

L3 Harris Tracking Pedestal



L3HARRIS™



Problem Background:

L3 Harris manufactures antennas used for communication and tracking for the defense industry. These systems are complex and difficult to explain to laypeople.

Project Goal:

Create a simulated tracking antenna to demonstrate antenna design and tracking concepts to audiences including students and non-technical L3 employees.

Design Requirements:

The tracking system must reliably work in noisy conditions. It must be capable of acquiring a signal via several acquisition methods. It must track an acquired signal across a room with a minimum speed of 70 degrees per second. It must track accurately to within 5 degrees. It must fit within a 10" cubic space and weigh less than 10 pounds.

Delivered Design:

The delivered pedestal was designed to track 940 nm IR light emitted from a flashlight. The pan and tilt motion are controlled by high-speed continuous rotation servos. The direction of the IR emitter is determined by a ring of 8 IR transistors. The IR transistors and servos are interpreted/controlled from an Arduino microcontroller. A RasPi computer runs a GUI. 7.5V power is routed to the electronics through the base via a slip-ring.

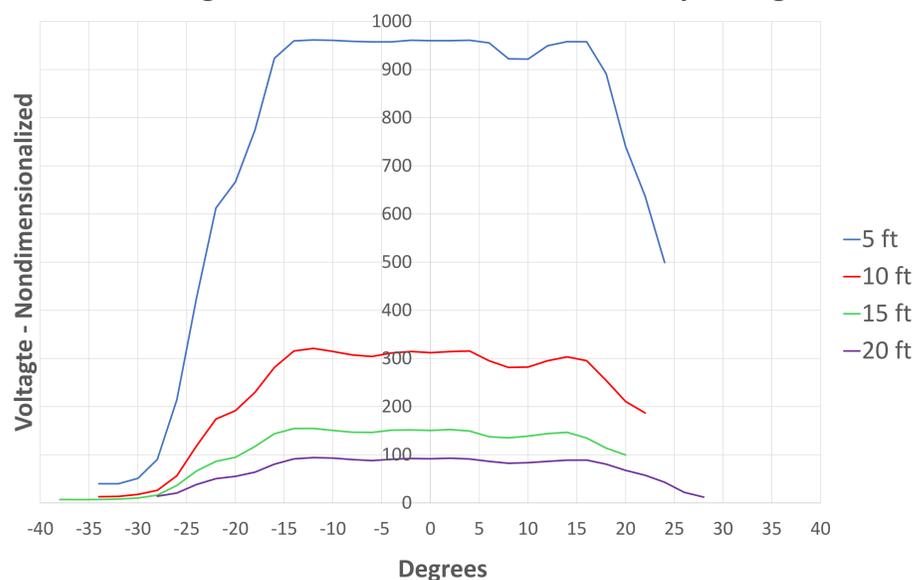
The completed design consists of (not including assembly hardware) 68 parts among 35 components, including 25 custom designed components. Including assembly hardware, the project consists of 160 total parts.

Applied Skills:

This project required the team to obtain or further develop skills in electro-mechanical design, programming, PID controls, data collection, electronics, CAD, prototyping, additive manufacturing, and PCB design.



30 Degree 940 nm Phototransistor Sensitivity Testing



Design Requirement Testing:

Among the testing conducted during this project, one difficult problem was determining whether IR phototransistors would be sensitive enough to distance for our purposes. The data shown were collected during comparison testing of several phototransistors.

Special thanks to L3 Harris'
Scott Lyon
Jaque Johansen

Andrew Gaudette, AGaudette121@gmail.com
Brandon Packer, BrandonMPacker@gmail.com
Derek Troy, DTroy15@gmail.com
Ryan Van Gieson, VanGiesonRyan@gmail.com