

# Viewing Data

## Using COS Software to view various SeaSonde data products by Regan Long

This is a “quick reference” for viewing COS data products such as: STAT, Cross Spectra, Radial, Wave, and Total Vector files. This guide will provide basic steps for utilizing DiagDisplay, SpectraPlotter apps, RadialDisplay, WaveDisplay and SeaDisplay. All of these “viewer” applications can be found in the ‘/Codar/SeaSonde/Apps/Viewers’ directory.

### Viewing diagnostic files (STAT\* files)

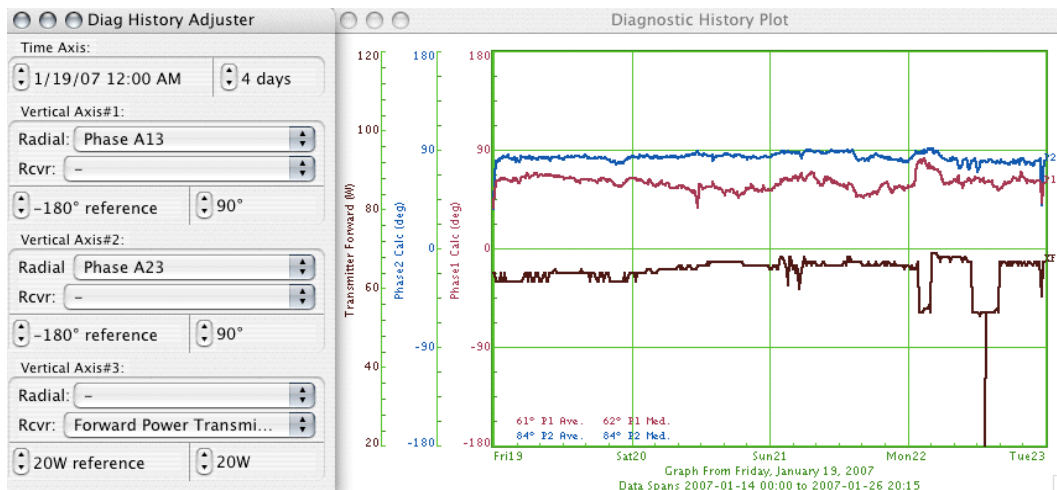
‘STAT’ files are created to provide radial and hardware diagnostics from CODAR systems. Anything from chassis temperature to supply voltages to the number of radials produced each hour are contained in these files.

#### Need to know:

- Two types of ‘STAT’ files: one contains hardware information (extension ‘.hdt’) and the other contains “radial” information (extension ‘.rdt’)
- Files are written to ‘/Codar/SeaSonde/Data/Diagnostics/’
- **Viewer: DiagDisplay**
- Common uses: visualizing trends in forward and reflected power, temperatures, or obtaining sea echo phase values for ideal radials
- Format: ASCII data organized in CTF (Codar Tabular Format)

#### How to use DiagDisplay to view STAT files:

1. Open a STAT file in DiagDisplay by:
  - Double-clicking one or more STAT files – or --
  - Drag and drop one or more STAT files on the DiagDisplay icon
2. Use the ‘Diag History Adjuster’ to view file contents
  - Three items can be plotted at once in the ‘Diagnostic History Plot’ window – all items in the “Radial:” pull-down menu are in the ‘.rdt’ files; all items in the “Rcvr:” pull-down menu are in the ‘.hdt’ files
  - Adjust the time axis (at top) to view from 12 hours to 2 months of data



