

# Central Control Database for the HamSCI Personal Space Weather Station

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The Ham Radio Science Citizen Investigation (HamSCI) Personal Space Weather Station (PSWS) is a modular ground-based platform for studying the geospace environment using ground magnetometers, medium frequency (MF) and high frequency (HF) radio receivers, Global Navigation Satellite System (GNSS) receivers, and very low frequency (VLF) radio instruments. The PSWS is a citizen science-based project, designed and developed as a partnership between the international amateur (ham) radio community and professional academic researchers. Data from each PSWS node is sent via internet to a public Central Control System, where the data can be easily downloaded by researchers. In this presentation, we discuss the architecture and show the features of the HamSCI PSWS Central Control System.



**PERSONAL SPACE WEATHER STATION (PSWS)  
WEB SITE UPDATE**

DCC  
BILL ENGELKE, AB4EJ  
CHARLOTTE, NC, SEP. 2022

v9

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## WHAT WE WILL COVER TODAY

- National Science Foundation (NSF)-sponsored project to develop a network of personal space weather stations
- Web site development status; testing prototype hardware

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## PERSONAL SPACE WEATHER STATION PROGRESS REPORT

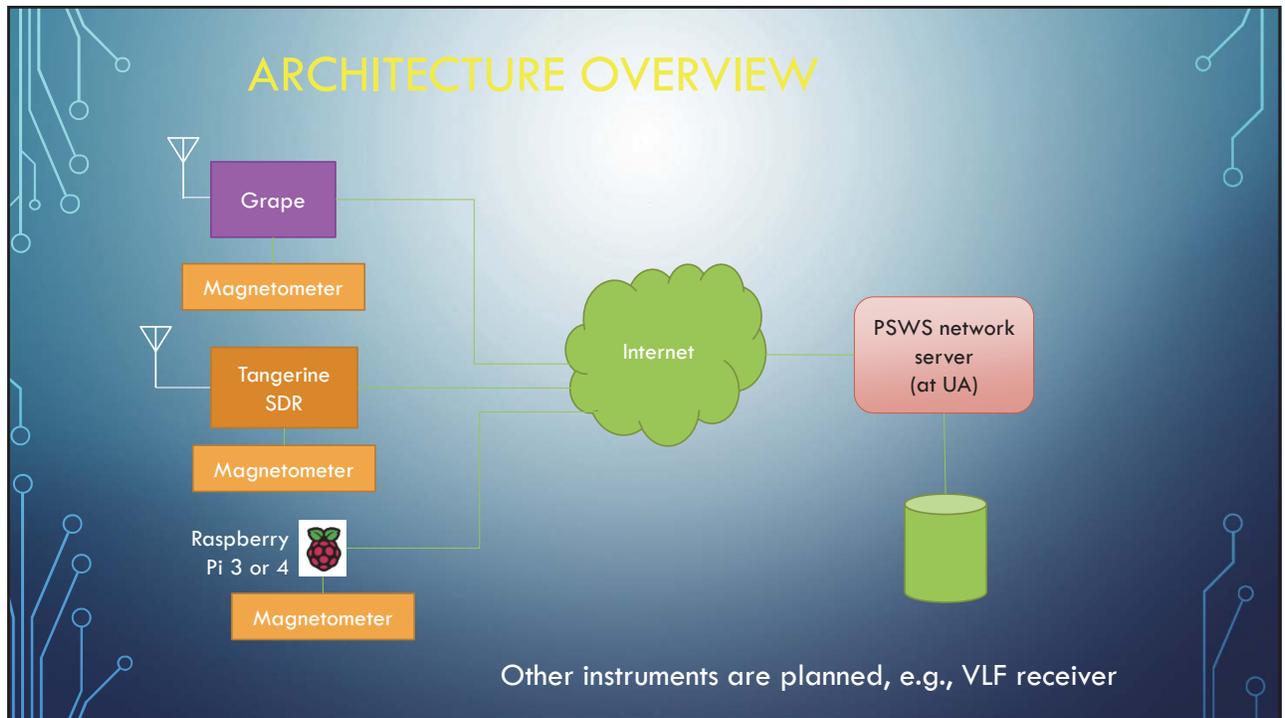
- Included design of 2 new software defined radios (one inexpensive, one high performance), plus a web site to hold collected data. Both radios use GPSDO.
- To be used for studying ionosphere via Doppler shift in WWV and other phenomena

