CDR Presentation

StarTrack

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What is StarTrack?

What is our motivation?

- We want to provide a low cost, accurate, and intuitive tool for taking photos of the night sky

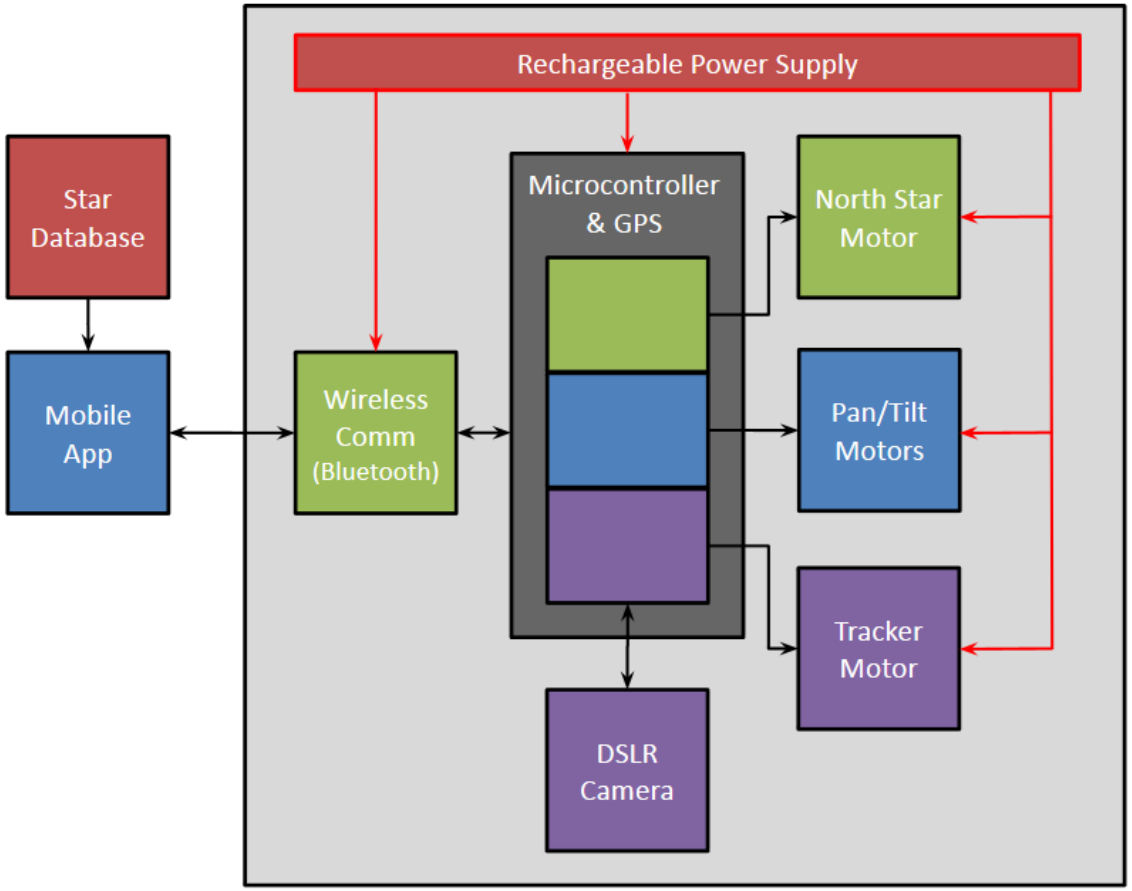
Who is it for?

- StarTrack is geared toward hobbyists who already own a DSLR camera

What does it do?

- StarTrack automates the process of finding interesting targets in the sky
- Allows for wireless control of the barn door tracker, including alignment with the North Star
- Sends wireless commands to control the camera shutter

