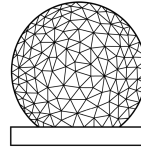


Eclipse research technology: more detailed descriptions

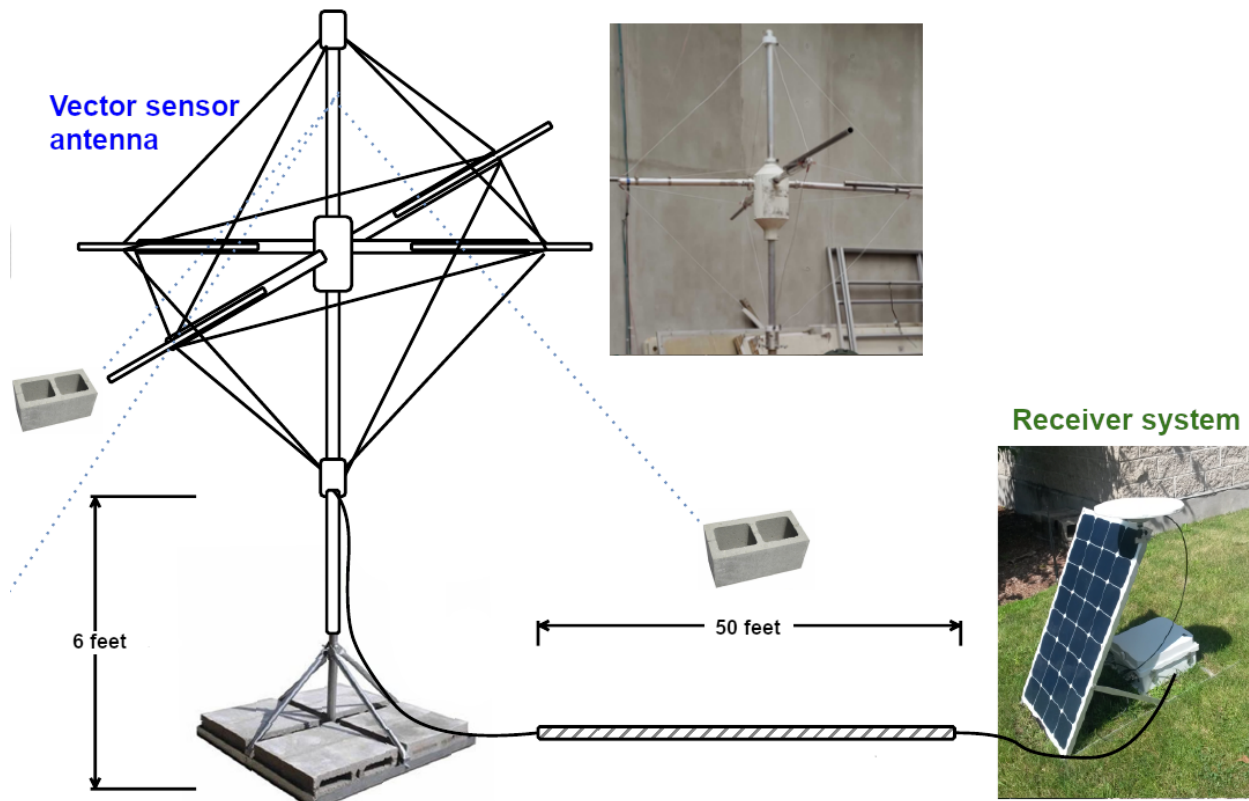


MIT
HAYSTACK
OBSERVATORY

Contact: Haystack2024EclipseCampaign@mit.edu

Zephyr/EMVSIS receiver site

We are looking to deploy a **vector sensor antenna** and **receiver system** to use radio waves to study the effects of an upcoming solar eclipse on the upper layers of Earth's atmosphere. Our goals are to estimate upper-atmospheric wind fields from radio meteor observations and measure ionospheric density from radio reflection. Additional information on the science can be found in the companion **Eclipse project background information** document.