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## STATUS

- The inexpensive SDR (CWRU) – is designed and is in final preparation
- The high performance SDR (TAPR) was delayed by about 2 years due to COVID supply chain, but we now have the parts!
- The magnetometer is in production, announcement at DCC Charlotte
- The software for all the systems is ready for testing; all open source
- The web site is in beta testing now

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## Personal Space Weather Station Central Control System

Home
Stations
Observations
Users
Log In
Register your station
About

Welcome User : ab4ej-3 Log out

The map shows the United States, Mexico, and parts of the Caribbean. Three green location pins are placed on the map: one in the Midwest (near Chicago), one in the Southeast (near Jacksonville), and one in the Northeast (near New York). A red location pin is also visible in the Northeast. The map is labeled with state and country names and includes a 'mapbox' logo in the bottom left corner.

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## Personal Space Weather Station Central Control System Stations

Home
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[View your stations](#)  
[Add new station](#)

ID	User	Nickname	Grid	Elevation	Station status
N000003	ab4ej-3	N000003_A	EM63fi	112.0	Online
N000004	ab4ej-3	Grape N000019	EM63fj	100.0	Online
S000028	w2naf	W2NAF	FN21ei	480.0	Offline
S000030	AD0RR	Grape32	EM37ie	300.0	Online

[View your stations](#)  
[Add new station](#)

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## HOW TO USE IT

- Sign up for account on web site
  - Add a station and one or more instruments
  - Grape, Magnetometer, TangerineSDR(future)
- Configure & start an uploader

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## Personal Space Weather Station Central Control System Observations

Home
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Center Frequency:  Station Nickname:  Start Date:  End Date:

To download observation data, click on File/Observation link. Please be patient, it may take a while to zip a large observation.

Data rate	Center Frequency	Station	Instrument	Size	File/Observation	Start (UTC)	End (UTC)
1	—	N000003_A	Magnetometer2	293282	<a href="#">OBS2022-08-31T00:00.zip</a>	2022-08-31T00:00:00+00:00	2022-08-31T16:36:00+00:00
10	5.000 MHz	Grape32	Grape32	718729929	<a href="#">OBS2022-08-04T13:00</a>	2022-08-04T19:11:00+00:00	2022-08-31T16:29:00+00:00
10	5.000 MHz	Grape N000019	Grape19	725962491	<a href="#">OBS2022-08-04:13:00</a>	2022-08-04T17:59:00+00:00	2022-08-31T16:19:00+00:00
1	—	N000003_A	Magnetometer2	428862	<a href="#">OBS2022-08-30T00:00.zip</a>	2022-08-30T00:00:00+00:00	2022-08-30T23:50:00+00:00

