

Memo

To: Troy Scevers
From: Nathan Wiley
Date: April 4, 2022
Re: Initial Proposal Memo

Summary:

For my project, I would like to build a lightweight motorized 12" Dobsonian Telescope that can automatically track coordinates in the sky such as stars or planets. Ideally, it could be operated remotely without any physical interaction with the telescope. Aside from weather concerns, it should be able to be mounted in a permanent spot and utilized without wasting valuable time setting up. If it is needed to be moved, it should be easy to recalibrate it. If I can get help from others, I would love to create a small weatherproof dome or something like that, but that is outside my expertise and timeframe.

Problems this project will solve:

There are many tracking telescopes out there, but few have a primary mirror of 12" or more, and most of those require an operator to be present in the middle of the night to capture the images. This project would be to create a telescope that can be operated remotely and still have the functionality of one that is operated by a person. This includes things like adjusting focal lengths, camera exposure settings, and possibly even eyepiece swapping.

Requirements:

The main things that will be needed for this to work are:

- Rigid, lightweight frame
- Motors with power and precision
- Smooth mounting and gearing
- Database of stars and coordinate system to reference
- Reliable power source

Issues:

The main issues that I can see are:

- Frame not being finished in time
- Issues getting microprocessor to work with the motors
- Issues getting coordinates and database to work properly

Proposed resolutions:

I think since the frame is not part of the senior project directly, I can build it over the summer. This will allow me to work on the motorization, board production, and programming, in the fall and winter. That leaves the coordinates and database, which I will need to choose carefully because there are many different places I can get those. Once I do more research in that area, I will need to choose the one that is easiest to integrate and understand.

Parts:

I know we aren't supposed to be worried about parts yet, but one of the reasons I want to do this project is because I have the 12" primary mirror already from another project. Since it was expensive and now collecting dust, I can see no better use for than to put it to good use. It will allow my budget to be focused on the rest of the project's materials. Below is a very crude parts list that give a rough estimate of what I think the project will require.

Part	Price	Link
304mm f/5 Primary Mirror (Already purchased)	\$590.00	https://agenaastro.com/gso-parabolic-primary-telescope-mirror-12-f-5-ad017.html
70mm Elliptical Secondary Mirror	\$82.00	https://agenaastro.com/gso-elliptical-secondary-mirror-70-mm.html
2x Stepper motors	~\$200.00	-
Frame Materials	~\$200.00	-
Eyepieces	\$189.95	https://www.adorama.com/cnak.html