

Personal Space Weather Station – Central Control and Database

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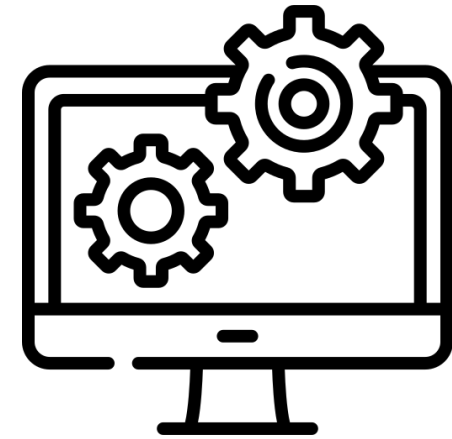
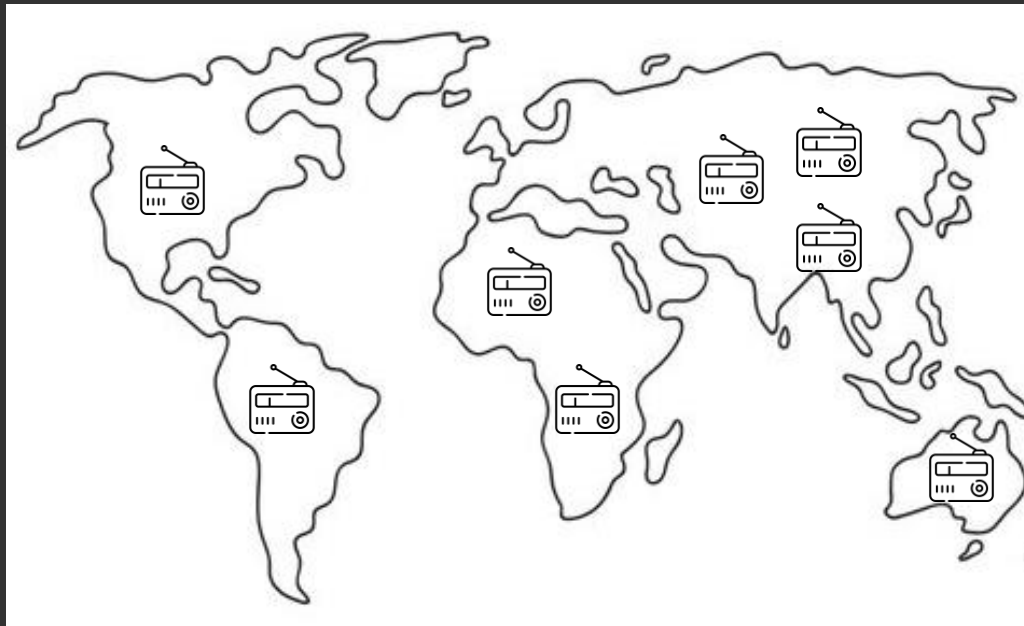
Dr. Travis Atkison - Department of Computer Science

Overview



Personal Space Weather Station

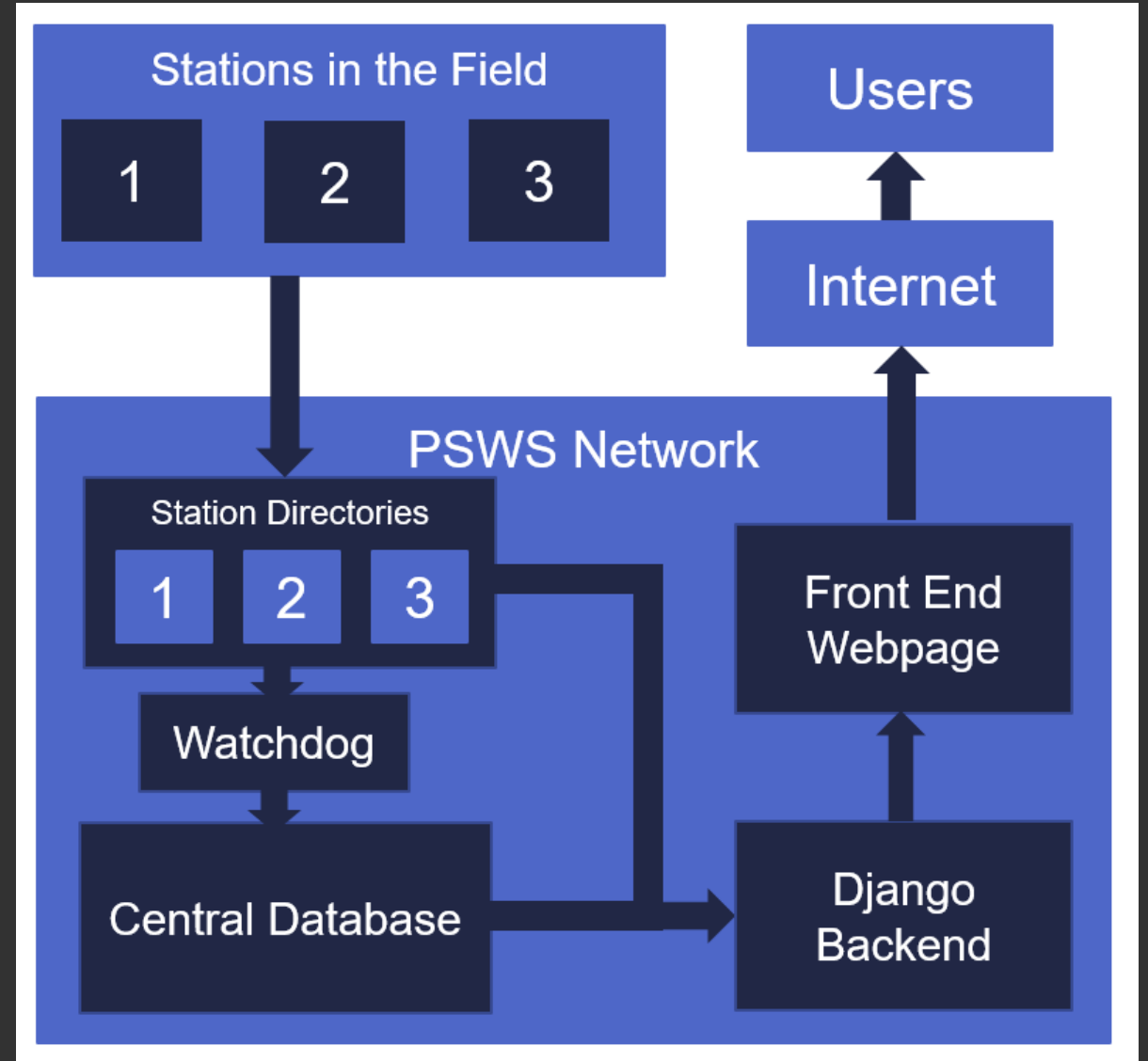
- Two Main Components:
 - Local Control Unit
 - Central Control System