Block Diagram

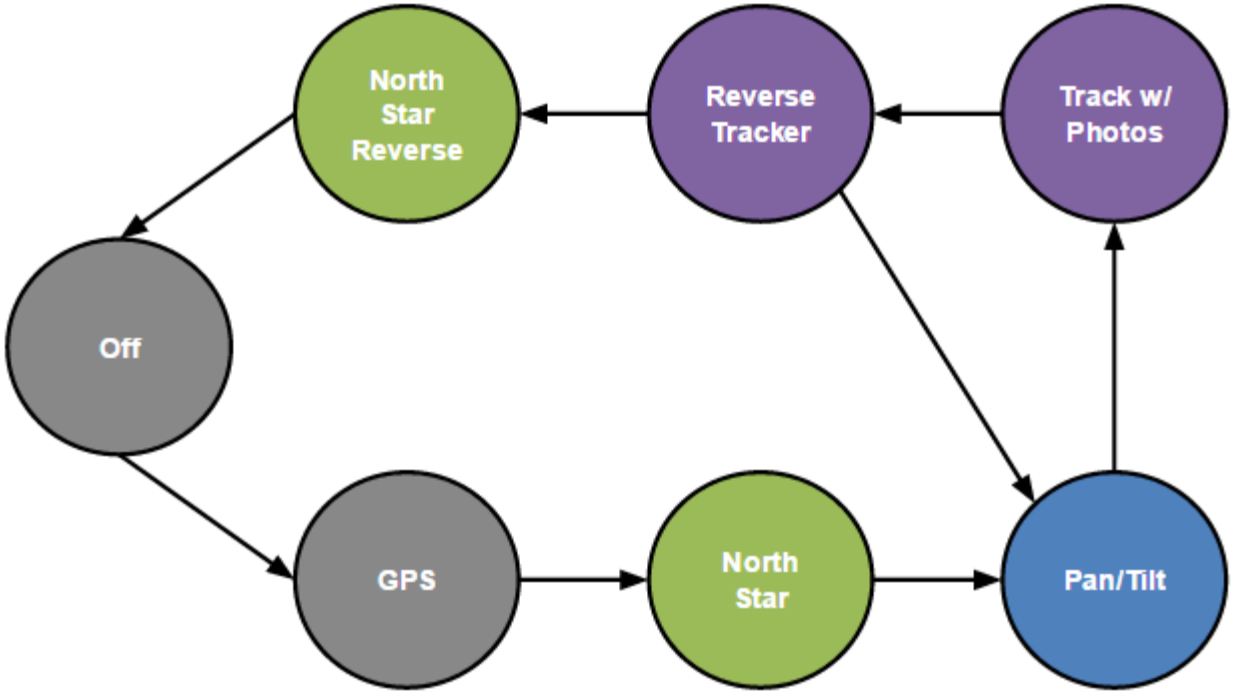


StarTrack Camera Mount

Subsystem Owners:

- Red- Charles
- Blue- Chris
- Green- Daniel
- Purple- Rebecca

State Machine – Initiated by iOS App



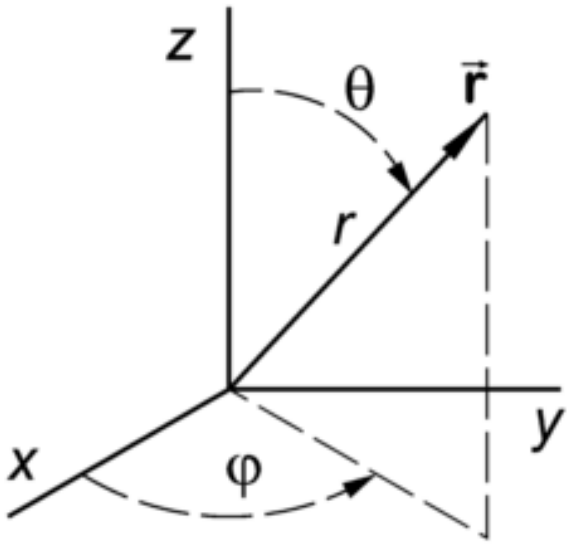
CDR Deliverables

Demonstration of Entire System

- × iOS app initializes StarTrack mount
  - × iOS app sends command to microcontroller to align mount
  - ✓ Microcontroller gathers GPS Data and uses North Star Motor to align StarTrack mount with the North Star
- ✓ User specifies desired sky target via iOS app
  - × Star coordinates are sent to the microcontroller via the iOS app
  - ✓ Pan/Tilt mount moves camera to desired coordinates
- ✓ User specifies desired operation parameters
  - × iOS app sends command to microcontroller to begin tracking
  - ✓ DSLR receives shutter commands from the microcontroller to take a specified number of images (using pre-set exposure lengths)
- ✓ Tracker returns to ready state, and waits for further interaction from app
  - ✓ Tracker motor returns StarTrack mount to a closed position
  - × iOS app notifies user that StarTrack is ready to image another target
- ✓ Once the user is done, the North Star Motor returns to a closed position

Accuracy Concerns

- 4 Areas of Potential Error
  - Level board (*initial θ)*
  - North-facing mount (*initial φ*)
  - Horizontal North Star Motor (*θ rotation)*
  - Star Rotation tracking speed/distance (*θ, φ rotation)*



FPR Deliverables

A Fully Functioning Production Model

- Accuracy in Tracking
  - Pictures should produce circular stars
- Robust iOS application with intuitive user interface
- Rechargeable power supply
- A precisely built mount that will allow for greater accuracy
  - Stronger wood
  - Boards flush for complete close
- All electronics on PCB

Prototype Demonstration