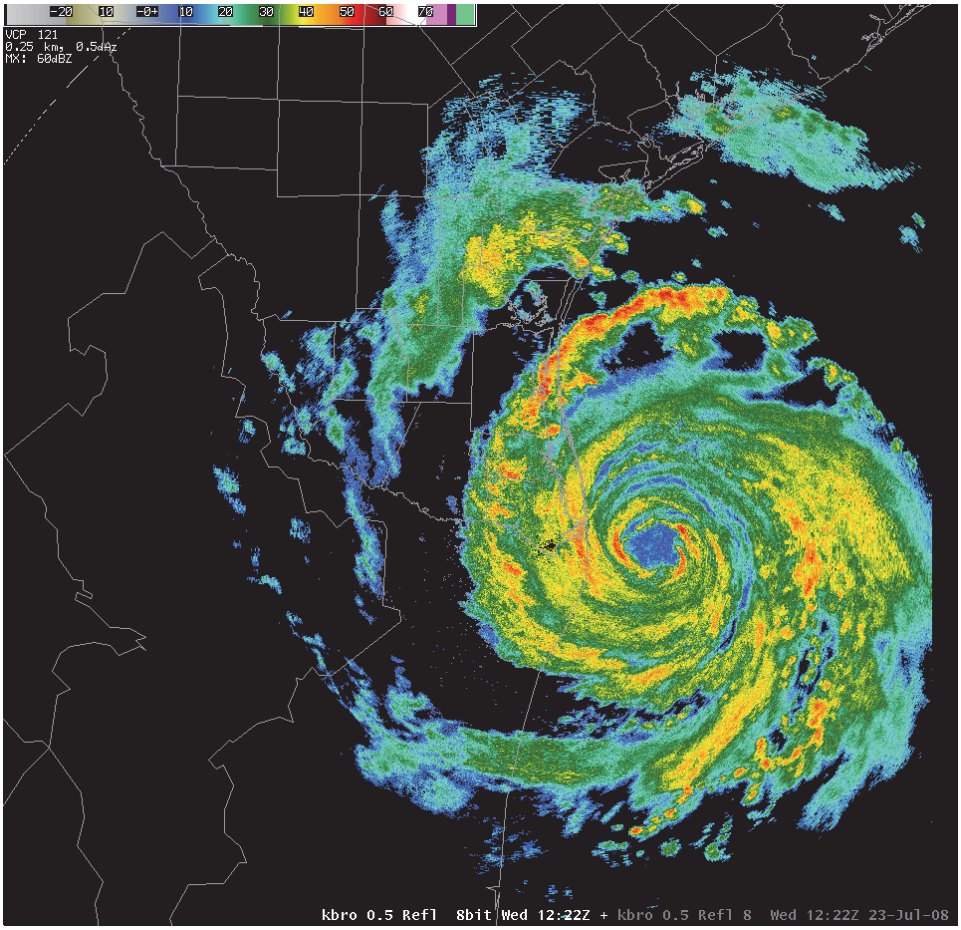
Distance Learning Operations Course



Topic 1: Radar & Warning Applications in AWIPS

Presented by the

Warning Decision Training Branch

Version: 1211

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Instructions for Completing DLOC Topic 1

Introduction

DLOC Topic 1 consists of a series of AWIPS-related lessons and exercises that describe basic radar- and warning-related features of the software and step-by-step instructions on performing specific tasks. There are 18 lessons and nine exercises that compose Topic 1.

This printed document contains 18 lessons which are divided up into four sections:

- **Section 1:** Basic Manipulations in AWIPS (Lessons 1 - 4)
- **Section 2:** Loading Radar & Radar-Related Products into AWIPS (Lessons 5 - 7)
- **Section 3:** Radar-Related Tools for Interrogation (Lessons 8 - 14)
- **Section 4:** Other Tools/Tasks in AWIPS (Lessons 15 - 18)

The exercises are available on a DVD sent with your student guide and other course materials. These exercises cover some of the topics in this document in further detail and have been designed specifically for use with the WES test case data found on your local office's WES machine. These exercises are:

- WES Exercise 1: Map Overlays
- WES Exercise 2: AWIPS Radar-Related Tools
- WES Exercise 3: Integrated Radar Environmental Sampling (IRES)

- WES Exercise 4: The Four-Dimensional Stormcell Investigator (FSI)
- WES Exercise 5: Panel Combo Rotate (PCR) & All Panel Sampling
- WES Exercise 6: Dual-Pol Radar Practice
- WES Exercise 7: WarnGen
- WES Exercise 8: Flash Flood Monitoring and Prediction (FFMP)
- WES Exercise 9: System for Convection Analysis and Nowcasting (SCAN)

In addition to viewing these exercises on your local WES machine, you can also review the exercise material on the DLOC main web site at: http://www.wdtb.noaa.gov/courses/dloc/topic1/.

To complete Topic 1, you must:

- **Step 1:** Read each lesson and perform the associated tasks at a live AWIPS workstation.
- **Step 2:** After completing all of the lessons in a section, log into the NWS LMS (https://doc.learn.com/noaa/nws) and take the associated quiz.
- **Step 3:** Repeat Steps 1 and 2 for each section.
- **Step 4:** Complete each WES Exercise and write down the associated keyword for each one. There is a sheet at the end of this topic that you can use to write down these keywords. ***NOTE: The WES Exercises can be completed in conjuction with the lesson, or all at once at the end.***

- **Step 5:** Complete the post-test in the LMS.
- **Step 6:** Take the AWIPS Proficiency Exam

The quizzes after each section are designed to help you reinforce basic task procedures and product/feature locations in AWIPS. The quizzes are not graded, but will provide you feedback if you miss a question to help you prepare for the AWIPS Proficiency Exam. The post-test is a nine question test where you will fill in the keyword for each WES Exercise you were asked to write down in Step 4. The AWIPS Proficiency Exam is a timed, paper exam and is the only portion of the topic you must pass in order to receive credit for this topic. It will be administered by your training officer. He/she will observe your performance of specific tasks, inform you of your grade, and pass along your results to WDTB. You will need to achieve a passing score of at least 70% on the exam to receive credit for this portion of the course.

While DLOC Topic 1 covers many details of AWIPS needed to be a *proficient* warning forecaster, it is not an all-inclusive training guide on AWIPS. If you need more information on specific AWIPS functionality, consider reviewing the AWIPS D-2D User's Manual available at https://onestop.noaa3a.awips.noaa.gov/aumob9.0/toc.htm) which contains copious information about the application as well as examples of tasks you can perform in D-2D.

This document is designed as a reference that can be used while working at an operational AWIPS workstation. The WES exercises will provide you further expertise in using specific applications in D-2D. After completing all the lessons in this document and all of the WES exercises, you should be

able to complete the proficiency exam successfully. However, to maintain proficiency until you complete the course, you will want to continue using the applications and performing tasks covered in the DLOC Topic 1 training on a regular basis.

Performance Objectives

After completing this training, you should be able to, without references or aids, demonstrate how to:

1. Display and manipulate base and derived products using the various radar pull-down menus, including loading single and four-panel displays, utilize cursor readout, product selection, and toggling;
2. Manipulate the display of base and derived products through the product legend menus and Image Properties dialog box;
3. Display, toggle, edit the display characteristics of, and unload map overlays;
4. Effectively load multiple products in a single D-2D display panel so that the products update correctly;
5. Make One-Time Requests (OTRs) for products from dedicated and non-dedicated RPGs, including non-routine products (i.e., cross-sections), as well as create a Radar Multiple Requests (RMRs) and determine the requested products' status;
6. Use all-tilts products to interrogate storm features;
7. Create new procedures and display them;
8. Utilize all of the applications listed under the Tools menu, including the Radar Display Controls Graphical User Interface (GUI), the Feature Following Zoom, the Estimated Actual Velocity Tool, VR Shear, and the Time of Arrival tool;

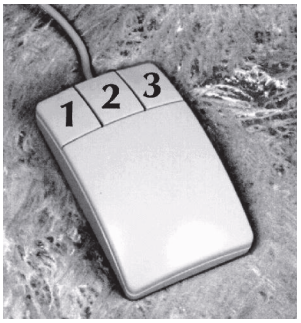
9. Utilize the Volume menu to load certain radar-based products via the Volume Browser (i.e., VWP Hodograph and radar cross-sections), load the Standard Environmental Data package to overlay environmental data on radar displays, and use the pop-up Skew-T window to analyze environmental soundings while analyzing radar data;
10. Use the Four-Dimensional Stormcell Investigator (FSI) Extension to analyze volumetric base radar data and interrogate storm features;
11. Use the Panel Combo Rotate (PCR) & All Panel Sampling feature to quickly navigate through eight image products for storm interrogation
12. Create warnings, advisories, etc., using WarnGen;
13. Display and manipulate the FFMP suite of products;
14. Display and manipulate the SCAN suite of products;
15. Utilize the AWIPS text windows to view information from various text products;
16. Utilize keyboard shortcuts to perform certain tasks more efficiently in AWIPS; and
17. Monitor the status of radar products in the radar database and data ingest processes in AWIPS, and restart slow (or dead) panes in D-2D;
18. Perform other tools/tasks in AWIPS that are useful but not used on a regular basis in AWIPS (i.e. blinking a range of colors and printing the content of the main display).

General Task Assumptions

This document is designed so that most lessons include tasks for you to work through to gain procedural knowledge. These examples make some

general assumptions in how the tasks are described. These assumptions are:

1. **You are working on an operational AWIPS workstation.** Many of these tasks can be performed on a WES workstation in simulation or case review mode. However, some tasks will not work on a WES workstation. Others may require slight modifications to the steps included in this documentation to work.
2. **You have a D-2D window open and it is functioning normally.** These tasks are designed for you to work through them as you read them. However, you may wish to quickly review how to perform certain tasks.
3. **You have access to some basic radar products in your current archive.** Some examples may require access to specific products, but in general your local database must contain some base products for viewing.
4. **You are familiar with the following mouse buttons nomenclature:**
   - **Left-mouse button - Button 1,**
   - **Middle-mouse button - Button 2, and**
   - **Right-mouse button - Button 3.**



Each of the following lessons uses the conventional mouse button names in contrast to much of the AWIPS documentation. Since more people are used to the conventional names, we chose to use those labels instead. NOTE: The Left, Middle, and Right button labels refer to the standard right-hand configuration for mouses.

Lesson 1: Basic Product Displays and Manipulations

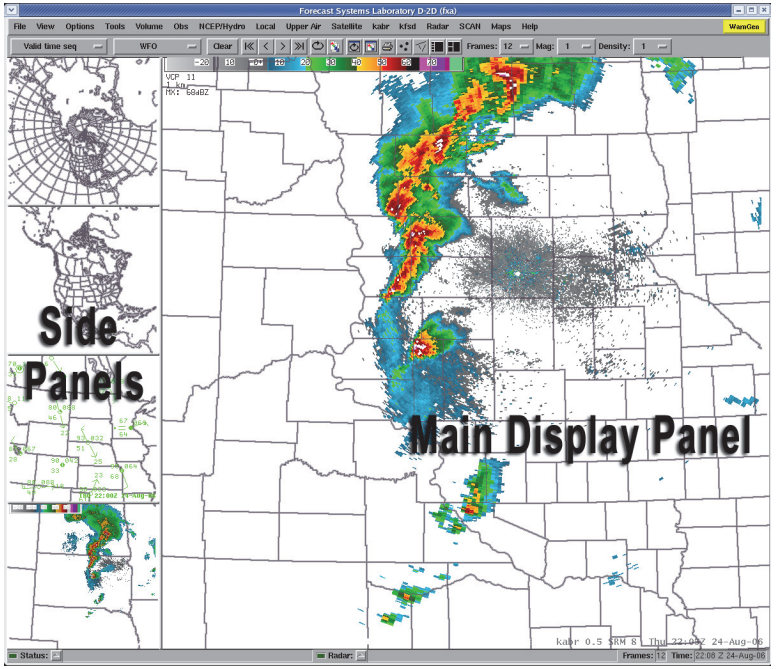
This lesson provides instructions on loading and unloading basic radar products, changing the number of panels in the main display, swapping panels into the main display, and using the cursor readout. As an AWIPS operator, one of the fundamental tasks you will perform is loading various product displays. While D-2D allows loading of products from gridded model fields, surface observations, and other data, the tasks in this document will focus on displaying radar products.

A. General Information about D-2D

As an AWIPS operator, you should be very familiar with how the D-2D interface works. This document highlights some specific features of D-2D to help you better understand how to perform basic tasks in AWIPS. If you have used an AWIPS workstation for any significant amount of time, then portions of this document will be a review. If you are new to AWIPS, then this document will help you to become proficient at using AWIPS.

i. Main Display Panel

The vast majority of the D-2D window is composed of the main display panel. The large pane allows for the AWIPS operator to look at a large area of data with a modest amount of detail or to zoom in to a small area with a large amount of detail. Growing comfortable with loading products in the main display panel, as well as manipulating the contents of this panel to visualize the data for storm interrogation, is crucial for developing AWIPS proficiency.



There are multiple ways to view data in the main display panel. The default view is one pane of data. However, you can divide the main display panel into four separate panels (i.e., four-panel view) and load products separately into each of those panels. In both modes, you can view details about the data loaded in the main display panel by using the cursor readout to sample different areas of an image product. You even have the ability to toggle on and off the visibility of the various products loaded simultaneously in the main display.

ii. Side display panels

Although products are loaded into the main display panel, D-2D has several panels to view and store products. You can use the side panels to free up the main display panel for loading new images. Previously loaded products can be monitored in the smaller side display panels and swapped back to the main display panel when needed.

Proper usage of these side panels during warning operations allows the warning forecaster to be more effective and efficient. Loading the displays with products can use precious time when you are issuing short-fuse warnings. Thus, you should populate all of your display panels with products for storm interrogation and near-storm environmental analysis.

iii. External windows

There are numerous tools and products in D-2D that use an external window in some way. Some of these windows are simple Graphical User Interfaces (GUIs) that users will interact with to alter the appearance of data in the main D-2D window (e.g., Radar Display Controls GUI). Some of these windows may be interactive tables or other displays that can control the appearance of the main D-2D window, but also allow for more detailed data analysis (e.g., Flash Flood Monitoring and Prediction). Other external windows are applications intended for performing data analysis in an environment separate from the D-2D main window (e.g., Four-Dimensional Stormcell Investigator).

Regardless of the purpose of a specific external window, managing these external windows can be crucial to the proficient use of AWIPS during warning operations. Smaller external windows can be easily misplaced on the display or get lost behind larger windows. Larger external windows can obscure the view of smaller windows or even the main D-2D window. Window behaviors may also vary, depending on the tool or product that the window supports. Over the course of this training, each lesson and/or task that deals with an external window will directly discuss those windows and any unique behaviors associated with them.

Task: Transferring Screen Products Between Panels

This task describes swapping display panels between the individual side panels and the main display panel, which allows multiple displays in a D-2D session.

Additional Assumptions:

- None

1.0. Decide Which Side Panel to Swap with the Main Display Panel

2.0. Press the Right-Mouse Button in That Pane to Swap the Displays

- You should see the display from the small pane appear in the main display panel and the main display appear in the small pane.
- When you transfer displays, the most recent/latest time for that product will appear in each of the panes (even if that frame wasn't visible at the time of the swap).

3.0. Task Complete!

B. Toolbar Pull-Down Menus

If you are new to AWIPS, then you may not be aware of how all the pull-down menus and buttons in the toolbar of the D-2D display are used. The five pull-down menus (two on the left side of the toolbar, three towards the right) are the:

- Load Mode menu,
- Scale menu,
- Frames menu,
- Magnification menu, and
- Density menu.

These pull-down menus play a significant role in the display of any radar products loaded into the main display panel.

i. Scale menu

The Scale menu determines the scale of the map background on which your requested product will be displayed. While most radar products can be loaded on almost any scale, for storm interrogation purposes you will generally want to set your scale to “WFO” for radar products.

ii. Load Mode menu

The Load Mode menu determines the time-matching procedure for products loaded from the AWIPS database. Generally speaking, “Valid time seq” or “Inventory” will be the options to use for viewing radar products.

Task: Load a Product from the Product Inventory

This task shows how to use the Load Mode menu for loading a single older product from AWIPS database inventory in the main display panel.

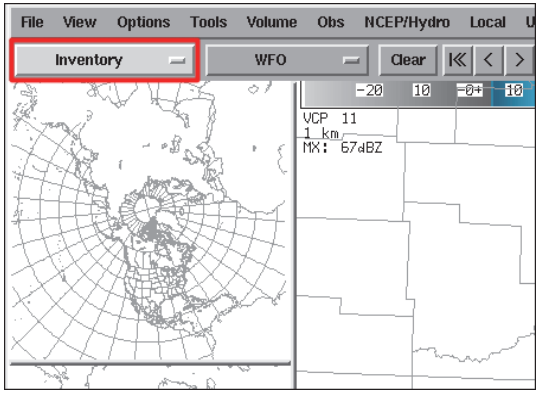
Additional Assumptions:

- Make sure to change the main display to the appropriate scale (usually WFO or State for radar data).

1.0. Change the Load Mode Setting to “Inventory”

1.1. Position the cursor over the Load Mode pull-down menu then press & hold the Left-Mouse Button.

1.2. In the menu that appears, select “Inventory” and release the Left-Mouse Button.

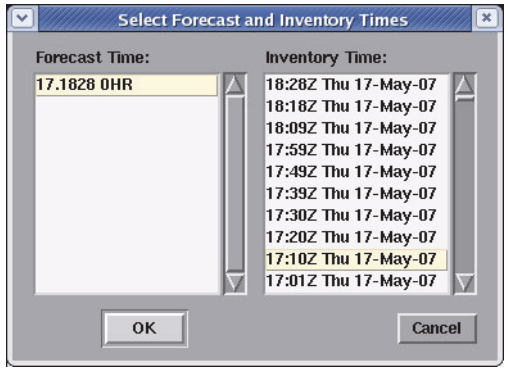


2.0. Select an Inventory Product

2.1. Choose the pull-down menu for the radar of your choice and press the Left-Mouse Button.

2.2. In the menu that appears, select a product to load with the cursor and press the Left-Mouse Button.

3.0. Select an Inventory Time



3.1. In the "Select Forecast and Inventory Times" GUI that appears, select a volume scan time from the "Inventory Times" list.

3.2. Select the "OK" button and press the Left-Mouse Button.

4.0. Reset the Load Mode When Finished

4.1. Select the Load Mode pull-down menu then press & hold the Left-Mouse Button.

4.2. In the menu that appears, select "Valid time seq" and release the Left-Mouse Button.

5.0. Task Complete!

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iii. Frames menu

The Frames menu determines the number of image or graphic radar products (in AWIPS, there is a difference between the two; more on that in Lesson 5) that will be loaded into the main display panel. The maximum number of frames that can be loaded into the main display panel is 64.

iv. Magnification menu

The Magnification menu changes the size of alphanumeric data (or labels) information, contours, and legend information for all products and overlays in the main display panel. The larger the Magnification menu value, the larger these items will appear in the main display panel.

v. Density menu

The Density menu changes the amount of detail visible in the main display panel for all overlays (i.e., maps) and contoured products. Increasing the Density menu value will result in more detail being visible in certain background maps and contour intervals for graphic products being increased. The opposite is true for decreasing the Density menu value.

The impact that the Density setting has on the data in the display panel is dependent on the zoom factor. AWIPS uses a progressive disclosure method such that more detail becomes visible the more the user zooms in on the data display. The AWIPS user can override this technique by choosing the “Max” density option (i.e., forcing the display of all the data visible at the most detailed zoom factor).

NOTE: The frame count, Magnification, and Density can be changed after loading a product into the main display panel and the change will take effect immediately. For the Load Mode and Scale menus, you need to reload your products for any changes in those menus to take effect on the products in the main display panel.

C. Product Menus for Radar Products

The menu bar at the top of the D-2D window contains numerous menus to load products into the main display panel and for tools, or GUIs, to help in the interpretation of those products. This discussion focuses on the menus for loading the main suite of radar products for sites within and surrounding your CWA.

i. Menus for specific dedicated radars

Each dedicated radar for your CWA appears (assuming a standard configuration) as a separate product menu. If you have any Terminal Doppler Weather Radar (TDWR) sites in your CWA, then you will need menus for each of those radars as well. All base and most derived radar products from a given radar will be listed under a menu labeled with that site’s four-letter identifier (e.g., kabr, kmlb). NOTE: Additional non-dedicated radars may appear next to your dedicated radar menus depending on your local office’s D-2D configuration.

ii. The "Radar" menu: Non-dedicated radars and mosaic products

Using the default settings in AWIPS, products from non-dedicated radars in the vicinity of your CWA are listed under the Radar menu. In addition to these non-dedicated radars, several mosaic products are also available under the Radar menu.

Task: Load the Latest Radar Product from the AWIPS Database

This task covers a fundamental task in AWIPS: Loading a loop of a radar product for the latest volume scans from the AWIPS database.

Additional Assumptions:

- You have changed the main display to the appropriate scale (usually WFO or State for radar data).

1.0. Load a Product from a Dedicated RPG

1.1. Select the pull-down menu for the desired radar (i.e., *kxxx*) with your mouse and press the Left-Mouse Button.

1.2. In the menu that appears, select the product you want to load with the cursor and press the Left-Mouse Button.

- If you select an option with an arrow to the right, clicking on the Left-Mouse Button will display a submenu with more products from which you can select.
- If a product does not have a time/date stamp to its right, then there are currently no files in the AWIPS database for that product.

2.0. Load a Product from a Dial-Up (or Non-Dedicated) RPGs

2.1. Select the Radar menu and press the Left-Mouse Button.

2.2. In the menu that appears, choose a radar from the list with your mouse and press the Left-Mouse Button.

2.3. In the submenu(s) that appears, select a product from the pull-down list and press the Left-Mouse Button.

3.0. Task Complete!

Task: Toggling Product Displays

This task demonstrates the basic steps in toggling products on and off (i.e., making them visible or invisible) in the main display panel. The two methods to accomplish this task are discussed below.

Additional Assumptions:

- You have a product loaded in the main display panel (see "Load the Latest Radar Product from the AWIPS Database" Task on page 1-21.
- The product legend is visible in the main display panel.

1.0. Method 1: Select the Product You Want to Toggle from the Product Legend (i.e., the Product Name and Date/Time Stamp in the Lower Right-Hand Corner of the Pane) and Press the Left-Mouse Button.

2.0. Method 2: Using the Numeric Keypad

2.1. To toggle an image product loaded in the main display, press "0" in the numeric keypad on the right-hand side of the keyboard.

2.2. To toggle one of the first nine graphical overlay products (i.e., one of the first nine listed in the product legend) in the main display, press the corresponding number (i.e., for the first graphic overlay press "1", etc.) in the numeric keypad on the right-hand side of the keyboard.

3.0. Task Complete!

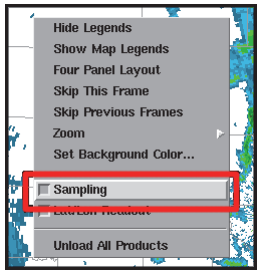
Task: Viewing Cursor Readout Information

This task focuses on how to view the cursor readout information available for image products in the main display panel.

Additional Assumptions:

- There is currently a radar image product loaded in the main display panel, or
- There is currently a non-radar product (i.e. surface obs) loaded in the main display panel that supports cursor readout.

1.0. Manually Viewing Cursor Readout Data



1.1. Position the cursor over a storm or region of interest then press & hold the Left-Mouse Button.

1.2. Move the cursor to sample data from different range gates in the main display.

- Image product value(s),
- Mean Sea Level elevation of beam center line,
- Above Ground Level elevation of beam center line,
- Azimuth/range from home location, and
- Other product-specific information.

1.3. Release the Left-Mouse Button to make the cursor readout disappear.

2.0. Turn on Sampling View

2.1. Position the cursor in the main display panel away from any legends then press & hold the Right-Mouse Button.

2.2. In the pop-up menu that appears, select “Sampling” and release the Right-Mouse Button.

3.0. Task Complete!

Task: Loading Products into Four-Panel Displays

This task demonstrates how to load products (predefined or manually created) into a four-panel layout in the main display panel.

Additional Assumptions:

- The main display panel is set to the WFO scale.

1.0. Loading a Four-Panel Product

1.1. Select the pull-down menu for the radar of your choice and press the Left-Mouse Button.

1.2. In the menu that appears, select the "kxxx four panel" option with your mouse and press the Left-Mouse Button.

1.3. In the submenu that appears, select a four-panel product with your mouse and press the Left-Mouse Button.

2.0. Loading a Product to a Single Panel in a Four-Panel Display

2.1. Position your mouse in the main display panel then press & hold the Right-Mouse Button.

2.2. In the menu that appears, select "Four Panel Layout" with the cursor and release the Right-Mouse Button.

2.3. In the main display panel, which should now have a four-panel layout, position the cursor in one of the quarter-screen panels then press & hold the Right-Mouse Button.

2.4. In the pop-up menu that appears, select "Load to this panel" and release the Right-Mouse Button.

- A yellow "L" should be visible in the lower-left corner of the panel in which you clicked.
- Always be aware of which panel has this label when manually loading four-panel products!

2.5. Select the pull-down menu for the radar of your choice and press the Left-Mouse Button.

2.6. In the menu that appears, select a product from the pull-down menu and press the Left-Mouse Button.

2.7. Repeat Step 2.3 through 2.6 for each of the other quarter-screen panels to populate the entire display.

- The product you selected should be in the panel with the yellow "L".
- Each time you perform Step 2.3, select a different panel in which to load a product.

3.0. Task Complete!

D. Toolbar Buttons

In addition to the pull-down menus, there are also several buttons in the toolbar menu. Rather than discuss what each button does, we will just focus on some of the more important ones. These buttons are the:

- Clear button,
- Frame Navigation buttons,
- Loop button, and
- Image Combination button.

These buttons affect how you view the image and graphic products loaded in the main display panel.

i. Clear Button

Pressing the Clear button clears the main display panel so only the default background map(s) remains.

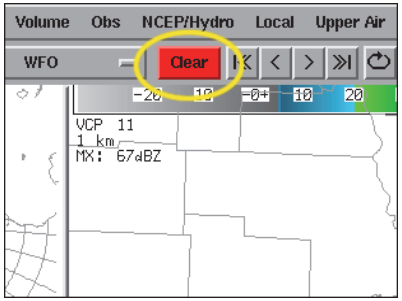
Task: Clearing a Product from the Main Display Panel

This task will demonstrate the different ways to clear a product(s) from the main display panel of the D-2D window.

Additional Assumptions:

- A product (i.e. 0.5 Refl) is loaded in the main display

1.0. Clear All of the Products from the Main Display Panel Using One of the Following Methods



1.1. Method 1: Select the "Clear" button and press the Left-Mouse Button.

1.2. Method 2: Use the keyboard shortcut <CTRL>-C.

2.0. Clear a Single Product

2.1. Select the product you want to unload from the product legend with the cursor then press & hold the Right-Mouse Button.

2.2. In the product menu that appears, select "Unload" with your mouse and release the Right-Mouse Button.

3.0. Task Complete!

ii. Frame Navigation buttons

The Frame Navigation buttons (First Frame, Step Backward, Step Forward, and Last Frame, respectively) allow you to toggle through the different frames loaded in the main display panel.

iii. Loop button

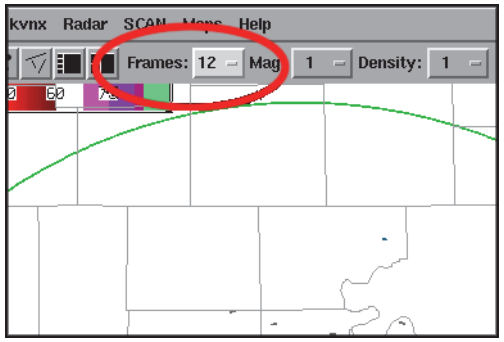
Pressing the Loop button allows you to toggle on (or off) a continuous loop of the frames in the main display panel.

Task: Manually Toggling and Looping Single Elevation Angle Products in Time

This task will discuss the different ways that you can examine the different frames of an image or graphic product loop loaded in the main display panel by manually moving forward or backward in time from one volume scan to another.

Additional Assumptions:

- You will need to have loaded a product with a frame count of more than one.



1.0. Toggle Backward in Time Using One of the Following Methods

1.1. Method 1: Select the "<" button in the tool bar and press the Left-Mouse Button.

1.2. Method 2: Use the keyboard shortcut - "f" (i.e., the left-arrow key).

2.0. Toggle Forward in Time Using One of the Following Methods

2.1. Method 1: Select the ">" button in the tool bar and press the Left-Mouse Button.

2.2. Method 2: Use the keyboard shortcut - "g" (i.e., the right-arrow key).

3.0. Going to the First Frame in the Loop Using One of the Following Methods

3.1. Method 1: Select the "|<<" button and press the Left-Mouse Button.

3.2. Method 2: Use the keyboard shortcut - <CTRL>+“f”.

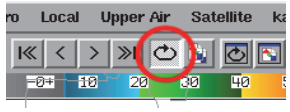
4.0. Going to the Last Frame in the Loop Using One of the Following Methods

4.1. Method 1: Select the “|>>” button and press the Left-Mouse Button.

4.2. Method 2: Use the keyboard shortcut - <CTRL>+“g”.

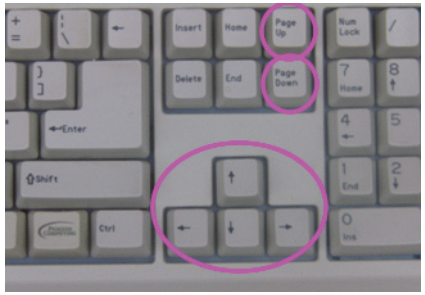
5.0. Toggle Looping Using One of the Following Methods

5.1. Method 1: Select the Toggle Looping button from the toolbar and press the Left-Mouse Button.



- This method works to toggle loops on and off.
- NOTE: Method 2 does not have the same exact functionality as the Toggle Looping button.

5.2. Method 2: Use the keyboard shortcut - <Page Up> or <Page Down>.



- Toggle loop off using the button method above.

5.2.1. Press the <Page Up> button to toggle the loop on.

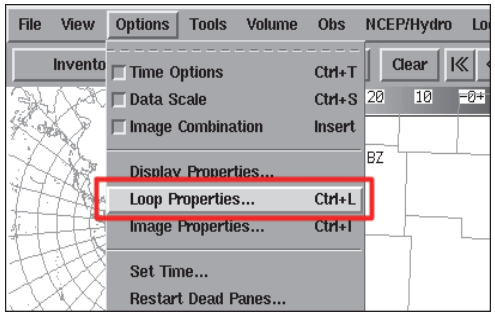
5.2.2. Press the <Page Up> and <Page Down> buttons to speed up and slow down the loop, respectively.