PSWS Central Control System

Central Control System

- Local Units and Directories
- Watchdog and Central Database
- Django and Webpage



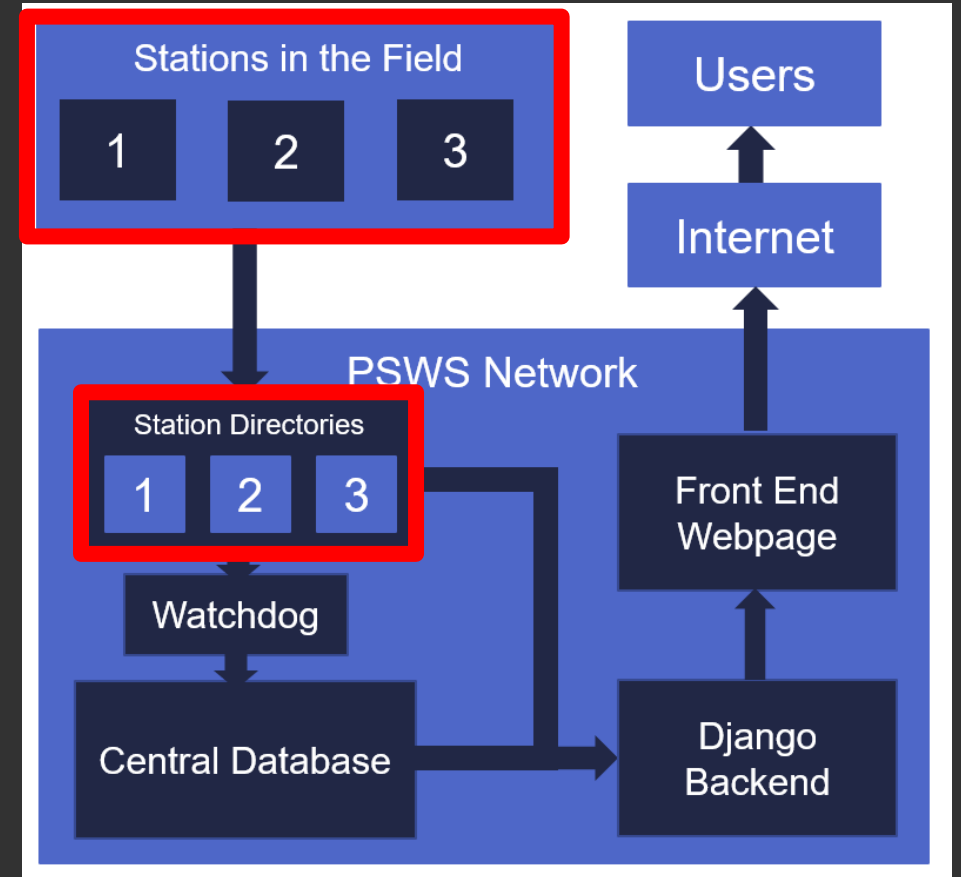
Local Unit Directories

```
[abliddle@pswsnetwork home]$ pwd
/home
[abliddle@pswsnetwork home]$ ls
N000003  S000028  S000031  S000034
```

Unit Home Directories

```
[abliddle@pswsnetwork magData]$ pwd
/home/N000003/magData
[abliddle@pswsnetwork magData]$ ls
OBS2021-03-17T00:00.zip  OBS2022-09-
OBS2021-05-28T00:00.zip  OBS2022-09-
OBS2021-05-29T00:00.zip  OBS2022-09-
```

Magnetometer Data



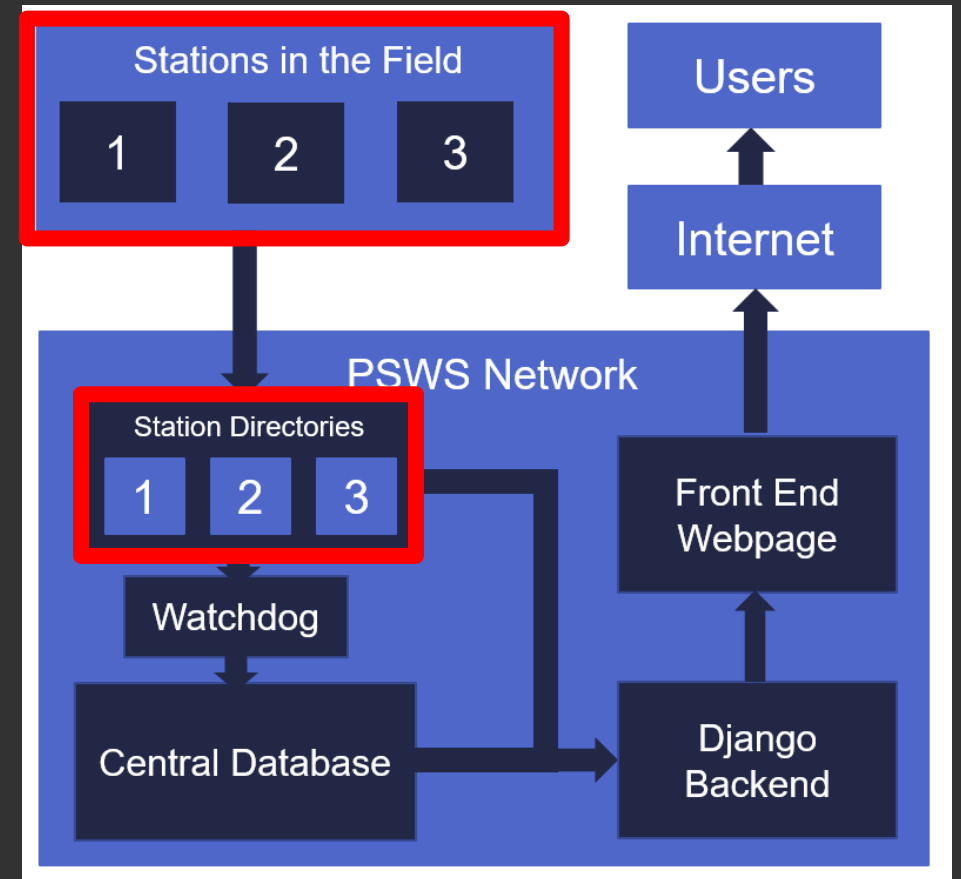
Local Unit Directories

```
[abliddle@pswsnetwork S000030]$ ls  
OBS2022-01-14T13:00  
OBS2022-08-03T13:00  
OBS2022-08-04T13:00
```

