

Real-Time-Controller (RTC) and Radar-User-Interface (RCI) Enhancements

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To support future adaptive scanning, a new method has been developed for users to define up to 10 active scan strategies. Named “Scan Table”, this method uses a table containing a list of scan strategies for data collection instead of a single scan strategy (i.e., super stimulus). Selections are provided to load individual scan strategies to a specific location in the table and modify them. Selections are also provided to save the contents of the scan table or load a previously saved scan table. Unlike Super Stimulus scanning, properties of each scanning strategy can be modified dynamically to better fit the active weather scenario. Each of these properties will be described further in this section.

A new panel, Scan Panel, has been added to the RCI client to support Scan Table scanning. It is displayed by selecting the “Scan” tab between the “System” and “Antenna/Pedestal” tabs. A sample Scan panel is presented in Fig. 3. The Scan Panel is broken up into two halves: scan table and scan control.

Scan Table

The upper half of the Scan Panel contains a table along with a number of selections to modify it. In addition, two groups of buttons are provided beneath the table to control a single scan table entry (Scan Control) and the entire scan table (Table Control).

In the “Scan Control” group four buttons are provided: Delete, Load, Properties, and Send. Only the Properties button can be selected whether or not the user is in Edit Mode.

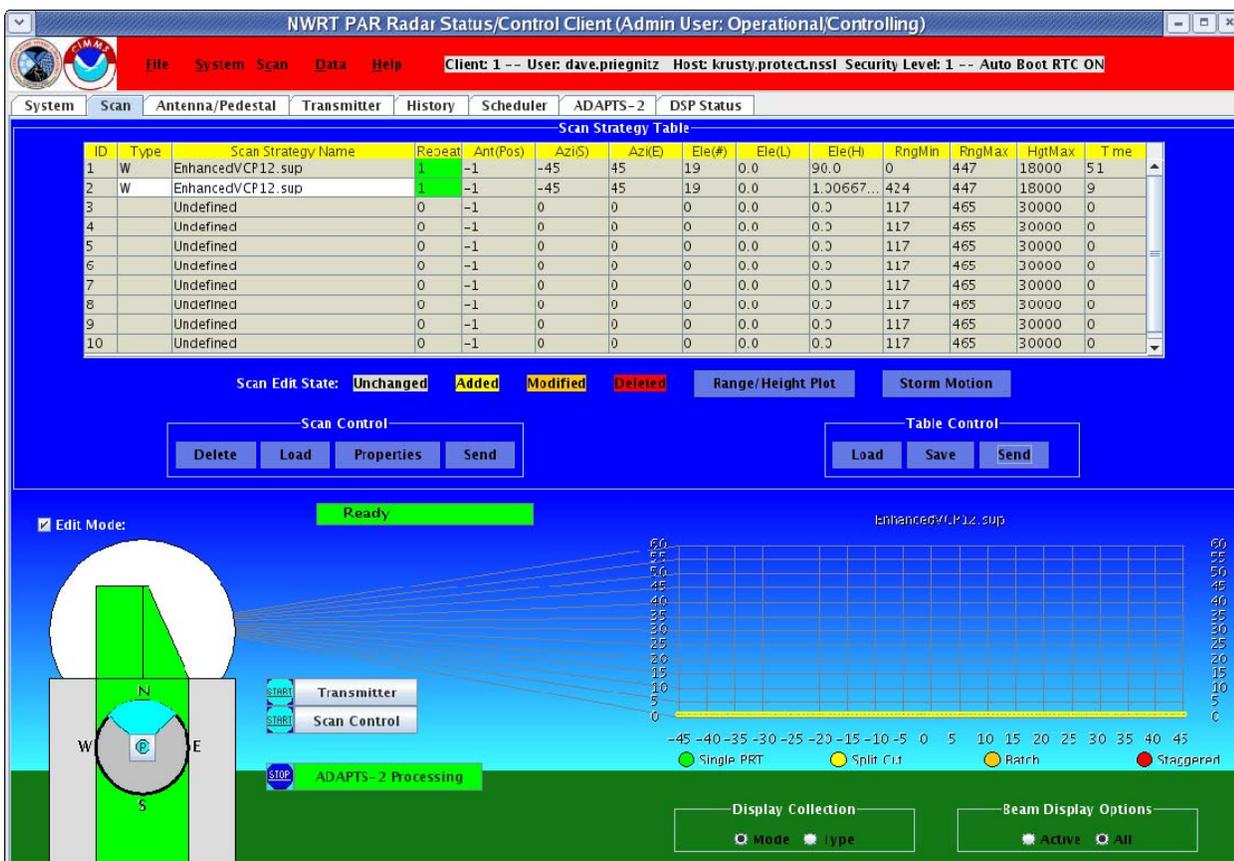


Figure 3: Sample Scan Panel

In edit mode, the “Delete” button removes the highlighted scan. When a scan is deleted, the area beneath the scan table ID turns red and the scan name is changed to “Undefined”. In non-edit mode this button is desensitized.

In edit mode, the “Load” button activates a pop up window from which the user selects a scan strategy from a list. It may take several seconds for the new scan to be loaded, so have patience. When a new scan is loaded, the area beneath the scan table ID turns yellow. In non-edit mode this button is desensitized.

