HARDWARE.astronomy: Repair and Refurbishment of the Small Radio Telescope

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**ABSTRACT**

A Small Radio Telescope (SRT), originally developed by MIT’s Haystack Observatory, was donated to Winona State University by Mayo High School in Rochester, Minnesota. The assembly includes a 2.3 meter dish with mount and motors that allow pointing over the entire sky. The SRT, unfortunately, has been weathered over years of exposure to the elements, and was absent all the electronics necessary for pointing and collecting data. Here we report our efforts to repair, replace, and refurbish the SRT for future undergraduate research. Specifically, the replacement of pointing hardware, the development of a motor control system and graphical user interface (GUI), and future work to implement a software defined radio (SDR) for detection of astronomical signals.

I have been tasked with replacing switches, motors, sensors, and any other hardware necessary to return the SRT to a functional capacity as well as developing a control system that can be accessed from a graphical user interface (GUI) for easy user access both on sight and remotely.

a 4 meter hexagonal base with supports for a mounting post in the middle, an extension to the mounting pole which allows for an offset secondary mounting pole with a motor/gear box to control azimuth direction, a similar motor/gear box sits atop the azimuth mounting pole to allow for directional control of the altitude, a mounting ring for a 4 piece dish, and a housing unit for the software defined radio (SDR) or similar component to read the incoming light.

Absent the donated equipment was the control box that would read a series of sensors to track the dish’s position and send commands to the motors.