Spectrum Station Directory

```
[abliddle@pswsnetwork ch0]$ pwd  
/home/S000030/OBS2022-01-14T13:00/ch0  
[abliddle@pswsnetwork ch0]$ ls  
2022-08-04T19-00-00 2022-09-07T16-00-00  
2022-08-04T20-00-00 2022-09-07T17-00-00  
2022-08-04T21-00-00 drf_properties.h5  
2022-08-04T22-00-00 metadata  
2022-08-04T23-00-00
```

Spectrum Data Directory



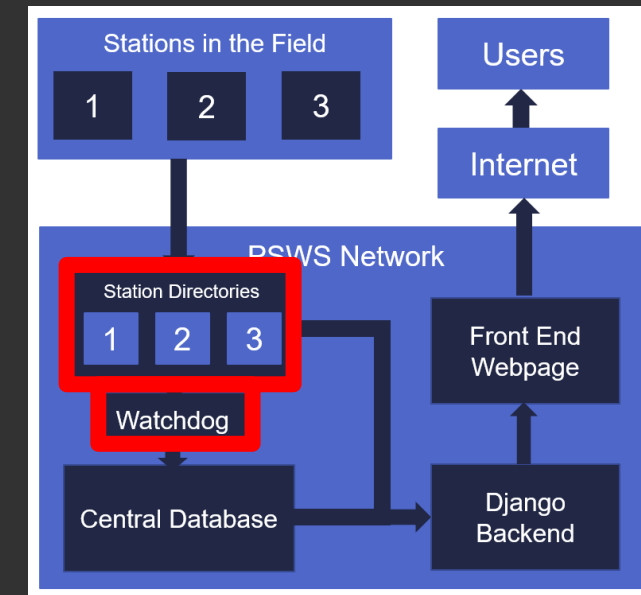
Watchdog and Database

```
[abliddle@pswsnetwork S000028]$ pwd
/home/S000028
[abliddle@pswsnetwork S000028]$ ls
OBS2021-12-13T00:00
mOBS2021-12-13T00:00_GMAG_2022-07-22T16:13
mOBS2021-12-13T00:00_GMAG_2022-07-22T16:21
mOBS2021-12-13T00:00_GMAG_2022-07-22T16:36
```

Watchdog Trigger Files

```
path = sys.argv[1] if len(sys.argv) > 1 else '/home'
# directory starting with "d" - this upload is in response to a Data Request
# directory starting with "c" = this upload is from a Continuous Upload
# directory starting with "m" = this upload is from magnetometer data
# The "N" prefixes are legacy, need to delete after test period
event_handler = UploadEvent(patterns=["S*/m*", "N*/c*", "N*/m*", "S*/d*", "S*/c*", "N*/c*"])
observer = Observer()
observer.schedule(event_handler, path, recursive=True)
observer.start()
print("observer started")
writeLog("Starting watchdog")
try:
    while True:
```

Watchdog Trigger Code



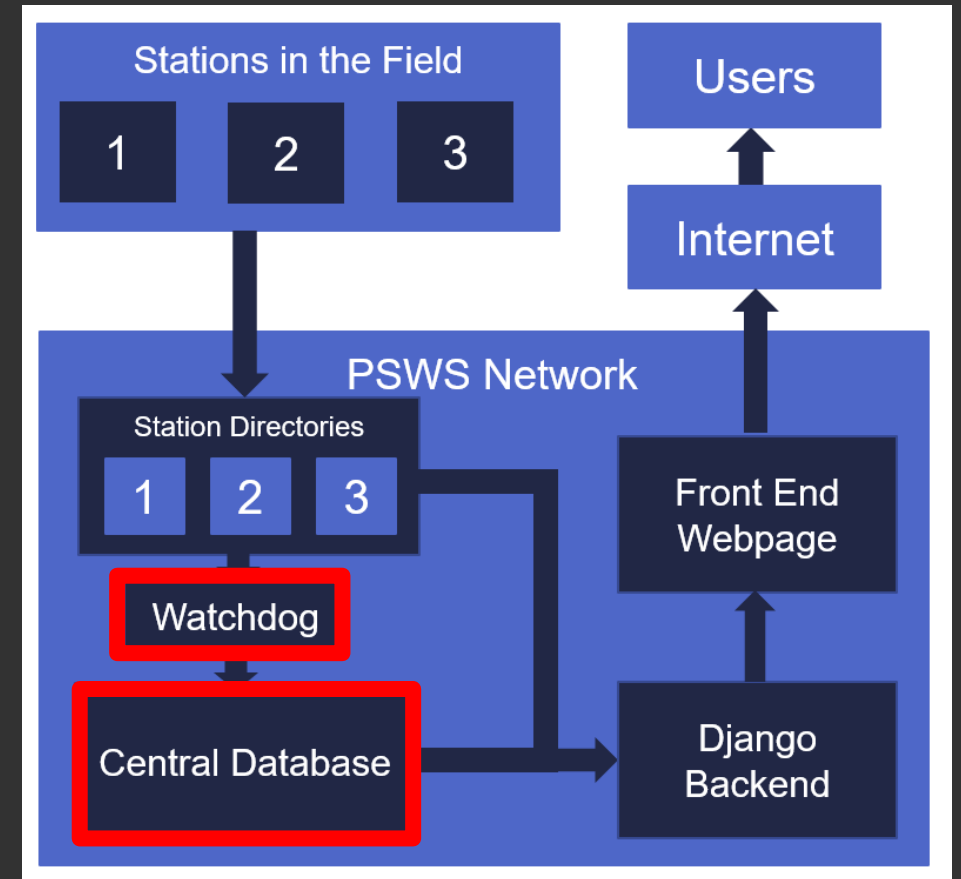
Watchdog and Database

```
def on_created(self, event):
    #Begin by identifying if continuous or not
    #Then locating the path of the event
    print("UPLOAD trigger at local time: " + dt.now().isoformat())
    print("UPLOAD path='" + event.src_path + "'")
    writeLog("UPLOAD, path " + event.src_path)
    try:
        instrumentNo = event.src_path.split("#")[1] # this should
    except:
        print("ERROR, parsing failure, the '#' not found")
        writeLog("ERROR - parsing failure, the '#' not found")
        return
```

