Inside SeaSonde

<u>How CrossSpectra are used to produce Radials.</u>

SeaSondeAcquisition collects data continuously over time and produces raw cross spectra. On a Standard SeaSonde, each raw cross spectra covers 512 doppler cells at a 2 Hz sweep rate resulting in 256 seconds or roughly four and half minutes for each spectra. These raw spectra are read by CSPro which uses a running average and ship removal methods to output CSS files.

<u>1. CSS Timing handling.</u>
On a Standard SeaSonde, CSPro is configured to output a CSS every ten minutes with a running average of 15 minutes and time stamp the center time of coverage. This means that successive CSS files will overlap with 5 minutes of data. This overlap of data can be thought of as a smoothing factor over time; that is you will not get as sharp a change in successive CSSs compared to using a running average of ten minutes.

The spectra processing script AnalyzeSpectra processes each CSS in order. There are four parameters in the Header.txt file, which dictate how the CSS are used to generate radials. Each radial is time stamped at the center of the collection time and contains a coverage time value, which means the radial data spans from the timestamp minus half the coverage time to the timestamp plus half the coverage time.

The values on line 21 of the Header configuration file are:
<coverage time> <output interval> <interval offset> <watch timespan>
A Standard SeaSonde sets these values to '75. 60. 0. 0'

<coverage time>
sets the time in minutes of how much coverage time do you want for each output radial. If <watch timespan> is zero then you must account for the expected overlap of the CSS coverage time.

sets the time in minutes of how often you want a radial output. This value should be a multiple of the CSS output interval and no less than the CSS output interval. On a standard SeaSonde, you could set the value to 10 and get a radial output every ten minutes with each radial covering 75 minutes. This value

<interval offset>
sets the time in minutes from the time to create a radial. If zero and is 60, you will get a radial every hour time stamped on the hour. If 30 and is 60, you will get a radial every hour time stamped on the half

hour. This value should be less than <output interval> and should be a multiple of the CSS output interval.

<watch timespan>
if zero, sets whether processing should use the CSS coverage time in determining if the CSS file should be included in the radial coverage time. The reason for having this value is that on large overlaps like LongeRange SeaSonde where CSS coverage is 60min and output is every 30min, there can be endpoint confusion about which Radial the CSS should belong to, and by setting <watch timespan> to one, it helps to end the confusion.

Spectra processing converts each CSS into a temporary radial with the same coverage and time stamp. When the above time conditions are met processing merges the temporary radials into the output radial.

Example of Standard SeaSonde Radial Output:
CSS set for 15minute coverage and 10 minute output.

CSS	start	stop
0920	0912.5	0927.5
0930	0922.5	0937.5
0940	0932.5	0947.5
0950	0942.5	0957.5
1000	0952.5	1007.5
1010	1002.5	1017.5
1020	1012.5	1027.5
1030	1022.5	1037.5
1040	1032.5	1047.5

Radial Coverage 75min, Interval 60min, offset 0, watch 0
Given the previous CSS files, an output radial file for 10:00 would be produce containing CSS from 0930 to 1030 (7 files). The radial coverage time would be 0922.5 to 1037.5 which is 75 minutes. The output radial file will not be created until the last CSS is created; this means that 10:00 radial will not be processed until after 10:37.5

Example of LongRange SeaSonde Radial Output:
CSS set for 60minute coverage and 30 minute output.

CSS	start	stop
1000	0930	1030
1030	1000	1100
1100	1030	1130
1130	1100	1200
1200	1130	1230
1230	1200	1300
1300	1230	1330

1330   1300   1400
1400   1330   1430

Radial Coverage 180min, Interval 60min, offset 0, watch 0
Given the previous CSS files, an output radial file for 12:00 would be produced containing CSS from 1100 to 1300 (5 files). The radial coverage time would be 1030 to 1330 which is 180 minutes. This is because we are ignoring the CSS coverage time in determining which files to use. The output radial file will not be created until the last CSS is created; this means that 12:00 radial will not be processed until after 1330.

2. CSS Radial handling.
Each CSS is processed into a radial, which we call a short-time radial because it is temporary and only covers the CSS time. These radials exist only in the processing folder and are managed by the RadialSlider tool. The RadialSlider tool makes the determination of when enough CSS have been processed to produce an output Radial. The short-time radials are then passed to the RadialMerger tool, which produces the final radial for the output period.