5.2.3. Press the right or left arrow keys on the keyboard to stop the loop

- NOTE: Pressing the up or down arrow keys on the keyboard while looping will stop the loop and disable the <Page Up> and <Page Down> keyboard shortcuts. You will need to press the right or left arrow keys to re-enable the <Page Up> and <Page Down> keys.

6.0. Opening the Loop Properties GUI Using One of the Following Methods

6.1. Method 1: Options Menu

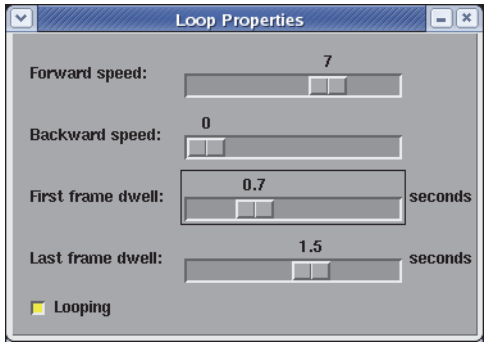


6.1.1. Select the Options menu and press the Left-Mouse Button.

6.1.2. In the menu that appears, select "Loop Properties..." and press the Left-Mouse Button.

6.2. Method 2: Use the keyboard shortcut - <CTRL>+"L".

7.0. Adjusting Loop Properties GUI values Using One of the Following Methods



7.1. Method 1: Drag slider bars

7.1.1. Select the slider bar for the parameter you wish to change then press & hold the Left-Mouse Button.

7.1.2. Drag the slider to change the value to what you wish and release the Left-Mouse Button.

7.2. Method 2: Use the arrow keys on the keyboard

7.2.1. If the Loop Properties GUI does not have the focus, position the cursor over the GUI and press the Left-Mouse Button.

7.2.2. Press the <Tab> key to toggle between the different slider bars.

- The property that currently has the focus will have a thin black rectangle around it (see example in Loop Properties GUI above).
- The rectangle does not appear until after you press <Tab> the first time.

7.2.3. When the property you want to change has the focus, use the arrow keys to adjust the value for that parameter.

8.0. Task Complete!

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iv. Image Combination button

Pressing the Image Combination button allows you to toggle on (or off) the ability to load two separate image products in the main display panel. With two image products in the display, you can toggle back and forth between the two products. You can also fade between the two images to compare details between the images.

Lesson 2: Editing Product Display Characteristics

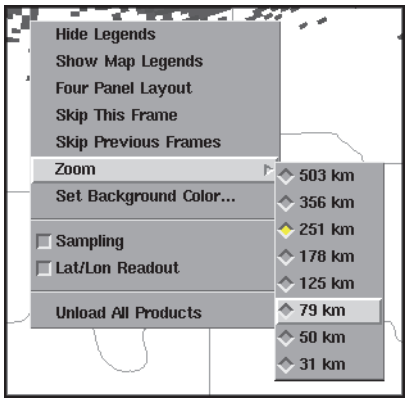
This lesson provides background information and step-by-step instructions on how to modify various product display characteristics in AWIPS.

A. Changing the View of a Product in the Main Display Panel

Probably the most straight forward way to change the appearance of a product loaded in the main display panel is to change the view of a product (i.e., to zoom in or change the center point of an product). While this task is simple, and is common in many visualization applications, how the task is performed can vary greatly from one application to another. AWIPS is no different. A proficient AWIPS operator needs to be comfortable and effective performing both of these processes.

i. Changing the zoom factor

Changing the zoom factor in the D-2D main display panel is a critical task. Regardless of the product or scale used, D-2D provides several different pre-defined zoom factors that you can utilize. These zoom factors are defined by the map size (in km) in the display panel. The smaller the range specified in the zoom menu, the greater the resolution of the data you are viewing, and vice versa.



Task: Zooming In/Out of a Product View

This task will demonstrate the different ways to change the zoom factor for a product in the main display panel.

Additional Assumptions:

- None

1.0. Change Zoom Incrementally in the Main Display Panel

1.1. To Zoom in, move the cursor to a desired center point and press the Middle-Mouse Button.

- Every button press will cause the panel to zoom in incrementally one step until you reach the maximum level of enlargement (or minimum map size) for that particular scale.
- Do not hold down the Middle-Mouse Button while trying to zoom in. Doing so, while moving the cursor pans (i.e., dragging the display) the main display panel.

1.2. To Zoom out, position the cursor to a point in the main display panel and press the Left-Mouse Button.

- Make sure your cursor is not on one of the products or maps listed in the legend when you zoom out. Doing so may cause that product or map to be toggled on/off in the display panel with no change in zoom.
- The position you place the cursor may or may not become the center point of the zoomed out image depending on the map size to which you switch.
- Every button press causes the panel to zoom out incrementally until you reach the minimum level of enlargement (or maximum map size) for that particular scale. Holding down <SHIFT> while pressing the Left-Mouse Button will cause the main display to fully zoom out.
- Do not hold down the Left-Mouse Button while trying to zoom out. Doing so will cause the cursor readout to appear and no change in zoom will occur.

2.0. Change Zoom to a Specific Size

2.1. Position the cursor in the main display panel then press & hold the Right-Mouse Button

2.2. In the menu that appears, select “Zoom”

2.3. In the submenu that appears, select the range (in km) that corresponds to the level of zoom wanted on the display.

3.0. Task Complete!

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ii. Changing the center point

By default, zooming will automatically re-center the display each time you zoom in or out. In some instances, you may want to simply reposition the display to have a different center point. AWIPS supports this functionality as well.

NOTE: When viewing a product at one of the default scales (i.e. WFO), the center of the product will always be the center point of that default scale.

Task: Panning a Zoomed in Image in the Main Display Panel

This task will demonstrate how to pan the main display panel without zooming in or out.

Additional Assumptions:

- The main display panel has been zoomed in at least once from the maximum range.

1.0. Position the Cursor in the Main Display Panel then Press & Hold the Middle-Mouse Button.

2.0. While Holding the Middle-Mouse Button, Drag the Cursor As If You Were Grabbing and Pushing the Image to Pan It in the Direction You Want.

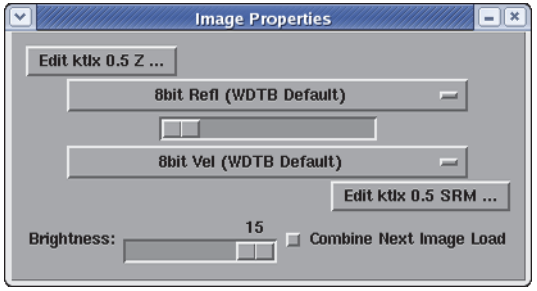
3.0. When You Have Finished Repositioning the Image, Release the Middle-Mouse Button.

4.0. Task Complete!

B. Changing the Image Color Table of an Image Product

Most radar products that you view in AWIPS are image products (i.e., a product that uses color fills to indicate the data value for a particular range gate or location). A useful feature in AWIPS is the ability to change the legend, also known as the color table, for any image product. Existing color tables can be applied to an image or the color tables can be edited and saved as new files. Either way, knowing how to change the color table for a given product to best visualize the data for your needs is an important aspect of AWIPS proficiency.

i. Switching color tables: The Image Properties GUI



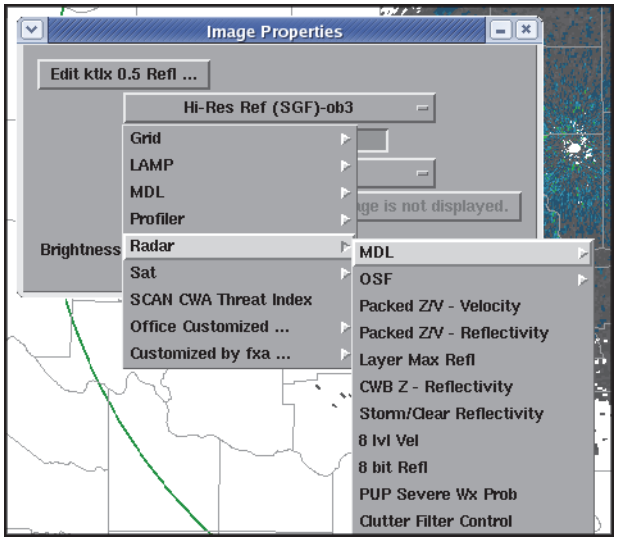
Most often, when you want to use a different color table, you just swap the default color table to a different one. To perform this task, use the Image Properties GUI. This GUI lists the color table for each image product loaded in the main display panel. The pull-down menu for the color table (e.g., Hi-Res Ref (SGF)-ob3 in the example to the right) provides all the different options available.

Task: Switching the Color Table for a Radar Image Product

This task demonstrates how to change the color table to another pre-existing color table for a radar image product.

Additional Assumptions:

- You should have a radar image product loaded in the main display panel to load or edit a color table.



1.0. Open the Image Properties GUI Using One of the Following Methods

1.1. Method 1: The Options menu

1.1.1. From the Options drop-down menu in the menu bar, select Image Properties

1.2. Method 2: Use the keyboard shortcut - <CTRL>+I.

2.0. Applying a Different Color Table

2.1. With Image Properties GUI open, select the pull-down menu for the product you want to change.

2.2. Navigate through the menu (and submenus) that appear to select the color table you want to apply and release the Left-Mouse Button.

- The image product refreshes with the color table that you just selected.
- You can continue changing the color table for this product from the Image Properties GUI until you find one you want.
- Close the GUI by clicking the "X" button in the upper-right-hand corner of the GUI.

3.0. Task Complete!

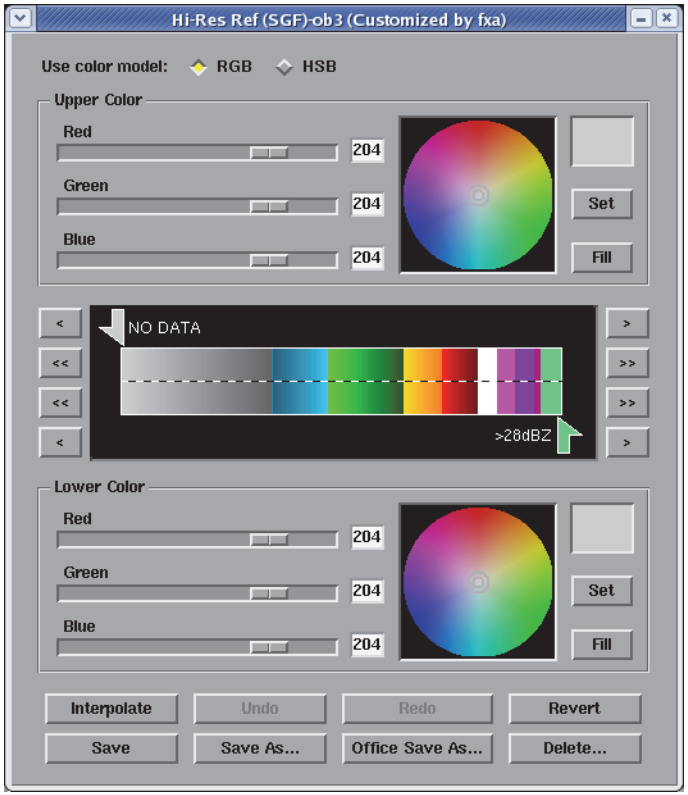
ii. Editing color tables: The Color Table Editor

In some instances, you may need to edit an existing color table. To perform this task, you will use the Color Table Editor. This GUI can be a little overwhelming at first because it provides the user with several options to change the color scale used.

In the center of the GUI, the current color scale is shown with half-arrows on the top and bottom of the legend. Using the arrows, the AWIPS operator specifies a range of colors based on data values to change the legend. Depending on whether the image is a 4-bit or 8-bit/Super Res product, you can either fill that range of data values with a solid color or with a gradient of colors.

The colors used to fill or interpolate the range of values are determined from the two color panels in the GUI. These color selection panels give the user the option of using RGB (Red-Green-Blue) or HSB (Hue-Saturation-Brightness) color models to select a color.

When finished editing the color table, save the changes either to the old Color Table file or to a new file.



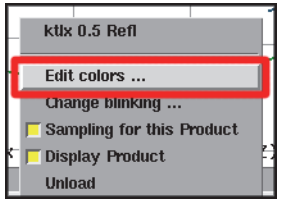
Task: Editing the Current Color Table

This task demonstrates how to make changes to the current color table using the Color Table Editor.

Additional Assumptions:

- You have an image product loaded in the main display panel.

1.0. Load the Image Colors Editor Using One of the Following Methods



1.1. Method 1: Load via the product legend

1.1.1. Position the cursor over the image product name in the product legend then press & hold the Right-Mouse Button.

1.1.2. In the menu that appears, select "Edit colors..." and release the Right-Mouse Button.

- Note: If two image products are loaded in the display, a sub-menu will appear with both products to choose from when selecting Edit colors...

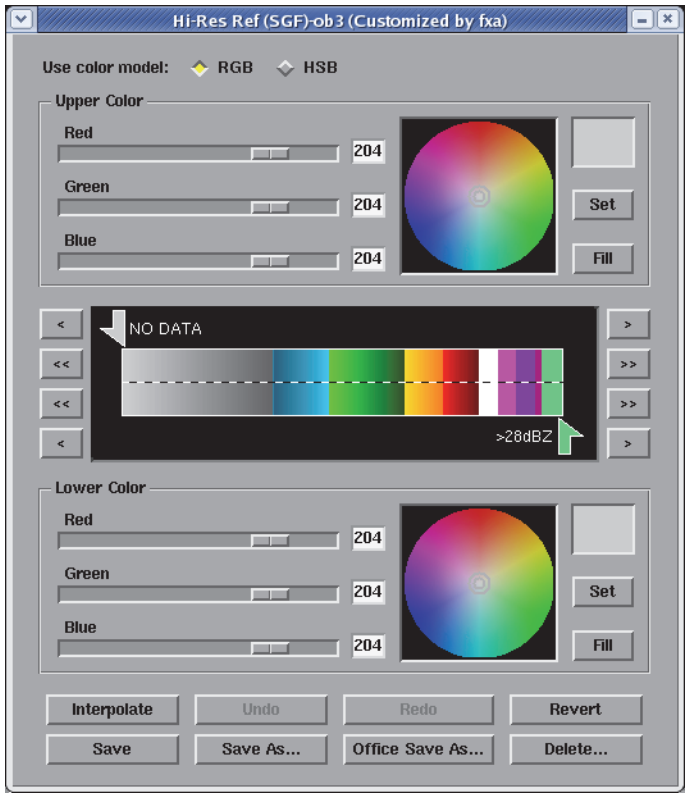
1.2. Method 2: Load via the Image Properties GUI

1.2.1. Open the Image Properties GUI using the keyboard shortcut: <CTRL>+I.

1.2.2. In the Image Properties GUI, select the "Edit product_name" button (where "product_name" is the product to which the color table is applied).

2.0. Pick a Range of Values to Edit by Positioning Half-Arrows Using One of the Following Methods

- The arrow at the top should be at the lower end (i.e., left side) of the range, while the arrow at the bottom should be at the higher end (i.e., right side) of the range.
- The data values that correspond to the location of each half-arrow appear next to the arrow. Use this information when setting up your range of values.



2.1. Method 1: Manually dragging the half-arrows

2.1.1. Select an arrow with your cursor then press & hold the Left-Mouse Button.

2.1.2. Drag the arrow to the desired location in the color table scale and release the Left-Mouse Button.

2.1.3. Repeat steps 2.1.1 and 2.1.2 for the other half-arrow.

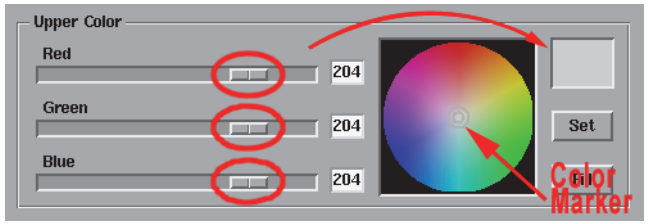
2.2. Method 2: Utilize the directional buttons near the color table scale

- There are four buttons that control each arrow: “<”, “<<”, “>”, and “>>”.
- The “<” and “>” buttons move the arrows on small increments in each direction.
- The “<<” and “>>” buttons move the arrows in larger data ranges.
- The top two buttons on each side control the position of the top arrow while the bottom two buttons on each side control the position of the bottom arrow.

2.2.1. Use the arrow buttons for one of the half-arrows to incrementally adjust its position.

2.2.2. Repeat step 2.2.1 for the other half-arrow.

3.0. Change the Color in the Upper or Lower Color Panel Using One of the Following Methods



3.1. Method 1: Adjust the RGB or HSB values.

3.1.1. Choose the color model you want to use.

3.1.2. Position the slider bar for each channel to create your desired color (the new color appears in the preview window in the upper right-hand side of the color panel).

3.2. Method 2: Use the Hue/Saturation color wheel

3.2.1. Locate the color marker (i.e., the gray double circle, or "bulls-eye") in the color wheel.

3.2.2. Position the cursor on the color marker then press & hold the Left-Mouse Button.

3.2.3. Drag the color marker to the desired position on the color wheel and release the Left-Mouse Button.

- You will only be able to change the Hue or Saturation values in HSB mode for a given color using this method. You will have to change the Brightness manually if you choose to change it.

4.0. Fill a Range of Values

4.1. Set the range of values using one of the methods in Step 2.

4.2. Adjust the color(s) in the Upper or Lower Color panel using one of the methods in the previous step.

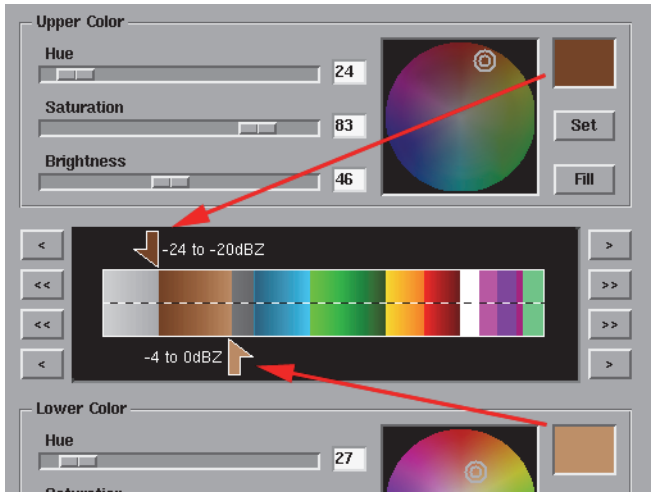
4.3. Select the "Fill" button in the appropriate color panel and press the Left-Mouse Button.

5.0. Interpolating a Range of Values between Two Colors

5.1. Set the range of values using one of the methods in Step 2.

5.2. Adjust the colors in both the Upper and Lower Control panels using one of the methods in Step 3.

5.3. Select the "Interpolate" button in the bottom button panel with the cursor and press the Left-Mouse Button.



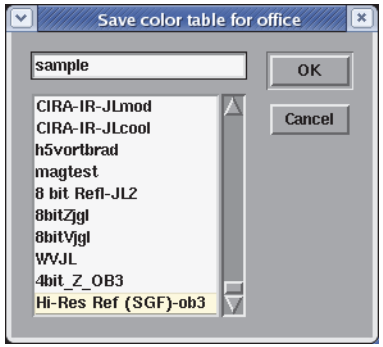
6.0. Undo, Redo, and Revert to Previously Saved Colors

6.1. Select the "Undo" button with the cursor and press the Left-Mouse Button to undo the last change to the color table.

6.2. Select the "Redo" button with the cursor and press the Left-Mouse Button to reapply the last change made to the color table.

6.3. Select the "Revert" button with the cursor and press the Left-Mouse Button to return to the last saved version of the color table.

7.0. Save an Edited Color Table Using One of the Following Methods



- It is a good practice to save changes to an existing color table to a file once you have made some desired changes.
- It is often preferable to save the changes to a new file, so you can change the new file without negatively impacting any of the existing color tables.

7.1. Method 1: Select the "Office Save As..." button and press the Left-Mouse Button.

- Choose this method if you want the new color table to be available to all users in your office.
- Make sure you enter a unique name for the new color table.

7.2. Method 2: Select the "Save As..." button and press the Left-Mouse Button.

- Choose this method if you want the new color table only be visible to the current user account.
- Make sure you enter a unique name for the new color table.

7.3. For either Method 1 or 2: Enter a name for the new color table and press "OK" button.

7.4. Method 3: Select the "Save" button and press the Left-Mouse Button.

- Choose this method if you are editing a color table that you have created and do not want to make a new version.
- Selecting the "Revert" button returns the color table to these settings unless you overwrite this color table in the future.

8.0. Task Complete!

Lesson 3: Loading and Manipulating Map Displays

This lesson presents information on map overlays that can be loaded into a D-2D display panel and how the properties of those maps can be adjusted. This lesson presents the basics. For more detailed practice opportunities on this topic, complete DLOC Topic 1, Exercise #1 (Map Overlays) on your office's WES machine.

Required WES Exercise #1 (Map Overlays)

A. Maps Menu

The Maps menu provides the AWIPS operator the ability to display various map overlays in the main display panel. Most maps display similarly to graphic products (i.e., HiRes Topo Image is the sole exception). Numerous maps can be loaded in a single display.

Maps are very important in visualizing and interpreting products in a display panel. Maps of County Warning Area (CWA) boundaries, cities, drainage basins, etc., provide the AWIPS operator with critical geographic references. Some offices may have similar procedure bundles where the data products displayed are the same, but the maps (and the display characteristics of those maps) vary depending on the warning situation. Knowing how to combine maps with adequate, but uncluttered and distinguishable, information is an important skill that can significantly enhance the speed and effectiveness of your data analysis during warning operations.

Task: Loading a Map Overlay

This task demonstrates how to load a map into the main display panel.

Additional Assumptions:

- None

1.0. Select the Maps Menu and Press the Left-Mouse Button.

2.0. In the Menu That Appears, Select a Map to Load and Press the Left-Mouse Button.

3.0. Task Complete!

B. Map Legend vs. Product Legend

Whether discussing products or maps loaded in the main display panel, the legend (located in the lower right-hand corner of the display) provides access to important characteristics of each item loaded in the display. Maps, via their legend, can be toggled on and off, the color changed, the line width and style edited. You also have the ability to individually set the Density and Magnification settings for a product or overlay independently from all of the other products in your display.

While utilizing the context-sensitive menu for each map (with the Right-Mouse Button, press & hold on the map legend) can be powerful, the map legend must be visible to access this menu. Product legends are displayed by default whenever D-2D starts, a pane is cleared, or a dead pane restarted. At any given time, only the product or map legends can be displayed. So, to display the map legends, you will need to use one of the methods discussed in Step 1 of the task below.

Task: Unload a Map Overlay

This task will demonstrate how to unload a map that is currently loaded in the main display panel.

Additional Assumptions:

- That there is currently a map background loaded in the main display panel.

1.0. Toggle to the Map Legend View Using One of the Following Methods

1.1. Method 1: Use the main display panel background context-sensitive menu

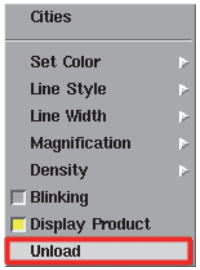
1.1.1. Position the cursor in the background of the main display panel then press & hold the Right-Mouse Button.

1.1.2. In the menu that appears, select "Show Map Legends" and release the Right-Mouse Button.

1.2. Method 2: Press the <Enter> key on the numeric keypad one or two times until the map legend appears.

- Each time <Enter> is pressed, the display toggles between the product legend, the map legend, and an abbreviated time stamp legend.

2.0. Unload the Map



2.1. Position the cursor over the name of the map in the map legend you wish to unload then press & hold the Right-Mouse Button.

2.2. In the menu that appears, select "Unload" and release the Right-Mouse Button.

3.0. Task Complete!

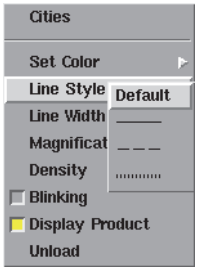
C. Editing Map Characteristics

Once the map legend is visible, use the context-sensitive menu (i.e., press & hold the Right-Mouse Button while the cursor is over the map legend) to change a map's characteristics. All configurable map traits are listed and discussed below.

i. Set color

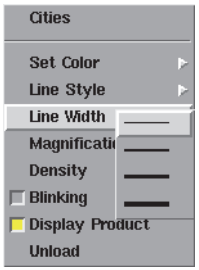
Since most map overlays display like a graphics product, each map is displayed as one color (gray is the default). The color can be changed using the "Set Color" option of the map legend menu. This option provides an interface where any RGB or HSB color can be applied to the selected map.

ii. Line style



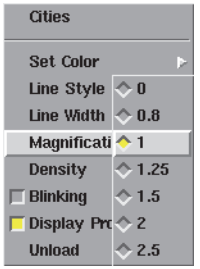
Most maps are composed of line segments. The line style for a specific map can be changed under the "Line Style" option of the map legend menu. There are three possible line styles to chose from: solid, dashed, or dotted (solid is the default).

iii. Line width



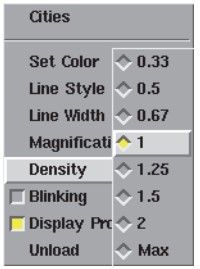
Similar to line style, the line width of a map can be changed using the "Line Width" option. Four different line widths are available with the thinnest option being the default.

iv. Magnification



Many maps also have text labels. The size of the labels can be changed for a specific map by using the "Magnification" option of the map legend menu. There are seven different magnification settings available between 0 and 2.5 with 1 being the default value.

v. Density



For some maps (e.g., cities), the level of detail visible can be adjusted. The number of markers or labels visible on a specific map is controlled under the "Density" option of the map legend menu. There are eight different Density settings available from 0.33 to Max (with 1 being the default value).

Just as with products, the density setting (along with Magnification, to a degree) impacts the level of detail displayed in the main display panel. Setting the value to "Max" turns off progressive disclosure and causes all map information to be displayed regardless of what the current zoom factor is.

Task: Changing a Map's Display Characteristics

This task demonstrates how to alter the default appearance of a map overlay by changing its display characteristics.

Additional Assumptions:

- None

1.0. Load a Map into the Main Display Panel

1.1. Select the Maps menu and press the Left-Mouse Button.

1.2. In the Menu that appears, select a map to load (not Hi-Res Topo Image) with the cursor and press the Left-Mouse Button.

2.0. If the Map Legend is not Currently Open, then Toggle to the Map Legend View Using One of the Following Methods

2.1. Method 1: Use the main display panel background context-sensitive menu

2.1.1. Position the cursor in the background of the main display panel then press & hold the Right-Mouse Button.

2.1.2. In the menu that appears, select "Show Map Legends" and release the Right-Mouse Button.

2.2. Method 2: Press the <Enter> key on the numeric keypad one or two times until the map legend appears.

3.0. Change the Map's Magnification

3.1. Position the cursor over the name of the map in the map legend you wish to modify, then press & hold the Right-Mouse Button.

3.2. In the menu that appears, select "Magnification" and release the Right-Mouse Button.

3.3. In the submenu that appears, select the magnification value to which you want to change the map display and press the Left-Mouse Button.

- NOTE: Magnification settings only apply to maps with text labels (e.g., cities, county names).

4.0. Change the Map's Line Width

4.1. Position the cursor over the name of the map in the map legend you wish to modify then press & hold the Right-Mouse Button.

4.2. In the menu that appears, select "Line Width" and release the Right-Mouse Button.

4.3. In the submenu that appears, select the line width to which you want to change the map display and press the Left-Mouse Button.

- NOTE: Line width settings do not apply to map text labels (e.g., cities, county names).

5.0. Change the Map's Color

5.1. Position the cursor over the name of the map in the map legend you wish to modify then press & hold the Right-Mouse Button.

5.2. In the menu that appears, select "Set Color" and release the Right-Mouse Button.

5.3. In the submenu that appears, select one of the pre-defined colors to which you wish to change the map display and press the Left-Mouse Button.

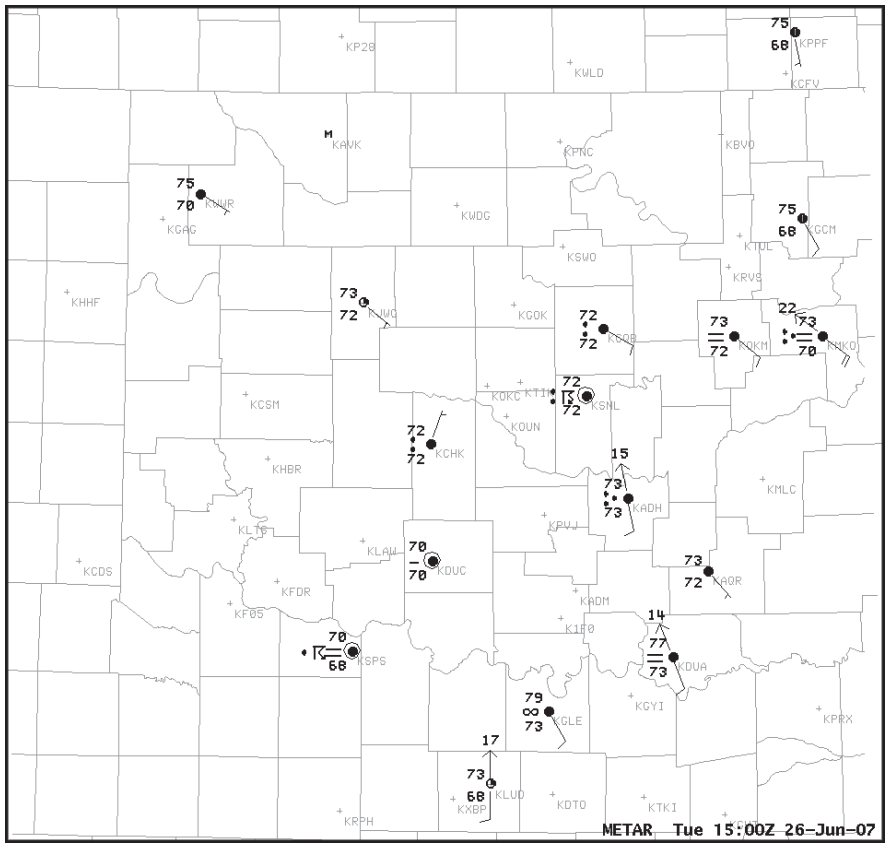
6.0. Task Complete!

Lesson 4: Overlaying Multiple Products on a Single Display

This lesson provides instructions on loading multiple products into a single display. It references tasks from previous lessons (e.g. loading and editing product displays) and introduces new tasks designed to help forecasters maximize workflow for increased efficiency.

A. Graphic Products vs. Image Products

When working with D-2D, it is important to know and understand the difference between image products and graphic products. While, in many circumstances, these differences may seem insignificant, they are important.



i. Graphic products

In D-2D, graphic products are maps containing plotted or contoured data, soundings, or other plotted data. Graphic products can be either observational data or model output products.