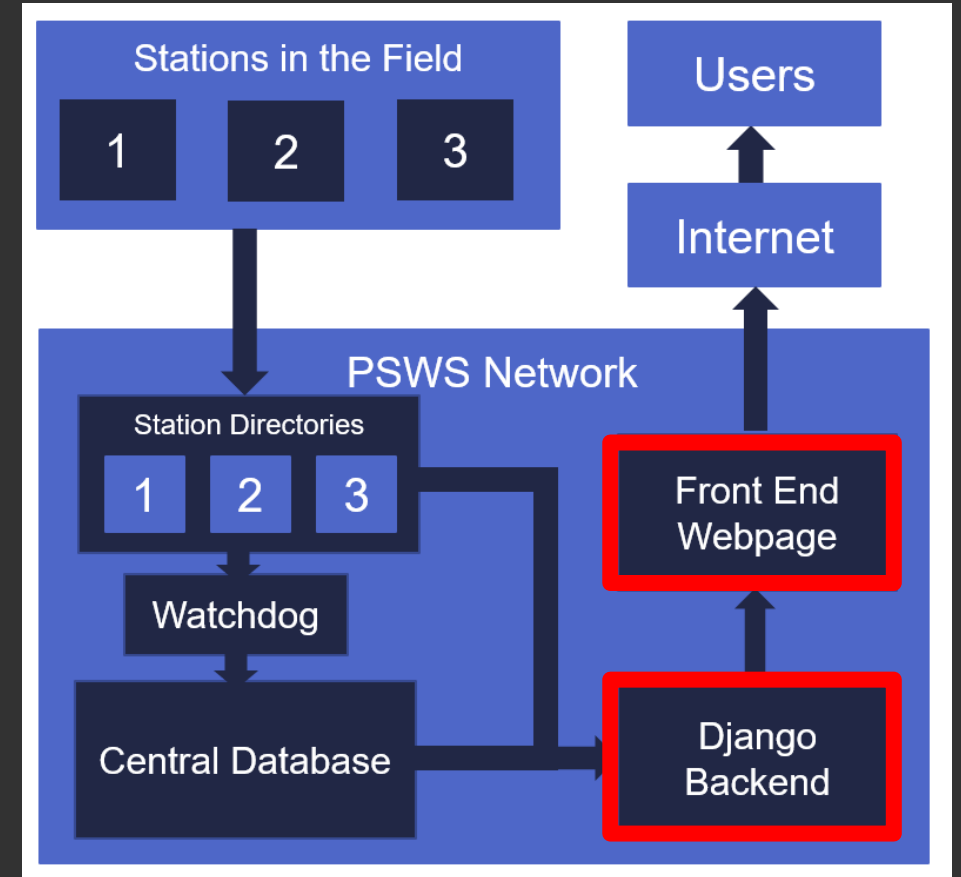
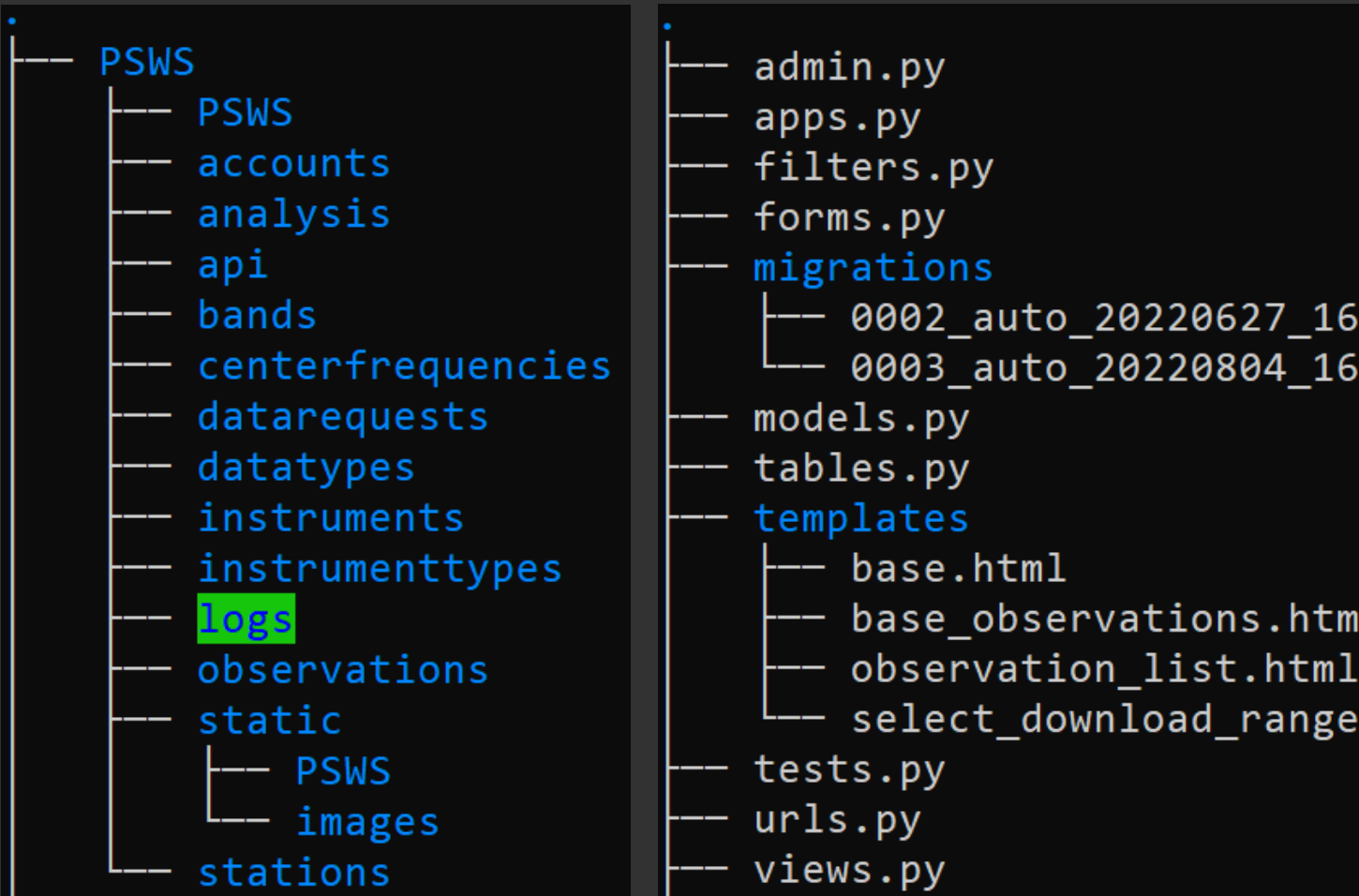
Watchdog Parsing Code

```
2023-03-09T00:20:39 Removed directory:/home/N000004/cOBS2023-01-27T19:00_#Grape19_#2023-03-09T00:16
2023-03-09T00:22:21 UPLOAD, path /home/S000031/mOBS2022-08-28T12:00_#Mag_rev_E_#2023-03-09T00:22
2023-03-09T00:22:21 Issued syscommand:python3 psws_addMAG.py /home/S000031/magData/ S000031 Mag_rev_E
2023-03-09T00:22:21 Removed directory:/home/S000031/mOBS2022-08-28T12:00_#Mag_rev_E_#2023-03-09T00:22
2023-03-09T00:37:23 UPLOAD, path /home/S000031/mOBS2022-08-28T12:00_#Mag_rev_E_#2023-03-09T00:37
2023-03-09T00:37:24 Issued syscommand:python3 psws_addMAG.py /home/S000031/magData/ S000031 Mag_rev_E
2023-03-09T00:37:24 Removed directory:/home/S000031/mOBS2022-08-28T12:00_#Mag_rev_E_#2023-03-09T00:37
2023-03-09T00:40:21 UPLOAD, path /home/S000028/mOBS2022-06-10T00:00_#GMAG_#2023-03-09T00:40
2023-03-09T00:40:22 Issued syscommand:python3 psws_addMAG.py /home/S000028/magData/ S000028 GMAG 2023
2023-03-09T00:40:22 Removed directory:/home/S000028/mOBS2022-06-10T00:00_#GMAG_#2023-03-09T00:40
2023-03-09T00:44:38 UPLOAD, path /home/N000003/mOBS2022-07-27T12:00_#Magnetometer2_#2023-03-09T00:44
2023-03-09T00:44:39 Issued syscommand:python3 psws_addMAG.py /home/N000003/magData/ N000003 Magnetome
2023-03-09T00:44:39 Removed directory:/home/N000003/mOBS2022-07-27T12:00_#Magnetometer2_#2023-03-09T00:44
```

