

Spacecraft Emulation using Magnetic Levitation

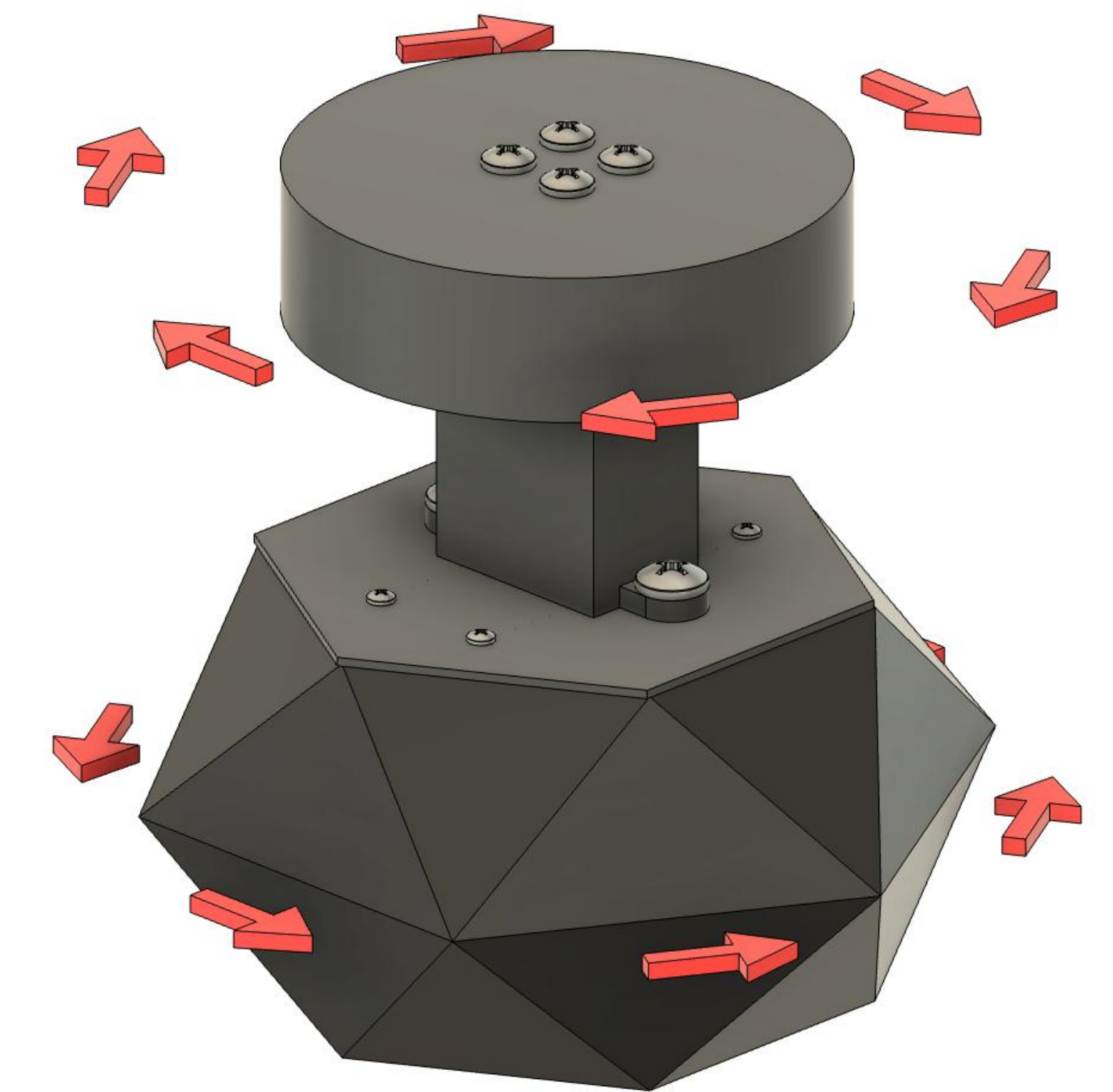


Background and Objective

- Spacecraft rely on reaction wheels as their primary method of orientation control, but testing these systems on Earth is complicated by gravity and friction.
- Our solution is to use magnetic levitation, which creates a near-frictionless testbed that accurately emulates spacecraft dynamics.
- Our objective is to demonstrate fundamental attitude control principles and develop a multi-axis platform for research and education.



Our Solution



- We are attaching a frame to an existing magnetic levitation product.
- Our system includes a small DC gearmotor, an Arduino board to control it, and a LiPo battery pack to power them both.
- There is a perf board to house additional circuitry.
- Structural components will be 3D-printed and held together using fasteners.

Next Steps

- Once our components arrive, we can begin building and testing the system.
- The perf board will be arranged as seen on the right. This is how we will distribute power to the various system components.
- There is still some work to be done on the mechanical design; the reaction wheel dimensions are not final.
- We are planning to use magnetic shielding to ensure that the electric components are safe.
- After assembly, we will begin testing control algorithms for attitude stabilization.

