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SIMNET

PLAN VIEW DISPLAY

USER MANUAL

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Bolt Beranek and Newman, Inc. (BBN)
Systems and Technologies; Advanced Simulation
10 Moulton Street
Cambridge, MA 02138

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A Simulation Network (SIMNET) project user manual describing the use of the Plan View Display (PVD) workstation of the SIMNET hardware and software training system for vehicle crew training and operational training.

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The SIMNET Plan View Display (PVD) workstation user manual.

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SIMNET PLAN VIEW DISPLAY USER MANUAL

June 1991

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Prepared by:

BBN Systems and Technologies
Advanced Simulation
10 Moulton Street
Cambridge, MA 02138 USA

Prepared for:

Defense Advanced Research Projects Agency (DARPA)
1400 Wilson Blvd.
Arlington, VA 22209-2308

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1   Introduction

1.1   SIMNET

The SIMNET program is an advanced technology project developed by Bolt Beranek and Newman Inc. and sponsored by the Defense Advanced Research Projects Agency (DARPA) in close cooperation with the Army. Its objective is to develop large-scale networking of military simulators for such vehicles as tanks and fixed-wing and rotary-wing aircraft. By utilizing a network of low-cost, full-crew simulators, each supported by its own set of microprocessors, the Army can conduct platoon-, company-, and battalion-level exercises incorporating all of the tactical, logistic, administrative, and communication elements that are critical to actual field operations. This technology will permit regular and intensive practice of team combat skills.

A SIMNET simulator models the performance of the actual vehicle in mobility, fire control, and communication. A simulator contains crew stations, each of which has a set of controls comparable to those in the actual vehicle. The simulator's visual display system ensures that each crew member sees a depiction of the battlefield terrain as it would be seen from his vision blocks in the actual combat vehicle. SIMNET offers the crew member the opportunity to behave as he would in a real vehicle, succeeding or failing in assigned missions as he would in a battlefield exercise.

SIMNET provides components for recording exercise data and for reviewing an exercise via a plan view (bird's-eye view) of the battlefield. Data packets from a SIMNET exercise are received at the Plan View Display and are used to provide a view of a SIMNET exercise that is currently in progress. These data packets from a SIMNET exercise can also be recorded by the Data Logger. The Data Logger can transmit these recorded data packets to the Plan View Display for the purpose of playing back a SIMNET exercise at a later date.

1.2   The Plan View Display

The Plan View Display (PVD) provides real-time viewing of an exercise or the playback and review of an exercise at a later time. The PVD program runs on a MASSCOMP 68020 computer with color graphics enhancements. The PVD provides a view of the battlefield as seen from directly above. It is attached to the SIMNET network by means of a high-performance Ethernet interface.

The PVD can display exercise data that originates from currently active simulators and the MCC computer, and from the playback mode of the Data Logger. During playback of an exercise, the Logger can be controlled directly from its keyboard or from the Plan View Display. Commands can be issued to the Data Logger to select the specific times from within an exercise, to vary the speed of exercise playback, to halt and restart, and to rewind an exercise playback.

The PVD contains a color-coded display showing various geographic details, such as roads, rivers, and terrain relief. Individual vehicles are represented on the PVD by icons

that indicate the position and orientation of the hull and the relative orientation of the turret. The user can vary the size of the icons by selecting a magnification level. Shading of the geographic display is performed according to an algorithm which assumes a sun elevation of 45 degrees from the horizon and a sun shining from the top right-hand corner of the display.

The path of a vehicle over time is indicated by a trail of small dots, each representing one of n previous hull positions, and a shot is indicated by a line segment emanating from the firing vehicle. The user can select particular vehicles and obtain detailed information such as the vehicle location, speed, alignment, identification number, and repair and supply status.

The user can zoom in or out on any selected area of the battlefield, pan the display in any direction, obtain intervisibility readings, and optionally overlay grid and/or contour lines at selected intervals. Any terrain cross-section is viewable by selecting its two endpoints. Numeric values for the terrain elevation and corresponding map coordinates (UTM or XY) for any point in the field of view are similarly obtainable.

2   Operating instructions for collecting and reviewing SIMNET data.

If an option requires a time-consuming action such as panning, the on-screen arrow is transformed into the word *wait*. The user must wait until the action is completed (the arrow returns) before selecting another option.