Watchdog Log File



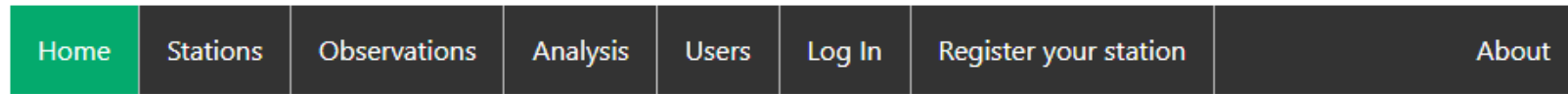
Django and Frontend



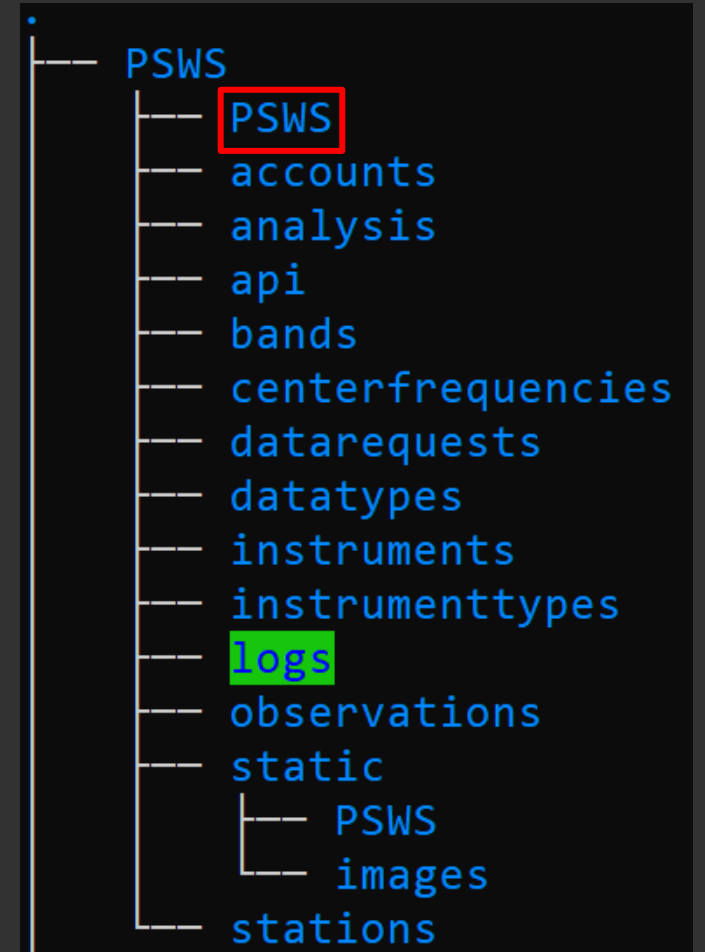
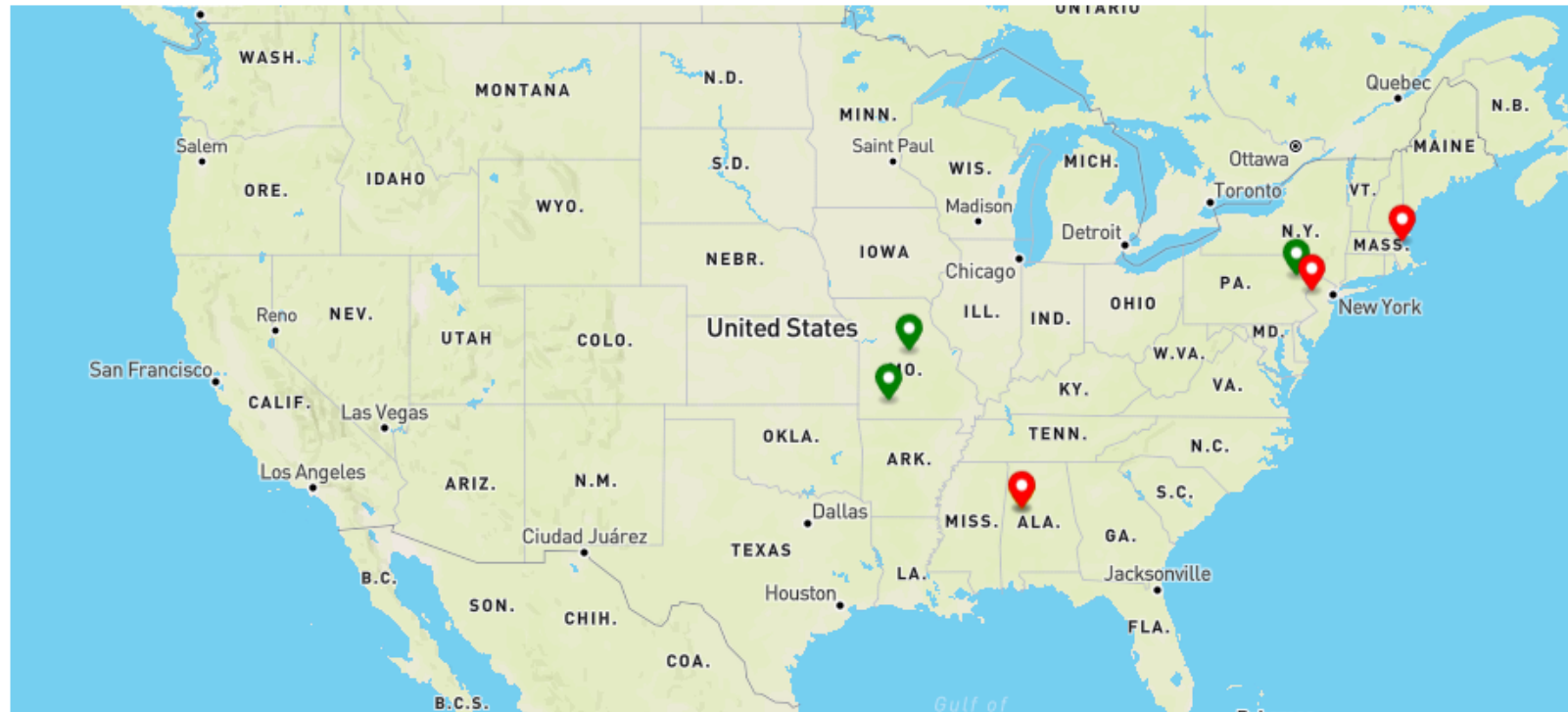
Django File Structure

Django and Frontend

Personal Space Weather Station Central Control System



Welcome User : [abliddle](#) [Log out](#)



Django and Frontend

×

Select options below to filter:

Instrument Type:

- Grape
- Tangerine
- Magnetometer

Center Frequency:

- 10.000 MHz
- 5.000 MHz
- 2.500 MHz
- 15.000 MHz

Station Nickname:

Start Date:

mm/dd/yyyy

End Date:

mm/dd/yyyy

Latitude Range:

[-90, 90] [-90, 90]

Longitude Range:

[-180, 180] [-180, 180]

