



Motorized Heliostat Array

Project Description:

- The goal of the project is to design and construct a $\frac{1}{4}$ scale working prototype of a motorized heliostat mirror device that will be able to actively track and reflect EMR rays.
- The system will use heliostat mirrors, fresnel lenses, servo motors, and a microcontroller.
- The heliostat is equipped with two servo motors that will effectively trace the sun.
- The goal is to continuously reflect the maximum amount of sunlight (EMR) toward the primary optical device.

Early Design Concept(s):



Heliostat Control Arm

General Success Markers (Spring Semester):

1. By **Week 3**, the mirrors should be securely mounted and capable of movement.
2. By **Week 4**, the wiring and motor control should be working, and the mirrors should respond to Arduino commands.
3. By **Week 5**, the system should be tracking the sun using the Arduino.
4. By **Week 6**, the Fresnel lens should focus light onto the aperture.
5. By **Week 8**, the entire system should work together to concentrate sunlight onto the desired target area.

Semester Deliverables:

1. **Energy Collection:** Capture and focus sunlight with heliostat mirrors.
2. **Energy Modulation:** Optimize sunlight capture with a dynamic control system.
3. **Light readout:** Photodetector provides data relating to light capture

Design Options/Possible Solutions:

- **Heliostat mirrors:** mirror glass, polished aluminum, polymer/plastic with reflective coating. Concave or square in shape.
- **Heliostat Control Arms:** Dual Axis Pan Tilt Solar Tracking and Monitoring Robot Worm Gear Motor.
- **Sun Tracking:** Light sensor-based tracking or a solar tracking algorithm
- **Control System:** Open-loop control system using solar position or closed-loop system with light sensors