Some operations require the specification of a vehicle, location or area. When such specification is necessary, first select the vehicle, location, or area and then select a command from the menu. To select a vehicle or location, click on the desired vehicle or location with the middle mouse button. To select an area, drag with the left mouse button.

Some options operate like a toggle switch. For example, when a user selects *Cross Sec On*, the option in *Top Menu 1* changes (toggles) to *Cross Sec Off*. The next time the user selects the option, it toggles back to *Cross Sec On*. Sometimes an *X* appears or disappears beside an option in the menu to indicate that a setting is active or inactive.

Some options generate pop-up windows. Remove a pop-up window by putting the arrow inside the small box in the upper left corner and clicking the right mouse button. Move a pop-up window by putting the arrow inside the bar at the top of the window, pressing the mouse right button, dragging the window by moving the mouse, and releasing the button when the window is at its new location.

The leftmost section at the bottom of the screen displays a map color key (terrain, intervisibility, or icon) or a help message. The rightmost section displays the coordinates of a selected location, the current icon size and the zoom ratio.

By default the Plan View Display (PVD) displays only the vehicles in exercise 1. The *set exercise* command can be selected from *Top Menu 2* to select the exercise to be viewed. In response to the command a message appears in the Information Section asking for an exercise ID. Type an ID number (1 to 255) to specify the display of only that exercise's vehicles.

Each menu is composed of a set of options or commands grouped under a heading. The active options are white on a black background. Any inactive options are white on a brown background. If the user selects an inactive option, no action takes place. When the *Connect* Menu or *Overlays* Menu is on the screen the network is blocked and the user does not see moving vehicles on the map.

3   Playing Back a SIMNET Exercise on the Plan View Display

The Data Logger and PVD programs are used for replaying a prerecorded SIMNET exercise. The Data Logger program runs on a MASSCOMP computer (for details on use of the Data Logger, see Appendix F). The PVD runs on a MASSCOMP computer which displays a prompt of either *login:* or *machinename login:*.

To play back a SIMNET Exercise on the PVD:

1)   If playback would interfere with an ongoing exercise, disconnect the data analysis network from the SIMNET network and install the terminator plug in that port on the TCL box. This insures that only vehicles from the recorded exercise will appear on the PVD .

When the connection to Data Logger is made, the options under the heading *DATA LOGGER* have a black background to show that they are active. A brown background means the connection·could not be made and they are inactive. A message in the *Information* box tells why the connection failed. See *To Use Top Menu 1*, section G.5 below.

2)   On the Data Logger, at the prompt, type:

logger -s

This tells the computer to run the Data Logger program in server mode.

* **logger** tells the computer to run the Data Logger program.

* **-s** tells the Data Logger program to accept remote commands from the PVD (server mode).

3)   On the PVD, in response to the PVD prompt, enter **pvd** to instruct the computer to run the PVD program.

4)   A menu, called *Top Menu 1*, appears on the screen. Move the on-screen arrow to *Connect* under the heading *OTHER MENUS*. Press the right mouse button on connect, to connect to the data logger chosen in the *pvd_init.def* file.

5)   Move the on-screen arrow to *Play* under the heading *DATA LOGGER*. Press the right mouse button. Enter the name of the file on the logger to be played. Select *Continue* under the heading *DATA LOGGER*. This tells PVD to notify the Data Logger program that it is time to start sending the recorded exercise packets to the PVD. See *Using Top Menu 1*, G.5, below.

The viewing of the prerecorded SIMNET exercise begins. See appendix F and Using Top Menu 1, G.5, Using Top Menu 2, G.6, Using the Overlays Menu, G.7 for information on using the mouse button and menus.

To quit the PVD program, press ^c.

To repeat the playback of an exercise, select *Rewind* under the heading *DATA LOGGER* in *Top Menu 1*.

Here is a sample procedure:

1)   At the Data Logger, type:

     logger -s

     to start the logger in server mode.

2)   At the PVD, type:

     login: **pvd**

3)   When the *Top Menu 1* appears on the PVD, select *Connect* under the heading *OTHER MENUS*. The message: *Looking for <logger name>* will appear in the information window where <logger name> is the name given after the key word *vehicle_recorder_host* in the *file pvd_init.dat*. If successful, the shading under the Data Logger menu will go from brown to black. If unsuccessful, the message: *Start <logger name> in server mode and try again* will appear in the information window.

4)   Select *Play* under the heading *DATA LOGGER*, and enter the name of the file on the logger to play.

