



Research Product 96-05

SIMNET Unit Performance Assessment System (UPAS) Version 2.5 User's Guide

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Simulator Systems Research Unit

U.S. Army Research Institute for the Behavioral and Social Sciences

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FOREWORD

The networking of combat vehicle simulators, as illustrated by SIMNET, provides a method for collective training that supplements field exercises with operational equipment. The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) developed a PC-based Unit Performance Assessment System (UPAS) to support training feedback and research in the SIMNET environment.

This report provides guidance for trainers and researchers to use in applying the UPAS to collect and analyze unit performance data. It is an updated version of ARI Research Product 92-02 that was prepared to reflect UPAS refinements and lessons learned from the application of the UPAS to multiservice distributed training, armor unit training feedback research, and assessments of computer-generated force behaviors. This update reflects the addition of new capabilities to the UPAS that include company-level data displays, a Fire Fight display, an After Action Review Presentation Manager, the option to display individual entities or aggregate unit icons, line-of-sight displays, and a mouse interface.

The work described in this report is a portion of research task 2114, SYNTRAIN: Development of Advanced Training Technologies for Distributed Interactive Simulation (DIS) Systems. This task supports a Memorandum of Agreement entitled "Training Research Support of Combined Arms Tactical Trainer Development Efforts," signed 24 February, 1983. Parties to this agreement are the U.S. Army Project Manager for Combined Arms Tactical Trainer (PM-CATT) and ARI.

Users are encouraged to submit any suggestions for improving UPAS software or the user's guide to the first author. Comments and questions should be addressed to Chief, ARI Simulator Systems Research Unit, 12350 Research Parkway, Orlando, FL 32826-3276.

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SIMNET UNIT PERFORMANCE ASSESSMENT SYSTEM (UPAS) VERSION 2.5
USER'S GUIDE

CONTENTS

	Page
INTRODUCTION TO THE UPAS	1
Purpose of User's Guide	1
UPAS After Action Review Aids	2
After Action Review Presentation Manager	8
Rules of Thumb for Applying UPAS Data Summaries to Unit Performance Measurement	8
Types of Unit Performance Measures	8
Organization of Guidebook	14
COLLECTING DATA FROM THE SIMULATION NETWORK	15
Setting the Data Path	16
Setting up for Data Collection	17
Filtering Data	19
Initiating and Monitoring Data Collection	20
Platoon Organization	20
Master Event List	22
Control Measures	24
Converting Data to the National Training Center Format	28
USING UPAS DATA SUMMARY MENUS	31
Display Graphs	32
Display Tables	35
Menu of After Action Review (AAR) Aids	37
Map Displays	38
Setting up the Printer	44
Plan View Display	46
Battle Flow Chart	51
Battle Snapshot	56
Fire Fight Display	59
Exercise Timeline	62
Saving Screens and the AAR Presentation Manager	65
Battle Scorecards	67
UPAS UTILITIES MENU	70
OVERVIEW OF THE PERFORMANCE MEASUREMENT AND NTC ARCHIVE DATABASE OPTIONS	71

CONTENTS (Continued)

	Page
APPENDIX A. HARDWARE AND SOFTWARE REQUIREMENTS	A-1
B. UPAS DATA FILES	B-1
C. UPAS EXECUTABLE FILES	C-1
D. CAPABILITY TO CREATE SUBSETS OF EXERCISE DATA	D-1
E. CHANGING ORIGIN OF TERRAIN DATABASES	E-1
F. UPAS JOB AID	F-1

LIST OF TABLES

Table 1. Categories of Standards Appropriate to Each Type of AAR Aid	10
2. Firing Events as a Funtion of Time, Result, and Range	36
3. Colors Used to Represent Terraing Features	42
4. UPAS Direct Fire Weapon System Summary Table	69
5. Fire Support Summary Table	69
6. Exercise Data Contained in the UPAS NTC Archive Database	72
C-1. Names and Descriptions for UPAS Executable Files ..	C-1

LIST OF FIGURES

Figure 1. Example of a Plan View Display screen showing a replay of an exercise from a bird's-eye view	3
2. Battle Flow Chart tracing movement of vehicles during a critical segment of an exercise	4
3. Example of a Battle Snapshot	5
4. Example of a Fire Fight Display	6
5. Example of an Exercise Timeline	7
6. Example of a graph produced using the UPAS	7
7. Screen showing a table created using the UPAS	7
8. Battle snapshot screen with teaching point saved for use during an AAR	9
9. The UPAS Main Menu Screen	14
10. Data Collection Menu	15
11. Screen for identifying data paths	16

LIST OF FIGURES (Continued)

Figure 12.	Screen showing message displayed when attempting to load exercise data into a directory that is not empty.....	17
13.	Data Collection Setup screen.....	18
14.	Screen for limiting data collection to specified vehicles.....	19
15.	Data Collection Record screen.....	21
16.	Screen for entering IDs of vehicles assigned to a particular platoon.....	22
17.	Example of a Master Event List.....	23
18.	Screen for loading data on control measures.....	24
19.	Screen for selecting type of control measure to add.....	25
20.	Control Measure screen showing major terrain features.....	26
21.	Control Measures screen with pan scale options.....	26
22.	Sample screen for selecting control measures to be deleted.....	27
23.	Screen displayed when a user attempts to perform a National Training Center data conversion on data that have already been converted.....	29
24.	National Training Center data conversion screen...	30
25.	Screen for monitoring progress of data conversion to the National Training Center format.....	30
26.	Data Summary Menu screen.....	31
27.	Menu of graph options.....	32
28.	Menu of weapon system options.....	33
29.	Graph showing BLUFOR firing events as a function of time and weapon type.....	34
30.	Scale End Anchor Screen for changing X and Y scales for graphs.....	35
31.	Pop-up Menu for UPAS Data Summary Tables.....	36
32.	After Action Review Main Menu.....	37
33.	Screen for changing the center of the map display.....	38
34.	Screen for selecting a new center for an electronic map when the new center is outside the boundaries of the map being displayed.....	39
35.	Screen for changing scale of map display.....	40
36.	Screen for selecting whether contour lines are to be displayed in an electronic map.....	41

LIST OF FIGURES (Continued)

Figure 37.	Screen for deciding if contour elevations are to be displayed in electronic maps	42
38.	Screen for selecting or changing contour intervals	43
39.	Electronic map with terrain features displayed....	43
40.	Printer selection menu screen.....	45
41.	Printer connection screen.....	45
42.	Initial Plan View Display screen.....	46
43.	Screen for changing the time within a replay of an exercise on the Plan View Display.....	47
44.	Plan View screen showing unit at the time when it should be crossing its line of departure	48
45.	Plan View Display showing the logical player number and bumper number for a selected vehicle	49
46.	Plan View Display showing the logical player numbers and bumper numbers for multiple selected vehicles	49
47.	Pop-up screen for selecting Individual or Aggregate display type menu	50
48.	Plan View Display showing a platoon's identification in the aggregate display type mode	51
49.	Battle Flow screen tracing the movement of a unit	52
50.	Pop-up screen for changing Battle Flow time parameters	53
51.	Pop-up menu for changing the beginning or end times for a Battle Flow	54
52.	Pop-up screen for changing position marker interval	55
53.	Battle Flow screen for changing numerical marker intervals	55
54.	Screen for designating the time during an exercise at which a Battle Snapshot is to be made	57
55.	Battle Snapshot screen.....	57
56.	Battle Snapshot screen for selecting source and targets for line-of-sight displays	58
57.	Battle Snapshot screen showing line-of-sight (or no-line-of-sight) among the four vehicles in a platoon occupying a defensive position	59
58.	Sample Fire Fight Display.....	60

LIST OF FIGURES (Continued)

Figure 59.	Screen for changing period of time covered by a Fire Fight Display.....	61
60.	Screen for selecting sampling plan for display of rounds fired for rapid fire weapons.....	61
61.	Exercise Timeline showing halts, crossing of control measures, inintial firing events, and casualties inflicted or sustained.....	62
62.	Legend of firning events included in the Exercise Timeline.....	64
63.	Battle Snapshot screen being saved with trainer comments.....	65
64.	Menu of saved screens for After Action Review Presentation Manager.....	66
65.	Display of saved screen with trainer comments.....	67
66.	Battle Scorecard Menu Screen.....	68
67.	Screen displayed when a Battle Scorecard has already been generated for exercise data.....	68
68.	Utilities Menu screen.....	70
69.	Performance Measurement Screen.....	73
D-1.	Screen for defining a new data subset.....	D-2

SIMNET UNIT PERFORMANCE ASSESSMENT SYSTEM (UPAS)
VERSION 2.5 USER'S GUIDE

Introduction to the UPAS

Simulation Networking (SIMNET) is a method of collective training that supplements field training exercises with operational equipment. Each simulator in the network simulates a vehicle or aircraft in the battlefield environment. Simulators broadcast their position, status and other pertinent information over the network. The image generator for each simulator is capable of displaying the terrain on which the battle is conducted and all participants in the exercise.

SIMNET is intended to help train crews to fight together as part of a unit and units to fight together as part of a larger organization. The Unit Performance Assessment System (UPAS) is a PC-based system developed to assist trainers and researchers in analyzing unit performance. The UPAS was designed to:

- o collect data broadcast over the network (vehicle location, vehicle status, and firing events);
- o filter and organize the data to support rapid analysis;
- o load data into a relational database patterned after the National Training Center (NTC) database;
- o integrate broadcast data with unit planning and terrain data; and
- o provide graphic and tabular displays of data to support unit performance analysis and performance feedback.

After the UPAS collects data from networked simulators, it serves as a stand alone tool. It can be used after an exercise to support After Action Reviews (AARs), and it can be used subsequently to support training needs analysis and research.

Purpose of User's Guide

This guide is designed to meet the information needs of trainers and researchers desiring to use the existing UPAS graphs, tables, and other AAR aids to examine unit performance. Users wanting to modify the UPAS graphs and table options or perform additional analyses using the data in the SIMNET/NTC database are referred to the Advanced User's Guide for the Unit Performance Assessment System.

The text of this guide assumes that UPAS hardware and software have already been installed on your computer and your

computer has been linked to the SIMNET network. If this is not the case, see Appendix A for guidance.

UPAS After Action Review Aids

UPAS displays information in a way that supports quick interpretation by a trainer or researcher, and, at the same time, provides animated figures, static figures, and tables that can be used to illustrate key training points to exercise participants. The information displays include a Plan View Display, a Battle Flow Chart, Battle Snapshots, a Fire Fight Display, an Exercise Timeline, graphs, and tables. Each type of display is described below.

The Plan View Display replays the battle or selected segments of a battle. As Figure 1 illustrates, the Plan View shows a bird's eye view over a grid map displaying terrain features and unit control measures from the unit's operations order. Terrain features are color coded in the UPAS display, and these features include contour lines, treelines, rivers, dirt roads, highways, and buildings. Control measures are displayed in yellow, and the name of each measure is included with its display. The icons representing ground vehicles include an accurate display of vehicle and gun tube orientation. Dismounted infantry are represented by a triangle and rotary wing aircraft are represented by an oval with a short vertical line in the center. Fixed wing aircraft are represented by an icon that looks like a top-down view of an aircraft. These icons change colors to indicate when a vehicle fires and when it is destroyed.

The Plan View includes options that allow you to move forward and backward to specific points in an exercise quickly to examine critical aspects of unit performance. For example, if you wanted to find out if a unit returned fire and moved to covered and concealed positions promptly when fired upon by the enemy, you could use the replay to serve this purpose. Further, the Plan View allows you to magnify portions of the battlefield of particular interest to you and print a hard copy of the action at any point in the battle. Such hard copies can be used with an overhead projector to illustrate key points during AARS.

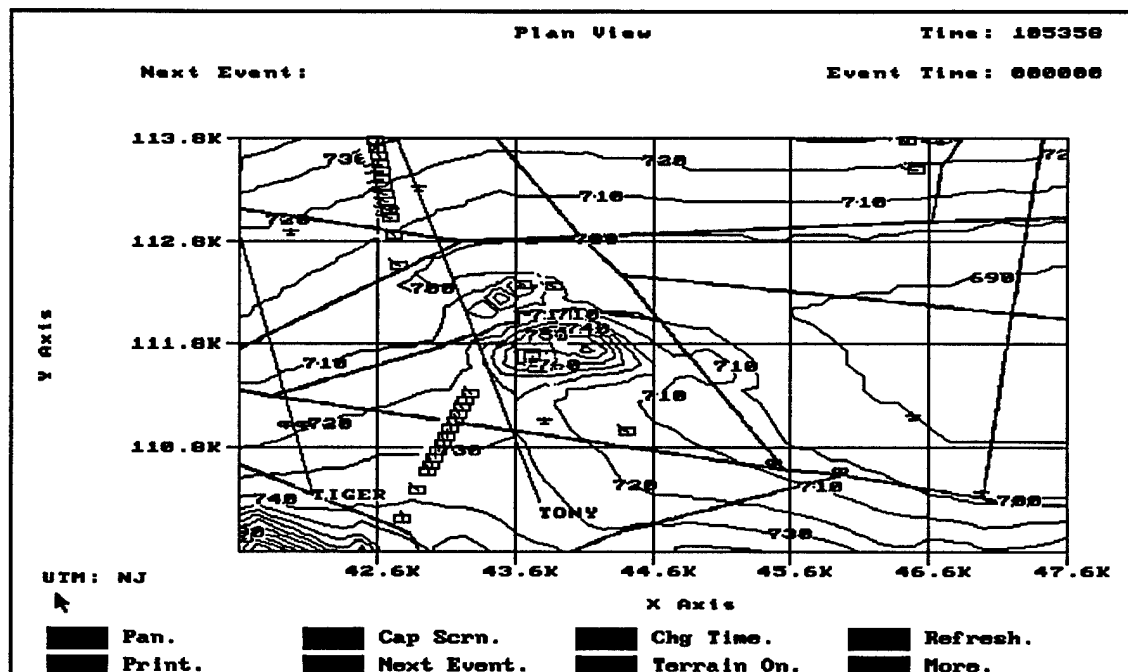


Figure 1. Example of a Plan View Display screen showing a replay of an exercise from a bird's-eye view.