In both edit and non-edit mode the “Properties” button displays a window containing detailed scan information for the highlighted scan strategy. A sample Scan Properties window is presented in Fig. 4. The scan properties are presented in a table with each row representing an elevation cut. Properties for each cut can be modified only by the controlling client. These properties include: elevation angle, waveform (long or short), scan type (weather or tracking), cut mode (single, split cut, batch), azimuth mode (constant beam or beam relative), azimuth beam spacing, PRT(s), and pulse count(s). In addition, elevation cuts can be added or deleted. Any changes are internal and do not affect the original scan strategy that was loaded into the scan table. If you want to save any changes you must save the entire scan table.

In edit mode the “Send” button sends the highlighted scan strategy to the RTC. If the scan strategy was modified and the edits not previously saved, a pop up window is displayed asking whether the changes are to be saved first. Again, if you want to save any edits you must save the entire scan table.

Cut	Elev	Waveform	Type	Mode	Azimuth(M)	Azimuth(I)	Nyquist	Range(E)	PRT(1)	Pulses(1)	PRT(2)	Pulses(2)
1	0.51	Short	Weather	Split Cut	Beam	0.5	29.296...	447.645	3000	12	800	26
2	0.9	Short	Weather	Split Cut	Beam	0.5	29.296...	434.46	2912	12	800	26
3	1.3	Short	Weather	Split Cut	Beam	0.5	29.296...	391.29	2624	12	800	26
4	1.8	Short	Weather	Split Cut	Beam	0.5	29.296...	345.735	2320	12	800	26
5	2.4	Short	Weather	Split Cut	Beam	0.5	29.296...	300.18	2016	12	800	26
6	3.1	Short	Weather	Split Cut	Beam	0.5	29.296...	258.21	1736	12	800	16
7	4.0	Short	Weather	Split Cut	Beam	0.5	29.296...	216.255	1456	12	800	16
8	5.1	Short	Weather	Split Cut	Beam	0.5	29.296...	179.085	1208	12	800	16
9	6.4	Short	Weather	Single	Beam	0.5	19.401...	179.085	1208	16	0	0
10	8.0	Short	Weather	Single	Beam	0.5	28.443...	121.53	824	16	0	0
11	10.0	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
12	12.5	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
13	15.6	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
14	19.5	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
15	23.37	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
16	28.2	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
17	34.25	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
18	42.8	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
19	52.9	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0

Figure 4: Sample Scan Properties display

Two additional buttons are available beneath the scan table: “Range/Height Plot” and “Storm Motion”. These buttons launch applications that can be used to modify scan properties. Both buttons are selectable regardless of RCI control and edit modes.