5)   When *Top Menu 1* appears on PVD, select *Continue* under the heading *DATA LOGGER*.

Icon size is initially set at 100X. Change it by selecting another size under the heading *SELECT ICON SIZE* in *Top Menu 2*.

4   The PVD Mouse

Left button:
select a region

Center button:
select a point
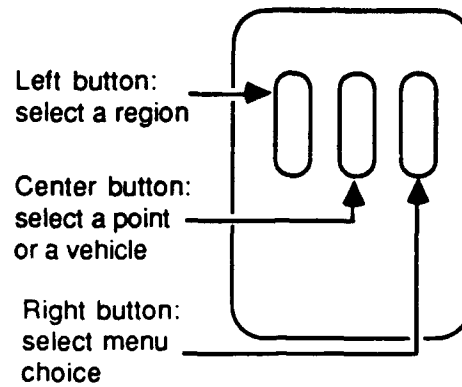or a vehicle

Right button:
select menu
choice

Figure 1   Plan View Display Mouse

Some operations that require redrawing the map can take a long time. To abort one of these operations, hold down the left and right mouse buttons simultaneously.

5   Getting Help on the PVD

Select *Set Help On* under the heading, *MAP TOOLS*, on *Top Menu 1* to display the mouse
help window in figure G-2.

```
┌─────────────────────────────────────────────────┐
│  □               Help!                           │
├─────────────────────────────────────────────────┤
│             How to Use the Mouse                 │
│  Left Button:  Press and drag to select  regions.│
│  Middle Button: Click to select  points and vehicles.│
│  Right Button: Click to make menu choices.  Click on│
│   a window's kill box to delete the window.  Drag in│
│   a window's title bar to move a window.         │
│                                                  │
│                                                  │
└─────────────────────────────────────────────────┘
```
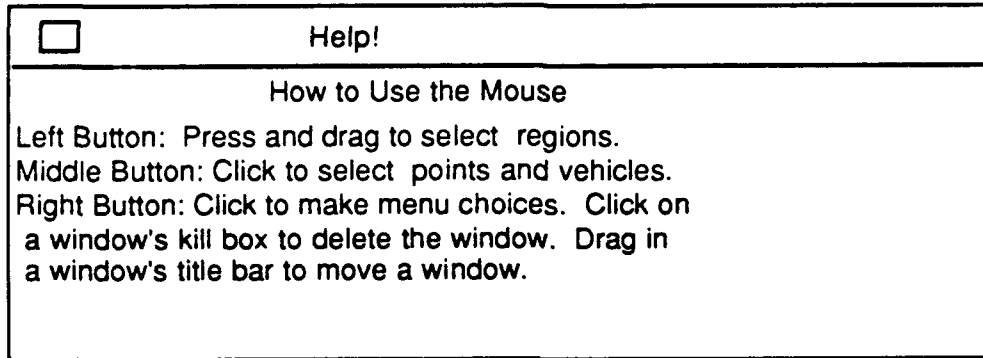
Figure 2   Mouse Help Window

To remove the mouse help window from the screen, either click the right mouse button
inside the small box (kill box) at the top of the mouse help window, or click it on *Set Help
Off* under the heading, *MAP TOOLS*, at *Top Menu 1*.

6   Using *Top Menu 1*

Top Menu 1 looks like this:

MAP MANIPULATION

Zoom In	Zoom Out
Pan	Top Level
Display Zoom	Save Zoom
Previous View	Next View
Zoom 1:125000	Zoom 1:50000
Zoom 1:25000	

MAP TOOLS

Cross Sec On	Ruler
Select Vehicle	Unselect Vehs
Show Tgt List	Set XY Format
Clear All	Set Help On

INTERVISIBILITY

Area	Veh to Veh
Pt to Pt	Pt to Veh

DATA LOGGER

Play	Connect
Pause	Continue
Fast Play	Stop
Skip Ahead	Skip Back
Goto	Rewind

EVENT FLAGGING

Waypoint 1	Waypoint 2
Waypoint 3	Waypoint 4
Waypoint 5	Waypoint 6

OTHER MENUS

Top Menu 2	Connect
CATC	Overlays

Top Menu 1 contains these options for manipulating the plan view map:

Zoom In. Enlarges a selected rectangular area to fill the PVD map area. First select a region of the map with the left mouse button, then select *Zoom In* with the right button.

Pan. A selected point becomes the center point of the map displayed on the screen. The zoom scale remains constant. Select a point on the map with the middle mouse button.