A Battle Flow Chart is an animated figure that traces the movement of vehicles and units throughout a mission or during critical segments of a mission. Movement is traced over a grid map that includes control measures and major terrain features (Figure 2). UPAS allows you to control the points in time covered by a particular trace so that you can focus attention on a specific part of a mission. The Battle Flow also allows you to specify the time interval at which vehicle positions are to be marked. This important feature allows you to adjust the position updates to, for example, avoid data clutter for exercises that are long or involve a large number of vehicles. As in the case of the Plan View, the Battle Flow also allows you to magnify portions of the battlefield of particular interest and print copies of screens.

The Battle Flow provides a picture of a unit's overall movement for use in assessing how effectively it navigated towards the objective, applied movement techniques like bounding overwatch, and followed control measures. For example, you could use a Battle Flow of the entire exercise to find out if a unit crossed each of its control measures by the time specified in the operations order.

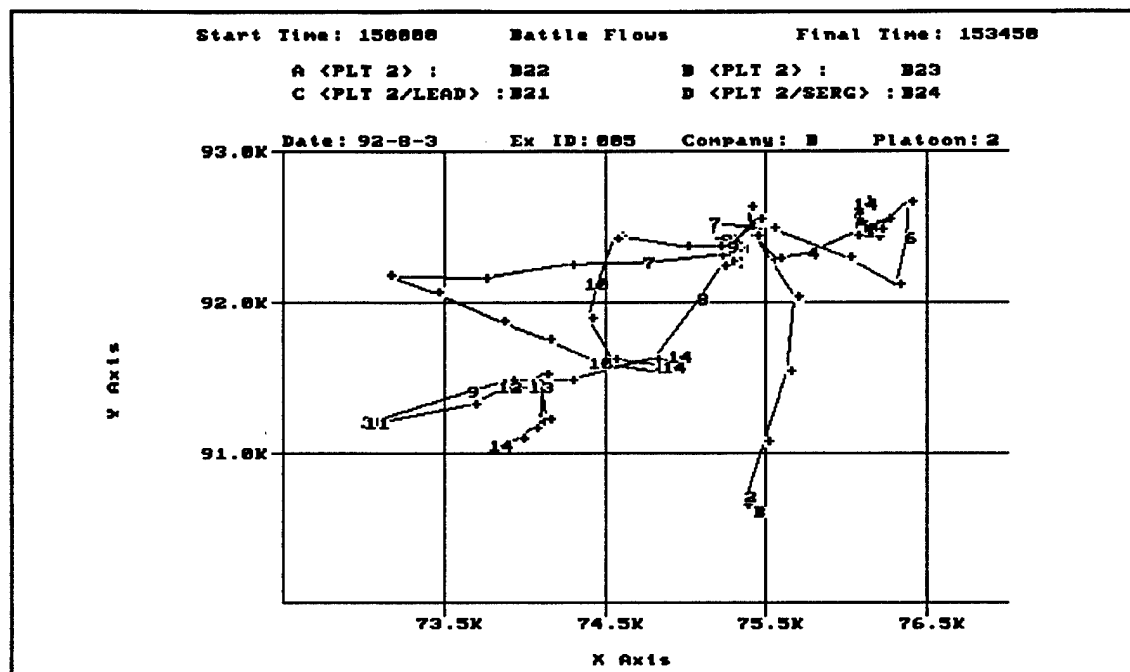


Figure 2. Battle Flow Chart tracing movement of vehicles during a critical segment of an exercise.

Battle Snapshots (see Figure 3) show the position of vehicles and their gun tube orientation at specific points in a mission. Positions are displayed over a grid map with unit control measures and major terrain features. You can select the points during a mission for which Snapshots are to be prepared to examine unit performance or to illustrate a critical point during an AAR. For example, you might want a graphic showing that a unit is two kilometers away from a phase line at a time it is supposed to be crossing the phase line. The Snapshot also has the capability to indicate line-of-sight between friendly and enemy vehicles. This capability can be used to assess the cover and concealment offered by a unit's halt positions, battle positions, and routes.

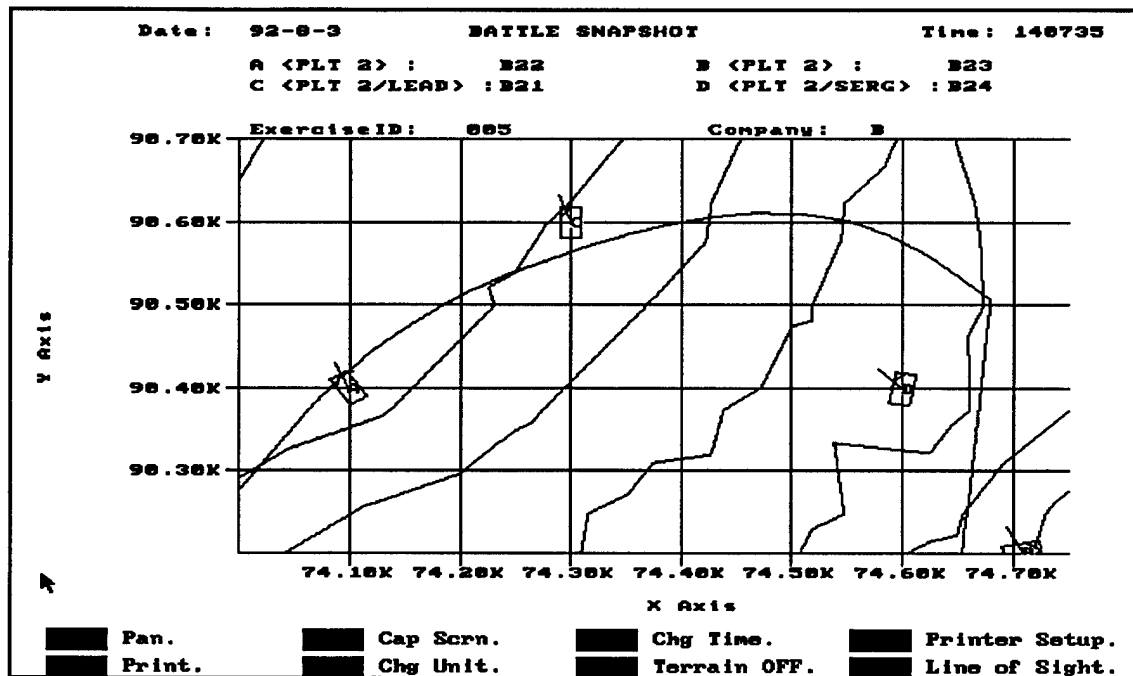


Figure 3. Example of a Battle Snapshot.

A Fire Fight Display (Figure 4) shows direct and indirect firing events over a terrain map. The period in time covered by this display is user selectable. Direct firing events are displayed with shot lines connecting the location of the firing vehicle with the location of the vehicle or ground impact, and a vehicle icon is used to show the location of the firing vehicle using the same color coding system as the Plan View. A miss is indicated by a white line, and a green line indicates a hit or a catastrophic kill. If the firing event results in a kill, there will also be a dead vehicle icon at the target location (cyan for a destroyed BLUFOR vehicle and white for a destroyed REDFOR vehicle). Artillery impacts are shown using white rectangles.

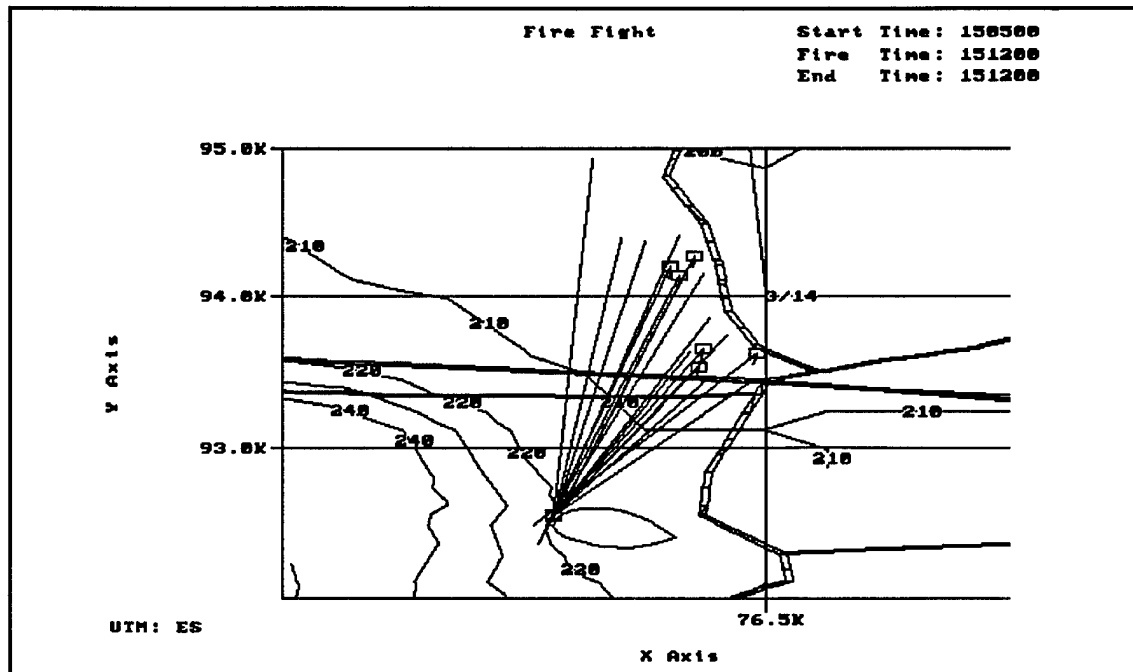


Figure 4. Example of a Fire Fight Display.

An Exercise Timeline is a figure that describes events as a function of time (see Figure 5). The intent of the Timeline is to describe events in a way which makes it easy for you to see how well a unit coordinates movement and weapons employment with each other and with other tactical events. If a communications log is kept by an observer during a SIMNET exercise, the time and content of messages can also be related to movement and firing events shown on the Timeline. The Timeline may help you to identify key time segments or points in time for more detailed examination using a Battle Flow Chart or Battle Snapshot.

By loading network data into a relational database management system, UPAS makes it possible for even non-programmers to examine these data quickly using Structured Query Language (SQL). To further assist users, menus of graph and table options have been included in the UPAS that can be used without knowing SQL. Figure 6 is an example of a graph that can be generated using the graph menu, and Figure 7 is an example of one of the tables that can be created using the table menu.

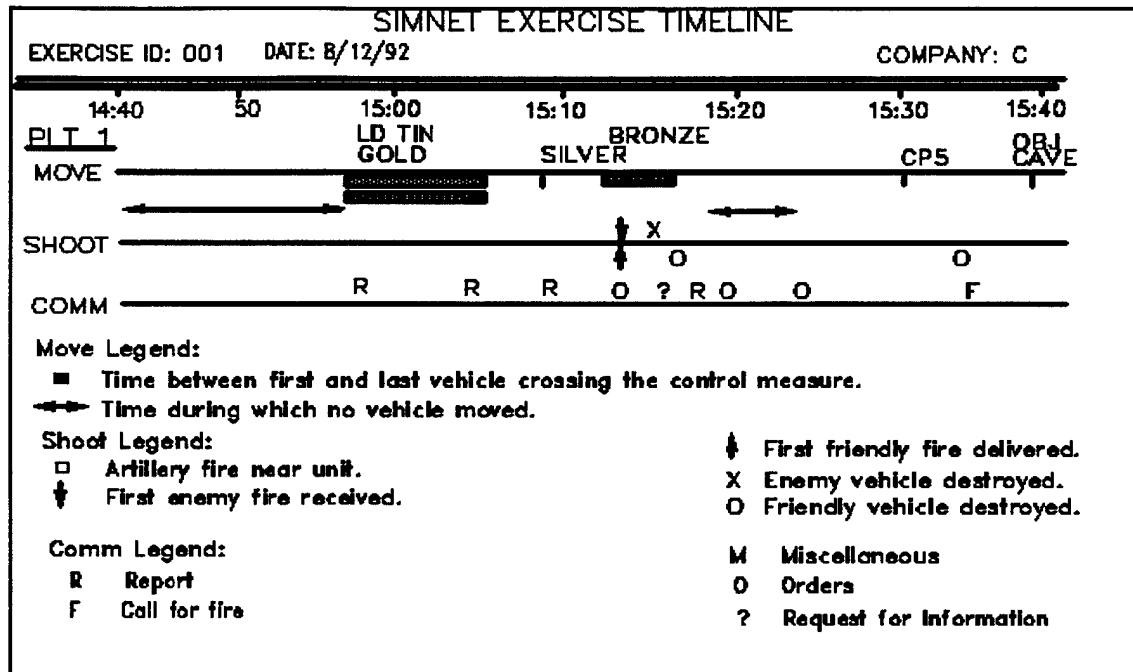


Figure 5. Example of an Exercise Timeline.