1) Range/Height Plot

Selecting the “Range/Height Plot” button displays the “NWRT Scan Range/Height Diagram” window. It is used to display graphically the elevation cuts contained in the highlighted scan

strategy. It is also used to define a minimum and maximum range and storm height which in conjunction can be used to reduce scan time. A sample window is presented in Fig. 5.

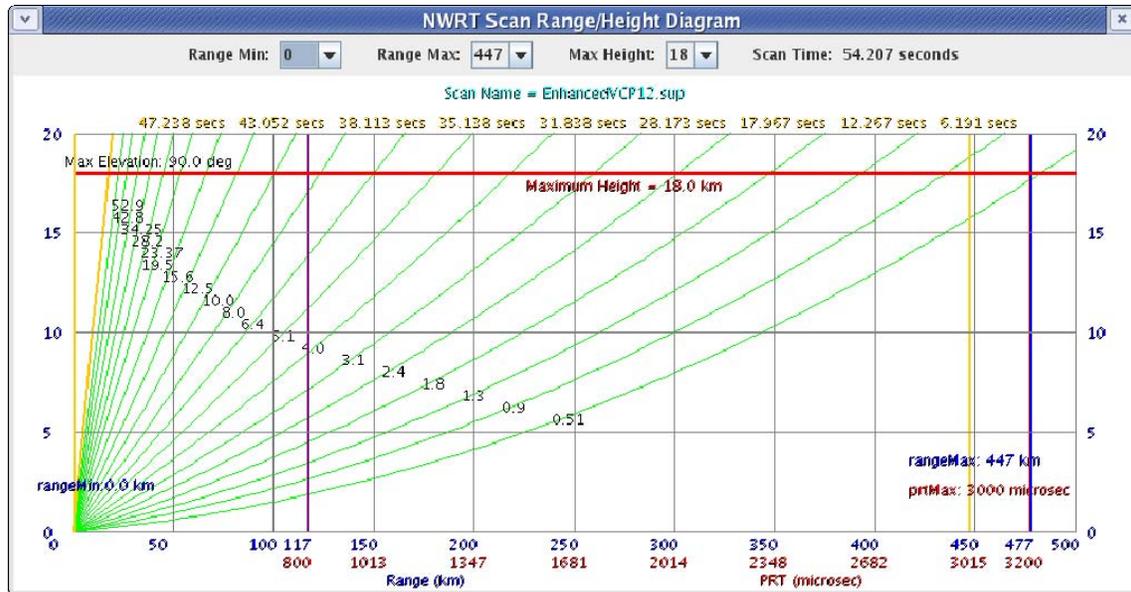


Figure 5: Sample NWRT Scan Range/Height Diagram display

Across the top of the window is a set of selections to set the minimum and maximum ranges along with a maximum height. The minimum range and maximum height are used together to determine an upper elevation cut off value. By increasing the minimum range and/or lowering the maximum height one can eliminate unnecessary elevation cuts, thus reducing overall scan time. A plus 1 rule has been implemented which keeps one elevation cut above the threshold. Fig. 6 illustrates the effect of setting a higher minimum range on the active elevation angles and scan time.