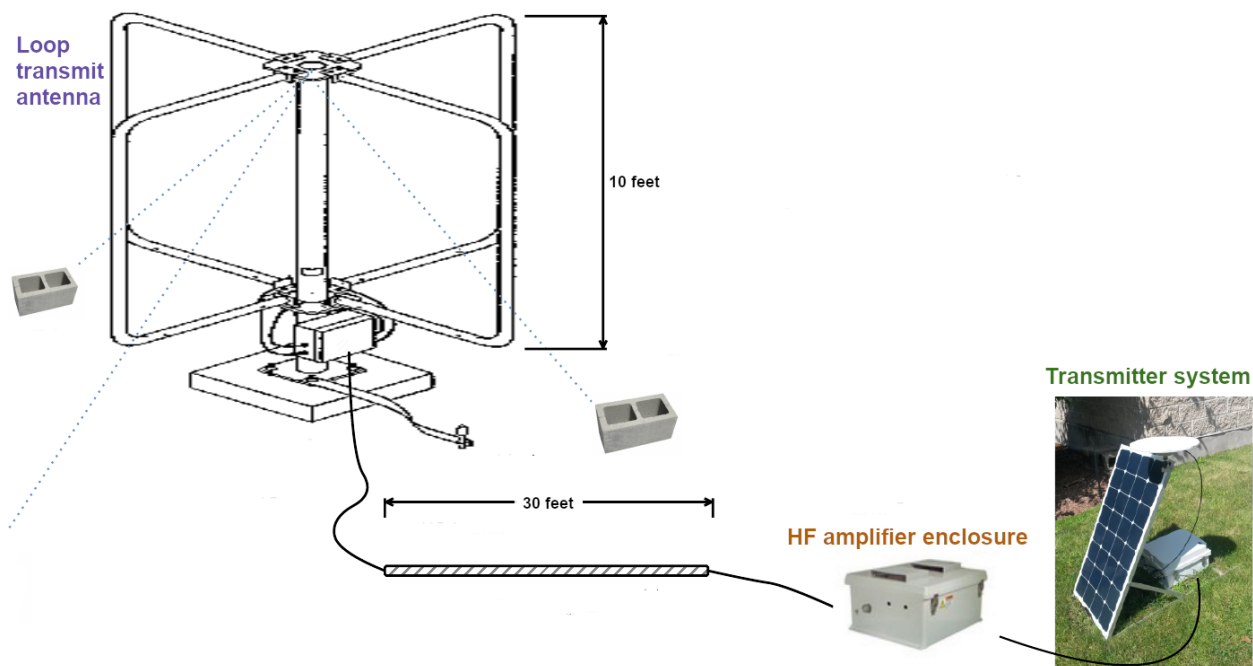
Some things that we are looking for in a potential site include:

- **Outdoor space:** First and foremost, we need space to put the equipment described above. The ideal space is away from metal structures, power lines, or buildings.
- **Power:** The antenna and receiver can use standard electrical power or use solar and battery if there is space with ample sunlight. They do not draw much electrical power, on the order of a small kitchen appliance like a blender.

- **Communication:** An internet connection through WiFi or Ethernet is preferred, but we can fall back to a cellular (LTE) connection if service is available.
- **Avoiding radio frequency interference:** Ideally, we will be able to locate the receiver system at least 100 feet away (up to 300 feet) from buildings to avoid sources of electromagnetic interference, such as LED/CFL lightbulbs, electronics with large “wall wart”-style plugs (AC/DC converters), or solar panels.

EMVSIS low-power transmitter site

At some locations, we are also looking for space for a transmitter setup consisting of a **loop transmit antenna**, an **HF amplifier enclosure**, and a **transmitter system**.



Safety

An additional requirement for this kind of site is:

- **Fenced outdoor or roof space:** This equipment will need to be fenced off or be located on a rooftop for safety concerns.

Since these sites involve transmitting (even at relatively low power levels), we will follow all environment health and safety requirements from government authorities and MIT. These transmitters will need to be fenced off and have mechanisms to turn off emissions in

emergencies. Fencing can be provided by the site or MIT Haystack can install a simple and easily removable fence.