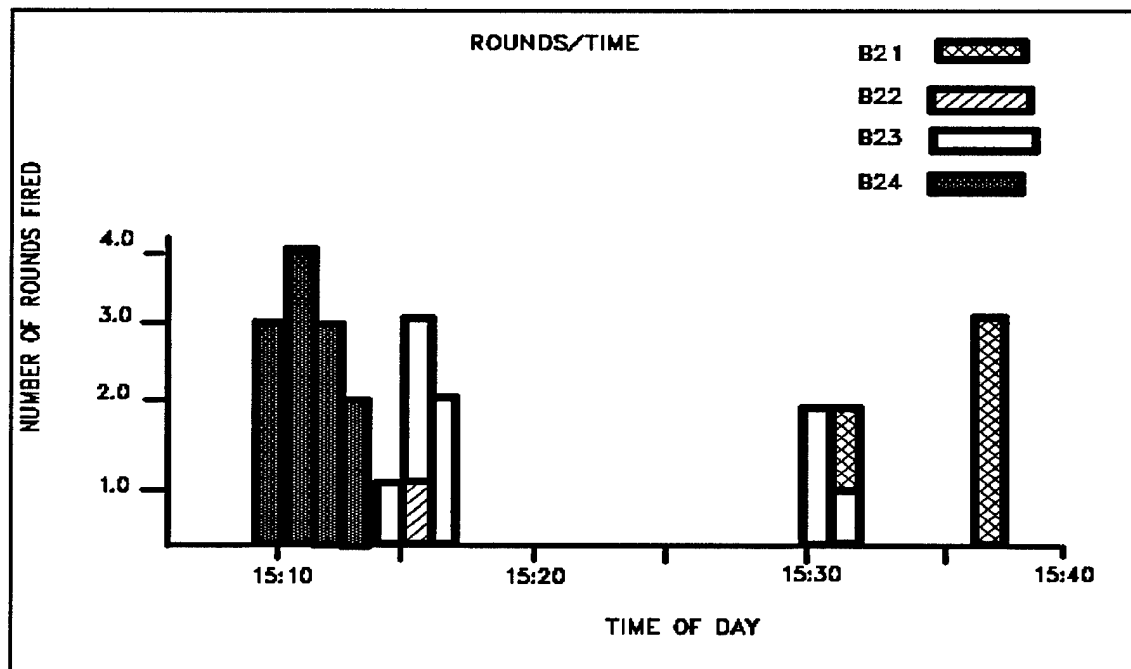


Figure 6. Example of a graph produced using the UPAS.

PAIRED BLUFOR FIRING EVENTS			
TIME	TARGET BUMPER #	FIRING BUMPER #	RESULT
10:25:00	342 (53)	A43 (53)	M
10:25:00	342 (53)	A44 (53)	H
10:26:00	311 (53)	A44 (53)	H
10:26:00	312 (53)	A43 (53)	M
10:27:00	313 (53)	A44 (53)	M
10:28:00	311 (53)	A22 (53)	K

Use Arrow Keys to scroll data.
F1 to print table.
<Esc> to Exit Display Mode.

Figure 7. Screen showing a table created using the UPAS.

After Action Review Presentation Manager

The AAR Presentation Manager is used to support the efficient management of UPAS data displays during feedback sessions. The user can select and save Battle Snapshot, Battle Flow, Fire Fight, and Exercise Timeline screens for use during AARs. For each of the map displays, the user can type a teaching point or comment that will also be shown when the saved screens are shown during AARs. Figure 8 shows an example of a saved Battle Snapshot with a teaching point.

The AAR Presentation Manager, menus of graph options, menus of table options, and the Plan View combine to provide AAR leaders and researchers with a wide variety of data displays.

Rules of Thumb for Applying UPAS Data Summaries to Unit Performance Measurement

Table 1 is a matrix that relates categories of performance measures to each type of AAR aid (including graphs and tables). This table is provided as a general guide in deciding which types of measures might be applied most effectively with each type of aid. These categories of performance measures are described below with examples taken from the Mission Training Plans for Armor Platoons.

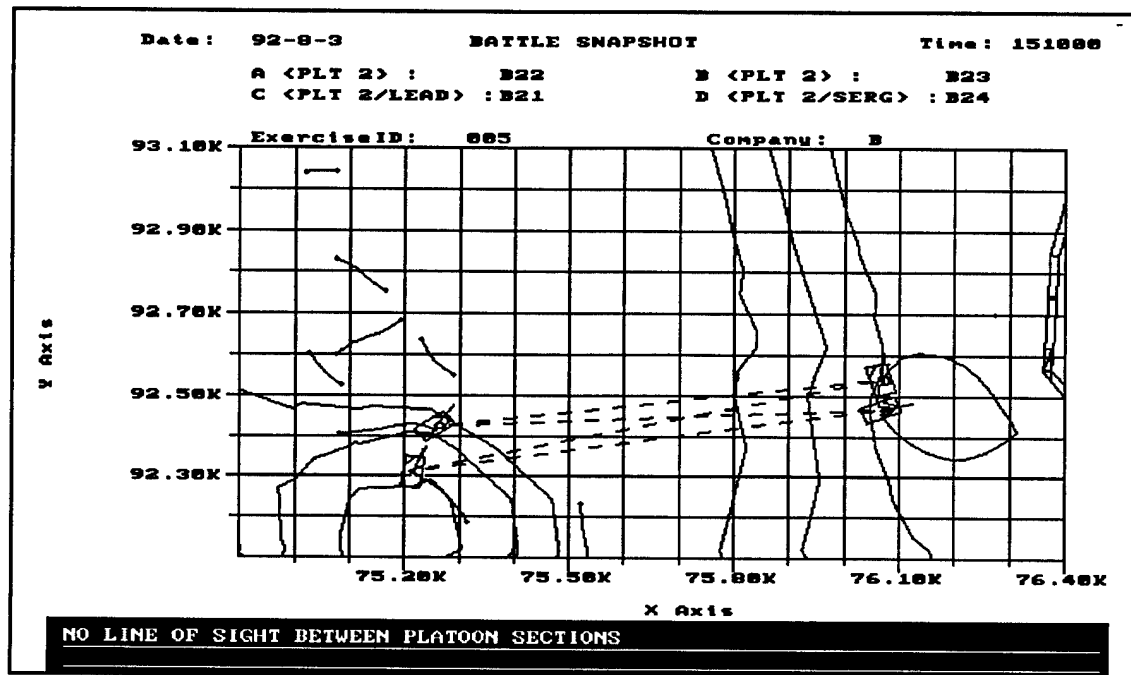


Figure 8. Battle snapshot screen with teaching point saved for use during an AAR.

Friendly movement cued by enemy or friendly firing events. These standards are used to assess whether a unit takes appropriate movement actions when fired upon. The initial and subsequent movement responses to enemy fires are a function of the overall METT-T situation. This category of standards also addresses the coordination of friendly movement with friendly covering fires across a wide range of tactical situations. Examples of performance measures under this category from the platoon task "Perform Platoon Fire and Movement" are as follows.

- o Plt ldr moves out of kill zone and seeks better cover and concealment.
- o Each vehicle moves to alternate firing positions as necessary.
- o Plt ldr repositions the Platoon to gain an advantage over the Threat and maximize opportunities for flank shots against Threat tanks.

Table 1

Categories of Standards Appropriate to Each Type of AAR Aid.

CATEGORY OF STANDARDS	AAR AID FORMAT				
	TABLES/ GRAPHS	BATTLE FLOW	SNAPSHOT	PLAN VIEW	FIRE FIGHT
Movement and Firing	-----	-----	-----	▲	▲
Friendly and Enemy Fires	▲	-----	-----	▲	▲
Movement and Control Measures	-----	▲	▲	▲	-----
Movement Technique and METT-T	-----	▲	▲	▲	-----
Movement and Cover/Concealment	-----	▲	▲	▲	-----
Weapon Orientation	▲	-----	▲	▲	▲
Halts and Cover/Concealment	-----	▲	▲	▲	-----
Locations of Friendly Indirect Fire and Enemy Positions	▲	-----	-----	-----	▲
Spatial Relationships Among Moving Vehicles	▲	▲	▲	▲	-----
Rate of Movement	-----	▲	-----	▲	-----
Location, Control Measures and Communication	-----	-----	-----	-----	▲
Firing Events and Communications	-----	-----	-----	-----	▲

Friendly firing events cued by enemy firing events. The standards within this category assess how well a unit controls its volume and distribution of fires in response to enemy firing events. Do units promptly return fire? Do units adjust volume and distribution of fires in response to changes in volume of enemy fires? Examples of standards in this category from the task "Perform an Attack by Fire" are listed below.

- The platoon increases and decreases the rate of fire depending on METT-T.
- Plt ldr redirects, adjusts, or concentrates fires on Threat forces displacing, moving to alternate firing positions, or moving in as reinforcements.
- Plt ldr requests shifting/lifting of supporting direct and indirect fires as necessary.

Compliance of movement with control measures. These standards are used to assess how well a unit's movement techniques, routes, and rates match the unit's operations order. Do units initiate movement and cross control measures as designated in the operations order? Do units employ appropriate movement techniques or formations as a function of control measures designated in the unit operations order. The examples below were taken from the task "Conduct a Tactical Road March."

- o Follows the prescribed route of march, without deviation.
- o Crosses SP within one minute of designated time without stopping or exceeding the catch-up speed specified in the OPORD or FRAGO.

Appropriateness of movement techniques as a function of the METT-T situation. These standards are used to assess whether the movement techniques employed by the unit are appropriate to the METT-T situation throughout the exercise. The following standards are from the tasks "Execute a Line Formation" and "Execute a Vee Formation", respectively.

- o Terrain is open, maximum fire power forward is essential, and the platoon must assault a position, cross a danger area, or move on-line to occupy a defensive overwatch.
- o Excellent protection and control are required, but maximum fires to the front are not necessary. Sufficient space exists for lateral dispersion of the lead section.

Use of cover and concealment during movement. This category of standards addresses the cover and concealment offered by the overall route of advance of a unit. It also addresses the cover and concealment afforded by short movements, such as the route from a battle position to an alternate firing position. The standards below are from the task "Displace to a Subsequent Battle Position."

- o Plt ldr designates covered and concealed routes in and out of the BP to subsequent positions.
- o Tank commanders select covered and concealed routes between primary, alternate, and supplementary firing positions.

Orientation of weapon systems as a function of the METT-T situation. This category covers two subcategories. The first assesses whether the orientation of the gun tube of each vehicle is appropriate given the METT-T. The second addresses the issue of whether each crew continually scans its assigned sectors or areas of responsibility as indicated by gun tube movement.

The following standards are taken from the task "Execute a Herringbone Formation."

- o Lead tank orients main gun toward the column's direction of travel.
- o Trail tank main gun orients opposite to the direction of travel.
- o Other tanks orient main gun toward the flank of the column corresponding to their direction of travel after exiting the route.

Halts and cover/concealment. These standards are used to assess the use of cover and concealment in selecting halt positions. In the context of offensive missions, these positions include overwatch positions selected prior to actual contact and firing positions. In the context of defensive missions, they include primary, alternate, and supplementary firing positions. The following standards are from the tasks "Take Actions at an Obstacle" and "Execute a Herringbone Formation", respectively.

- o Plt ldr establishes an overwatch position at the last covered and concealed position on the friendly side of the obstacle.
- o Each tank commander occupies covered and concealed positions.

Locations of friendly indirect fire relative to enemy location. Some standards in this category are concerned with using indirect fire on known enemy locations, while others are concerned with using indirect fire on likely enemy locations. The standards below are from the task "Assault an Enemy Position."

- o Plt ldr initiates indirect fires to suppress known or suspected Threat forces on or within range of the objective.
- o Plt ldr lifts and shifts indirect fires beyond the objective.