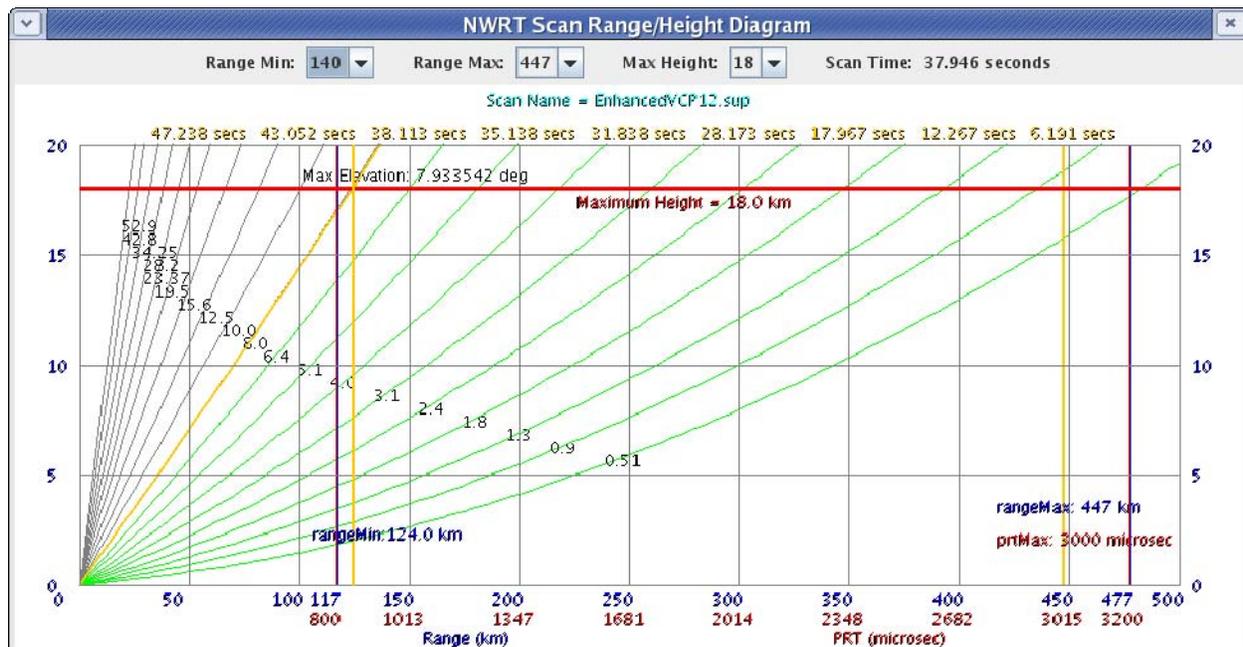


Figure 6: Sample NWRT Scan Range/Height Diagram display with minimum range set to 140 km

In this example, using the plus 1 rule will set the upper elevation cutoff at 10.0 degrees.

Setting the minimum range and maximum height also affects the appearance of the Scan Properties window. Elevations that are “deactivated” are highlighted in yellow. Fig. 7 shows a sample display with “deactivated” elevation cuts.

Cut	Elev	Waveform	Type	Mode	Azimuth(M)	Azimuth(I)	Nyquist	Range(E)	PRT(1)	Pulses(1)	PRT(2)	Pulses(2)
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8	5.1	Short	Weather	Split Cut	Beam	0.5	29.296...	179.085	1208	12	800	16
9	6.4	Short	Weather	Split Cut	Beam	0.5	29.296...	147.915	1000	12	800	16
10	8.0	Short	Weather	Single	Beam	0.5	28.443...	121.53	824	16	0	0
11	10.0	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
12	12.5	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
13	15.6	Short	Weather	Single	Beam	0.5	29.296...	117.945	800	16	0	0
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Insert Cut: 1 Delete Cut: 1 Scan Time: 54.81 seconds Close

Figure 7: Sample Scan Properties display with "deactivated elevation cuts"

2) Storm Motion

Selecting the “Storm Motion” button displays the “NWRT Storm Motion Diagram” window. It is used to display graphically where a storm will move in a two-hour period provided a specified initial location and motion vector. In addition, the direction of a 90 sector representing the antenna can be manipulated to help define an antenna position that will maximize storm coverage and minimize antenna repositioning. A sample window is presented in Fig. 8.