Save Zoom. Saves the display on the screen You can recall it with the *Display Zoom.*

Display Zoom. Shows the display most recently saved with *Save Zoom.*

Previous View. Returns the previous display to the screen.

Next View. Undoes the *Previous View* command.

Zoom Out. Increases the area displayed by a factor of four.

Top Level. Returns the display to the entire terrain map that appeared when you began using the PVD.

Zoom 1:25000. Scales the map 1:25000. The center of the map is the last point you clicked with the middle mouse button.

Zoom 1:50000. Scales the map 1:50000. The center of the map is the last point you clicked with the middle mouse button.

Zoom 1:125000. Scales the map 1:125000. The center of the map is the last point you clicked with the middle mouse button.

Top Menu 1 contains these general purpose map tool options:

Cross Sec On/Off. Toggles to display or remove a plot of the elevation between two points. Click on two points (map locations) with the middle mouse button, then select *Cross Sec On.* A pop-up window appears, with a graph of the elevation of the locations between the two points, and the command toggles to *Cross Sec Off.*

Set Help On/Off. Toggles to display or remove a pop-up help window with instructions on the use of the three mouse buttons.

Ruler. Measures the distance between two locations. Click on two points on the map with the middle mouse button, then select *Ruler.* The distance between the two points appears in the *Information Section.*

Show Tgt List. Toggles to determine whether the list of targets appears. An X beside the command indicates that the targets appear. Create a target list with the options in the *CATC* Menu. **Note:** This is not currently supported.

Unselect Vehs. Voids all vehicle selections. Select a vehicle by clicking the middle mouse button on the vehicle icon, or by clicking on the *Select Vehicle* command. A box surrounds the icon to show it is selected. Turn off its selection by clicking the middle button on it again. You can unselect all selected vehicles by using this command.

Select Vehicle. Selects a vehicle. A request for a vehicle ID or bumper number appears in the Information Section. A box surrounds the specified vehicle icon to show it is selected.

Set XY/UTM Format. Toggles between xy and UTM coordinates.

Clear All. Clears markings (intervisibility rays, overlay objects, etc.) from the map.

The PVD program performs several types of intervisibility calculations, which are available through the *INTERVISIBILITY* section of *Top Menu 2.* Intervisibility is based on the idea of running a ray from an eye to a target and checking whether the ray encounters any obstacles. A target is fully visible when there are no obstacles obscuring any part of the target. A target is partially visible when some parts of the target, are obscured, for example a hull down tank or a tank behind a tree line. A target is invisible when there does not exist a line of sight from the eye point to any part of the target.

Area. Produces a fan of color-coded intervisibility rays emanating from a selected point. Click on one point (map location) with the middle mouse button, then select *Area* with the right mouse button. Color-coded rays appear to mark areas that are fully visible (purple), partially visible (light blue), and invisible (white).

Pt to Veh. Determines whether a particular vehicle is visible from a point. Click on one point (map location) with the middle mouse button, then select *Pt to Veh* with the right mouse button. Rays from the selected point spread to appropriate vehicles, indicating their intervisibility from that point. The Information Section displays the number of vehicles in each visibility class.

Veh to Veh. Toggles to determine the intervisibility of a vehicle selected with the middle mouse button and either all or only opposing vehicles. (See *Intervisibility Options* of *Top Menu 2*.) This information updates as the vehicle moves. Toggle this command either by clicking again on the command, or by selecting *Clear All*. *Veh to Veh* causes a very slow PVD response time if there are a large number of vehicles in the current exercise.

Pt to Pt. Determines the intervisibility of two selected points. Click on two points on the map with the middle mouse button, then select *Pt to Pt* with the right button. A color-coded ray shows the intervisibility between the selected points. An X appears at each selected point. Information about the intervisibility between the points appears in the Information Section.

Top Menu 1 contains these commands for controlling the Data Logger:

Play. Selects the name of the file on the Data Logger to be played

Pause. Stops transmitting from the recorded exercise file. Restart with *Continue*.

Continue. Starts or continues the transmission of the recorded exercise file to the PVD.

Fast Play. Transmits to the PVD at a faster-than-normal rate and prompts you for a number--how many times faster than normal to transmit. Resume normal speed by setting *Fast Play* to 1.

Stop. Concludes playback of a file. Another file may be played back by selecting *Play*.

Skip Ahead. Prompts you to type a number of seconds, then jumps forward that number.

