



MIE 415 - Fall 2014
Senior Capstone Design Project

Team 1: TrackStar
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TrackStar: Motion Tracking Stagelight Mount

Motivation

TrackStar aims to provide autonomous, real-time tracking and lighting of an on-stage target. The system would be compatible with standard lighting fixtures and controls, and provide lighting to all areas of the stage.

Objectives

- Real-time Tracking
- Cover all areas of stage
- Mount to current fixed lights and scaffolding
- DMX Communication
- Quiet Operation

Specifications

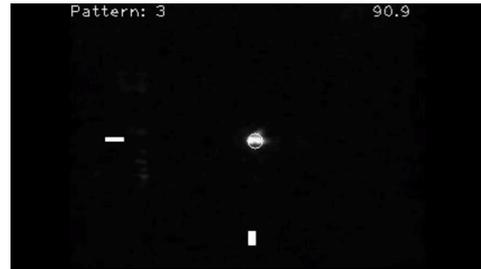
Specification	Target Value	Acceptable Value
Range of Motion	Pan 300 °, Tilt ±45°	Pan 180 °, Tilt ±30°
Speed	180 deg/sec,	30 deg/sec
Camera Frame Rate	120 Hz	60 Hz
Mounting	Hang from 1.5" Pipe	Upright operation
Overall Sizing	2' x 1' x 2'	2.5' x 2' x 2.5'
Battery Life	5 hours	3 hours
Operation Noise	30 dB	50 dB

Engineering Analysis

- 8.5 in.-lb. Torque Required
- IR Intensity of 31 mW/sr at 100 mA
- 14hr Beacon Battery Life
- 8 Distinct Patterns

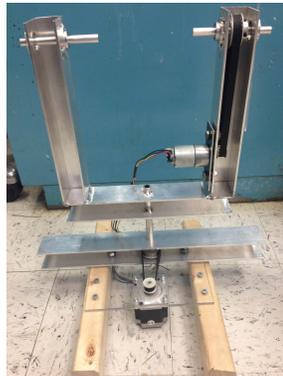
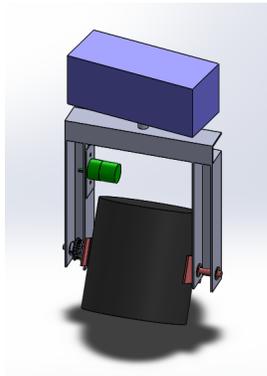
Performance

- Full Range of Motion
- Pattern Detection within 350 ms
- Successful Tracking at 50 ft
- Beacon Visibility at 200 ft



Camera View with Tracking and Pattern Recognition

Selected Design



User Interface

- Manual Configuration Mode
- Tracking Mode
- Controlled by DMX



Next Semester Plan

- Motor Integration
- Structural and Beacon Housing
- Pattern Discrimination
- Beacon PCB