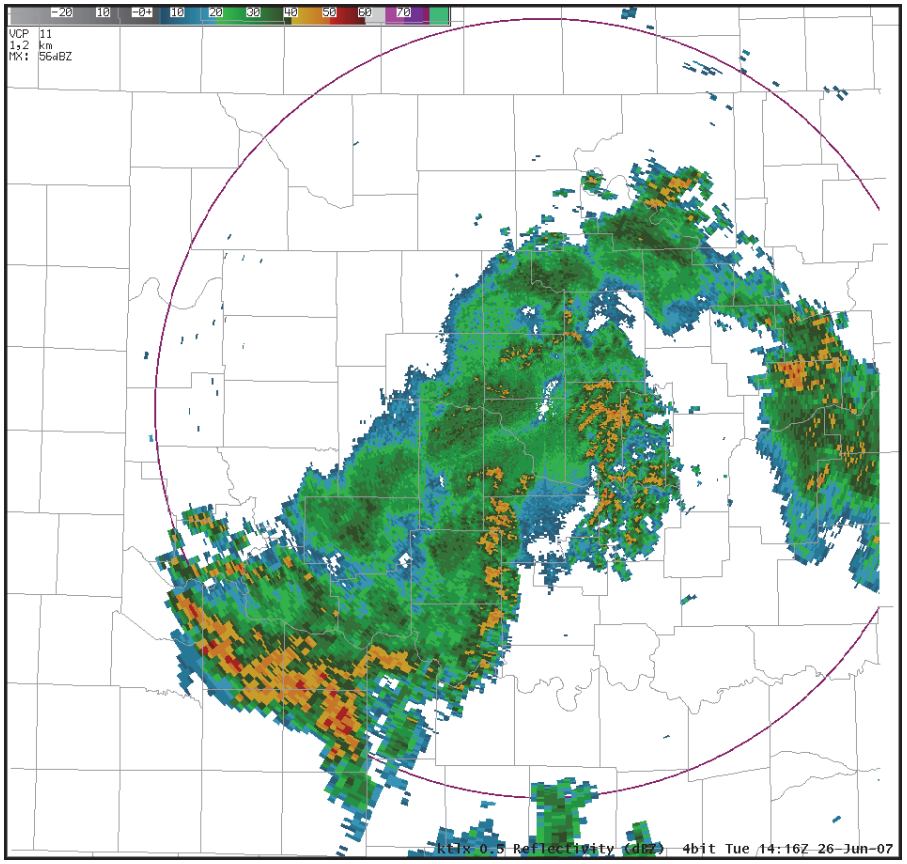
Graphic products are beneficial for data analysis because multiple graphic products can be loaded into a single display panel and viewed concurrently. These products can also be overlaid on other image products, making them a useful analysis tool.

Graphic products contain less visual information than image products. Cursor sampling only works for certain point measurements (e.g. soundings). A single graphic product is displayed as one color, which can sometimes cause legibility issues. For instance, fields in a METAR station plot are all a single color, sometimes impeding interpretation. Further legibility issues can result from small font sizes or contour widths. Changing the panel Magnification and/or Density settings, or changing the product specific parameters (i.e. color, line width, etc.), can help mitigate some legibility issues with graphic product displays.

ii. Image products

Simply stated, image products in D-2D are continuous fields of data that are represented by color fills. Owing to how data are visualized in AWIPS, this characterization means much more. D-2D provides the user substantial control over the display of image products. For instance, users can change the Color Table of an image product to aid in visualization. The user can also select a range of values to blink in that color table to help differentiate certain values in the product. Image products even allow the user to sample the data at any point in an image through the cursor sampling function.

Due to the continuous nature of the data in an image product, it is possible to only display one (or two in image combination mode) image product in a display panel at one time. However, four-panel layouts permit viewing multiple image products simultaneously. Multiple graphic products are easily overlaid on top of an image product.



B. Importance of Loading Order

AWIPS operators commonly overlay graphics and image products on a single display panel. The sequential order of how products are loaded into the display panel is crucial to how those products update. The first product loaded into a display determines the frequency at which the frames in that display panel will update. For instance, if a 0.5^{o} Reflectivity product is loaded first, then METAR data, a new frame is added to the loop when the next 0.5^{o} Reflectivity product is received in the AWIPS database (i.e., about every 5-10 minutes). However, if METAR surface observations are the first product loaded in the display panel, then a 0.5^{o} Reflectivity product, the next frame in that display panel will not be added until the next METAR observation is received in the AWIPS database, which could be on the order of an hour. Therefore, the user might not be getting the most up-to-date radar data.

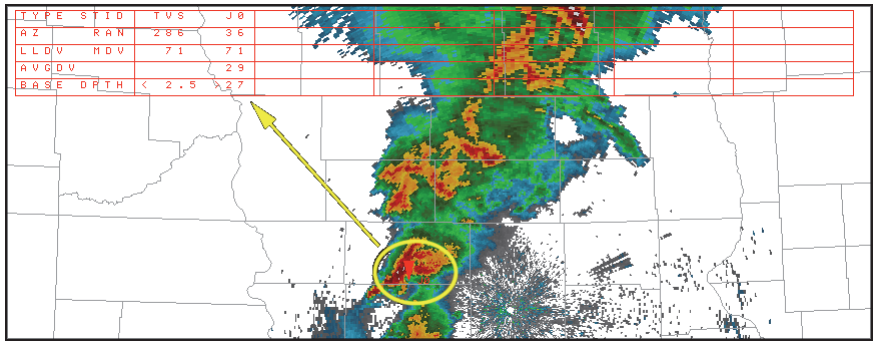
When setting up a display panel for storm interrogation, data that updates the quickest should be loaded first to ensure that all data is being loaded into the AWIPS database. This generally means that radar image and graphic products should be the first products loaded in the display panel. While some exceptions to this rule exist, particularly when comparing model and observational data, this guideline works well in most situations.

C. Different Types of Graphic Product Overlays

Graphic products can vary significantly in their functionality and in their look and feel. This variation depends on the type of graphic product, how products are loaded, etc. While much diversity exists among the types of graphic products, for the purposes of warning operations they generally fall into three categories: radar product overlays, Volume Browser product overlays, and other product overlays.

i. Radar product overlays

Numerous radar graphic products can be overlaid on radar image products. These products include Storm Track (STI), Tornado Vortex Signature (TVS), Meso Rapid Update (MRU), and output from other algorithms. Most of these products have multiple pages of overlays (up to 6 pages per product).



Task: Loading and Toggling Radar Graphic Overlay Products

This task demonstrates how to load and toggle a graphic product overlay into a frame after first loading an image product.

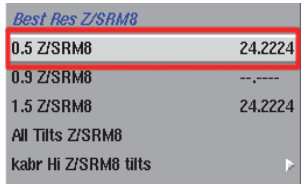
Additional Assumptions:

- None

1.0. Load an Image Product

1.1. Select the pull-down menu for one of your local radars and press the Left-Mouse Button.

1.2. In the menu that appears, select "0.5 Z/SRM8" (or similar image product) and press the Left-Mouse Button.

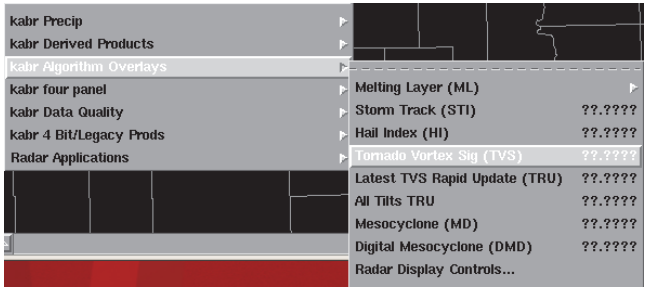


1.3. If necessary, press the "." key on the numeric keypad to toggle between the images (if you selected an image combination product).

2.0. Load Graphic Product Overlays

2.1. Select the same pull-down menu from Step 1.1 and press the Left-Mouse Button.

2.2. In the menu that appears, select the "*kxxx* Algorithm Overlays" menu (where *kxxx* is your chosen radar) and press the Left-Mouse Button.



2.3. In the subsequent submenu, select the graphic product you want to load and press the Left-Mouse Button.

- Remember to look at the date/time information in the menu to ensure the product you select currently has data in the AWIPS database.
- If the product you load has multiple pages, each page of information will display in the same color. However, only one page is typically visible with the other pages available to be toggled.

3.0. Toggle between Pages of Graphic Product Overlays Using One of the Following Methods

- As long as one page of the table is toggled on, all of the icons in the main display remain visible.
- By default, each page for a single graphic overlay product loads using the same color, which helps the user distinguish between multiple overlay products loaded on the same panel.

3.1. Method 1: Select the product page you wish to toggle from the product legend in the main display panel and press the Left-Mouse Button.

3.2. Method 2: Using the keyboard shortcuts

3.2.1. Starting at the bottom of the product legend, count up to the graphic product you wish to toggle.

3.2.2. As long as the number is nine or less, use that number in the numeric keypad on the keyboard to toggle that page of the graphic product.

4.0. Task Complete!

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ii. Volume Browser product overlays

In many situations it is useful to display near-storm environment model data as product overlays on radar imagery. In addition, many products loaded from the Volume Browser can be displayed as an image product (if the panel has the room for an image product). This feature can come in handy when visualizing environmental parameters that can be large in magnitude and/or have large gradients over small areas (i.e., CAPE).

NOTE: A detailed description of the Volume Browser and its usage falls outside the scope of DLOC Topic 1. However, on occasion the Volume Browser is necessary for warning operations. This document assumes you have a basic understanding of the Volume Browser, but also provides detailed instructions so you can complete the necessary tasks.

Task: Overlaying CAPE on a Base Reflectivity Product

This task will demonstrate how to use the Volume Browser to load a graphic overlay product (CAPE in this example) in the same display panel as an image product (Base Reflectivity).

Additional Assumptions:

- If you do not have any active weather in your area, try this example on your office WES machine using the WES test case (i.e., 2006Aug24).

1.0. Load a Base Reflectivity Product in the Main Display

- Make sure that the main display is clear of all products (image or graphic).
- Make sure that the main display panel is set to WFO Scale.

1.1. Choose a local radar to use, select its pull-down menu from the D-2D toolbar, and press the Left-Mouse Button.

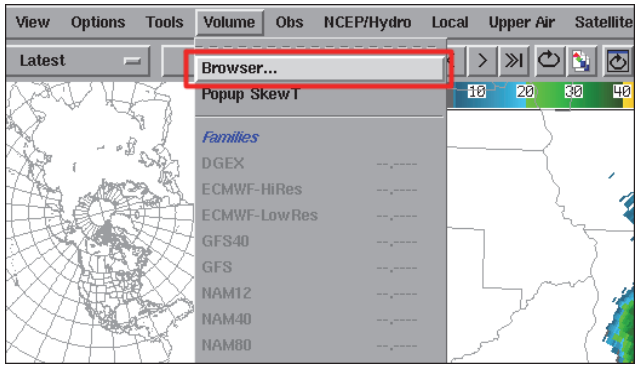
1.2. In the menu that appears, select the "*kxxx* Z" menu under the Best Res Base Products section and press the Left-Mouse Button.

1.3. In the submenu that appears, select "0.5 Refl" and press the Left-Mouse Button.

2.0. Open the Volume Browser GUI

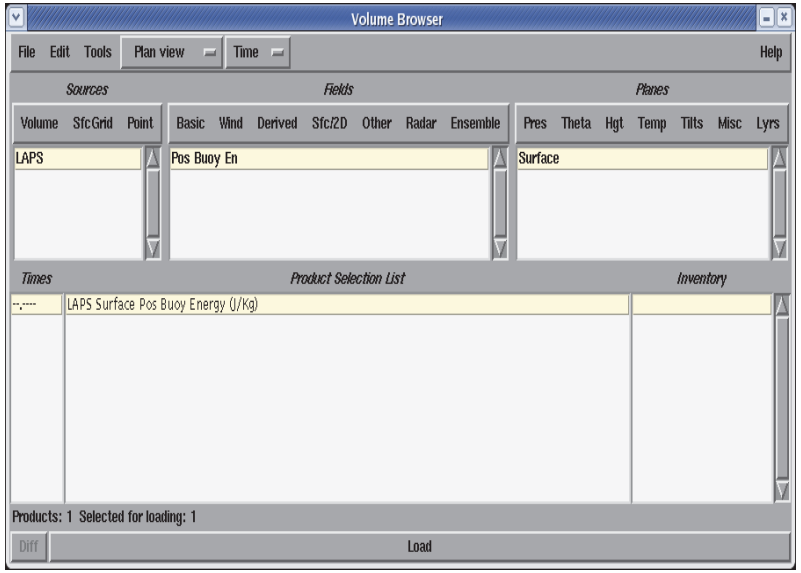
2.1. Select the Volume menu and press the Left-Mouse Button.

2.2. In the menu that appears, select "Browser..." and press the Left-Mouse Button.



3.0. Load LAPS CAPE on the Base Reflectivity Product

- NOTE: Menu and submenu options that appear in light green in the panel menus are available in the database while parameters that appear in black are not.
- If for some reason LAPS CAPE is not available at the time you try this task, try to use CAPE from a different source (or even a different Field from the LAPS output).



3.1. Select LAPS as the Source type

3.1.1. In the Source panel, select the Sfc Grid menu and press the Left-Mouse Button.

3.1.2. In the menu that appears, select LAPS and press the Left-Mouse Button.

3.2. Select CAPE as the Field type

- NOTE: The following steps are for a common Volume Browser configuration. Your local office configuration may be different.
- If your office configuration differs from what is discussed in these directions, and you are unfamiliar with where "Pos Buoy En" is located in your office set up, talk to your SOO or another forecaster at your office for assistance.

3.2.1. In the Field panel, select the Sfc/2D menu and press the Left-Mouse Button.

3.2.2. In the menu that appears select Convective and press the Left-Mouse Button.

3.2.3. In the submenu that appears select "Pos Buoy En" and press the Left-Mouse Button.

- Once you have selected this field, "Surface" should automatically be selected in the Planes panel with "LAPS Surface Pos Buoy Energy (J/Kg)" highlighted in the Product Selection List panel.
- If "Surface" does not automatically appear, select "Surface" from the Misc menu in the Planes panel and press the Left-Mouse Button.

3.3. Select the Load button at the bottom of the Volume Browser and press the Left-Mouse Button.

4.0. Edit the Contour Interval for CAPE

4.1. Position the cursor over the listing for CAPE (i.e., Pos Buoy Energy) in the product legend then press & hold the Right-Mouse Button.

4.2. In the menu that appears, select "Density" while still holding the Right-Mouse Button.

4.3. In the submenu that appears, select "2" and release the Right-Mouse Button.

- The number of CAPE contours should approximately double.
- Repeat Step 4.1 and try other menu (and submenu) options to further customize the appearance of the CAPE contours. This method of trying different options is the best way to learn the various graphic product display options that are available.

5.0. Task Complete!

iii. Other product overlays

Other AWIPS products (i.e. METAR observations, warning polygons, etc) can be displayed as graphic overlays. These products are mostly located under the Obs or NCEP/Hydro menus in D-2D.

Task: Overlaying a Surface Plot on a Base Reflectivity Product

This task demonstrates how to load a graphic overlay (METAR surface observations) in a display panel with an image product (Base Reflectivity).

Additional Assumptions:

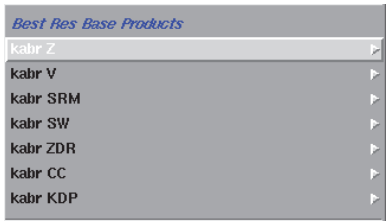
- If you do not have any active weather in your area, try this example on your office WES machine using the WES test case.

1.0. Load a Base Reflectivity Product in the Main Display

- Make sure that the main display is clear of all products (image or graphic).
- Make sure that the main display panel is set to WFO Scale.

1.1. Choose a local radar to use, select its pull-down menu from the D-2D toolbar, and press the Left-Mouse Button.

1.2. In the menu that appears, select the "*kxxx* Z" menu under the Best Res Base Products section and press the Left-Mouse Button.



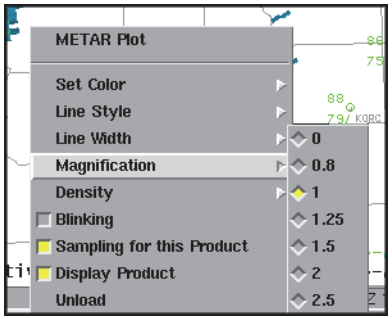
1.3. In the submenu that appears, select "0.5 Refl" and press the Left-Mouse Button.

2.0. Load METAR Station Plots on Base Reflectivity

2.1. Select the Obs pull-down menu and press the Left-Mouse Button.

2.2. In the menu that appears, select "Station Plot" and press the Left-Mouse Button.

3.0. Edit the Size of the Station Plot Display



3.1. Position the cursor over the listing for METAR in the product legend then press & hold the Right-Mouse Button.

3.2. In the menu that appears, select “Magnification” while still holding the Right-Mouse Button.

3.3. In the submenu that appears, select “2” and release the Right-Mouse Button.

- The size of the station plot should be about twice as big and much more legible.
- Repeat Step 3.1 and try other menu (and submenu) options to further customize the appearance of the METAR station plot. This method of trying different options is the best way to learn the various graphic product display options that are available.

4.0. Task Complete!

You have now completed Part 1 (Basic Manipulations in AWIPS) for Topic 1. Please go to the LMS (https://doc.learn.com/noaa/nws) and complete the quiz before continuing on with the next lessons.

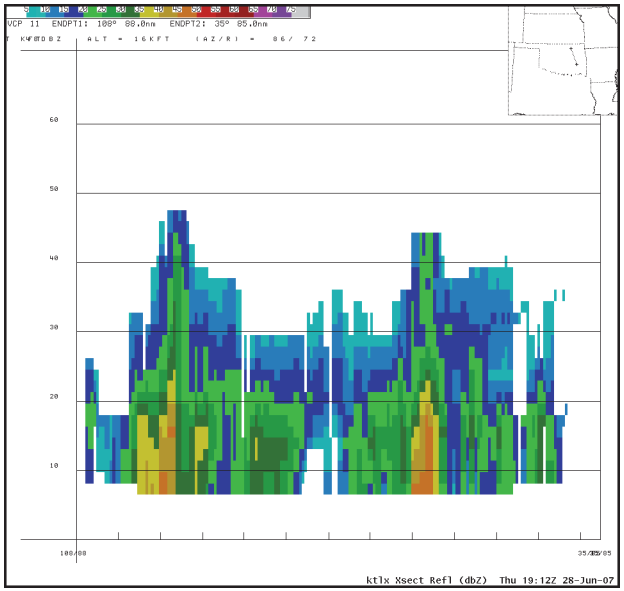
Lesson 5: Requesting Non-Standard Products from an RPG

This lesson provides instructions on how to use One-Time Requests (OTRs) and Radar Multiple Requests (RMRs) to request products that do not normally appear in your local AWIPS database. These may be products that are not routinely sent by your dedicated RPG(s) or products from surrounding RPGs that your office receives via dial-up connections rather than the AWIPS SBN.

Note: Because the tasks described in this lesson involve interactions with a real WSR-88D RPG, these tasks must be performed using a live AWIPS workstation.

A. One-Time Requests (OTRs)

Sometimes an AWIPS operator needs to access products not included on your Routine Product Set (RPS) list, not from one of your dedicated radars, and/or not in the AWIPS SBN data feed. When only a single product is needed for a short period of time, or when the product request requires user input that might change from one request to another, then an OTR is the best way to request that product from an RPG. An OTR can only request a single product from a single RPG with each request, but it can request multiple instances of a product over several Volume Scans (up to nine total). Products that are typically requested using an OTR include Reflectivity and Velocity Cross-Sections and Clutter Bypass Maps.



Task: Submit an OTR for a Radar Cross-Section (RCS) Product

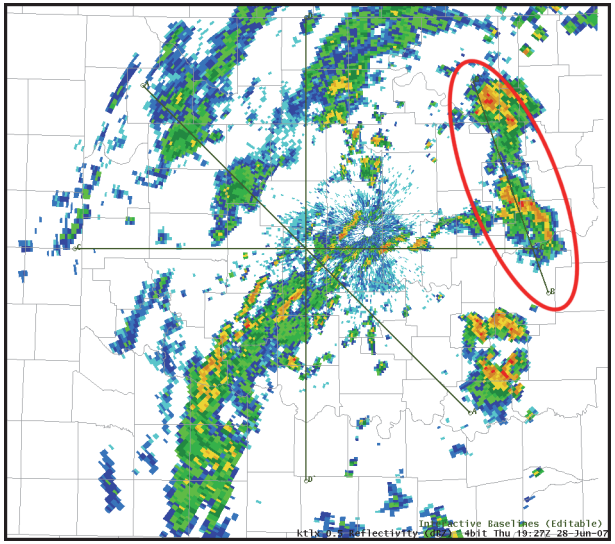
This task demonstrates how to use an OTR to request a RCS product for a radar that covers part of your CWA. Operationally, you would likely only perform this task for a non-dedicated radar that best covers a portion of your CWA (i.e., normally you would use FSI to view a radar cross-section). For this example, you can choose to use a dedicated or non-dedicated radar to request a RCS product.

NOTE: This process is applicable to both RCS and VCS (i.e., Velocity Cross-Section) products, even though only an RCS is covered in these instructions.

Additional Assumptions:

- None

1.0. Determine the Baseline for the RCS Product



1.1. Load a 0.5^{0} Reflectivity product (or a Composite Reflectivity product if the situation warrants) in the main display panel.

1.1.1. Select a menu for a dedicated radar that gives you the best view of the region for which you want to generate a cross-section and press the Left-Mouse Button.

1.1.2. In the menu that appears, select "*kxxx* Best Res Refl" (where *kxxx* is the menu you originally selected) and press the Left-Mouse Button.

1.1.3. In the submenu that appears, select "0.5 Ref" and press the Left-Mouse Button.

1.2. Position the baseline used to generate the cross-section.

1.2.1. Select the Tools menu and press the Left-Mouse Button.

1.2.2. In the menu that appears, select "Baselines" and press the Left-Mouse Button.

1.2.3. In the main display panel, position one of the baselines that appear where you want a RCS product to be generated.

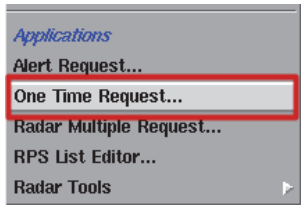
- The baseline end points must be located between 0.5 and 124 nm from the RDA of the radar from which you want to generate the cross-section.

- The baseline must be less than 124 nm in length.

1.2.4. Note the baseline ID (labeled A through J) used in Step 1.2.3.

1.3. Position the cursor in one of the side display panels and press the Right-Mouse Button to swap panes.

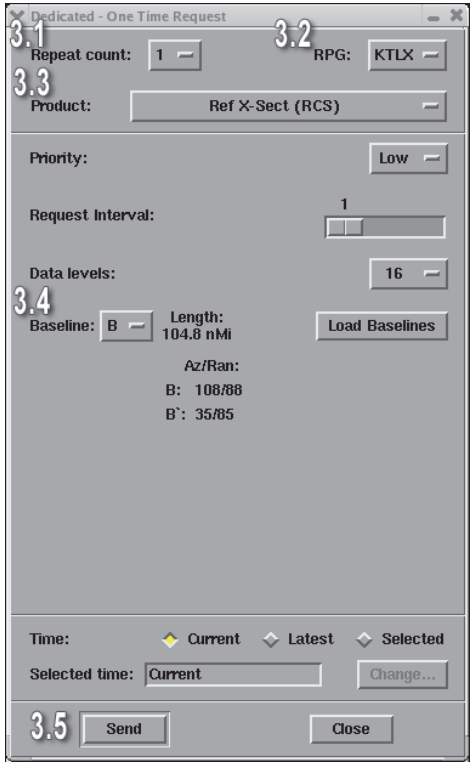
2.0. Open the OTR GUI



2.1. Select a menu for a dedicated radar or the Radar menu from the D-2D toolbar and press the Left-Mouse Button.

2.2. In the menu that appears, select "One time request..." and press the Left-Mouse Button.

3.0. Select the Parameters and Submit Your OTR.



3.1. Set the Repeat count

3.1.1. Select the Repeat count pull-down menu then press & hold the Left-Mouse Button.

3.1.2. Choose the number of products (up to 9) you want to request from the RPG and release the Left-Mouse Button.

3.2. Select the RPG

3.2.1. Select the RPG pull-down menu then press & hold the Left-Mouse Button.

3.2.2. Choose the RPG ID for the desired radar and release the Left-Mouse Button.

3.3. Select RCS Product

3.3.1. Select the Product pull-down menu then press & hold the Left-Mouse Button.

3.3.2. Choose the "Ref X-Sect (RCS)" product and release the Left-Mouse Button.

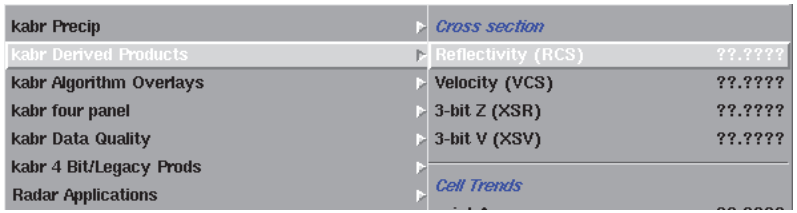
3.4. Select the Baseline

3.4.1. Select the Baseline pull-down menu then press & hold the Left-Mouse Button.

3.4.2. Choose the baseline you edited in the main display panel (in Step 1.2) and release the Left-Mouse Button.

3.5. Select the "Send" button and press the Left-Mouse Button.

4.0. Display the RCS Product



4.1. Select the radar menu (i.e., *kxxx* or Radar) for the RPG you submitted the OTR and press the Left-Mouse Button.

4.2. In the menu that appears, select "*kxxx* Derived Products" (where *kxxx* is the menu you originally selected) and press the Left-Mouse Button.

4.3. In the submenu that appears, select "Reflectivity (RCS)" and press the Left-Mouse Button.

5.0. Task Complete!

B. Radar Multiple Requests (RMRs)

When an AWIPS operator requires non-standard products from their dedicated RPG(s), or products not found in the normal AWIPS SBN feed from a non-dedicated RPG on a more regular basis than is possible with an OTR, then a RMR is usually used to request that data. The RMR application allows the AWIPS operator to automate up to eight hours of non-routine radar products, including multiple RPGs and products. These requests are saved and can be resubmitted by other AWIPS operators in the future.

NOTE: Unless you are creating a new or manipulating an existing RMR, the only buttons you need to use are the “Submit” button in the top and the “Cancel” button in the bottom of the RMR GUI.

Task: Opening the RMR GUI

This task demonstrates how to open the RMR GUI. Subsequent tasks demonstrate specific features of the RMR GUI.

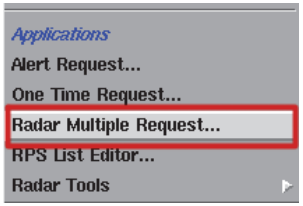
Additional Assumptions:

- None

1.0. Select One of the Dedicated Radar Menus (or the Radar Menu) from the D-2D Toolbar and Press the Left-Mouse Button.

2.0. In the Menu That Appears, Select “Radar multiple request...” and Press the Left-Mouse Button.

3.0. Task Complete!



i. Creating a new request

While most offices probably have a fairly thorough list of RMRs, situations may arise where you need to create a new request. Use the step-by-step GUIs and the “New Request” feature to name the request and add products to the list.

Task: Build a New Request in the RMR GUI

This task demonstrates how to build a new request for non-routine products in the RMR GUI.

Additional Assumptions:

- None

1.0. If the RMR GUI is not Currently Open, Follow the Steps in the Task on "Opening the RMR GUI" to Open the GUI.

2.0. Create a New Request

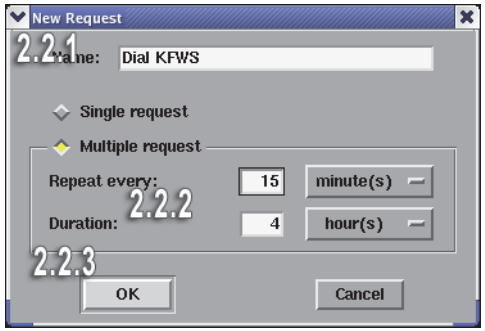
2.1. In the RMR GUI, select the "New Request..." button and press the Left-Mouse Button.

2.2. Enter information in the "New Request" GUI

2.2.1. Type a name in the "Name" field.

2.2.2. If this request is a multiple request, enter a request frequency (in the "Repeat every") and a duration (in the "Duration") fields.

2.2.3. Select the "OK" button and press the Left-Mouse Button.



3.0. Add Products to the New Request

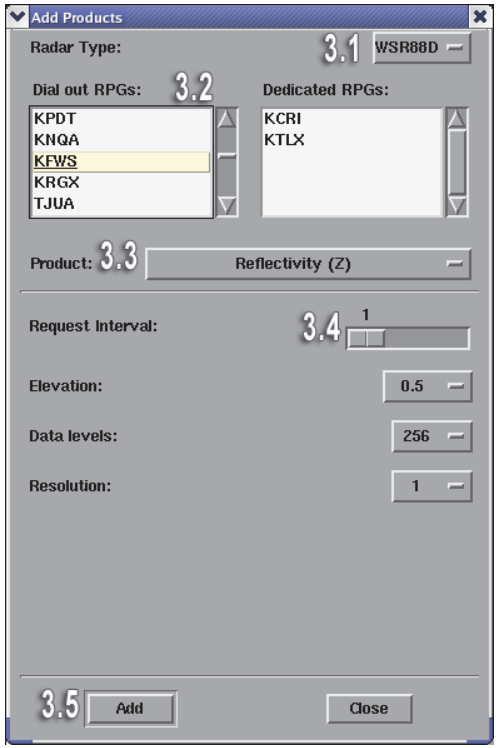
3.1. Select the Radar Type

3.1.1. Select the Radar Type pull-down menu then press & hold the Left-Mouse Button.

3.1.2. Choose the radar type and release the Left-Mouse Button.

3.2. Select the radar from either the Dial Out or Dedicated RPGs listing and press the Left-Mouse Button.

3.3. Select the Product



3.3.1. Select the Product pull-down menu then press & hold the Left-Mouse Button.

3.3.2. Choose a product from the list and release the Left-Mouse Button.

3.4. Set the Request Interval and other necessary parameters (i.e., Elevation, Data Levels, and Resolution) for the requested product.