Skip Back. Prompts you to type a number of seconds, then jumps backward that number.

Goto. Prompts you to type a number of seconds, then goes to the specified point in the exercise file.

Rewind. Returns to the beginning of the recorded exercise file.

Top Menu 1 offers these commands for event flagging:

Waypoint 1. Sends a waypoint 1 event flag packet for a selected vehicle.

Waypoint 2. Sends a waypoint 2 event flag packet for a selected vehicle.

Waypoint 3. Sends a waypoint 3 event flag packet for a selected vehicle.

Waypoint 4. Sends a waypoint 4 event flag packet for a selected vehicle.

Waypoint 5. Sends a waypoint 5 event flag packet for a selected vehicle.

Waypoint 6. Sends a waypoint 6 event flag packet for a selected vehicle.

You can change these command names by editing the file
/simnet/pvd/data/knox/event.defs, where the current database name replaces *knox*.
Event flag packets appear in the Events Section when an exercise is played back.

Top Menu 1 has these commands for controlling which menu appears in the On-screen
Menu Section:

Top Menu 2. Invokes *Top Menu 2*.

Connect. Invokes the *Connect* menu.

CATC. Invokes the *CATC* Menu. **Note:** Not currently supported.

Overlays. Invokes the *Overlays* menu.

7   Using Top Menu 2

Top Menu 2 looks like this:

MAP FEATURES

Set Contour On	Set Grid On
Set Shading Off	Set Exercise

SELECT ICON SIZE

100X	50X
20X	10X
5X	2X
1X	Symbolic

SELECT GRID INTERVALS

10k m	1k m
500 m	250 m

SELECT CONTOUR INTERVALS

60 m	20 m
10 m	5 m

INTERVISIBILITY OPTIONS

Set All Vehicles	View Range
View Height	Target Height

MAP INFORMATION

Terrain Key	Icon Key
Intervis Key	Mouse Help

EVENT LOGGING

Logging On   Logging Off

DATABASES

Ft_Knox   Hunter
Bergen   NTC

OTHER MENUS

Top Menu 1   Connect
CATC   Overlays

Top Menu 2 has commands for toggling map features on and off and setting exercise ID.

Set Contour On/Off. Toggles to draw or remove contour lines from the map.

Set Grid On/Off. Toggles to draw or remove grid lines.

Set Shading On/Off. Toggles to draw or remove shaded regions from the map.

Set Exercise. Lets you display only vehicles in a specified exercise. A message in the
Information Section asks for an exercise ID. Type an ID number from 1 to 255 to
specify the desired exercise.

Top Menu 2 lists four distances for setting the interval between grid lines. For these
options, 1k represents 1,000 meters or a kilometer. When the PVD begins operating, the
grid interval is set to 10,000 meters. In the on-screen menu, an *X* appears with the
currently selected grid interval.

10k meters

1k meters

500 meters

250 meters

Top Menu 2 lists four distances for setting the interval between contour lines. When the PVD begins operating, the contour interval is set to 60 meters. In the on-screen menu, an *X* appears with the currently selected contour interval.

60 meters

20 meters,

10 meters

5 meters

Top Menu 2 contains the following intervisibility commands. In the on-screen menu, an *X* appears with the currently selected intervisibility option.

Set All Vehicles/Opposing Vehs. Toggles options for the *Top Menu 1* intervisibility commands.. For *Veh to Veh* and *Pt to Veh, Set All Vehicles* shows intervisibility rays from the selected vehicle or point to all other vehicles, and *Set Opposing Vehs* shows intervisibility rays from the selected vehicle or point only to enemy vehicles and vehicles of opposing (offense vs defense) alignment.

View Range. The Information Section requests a viewing range to use in the intervisibility calculations. Type a range in meters. *The default range is 3500.0* meters.

View Height. The Information Section requests a viewing height to use in the intervisibility calculations. Type a height in meters. The default viewing height is 2.6 meters.

Target Height. The Information Section requests a target height to use in the intervisibility calculations. Type a height in meters. The default target height is 2.4 meters.

The setting of map information determines what information is displayed in the leftmost section at the bottom of the map. When the PVD starts, the map legend is set to Mouse Help. In the on-screen menu, an *X* appears with the currently selected map information. The four options for choosing map information are:

Terrain Key. Displays seven shades of green representing ground area facing the sun or facing away from the sun. Red represents roads, light blue represents fordable rivers, and dark blue represents unfordable rivers.