1 | | | | | | | | | |

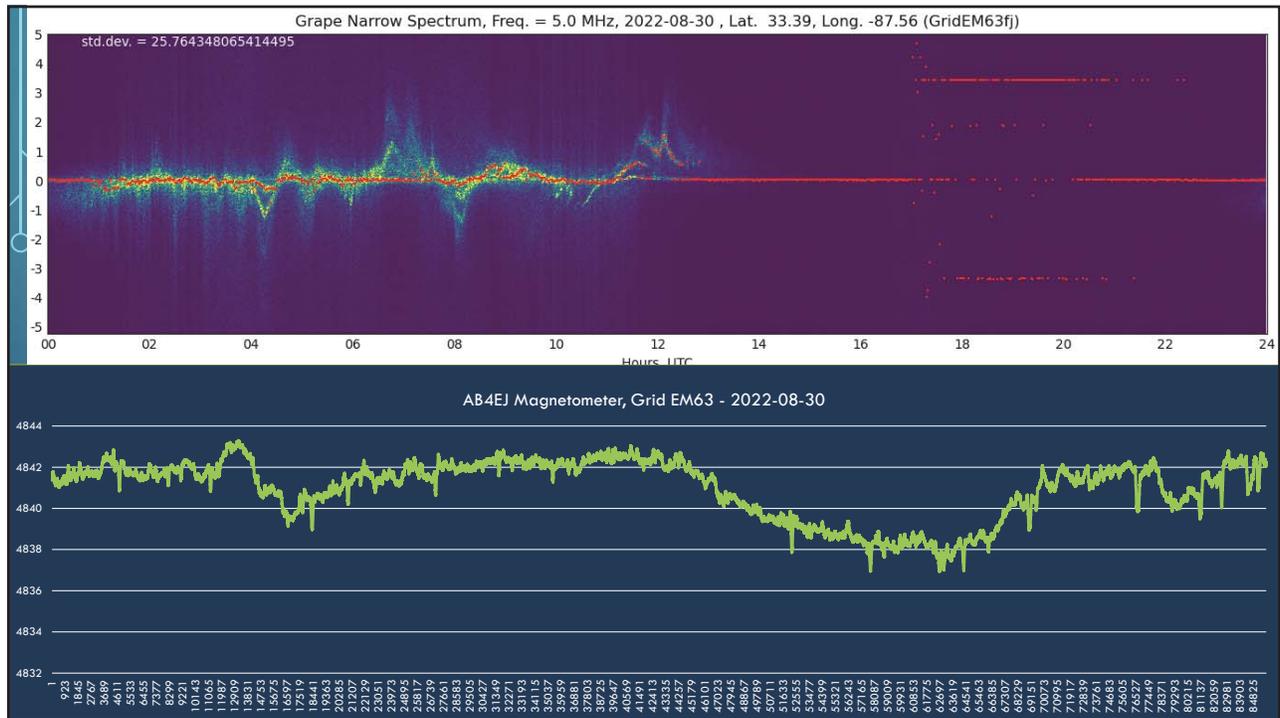
Page 1 of 15. [next](#) [last](#) »

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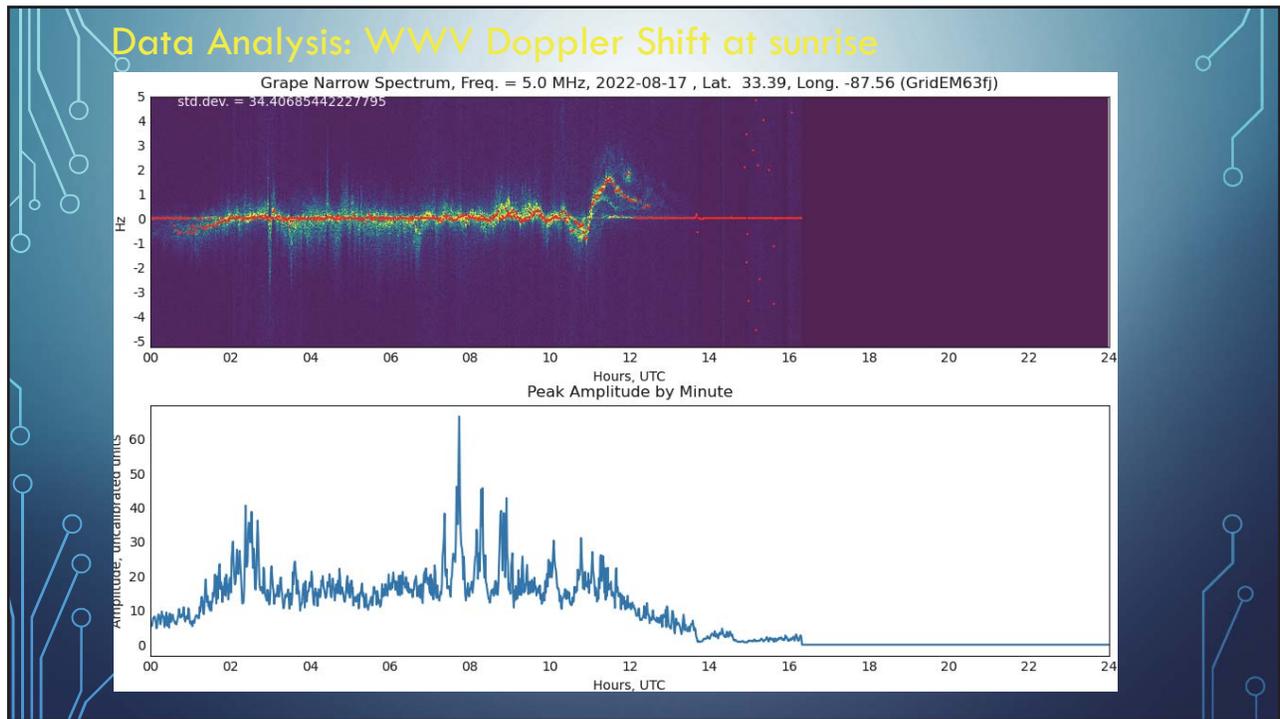
## USING OBSERVATIONS

