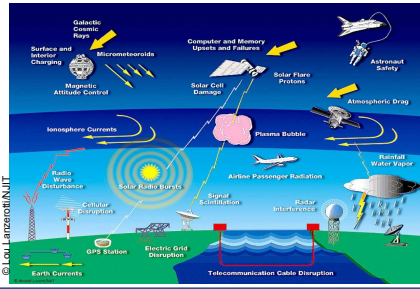
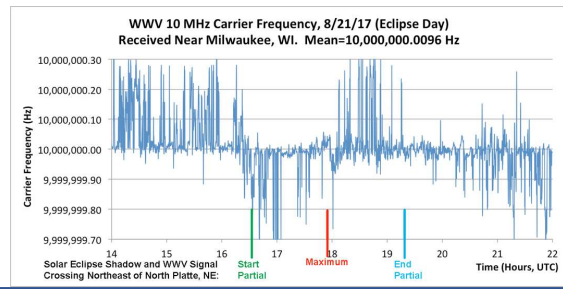


## Personal Space Weather Station

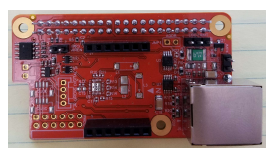
### What does Space Weather Affect?



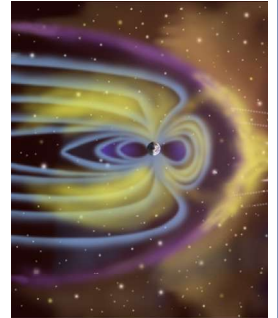
### WWV/CHU Standards Monitor



- #### Ground Magnetometers
- Detect Ionospheric & Space Currents
  - Geomagnetic Storms
  - Geomagnetic Substorms
  - Kp and Ap are derived from GMAGs data.



HamSCI Magnetometer



#### Lightning Detector

- Signatures from LF to VHF/UHF
- On HF, lightning noise can propagate long distances and disrupt communications

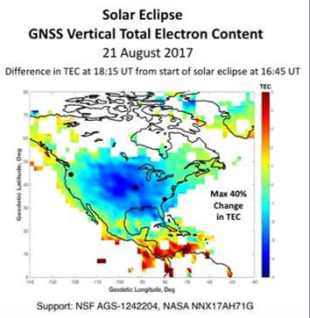


Photo: Jessie Eastland

([https://en.wikipedia.org/wiki/File:Desert\\_Electric.jpg](https://en.wikipedia.org/wiki/File:Desert_Electric.jpg))

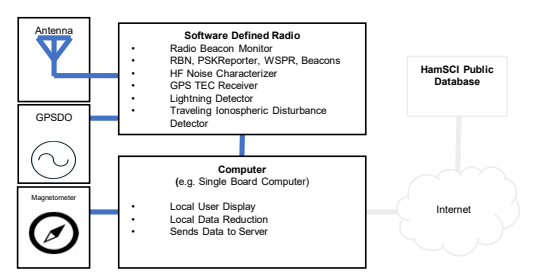
#### GPS Total Electron Content

- Total Number of electrons between ground and GPS Satellite
- Measured by examining delay between two GPS Frequencies
- Traveling Ionospheric Disturbances
- Storm Effects
- Ionospheric Scintillations



Support: NSF AGS-1242204, NASA NNX17AH71G

### Introducing the Personal Space Weather Station

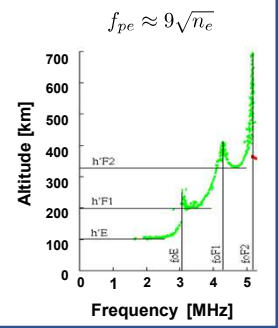


#### Ionosondes

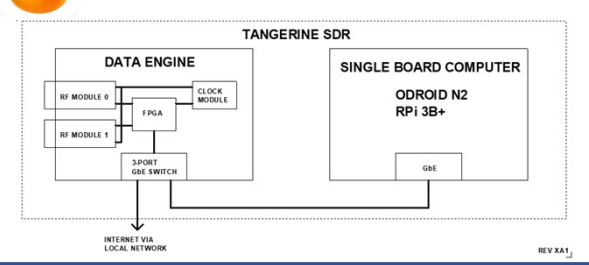
- Vertical Incidence HF Radar
- Measure Plasma Density for bottomside ionosphere



San Juan Observatory (Small - 15 m tall x 45 m long)



### TangerineSDR Radio Hardware from TAPR



IRIS - Imaging Riometer for Ionospheric Studies in Finland  
Photo: Derek McKay

- #### Riometer
- Relative Ionospheric Opacity Meter
  - Directly measures absorption of cosmic rays
  - Indirectly measures electron density, particle precipitation
  - Typically passive instrument 30-50 MHz

### HamSCI + TangerineSDR



Learn More at the Upcoming  
[HamSCI Workshop](#)  
March 19-20, 2021