Icon Key. Shows the icons used for the M1/T72, the M2/BMP, any MCC-controlled vehicles, the FAAD vehicles, the fixed-wing aircraft, and the rotary-wing aircraft, as well as the icons for bursts, smoke puffs, CATC targets, and boresight targets. Red icons represent the offense team . Blue icons represent the defense. Orange represents any friendly icon (considered a friend to all exercise participants). White represents the turrets of offense, defense and friend icons. A foe vehicle (considered an enemy to all exercise participants) is red with a blue turret. A destroyed vehicle has its turret and hull colors reversed. A tank aligned with the offense has a red hull and a white turret. Destroyed, it appears on the PVD map with a white hull and a red turret. CATC targets appear as triangles that turn red when hit.

Mouse Help. Displays information on the use of each mouse button.

Intervis Key. The intervisibility color key shows full visibility (purple), partial visibility (Light blue), and invisibility (white).

Top Menu 2 offers a pair of mutually exclusive choices to control event logging during PVD operations. They determine if exercise events (collisions, impacts, firings) are displayed in the Events Section located to the right of the map.

Logging On

Logging Off

Top Menu 2 contains graphics database options. The options available depend on the terrain databases installed and the configuration of */simnet/bin/pvd_init.dat*.

Top Menu 2 offers these choices of menus to appear in the on-screen Menu Section.

Top Menu 1. Invokes display of *Top Menu 1*.

Connect. Invokes display of the *Connect* menu.

CATC. Invokes display of the *CATC* menu. **Note:** Not currently supported.

Overlays. Invokes display of the *Overlays* menu.

8   Using the Overlays Menu

The Overlays Menu provides for the creation of map overlays, that is, unit symbols, free draw objects, and control points. You can create and store overlays before an exercise and then retrieve them.

The *Overlays* Menu looks like this:

MAP FUNCTIONS

Zoom In	Zoom Out
Pan	Top Level
Set Contour On	Set Grid On
Set Shading Off	Zoom 1:50000

UNIT SYMBOL

Create	Edit

FREE DRAW

Create	Edit Features

Edit Shape

CONTROL POINTS

Check	Coordinating
Contact	Linkup
Release/Start Passage	

OVERLAY FUNCTIONS

Delete	Reduce/Enlarge
Move	Add Text
Erase	Redraw
Reset	

FILE COMMANDS

Save to File   Read from File
List Files   Delete Files
Edit File

OTHER MENUS

Top Menu 1   Top Menu 2

The *Overlays* Menu has five options for map features and three options for toggling map features on and off. The same options appear in *Top Menu 1* and *Top Menu 2*.

Zoom In. Enlarges a selected rectangular area to fill the PVD map area. First select a region of the map with the left mouse button, then select *Zoom In* with the right button.

Pan. A selected point becomes the center point of the map displayed on the screen. The zoom scale remains constant. Select a point on the map with the middle mouse button.

Set Contour On/Off. Toggles to draw or remove contour lines from the map.

Set Shading On/Off. Toggles to draw or remove shaded regions from the map. Takes effect when you do the next *Zoom In, Zoom Out, Zoom 1:50000,* or *Pan* command.

Zoom Out. Reduces the area displayed by a factor of four. Increases map scale by a factor of two.

Top Level. Returns the display to the entire terrain map that appeared when you began using the PVD.

Set Grid On/Off. Toggles to draw or remove grid lines.

Zoom 1:50000. Scales the map 1:50000. The center of the map is the last point you clicked with the middle mouse button.

The *Overlays* Menu has two options for creating and editing unit symbols. Unit symbols appear on the map in blue for defense and red for offense.

Create. Creates a symbol. Select *Create* with the right mouse button. In a pop-up window, satisfy requests for symbol input data by clicking the middle mouse button in relevant boxes. When a request for information appears in the Information Section, type the requested data and press *return*. Click in the *Done* box when the pop-up window is satisfactory. The x and y coordinates of the arrow appear at the bottom of the screen. Click the middle mouse button to put the unit symbol at the correct location on the PVD map.

Edit. Changes an existing unit symbol. First you select the symbol, then you change it. Select a symbol with the middle mouse button. The symbol turns purple to show it is selected. Select *Edit* with the right mouse button. When the pop-up window for that symbol appears, change information by clicking with the middle mouse button in the appropriate boxes.