Filter

Personal Space Weather Station

Central Control System

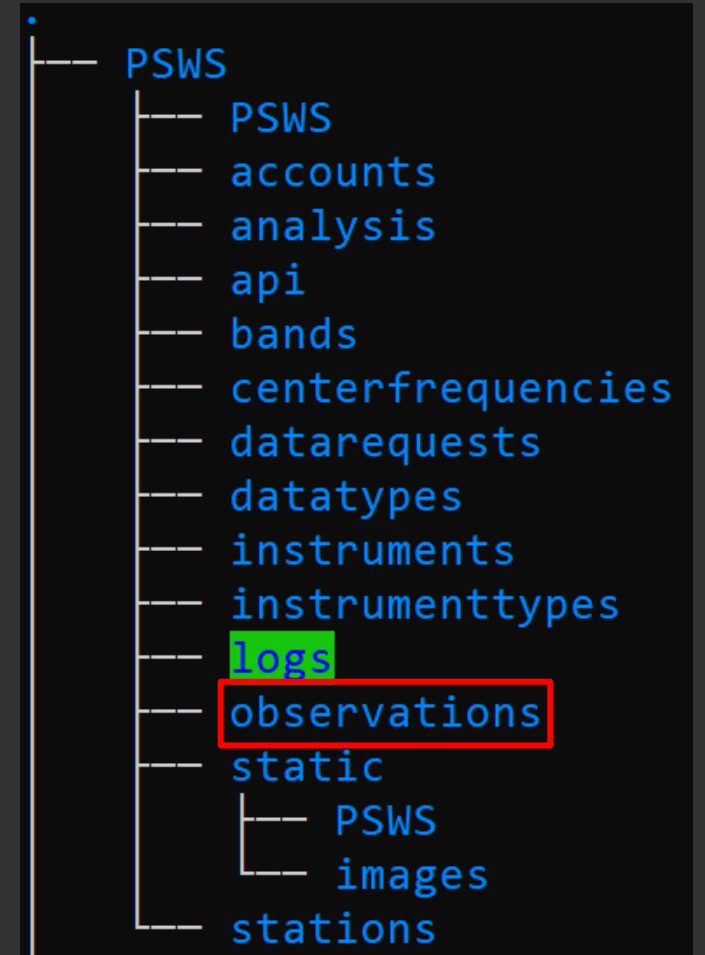
Observations

Home Stations **Observations** Analysis Users Log In Register your station About

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

Open Filter

Data rate	Center Frequency	Station	Instrument	Size	File/Observation	Start (UTC)	End (UTC)
1	—	Mag_kv0s4	Mag_rev_E	0.9186	OBS2023-03-05T00:00.zip	2023-03-05 00:00:00	2023-03-05 20:33:00
10	5.000 MHz	Grape32	Grape32	3,622.2182	OBS2022-01-14T13:00	2022-08-04 19:11:00	2023-03-05 20:19:00