3.5. Select the "Add" button and press the Left-Mouse Button.

3.6. Repeat Steps 3.1 through 3.5 for any other products you wish to add to the RMR.

4.0. Select the "Close" Button and Press the Left-Mouse Button to Close the Window.

5.0. Task Complete!

Sometimes, you may wish to edit an existing RMR. For example, you may need to adjust a recently made RMR or you may wish to add some newly developed products to the list.

ii. Submit an existing request

Once you have a RMR product listing, you can submit the request whenever you wish to receive those products. A RMR can be submitted even when other RMRs are currently active. After the request is submitted, it appears in the "Active Request" panel of the RMR application.

Task: Submit an Existing Request to the List of Active Requests

This task demonstrates how to submit an existing RMR to the Active Request list.

Additional Assumptions:

- That there is currently at least one existing RMR ready to submit.

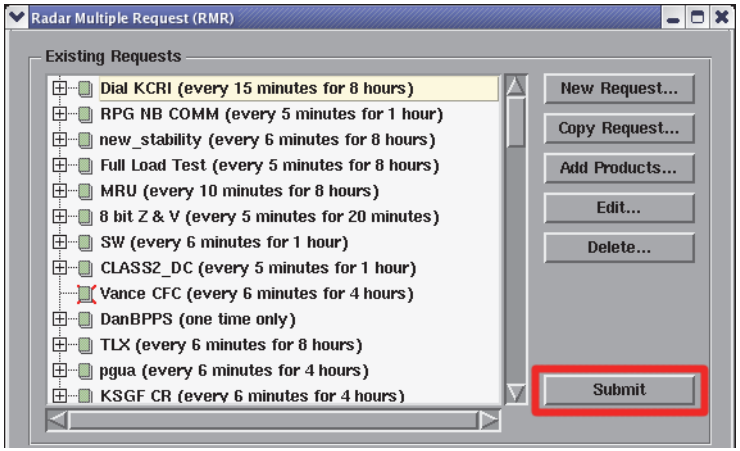
1.0. If the RMR GUI is not Currently Open, Follow the Steps in the Task on "Opening the RMR GUI" to Open the GUI.

2.0. In the RMR GUI, Select a Request from the Existing Requests Listing and Press the Left-Mouse Button.

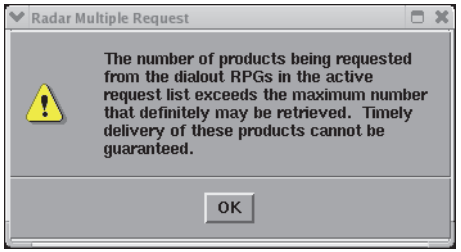
3.0. Select the "Submit" Button and Press the Left-Mouse Button.

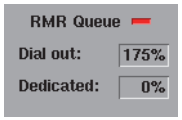
- The request should now appear in the Active Requests panel.
- You should monitor the Request Queue and be prepared to take action if either of the percentages exceeds 100% (see below).

4.0. Task Complete!



iii. Monitoring RMR activity





Although RMRs provide users more flexibility to receive data than an OTR, there are drawbacks. It is possible to request too much data using the RMR application. When this happens, the data will still be requested, but the system will warn the AWIPS operator that the requested products may not be received in a timely fashion. Consequently, another important aspect of the RMR application is the ability to monitor active requests and remove requests from the RMR Queue.

When monitoring activity in the RMR application, it's important to keep an eye on the Dial Out and Dedicated RMR Queue percentages. When these percentages exceed 100%, the RMR application error message is triggered. The RMR application provides an additional cue by changing the small color signal next to the "RMR Queue" label from green to red when one of the percentages exceeds 100%.

NOTE: Even if the Queue percentage exceeds 100%, you may not experience a drop in performance or a data slow down. In some cases, you may notice a percentage of over 300% and not experience any issues with your RMR. However, when the percentage exceeds 100% you need to be aware that problems may occur with your RMR.

Task: Removing a Request from the RMR Queue

This task demonstrates how to remove a request from the Active Request Panel.

Additional Assumptions:

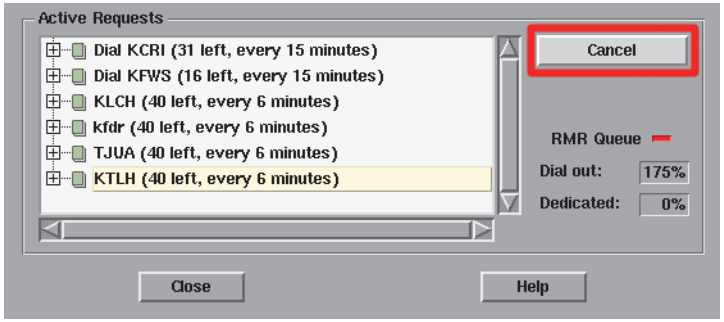
- There is at least one active RMR.

1.0. If the RMR GUI is not Currently Open, Follow the Instructions in the Task on "Opening the RMR GUI" to open the GUI.

2.0. In the Active Request Panel, Select a Request You Want to Remove and Press the Left-Mouse Button.

3.0. Select the "Cancel" Button and Press the Left-Mouse Button.

4.0. Task Complete!



Lesson 6: Using All Tilts Products to Interrogate Storms

This lesson provides information on, and instructions for, using All Tilts radar products. Besides explaining the steps for loading this product and interrogating storms, this lesson also incorporates some best practices for using All Tilts products during warning operations.

A. What Are All Tilts Products?

All Tilts products are loops of radar base data in AWIPS where every available elevation angle for each volume scan is loaded in a loop. The AWIPS operator uses the arrow keys on the keyboard to step through the products for either a constant elevation angle or volume scan. NOTE: The effectiveness of this product depends on the number of frames in the loop for the main display panel and the products available in the AWIPS database for a given radar.

B. Important Points to Remember When Using All Tilts Products

i. Avoid using WarnGen with all tilts products

In general, WarnGen should be loaded on a display panel with single elevation angle product, not an All Tilts product. All Tilts products offer a limited number of volume scans in the frame loop to determine storm motion. Loops of single elevation angle products are better suited for that purpose. Use all tilts products to interrogate storm structure instead.

ii. For non-dedicated radars, use Radar Multiple Requests to have access to all 8-bit base data

When interrogating storms that are best covered by a non-dedicated radar, remember to use Radar Multiple Requests (RMRs) to download the 8-bit base data from those radars. This process ensures having the best quality data from those radars for storm interrogation.

iii. Set the frame count to 64

To maximize the effectiveness of All Tilts products, set the frame count to the maximum (i.e., 64 frames in AWIPS OB 8.3) amount possible. This change provides 3-4 full volume scans of base data available for storm interrogation.

iv. If lost, go to the last frame

Because of the nature of the product, users can get confused to which volume scan is the latest, etc. If you find yourself in this situation, click on the last frame button in the D-2D toolbar to move to the last frame in the loop. This process ensures you're viewing data from the latest volume scan.

Task: Loading an All Tilts Product into the Main Display Panel

This task covers loading an All Tilts product in the main display panel and the two methods for navigating through those products.

Additional Assumptions:

- The main display is set to the WFO scale

1.0. Load an All Tilts Radar Product into the Main Display Panel

1.1. Set Frame Count to 64

1.1.1. Select the Frames pull-down menu and press the Left-Mouse Button.

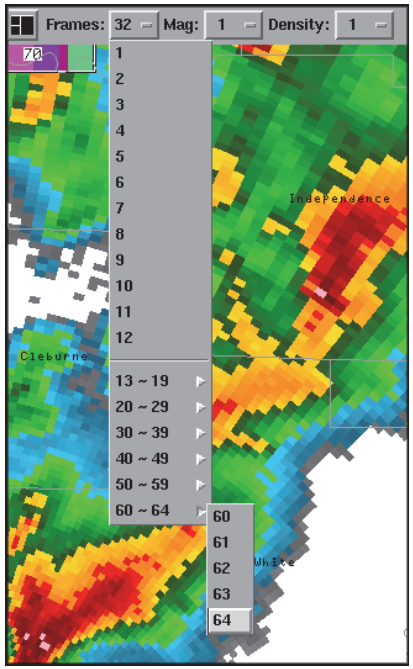
1.1.2. Position the cursor over "60 ~ 64" and press the Left-Mouse Button.

1.1.3. Position the cursor over "64" and press the Left-Mouse Button.

1.2. Load an All Tilts Product from the Menu

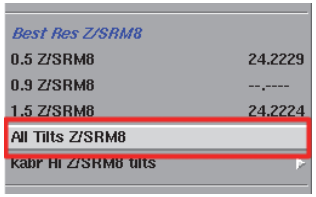
1.2.1. Select the menu for the desired radar (i.e., *kxxx*) with your cursor and press the Left-Mouse Button.

1.2.2. In the menu (and submenu) that appears, select an All Tilts product you want to view (i.e., base data, base data combination, or rapid update algorithm products) and press the Left-Mouse Button.



1.3. If loading an all tilts combination product (e.g., All Tilts Z/SRM8), use the "." on the keypad to toggle between the image products

2.0. Step Forward and Backward in Time Using One of the Following Methods



2.1. Method 1: Using the keyboard directional arrows to step through frames (preferred method)

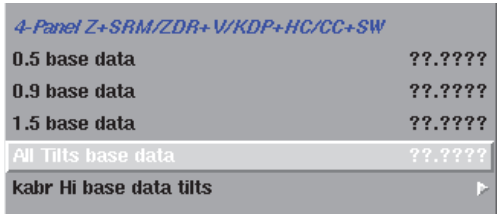
- After loading an all tilts product, use the four directional arrows on the keyboard to navigate through product loop.
- **Constant Volume Scan Viewing:** The "↑" and "↓" keys advance to the next highest or lowest elevation angle available in the current volume scan, respectively.
- **Constant Elevation Angle Viewing:** The "←" and "→" keys will advance to the next or previous image available for the current elevation angle, respectively.

2.2. Method 2: Using the Toolbar buttons to step through frames

- After loading an all tilts product, the "<" and ">"buttons in the toolbar moves the frame forward and backward.
- To determine frame order, the highest elevation angle in the latest volume scan is the most recent product while the lowest elevation angle in the oldest volume scan is the oldest product. While viewing the lowest elevation angle of a given volume scan, the next oldest product is the highest elevation angle of the previous volume scan.
- Pressing the "|<<" or ">>|" buttons in the toolbar will take you the oldest or most recent product in the all tilts display, respectively.

3.0. Task Complete!

C. Four-Panel All Tilts Displays



In addition to standard All Tilts displays, AWIPS also supports the use of all tilts products being displayed in a four-panel layout. All of the items mentioned in Section B of this lesson apply for the four-panel All Tilts products as well as the single panel all tilts products. In addition to the previously mentioned important points, there is one other issue to remember with the four-panel All Tilts displays. If you manually load radar products into the four-panel, you have the ability to combine All Tilts products with other products that are generated only once per volume scan. Recall from Lesson 4 that D-2D time matches all products to the time listed in the first product loaded. To avoid any problems with All Tilts and volumetric products in the same display, always load All Tilts products first.

Lesson 7: Creating and Editing Procedures

This lesson provides instructions on creating and editing procedures in AWIPS. It discusses both procedures and bundles, as well as the various Procedure GUIs that open, create, and edit procedures and bundles. Lastly, it touches on the History List and how it can also be used to create procedure bundles.

A. Procedures

Procedures are user-generated tasks that automatically display graphics and/or image products and maps in the main display panel. Procedures provide a convenient way to display commonly used products (or products that are useful for a particular weather situation). All procedures have user-defined names to identify the types of product/map combinations included in the procedure.

B. Bundles

Bundles are the individual groupings of products that are contained within a procedure. Each procedure is composed of one or more bundles. Bundles contain not only all of the products loaded in the main display panel, but also any applicable display parameters (i.e, frame count, looping speed, color tables, etc.). When bundles are created, D-2D provides default names based on the products and maps that the display contains. The AWIPS operator can rename any bundle.

C. Using the Procedure GUIs

When creating, editing, or loading procedures, use Procedure GUIs - the various windows that open an existing procedure, create a new procedure, or add new bundles to an existing procedure.

Task: Opening an Existing Procedure

This task demonstrates how to open an existing procedure in AWIPS.

Additional Assumptions:

- None

1.0. Open the Procedures GUI Using One of the Following Methods

1.1. Method 1: Using the File menu

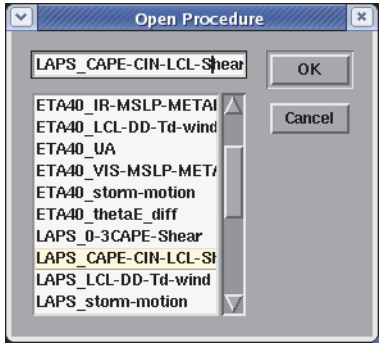
1.1.1. Select the File menu and press the Left-Mouse Button.

1.1.2. In the menu that appears, select "Procedures" and press the Left-Mouse Button.

1.1.3. In the submenu that appears, select "Open" and press the Left-Mouse Button.

1.2. Method 2: Using the keyboard shortcut - <CTRL>+O.

2.0. Choose a Procedure to Open



2.1. From the Open Procedure GUI, select a procedure from the list and press the Left-Mouse Button.

2.2. Select the "OK" button and press the Left-Mouse Button.

3.0. Select a Bundle to Open

3.1. In the Procedure GUI, select a bundle from the list and press the Left-Mouse Button.

3.2. Select the "Load" button and press the Left-Mouse Button.

4.0. Task Complete!

Task: Create a New Procedure

This task demonstrates how to create a new procedure and add a new bundle to that procedure.

Additional Assumptions:

- None

1.0. Set Up the Main Display

- Load all the products (image and graphics) and maps in the main display panel exactly as you want them to appear in the bundle.
- Remember to keep the load order in mind. The first product determines the refresh frequency.
- For instructions on loading products and maps into the main display, review the previous sections of this document on *Basic Product Displays and Manipulations*, *Editing Product Display Characteristics*, *Loading and Manipulating Map Displays*, and *Overlaying Multiple Products on a Single Display.*

1.1. Load one or more products into the main display panel (see Lesson 1).

1.2. Load any additional maps into the main display panel (see Lesson 3).

1.3. Edit the display characteristics (i.e., color table, graphic colors, Magnification, etc.) for the products and maps in the main display panel (see Lessons 2 & 3).

- Take time to change the display traits of graphic overlay products and maps prior to saving the procedure. Make use of the different colors and line styles available, using brighter colors and thicker (or solid) lines for items you want to stand out more. Use thin lines for reference information and to reduce clutter.
- If you have several graphic or map overlays loaded in the main display, consider toggling some of them off prior to creating the procedure. This way, the overlays are available in the procedure, but initial clutter in the display is reduced.

2.0. Open the New Procedures GUI Using One of the Following Methods

2.1. Method 1: Using the File menu

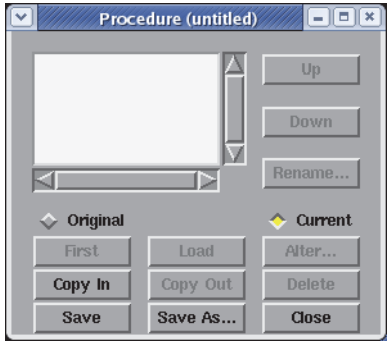
2.1.1. Select the File menu and press the Left-Mouse Button.

2.1.2. In the menu that appears, select "Procedures" and press the Left-Mouse Button.

2.1.3. In the submenu that appears, select "New" and press the Left-Mouse Button.

2.2. Method 2: Using the keyboard shortcut - <CTRL>+N.

3.0. Add a Bundle to the New Procedure GUI



3.1. In the Procedure GUI that appears, select the "Copy In" button and press the Left-Mouse Button.

3.2. Select the "Save" or "Save As..." button and press the Left-Mouse Button.

3.3. In the "Save Procedure As" window that appears, enter the name you want to assign to the new procedure, select the "OK" button, and press the Left-Mouse Button.

- The procedure window, originally titled "Procedure (untitled)", should now be titled "Procedure (*procedure_name*)", where *procedure_name* is the name you just gave the new procedure.
- You can continue creating new bundles in the new procedure or you can select the "Close" button and press the Left-Mouse Button to close the window.

4.0. Task Complete!

Task: Changing Existing Bundles in a Procedure

This task demonstrates some of the ways to modify existing bundles and procedures.

Additional Assumptions:

- There is an existing procedure

1.0. Open the Procedures GUI Using One of the Following Methods

1.1. Method 1: Using the File menu

1.1.1. Select the File menu and press the Left-Mouse Button.

1.1.2. In the menu that appears, select "Procedures" and press the Left-Mouse Button.

1.1.3. In the submenu that appears, select "New" and press the Left-Mouse Button.

1.2. Method 2: Using the keyboard shortcut - <CTRL>+O.

2.0. Choose a Procedure to Open

2.1. From the Open Procedure GUI, select a procedure from the list and press the Left-Mouse Button.

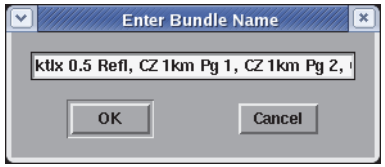
2.2. Select the "OK" button and press the Left-Mouse Button.

3.0. Add a Bundle to a Procedure

3.1. Set up the main display panel with maps and products desired for a new bundle in an existing procedure (see Lessons 1-3).

3.2. In the Procedure GUI, select the "Copy In" button and press the Left-Mouse Button.

4.0. Change the Name of a Bundle



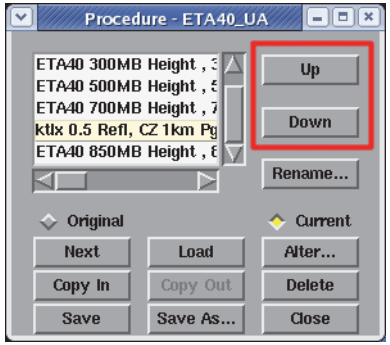
4.1. In the Procedure GUI, select a bundle whose name you want to change and press the Left-Mouse Button.

4.2. Select the "Rename..." button and press the Left-Mouse Button.

4.3. In the window that appears, change the name for the bundle in the text window.

4.4. Select the "OK" button and press the Left-Mouse Button.

5.0. Change the Order Bundles Are Listed in a Procedure



5.1. Select a bundle from the list in the Procedure GUI and press the Left-Mouse Button.

5.2. Select the "Up" or "Down" button and press the Left-Mouse Button.

- Each time you press one of these buttons, the highlighted bundle will be moved up or down in the stack.

6.0. Delete Bundles from a Procedure

6.1. Select the bundle you want to delete from the Procedure GUI display panel and press the Left-Mouse Button.

6.2. Select the "Delete" button and press the Left-Mouse Button.

- That bundle should no longer be listed in the Procedure GUI display panel.
- NOTE: Be careful when deleting bundles. There is no undo option in the GUI. If you accidently delete a bundle, close the Procedure GUI without saving and then reopen the procedure to revert back to the last saved copy of the procedure.

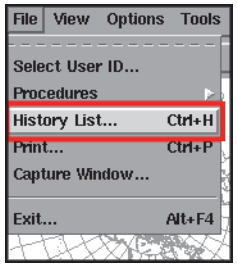
7.0. Save Changes to a Procedure

7.1. To overwrite the old version of the procedure, select the "Save" button and press the Left-Mouse Button.

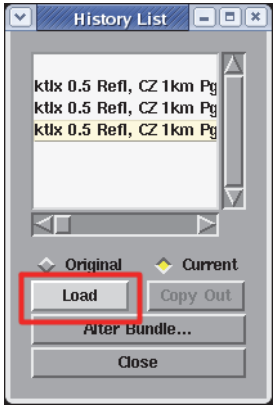
7.2. To save the procedure as a new file, select the "Save As..." button and press the Left-Mouse Button.

8.0. Task Complete!

D. History List



The History List is a GUI that contains the most recent bundles that were displayed in the main display panel (the most recent bundle appears at the top of the list). Procedures (or procedure bundles) may be built from bundles contained in the History List.



The History List can be accessed in two ways:

1.0. Under the File menu, select "History List..." and press the Left-Mouse Button.

2.0. Use the keyboard shortcut: <CTRL>+H.

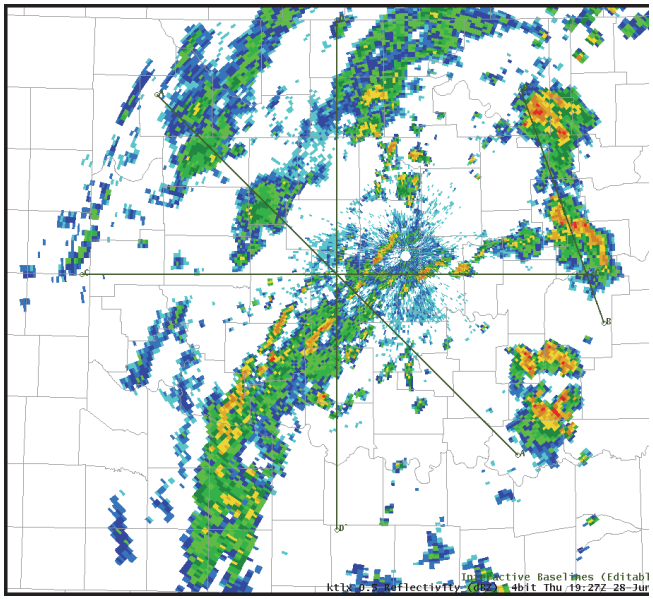
You have now completed Part 2 (Loading Other Standard & Non-Standard Radar Products into AWIPS) for Topic 1. Please go to the LMS (https://doc.learn.com/noaa/nws) and complete the quiz before continuing on with the next lessons.

Lesson 8: The Tools Menu Applications

This lesson presents information on the different tools (found under the Tools menu) in D-2D for analyzing data. These tools have a wide variety of uses that can be very useful to the AWIPS operator. This lesson will present the basics. For a more detailed set of tasks and examples, access the DLOC Topic 1 WES Exercise #2 on your local office's WES machine.

Required WES Exercise #2 (AWIPS Radar-Related Tools)

A. Location Tools



i. Baselines tool

The Baselines tool, when selected, displays 10 different lines on the main display panel. These lines, labeled A-A' to J-J', are used to construct cross-sections from model and radar data from within the Volume Browser. These lines are "editable" by default and can be moved anywhere in the main display and adjusted to almost any length.

ii. Home tool

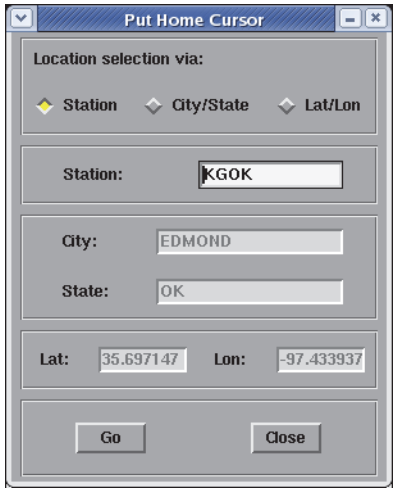
The Home tool displays a marker (denoted with an "x" and labeled with "Home") that is used as a reference point for various azimuthal and range (AZ/RAN) calculations while the marker is loaded in the display. One useful application is obtaining AZ/RAN information while viewing data from a non-dedicated radar. The Home location is not editable by default, but can be made editable by selecting the Home product listing in the product menu while pressing the Middle-Mouse Button (or by changing the "Editable" setting in the product legend).

iii. Choose by ID tool

The Choose by ID tool is a method of selecting feature locations as part of the Digital Mesocyclone Display (DMD) algorithm. This tool allows the AWIPS operator to monitor the same feature over time as it moves (as long as the DMD algorithm continues to identify that feature).

Besides its use for the DMD algorithm, the Choose by ID tool can also be used to set Points, Baselines, and Home at specific locations (e.g., METARs and RAOBs).

iv. Put Home Cursor tool



The Put Home Cursor tool allows the AWIPS operator to quickly identify the location of a specific METAR station, city, or Latitude/Longitude coordinate. (NOTE: if placing Home based on a METAR station, the site must be a North American location) This tool uses the Put Home Cursor GUI when the AWIPS operator specifies the method used to put Home in the new location.

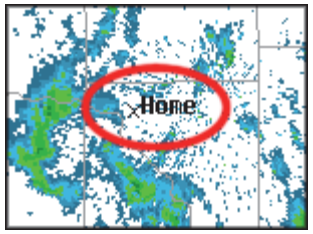
Task: Defining the Location of Cursor Home

This task demonstrates two different methods to position the Home cursor location: positioning Home in the main display panel and by using the Put Home Cursor Tool.

Additional Assumptions:

- None

1.0. Method 1: Defining Cursor Home Location in Display



1.1. Position the cursor over the Tools pull-down menu and press the Left-Mouse Button.

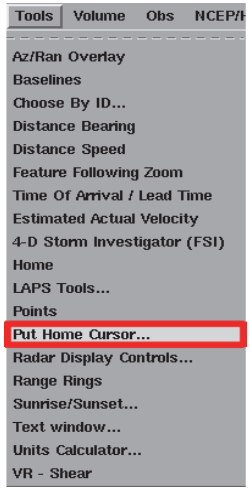
1.2. In the menu that appears, select the “Home” menu option and press the Left-Mouse Button.

1.3. Position your cursor over the “Home Location” label in the product legend and press the Middle-Mouse Button to make Home editable.

1.4. Position your cursor over the location you want to be the new Home and press the Right-Mouse Button.

- You can also press and hold the Left-Mouse Button with the cursor over the old Home location and drag the Home marker to the new Home location.

2.0. Method 2: Defining Cursor Home Location Using Station, City/State, or Lat/Lon



2.1. Select the Tools pull-down menu and press the Left-Mouse Button.

2.2. In the menu that appears, select the "Put home cursor..." option and press the Left-Mouse Button.

2.3. In the Put Home Cursor GUI that appears, choose the radio button for the proper location selection type you wish to use.

2.4. Enter the necessary information for that particular location type in the correct panel of the GUI.

2.5. Select the "Go" button with your cursor and press the Left-Mouse Button.

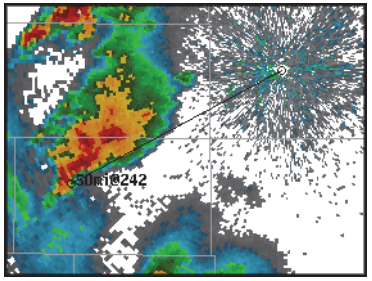
3.0. Task Complete!

---

v. Points tool

The Points tool, when selected, displays ten points in the main display panel. These points, labeled A through J, can be used to generate model soundings, vertical wind profiles (using profilers and WSR-88D VAD Wind Profiles), time-height cross-sections, time series, and variable vs. height plots in D-2D using the Volume Browser. These points are editable when loaded and can be moved to any location visible in the main display panel.

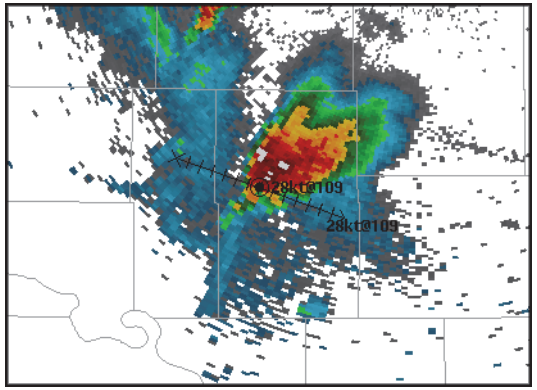
B. Distance/Motion Tools



i. Distance Bearing tool

The Distance Bearing tool, when selected, displays six different lines in the main display panel. Each line shows the AZ/RAN information for the labeled end of the line relative to the unlabeled end of the line. The lines are not editable by default, but can be made editable by selecting the Distance Bearing tool listing in the product menu while pressing the Middle-Mouse Button or by changing the "Editable" setting in the product legend.

ii. Distance Speed tool



The Distance Speed tool can be used to determine the speed and direction of a storm or other meteorological feature. When this tool is selected, a circular marker will be displayed in the main display panel that the AWIPS operator can move to the feature they wish to track. By moving the frames forward/backward to a different volume scan in the loop, and moving the marker again to the feature, the forecaster will get a motion track with the tracks direction (in degrees) and speed (in knots). This tool works similarly to the WarnGen storm motion tool (see Lesson 8: Warn-Gen Basics).

Task: Using the Distance Speed Tool

This task demonstrates how to use the use the Distance Speed tool to determine the linear speed and direction of motion of a storm or other meteorological feature.

Additional Assumptions:

- You have a product with multiple frames loaded in the main display panel.

1.0. Select the Distance Speed Tool

1.1. Select the Tools menu in the D-2D toolbar and press the Left-Mouse Button.

1.2. In the menu that appears, select the “Distance Speed” tool and press the Left-Mouse Button.

2.0. Use the Tool to Determine the Features Speed and Direction of Motion.

2.1. Position the cursor over the “Drag me to feature” marker then press & hold the Left-Mouse Button.

2.2. Move the marker to the feature you want to track and release the Left-Mouse Button.

2.3. Step the loop in the main display panel backwards several frames.

2.4. Again, position the cursor over the feature marker then press & hold the Left-Mouse Button.

2.5. Move the marker over the same feature you originally tracked in Step 2.2 and release the Middle-Mouse Button

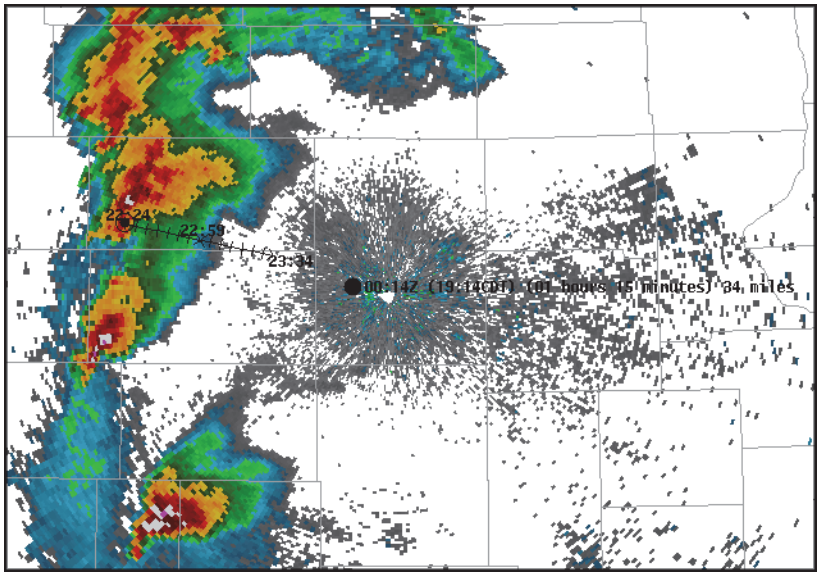
2.6. Toggle back in forth several frames in the main display panel to ensure that the storm motion vector is accurate for the storm feature you are tracking.