The *Overlays* Menu contains three free draw options for use with lines and boundaries such as phase lines and defended areas. Free draw objects appear on the map in blue for defense and red for offense.

Create. Creates a free draw object. Select *Create* with the right mouse button. Fill in the appropriate information in the pop-up menu. Drag with the right mouse button to draw the object. To erase parts of the object, click the middle button. To tell the system you are finished drawing the object, click the left mouse button.

Edit Shape. Changes the shape of a free draw object. First you select the object, then you modify it. Select a free draw object by clicking on it with the middle mouse button. The object turn purple. Select *Edit Shape* with the right mouse button. Click the middle button to erase segments of the object. Redraw the object by dragging with the right mouse button. To tell the system you are finished changing the shape of the object, click the left mouse button.

Edit Features. Changes features of a free draw object. First you select the object, then you edit its features. Select a free draw object by clicking on it with the middle mouse button. Select Edit Features with the right mouse button. When the pop-up window for the selected object appears, change information by clicking with the middle mouse button in the appropriate boxes. To tell the system you are finished changing the features of the object, click in the *Done* box.

The *Overlays* Menu contains options for creating six kinds of control points (check, contact, release/start, coordinating, linkup, and passage points). To create a control point, select the kind of point with the right mouse button. Place the point on the PVD map by clicking at the right spot with the middle mouse button.

The *Overlays* Menu contains these options for overlay functions.

Delete. Deletes an overlay object. First you select the object, then delete it. Select it by clicking on it with the middle mouse button. The selected object turns purple. Select *Delete* with the right mouse button.

Move. Moves an existing symbol or control point to a new location. You can't move free draw objects. First you select the symbol or control point, then move it. Select *Move* with the right mouse button. Click the middle mouse button on the PVD map where you want the object to go.

Erase. Temporarily erases all existing overlays. Select *Erase* with the right mouse button. The overlay data is still in computer memory and can be restored with *Redraw*.

Reset. Completely removes all existing overlays. Stored overlay files that were created with *Save to File* are not removed. Select *Reset* with the right mouse button. The overlay data is no longer in computer memory and can't be restored with *Redraw*. It is a good idea to use *Reset* to remove any old overlay data from computer memory before creating new overlay files, unless the new overlay file is to include the overlay data still in computer memory.

Reduce/Enlarge. Resize a symbol or control point. First you select the object, then select *Reduce/Enlarge* with the right mouse button. Click the right mouse button to enlarge the selected object and the middle to reduce. Click the left mouse button to quit resizing. These directions appear at the bottom of the screen, when mouse help is ON.

Add Text. Adds text to an overlay object. Select an overlay object with the middle mouse button, select *Add Text* with the right mouse button. Type in the text, then place it relative to the object with the middle mouse button.

Redraw. Restore erased overlays. Select *Redraw* with the right mouse button. The erased overlay data is still in computer memory reappears on the PVD map.

The *Overlays* Menu contains these options for file commands.

Save to File. Saves the overlays to a file. The Information Section asks for the name of the overlay file. Overlay objects erased with *Erase* are still in computer memory and are saved. Overlay objects erased with *Reset* are no longer in

computer memory and are not saved. It is a good idea to use *Reset* to remove any old overlay data from computer memory before creating new overlay files, unless the new overlay file is to include the overlay data still in computer memory.

Read from File. Places overlay objects in a selected file on the map. The Information Section asks for the name of the overlay file. Press *return* to accept the default filename, or type the filename that the PVD program is to read from. Overlay objects from the file are added to any overlay objects already on the PVD map. You can't edit the overlays. (See the *Edit File* command below.) Consequently, certain menu sections (*unit symbols, free draw, control points*) don't appear on the menu. If the PVD program can't find a file with the name you type, it displays an error message in the Information Section.

List Files. Shows the names of the overlay files available for reading.

Edit File. Lets you edit an overlay file. The Information Section.displays a message.asks for the name of the overlay file.. Press *return* to accept the default filename, or type the filename that the PVD program is to read from. Overlay objects from the file are added to any overlay objects already on the PVD map. You can edit the overlay information, as described in the commands above If the PVD program can't find a file with the name you type, it displays an error message in the Information Section.

Delete Files. Removes one or more overlay file(s) from the system.

The *Overlays Menu* has two options for choosing other menus.

Top Menu 1. Invokes *Top Menu 1.*

Top Menu 2. Invokes *Top Menu 2.*