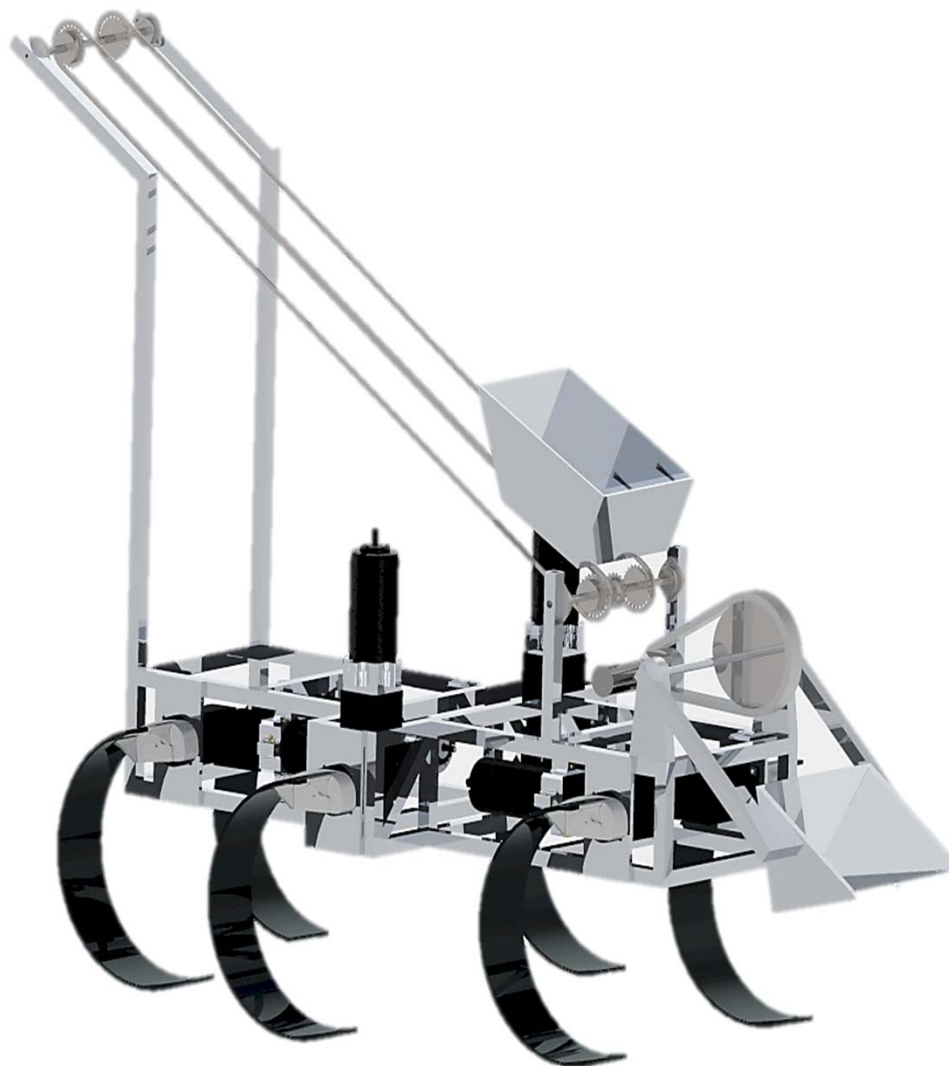
Design 3: Mechanism

- Arm Fixture
- Shovel Head
- Motor System
- “Screw Jack” Actuation
- Hexcavator Mount
- Raising Arm
 - Motor Actuator





Design 4: Shovel and Dump Bucket





Questions?





Works Cited

- http://www.youtube.com/watch?v=wluRVr8z_WE
- NASA. "NASA - Lunabotics Mining Competition." *NASA - Home*. Web. 19 Oct. 2011.
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- "Backhoe Excavator - Construction Excavator." *Backhoe Excavator - Construction Excavators*. Caterpillar, 18 Oct. 2011. Web. 21 Oct. 2011.
- Galetovic, Joe R., Terrence J. Toy, and George R. Foster. *Guidelines for the Use of the Revised Universal Soil Loss Equation (RUSLE), Version 1.06, on Mined Lands, Construction Sites and Reclaimed Lands*. Denver, CO: Office of Technical Transfer, Western Regional Coordination Center, Office of Surface Mining, 1998. Print.
- "Everist Reservoir - Dam & Reservoir Design by Deere & Ault Consultants, Inc." *Water Rights - Dam & Tunnel Engineers*. Deere & Ault Consultants, Inc. Web. 24 Oct. 2011. <<http://deereault.com/dam-reservoir-design/everist-reservoir.php>>.