## Viewing Cross Spectra files (CSQ, CSS, CSA)

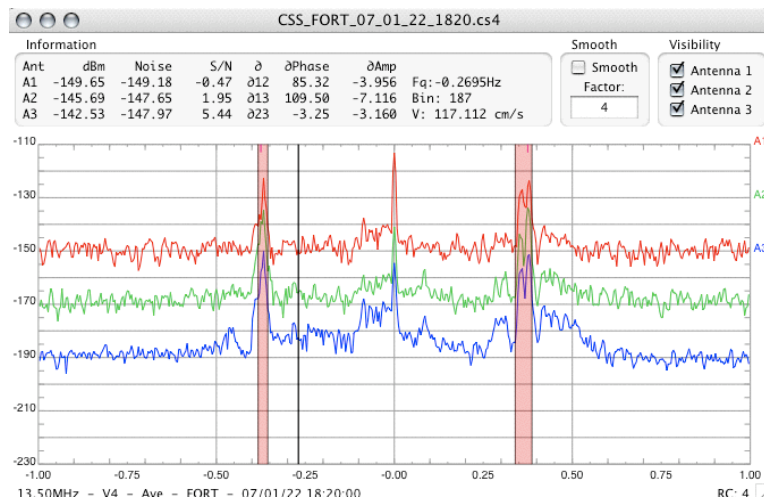
Cross Spectra files contain information such as signal intensity vs. Doppler on each channel, signal vs. range, and differential phase and amplitude. There are several ways to view these data and each of the applications identified below are unique in how they view these files.

### Need to know:

- Three “types” of Cross Spectra files: **CSQ files** are the “unaveraged” cross spectra files output from SeaSondeAcquisition. **CSS files** are “averaged” from several CSQ files (the number is dependent upon preferences set). **CSA files** are averaged from several CSS files (number dependent upon preferences set)
- Files are output in subfolders of ‘/Codar/SeaSonde/Data/Spectra/’
- **Viewers: SpectraPlotter, SpectraPlotterMap, SpectraPlotter3D**
- Common uses: identifying and/or setting First and Second Order regions, quantifying signal and noise levels on each channel, determining range limitation of systems, identifying interference, etc.
- File format: binary with resource fork

### How to use SpectraPlotter to view CSQ, CSS and CSA files:

1. Open a CSQ, CSS, or CSA file in SpectraPlotter by:
  - drag and drop one file on the SpectraPlotter icon
2. Click on the plot to pinpoint location in Doppler with cursor (arrow keys can be used to move cursor right or left)
  - Red is channel 1; green is channel 2 and blue is channel 3
  - Uncheck antenna boxes in upper right to remove channels from plot
  - Information at top: signal, noise floor, signal to noise ratio, differential phase, amplitude, and frequency, bin number & radial velocity at cursor location
  - Smooth plot by selecting “Smooth Factor” in upper right
  - First order regions are identified in pink if file has been processed