- If the track is a little off, keep repeating steps 2.1 through 2.5 to fine tune the storm motion vector.
- Depending on the feature you are tracking, this process can sometimes take several iterations before you have a storm motion vector you are confident is accurate.

3.0. Task Complete!

iii. Time of Arrival / Lead Time tool

The Time of Arrival / Lead Time tool displays a tracking line from a feature's initial starting point in a previous frame to its final position in the current frame. Once the AWIPS operator sets both of these points, an Arrival Point is displayed. The Arrival Point can be dragged anywhere along the line to get the arrival and time and distance of the feature to that point. In addition to calculating these variables for a point feature, this tool can also be used to determine arrival time and distance for a Circular Front or Polyline for situations where these options are more representative.

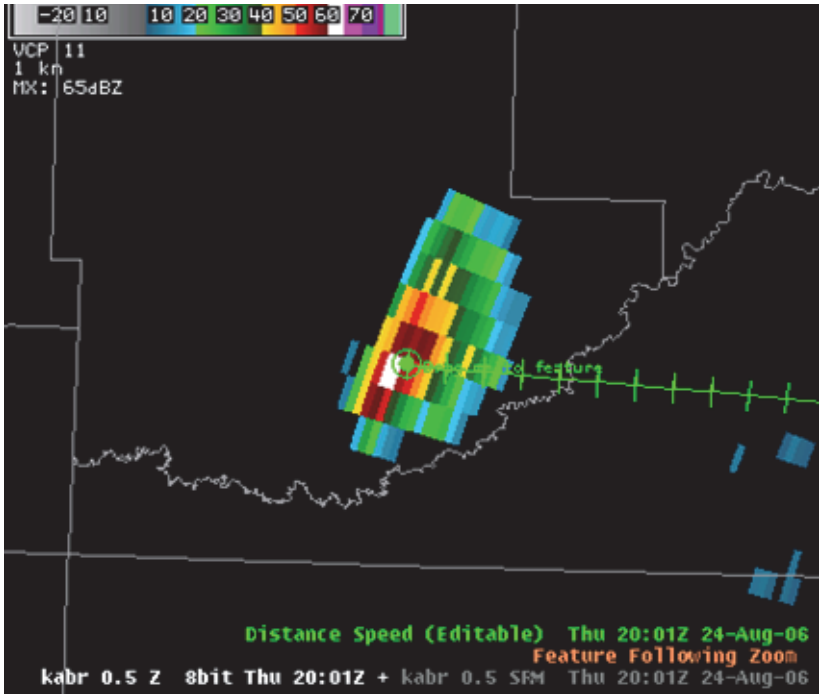


C. Radar-Related Tools

i. Feature Following Zoom (FFZ)

The Feature Following Zoom (FFZ) tool allows a forecaster to loop a series of images that stays centered on a specific feature (e.g. supercell thunderstorm) rather than staying centered on a geographic point. This has two primary benefits for a forecaster. One, the forecaster can focus more on storm relative evolution and not so much on basic motion. Two, they can zoom in and see far greater detail throughout the loop than they could with a geographic based center for the loop.

The FFZ utilizes the Distance-Speed tool to determine where the floating center point will be located. This brings up three key points to remember when using FFZ. The first is that the most recent Distance-Speed tool or WarnGen track loaded will be used by FFZ. In other words, any update to these tools will cause FFZ to update. Second, the Distance-Speed tool only allows for linear motion. Non-linear motions of storms cannot be followed with FFZ. A final point to remember when using the FFZ is that it will not work on default D-2D scales. A forecaster must zoom in beyond the WFO scale for it to work.



Task: Set up the Feature Following Zoom Tool in D-2D

This task will demonstrate how a forecaster can load the Feature Following Zoom tool in D-2D.

Additional Assumptions:

- None

1.0. Load a Reflectivity product from your dedicated RPG

1.1. In the toolbar, set the number of frames to be 64.

1.2. Select the pull down menu for your dedicated radar (i.e. kxxx) with your mouse and press the Left-Mouse button

1.3. From the menu that appears, select the "kxxx Best Res Refl" submenu and press the Left-Mouse button

1.4. From the menu that appears, select the "0.5 Refl" product

2.0. Load the Distance-Speed tool

2.1. Select the "Tools" pull down menu with your mouse and press the Left-mouse button

2.2. From the menu that appears, select the "Distance Speed" tool and press the Left-mouse button

2.3. In the main D-2D panel, Left-click and drag the "Drag me to feature" dot to the storm of interest

2.4. Navigate to the first frame in the sequence by pressing the left arrow key making sure to follow the storm of interest

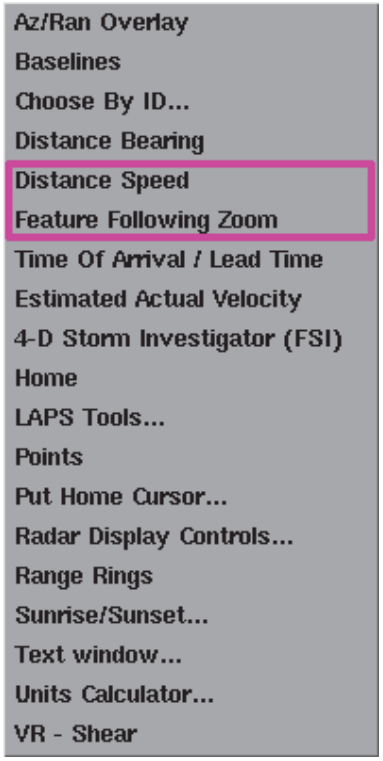
2.5. In the first frame of the sequence, left-click and drag the "Drag me to feature" dot to the same storm of interest

3.0. Zoom in on the storm of interest a level greater than the WFO scale

3.1. Mouse over the storm of interest and press-and-release the middle mouse button until the storm of interest takes up a majority of the main D-2D panel.

4.0. Load the Feature Following Zoom tool

4.1. Select the "Tools" pull down menu with your mouse and press the Left-mouse button



4.2. From the menu that appears, select the "Feature Following Zoom " tool and press the Left-mouse button

4.3. Turn off the Distance-Speed tool

4.3.1 Select the Distance Speed tool legend in the lower right of the main D-2D panel with your mouse and press the Left-mouse button

4.4. In the toolbar buttons, Left-click on the loop button and watch the loop stay centered on the feature of interest

5.0. Task Complete!

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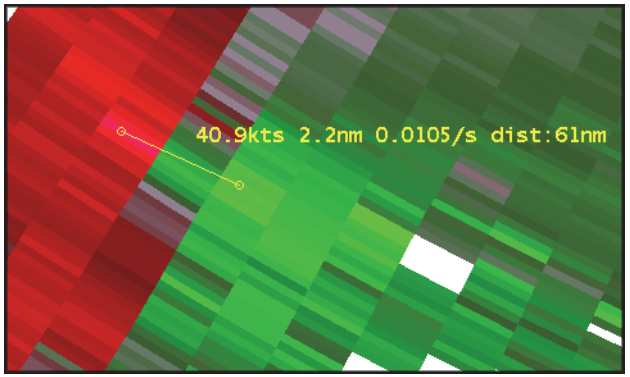
ii. VR-Shear tool

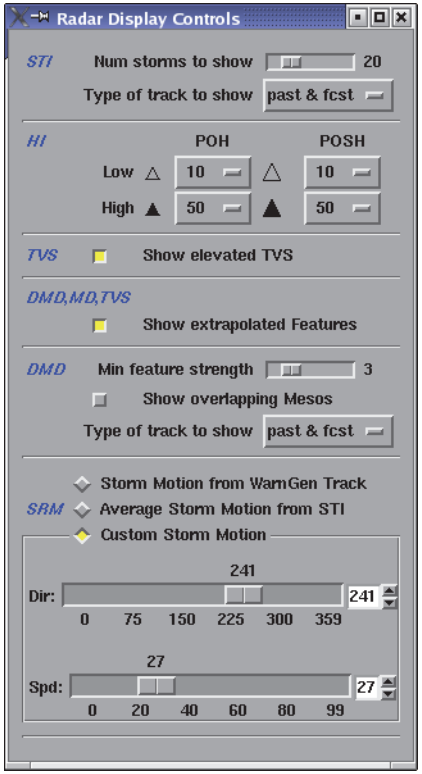


The VR-Shear tool is used in conjunction with a Radial Velocity (or Storm Relative Mean Radial Velocity Map) product to calculate the velocity difference (or shear) between two points. The AWIPS operator positions the two endpoints of the VR-Shear tool over the desired range gates. When positioned, the VR-Shear tool determines the speed difference (in kts), the distance between end points (in nautical miles), the shear (in s^{-1}) and the distance from the radar (in nautical miles).

Positive shear values measured by the tool indicate cyclonic shear, while negative shear values indicate anticyclonic shear. If either end point is not directly over a range gate with valid velocity data, the phrase "no data" will appear in place of the shear value.

NOTE: If you pan the main display panel while using the VR-Shear tool to the point where you no longer see the tool endpoints, pressing the Right-Mouse Button in the main display panel will cause the tool to snap to the point where you clicked the button. Also, when using the VR-Shear tool in four-panel mode, the tool will appear in different colors in each separate panel of the main display window.

iii. Radar Display Controls tool



The Radar Display Controls tool is a GUI that gives the AWIPS operator control over the appearance of several different radar products, including Storm Track (STI), Tornado Vortex Signature (TVS), Digital Mesocyclone Display (DMD), and Storm Relative Mean Radial Velocity Map (SRM). Of all of these options, the most likely use is to alter the appearance of SRM products. The controls for the appearance of SRM products appears in the bottom panel of the GUI.

Using the Radar Display Controls tool, the AWIPS operator can select from one of three different storm motion vectors to generate a SRM product: storm motion from the last use of WarnGen or Distance/Speed Tool (velocity is the zero vector if older than 24 hours), the average storm motion from the STI algorithm, or an operator-specified custom storm motion. The storm motion vector used for the SRM data values is displayed below the color scale (in the upper-left-hand corner of the panel). The settings chosen by the AWIPS operator are workstation specific. So, these settings will affect all displays on that same workstation, but not displays on any other workstations in the WFO.

When viewing SRM products in D-2D, always check the storm motion values for the product being displayed. The last value used may no longer be representative, or desired, for the current situation.

Task: Change the SRM Product Storm Motion in the Radar Display Controls GUI

This task will demonstrate how forecasters can update the storm motion estimate used by the Storm-Relative Velocity Map (SRM) product. There are three different ways to change the velocity estimate for SRM in the Radar Display Controls GUI. This task will show how to set a custom storm motion. The other two methods (use the storm track from WarnGen and use the STI average motion) are implemented in a similar manner.

Additional Assumptions:

- None

1.0. Load a SRM Product from Your Dedicated RPG

1.1. Select the pull-down menu for the desired radar (i.e., kxxx) with your mouse and press the Left-Mouse Button.

1.2. In the menu that appears, select the "kxxx Best Res 8-bit SRM" submenu and press the Left-Mouse Button.

1.3. In the submenu that appears, select the "0.5 SRM" product.

2.0. Open the Radar Display Controls GUI

2.1. Select the "Tools" menu and press the Left-Mouse Button.

2.2. In the menu that appears, select the "Radar Display Controls..." option and press the Left-Mouse Button.

3.0. Change the SRM Storm Motion to a Custom Value

3.1. In the SRM section of the Radar Display Controls GUI, select the "Custom Storm Motion" radio button (if not already selected).

3.2. Change one of the custom storm motion parameters

3.2.1 Position the cursor over either the "Dir" or "Spd" slider bar.

3.2.2 Press and hold the Left-Mouse Button over the slider bar.

3.2.3 Drag the slider bar to the left or the right to change the value for that parameter.

- Changing either value should result in an immediate change in the SRM product shown in the D-2D main display panel.
- If the product does not immediately update, try zooming in or out in the main display panel.
- If the SRM product still doesn't respond, try clearing the main display panel and restarting this task.

3.3. Set the custom storm motion more precisely using one of the following two methods.

3.3.1 Method 1: Select the numeric value text box to the right of one of the slider bars and type in the exact value you want.

3.3.2 Method 2: Position your cursor over the up and down arrows to the right of the Custom Storm Motion text boxes and press the Left-Mouse Button over an arrow to increment the values up or down by one.

4.0. Task Complete!

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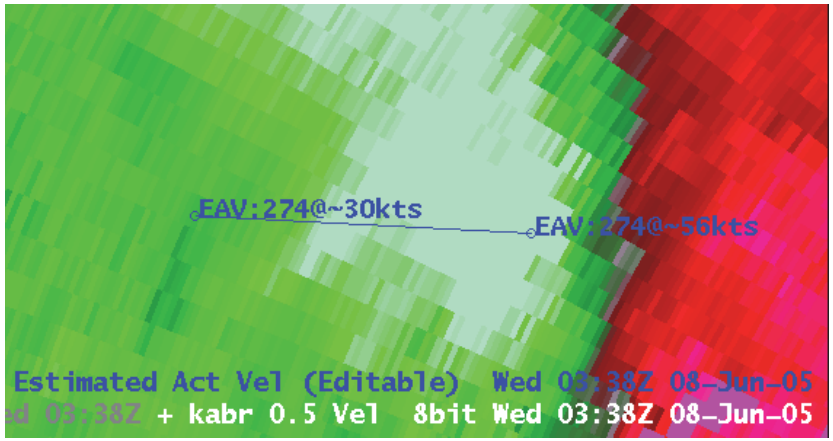
iv. Estimated Actual Velocity (EAV) tool



The Estimated Actual Velocity (EAV) tool is a radar analysis tool that allows forecasters to estimate the actual wind speed based on a user defined wind direction, the measured radial velocity, and the intersection angle between the radar beam and wind direction. This tool may be useful to some forecasters during situations where a more exact wind speed is desired to include in a warning, follow-up statement, or other text product. When the angle between these two vectors is relatively small (i.e., less than 45 degrees) and the forecaster has a good estimate of the actual wind direction at that height and location, than this tool's wind speed values are representative of what is actually occurring. When this angle is less than 20 degrees, the wind speeds returned by the tool will be similar to the radial velocity values and provide little additional benefit. When this angle is greater than 45 degrees, the equation used by the EAV tool becomes too sensitive to incremental changes in the angle to reliably determine the actual velocity.

The tool allows users to obtain the actual wind speeds in two different manners. First, the wind speed and direction are listed at either end of the line tool that forecasters use to indicate the wind direction. Second, users can access the EAV estimated velocity at any given point by using sampling.

When using the EAV tool, there are some guidelines you should follow:

- You should only use the EAV tool on super-resolution or 8-bit base velocity (V) data
- DO NOT use the EAV tool on Storm-Relative Velocity Map (SRM) product displays
- Only use the EAV tool in well-sampled radial velocity areas where the wind direction is likely to be unambiguous.

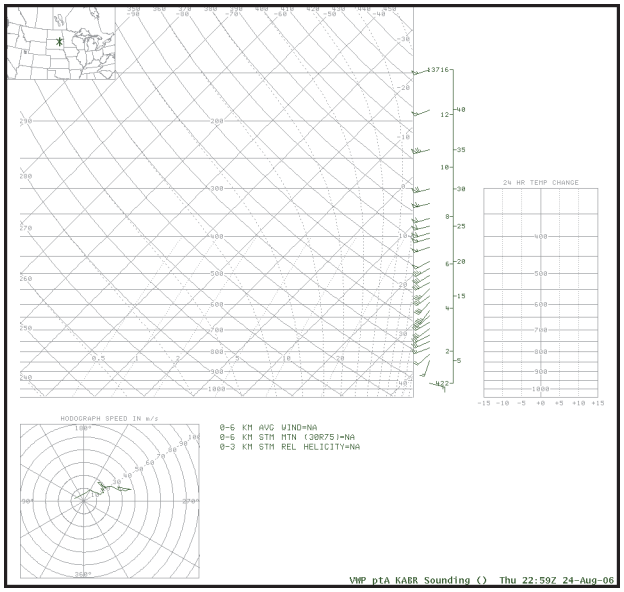
More information on the EAV Tool can be found in WES Exercise #2 and in DLOC Topic 5, Lesson 3.

Lesson 9: Radar-Related Products in the Volume Browser and Integrated Radar Environmental Sampling

This lesson provides instructions on how to use the AWIPS Volume menu to display radar data and environmental parameters that can assist in your storm interrogation and analysis. Some products (e.g. Vertical Wind Profile hodographs and radar cross-sections) are displayed using the Volume Browser. Other products (e.g. the Integrated Environmental Sampling and Popup Skew-T) are tools that allow forecasters to view vertically oriented, environmental parameter data in conjunction with radar data. More details on these later tools can be found in WES Exercise #3 on your local machine.

Required WES Exercise #3 (Integrated Radar Environmental Sampling)

A. Vertical Wind Profile (VWP) Hodographs



VWP Hodographs are generated using the Volume Browser. These hodographs are displayed on a Skew-T graphic in a D-2D pane and can be augmented with various model soundings that are time-matched to the VWP observations.

Because this product is only available via the Volume Browser, the cursor Home location must be located at the radar site for which you want to generate the VWP, and the map scale in the main display panel must be set to WFO or State scale.

Task: Load a VWP Hodograph

This task demonstrates the basic steps for loading a VWP Hodograph using the Volume Browser.

Additional Assumptions:

- That there are data in the AWIPS database for the site you wish to display.

1.0. Set Cursor Home to a Radar Location

1.1. Select the Tools menu and press the Left-Mouse Button.

1.2. In the menu that appears, select "Put Home Cursor..." and press the Left-Mouse Button.

1.3. Use the Put Home Cursor GUI to move cursor Home.

1.3.1. In the "Location selection via:" panel, select the check box next to "Station".

1.3.2. In the Put Home Cursor GUI, type the four-letter identifier for the radar you want to display a VWP hodograph for in the "Station" text field.

1.3.3. Select the "Go" button at the bottom of the GUI and press the Left-Mouse Button to change the Home location.

1.3.4. Select the "Close" button at the bottom of the GUI and press the Left-Mouse Button to close the GUI.

2.0. Move a Point to the Same Location as Cursor Home

2.1. Select the Tools menu and press the Left-Mouse Button.

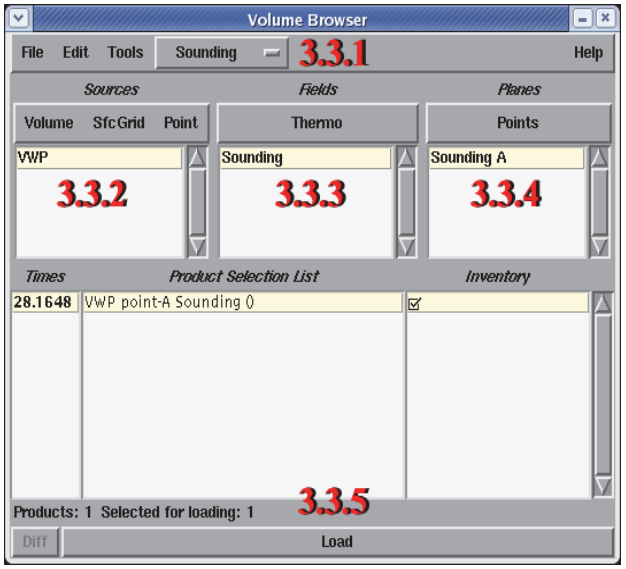
2.2. In the menu that appears, select "Points" and press the Left-Mouse Button.

2.3. Move a Point to the same position as cursor Home

2.3.1. In the main display panel, select a Point then press & hold the Left-Mouse Button.

2.3.2. Drag the Point to the "x" next to the "Home" label and release the Left-Mouse Button.

3.0. Use the Volume Browser to Load the VWP Hodograph



3.1. Select the Volume menu in the D-2D toolbar and press the Left-Mouse Button.

3.2. In the menu that appears, select “Browser...” and press the Left-Mouse Button.

3.3. Use the Volume Browser GUI to load the VWP hodograph.

3.3.1. Change the pull-down menu in the toolbar to “Sounding”.

3.3.2. In the Sources panel, select “VWP” from the Other menu and press the Left-Mouse Button.

3.3.3. In the Fields panel, select “Sounding” from the Thermo menu and press the Left-Mouse Button.

- Besides “Sounding”, you can also select the “model + Profiler” options under the Thermo menu, where model is the grid source that is used to generate the thermodynamic (and fill in gaps in the kinematic) profile.
- When using one of the other options, the profile that is generated from the gridded fields is time-matched to the VWP data.
- Regardless of which Thermo option you choose, the only VWP available in the Planes panel is the one for the Point located at the cursor Home location.

3.3.4. In the Planes panel, select the Point (letters A-J) that is located at the same point as cursor Home.

3.3.5. Select the “Load” button and press the Left-Mouse Button.

4.0. Task Complete!

B. Reflectivity and Velocity Cross-Sections

In addition to VWP hodographs, the AWIPS operator can use the Volume Browser to load a Reflectivity or Velocity Cross-Section. The benefit to loading a cross-section in this manner is that the cross-section is generated by data already present in the AWIPS database. In other words, a One-Time Request for a Reflectivity or Velocity Cross-Section is not necessary to display this product. Additionally, environmental data (i.e. temperature levels) can be overlaid on these types of cross sections.

Task: Load a Reflectivity Cross-Section Image Product Using the Volume Browser

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This task demonstrates how to use the AWIPS Volume Browser to generate a Reflectivity Cross-Section without submitting a One-Time Request.

Additional Assumptions:

- None

1.0. Set Cursor Home to Radar Location

1.1. Select the Tools menu and press the Left-Mouse Button.

1.2. In the menu that appears, select "Put home cursor..." and press the Left-Mouse Button.

1.3. Use the Put Home Cursor GUI to move cursor Home.

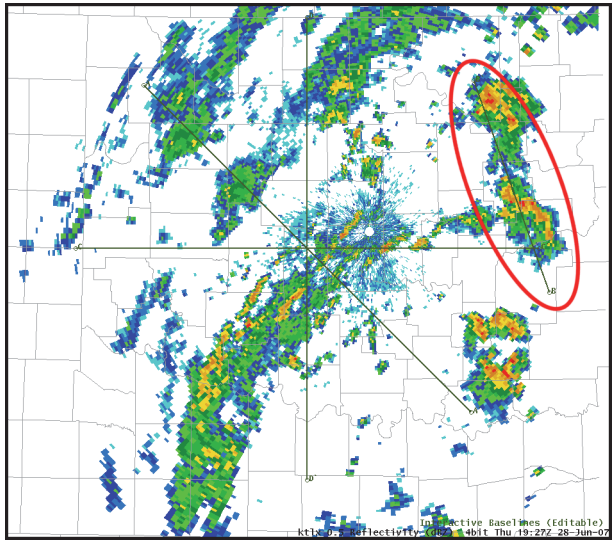
1.3.1. In the "Location selection via:" panel, select the check box next to "Station".

1.3.2. In the Put Home Cursor GUI, type the four-letter identifier for the radar you want to display a Cross-Section for in the "Station" text field.

1.3.3. Select the "Go" button at the bottom of the GUI and press the Left-Mouse Button to change the Home location.

1.3.4. Select the "Close" button at the bottom of the GUI and press the Left-Mouse Button to close the GUI.

2.0. Determine the Baseline for the RCS Product



2.1. Load a 0.5^{o} Reflectivity product (or a Composite Reflectivity product may be preferable) in the main display panel.

2.1.1. Select a menu for a dedicated radar that gives you the best view of the region you want to generate a cross-section for and press the Left-Mouse Button.

2.1.2. In the menu that appears, select "*kxxx* Best Res Refl" (where *kxxx* is the menu you originally selected) and press the Left-Mouse Button.

2.1.3. In the submenu that appears, select "0.5 Ref" and press the Left-Mouse Button.

2.2. Position the baseline that will be used to generate the cross-section.

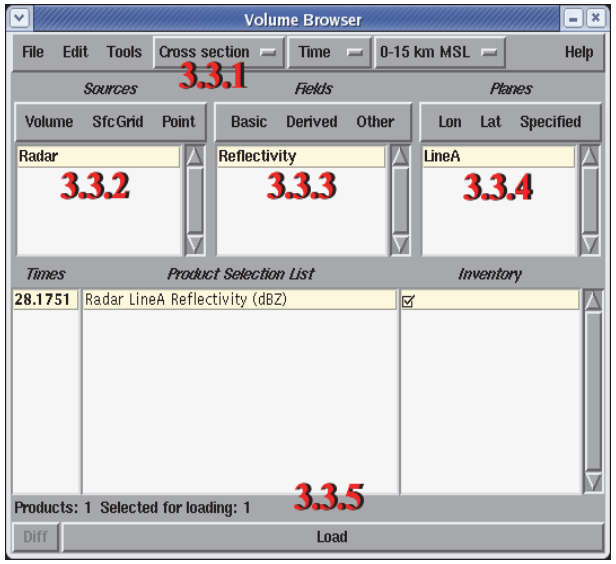
2.2.1. Select the Tools menu and press the Left-Mouse Button.

2.2.2. In the menu that appears, select "Baselines" and press the Left-Mouse Button.

2.2.3. In the main display panel, select one of the baselines that appears and position it where you want an RCS product to be generated.

2.2.4. Note which baseline, identified by letters A-J, you positioned for your RCS product.

2.3. Position the cursor in one of the side display panels and press the Right-Mouse Button to swap panes.



3.0. Use the Volume Browser to Load the Reflectivity Cross-Section

3.1. Select the Volume menu in the D-2D toolbar and press the Left-Mouse Button.

3.2. In the menu that appears, select "Browser..." and press the Left-Mouse Button.

3.3. Use the Volume Browser GUI to load the Reflectivity Cross-Section.

3.3.1. Change the pull-down menu in the toolbar to "Cross-Section".

3.3.2. In the Sources panel, select "Radar" from the Other menu and press the Left-Mouse Button.

3.3.3. In the Fields panel, select "Reflectivity" from the Other menu and press the Left-Mouse Button.

3.3.4. In the Planes panel, select the Baseline (labeled A through J) from the "Specified" menu that you positioned previously.

3.3.5. Select the "Load" button and press the Left-Mouse Button.

4.0. Load the Reflectivity Cross-Section as an image product

4.1. Select the Reflectivity Cross-Section product legend and press-and-hold the Right-Mouse button

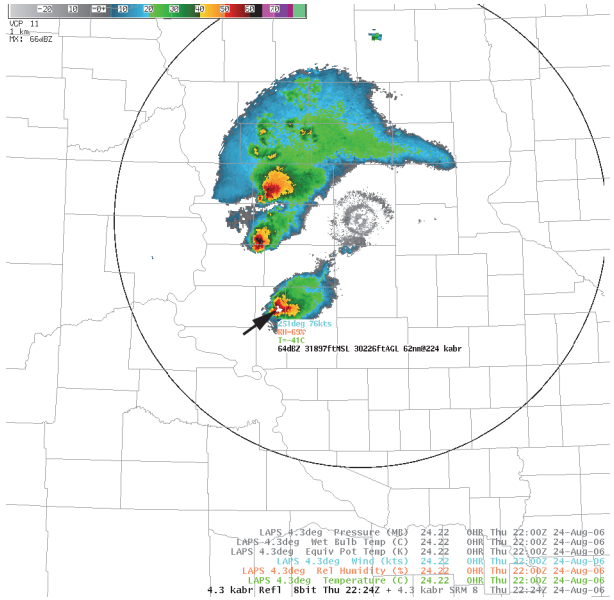
4.2. In the submenu that appears, select "Load as Image" and release the Right-Mouse button

5.0. Turn off the Reflectivity Cross-Section contours, leaving only the image product

5.1. Select the product in the product legend that does not have "Img" in the product name, and press the Left-Mouse button

6.0. Task Complete!

C. Standard Environmental Data Package



The Standard Environmental Data Package is one of the integrated radar environmental sampling tools in AWIPS. Loading the Standard Environmental Data Package from one of the standard model or observational input sources results in an invisible overlay for elevation-based radar products. The environmental sampling data are listed under the Volume menu in the “Std Env Data Package” section. The data from this overlay can be accessed using the standard D-2D sampling feature. By default, the environmental data visible via sampling is:

- Wind speed and direction,
- Relative humidity, and
- Temperature.

Other environmental data are also part of the Standard Environmental Data Package, but they are toggled off by default. These parameters are:

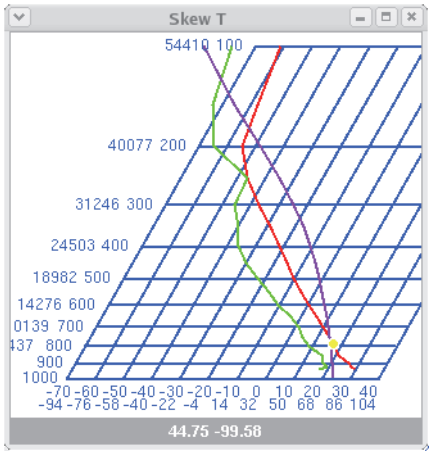
- Pressure,
- Wet bulb temperature, and
- Equivalent potential temperature.

While these parameters are initially invisible overlays, they can be made visible. By default, the Density for all of these overlays is set to 0. By setting the Density to a non-zero value, the overlay contours become visible.

When using the Standard Environmental Data Package to integrate environmental data with your base radar data analysis, it’s important to remember that the data values shown are only valid for the center of the radar beam. When a storm of

interest is located far from the radar, or there are significant vertical changes in some environmental parameters, then the data shown may not accurately represent the environment in the volume that the radar is sampling. More information on the Standard Environmental Data Package can be found in WES Exercise #3.

D. Pop-Up Skew-T



The other integrated radar environmental sampling tool available in AWIPS is the pop-up skew-T window. The skew-T window displays vertical profiles of environmental data at any point. The profiles are dynamic and change as you move the cursor around the D-2D display panel. The vertical profiles show the vertical temperature and dewpoint temperature profiles, the height of the current cursor location (indicated by a yellow dot), and the moist adiabatic curve for the LFC at that location.

To load the pop-up skew-T window, you need to select the “Popup SkewT” menu item from the Volume menu. After performing this task, you will also need to select a data source for this application. To select a source, press and hold the Right Mouse Button in the background of the main D-2D display panel to access a context sensitive menu. In this menu, you’ll need to select the “Sample Cloud Heights/Radar SkewT” submenu and then select a data source from the submenu. After performing this step, then the pop-up skew-T window will be visible.

When using the pop-up skew-T, it’s possible that the application window gets hidden behind the main D-2D window. To avoid this problem, use the application window’s configuration menu (located in the upper left-hand corner of the window) and select the “On Top” menu item. Choosing this setting will make sure the pop-up skew-T window is always the top level window, even if you are using the main D-2D window. This way, you can easily analyze the data in both the main D-2D window and in the skew-T.

