NASA · HADES · SDSU | San Diego State University

Project Overview

*NASA's Lunabotics Competition* challenges students to use the NASA System Engineering Process to design and construct a prototype robot that demonstrates the technologies required for a sustainable human presence on the Moon and other off-world locations.

During the challenge, the robot will be placed in a randomly selected starting position and direction. The robot will then be manually controlled to the excavation zone, maneuvering around randomly placed boulders and craters with the help of its Visual System (1). Next, using Excavation Autonomation, the robot will dig through the upper layers of regolith to reach and collect the icy regolith gravel (2). The team will then manually locate the Collector Sieve to deposit the collected icy regolith gravel (3).

Two Teams competing head to head in a split arena
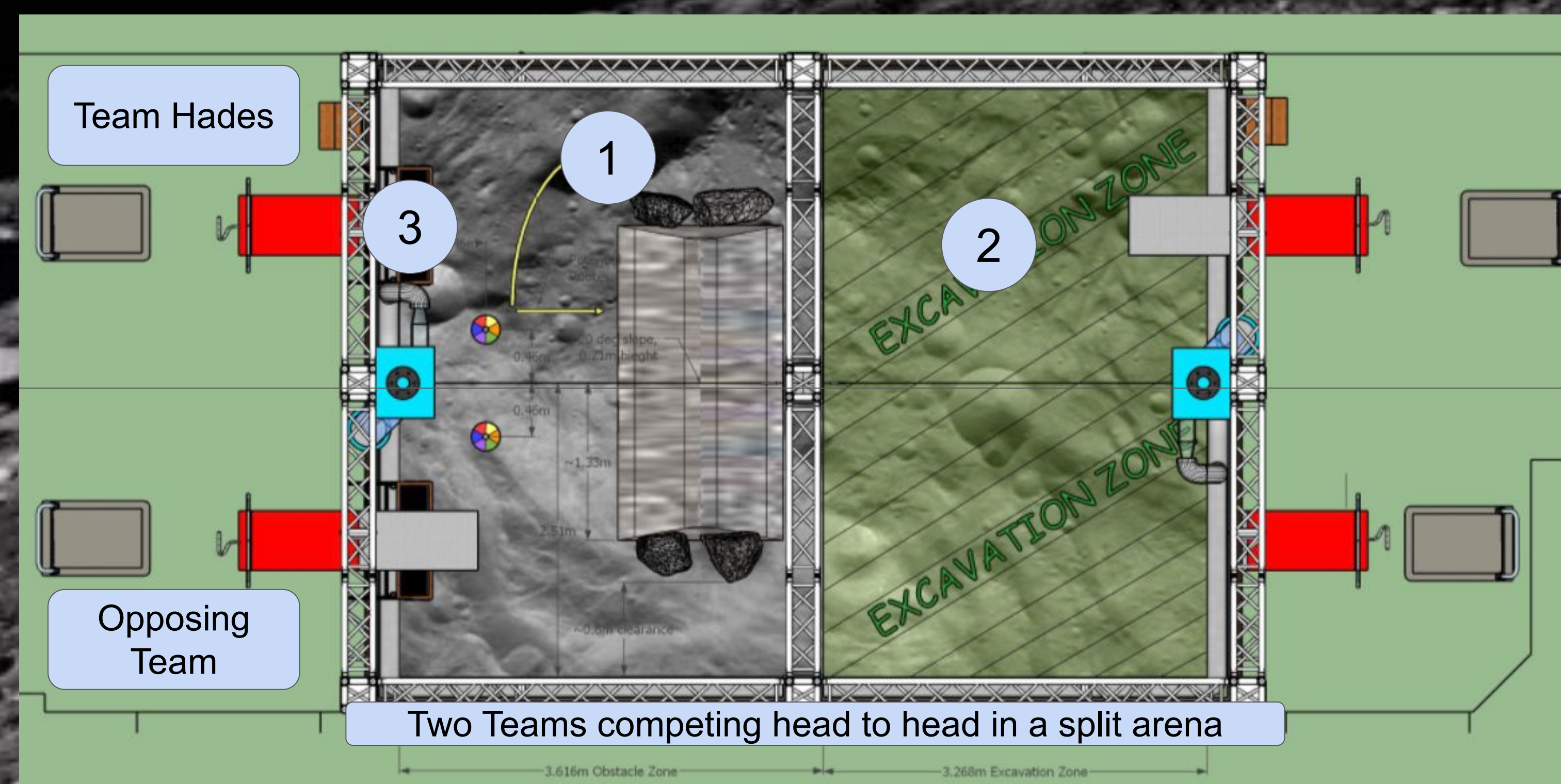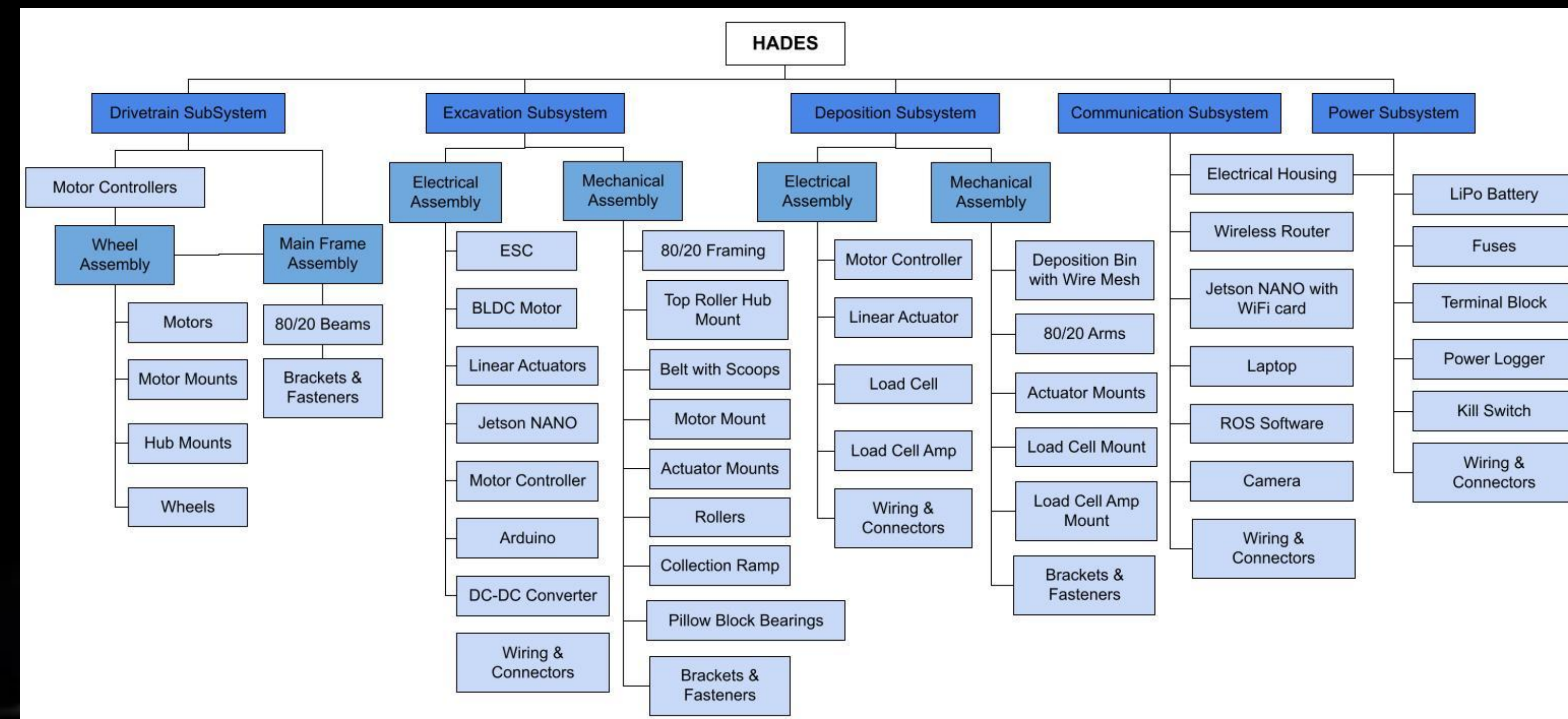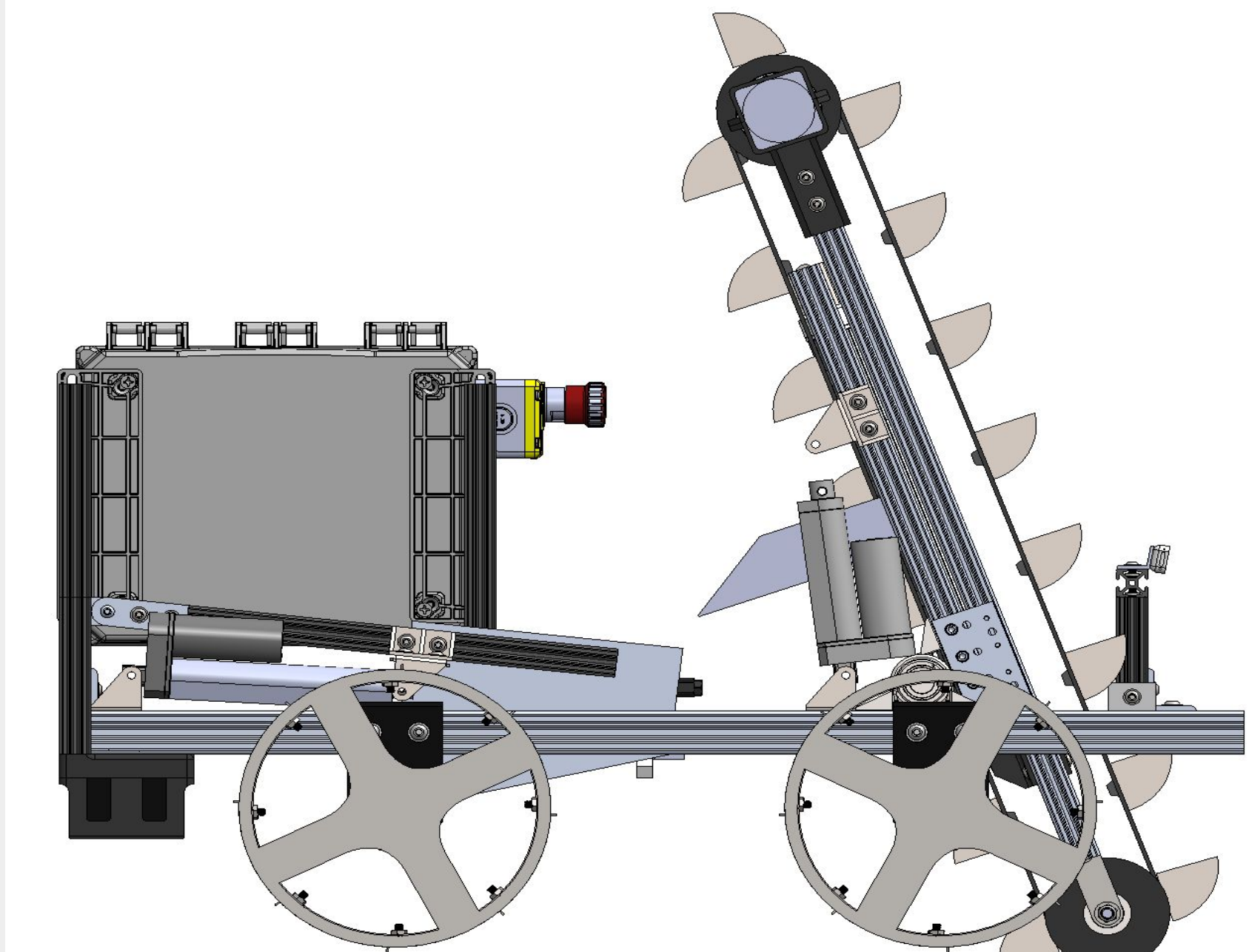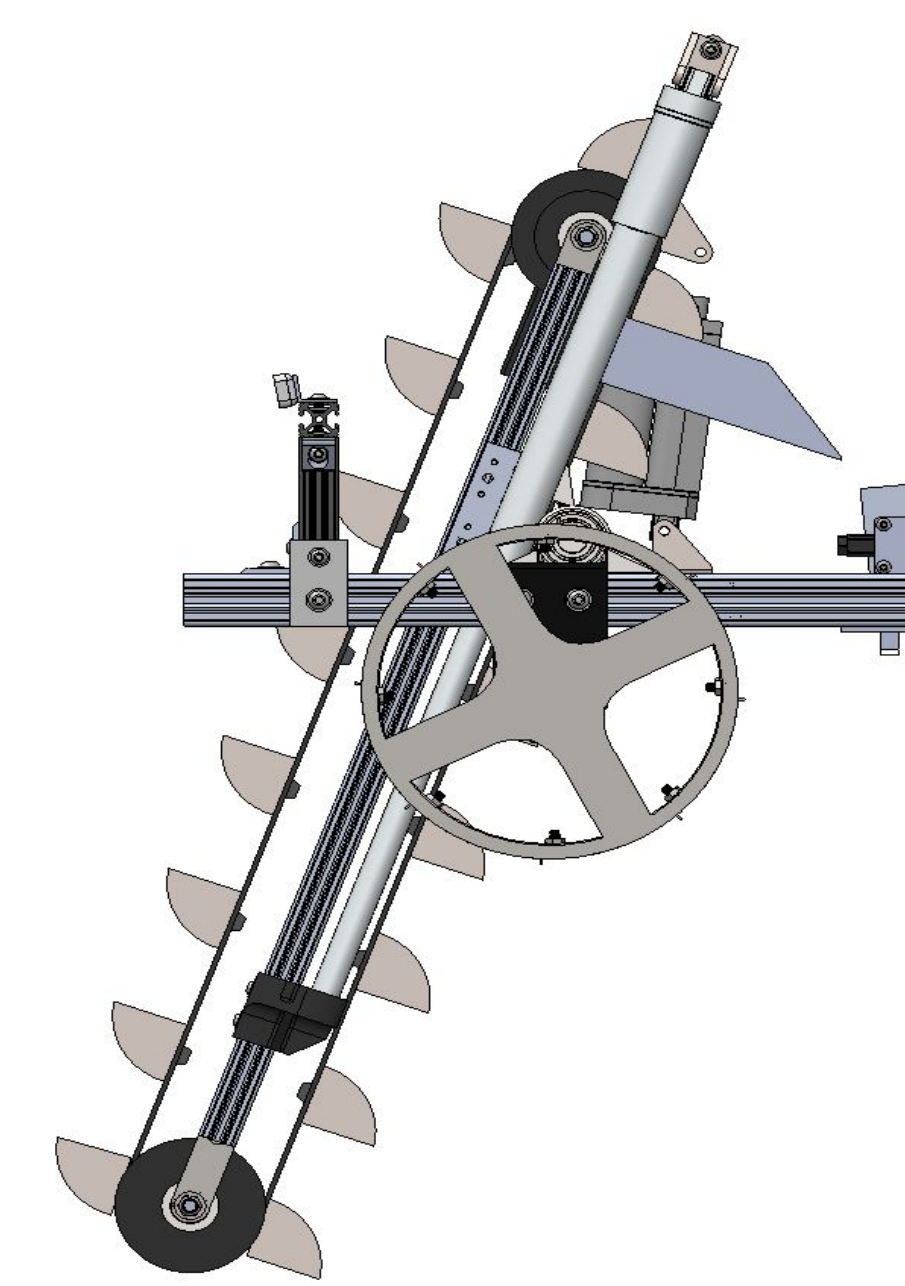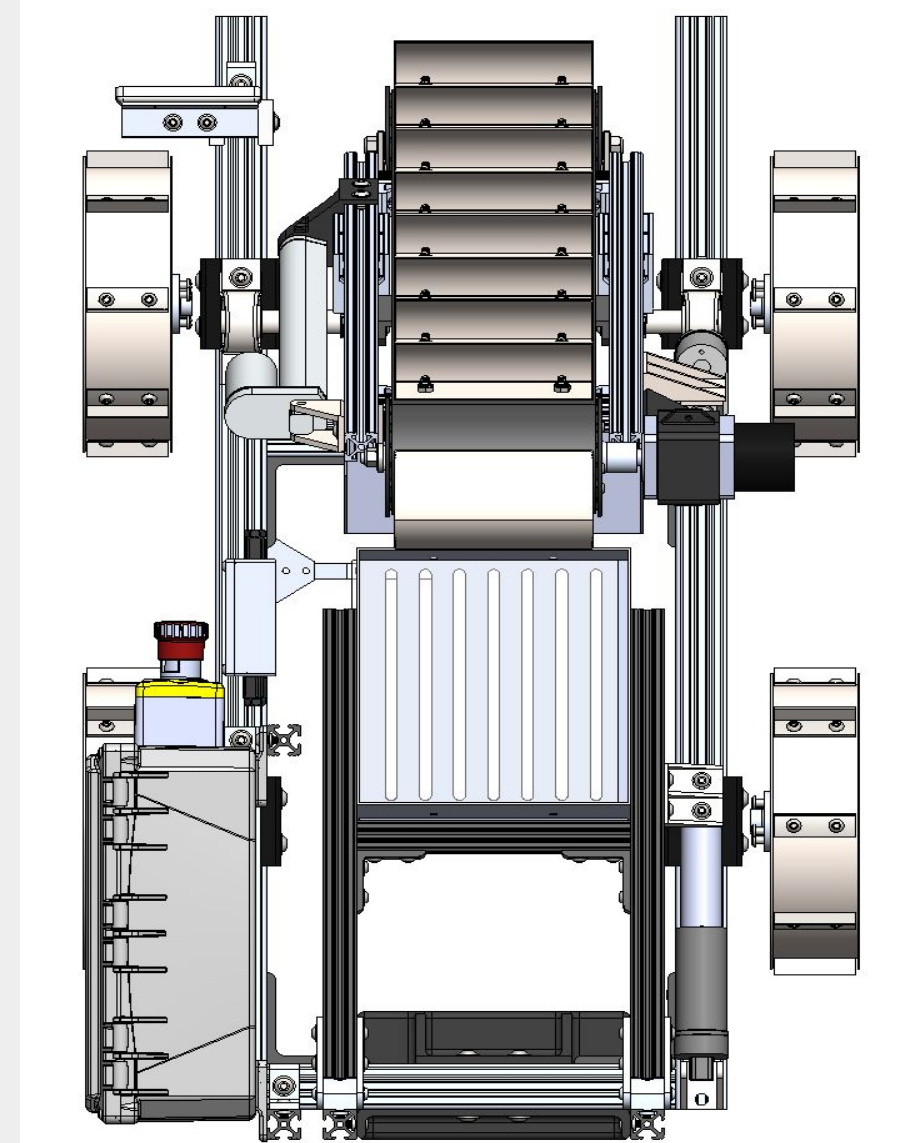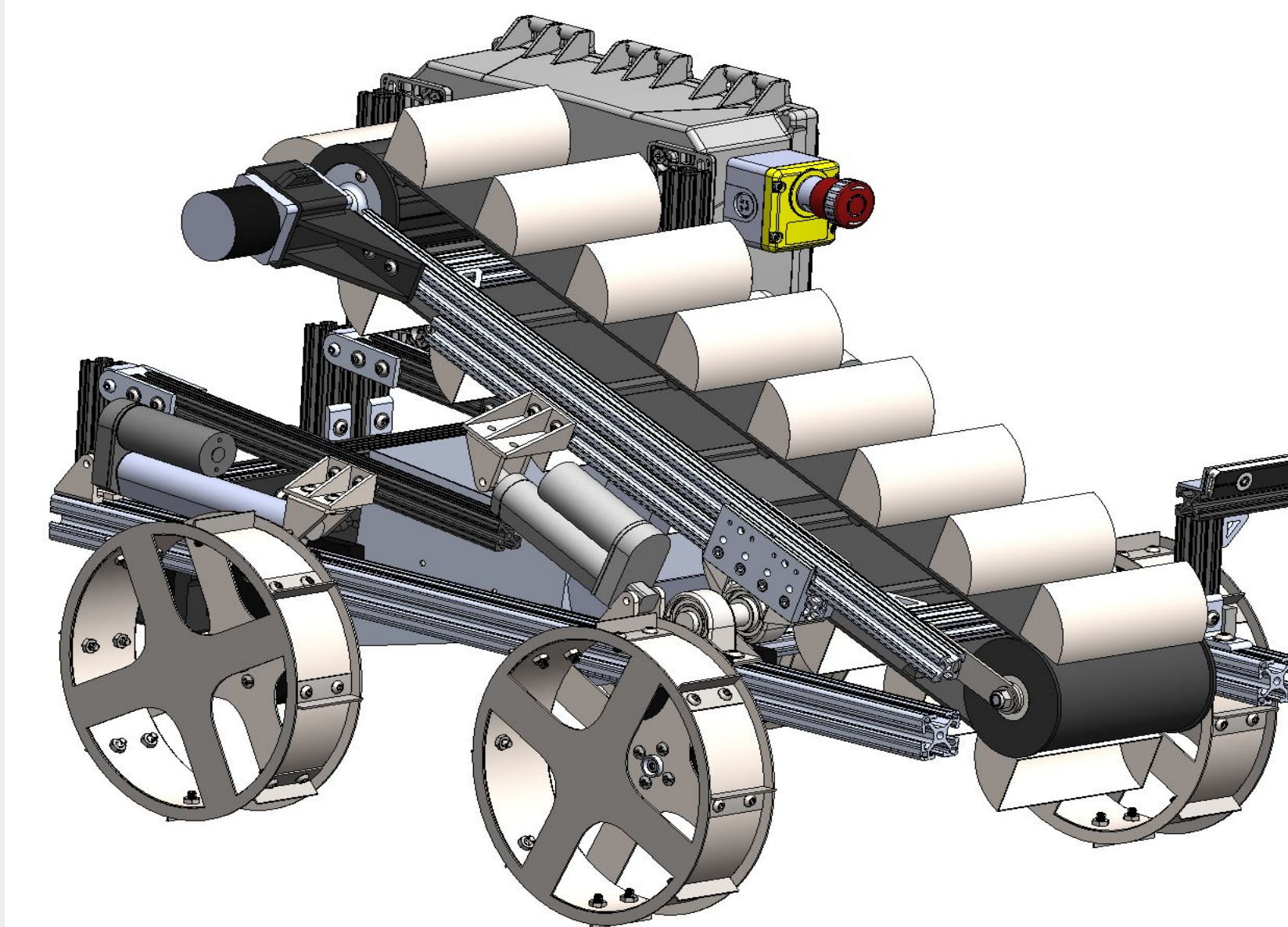
Team Members