Spatial relationships among moving vehicles. This category of standards assesses the quality of movement techniques used by a unit, the location of the Platoon Leader's and Platoon Sergeant's vehicles relative to other vehicles, and whether an appropriate interval is maintained among vehicles. The following standards are from the task "Execute a Wedge Formation."

- o Plt ldr positions himself at either the 1 o'clock or 11 o'clock position where he can best control his platoon and according to his SOP.
- o The PSG positions himself opposite the plt ldr at either the 11 o'clock or 1 o'clock position.
- o The wingmen take up positions behind and to the outside of their respective section leader.
- o Each tank commander maintains his tank's interval and speed in accordance with METT-T, platoon SOP, and plt ldr's guidance.

Rate of movement. This category addresses movement rates over both short and longer periods of time. Movement rates over very short periods (a few seconds) are examined to assess a unit's response to an actual threat situation (i.e., moving quickly and continuously to a covered and concealed position) or to assess if vehicles move continuously at critical points in time to avoid blocking the movement of other vehicles (such as when a unit is moving into an assembly area). The following standards are from the task "Perform Assembly Area Activities."

- o Vehicles move off the route of march without stopping or blocking traffic.
- o Vehicles slow movement but do not stop or block traffic (as they occupy the assembly area).

Reporting of locations in terms of control measures. These standards assess whether a unit reports to a higher headquarters when reaching or taking requiring actions at key locations. The following standards are from "Conduct a Tactical Road March".

- o Reports crossing of the SP on time, as required in the company team OPORD or FRAGO.
- o The plt ldr reports all graphic control measures within one minute of crossing, as required by the company team OPORD or FRAGO.

Reporting of enemy contact and firing events. This category is concerned with assessing whether units report initial contact, casualties inflicted, and casualties sustained. The standards listed below are from the task "Execute Actions on Contact".

- o Reports if the threat has been destroyed.
- o Reports if the platoon needs assistance to destroy or suppress the Threat force.

Organization of Guidebook

This guide is organized according to the UPAS Main Menu. To reach the main menu, change the directory of your computer to the "UPM" directory (type CD UPM), and then type "UPM" to initiate the UPAS program. The first screen you see will be the UPAS title screen. Press the carriage return key to move to the UPAS Main Menu screen shown in Figure 9.

Unit Performance Assessment System
 Data Collection Data Summary Performance Measurement NTC Archive Database Utilities
Use up or down arrow keys to highlight selection. <Enter> to accept. <Escape> to quit.

Figure 9. The UPAS Main Menu screen.

The Data Collection option calls up menus required to set up the UPAS to collect data from a SIMNET exercise and load these data into a relational database. The Data Summary option calls up menus required to generate the graphs, tables, and AAR aids used to examine unit performance. The Utilities option allows you to modify the menus of graph and table options available within the UPAS. The Performance Measurement option and the NTC Archive Database options are research tools that will be discussed briefly at the end of this guide. For more information on these options, you are referred to the advanced user's guide.

If you find it necessary to reboot while in UPAS, always turn off your computer (cold boot) instead of pressing <Ctrl>-<Alt>-<Del> (warm boot). Unless you do a cold boot, the high memory system associated with UPAS will not load properly and UPAS will lock up when it receives a task requiring high memory.

Collecting Data from the Simulation Network

As previously mentioned, UPAS collects virtually all of the data packets from SIMNET exercises relevant to unit performance assessment. This section is concerned with setting up the UPAS to collect data, periodically monitoring data collection, and initiating the program that automatically loads data into a relational database management system at the end of the exercise. This loading process must take place before you can use the UPAS graph and table menus.

Selecting the data collection option from the UPAS main menu will result in the screen shown in Figure 10. The first two options on the Data Collection Menu, "Set Data Path" and "Collect Data" must be addressed before the UPAS will begin to collect exercise data. The "Convert Data to NTC Format" option is employed after data have been collected from the network. The "Platoon Organization", "Master Event List", and "Control Measures" options may be used before or after data collection. The "Create UPM Subset Data" option is used after data collection is completed.

Data Collection
Set Data Path Collect Data Create UPM Subset Data Convert Data to NTC Format Platoon Organization Master Event List Control Measures
Use up or down arrow keys to highlight selection. <Enter> to accept. <Esc> to return to Main Menu.

Figure 10. Data Collection Menu.

Setting the Data Path

The data collected for a large scale (e.g., task force) SIMNET exercise may exceed two hundred megabytes. Therefore, before you start to collect data for a new exercise you should make sure that you have adequate space available on your hard disk. Terrain databases currently available for use on the UPAS are the "Knox", "NTC", and "GRAF" databases.

To collect data from networked simulations, you must first provide information about where the data are to be stored by selecting and addressing the "Set Data Path" option. To look at an exercise using one of the map displays you must specify the path of the correct terrain database, since the UPAS is capable of using any SIMNET terrain database in the appropriate format. When you select the set path option from the UPAS data collection menu, a screen similar to the one in Figure 11 will appear.

The data path entered will ordinarily lead to a subdirectory of the UPM directory. For example, a path of "C:\UPM\KNOX" would cause data to be collected in the Knox subdirectory. The subdirectory you specify for data collection should be empty, because UPAS will not allow you to collect data into subdirectory that already contains data. For practical reasons it is advisable to use a unique subdirectory name every time that you collect data. Further, the name of the subdirectory should be limited to eight characters.

Path Setup for Data Collection	
Data Path: C:\UPM\k3920803\ Terrain Path: C:\TDB\knox	
<F1> Save paths and quit. <Esc> Quit without saving. <Enter> Data or Terrain Path.	Up to 30 characters for each path. Use arrow keys (<-,-->) to move.

Figure 11. Screen for identifying data paths.

To change the directory or terrain path, use the arrow keys to position the cursor, type in the appropriate path, and press the <F1> key to accept the path. You can move between the data and terrain portions of the screen by pressing the <Enter> key. In addition to arrow keys, the <Backspace>, <Insert>, and <Delete> keys can be used to edit path names.

If the subdirectory you name in the path is not present on the hard disk (C), UPAS will prompt you to create it after you press <Enter>. When the prompt appears, enter "Y" to create the subdirectory with the name you entered, or "N" if you want to alter the name. A few seconds after you enter "Y", UPAS will display the message "directory created".

Setting up for Data Collection

The Collect Data option allows you to set up the system to collect data. The data collection process proceeds only if previous exercise data are not in the directory you have selected. If you select the Collect Data option and the path you selected already contains data, your screen will display the message shown in Figure 12. The system prompts you to decide whether or not to save the data that is already in the directory.

Collect Data
Found Previous Exercise Data Files. You must save the data collected to Floppy disk or tape or you will lose it.
<Esc> to access UTILITIES or <Enter> to delete previous Exercise data.

Figure 12. Screen showing message displayed when attempting to load exercise data into a directory that is not empty.

If you select the Collect Data option and no data are in the subdirectory, then the Data Collection Set-up screen shown in Figure 13 will appear.

The cursor will appear in the first field when this screen is displayed. The first field defaults to the current date. Unless you are setting up for data collection to be conducted in the future, it is not necessary to edit this field. Press <Enter> to move the cursor to the next field.

The second field requires you to type in the Exercise ID number. This ID number is the same number used to identify the exercise on the SIMNET network, and it must be obtained from the Battle Master before the exercise starts. This ID will be a number from 1 to 999. **This is the most important information to be inserted in this screen, because the UPAS cannot collect data unless the correct ID is used.**

The third field requires you to enter the mission type. Mission type includes attack, defend, road march, etc. The specific format of this information is not critical, and as many as 20 characters may be used. After you have identified the mission type, press the <Enter> key to move to the next field. In the fourth field, you are asked to choose the type of unit (armor, mechanized infantry, or combined arms). The fifth field asks you to enter the unit's organization. The unit's organization may be defined in any way the user wishes, using up to 20 characters.

Data Collection: Set Up	
Exercise Control # (date): 93-6-3 Exercise ID: 001 Mission Type: Hasty Attack Armor/Mech/Combined Arms: A Organization: The following functions control the selected IDs <F2> Adding IDs <F3> Modifying IDs <F4> Viewing IDs	
Type a date, then press Enter to accept. <F1> to start Collecting Data. <F2>, <F3>, and <F4> to select IDs. <Esc> to return to Data Collection Menu.	

Figure 13. Data Collection Setup screen.

Filtering Data

In certain cases there will be vehicles on the network for which you do not want to collect data. For example, two exercises may be run concurrently in SIMNET. The data from both exercises would be picked up by UPAS unless you designate the specific vehicles for which data are to be collected. To designate that data be collected for specific vehicles press the <F2> key. A screen will then appear with a block in which you can enter the logical player numbers for the vehicles of interest, as shown in Figure 14. The logical player numbers are obtained from the Battle Master. Each of these player numbers has three parts (i.e., the site ID, the host ID, and the vehicle number) separated by a period. The sequence of numbers for one vehicle should be separated from that for other vehicles with a space. UPAS will allow you to type in up to seventy vehicle IDs. To review subsequently the list of vehicle IDs, press the <F4> key. The use of this key will allow you to view, but not edit, the IDs. In order to edit the IDs after they have been saved, press the <F3> key. **Note: You do not have to enter vehicle IDs unless you want to limit data collection to specific vehicles.**

Data Collection: Set Up	
Exercise Control # (date): 93-6-3 Exercise ID: 001 Mission Type: Hasty Attack Armor/Mech/Combined Arms: A Organization:	
Adding IDs 17.200.15 17.200.16 17.200.17	
Type a date, then press Enter to accept. <F1> to start Collecting Data. <F2>, <F3>, and <F4> to select IDs. <Esc> to return to Data Collection Menu.	

Figure 14. Screen for limiting data collection to specified vehicles.

If you specify vehicle IDs for data collection, you should also add the ID "0.0.0" to make sure the UPAS will collect indirect fire data. At the Fort Knox Combined Arms Training Center, "2.60.*" should also be entered to avoid losing part of the indirect fire data. Ask the Battle Master at your site about the firing IDs you will need, in addition to "0.0.0" to collect all of the indirect fire data for a particular exercise.

You can also use an asterisk (*) as a wild card symbol for the last part of the ID, such as "2.17.*". This option will frequently be used to input the IDs for Semi-Automated Forces (SAFOR), because SAFOR IDs may not be available until just before the exercise or during the exercise. However, all of the SAFOR generated by the SAFOR work station for a particular exercise will have the same site and host ID. Check with the Battle Master to find out what the SAFOR site and host IDs are for a particular exercise.

Initiating and Monitoring Data Collection

After filling out all of the fields in the Data Collection Setup screen, press the <F1> key to start collecting data and view the Data Collection Record screen (Figure 15). This screen maintains a continuous tally of the different types of data packets being collected during an exercise, and it can be monitored from time to time to make sure that data are being collected.

You should expect the UPAS system to "crash" from time to time during data collection. We have attempted to identify the variables that lead to these crashes, but our efforts have not been successful. UPAS will save the data collected prior to the "crash", but it will not allow you to collect more network data in the exercise directory you were using. To restart data collection, do a cold reboot and create a new directory.

Platoon Organization

By selecting the Platoon Organization option from the Data Collection Menu you can designate vehicle assignments for each company and subordinate platoon in the exercise. This information must be loaded to use many of the UPAS AAR aids. Depending on your needs, you can load the vehicle ID data for BLUFOR units, REDFOR units, or both types of units. The first screen appearing after you select the Platoon Organization option will ask "which force" and give you the option of red or blue. If you plan to load vehicle ID data for both the red and blue side, you can use the <Esc> key to return to the force menu after you have loaded data for one force.

Data Collection Summary			
Simulation Protocol		Data Management Protocol	
Vehicle Appearance	24000	Change in Vehicle Status	00002
Vehicle Impact	00011	Vehicle Status	00022
Indirect Fire	00005	Other	00000
Fire	00011		
Other	00000	Other Protocols	00865
Counter Display F1: TURN OFF F3: Interrupt Data Collection, F4: Keyboard Lock, ESC: Stop			

Figure 15. Data Collection Record Screen.

After you select a force, a pop up menu will appear with the options Company A, Company B, Company C, and Company D. Use the arrow keys to move to the appropriate option, and press the <Enter> key. The next pop-up menu will provide a list of platoon options (platoons 1 through 3, attached platoon, and company headquarters). Use the arrow keys to make your selection and press the <Enter> key.

The screen illustrated in Figure 16 will appear after you have selected a specific platoon. You must type in the IDs for the platoon leader's vehicle and platoon sergeant's vehicle separately from the rest of the vehicles. To type in the vehicle IDs for the platoon leader or platoon sergeant, press the <F2> key. Press the <F3> to type in IDs for the other vehicles. These IDs are made up of the SIMNET host, site, and vehicle number rather than the bumper numbers. The three components of the ID must be separated from each other with a period, and a space should be used to separate vehicle IDs. When all of the vehicle IDs have been recorded, press the <F1> key to save the IDs for the entire platoon. If you select the Company HQ option, you will be asked to type in the vehicle IDs for the Company Commander and the Executive Officer (XO).