- Click on observation of interest
- Wait! (Large observation may take several minutes to be compressed)
- File shows up in your download directory
- Unzip file & run your data analysis
- Spectrum files can be examined by making a waterfall plot
- Magnetometer files can be analyzed using Excel (csv files)
- Some examples...

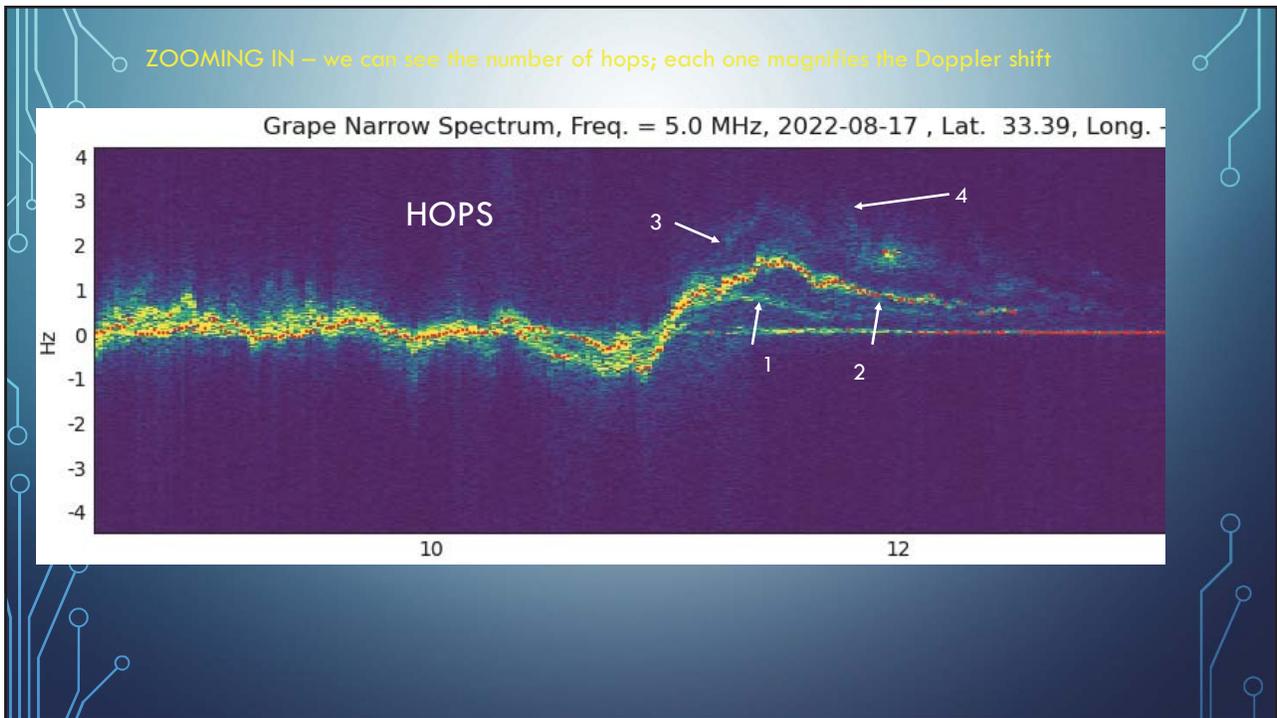
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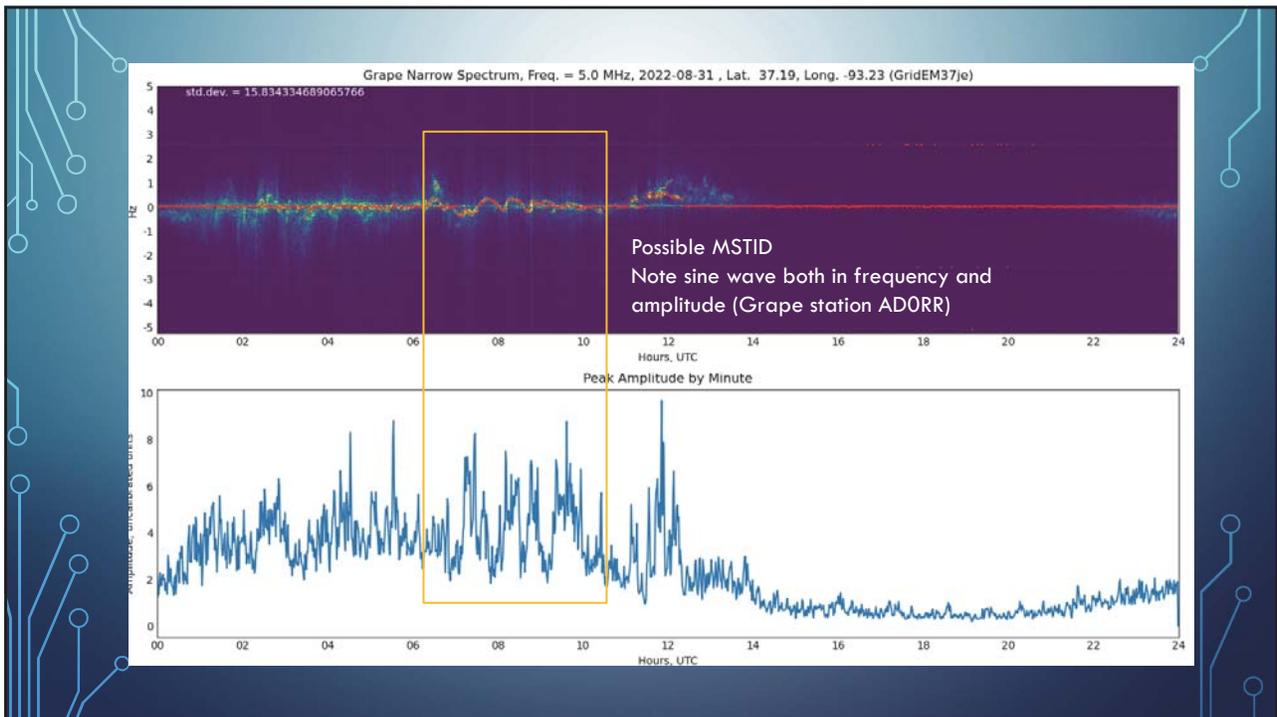
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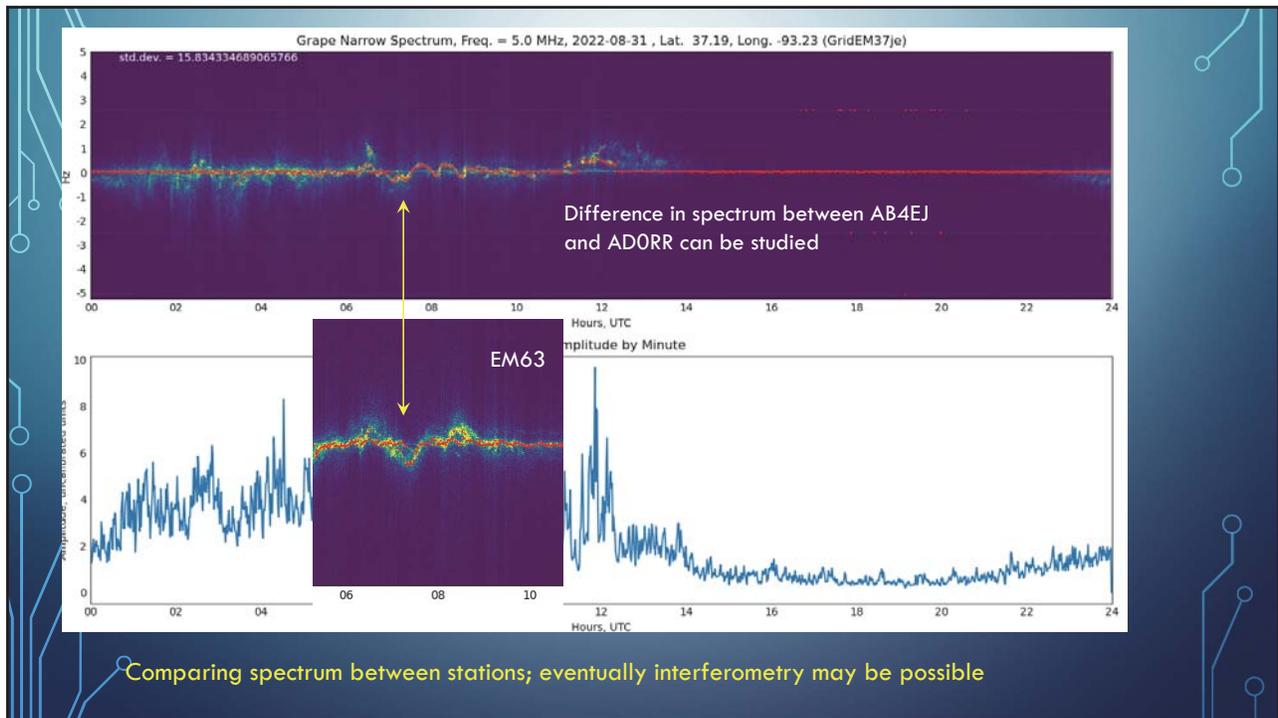
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## WHAT NEXT?

- We are looking for more beta testers who can set up a magnetometer and start reporting data to the web site
- Software is planned for producing magnetometer and spectrum plots on web server
  - Today you can download observations & process them at your site
- Final preparations in progress for producing both the Grape V2 and the Tangerine SDR
- Further tweaks and cleanups are planned for web site

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## GET INVOLVED

- [www.tangerinesdr.com](http://www.tangerinesdr.com)
- Monday night telco every week at 8 PM Central
- Thursday afternoon telco every other week at 2 PM central for science discussions

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## Q & A

- Bill Engelke, AB4EJ
- [bengelke@cs.ua.edu](mailto:bengelke@cs.ua.edu)

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- SuperDARN data:  
<https://link.springer.com/article/10.1007/BF00751350>
  - Thanks to Virginia Tech SuperDARN team for use of the North America data