Alyssa Brunen

Sterling Belaire

Billy Bilicki

Linda Clark

Nathan de Chambeau
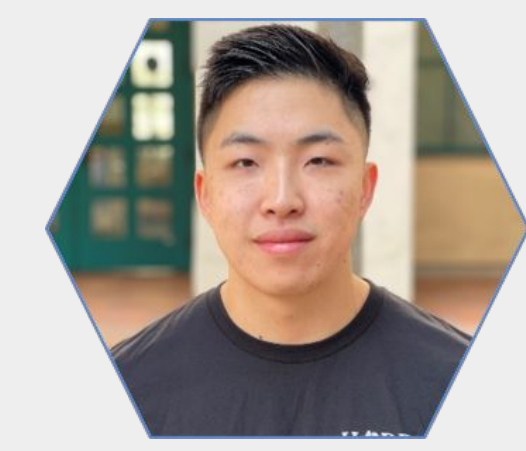
John Paul Ventura

Jean Michel VIves

Josh Dolled

Jaquelyn Fernandez

Andrew Chung

CAD Models

Major Testing Methods

Excavation Test
The excavation belt's effectiveness was tested by mounting the subassembly to a bin full of lunar regolith simulant. The motors were programmed to set the belt to a desired angle and rotate the belt at various speeds.
With these tests, the team was able to determine the optimal excavation angle and speed to maximize the amount of regolith collected.

Navigation Test
The navigational and integrated functionality of HADES were validated by testing the rover in a custom testbed, which contained a 3" deep layer of lunar surface simulant. The tests inside this testbed allowed the team to troubleshoot unforeseen challenges and conduct practice runs.

Wireless Test
This test assured the wireless control capabilities of the HADES rover along with observing the limits of the system in terms of range and latency. The HADES rover relies on a LAN with an operator computer giving the necessary inputs for field navigation and subsystem operation. This test confirmed the viability of using a console controller to run all the commands.

Motor Test
Extensive motor and actuator testing was done to find the most suitable electrical components for the HADES rover. The team experimented with a variety of drive components and supporting hardware to ensure that the rover can function with added weight, and drive through the necessary amount of BP1 simulant to collect the desired ICY Regolith underneath.