Slides (1 & 2) - Intro

* My name is… This is a SRT.
* Special Thanks to Mayo Highschool.
* Thanks to Dr. Moore for invaluable feedback and support.

Slide 3 – History (Karl Jansky)

* Graduated University of Wisconsin (’27) – Physics BS
* Began work at Bell Labs (’28)
* Was a radio engineer
* In ’29 he was instructed to search for possible sources of interference for a trans-Atlantic telephone system operating in the radio wavelength
* By ’31 he had it completed the device: 100 ft by 20 ft device measuring 10-20 m waves
* Found several sources of interference from weather related phenomena
* He also began to find various sources of interference outside the atmosphere

Slide 4 – What is radio astronomy

* Definition - The branch of astronomy concerned with radio emissions from celestial objects.
* Precision scanning of extrasolar objects such as, but not limited to: supernovae, blackholes, quasars and galaxies.
* The atomic hydrogen line allows for a relative density of hydrogen across the entire sky, which can help give a rough estimate of the amount of matter we are observing
* Radio waves top out at 300 GHz corresponds to about 1 mm
* The longest observable wavelengths are 100 km! (3Hz)

Slide 5 –

* MIT’s Haystack Observatory were the original designers
* Westford, MA about 45 km NW of Boston
* Because Cassi Corp is no longer in business, we were not able to purchase a new control box even if we wanted to
* In fact this made researching the SRT virtually impossible
* Wayback machine google
* Though similar control boxes may exist out there, there is no guarantee that they would integrate effectively with our SRT
* The most practical solution is to design a control system ourselves

Slide 6 – Block diagram

* Raspberry Pi is the highest-level computer that will be implemented
  + Uses raspbian
  + It will allow for an input of coordinates and calculate the path along the ecliptic
  + It will then send the appropriate information to the Arduino/s for them to run the motors
  + The motors will act as a control/feedback loop in which they output data to the operating switches that would then run the motors
  + Simultaneously the sensors on the motor will determine their location so as to stay the course of the calculated trajectory

Slide 7 – Switch Control

* A series of 6 switches will be implemented:
  + 4 switches will be necessary to allow current to flow forward or in the reverse direction.
  + The other 2 switches will determine which motor the current is flowing to.

Slide 8 – Audience participation

* Based on the wiring diagram which motor will have current flowing which direction?

Slide – Last

* Further calibration of the motors will be needed
* The rat’s nest of wires needs to be cleaned up and mounted
* A communication protocol will be established between the Raspberry Pi and the Arduino
* An algorithm must be developed to track objects across the sky
* A user interface must be created