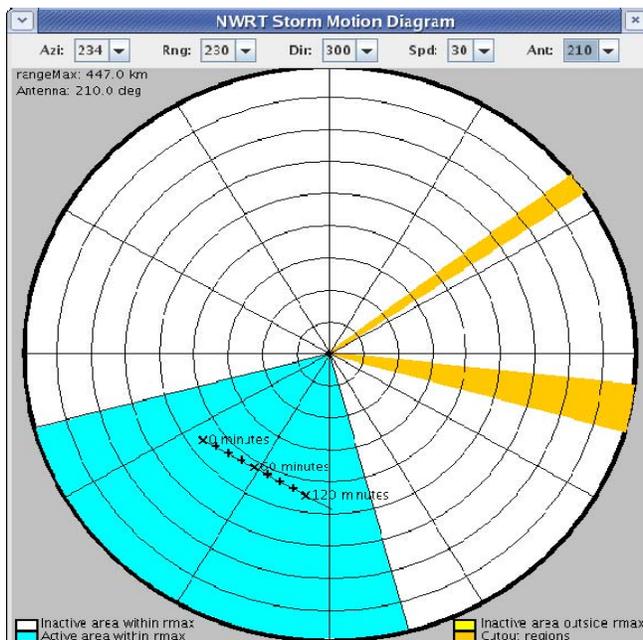


Figure 1a: Sample NWRT Storm Motion Diagram display

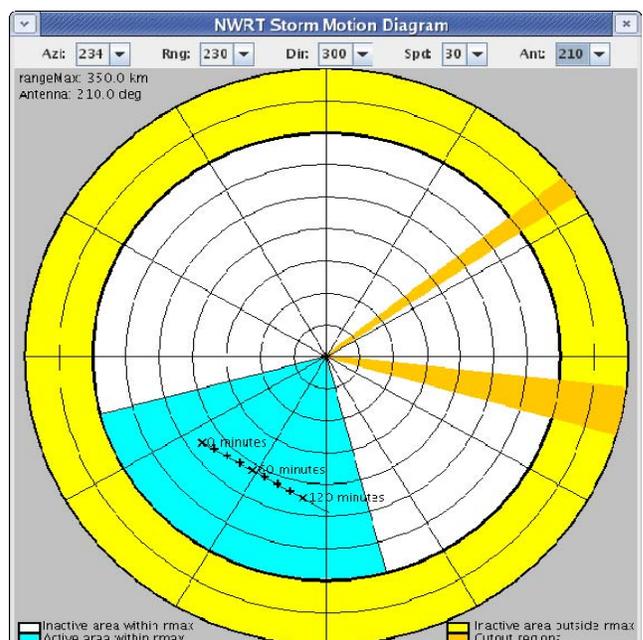


Figure 8b: Sample NWRT Storm Motion Diagram display with maximum range set to 350 km

One can further reduce scan time by adjusting the maximum range. Using the Range Max selection in the NWRT Scan Range/Height Diagram one can increase/decrease the maximum PRT used for the long pulse in split/batch cuts. In the example presented in Fig. 8b, if no storms existed beyond 350 km then the maximum range could be reduced accordingly, further reducing the scan time. Areas shaded in yellow indicate locations which are beyond the maximum scan range. Areas shaded in orange are inside the KCRI and KOUN cutouts and cannot be scanned (it is possible that the KOUN cutout may be deactivated this spring for data collection events).

To improve the display of storm tracks near the radar, pressing the left mouse button will increase the magnification factor by increments of 1. When the magnification factor exceeds 4 it is reset to 1.

Scan Control

The bottom half of the Scan panel is used for scan control and status. It has a similar look as the ADAPTS-2 panel with some extra scan control features. It displays graphically the status of the radar along with the status of the active scan strategy. When in controlling mode, buttons are available to move the pedestal ("P" button inside pedestal graphic), toggle on/off the transmitter, start/stop scanning, toggle on/off ADAPTS-2 processing. Most of these controls are identical to the controls for running Super Stimulus files from the System Panel window and will not be repeated here. The main difference is that these selections control the scan table.

The "Edit Mode" check box can be selected by both controlling and non-controlling clients. If the check box is selected only the beams for the scan strategy highlighted in the scan table are displayed in the right half of the Scan Control region. If the check box is unselected, the beams for the active scan strategy are displayed. If you want to monitor the progress of active scanning you will want the check box unselected.

In this example (Fig. 3), the scan strategy "EnhancedVCP12.sup" is defined twice. The first instance has all elevation cuts active while the second has only elevation cuts below ~1 degree active.