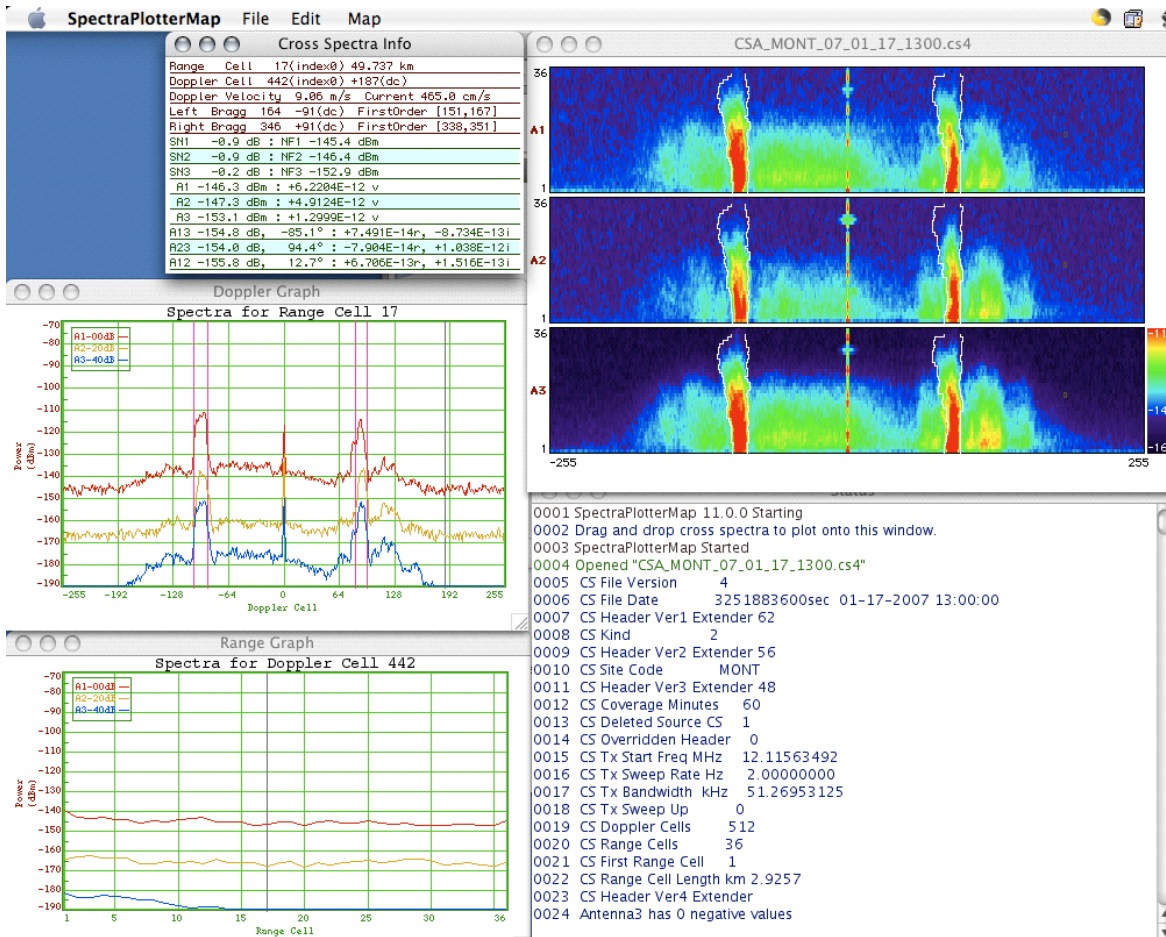


3. Use key commands to move in time or space
  - ⌘-] to move out one range cell; ⌘-[ to move in one range cell (range cell number shown in bottom right corner after RC)

- ⌘-' to move forward in time and ⌘-; to step back in time. Access limited to folder of most recent file opened.

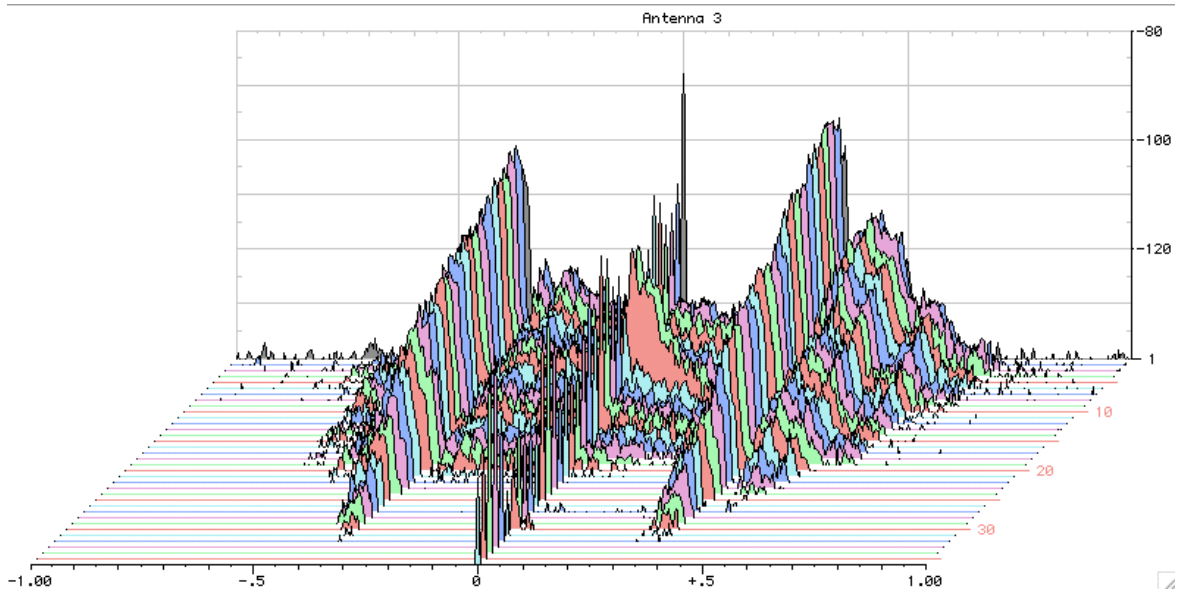
How to use SpectraPlotterMap to view CSQ, CSS and CSA files:

1. Open a CSQ, CSS, or CSA file in SpectraPlotterMap by:
  - Double-clicking on one CSQ, CSS or CSA file – or –
  - Drag and drop one file on the SpectraPlotterMap icon
2. Click on the ColorMap with target cursor to pinpoint location in Doppler and range (arrow keys can be used to move cursor right or left)
  - Five windows: ColorMap (top right), Cross Spectra Info (top left), Doppler Graph (middle left), Range Graph (bottom left) and Status (bottom right)
  - Signal intensity vs. range is shown in the ColorMap. Cursor selects range cell and displays Doppler cross-section in Doppler Graph
  - View signal, noise, signal to noise ratio, differential phase, amplitude, frequency offset and radial velocity corresponding to cursor location in Doppler Graph in Cross Spectra Info window
  - First Order lines shown in white
  - Center and start frequency, range cells processed, number of Doppler cells, etc. are shown in Status window
3. Use key commands to move in time or space
  - “apple”+ “]” to move out in range cell; “apple”+ “[” to move in in range cell (range cell number shown in bottom left corner)
  - “apple”+ “'” to move forward in time; “apple”+ “;” to back in time. Note: Will only access files in folder of original file dropped on application.



### How to use SpectraPlotter3D to view CSQ, CSS and CSA files:

1. Open a CSQ, CSS, or CSA file in SpectraPlotter3D by:
  - Drag and drop one file on the SpectraPlotter3D icon
2. View signal intensity and range (range cell 1 at back) in each channel (default is antenna 3)
  - Toggle to different channels (i.e. antenna) by using key command "apple"+ "]"
3. Use key commands to move in time
  - "apple"+ "[" to move forward in time; "apple"+ ";" to back in time. Note: Will only access files in folder of original file dropped on application.



## **Viewing Radial files**

Radial files are commonly the most regularly viewed files. They are often created every hour, but averaged over 75min (for standard systems; LR systems are commonly output every hour but averaged over three hours). They contain latitude, longitude, u and v velocity values, some quality factors (such as temporal and spatial uncertainty), and a wealth of metadata.