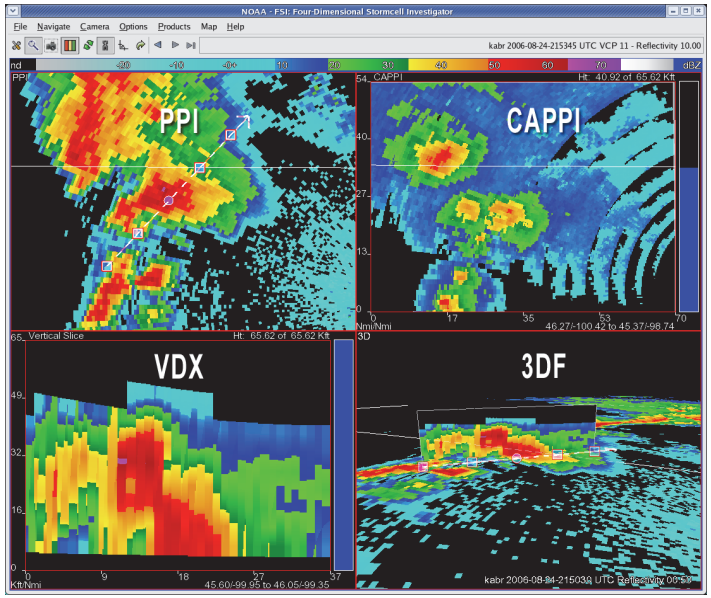
The possible utility of this application is obvious. Users get a snapshot of the vertical environmental profiles while simultaneously analyzing radar data. While this application can be quite useful, there is a significant caveat that needs to be taken into consideration when using the pop-up skew-T. While the popup skew-T shows the height of the beam center in the window, it doesn’t provide any indication of the actual beam size at that location. Forecasters should realize, for storms located far away from the radar, that the volume the radar is sampling may be several thousand feet across. In these situations, the temperature and dewpoint temperature data at these points in the window may not accurately represent the entire volume that the radar is sampling. More information on the pop-up skew-T can be found in WES Exercise #3.

Lesson 10: The Four-Dimensional Stormcell Investigator (FSI)

This lesson presents information on the Four-Dimensional stormcell Investigator (FSI) Extension for analyzing base radar data. The FSI Extension is based on the National Severe Storm Laboratory (NSSL) Warning Decision Support System - Integrated Information (WDSSII) and is accessed from within D-2D. This lesson will present the basics on this application. For a more detailed set of examples of how to perform certain tasks in FSI, access the DLOC Topic 1 WES Exercise #4 (The Four-Dimensional Stormcell Investigator) on your local office's WES machine.

Required WES Exercise #4 (The Four-Dimensional Stormcell Investigator (FSI))

A. FSI Basics

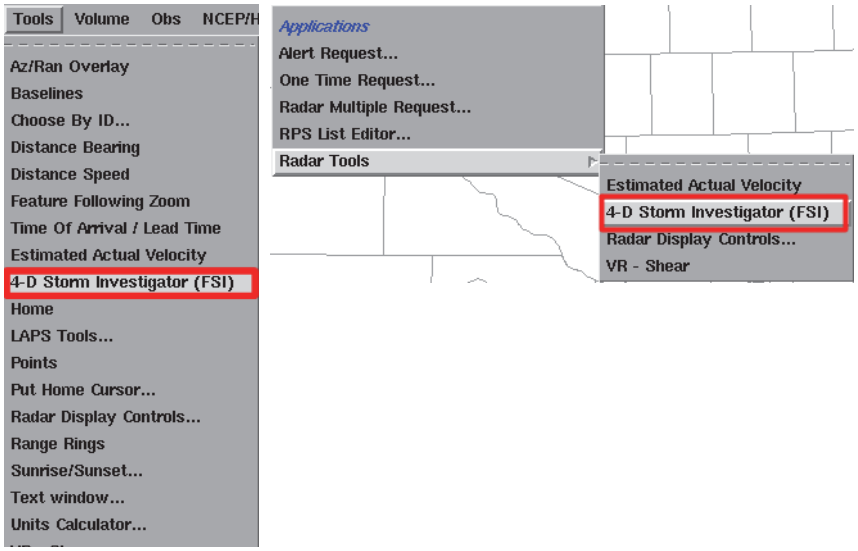


The FSI Extension to D-2D allows forecasters to view base radar data for a storm, or an area of storms, in a four-panel layout. Forecasters can view any of the four standard base data products (i.e., Reflectivity, Velocity, Storm-Relative Mean Velocity Map, and Spectrum Width), one at a time, from four different perspectives provided in each panel. These perspectives are:

- Upper Left - The Plan Position Indicator (PPI), or constant vertical elevation angle, Panel;
- Upper Right - The Constant Altitude Plan Position Indicator (CAPPI) Panel;
- Lower Left - The Vertical Dynamic Cross Section (VDX) Panel; and
- Lower Right - The Three-Dimensional Flier (3DF) Panel.

These different panels provide forecasters vantage points for analyzing base radar data that are unavailable anywhere else in the D-2D software (3DF) and also more dynamic and/or interactive analysis (VDX and CAPPI). FSI also has the benefit of a longer frame count (approximately 2 hours worth of volume data) than is available in D-2D. However, FSI is a system resource intensive application that is best used at specific points in the warning decision-making process. More details on this process will be covered in DLOC Topic 7 (Convective Storm and Evolution) and the DLOC Workshop.

B. Loading the FSI Extension from D-2D



The FSI Extension can be launched from within D-2D from two different locations:

- The Tools menu or
- The “Applications” section of any radar menu.

Regardless of which menu you use, there is a process you will want to follow prior to launching the application. First, you should load a Base Reflectivity or a velocity/reflectivity combination product in the main display panel. Use the products in this panel as a point of reference for which to launch the FSI Extension. Generally speaking, when you first launch FSI, you will want to identify a specific storm or area of storms that you want to interrogate more closely. Once you have identified those storms, then you will load FSI.

After you initially launch the application, you will need to press the Right-Mouse Button in the vicinity of a storm you wish to interrogate for the FSI Extension to open. If you forget, the product legend for FSI in the main D-2D display panel provides a hint. If your CWA has multiple dedicated radars, you will need to select the radar you want FSI to display at this point.

C. Using the FSI Extension

The FSI Extension displays data from any base moment (including SRM), but the same product appears in all four display panels simultaneously. The displays are linked so that when the user toggles a new product, zooms, or pans in one display, all of the other displays will update accordingly. Users can toggle between radar base products by using the following key-board shortcuts from the main typing area of the keyboard (i.e., not the numeric keypad):

- **Base Reflectivity** - “Z” or “1”
- **Base Velocity** - “V” or “2”
- **Storm-Relative Velocity Map (SRM)** - “S” or “3”

- **Spectrum Width** - “W” or “4”
- **Differential Reflectivity** - “D” or “5”
- **Correlation Coefficient** - “C” or “6”
- **Specific Differential Phase** - “K” or “7”
- **Hydrometeor Classification Algorithm** - “H” or “8”

The following sections provide a brief overview of each display panel, the general uses for both the menu bar and button panel items, and some other important points about FSI to know prior to working on WES Exercise #4.

i. The PPI panel

The PPI Panel displays an elevation-based radar product similar to what you’ve seen in the main D-2D window. Users can toggle up-and-down in elevation or back-and-forth in time to change the appearance of this display panel using the menu bar, button panel, or numeric keypad (more details on how to perform these tasks in Sections v-vii).

In addition to the base moment data, the PPI panel contains the vertical cross-section control tool. This tool is a dashed white line with five points that indicate and control the position of the vertical cross-section axis displayed in the VDX panel. You can press and hold on one of these points of the cross-section to dynamically adjust the image in the VDX display using the following controls:

- The circle at the middle of the cross-section allows the user to adjust the horizontal position of the entire axis;
- The square points at either end of the cross-section allows the user to adjust the end points of cross-section; and
- The square points between the end and center of the cross-section allow the user to rotate the axis around the center point of the line.

Learning how to quickly control both the product toggling and vertical cross-section control tool in this panel is critical for forecasters to use FSI effectively.

ii. The CAPPI panel

The CAPPI Panel allows forecasters to quickly visualize base moment data at a constant elevation. FSI allows forecasters to display CAPPIs and change their MSL height quickly. To adjust the height above MSL (AGL heights are not available in FSI) of the CAPPI, use the blue vertical bar immediately to the right of the display panel.

iii. The VDX panel

The VDX Panel shows a vertical cross-section of base data represented by the vertical cross-section control tool in the PPI and 3DF Panels. Changing the location, length, or orientation of the cross-section axis in either of the previously mentioned panels will result in the VDX Panel updating dynamically. In addition to altering the display with the vertical cross-section control tool, users can adjust the vertical scale of the cross-section by using the blue vertical bar immediately to the right of the display panel.

iv. The 3DF panel

The 3DF Panel plots both the vertical cross-section and either the PPI or CAPPI displays in true 3-D earth coordinates. As in the PPI panel, the vertical cross-section tool is visible in the 3DF Panel and can be used to dynamically adjust the display in the VDX Panel using the same controls as mentioned previously in the PPI Panel. The 3DF Panel allows forecasters to visualize WSR-88D volumetric data on a single display. Novice forecasters who are not familiar with viewing three-dimensional radar visualization products may require some time to become confident at interpreting data using the 3DF Panel.

v. Menu bar

The menu bar contains several menus:

- **File** - Used primarily for saving current or restoring default settings as well as to exit the FSI extension;
- **Navigate** - Contains a complete list of traditional volume navigation and some alternative volume browsing hot keys;
- **Camera** - Contains a list of some alternative display navigation hot keys;

- **Options** - Contains a list of additional display option hot keys;
- **Products** - Contains a list of product selection hot keys;
- **Map** - Map overlays can be added, hidden, removed, or configured here for all of the display panels; and
- **Help** - Contains an about screen for FSI.

vi. Button panel

The Button Panel contains several features that can be accessed by selecting the following buttons:

- **Preferences** - Used to open the “Edit Preferences” pop-up window;
- **Readout (Data Sampling)** - Toggles data sampling on/off;
- **Snapshot** - Opens the “Take Snapshot” pop-up window to make image captures of your FSI Extension;
- **Color Key**- Toggles the color key off/on under the FSI Button Panel;
- **Loop** - Toggles looping on/off (NOTE: Loop preferences are editing using the “Edit Preferences” pop-up window);
- **Auto-Update** - Toggles automatic radar data updates on/off;
- **Plan View**- Resets the viewing angle of the 3DF Panel to the default position;
- **Reset** - Restores the FSI Extension panels to the initial conditions of when you last launched FSI;
- **Back** - Steps the display panels back one volume scan while maintaining the current elevation angle;
- **Next** - Steps the display panels forward one volume scan while maintaining the current elevation angle;
- **Latest** - Steps the display panels forward to the current (or latest volume scan available) while maintaining a constant elevation angle; and
- **Radar Status Bar** - Continuously updating readout showing the date, time, VCP, and elevation angle of the most recently completed elevation scan from the radar and the product being viewed.

vii. Basic panel controls

When using the FSI Extension, there are some basic controls you will need to know to use the interface effectively. Some of the controls are primarily mouse-based while others primarily use the numeric keypad. The mouse-based controls allow the user to control the appearance of the displays at a single point in the volume. These mouse-based control features are:

- Zoom - Press and hold the Middle-Mouse Button while moving the mouse forward (zoom in) or backward (zoom out);
- Pan - Press and hold the Left-Mouse Button while moving the mouse to “pull” the image to the desired location;
- 3D Rotate- Press and hold the Left-Mouse Button and <SHIFT> key while moving the mouse forward (increase viewing angle) or backward (decrease viewing angle) to adjust the viewing angle in the 3DF Panel;

Similarly, the numeric keypad is the easiest way to navigate through the radar volumes. These numeric-keypad controls are (NOTE: For the following commands to work, you will need to have “Num Lock” toggled on):

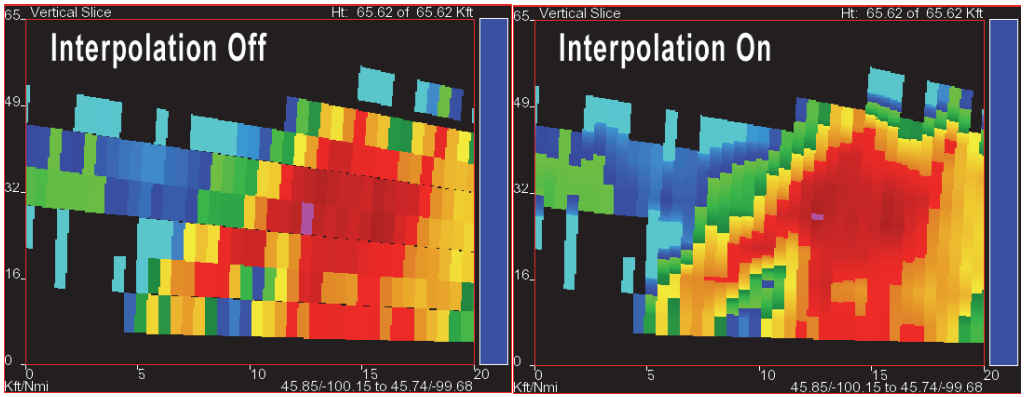
- “8” Key - Move up one elevation angle in traditional volume scan
- “2” Key - Move down one elevation angle in traditional volume scan
- “4” Key - Move backward one volume scan at constant elevation angle
- “6” Key - Move forward one volume scan at constant elevation angle
- “9” Key - Move up one elevation angle in virtual volume scan
- “3” Key - Move down one elevation angle in virtual volume scan
- “.” Key - Toggle between Reflectivity and Storm-Relative Velocity Map products
- “+” Key - Zoom camera view in
- “-” Key - Zoom camera view out
- “/” Key - Tilt camera view up in 3DF Panel
- “*” Key - Tilt camera view down in 3DF Panel

D. Other Important Issues with FSI

In addition to all of the previous features and controls discussed, there are a handful of other important items to mention related to FSI. These items are:

i. Interpolation

FSI allows users to toggle on data interpolation for the CAPPI, VDX, and 3DF panels. This interpolation feature is turned on by default. Interpolation can be toggled using the “I” keyboard shortcut or by using the Options Menu. More on the interpolation feature will be discussed in WES Exercise #4.

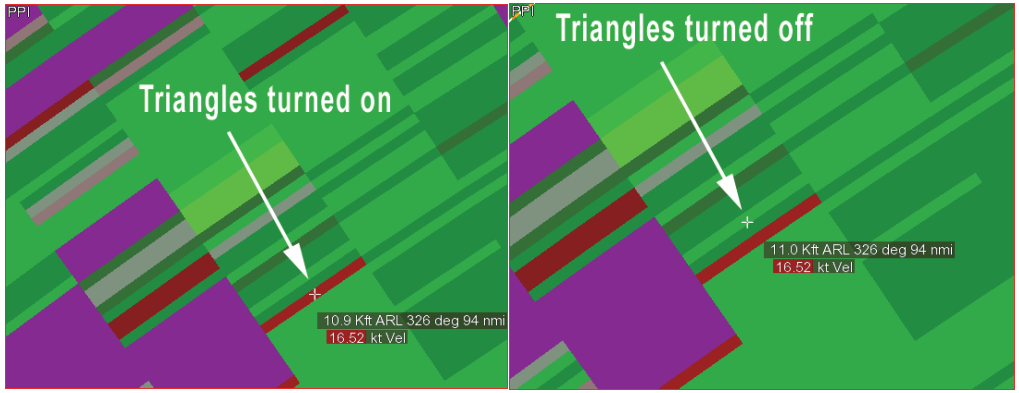


ii. City name labels

FSI allows the user to add various map overlays to all of the display panels. One of these overlays (Cities --> NAME) has been shown to severely limit the performance of FSI. It is recommended that you don’t plot this overlay in FSI.

iii. Using triangles for more accurate sampling

While you have to ability to toggle sampling on, the accuracy of that sampling will vary depending on one of your settings in the “Edit Preferences” window. That setting, called “Use Triangles over Textures” (found under Advanced Settings --> Display --> OpenGL), will result in more accurate sampling when turned on. However, there is a significant reduction in performance when this option is turned on. More on this issue with sampling will be discussed in WES Exercise #4.



E. TDWR in FSI

With AWIPS OB9.0, TDWR can be displayed in FSI if there is a TDWR in or near a forecaster's CWA. The primary advantage of TDWR in FSI is volumetric analysis using dynamic vertical and horizontal cross-sections. However, there are a few caveats you must remember when viewing TDWR in FSI:

- Some tilts are omitted to allow FSI to display the data
  - Long-range reflectivity
  - Four of the 0.5 degree scans
- First tilt of second sub-volume is adjusted in time
- Large data gaps in vertical can hinder volumetric analysis (use interpolation)

As a final reminder, D-2D will continue to bring in all of the TDWR data, so if a forecaster wants to continue to use all the TDWR data available, they will have to use D-2D. However, if a forecaster is interested in volumetric analysis of TDWR data (e.g. vertical cross sections), it can be done now in FSI.

Lesson 11: Panel Combo Rotate (PCR) and All Panel Sampling

This lesson presents information on the Panel Combo Rotate (PCR) and All Panel Sampling features new to AWIPS OB9.0. The PCR and All Panel Sampling features were originally designed for AWIPS to accommodate the future upgrade of the WSR-88D network to dual-polarization. This lesson, however, will present how PCR and All Panel Sampling can be used with the current products available in AWIPS. For more detailed uses on how to use PCR and All Panel Sampling, please refer to WES Exercise #5. An additional WES Exercise (#6) has been created to help you practice using the dual-polarization products.

Required WES Exercise #5 (Panel Combo Rotate (PCR) & All Panel Sampling)

Required WES Exercise #6 (Dual-Pol Radar Practice)

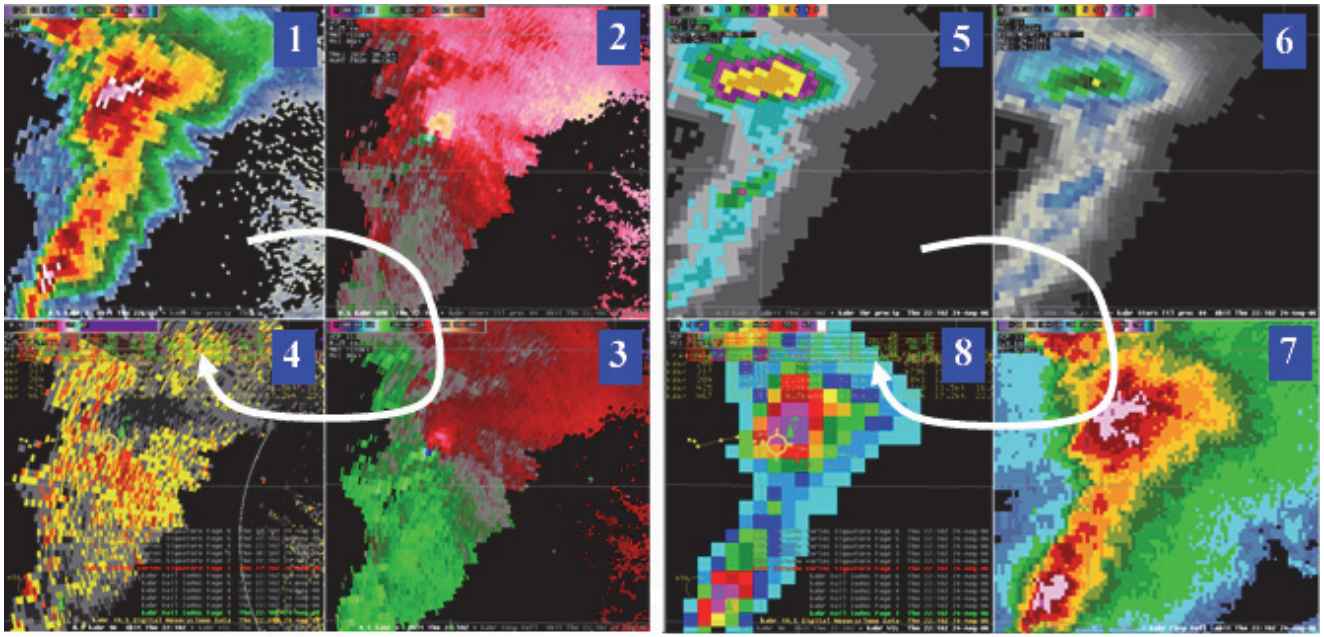
A. Panel Combo Rotate and All Panel Sample Basics

The Panel Combo Rotate and All Panel Sampling are two separate features in AWIPS, but they are designed to be used together. This section will describe the two features separately and then conclude with how they can be used together.

i. Panel Combo Rotate

The Panel Combo Rotate is used exclusively for image and graphic products loaded into a 4-panel layout in D-2D. In a 4-panel layout, a forecaster can load up to two image products per panel for a total of eight image products, and as many graphic products as needed. Using Panel Combo Rotate, a forecaster can then quickly cycle through these eight products on a single panel display with simple keyboard commands. When a forecaster loads eight image products in the 4-panel layout, they essentially load two 4-panel layouts. This can be thought of as Side A and B.

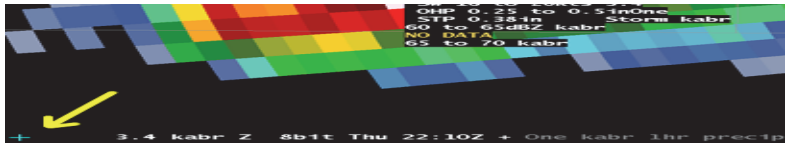
- **Side A -** First four products loaded
  - Numbered 1 - 4 (Top Left = 1, Top Right = 2, Bottom Right = 3, Bottom Left = 4)
- **Side B -** Second set of four products loaded
  - Numbered 5 - 8 (Top Left = 5, Top Right = 6, Bottom Right = 7, Bottom Left = 8)



SIDE A SIDE B

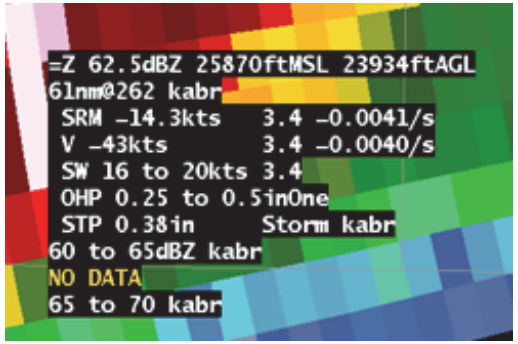
These products can be cycled through in order while in PCR mode, or a forecaster can access any particular product using its corresponding keyboard shortcut. To access a particular product, a forecaster needs to press one of the keyboard numbers 1 through 8 corresponding to its product number. For example, to see product number 5, press 5 on the keyboard.

Finally, a forecaster can identify when they are in PCR mode by noting the small “+” sign in the lower left of the single panel display.



ii. All Panel Sampling

After entering into Panel Combo Rotate, there is no way to visually compare the product visible with any of the other products loaded in the 4-panel display. All Panel Sampling helps mitigate this problem. When All Panel Sampling is turned on and a forecaster samples one of the products while in Panel Combo Rotate mode, the values from all eight products are displayed in the readout. The product values are listed in numerical order from top to bottom (i.e. product 4 will be listed 4th from the top), and the product currently being examined will have an equal sign to the left. One drawback with this feature is that some of the products do not have clear labels.



B. Entering PCR Mode and using All Panel Sample in D-2D

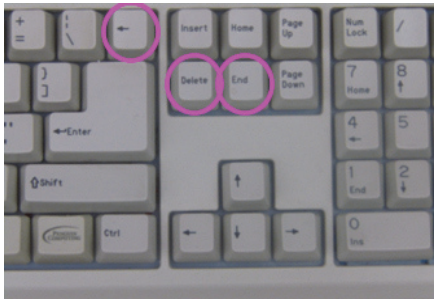
Accessing PCR mode and All Panel Sampling in D-2D is straightforward. The following task will show you how to enter PCR mode and cycle through the products. For more practice using PCR and All Panel Sample, please take WES Exercise #5.

Task: Use Panel Combo Rotate and All Panel Sample

This task demonstrates how to enter PCR mode, cycle through the products and use All Panel Sample, and exit PCR mode in D-2D.

Additional Assumptions:

- You have a four-panel Z/V combo loaded into the main display in D-2D.



1.0. Press the "Delete" key directly above the arrows on the keyboard to enter Panel Combo Rotate mode

2.0. Cycle through the products in order

2.1. Press the "Delete" key to cycle *forward* through the products in order

2.2. Press the "Backspace" key to cycle *backward* through each of the products in order

3.0. Access an individual product using the keyboard shortcuts

3.1. Load the 3rd product in the sequence by pressing the "3" on the keyboard

4.0. Turn on All Panel Sampling

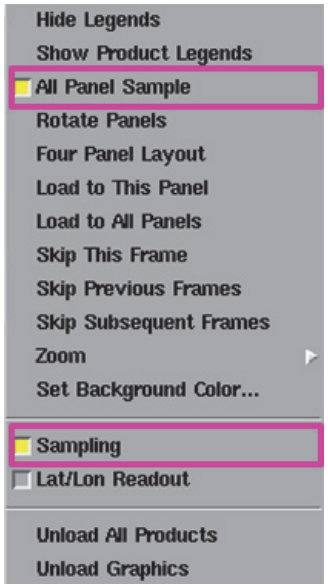
4.1. Right-click and hold over the current product and select "All Panel Sample" in the pop-up menu.

4.2. Right-click and hold over the current product and select "Sampling" in the pop-up menu.

4.3. Roam around the product display and note the various values from the other products as well as the current product value

5.0. Exit the PCR mode by pressing the "End" key above the keyboard

6.0. Task Complete!



C. Using the PCR and All Panel Sample

Though PCR and All Panel Sample were designed to accommodate the future upgrade of the WSR-88D network to dual-polarization, it can be used with the current suite of products to help a forecaster more quickly interrogate a storm. Some examples of where this might be useful include, but are not limited to:

- Three Body Scatter Spike (TBSS) detection
- Comparing One-hour precip (OHP) and Storm Total Precip (STP) with current reflectivity
- Comparing SRM and base V with reflectivity for rotational analysis and ground relative wind analysis
- Combining with Integrated Radar Sampling (IRES)

For a more thorough walkthrough of PCR and All Panel Sample, please refer to the AWIPS OB9.0 delta training and/or WES Exercise #5.

D. Other Important Issues with PCR and All Panel Sample

i. Memory issues

The amount of memory used at any particular time in D-2D is dependent upon how many images are loaded onto the screen at that time. PCR can help (or hurt) the memory issues with AWIPS. To help the memory issues, it is recommended that all of the forecaster's All Tilts procedures be consolidated into one PCR. Having PCR loaded in addition to multiple All Tilts procedures in other panes can slow down the performance of a workstation.

ii. Which Product am I Viewing?

While cycling through or perusing the different products in PCR mode, a forecaster may forget which product goes with which product number. This is because there is no indicator of what product number is currently being displayed. As a forecaster gains experience with PCR, they will develop a system of loading a PCR. Using the keyboard shortcuts should also mitigate this problem.

iii. Graphic Products

It was mentioned earlier that only eight image products can be displayed with PCR, but as many graphic products (e.g. TVS) can be loaded into each panel as can be tolerated by a forecaster. When a graphic product is loaded into a panel, it will be visible on both sides of the PCR. For example, if the top left panel has a Z/SRM combination with the TVS graphic overlaid, the TVS graphic will be visible in both product 1 and 5 in PCR mode.

Lesson 12: WarnGen Basics

This lesson provides some background information on WarnGen. While this lesson presents basic instructions, more details and examples are available in WES Exercise #7 (WarnGen).

Required WES Exercise #7 (WarnGen)

A. Setting Up the Main Display Panel Prior to Loading WarnGen

The primary tool in AWIPS for issuing short-term, text-based warnings is the application called WarnGen. WarnGen proficiency is critical to support effective warning operations.Prior to using WarnGen, you should configure a display panel in one of your D-2D windows to use in conjunction with WarnGen. In this display panel, you want to load useful product(s), significant maps, and the optimal number of frames prior to starting WarnGen. Having the wrong ones can cost precious time. Your office may already have a procedure bundle designed for loading products and maps into the main display panel prior to launching WarnGen. Whether you do or not, here are some important (but not all-inclusive) practices to know about setting up such a panel.

i. Keep the frame count at or below the default frame count of 12.

Six to ten frames is better, but you definitely want to have twelve or less frames.

ii. Load the products (and maps) in the display panel used to generate the warning.

For many short-fuse warning situations, the product is a 0.5^{o} Base Reflectivity and a Storm Relative Mean Velocity Map (or Base Velocity) combination product.

iii. Do not use an all tilts or four-panel products in the same display panel with WarnGen.

iv. Try not to clutter the display with extra maps or products.

If you think you may need certain products on the display in the future, consider loading the maps/products and then toggling them off so that they are not a distraction. Better yet, have the additional products in a separate display panel that you can monitor in the same D-2D window. The WarnGen display has one, and only one, purpose: To support issuing warnings.

v. Develop two-handed proficiency with the WarnGen storm motion tool.

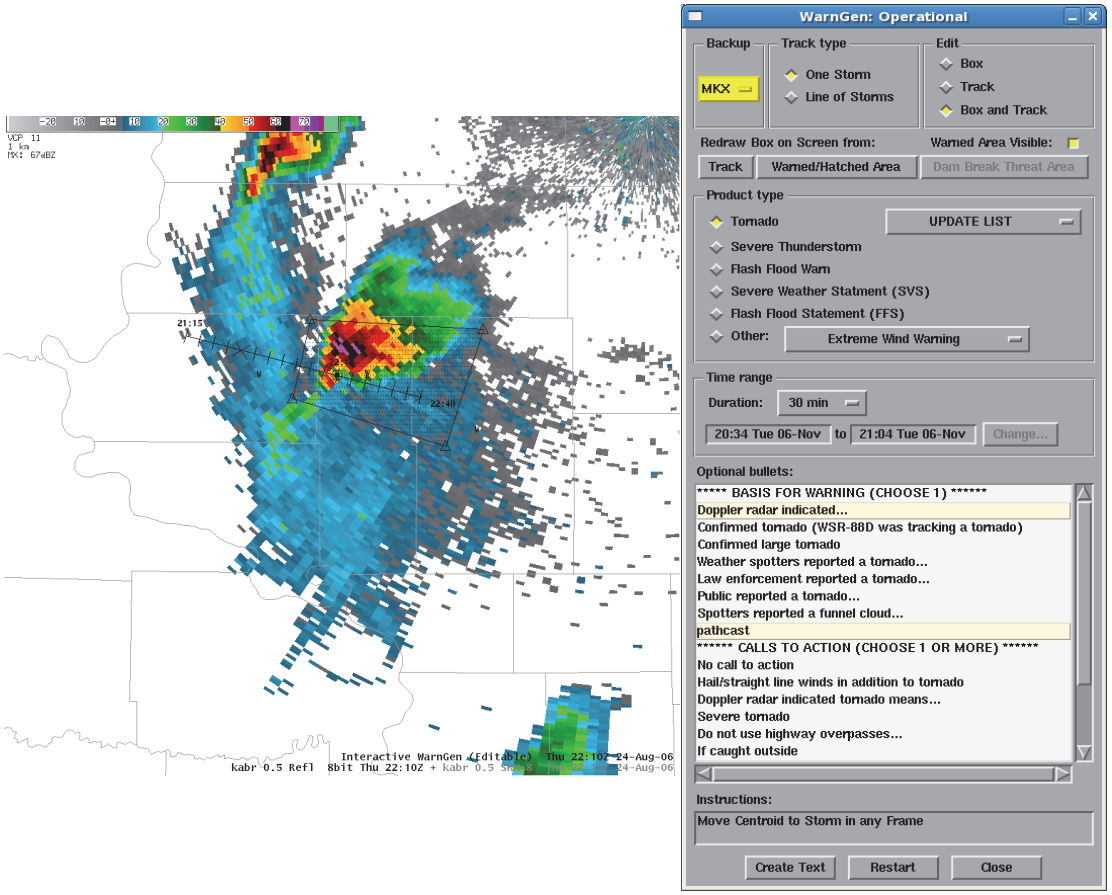
When generating most warnings, you will need to determine a storm motion with WarnGen. To become faster at using WarnGen, practice determining the storm motion using both hands (i.e., one hand using the mouse to move the feature tracker and the other hand using the arrow keys to step through the frames). With a little practice, you will become significantly faster at determining storm motion if you are proficient at using both hands in the process.