You can enter IDs for up to four platoons within a company. This feature allows you to include the vehicle IDs for attached platoons or sections. When all platoons of interest have been identified, press the <Escape> key to return to the Data Collection Menu.

Platoon Organization					
Leader ID: 3.4.1594	Sergeant ID: 3.4.1545				
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Vehicle 1 ID: 3.4.1592</td> <td style="padding: 5px;">Vehicle 3 ID:</td> </tr> <tr> <td style="padding: 5px;">Vehicle 2 ID: 3.4.1591</td> <td style="padding: 5px;">Vehicle 4 ID:</td> </tr> </table>		Vehicle 1 ID: 3.4.1592	Vehicle 3 ID:	Vehicle 2 ID: 3.4.1591	Vehicle 4 ID:
Vehicle 1 ID: 3.4.1592	Vehicle 3 ID:				
Vehicle 2 ID: 3.4.1591	Vehicle 4 ID:				
Enter Vehicle ID for Company A / Platoon 1 (Red Force)					
<F2> Commander Field <F3> Vehicle Field. Use Arrow Key to Change Position. <F1> to Save. <Enter> to Accept. <Esc> Return to Previous Menu.					

Figure 16. Screen for entering IDs of vehicles assigned to a particular platoon.

Master Event List

The Master Event List option allows you to record up to seven time-tagged events. These may be events from the unit operations order (e.g., the time the unit is expected to cross its Line of Departure) or events observed during the exercise. Recording this information is useful, because it will allow you to move through the replay of the exercise on the Plan View from one planned event in the mission directly to another. Information you place in the Master Event List is automatically tied to the Plan View.

Figure 17 illustrates a Master Event List screen on which the user has listed four events and the time each event is to occur. To start typing the first master event only, you must first press the <F2> key. After typing the event, press <Enter> to move to the time column. After you type in the hour, you must press <Enter> to move to the minute portion of the time column. After you type in the minutes, press <Enter> and the entire line you have just typed will be highlighted. If you want to add or append another event to the list, press the <F4> and start typing. Each event may be up to twenty characters in length.

Master Event List	
Event	Time
Move out of assembly area	06:30
Cross Line of Departure	06:45
Cross Phase Line Dog	07:10
Reach Assault Position Falcon	07:30
<F1> Save Change and Exit <F4> Append <F2> Edit <F9> Delete <F3> Insert <ESC> Exit Without Change	

Figure 17. Example of a Master Event List.

If you decide that you missed a key event and want to go back and insert it in the correct time sequence, move the cursor to the line immediately below where you want to make the insertion and press the <F3> key. UPAS will then allow you to type in the event at the desired location.

When you have completed the list, press the <F1> key to save the list and you will automatically exit the Master Event List option. If you re-enter the Master Event List option to make edits, move the cursor to the line you want to change and press the <F2> key. If you want to delete a line, move the cursor to that line and press the <F9> key. To exit after making your changes, press the <F1> key. Press the <Esc> key to exit without saving your changes.

When using the Master Event List, you should avoid typing "26" as the minute entry for the time of an event. This particular number is an "end of file" code and using it will cause the loss of any events typed after the number "26" appears.

Control Measures

The Control Measure Option allows you to record the name and location of up to 24 unit control measures (for each force). Once this information is recorded, the control measures will automatically be displayed on appropriate AAR aids such as the Battle Flow Chart.

If you select the Control Measure option, you will first be asked to select the force, red or blue, for which control measures are to be added. After you select the side, you will see the screen shown in Figure 18. To select a type of control measure, use the mouse icon to select the option "type" from the bottom of the screen. The next screen (Figure 19) will provide a list of control measure types that include air space coordination areas, assembly areas, boundary lines, check points, combat service support areas, engagement areas, lines of departure, minefields, objectives, obstacles, phase lines, release points, and starting points. Use the mouse icon to select the up and down arrows at the right side of the pop-up screen and cycle through the list of options. When you press the left mouse button to select an option, the name of that option will appear in the box at the top of the pop-up screen. When you are satisfied with your selection, move the icon to the okay box and press the left mouse button. To add the type of control measure you have selected, move the icon to the "add" option at the bottom of the screen and press the left mouse button.

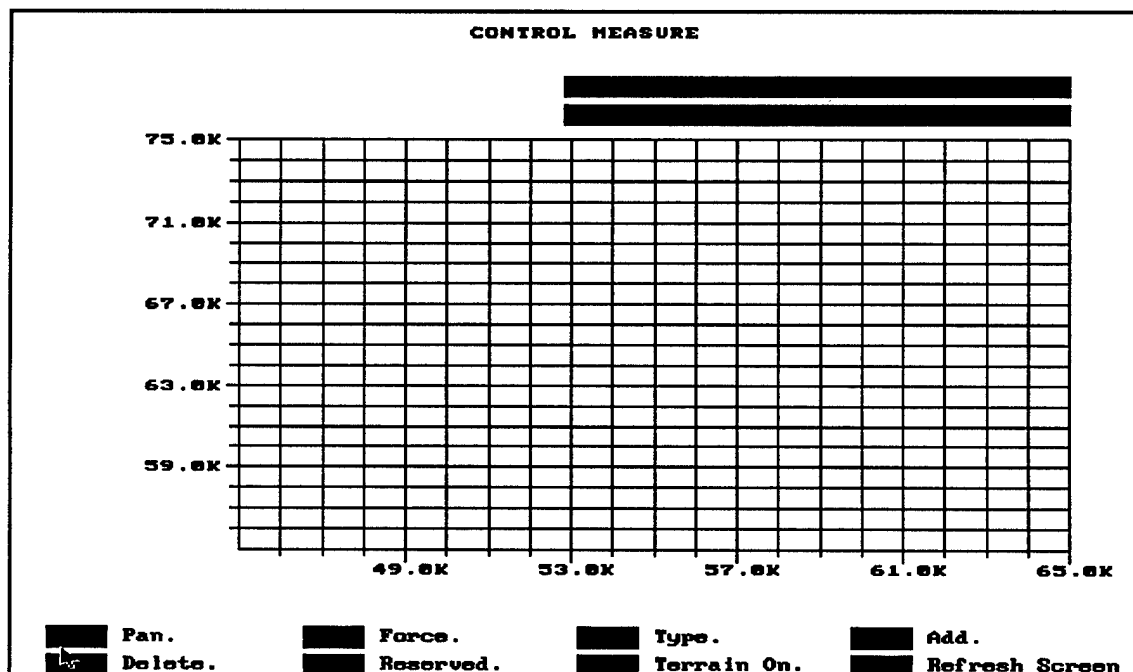


Figure 18. Screen for loading data on control measures.

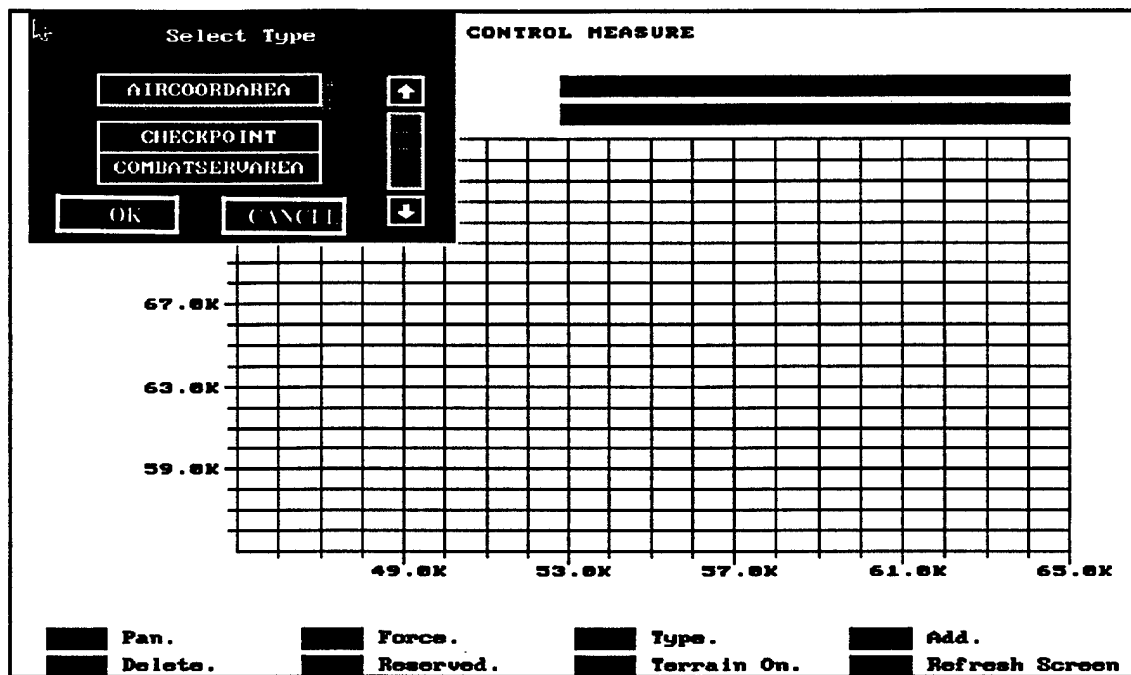


Figure 19. Screen for selecting type of control measure to add.

After you select "add", you will be asked to type the name of the control measure (e.g., tiger) and then move the icon to the "okay" box before pressing the left mouse button. The procedures for adding control measures differ among types. For points, move the icon to the point on the map and press the left mouse button. For areas, move the icon to the boundary of the area (e.g., objective), press the left mouse button, and drag the icon to a point on the opposite boundary before releasing the left mouse button. All areas except the Engagement Area will be defined by ovals. The Engagement Area will be defined by a free form polygon so that the user can determine its shape. Minefields will appear as ovals filled with x's to represent mines. For lines, press the left mouse button and move the icon to draw each segment of a line. When you are finished drawing the entire line, press the right mouse button.

To help orient yourself when adding control measures, the UPAS allows you to call up major terrain features. To call up these features, or to remove these features, move the icon to the terrain feature option at the bottom of the screen and press the left mouse button. Figure 20 shows an example of control measures drawn over terrain features.

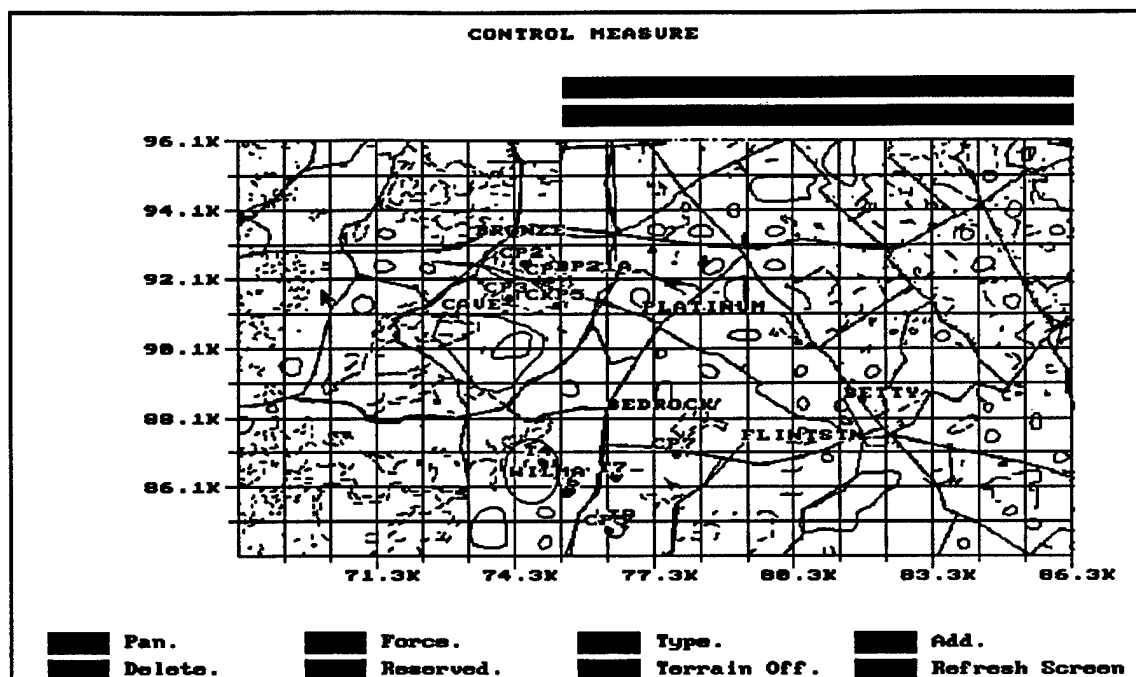


Figure 20. Control Measure screen showing major terrain features.