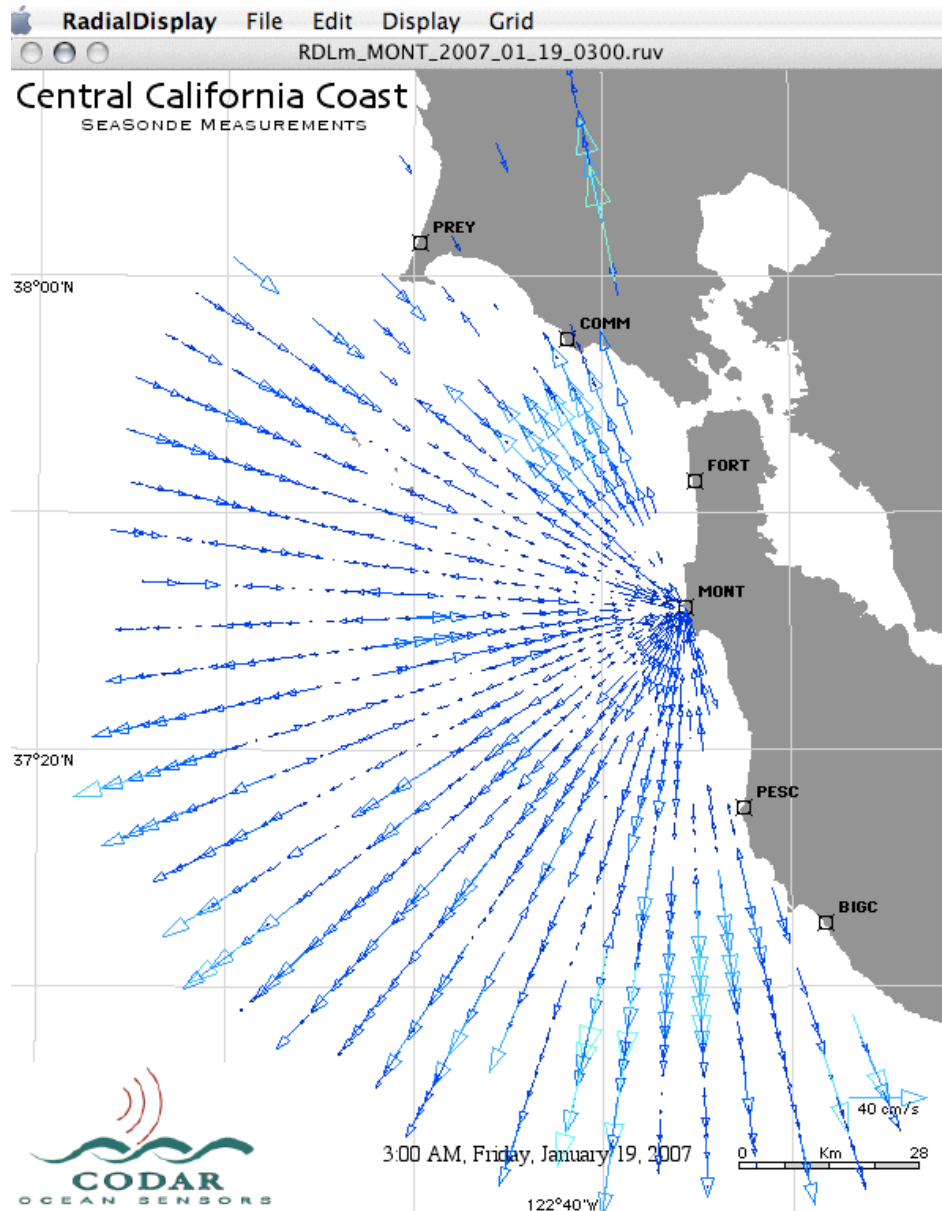
### Need to know:

- Two “types” of radial files: Calibrated (denoted by RDLm\* prefix) and Ideal (RDLi\* prefix)
- Located in '/Codar/SeaSonde/Data/Radials/'
- **Viewer: RadialDisplay**
- Common uses: viewing hourly radial vectors, qualitatively viewing range extent of signal, creating movies of radial vector files, creating distributions of radials over a period of time
- File format: CTF (Codar Tabular Format)

### How to use RadialDisplay to view Radial files:

1. Create a SeaDisplay Site map for the radial site and place in /Codar/SeaSonde/Configs/SiteDefinitions
  - This process is detailed in the Quick Reference guide on creating SeaDisplay Site maps
2. Open a radial vector file in RadialDisplay by:
  - Double-click on one radial file – or –
  - Drag and drop one file on the RadialDisplay icon
3. Use Map Options within 'Display' pull-down menu to select asthetics
  - Select 'Use Color' for colored vectors
  - Scale adjustments are made by pressing the 'More vector options...' button
4. More viewing options:

- Select “Show Vector Info” from ‘Display’ menu and pinpoint individual vector for further detail
- Utilize ‘Create Movie’ option under ‘File’ menu
- Utilize the ‘Radial distribution’ option under the ‘Display’ menu to create a distribution of radial files within a folder