B. Starting WarnGen and Using the WarnGen GUI

The WarnGen application can be used with any D-2D window and can be run on multiple displays simultaneously. The button that launches WarnGen is bright yellow and located in the upper right-hand side of the D-2D window.

Once WarnGen is started, the WarnGen storm centroid marker appears in the center of the main display panel and the WarnGen GUI will appear in a separate window.

The storm centroid marker functions similarly to the Distance Speed tool in the Tools menu. Move the marker to the storm centroid, hook echo, or other trackable feature on both the last frame and a previous frame in the loop to generate a storm motion vector. In addition to the storm motion vector, a hatched polygon appears. This enclosed, hatched area represents the area included in the warning.



The WarnGen Dialog box provides the ability to easily customize several components of the warning (or follow-up product). From this interface, the user can choose many details including the type of warning, the duration of the warning, and customized statements specific to the current threat. After using the WarnGen GUI to customize the warning details for the current storm (or threat), the user creates the actual warning text by clicking the “Create Text” button at the bottom of the GUI.

Task: Starting WarnGen and Generating a Storm Motion Vector

This task demonstrates the basic steps of starting WarnGen in a D-2D window and using the storm centroid marker to generate a storm motion vector and warning polygon. While this task is designed to be performed on an operational AWIPS workstation, it is highly recommended that you only try these steps on a WES workstation or on **an AWIPS workstation set to practice mode in coordination with your local training officer**. Other WarnGen exercises are also available for use on your local WES machine using WES Exercise #7.

Additional Assumptions:

- That you have changed D-2D to practice mode for this exercise.

1.0. Select the WarnGen Button and Press the Left-Mouse Button.

2.0. Use the Storm Centroid Marker Tool to Determine the Storm Motion Vector.

2.1. Select the “Drag me to Storm” marker then press & hold the Left-Mouse Button.

2.2. Move the marker to the feature you want to track and release the Left-Mouse Button.

2.3. Step back several volume scans in the main display panel using either the arrow keys or the buttons in the toolbar.

2.4. Again, select the feature marker then press & hold the Left-Mouse Button.

2.5. Move the marker over the same feature you originally tracked in Step 2.2 and release the Left-Mouse Button

2.6. Review several frames of the loop forward and backward in time to ensure that the storm motion vector is accurate for the storm feature you are tracking.

- If the track is not satisfactory, keep repeating steps 2.1 through 2.5 to refine the storm motion vector.
- Depending on the feature you are tracking, this process can sometimes take several iterations before obtaining an accurate estimate.
- This vector is critical for the warning polygon and the warning text to be accurate!

3.0. Task Complete!

C. Customizing Your Warning Polygon

Besides determining the storm's motion for the warning and using the WarnGen GUI to configure important elements of your warning product, the other step you will normally perform prior to creating your warning text is to adjust the shape of your warning polygon. The following are the most critical tasks to perform when altering the shape of your WarnGen polygon from its default state.

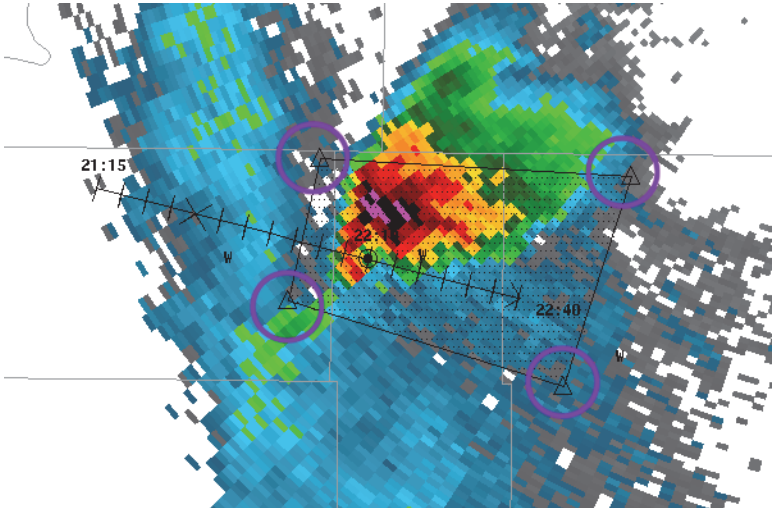
i. Redraw polygon based on storm track

After you determine a storm motion using WarnGen, you will first want to redraw the polygon to fit the new storm track. The easiest way to do this task is to use one of the "Redraw Box on Screen" buttons in the WarnGen GUI. After creating the storm track, select the "Track" button in the section of the GUI to redraw a default warning polygon oriented along the storm motion track and containing the storm centroid dot for the most recent volume scan available in the main D-2D display.

ii. Moving vertex points

In most instances, you will only need to customize your warning polygon by moving the default vertex points to cover a larger, smaller, or different area. The vertices can be moved with a simple "click and drag" action using the Left Mouse Button. The warning polygon, including stippling, will update automatically.

When reshaping your warning polygon in this manner, remember to include all areas that are at risk of experiencing severe weather covered by that warning type. In the case of a single tornado warning issued for a storm, make sure the warning polygon includes the tornado risk area as well as any areas at risk for severe hail or straight-line winds, too. In general, when unsure of how to draw a warning polygon, it's better to make it a little bit bigger than a little bit smaller.



Additionally, if you are warning for a storm where there is significant uncertainty as to the storm motion track, account for that uncertainty in your warning polygon by making the line segment at the far end (i.e., farthest from the storm) of your warning polygon longer than the line segment at the beginning (i.e., nearest to the storm) to incorporate that uncertainty into your warning.

iii. Adding or removing vertex points

There will be some occasions where you will want to add vertices to your warning polygon. Most often, these situations will involve line warnings with bowing segments or single storm warnings where you want to account for storm motion uncertainty or multiple threat areas that may have differing storm motions.

New vertices are added to the warning polygon using a context relative menu accessed by selecting the warning polygon line segments with a Right Mouse Button "click and hold". In the menu that appears, just select the "add vertex" option to add a new point to the warning polygon. Make sure, when using this feature, that you select the line segment in the warning where you want to add the additional vertex. After selecting this option, you will see a new vertex linked to the cursor. Just press your Left Mouse Button at the location you desire for the new vertex and the new point is located there.

Vertex points are removed from the warning polygon using the same context relative menu. Instead of selecting a line segment, you select the vertex you wish to remove and then "click and hold" with the Right Mouse Button. In the menu that appears, select "remove vertex" to remove the point from the warning polygon. Generally speaking, you should always have at least four points in your warning polygon. So, you should only remove a vertex if you are at a point after you have already added one to your warning polygon.

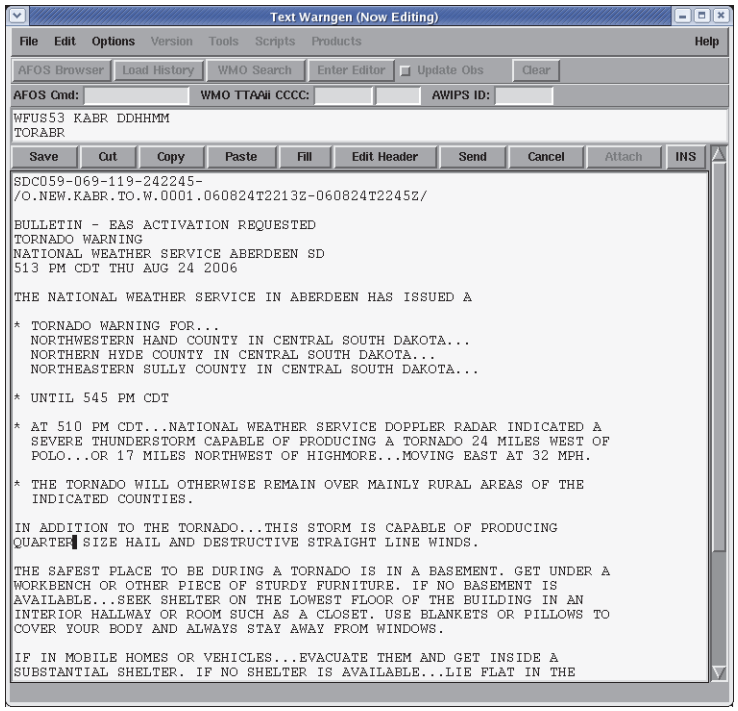
iv. Restoring polygon to default configuration

When you are customizing a polygon in WarnGen, speed is critical. Everyone, even veteran warning forecasters, will occasionally draw a warning polygon one way and then realize, prior to sending the warning, that they want to draw the warning boundaries differently. Depending on the complexity of the changes you make to a warning polygon, sometimes it's faster to just start over from scratch. The easiest way to proceed, especially if you are still comfortable with the storm motion, is to select the "Track" button from the "Redraw Box on Screen from" section of the WarnGen GUI.

D. Using the Text Window

Using the customized settings in the WarnGen GUI, WarnGen translates the information into a text product that is displayed in a text window on the Text Display. The auto-generated text contains the storm speed and direction, the counties and cities affected by the warning/advisory, the valid times of the product, the warning/advisory body text (including any optional bullets selected in the GUI), and additional code to help our partners to efficiently process and disseminate the warning/advisory. The text appears in an editor window for final review before issuance.

NOTE: Edits made to product text in the editor window should be limited to items such as forecaster name/initials, call-to-action text, etc. If changes are warranted for items such as storm motion, warned counties, or Latitude/Longitude points, close the editor window and make changes using the D-2D and WarnGen graphical tools, then recreate the text.



Lesson 13: Flash Flood Monitoring and Prediction (FFMP) Basics

This lesson presents information on the Flash Flood Monitoring and Prediction (FFMP) application and the High-resolution Precipitation Estimator (HPE) and the High-resolution Precipitation Nowcaster (HPN). While this lesson presents the basics, more detailed tasks and examples are included in WES Exercise #8(Flash Flood Monitoring and Prediction) on your local WES machine.

Required WES Exercise #8 (Flash Flood Monitoring and Prediction (FFMP))

A. About FFMP

The Flash Flood Monitoring and Prediction system is an integrated suite of multi-sensor applications that detects, analyzes, and monitors precipitation and generates short-term warning guidance for flash flooding automatically within AWIPS. FFMP conducts its precipitation analyses on a basin-scale, meaning that all of the calculations are done over the area of a drainage basin. Because of its ability to combine multiple measurements of observed rainfall with flash-flood guidance on a basin-level into a single interface that the AWIPS operator can monitor, being proficient in using FFMP can significantly enhance operator efficiency in warning operations.

B. Starting FFMP

All of the FFMP product suite products are available underneath the SCAN menu in D-2D. The FFMP products are grouped together in the “FFMP” section and they are grouped together by quantitative precipitation estimate (QPE) input source. FFMP can be configured to use any of your WFOs dedicated radars as a QPE source or a gridded, multi-sensor QPE source that is defined by AWIPS configuration files. The standard gridded, multi-sensor QPE source for FFMP is the High-resolution Precipitation Estimator (HPE).

After selecting the “FFMP Image/Basin Table” product, FFMP displays a GUI, called the FFMP Basin Table, and an interactive image in the main display panel of D-2D. It may take several moments for FFMP to load as it creates the Basin Table GUI. If no data are available to display, the AWIPS operator is informed that FFMP will not load.

Task: Loading the FFMP Basin Table

This task demonstrates how to load the FFMP Basin Table in D-2D in preparation for using the GUI. Besides this simple task description, several other sample tasks can be performed on your office’s WES workstation in the WES Exercise #8 (distributed with your DLOC Student Guides) on your local WES machine. Practicing those exercises will result in a more thorough understanding of how FFMP works.

Assumptions:

- None

1.0. Select the SCAN Menu in the D-2D Display and Press the Left-Mouse Button.

2.0. In the Menu That Appears, Select the “FFMP *kxxx* Display” for a Particular Radar and Press the Left-Mouse Button.

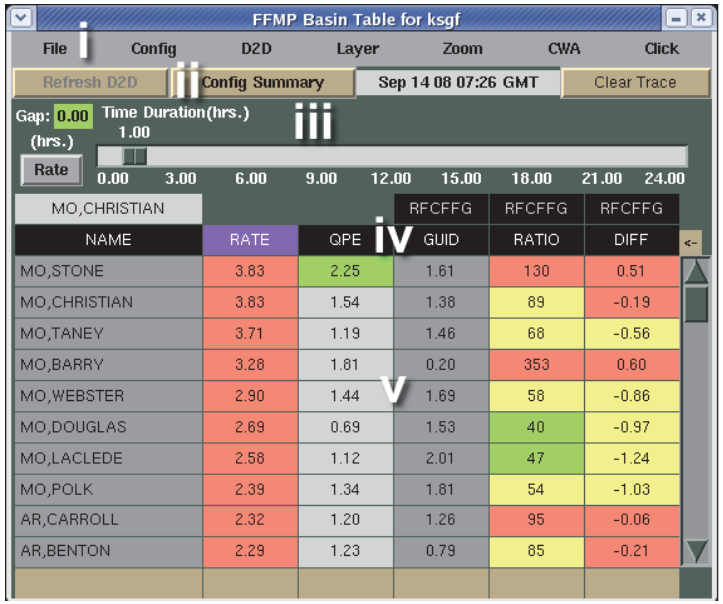
3.0. Task Complete!

C. The FFMP Basin Table

The FFMP Basin Table contains comprehensive data on all the drainage basins in your CWA at multiple spatial scales. Many options are available in this GUI. Time and practice are required for the novice operator to become familiar with all of the functionality.

The GUI is divided into five different sections, each discussed below.

i. Menu bar



The Menu bar contains numerous menu buttons that allow users to access many functions and features in FFMP. It may take novice users some time to become familiar with all of the features located under these menus. Here is a brief description of each menu:

- File - Used primarily to save or retrieve FFMP configuration settings.
- Config - Allows users to change the FFMP configuration settings for Link to Frame (i.e., time matching between FFMP Basin Table and main D-2D display), Worst Case (aggregate FFMP data will show worst case data vs. average), and Auto-Refresh.
- D2D - Changes what attribute is used to fill county and basin level plots in the main D-2D display.
- Layer - Allows users to change how FFMP Basin Table and Color Image aggregate (i.e., average) data.
- Zoom - Changes settings for how FFMP Basin Table and Color Image behave when a user selects a county in the Basin Table.
- CWA - Allows users to trim the Basin Table and Color Image down to only counties and basins in a particular CWA.
- Click - Configures interactivity available to users when they click on the Color Image in the main D-2D display.

ii. Utility bar

The Utility bar contains two buttons (Refresh D2D and Config Summary) and the date and time for the currently displayed data. Each time you change a display setting in the FFMP Basin Table, unless auto-refresh is turned on, you will need to select the “Refresh D2D” button to update the Color Image in the D-2D main display. By selecting the “Config Summary” button, you display a pop-up window with the current settings for several configuration settings in FFMP.

iii. Timing Section

The Timing section of the FFMP Basin Table allows users to configure and access information about the time duration of data being displayed in the Table Body and Color Image. The Time Duration slider bar allows users to choose the time window to be displayed in 15-minute increments. The “Gap” value indicates the cumulative amount of time (in hours) that data are not available for the specified duration window. Lastly, the “Rate” button toggles on/off the display of instantaneous precipitation rate information (i.e., Time Duration = 0 hrs) in the Color Image display.

iv. Attribute column titles

The attribute column titles are the labels designating which attributes are displayed in the Table Body. Selecting the Title of an attribute sorts the data in the Table Body by that column. If a county’s or basin’s data for that attribute falls below a predefined “Filter” value, that county or basin will not be displayed in the Table Body. The “Filter” value, as well as other threshold values used to color code the data in the Basin Table, can be accessed and/or edited in the Attribute Threshold GUI. This GUI is accessible for each attribute, except flash flood guidance, by selecting an attribute column title with a Right Mouse Click.

FFMP allows the user to configure the attributes displayed in the Table Body by using the Attribute Inclusion GUI. This window is accessed by selecting the small khaki arrow button to the right of all the Table Body column titles.

v. The Table Body

FFMP lists the precipitation and flash flood guidance data for each drainage basin in the Table Body. If there is no rainfall over all the geographic entities for the specified precipitation data source and time duration, the table indicates “NA”. The D-2D display is linked to the table. After pressing the Left-Mouse Button on an identifier in the “area_Id” column of the Table Body, D-2D zooms and re-centers on that particular county or basin and places an “X” at the centroid of that geographic region.

D. High-Resolution Precipitation Estimator (HPE) & High-Resolution Precipitation Nowcaster (HPN)

i. High-Resolution Precipitation Estimator (HPE)

The High-resolution Precipitation Estimator (HPE) uses multiple radars to generate its precipitation estimates that can be used as input into the FFMP. It works by ingesting reflectivity and storm total precipitation from many WSR-88D radars configured for use in and around a forecaster's CWA. From the multiple reflectivity and storm total precipitation inputs, the HPE creates a mosaic of rainfall rates and accumulations on a mesh grid of 1 km x 1 km at intervals of at least 5 minutes. Two major advantages for having the HPE are:

- The rainfall rate and accumulations are computed from the radar closest to that particular point, thus providing the estimate that is closest to the ground.
- Can be used as input into FFMP meaning only one instance of FFMP needs to be open instead of one instance of FFMP for each radar of interest.

If the HPE is over or underestimating what actually is occurring, a bias can be applied to the original HPE to compensate for this. This referred to as biasHPE. For more information on the HPE, refer to the AWIPS OB8.3 training.

ii. High-Resolution Precipitation Nowcaster (HPN)

The High-Resolution Precipitation Nowcaster (HPN) is a gridded forecast of precipitation rates and accumulations provided every 15 minutes out to 1 hour. The primary input into the HPN is HPE or biasHPE. The HPN works by first computing a storm motion vector by comparing the current HPE precip rates with the HPE precip rates from 15 minutes prior. The HPN then uses this motion vector to extrapolate forward in time the current precip rates every 15 minutes out to 1 hour. From the forecasted precip rates, a forecasted 1-hour accumulation is computed. The resolution of the HPN (4 km x 4 km) is coarser than the HPE (1 km x 1km).

This gridded forecast of precipitation rates and accumulations can be input into FFMP to evaluate potential scenarios for basins exceeding flash flood guidance (FFG). The primary advantage of the HPN over SCANQPF into FFMP is that the HPN does not truncate at 0.7 in/hr.

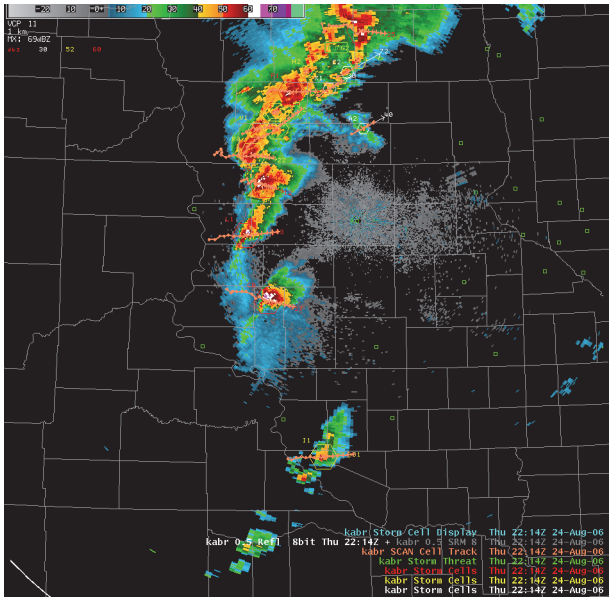
For more information regarding the HPN, please refer to the AWIPS OB9.0 training.

Lesson 14: System for Convection Analysis and Nowcasting (SCAN)

This lesson presents information on the System for Convection Analysis and Nowcasting (SCAN) application. While this lesson presents the basics, more detailed examples are included in WES Exercise #9 on your local WES machine.

Required WES Exercise #9 (System for Convection Analysis and Nowcasting (SCAN))

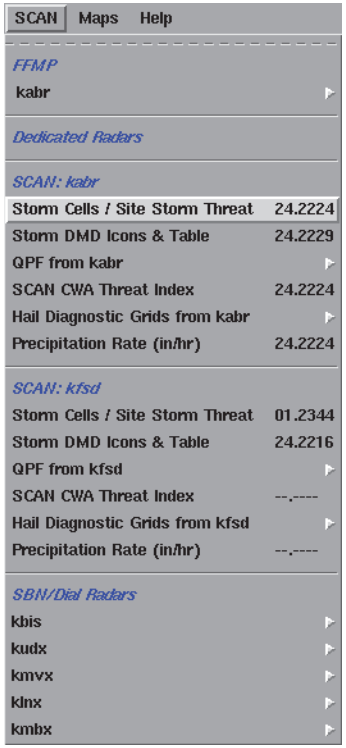
A. About SCAN



The System for Convection Analysis and Nowcasting (SCAN) is an application that integrates data from multiple input sources to generate algorithm output and help forecasters detect, analyze, and monitor convective storms within AWIPS. SCAN algorithms provide deterministic and probabilistic information on storms in their area to supplement standard base radar product and environmental parameter data interrogation. SCAN's automated event monitoring was developed to assist forecasters in increasing warning lead times, reduce missed events, increase forecaster situational awareness, and reduce forecaster fatigue during warning situations.

For novice forecasters, SCAN should be used with caution. The SCAN Storm Cell Table and Display provide extensive information on numerous storms that can be difficult for experienced forecasters to integrate into their warning decision-making process. If not configured properly (i.e., if the default settings are used), SCAN can overstimulate a novice forecaster's visual and auditory senses with its flashing cells and beeping alarms. Generally speaking, there are two areas where SCAN has been found to be useful for proficient warning forecasters who incorporate it into their warning decision-making process: For looking at storm trend graphs and as a "safety net". More will be said on these subjects in Section C of this lesson.

B. Starting SCAN



All SCAN products (including the Storm Cell Table and Display) are loaded from the SCAN menu in D-2D. All SCAN products are grouped together by radar input source. For the two uses discussed in Section A (viewing storm cell trends and using SCAN as a “safety net”), load the “Storm Cells/Site Storm Threat” menu option for your radar of interest. Loading this product will display the SCAN Storm Cell Table (in a separate window) and Display (in the main D-2D display panel). When loading this product, you will likely want to load a base reflectivity (or even a composite reflectivity) product into this same display to better visualize what storms SCAN is triggering on at a given time.

If your CWA has multiple dedicated radars that provide optimal coverage of certain areas, you will need to be careful which radar source you use for loading SCAN. You don’t want to load multiple instances of SCAN, so you will need to have an idea of your primary threat areas and use that information to decide which dedicated radar works best for the situation on that day.

C. Using SCAN

Because SCAN can be overwhelming, it’s best to start slowly. It’s best for novice forecasters to focus on the most commonly performed tasks in SCAN. Learning these tasks will help you decide how you might want to integrate a tool like SCAN into your decision-making process.

Recent user surveys by the NWS Meteorological Decision Laboratory (MDL) suggest that the most common uses for SCAN are to:

- Analyze storm cell trend graphs for various storm-based parameters and
- Use the SCAN Storm Cell Table and Display as a “safety net” to alert forecasters about strong (or rapidly developing) storms that may have escaped their detection previously.

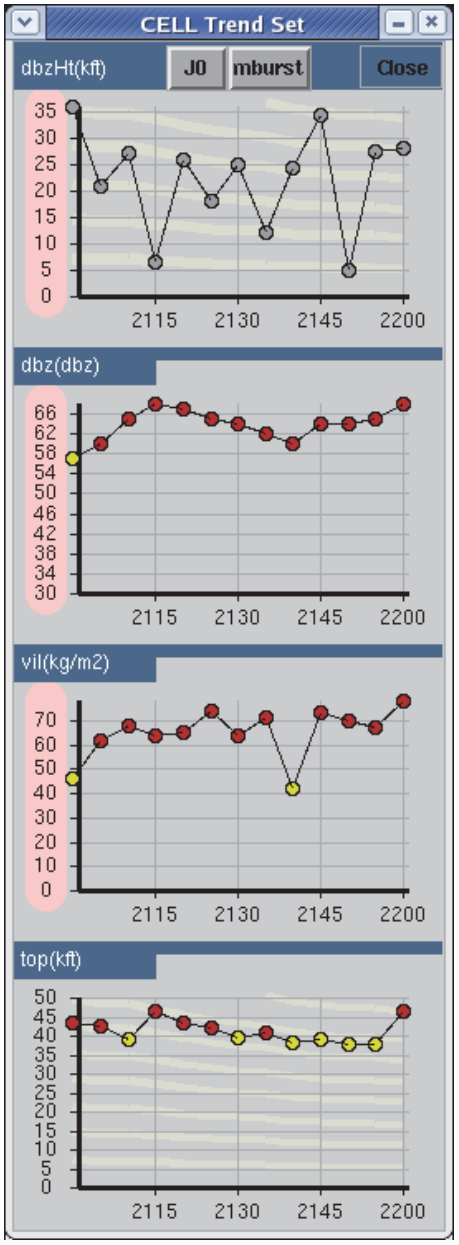
The following sections will discuss each of these tasks.

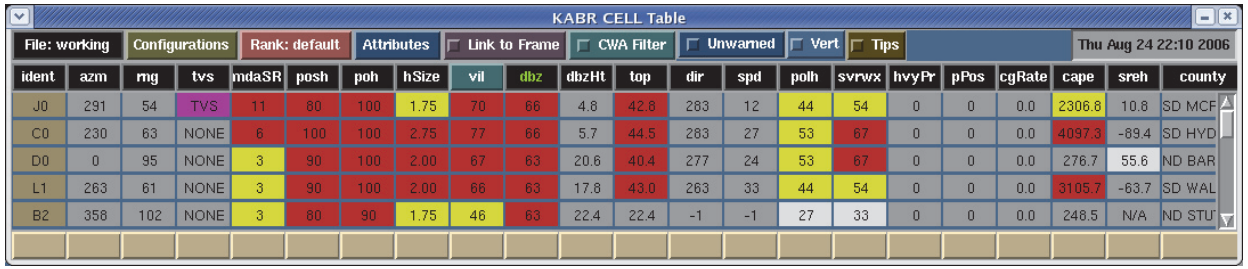
i. Storm cell trends

SCAN allows users to create cell trend graphs for any storm ID in the SCAN Storm Cell Table by selecting the ID with the Right Mouse Button. These trends display in a stand alone window, with the exact trends included depending on your current configuration settings. Use the “Configurations” button in the SCAN Storm Cell Table to either change the active trend set (Trend Sets --> Define Active Trend Set) or to create/edit a trend set (Trend Sets --> Create/Edit Trend Set). If you change the active trend set, you will need to reload any desired cell trend sets to see the update information.

When using SCAN cell trends, it’s important to understand what information is being shown in the cell trends. Until you get familiar with a particular trend set, make sure to routinely double-check the parameter name in each cell trend. The parameters plotted here are the same data that appear in the SCAN Storm Cell Table. If you are unsure of exactly which parameters are included in a current trend set, positioning your cursor over the trend set name will show a pop-up “hint” box with a list of all the parameters included in that trend set. This feature can be very helpful in differentiating between some trend sets with similar names (e.g., “base” and “base1”).

An additional feature, which can be seen in the graphic to the right, is that height-based cell trend windows include graphical information about the elevation angles available for the current volume scan. These graphics provide qualitative feedback about how the height-based data compare to the altitude of the radar beams at that time and location.





ident	azm	rng	tvs	mdaSR	posh	poh	hSize	vil	dbz	dbzHt	top	dir	spd	polh	svrwx	hvyPr	pPos	cgRate	cape	sreh	county
J0	291	54	TVS	11	80	100	1.75	70	66	4.8	42.8	283	12	44	54	0	0	0.0	2306.8	10.8	SD MCF
C0	230	63	NONE	6	100	100	2.75	77	66	5.7	44.5	283	27	53	67	0	0	0.0	4097.3	-89.4	SD HYD
D0	0	95	NONE	3	90	100	2.00	67	63	20.6	40.4	277	24	53	67	0	0	0.0	276.7	55.6	ND BAR
L1	263	61	NONE	3	90	100	2.00	66	63	17.8	43.0	263	33	44	54	0	0	0.0	3105.7	-63.7	SD WAL
B2	358	102	NONE	3	80	90	1.75	46	63	22.4	22.4	-1	-1	27	33	0	0	0.0	248.5	N/A	ND STU

ii. SCAN as a “safety net”

Many forecasters who utilize SCAN primarily use it as a “safety net”. They load the SCAN Storm Cell Table and Display into a D-2D panel and check the table and display occasionally to ensure there are not any storms approaching warning-criteria that have escaped their attention. If a storm they have not been monitoring appears at the top of the table list, has been identified as having a TVS when tornadoes were not considered a primary threat, etc., then the WFO staff will start investigating the base radar and environmental parameter data for that storm in greater detail.

The exact parameters and/or thresholds you use for this type of SCAN use will vary greatly from office to office, or even from forecaster to forecaster. If you do plan on using SCAN in this manner, you will want to customize the “CELL Alarm Thresholds” to ensure that any SCAN alarms that trigger are significant for your usage. We also suggest that, if it is turned on, that you turn off the “Bell” so that the SCAN alarms are not audible (and do not irritate your co-workers). Whether or not you use SCAN in this manner, your need for the “safety net” should decrease as you gain more expertise working convective, severe-weather events.