Heliostat Mirror

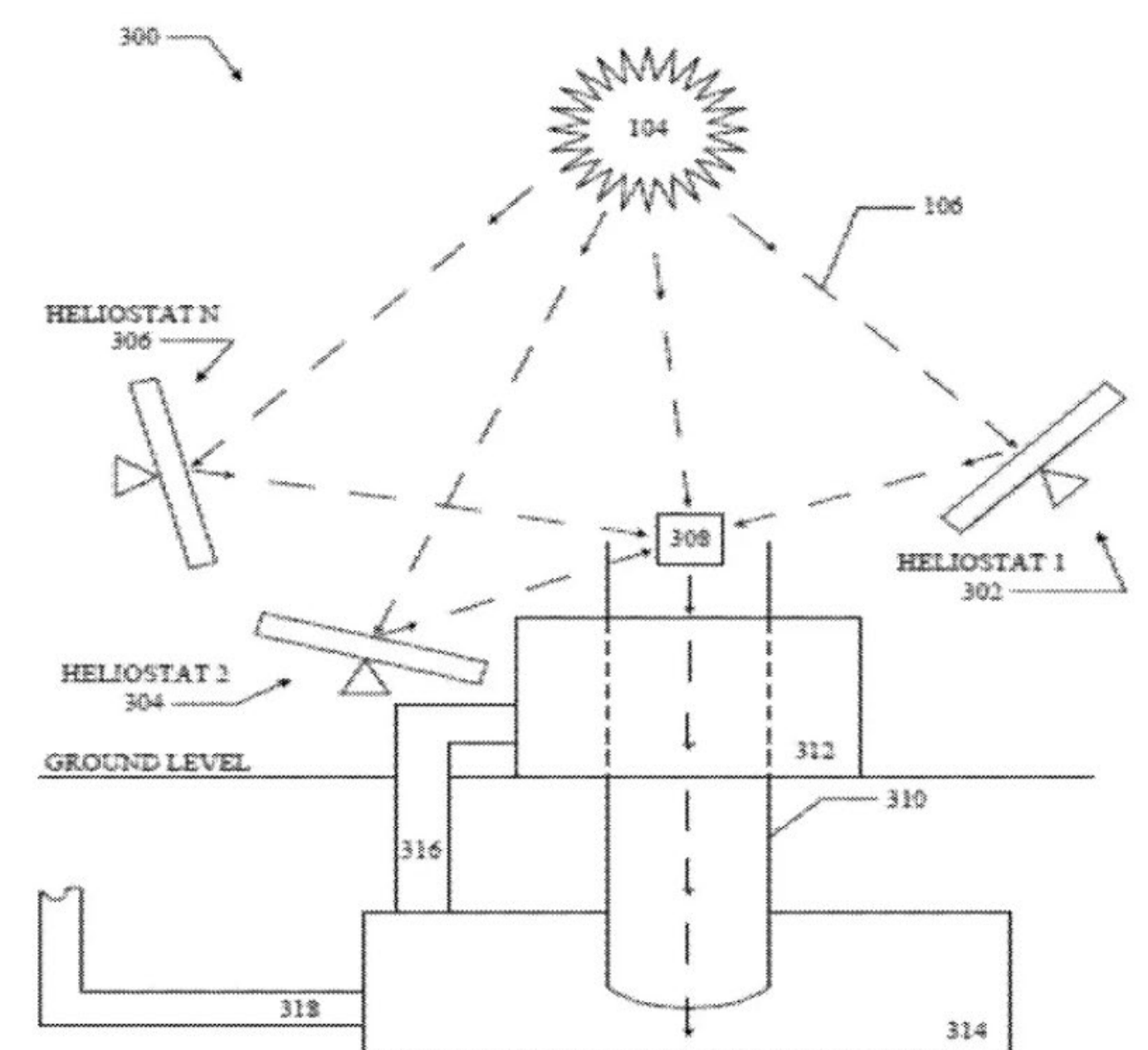


FIG. 3

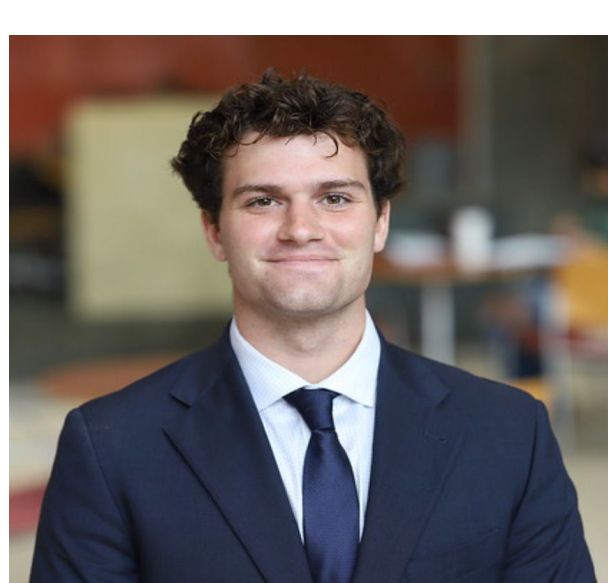
Heliostat Mirror Functionality



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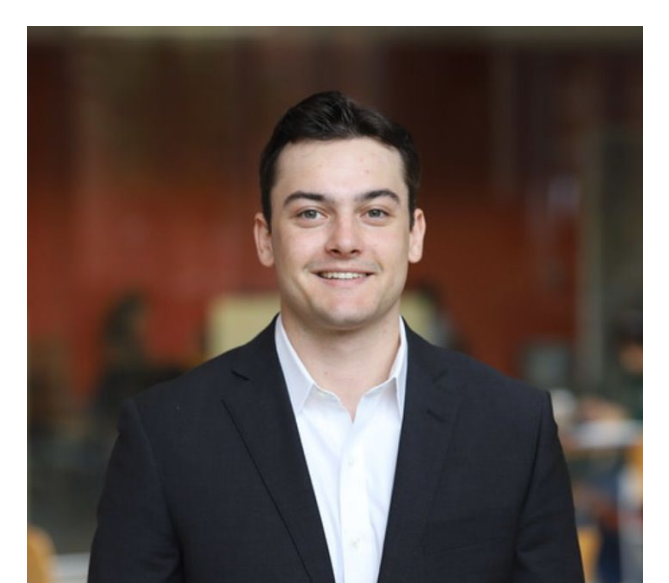
Charles Germosen



Oscar Morabito



Channing Kalec



Owen Gallen