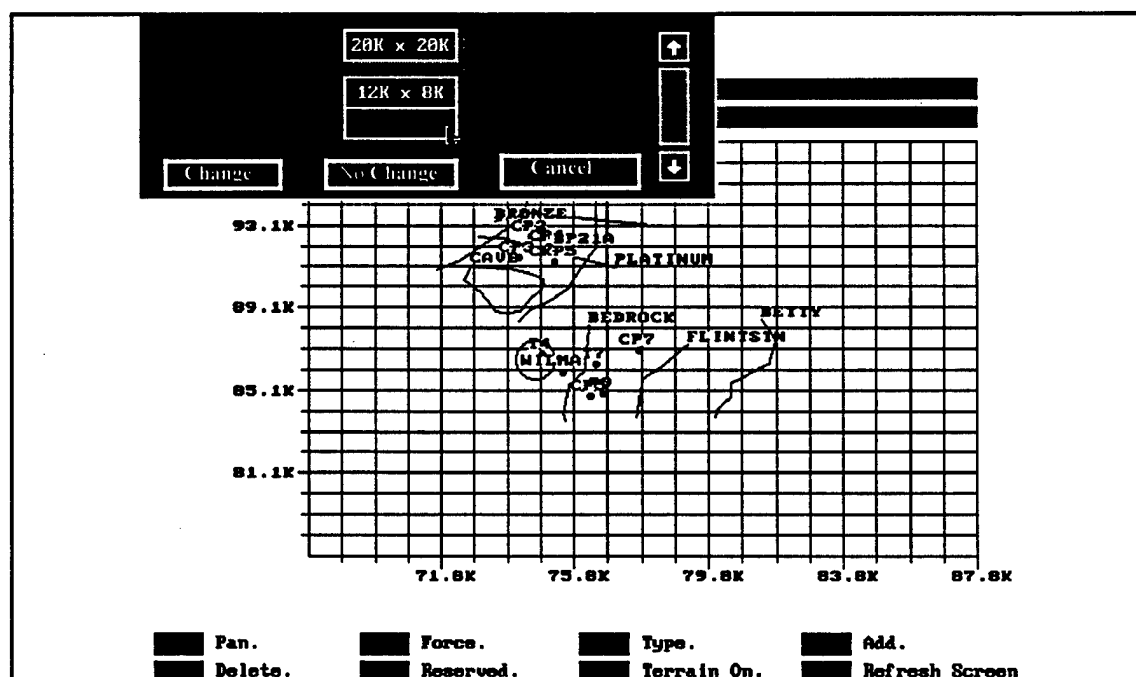


Figure 21. Control Measure screen with pan scale options.

The UPAS also allows you to pan and zoom a display. Move the icon to "pan" option at the bottom of the screen and press the left mouse button. The icon will then change to a "plus" sign. Move the icon to the point on the display that you want to use for the center of a new display and press the left mouse button again to call up the pop-up menu shown in Figure 21.

Place the mouse icon on the up and down arrows on the right side of the pop-up display to cycle through the list of scale options. Press the left mouse button to select an option, and the selected option will be appear in the box on the top of the pop-up display. Move the icon to the "okay" box and press the left mouse button to cause the map to be displayed with the new scale.

Select the "delete" option from the Control Measure menu to remove a control measure. The screen for deleting control measures (Figure 22) lists the names of all the control measures you have loaded. Place the mouse icon on the up and down arrows on the right side of the pop-up display to cycle through the list of control measures. Press the left mouse button to select an option, and the selected option will be appear in the box on the top of the pop-up display. Move the icon to the "okay" box and press the left mouse button to remove the selected option.

After all of the control measures are recorded, press the <Escape> key to return to the initial Control Measure menu.

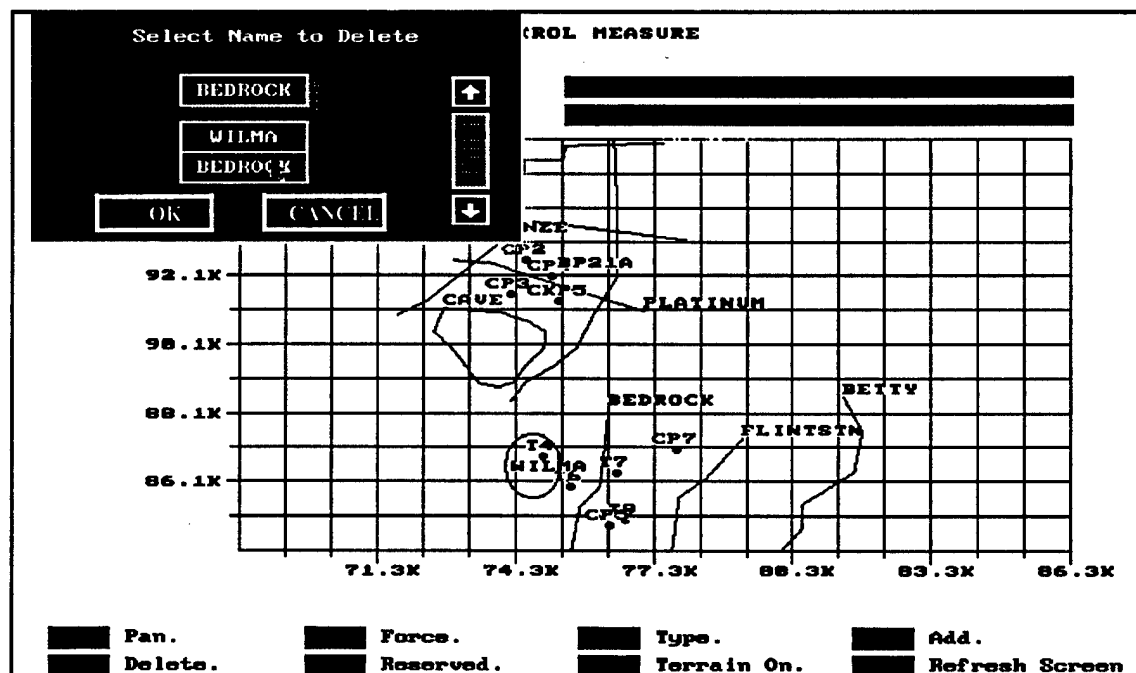


Figure 22. Sample screen for selecting control measures to be deleted.

Converting Data to the National Training Center Format

None of the AAR aids can be used until the network data have been loaded into the NTC database. This loading process is referred to as NTC data conversion because data are loaded into a relational database management system patterned after the NTC database. At the same time that data are being loaded into the database, selected data filtering is also automatically performed by the UPAS.

The UPAS is capable of filtering the data loaded into the NTC database to help reduce the volume of data to be stored. A large portion of the data collected from the network is in the form of Vehicle Appearance Packets that are broadcast by each vehicle in an exercise at one second intervals. At times in the exercise when there is little action, most of these packets are identical to the previous packet for a particular vehicle except for the time stamp. A default option in the UPAS causes data on the status of vehicles to be loaded into the SIMNET/NTC database at five minute intervals unless a significant event (such as a firing event) occurs. The interval at which data are loaded into the SIMNET/NTC database is selectable so that you can change it if, for example, you want to update the vehicle status data at one minute intervals rather than the default five minute interval. If you select an amount of time less than one minute, the UPAS will load data from all of the network packets into the data tables.

Select the Convert Data to NTC Format Option from the Data Collection Menu. *You must make sure that the terrain database path specified in the Set Data Path screen matches the data you are converting.* That is, the terrain database path must be the one on which exercise was performed.

If the exercise data in the directory in which you are working have already been converted, you will see the screen shown in Figure 23. If you do not want to reconvert the data, press the <ESC> key to return to the previous menu. In certain cases you may want to reconvert the data using a new time interval and you do not care if the data converted under the previous interval are erased. In this case, type "Y" in response to the prompt, and the next screen in the conversion process will appear.

Data Conversion has been performed.	
Data conversion interval used:	5 minutes
Exercise ID:	001
Exercise Date:	93-5-10
Do you want to re-convert data (Y/N)?	

Figure 23. Screen displayed when a user attempts to perform a National Training Center data conversion on data that have already been converted.

When you are ready to proceed with the data conversion process, the screen shown in Figure 24 will be displayed. The "Data Conversion Interval" section at the top of the NTC conversion screen allows you to select the interval at which position location data will be loaded into the database. The default is five minutes. If you want to use another interval, type the new interval using numbers at the top of the keyboard in the format shown in Figure 24. The purpose of controlling the data conversion interval is to reduce the data load associated with the large amount of position location data flowing across the simulation network. An interval of one to five minutes is usually ideal.

The "Data Conversion Needed" section of the screen indicates the amount of time required to convert the data. UPAS estimates this conversion time based upon the amount of data to be converted. **Actual conversion time depends on the conversion interval you have selected and the operating speed of your computer.** For a 286 computer, the estimate is accurate for a five minute conversion interval. For a 386 computer, the actual conversion time is about one-third that shown on the screen for a five minute conversion interval. For a 486 50 megahertz computer, the actual conversion time is about one-tenth that shown on the screen.

NTC DATABASE: Convert	
Data Conversion Interval:	05:00
Data Conversion Needed:	10 Minutes
CAUTION: SHORTER INTERVALS WILL REQUIRE LONGER CONVERSION TIME	
<F1> to start Conversion <Esc> to Previous Menu	

Figure 24. National Training Center Data Conversion screen.

To start the data conversion process, press the <F1> key. The progress of the conversion process will then be indicated on your screen by showing the number of data packets that remain to be converted, as illustrated in Figure 25. At the end of the data conversion process, the message "Data conversion process has been successfully completed" will appear on your screen.

NTC DATABASE: Convert	
Data Conversion (Left): 12212	
<F2> to stop Conversion and return to Previous Menu.	

Figure 25. Screen used to monitor the progress of data conversion to the National Training Center format.

Using UPAS Data Summary Menus

When you select the "Data Summary" option from the UPAS Main Menu, the screen shown in Figure 26 will appear. The "Display Graph" and "Display Table" options are used to access menus of data summary graphs and tables, respectively. The "Packet Access" option is not a data summary function. Instead, this option allows you to look at the data in the individual packets collected from the simulation network. Since this option would rarely, if ever, be used to prepare for an AAR, the use of this option is discussed in the Advanced UPAS User's Guide.

The "After Action Review" option provides access to the Plan View Display, Battle Snapshot, Battle Flow Chart, and Exercise Timeline functions of the UPAS. The "Battle Scorecards" option provides access to two data summary tables describing the effects of direct and indirect firing events. Use of the various options, other than the one for packet access, is described below. Instructions for preparing your printer to make copies of UPAS graphs, tables, and figures are provided at the end of this chapter.

Data Summary
Display Graph Display Table Packet Access After Action Review Battle Scorecards
Use up or down arrow keys to highlight selection. <Enter> to accept. <Escape> to return to Main Menu.

Figure 26. Data Summary Menu Screen.

Display Graphs

UPAS includes a menu of graph options for your use. These graphs were designed to meet some of the information needs of users after SIMNET exercises. To gain access to these graphs from the Data Summary menu, select the "Display Graph" option and a screen similar to that shown in Figure 27 will appear. This screen allows you to select the unit performance graph that you want to examine. To select a graph move the cursor to your selection using arrow keys and press the <Enter> key. Only a portion of the graph options are shown on the screen at any one time. To examine additional options continue to use the down arrow key when you reach the last selection on the screen.

Display Graphs
Rounds Fired Over Time Rounds Fired Over Range Rounds/Time by Force/Comp/Plt Entities Hit Over Range Entities Hit Over Range by Ammo Rounds Fired Over Range by Ammo Rounds Fired by Weapon, Time Entities Hit by Range, Weapon
Use up or down arrow keys to highlight selection. <Enter> to select. <Esc> to return to Data Summary Menu.

Figure 27. Menu of graph options.

After you select a graph option, a pop-up menu will appear with the options "Red" and "Blue." If you want to use data for the BLUFOR only, move the cursor to blue and press the <Enter> key. Blue will then be displayed in reverse video. Reverse video will appear as blue on gray at the cursor position, and white on blue elsewhere. If you also want to include "REDFOR" data, repeat the procedure with the red option. After you have finished indicating your selections, press the <F1> key.

Depending on the graph you select, you may have to respond to additional menu screens after the Red/Blue menu. For example, if you selected the graph option "Rounds Fired over Time by Weapon", a menu of weapon types would appear on your screen, as shown in Figure 28. According to the guidance at the bottom of the screen, you may select up to three different types of weapons by using arrow keys to scroll through the list and pressing <Enter> each time you come to a weapon you want to select. After you have selected all of the weapon systems, press the <F1> key. The resulting graph would be similar to that shown in Figure 29.

Display Graphs	
Rounds Fired Over Time	US M904 bomb
Rounds Fired Over Range	US M557- 107mm
Rounds/Time by Force/Comp/Plt	US M513- 107mm
Entities Hit Over Range	US M739- 105 mm
Entities Hit Over Range by Ammo	USM728- 105mm
Rounds Fired Over Range by Ammo	US M 791- 25mm
Rounds Fired by Weapon, Time	US M792- 25mm /HEI
Entities Hit by Range, Weapon	
Use up or down arrow keys to highlight selection. <Enter> to select. <F1> to accept. Select up to 3 items. <Esc> to return to Data Summary Menu.	