You have now completed Part 3 (Radar-Related Tools/Products for Storm Interrogation) for Topic 1. Please go to the LMS (https://doc.learn.com/noaa/nws) and complete the quiz before continuing on with the next lessons.

Lesson 15: Displaying Text Products in a Text Window

This lesson provides instructions on how to use AWIPS text windows to display a variety of text products. These products can be alphanumeric radar products generated by the WSR-88D or any of the text products generated by a WFO that are currently in the local database.

A. Displaying Alphanumeric RPG Products

While most products generated by the WSR-88D Radar Product Generator (RPG) can be displayed as graphical or image products in D-2D, some products contain textual information designed for display in a text window. These products are often referred to as Alphanumeric RPG Products. Some of these products are simply text products (e.g., Free Text Message) while others contain textual information embedded within a graphic product and can only be displayed in a text window (e.g., adaptable parameters of the Tornado Vortex Signature). Either way, to display this information you need to know which products can be viewed in a text window and how to do so.

Here is a list of the different alphanumeric RPG products you can view in a text window (including the three letter identifier for that product):

Alphanumeric RPG Products That Are Viewable in a Text Window

Product Name	Three-Letter Identifier
Free Text Message	FTM
Hail Index	HAI
Mesocyclone	MES
One Hour Precipitation	OHP
One Hour Snow Depth	OSD
One Hour Snow Water Equivalent	OSW
Product List	PTL
Radar Coded Message	RCM

Alphanumeric RPG Products That Are Viewable in a Text Window

Product Name	Three-Letter Identifier
Storm Structure	SST
Storm Total Precipitation	STP
Storm Total Snow Depth	SSD
Storm Total Snow Water Equivalent	SSW
Storm Track Information	STI
Supplemental Precipitation Data	SPD
Three Hour Precipitation	THP
Tornado Vortex Signature	TVS
User Alert Message	USM
User Selectable Snow Depth	USD
User Selectable Snow Water Equivalent	USW
VAD Wind Profile	VWP

The steps for displaying these products are shown in the following task that covers how to view an STI product.

Task: Loading the Alphanumeric Information for a STI Product

This task demonstrates how to use a text window to access the attribute and adaptable parameter information embedded within a STI product.

Additional Assumptions:

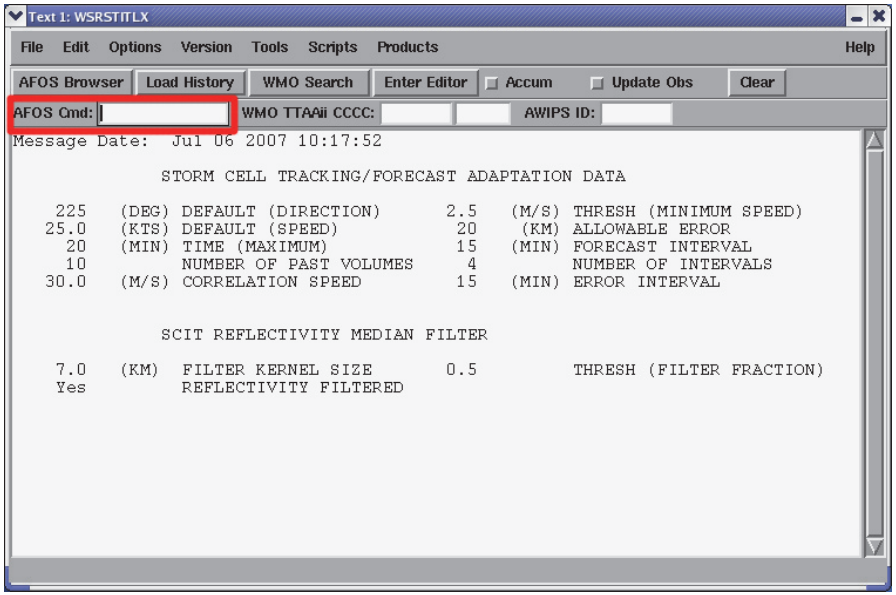
- The AWIPS database of radar products currently contains a STI product.

1.0. Choose an Open Text Window (or Open a New Text Window) on the AWIPS Workstation.

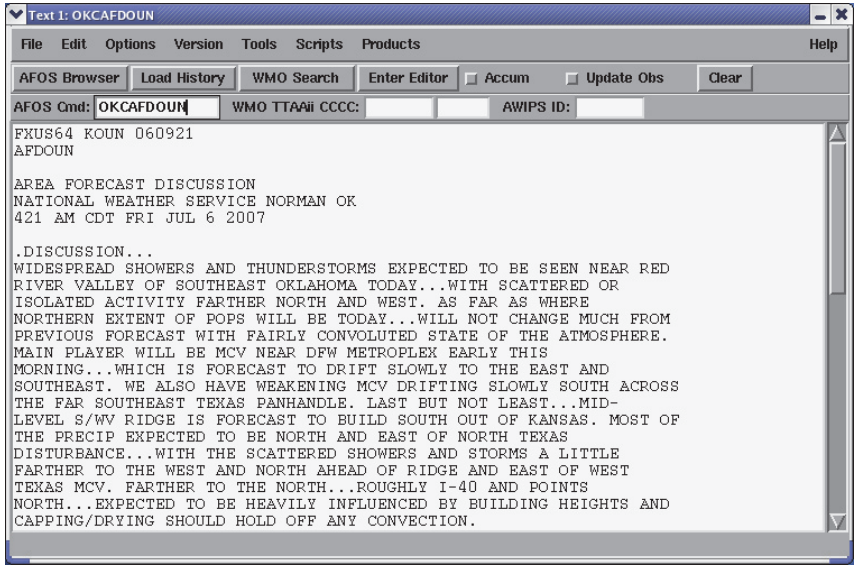
2.0. In the "AFOS Cmd:" Text Field, Enter the Following Text: "WSRSTI*XXX*", Where *XXX* is the Last Three Letters of the RPG ID and Press the <Enter> key.

- Request any desired RPG alphanumeric products in a similar fashion.
- Swap "STI" with the three-letter identifier for the desired alphanumeric product.
- Alphanumeric products from other radars in your local AWIPS database are obtained by switching the last three letters to a different RPG ID.

3.0. Task Complete!



B. Displaying Office Text Products



In addition to RPG alphanumeric products, the AWIPS text window can display any text product currently in the AWIPS database. These products may be issued by your local office or by neighboring offices which are pertinent to your operations.

There are several ways to access these products in a text window. Like RPG alphanumeric products, the nine-letter ID for a product in the “AFOS Cmd:” entry field retrieves all instances of that product from the database. Alternatively, the AFOS Browser provides a GUI used to select the Node, Category, and Designator from menus that construct the nine-letter ID for a text product. The AFOS Browser is particularly useful for loading less common products. Lastly, you can use the Load History to open text products that have been viewed previously on that AWIPS workstation.

Note: Because this task accesses a current text database, this task must be performed on a live AWIPS workstation.

Task: Using the AFOS Browser to Load an Area Forecast Discussion

This task demonstrates the steps for using the AFOS Browser to view an Area Forecast Discussion (AFD) from your local office AWIPS database.

Additional Assumptions:

- There is currently an AFD product in your local AWIPS database.

1.0. Select an Open Text Window (or Open a New Text Window) on the AWIPS Workstation.

2.0. Select the "AFOS Browser" Button from the Text Window Toolbar and Press the Left-Mouse Button.

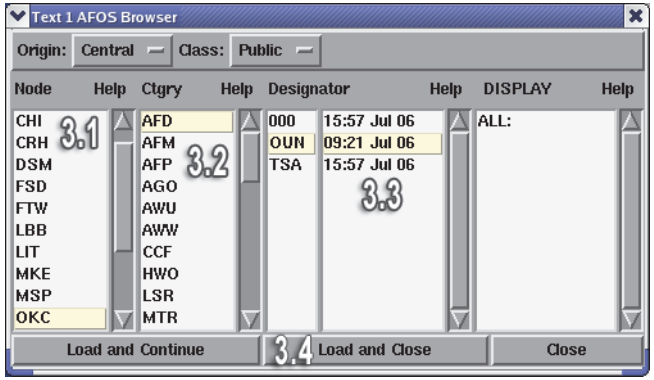
3.0. Select the Product from the AFOS Browser

3.1. In the AFOS Browser, select the Node from the first menu for the product you want to display and press the Left-Mouse Button.

3.2. In the second menu, select the Product Category for the product you want to display and press the Left-Mouse Button.

3.3. In the third menu, select the Office Designator for the product you want to display and press the Left-Mouse Button.

3.4. Select the "Load and Close" button (or the "Load and Continue" button if you want to load other text products after this example) and press the Left-Mouse Button.



4.0. Task Complete!

Lesson 16: AWIPS Keyboard Shortcuts

This lesson provides a list of keyboard shortcuts for the D-2D interface, the FSI Extension, and the Text Editor windows.

D-2D File Menu Shortcuts

Shortcut	Description
<CTRL>+N	Create a new procedure.
<CTRL>+O	Open an existing procedure.
<CTRL>+D	Delete an existing procedure.
<CTRL>+H	Open the History List.
<CTRL>+P	Print the contents of the main display panel.
<ALT>+<F4>	Close the D-2D window.

D-2D View Menu Shortcuts

Shortcut	Description
<CTRL>+C	Clear the main display panel.
←	Step back the contents of the main display one frame at a time.
→	Step forward the contents of the main display one frame at a time.
<CTRL>+←	Display the first frame in the main display panel loop.
<CTRL>+→	Display the last frame in the main display panel loop.
<Page Up>	First use will cause the frames in the main display panel to loop; subsequent presses will increase the speed of the loop.
<Page Down>	First use will cause the frames in the main display panel to loop; subsequent presses will decrease the speed of the loop.

D-2D Options Menu Shortcuts

Shortcut	Description
<CTRL>+T	Toggle time options GUI on.

D-2D Options Menu Shortcuts

Shortcut	Description
<CTRL>+S	Toggle data scale on.
<Insert>	Toggle image combination products on and off.
<CTRL>+L	Open the Loop Properties GUI.
<CTRL>+I	Open the Image Properties GUI.

D-2D All Tilts Keyboard Shortcuts - Requires an All Tilts Product in the Main Display Panel

Shortcut	Description
←	Step backward the contents of the main display one volume scan at the current elevation angle.
→	Step forward the contents of the main display one volume scan at the current elevation angle.
↑	Step up the contents of the main display panel to the next highest elevation angle in the database at the current volume scan.
↓	Step down the contents of the main display panel to the next lowest elevation angle in the database at the current volume scan.

D-2D Numeric Keypad Keyboard Shortcuts - For the Numeric Keypad on Right-Hand Side of Keyboard Only

Shortcut	Description
+	Increase brightness of image product 1, decrease brightness of image product 2 (if loaded).
-	Decrease brightness of image product 1, increase brightness of image product 2 (if loaded).
0	Toggle image product loaded in the main display panel on and off.
1-9	Toggle first nine graphic products loaded in the main display panel on and off.
.	If image combination is toggled on, and two image products are loaded in the main display, pressing this key will toggle between the two image products at full brightness.
<Enter>	Toggle between Product Legend, Map Legend, and Timestamp Only Legend.

FSI Keyboard Shortcuts - For the Main Keyboard Only

Shortcut	Description
1 or Z	Toggle on Base Reflectivity product displays
2 or V	Toggle on Base Velocity product displays
3 or S	Toggle on Storm-Relative Mean Velocity Map product displays
4 or W	Toggle on Spectrum Width product displays
5 or D	Toggle on Differential Reflectivity product displays
6 or O	Toggle on Correlation Coefficient product displays
7 or K	Toggle on Specific Differential Phase product displays
8 or H	Toggle on Hydrometeor Classification Algorithm product displays
<Ctrl> + ←	Display 0.5^{o} elevation product in current volume scan
<Ctrl> + →	Display most recent elevation angle available in current volume scan
<Ctrl> + ↓	Display 0.5^{o} elevation product in most recent volume scan
A	Toggle Auto Update
I	Toggle on/off Interpolation function
P	Toggle on Plan View in 3DF Panel
C	Toggle on CAPPI view in 3DF Panel
X	Toggle on/off VDX view in 3DF Panel
R	Toggle on/off cursor readout
[	Step forward the contents to the next volume scan
]	Step backward the contents to the previous volume scan
=	Step up the contents to the next highest elevation angel
‘	Step down the contents to the next lowest elevation angel
<CTRL> + F	Display FSI in full-screen format
<CTRL> + X	Exit FSI

FSI Keyboard Shortcuts - For Numeric Keypad Only (Num Lock Must Be on to Work)

Shortcut	Description
2	Toggle down in elevation on PPI panel
8	Toggle up in elevation on PPI panel
4	Toggle backward one volume scan
6	Toggle forward one volume scan
3	Toggle down in elevation on virtual volume scan
9	Toggle up in elevation on virtual volume scan
<CTRL> + 1	Pan Camera view down and left
<CTRL> + 2	Pan Camera view down
<CTRL> + 3	Pan Camera view down and right
<CTRL> + 4	Pan Camera view left
<CTRL> + 6	Pan Camera view right
<CTRL> + 7	Pan Camera view up and left
<CTRL> + 8	Pan Camera view up
<CTRL> + 9	Pan Camera view up and left
<CTRL> + 5	Set Camera to plan view
.	Toggle between the Base Reflectivity and Storm-Relative Mean Velocity Map products
+	Zoom Camera view in
-	Zoom Camera view out
/	Tilt Camera view up in 3DF Panel
*****	Tilt Camera view down in 3DF Panel

Panel Combo Rotate Keyboard Shortcuts

Shortcut	Description
Delete	Toggles the Panel Combo Rotate feature on / Cycles forward through the PCR products
End	Toggles the Panel Combo Rotate feature off
Backspace	Cycles backward through the PCR products
1	Displays the first product in the PCR sequence in PCR mode (top left panel of Side A)
2	Displays the second product in the PCR sequence in PCR mode (top right panel of Side A)
3	Displays the third product in the PCR sequence in PCR mode (bottom right panel of Side A)
4	Displays the fourth product in the PCR sequence in PCR mode (bottom left panel of Side A)
5	Displays the fifth product in the PCR sequence in PCR mode (top left panel of Side B)
6	Displays the sixth product in the PCR sequence in PCR mode (top right panel of Side B)
7	Displays the seventh product in the PCR sequence in PCR mode (bottom right panel of Side B)
8	Displays the eighth product in the PCR sequence in PCR mode (bottom left panel of Side B)

Text Display Editor Shortcuts: Selection Functions (Only Applies to the Text Editor Windows)

Shortcut	Description
<Shift>+<Home>	Changes selection area from current area to start of current line to the beginning of the current selection.
<CTRL>+<Shift>+<Home>	Extend selection to top of the document.
<Shift>+<End>	Changes selection area from current area to end of current selection to end of the current line.
<CTRL>+<Shift>+<End>	Extend selection to bottom of the document.
<Shift>+<Page Up>	Extend selection up one screen.
<Shift>+<Page Down>	Extend selection down one screen.
<Shift>+←	Extend selection to previous character.
<CTRL>+<Shift>+←	Extend selection to beginning of previous word (requires words be delineated by spaces, not ellipsis or other characters).
<Shift>+→	Extend selection to next character.

Text Display Editor Shortcuts: Selection Functions (Only Applies to the Text Editor Windows)

Shortcut	Description
<CTRL>+<Shift>+→	Extend selection to end of next word (requires words be delineated by spaces, not ellipsis or other characters).
<Shift>+↑	Extend selection to previous line.
<Shift>+↓	Extend selection to next line.

Text Display Editor Shortcuts: Delete Functions (Only Applies to the Text Editor Windows)

Shortcut	Description
<Backspace>	Delete left character or current selection.
<CTRL>+<Backspace>	Delete left word.
<Delete>	Delete right character or current selection.
<CTRL>+<Delete>	Delete from current point or selection to end of the current line.
<F6>	Delete right character.
<F7>	Delete next word.
<F8>	Delete from current point or selection to end of the current line.

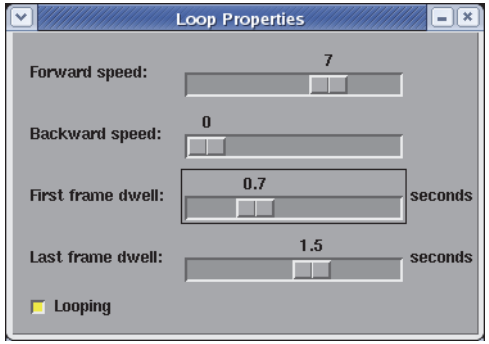
Text Display Editor Shortcuts: Edit and Application Functions (Only Applies to the Text Editor Windows)

Shortcut	Description
<Escape> (in menu)	Move back up one menu level.
<CTRL>+<F1>	Start spell checker.
<F2>	Open search (and replace) GUI.
<Alt>+<F4>	Close text window without saving.
<F5>	Print contents of window.
<F10>	Bring up first submenu of the main menu.

Text Display Editor Shortcuts: Edit and Application Functions (Only Applies to the Text Editor Windows)

Shortcut	Description
<CTRL>+C	Copy
<CTRL>+P	Print contents of window.
<CTRL>+V	Paste
<CTRL>+X	Cut
<Insert>	Toggle between insert and overstrike mode
<Shift>+<Insert>	Paste
<CTRL>+<Insert>	Copy
<Shift>+<Delete>	Cut

A. Using the <Tab> Key to Change Focus in a D-2D Window



When you open a GUI or window in D-2D, many times you can use the <Tab> key to select an object in the interface without using your mouse. Sometimes this method may be a more efficient means to completing a task.

In an open window, pressing the <Tab> key several times usually results in the focus (usually illustrated by a thin black rectangle around a given window option) changing between the different input options in that window. The order in which the focus moves with each <Tab> press is called the tab order.

After an item has focus, press <Enter> to select, or deselect, the item if it is a button or check box. If the object is a text window with a list of options, the arrow keys allow you to highlight an option from the list and pressing <Enter> selects that option. Otherwise, if the input object is an input text window, try entering text with the keyboard when the text entry window has the focus.

While the ability to select items in a D-2D GUI with the <Tab> order is technically available in almost every window, its actual execution can be inconsistent. Do not experiment with this method in an operational time-critical warning environment; rather, test out several common tasks during times of quiet weather (or during a WES simulation) to become familiar with the keyboard interface. The keyboard functions may speed up your workflow by not having to go back and forth between the mouse and keyboard, but this is often a user preference.

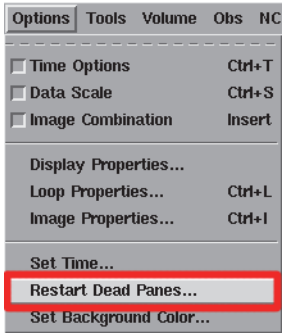
Lesson 17: Some Basic Troubleshooting Procedures in AWIPS

This lesson provides instructions on some initial steps to take when D-2D is not performing as expected. This documentation is very specific to common tasks needed during operations. This lesson does not address areas that should be troubleshooted by an AWIPS, Radar, or other staff Focal Point expert or problems supported by the Network Control Facility (NCF) or other agency outside the WFO.

A. Fixing Pane Problems in D-2D

Inevitably, D-2D panes do not update or swap in a timely manner. While these situations may be caused by several issues, these problems often can be fixed by either clearing the troublesome pane or restarting a pane, which is referred to as a “dead” pane. When clearing (or restarting a dead pane) does not ultimately correct your problem, the issue likely requires some form of support from either a focal point or NCF.

Task: Restarting Dead Panes in D-2D



This task demonstrates how to restart a dead pane in a D-2D window.

Additional Assumptions:

- None

1.0. Select the Options Menu in the D-2D Toolbar and Press the Left-Mouse Button.

2.0. In the Menu That Appears, Select the “Restart Dead Panes...” Option and Press the Left-Mouse Button.

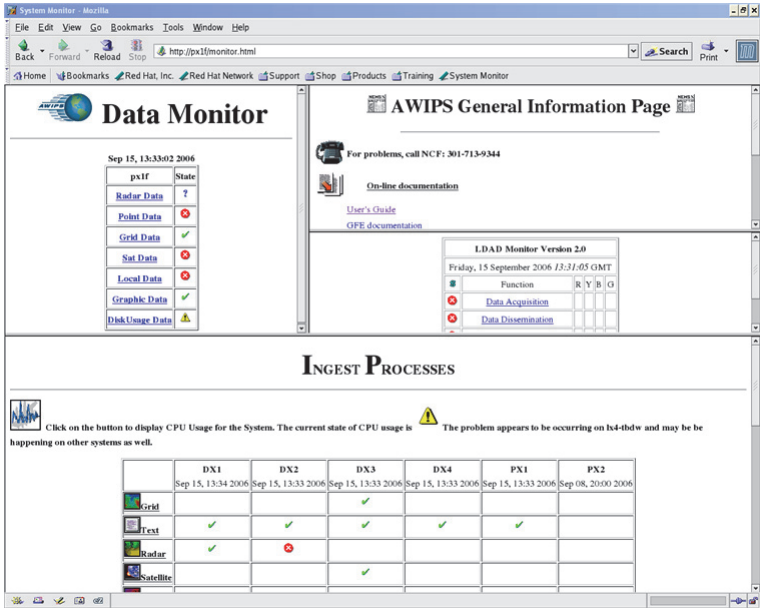
3.0. Restart the Dead Pane(s)

3.1. If the subsequent GUI says that a pane needs to be restarted, then select the “OK” button in the GUI and press the Left-Mouse Button.

3.2. If the subsequent GUI says that all panes are functioning properly, then you can restart the main display pane by selecting the "Yes" button in the GUI and pressing the Left-Mouse Button.

4.0. Task Complete!

B. Using the AWIPS Data Monitor



The AWIPS Data Monitor is one of the panels in the AWIPS System Monitor, which provides a status of the AWIPS Data (Radar, Point, Grid, Satellite, Local, Graphic, and Disk Usage) and the data ingest processes. The AWIPS Data Monitor is the panel in the upper left-hand corner of the System Monitor browser window. This panel summarizes the status of all these data sets in AWIPS. The panel is composed of a table with a data label and a corresponding state value. The state is characterized by one of four symbols: a green check mark, a red circle with a white "X", a blue question mark, and a yellow triangle with a black exclamation point. Each one of these has a specific meaning.

- A green check mark indicates that data are being received in a complete and timely manner.
- A yellow triangle with a black exclamation point indicates that data are somewhat late (i.e., more than 20 minutes old) or the data disks are running at a somewhat high level.
- A red circle with a white "X" indicates that data are very late (i.e., more than 40 minutes old) and/or very incomplete.
- A blue question mark indicates that no files are present in the data storage for that data set (i.e., perhaps a dedicated radar is down for maintenance for an extended period of time).

By using the label links in the Data Monitor table, a more detailed listing of products within each data set becomes available, as well as the respective state of each data product. It is important to look at the detailed listing information. If a symbol other than a green check mark appears in the status column of a particular data set, it could be that only one specific product updates poorly. Only by looking at the detailed listing can you see which individual products may have problems.

NOTE: It is important to note that a yellow triangle denotes a problem that is logged by NCF, but not necessarily known by NCF controllers. However, a red circle denotes a problem that would be visible on a NCF controllers monitor.

Note: The AWIPS Data Monitor is only available on a live AWIPS workstation

Task: Loading and Using the AWIPS Data Monitor

This task demonstrates how to load the AWIPS System Monitor and how to navigate to the detailed listing in the AWIPS Data Monitor.

Additional Assumptions:

- None

1.0. In the Background of the AWIPS Workstation, Press & Hold the Left-Mouse Button.

2.0. In the Menu that Appears, Select the Browser Application and Release the Left-Mouse Button.

- The AWIPS System Monitor is the home page for the browser on an AWIPS Workstation when started in this fashion.
- The AWIPS Data Monitor appears in one of the panels of the AWIPS System Monitor.

3.0. Use the AWIPS Data Monitor to Check the Current State of Data.

3.1. Examine the data sets listed in the upper left-hand portion of the browser window to determine which, if any, of the data sets do not have a green check mark.

3.2. To view a detailed listing for a particular data set, select the link for that category and press the Left-Mouse Button.

3.3. In the detailed listing that appears, examine the individual data product categories to determine which products are having a problem.

4.0. Task Complete!

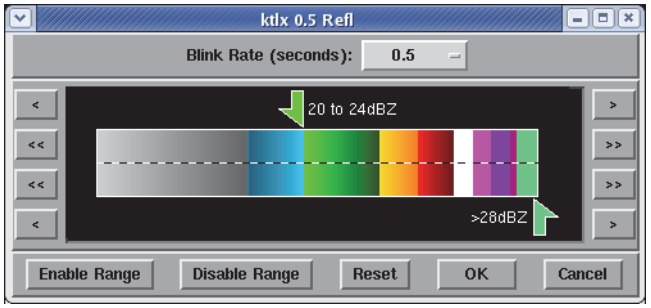
Lesson 18: Additional Tasks/Tools in AWIPS

This lesson provides information on tasks/tools in AWIPS that might useful for a forecaster to use occasionally.

A. Blinking portions of a color table

One option for the AWIPS operator is to not swap or edit a color table, but to make a portion of the legend blink. While this task in not a common one, it can be useful in certain circumstances. For instance, a warning forecaster who is color blind might have a difficult time distinguishing between two different colors used in a color table (even if the scale was specifically designed to mitigate this issue).

For data ambiguity issues over a small area, the cursor readout display usually is the more effective tool. However, if the data ambiguity issue is more widespread, or exists over several frames of a loop, blinking a color range may aid in clarity.



Task: Blinking a Range of Data Values

This task demonstrates how to select a range of values from an image product's color table and make those colors blink.

Additional Assumptions:

- You have an image product loaded in the main display panel.

1.0. Opening the Change Blinking GUI

1.1. Position your cursor over the name of the image product in the product legend then press & hold the Right-Mouse Button.

1.2. In the menu that appears, select "Change blinking..." and release the Right-Mouse Button.

2.0. Pick a Range of Values to Edit by Positioning Half-Arrows Using One of the Following Methods

- The arrow at the top should be at the lower end (i.e., left side) of the range, while the arrow at the bottom should be at the higher end (i.e., right side) of the range.
- The data values that correspond to the location of each half-arrow appear next to the arrow. Use this information when setting up your range of values.

2.1. Method 1: Manually dragging the half-arrows

2.1.1. Select an arrow with your cursor then press & hold the Left-Mouse Button.

2.1.2. Drag the arrow to the desired location in the color table scale and release the Left-Mouse Button.

2.1.3. Repeat steps 2.1.1 and 2.1.2 for the other half-arrow.

2.2. Method 2: Utilize the directional buttons near the color table scale

- There are four buttons that control each arrow: “<”, “<<”, “>”, and “>>”.
- The “<” and “>” buttons move the arrows on small increments in each direction.
- The “<<” and “>>” buttons move the arrows in larger data ranges.
- The top two buttons on each side control the position of the top arrow while the bottom two buttons on each side control the position of the bottom arrow.

2.2.1. Use the arrow buttons for one of the half-arrows to incrementally adjust its position.

2.2.2. Repeat step 2.2.1 for the other half-arrow.

3.0. Blink the Range of Values by Selecting the “Enable Range” Button and Press the Left-Mouse Button.

4.0. Stop Blinking the Range of Values by Selecting the “Disable Range” Button and Press the Left-Mouse Button.

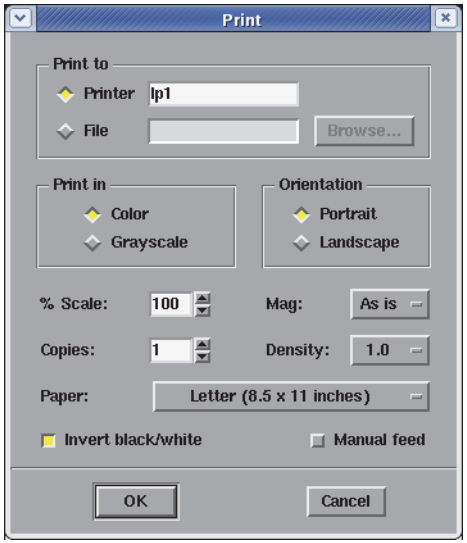
5.0. Close the Change Blinking GUI

5.1. Select the “OK” button (to save current settings) and press the Left-Mouse Button.

5.2. Select the "Cancel" button (to cancel recent changes) and press the Left-Mouse Button.

6.0. Task Complete!

B. Printing the Contents of the Main Display Panel



There may be instances when you wish to make a hard copy of the main display panel in D-2D. Making hard copies is a fairly straight-forward process in AWIPS (or on a WES machine, if you have a printer connected to your system). The Print GUI gives you many of the basic options that you will see in any print dialog boxes: Color/Grayscale, Portrait/ Landscape, Scale, Copies, etc.

When you print hard copies, most often the "Invert Black/White" check box should be selected. This option prevents using excessive amounts of black ink. Situations where you will want to toggle this feature off include printing an image product that uses a primarily grayscale Color Table (such as Satellite Data) or image products with Color Tables that use white and black as particular data values that would somehow make interpreting the hard copy difficult.

Task: Printing the Contents of the Main Display Panel

This task demonstrates how to make a hard copy of the main display panel contents.

Additional Assumptions:

- None

1.0. Open the Print GUI Using One of the Following Methods

1.1. Method 1: Use the File menu

1.1.1. Select the File menu and press the Left-Mouse Button.

1.1.2. In the menu that appears, select "Print..." and press the Left-Mouse Button.

1.2. Method 2: Use the keyboard shortcut <CTRL>+P

2.0. Using the Print GUI

2.1. Make sure the print location (Printer or File) is set correctly.

2.2. Select the document color settings (i.e., Color or Grayscale).

2.3. Select the document orientation (i.e., Portrait or Landscape).

2.4. Make sure the "Invert Black/White" check box is set correctly.

2.5. Press the "OK" button to send the job to the selected printer.

3.0. Alternate Method to Print: Press the Print Button in the D-2D Toolbar

- When pressing the print button, the contents of the main display will be sent to the printer without opening the Print GUI.
- Unless you are certain of the current printer settings, you should use one of the methods mentioned in Step 1 to print the contents of the main display panel.

4.0. Task Complete!

You have now completed Part 4 (Other Tasks/Tools in AWIPS) for Topic 1. Please go to the LMS (https://doc.learn.com/noaa/nws) and complete the quiz. After completing the quiz, you will only have the Proficiency Exam left for Topic 1.

WES Exercise Keywords

The spaces below are provided to write down the keywords from the WES Exercises for the DLOC Topic 1 LMS Post Test

WES Exercise #1 _____

WES Exercise #2 _____

WES Exercise #3 _____

WES Exercise #4 _____

WES Exercise #5 _____

WES Exercise #6 _____

WES Exercise #7 _____

WES Exercise #8 _____

WES Exercise #9 _____