1	—	Mag_kv0s4	Mag_rev_E	1.0704	OBS2023-03-04T00:00.zip	2023-03-04 00:00:00	2023-03-04 23:59:00
1	—	Mag_kv0s4	Mag_rev_E	1.0759	OBS2023-03-03T00:00.zip	2023-03-03 00:00:00	2023-03-03 23:59:00
1	—	Mag_kv0s4	Mag_rev_E	1.0609	OBS2023-03-02T00:00.zip	2023-03-02 00:00:00	2023-03-02 23:59:00



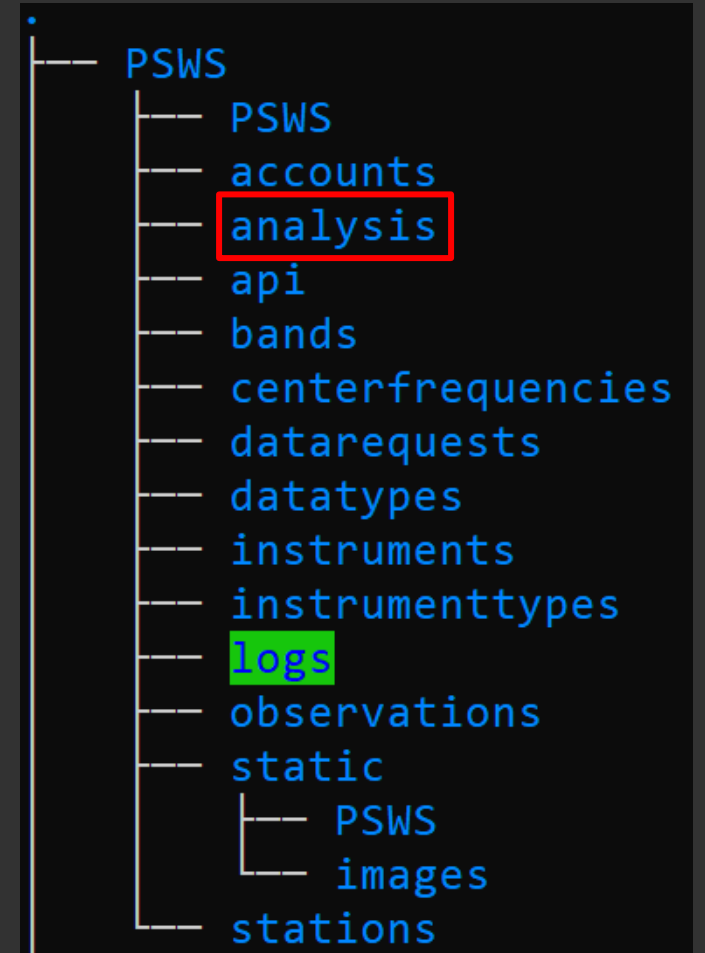
Django and Frontend



- Elevation: 220.0
- Antenna 1:
- Antenna 2:
- Date Created: Nov. 14, 2022, 7:13 p.m.

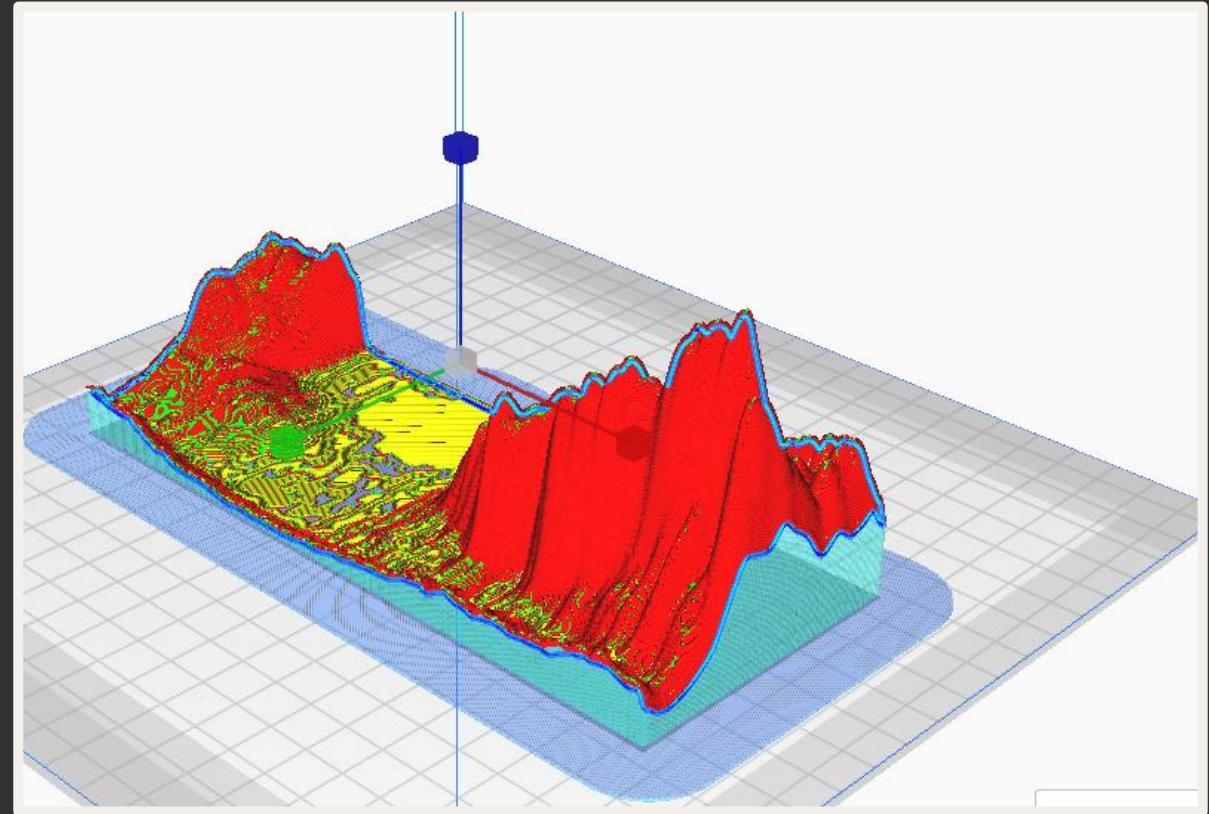
Below is a list of observations collected by this station.