Figure 28. Menu of weapon system options.

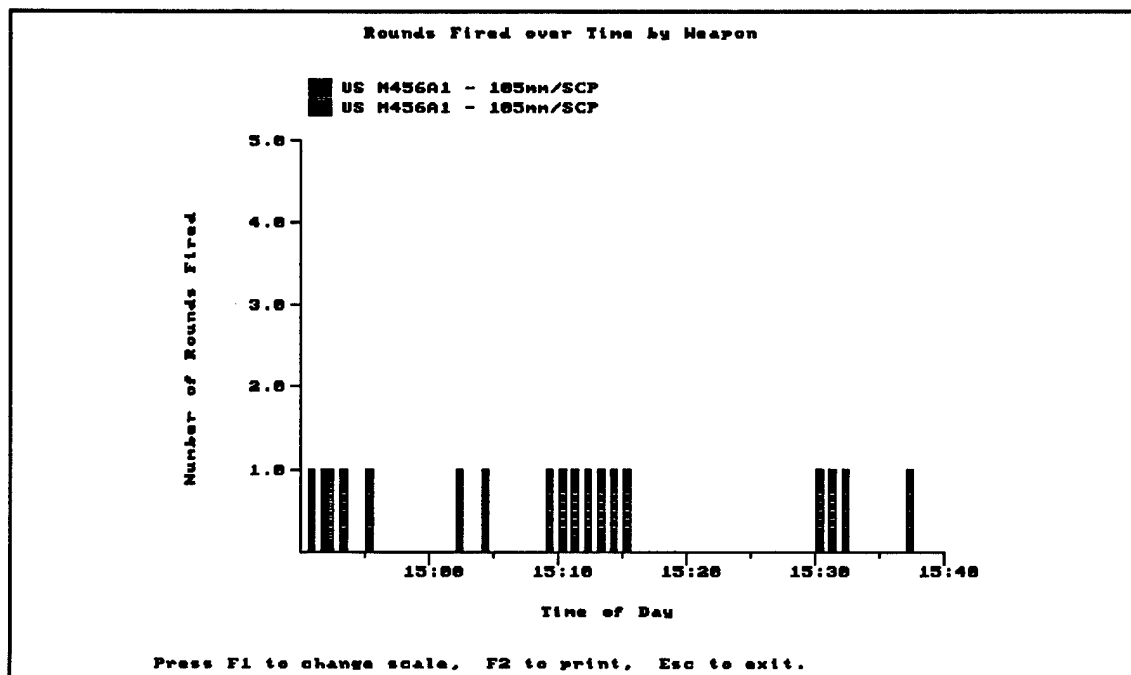


Figure 29. Graph showing BLUFOR firing events as a function of time and weapon type.

In certain cases you may want to increase or decrease the scales used for the X and/or Y axis of the graph. The primary reason for changing scales is to focus attention on a critical part of the scale. For example, you may be interested in focusing attention on the volume of friendly and enemy fires during the assault portion of a mission, rather than displaying fires for the entire mission.

To modify the X or Y scales, press the <F1> key, and a screen like that in Figure 30 will appear. To change the default end points of a scale, enter the new scale values using the numeric keypad, then press enter. Press the <F1> key to view the graph with the new scales.

Setup Scale		
Time	1440	1540
Count	0	5
Type 0-9999 to change scale, then press ENTER Press F1 to see GRAPH Press ESC to ignore changes.		

Figure 30. Scale End Anchor screen for changing X and Y scales for graphs.

If you want a hard copy of the resulting graph, press the <F2> key. When you are finished looking at the graph, press the <Escape> key to return to the menu of graph options.

Display Tables

UPAS includes a menu of table options. To access these tables from the Data Summary menu, select the "Display Table" option and a screen like Figure 31 will appear. The titles of the available tables will be changed over time, as the tables are modified in response to feedback from users. To select a table move the cursor to your selection using arrow keys and press the <Enter> key. Only a portion of the table options are shown on the screen at any one time. To examine additional options use the down arrow key to move to the last selection on the screen and then continue pressing the arrow key.

Table 2 illustrates one of the data summary tables from the UPAS menu. To print a hard copy of the table, press the <F2> key.

Display Tables
AVG, MIN, AND MAX RANGES BY SIDE, WEAPON CASUALTIES SUSTAINED (HIT OR KILLED)\ CASUALTIES SUSTAINED (KILLS) ENGAGEMENT RANGE FRATRICIDES BY FIRING WEAPON TYPE, TIME HIT/KILLS BY FIRING SIDE, WEAPON TYPE INDIRECT FIRE LOG
<Down> or <PgUp> to Move Cursor. <Return> to Select. <Esc> to Previous Menu

Figure 31. Pop-up Menu for UPAS Data Summary Tables

Table 2

Firing Events as a Function of Time, Result, and Range.

TIME	FIRING SIDE	RESULT	RANGE
06:45:00	R	M	1430
07:03:00	B	H	1860
07:04:00	B	H	1781
		M	1612
	R	M	2263
		H	1856
07:05:00	B	M	1563
		M	1836
		K	1132
		H	1894
	R	K	1900
		H	1918

Menu of After Action Review (AAR) Aids

After selecting the After Action Review option from the Data Summary Menu, you will see the screen shown in Figure 32. This menu allows you call up the five AAR aids. One of these aids, the Battle Snapshot, is unique in that using this aid requires that you know the exercise time for which you want to create a snapshot. Such times may be based on; your observations of critical event during the exercise, time-tagged events from the Master Event List, graphs or tables showing certain activities as a function of time, a review of selected phases of the battle using the Plan View, a review of a unit's overall movement using the Battle Flow, or a review of the Exercise Timeline for an exercise.

Three of the AAR aids (the Battle Flow, Battle Snapshot, and Timeline) provide the option of using company-level or platoon-level displays. Company-level displays for the Battle Flow and Snapshot provide vehicle location data for the Company Commander, XO, Platoon Leaders, and Platoon Sergeants only. The company-level Timeline includes a separate timeline for each platoon in a company, with the Company Commander and XO treated as a platoon. These AAR aids allow the user to examine the performance of either the company as a whole or a single platoon.

After Action Review
Battle Flow Battle Snapshot Exercise Timeline Fire Fight Plan View Screen Image File Display
Use up or down arrow keys to highlight selection. <Enter> to accept. <Escape> to return to Previous Menu.

Figure 32. After Action Review Main Menu.

Map Displays

Four of the AAR aids take the form of electronic maps. Each map automatically displays unit control measures, and each allows you to adjust various display settings. You can pan and zoom so that you can back off to gain a bigger picture of the action or focus on a critical portion of the battlefield. Each map also offers options for the display of terrain features. You may select to use a grid map without any terrain features, a map showing major terrain features (roads, treelines, rivers, lakes, buildings) without contour lines, or a map with major terrain features including contour lines. If you choose to display contour lines you have the options of including elevations and selecting the contour line interval to suit your purpose. The procedures for panning, zooming, and selecting terrain features common to the map displays are described below.

Panning and Zooming Map Displays. Press the <F1> key or use the mouse to select the F1 button at the bottom of the screen when you want to pan or zoom the display. The icon will then change to a cross, and a box will appear on the left hand side of the screen showing the coordinates for the location of the icon. (see Figure 33). If you want to zoom, use the mouse to move the icon to the location you want for the new center of the display and press the left mouse button.

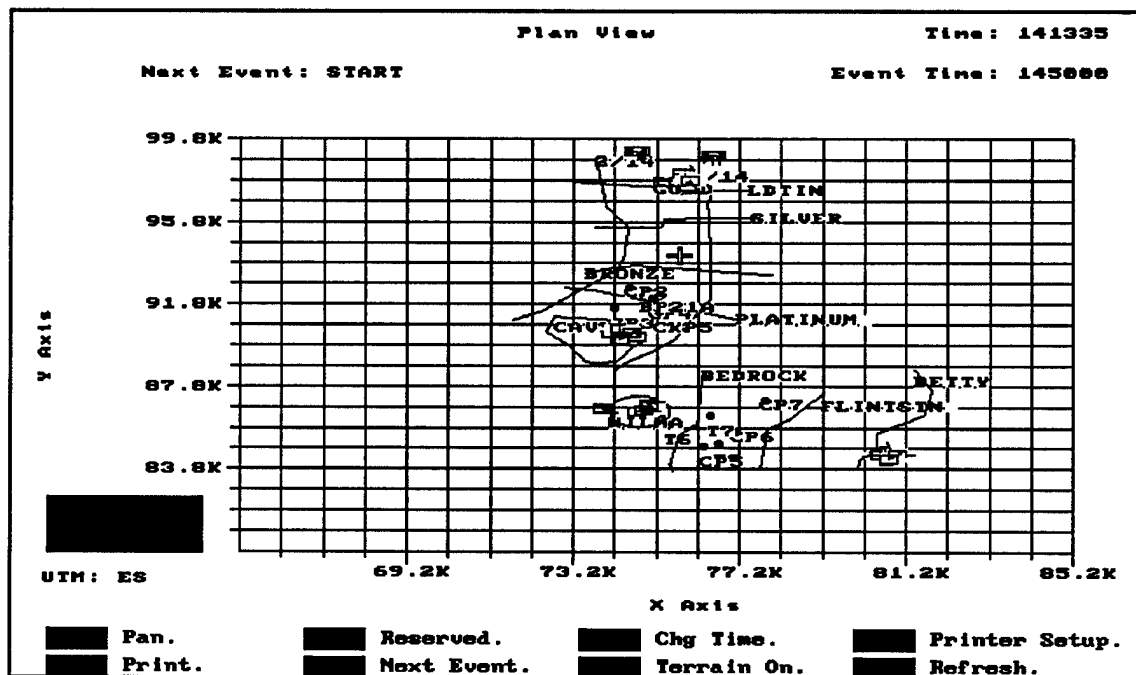


Figure 33. Screen for changing the center of the map display.

If you want to select a center that is off the portion of the map that is currently displayed, move the icon to a position off the map and press the left mouse button. The UPAS will then prompt you to type in the coordinates of the center for the new display, as illustrated in Figure 34.

After you select a center for the display, a pop-up menu will then ask you to select the scale for the new map display, as illustrated in Figure 35. Use the mouse to move the icon to the bar on the right of the menu to display additional scale values. Select the up or down arrow and press the left mouse button to cycle through the scale options. If you do not see a scale that you want to use, select the option "X x Y". Select an option by pressing the left mouse button while the option is highlighted, and your selection will then appear in the small box at the top of the pop-up screen. When you are satisfied with the selection, use the mouse to move the icon to "change" option at the bottom of the pop-up screen and press the left mouse button. If you have selected the "X x Y" option, the UPAS will prompt you to type in the desired coordinates.

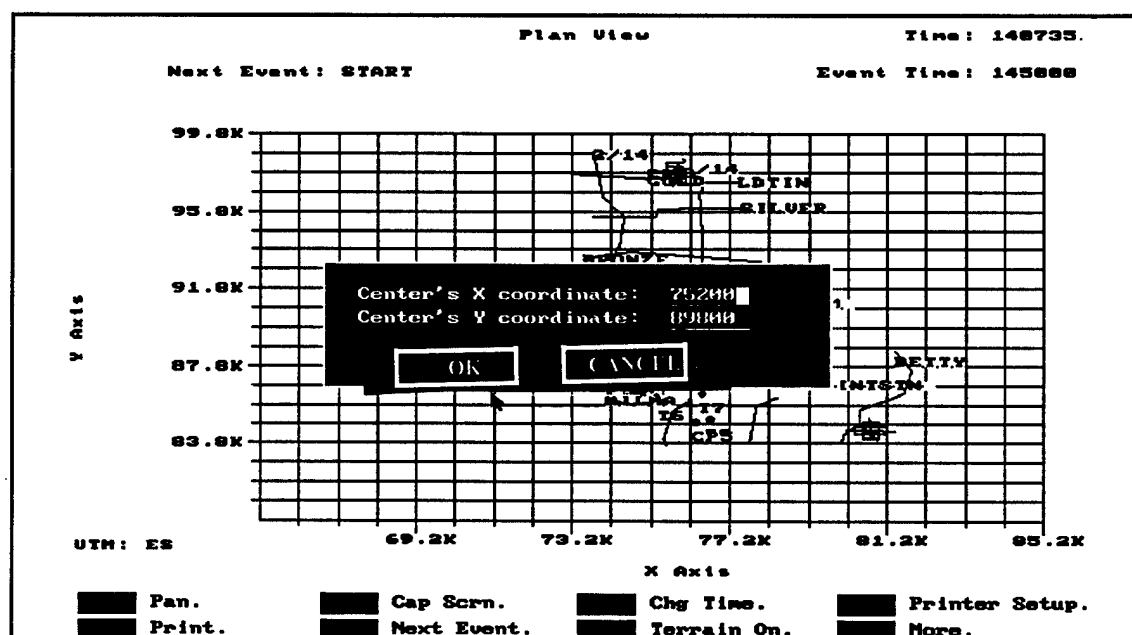


Figure 34. Screen for selecting a new center for an electronic map when the new center is outside the boundaries of the map being displayed.