### **Viewing Wave files**

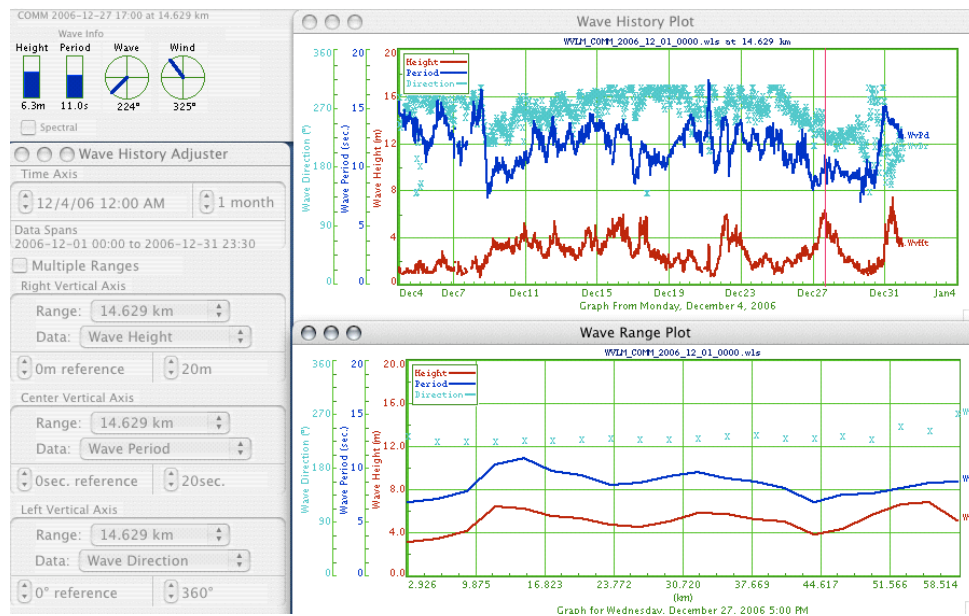
Wave files are created when wave processing is enabled on a CODAR system. Wave files are created every month and regularly appended to (interval dependent upon preferences set). They contain wave period, wave height, wave direction and wind direction for each range cell set in the preferences.

Need to know:

- Two “types” of radial files: Wave Model files (WVLM\*) and Spectral Wave files (WVLS\*)
- Located in ‘/Codar/SeaSonde/Data/Waves/’
- **Viewer: WaveDisplay**
- Common uses: viewing wave height, period, direction and wind direction for one or multiple range cells
- File format: CTF (Codar Tabular Format)

### How to use WaveDisplay to view Wave files:

1. Open a wave file in WaveDisplay by:
  - Double-clicking one or more wave files – or –
  - Drag and drop one or more wave files on the WaveDisplay icon
2. Use the ‘Wave History Adjuster’ to view file contents
  - Three items can be plot at once in the ‘Wave History Plot’ window
  - Select what range to plot (next to “Range:”) and select what data parameter from that range (next to “Data”)
  - Adjust the time axis (at top) to view up to 6 months of data or adjust scale to view only 12 hours of data
3. Click on the ‘Wave History Plot’ to pinpoint a specific time with cursor
  - Associated wave height, period, direction and wind direction are shown in the upper left, and will change as the cursor moves
  - The ‘Wave Range Plot’ window will update with wave height, period and direction vs. range from radar



### Viewing Total vector files

Total vectors are probably the “most looked at” files produced by CODAR. These files contain the latitude, longitude and u and v velocities of the total vectors produced from two or more radial sites. These are often produced every hour.

### Need to know:

- Located in ‘/Codar/SeaSonde/Data/Totals/’

- **Viewer: SeaDisplay**
- Common uses: viewing total vector fields, creating movies of total vectors
- File format: CTF (Codar Tabular Format)

How to use SeaDisplay to view Total vector files:

1. Create a SeaDisplay Site map for the total vector field and place in /Codar/SeaSonde/Configs/SiteDefinitions
  - This process is detailed in the Quick Reference guide on creating SeaDisplay Site maps
2. Open a total vector file in SeaDisplay by:
  - Double-clicking one Total vector file – or –
  - Drag and drop one file on the SeaDisplay icon
  - Drag and drop one file on the RadialDisplay icon
3. Use Map Options within 'Display' pull-down menu to select aesthetics
  - Select 'Use Color' for colored vectors
  - Scale adjustments are made by pressing the 'More vector options...' button
4. More viewing options:
  - Select "Show Vector Info" from 'Display' menu and pinpoint individual vector for further detail
  - Utilize 'Create Movie' option under 'File' menu