Data rate	Center Frequency	Station	Instrument	Size	File/Observation	Start (UTC)	End (UTC)
1	—	Mag_kv0s4	Mag_rev_E	1.0742	OBS2022-11-14T00:00.zip	2022-11-14 00:00:00	2022-11-14 23:59:00
1	—	Mag_kv0s4	Mag_rev_E	0.1025	OBS2022-11-15T00:00.zip	2022-11-15 00:00:00	2022-11-15 02:14:00
1	—	Mag_kv0s4	Mag_rev_E	1.0579	OBS2022-11-16T00:00.zip	2022-11-16 00:00:00	2022-11-16 23:52:00



Current Work and Future Directions

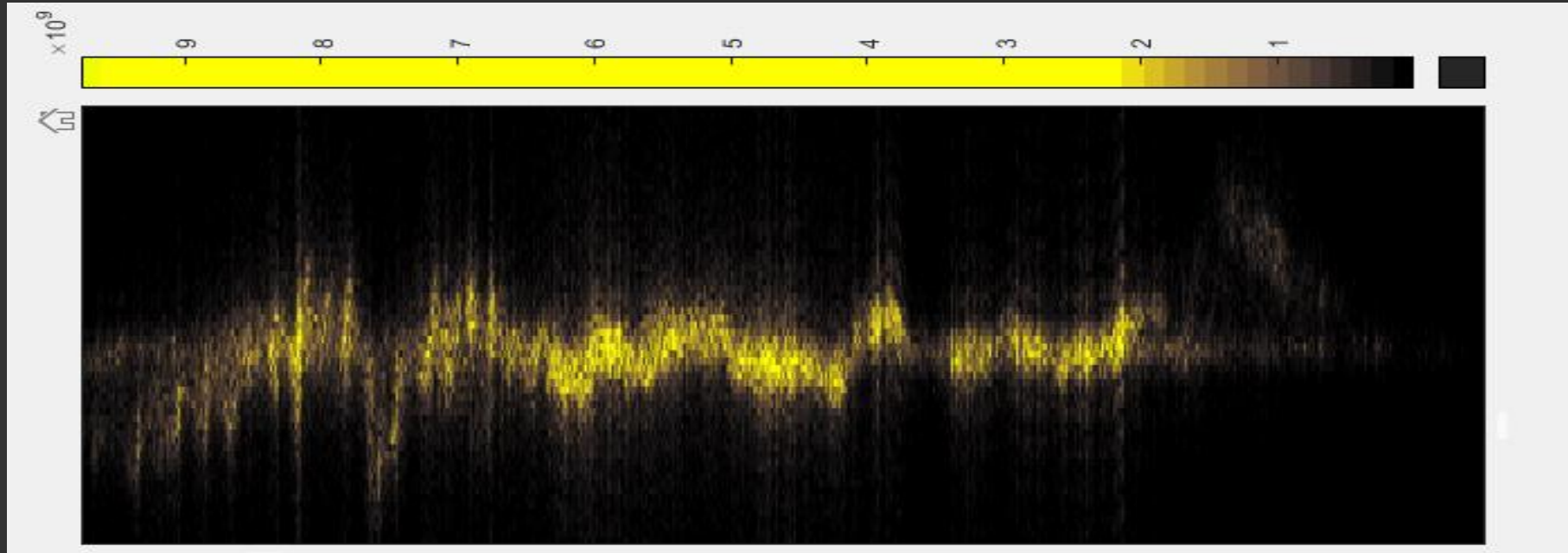
- Graphing
- Sonification
- Enhanced Tables and Filters



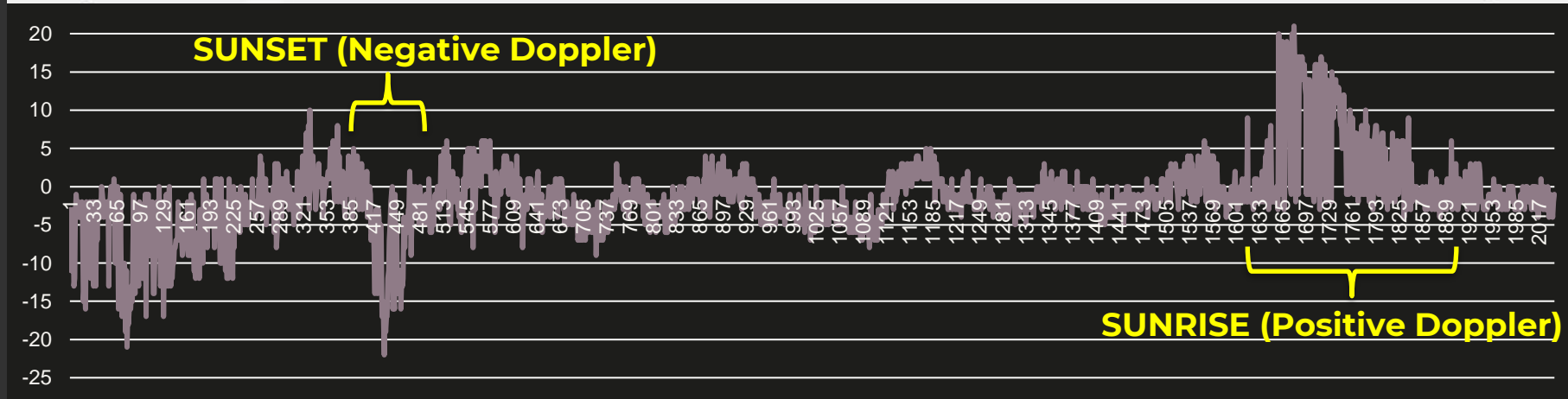
Data Graphed in 3D Software

Graphing

Frequency



Frequency



Time →

Acknowledgements

- National Science Foundation, Award Number 2002278
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Do you have any questions?

Contact Us

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