**Motorization and Tracking**

* Stepper motors - to control movement along RA and DEC axes
* Motor drivers - to drive the motors (can use L298N from robot kit)
* Mount for telescope (maybe)
* Control system - to control motors through the motor drivers (can use raspberry pi)
* Calibration - ensure the telescope is calibrated for a starting position

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Motorization and Tracking Components** | | | | |
| **Item** | **Description** | **Price** | **Link** | **3D Print needed** |
| NEMA 17 Stepper Motor | For Right Ascension (RA) and Declination (DEC) axes | $15 – 20 each |  | No |
| L298N Motor Driver | To drive the stepper motors | $7 |  | No |
| Motor Mount Brackets | To attach motors to the telescope mount | $10 – 15 |  | Yes |
| Telescope Mount Brackets | To secure stepper motors to the mount | $15 – 20 |  | Yes |

**Camera Control**

* gPhoto2 - allows interfacing with camera via the raspberry pi using a wired connection
* No physical items required

**Astrophotography and Software**

* OpenPHD2 - used for auto-guidance
* SkySafari ($50) or INDI (Free) - used for controlling the telescopes pointing and tracking
* No physical items required

**Power**

* Use a battery pack or some kind of dedicated power system
* Needs for power
  + 12V supply for motors
  + Power bank for RaspPi and Arduino
  + Must be portable and last at least a couple hours

**3D Print Parts**

* + Motor mounts
  + Camera mount
  + Redesign of telescope base (maybe)

Current materials

• Canon EOS 6D Mark 2 - camera

• Orion SkyWatcher 100 - telescope

• Raspberry Pi – programmable control board

• STM32 – programmable board for motor

• MSP 430 (2 of these) - programmable board for motor

• ELEGOO UNO R3 Smart Robot Car Kit V4 for Arduino Robotics – for motors

• ELEGOO Project Super Starter Kit and UNO R3 Board

• ThinkPad Laptop

• Access to a 3D printer

• Access to a Soldering Station