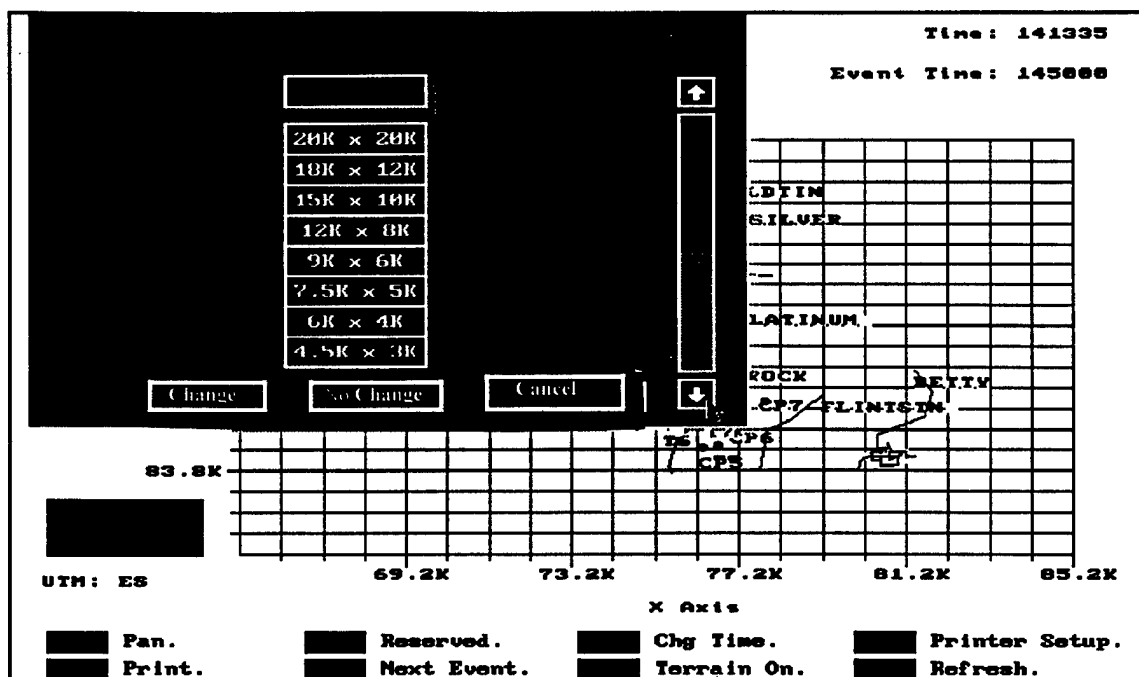


Figure 35. Screen for changing scale of map display.

The area on the screen that shows the terrain always remains twice as wide as it is high, so if you choose scale values that do not have a 2:1 ratio, such as 6 x 2 or 2 x 3, the square kilometer blocks in the display will be stretched into rectangles. It may be useful to do this to see more detail in an area, but it distorts the picture of the terrain and the apparent distances between vehicles.

The minimum portion of the battlefield that can be displayed is a 200 meter by 200 meter square. If you type in numbers lower than 200 in value, the UPAS will convert the value to 200. The largest portion of the battlefield that can be displayed is one where one of the scales is 60 kilometers. If you chose a value greater than this, the UPAS will give you an error message.

Adding or removing terrain features from a map display.
The initial display for each type of electronic map will not include terrain features. Before adding terrain features, you should focus on that part of the battlefield of interest. This approach is advisable due to the time required to display terrain features. This time is a function of the size of the area covered and the complexity of the terrain.

Pressing the <F7> key or using the mouse to select the "terrain on" or "terrain off" option at the bottom of the screen will either add or remove major terrain features from the map display. If terrain features are on the map when you press the <F7> key they will disappear. If no terrain features are displayed when you press the <F7> key or select "terrain on" with the mouse, you will be asked to respond to the series of three pop-up menus.

The first menu asks you to decide whether you want contour lines to be shown or hidden (see Figure 36). The default situation is to hide contour lines. If you select the option "hide" contour lines, then only the terrain features shown in Table 3 will be displayed. Use the mouse icon to highlight an option then press the left mouse button. The box at the top of the pop-up screen should display your selection. When you want to accept the option in this box, move the icon to the "OK" box and press the left mouse button.

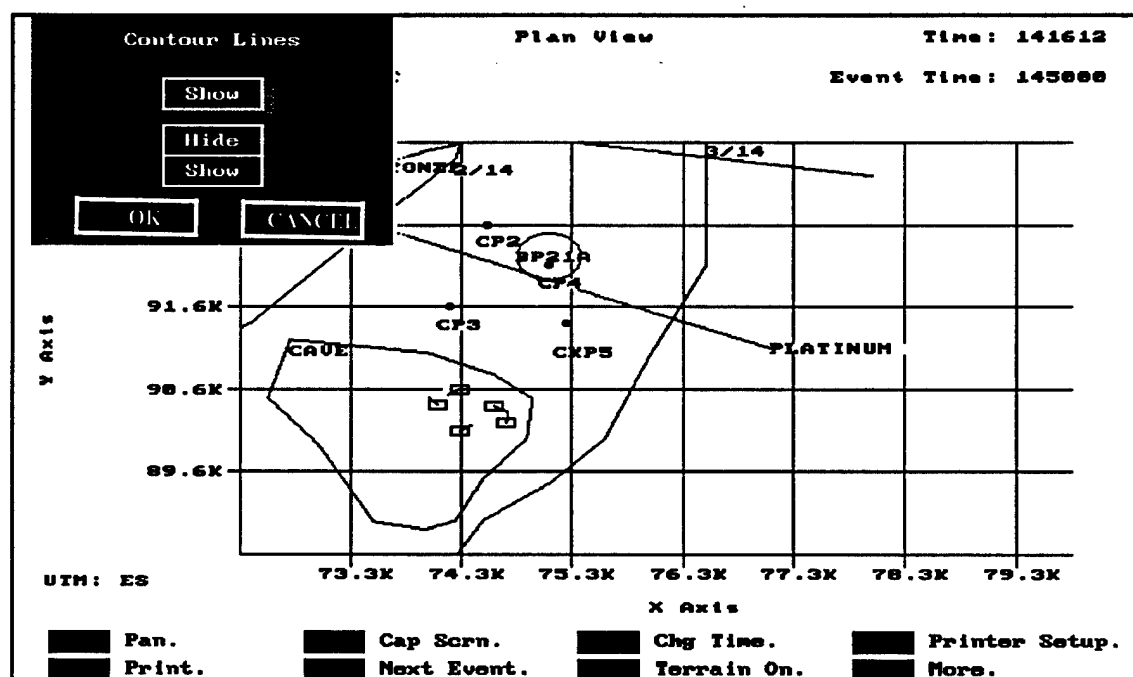


Figure 36. Screen for selecting whether contour lines are to be displayed in an electronic map.

If you select the "hide" option, the UPAS will display major terrain features . If you select the option "show", you will be asked if you want elevation data to be included on the contour lines (see Figure 37). In most cases, elevation data will clutter the screen. Next, you must decide if you want to use the default contour interval of 10 meters(see Figure 38). If you want another interval, type your selection and press <Enter>. You do not have to use decimal points. For example, the UPAS will display contour lines at 50 meter intervals if you simply type "50". Contour lines are displayed in the color magenta. Figure 39 shows an electronic map in which control measures and other major terrain features are displayed.

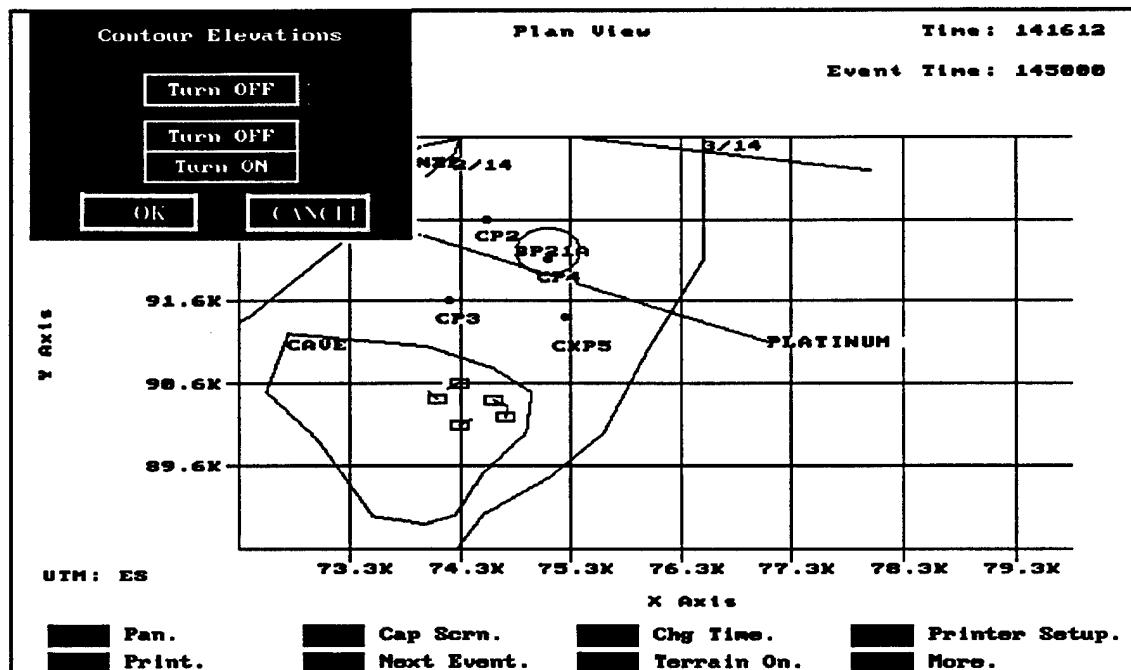


Figure 37. Screen for deciding if contour line elevations are to be displayed in electronic maps.

Table 3

Colors Used to Represent Terrain Features.

FEATURE	COLOR AND SHAPE REPRESENTATION
Buildings	Purple Dots or Squares
Highway	Black Lines
Dirt Road	Brown Lines
Rivers/Lakes	Cyan Lines or Ovals
Tree Line	Green Line
Tree Canopy	Green Oval

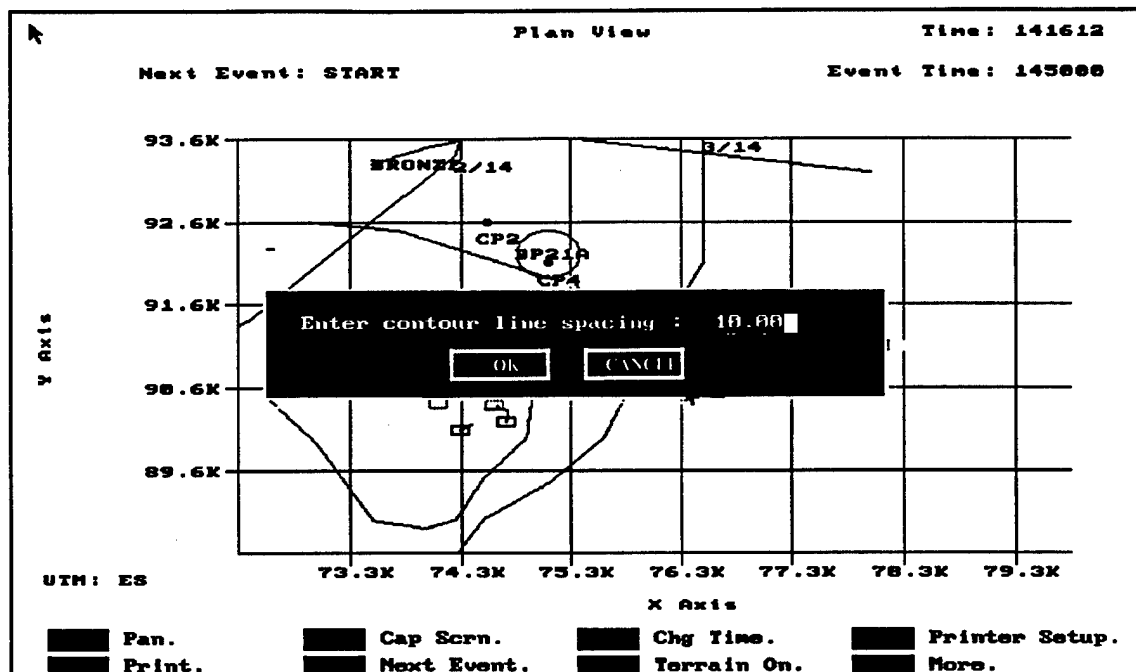


Figure 38. Screen for selecting or changing contour intervals.

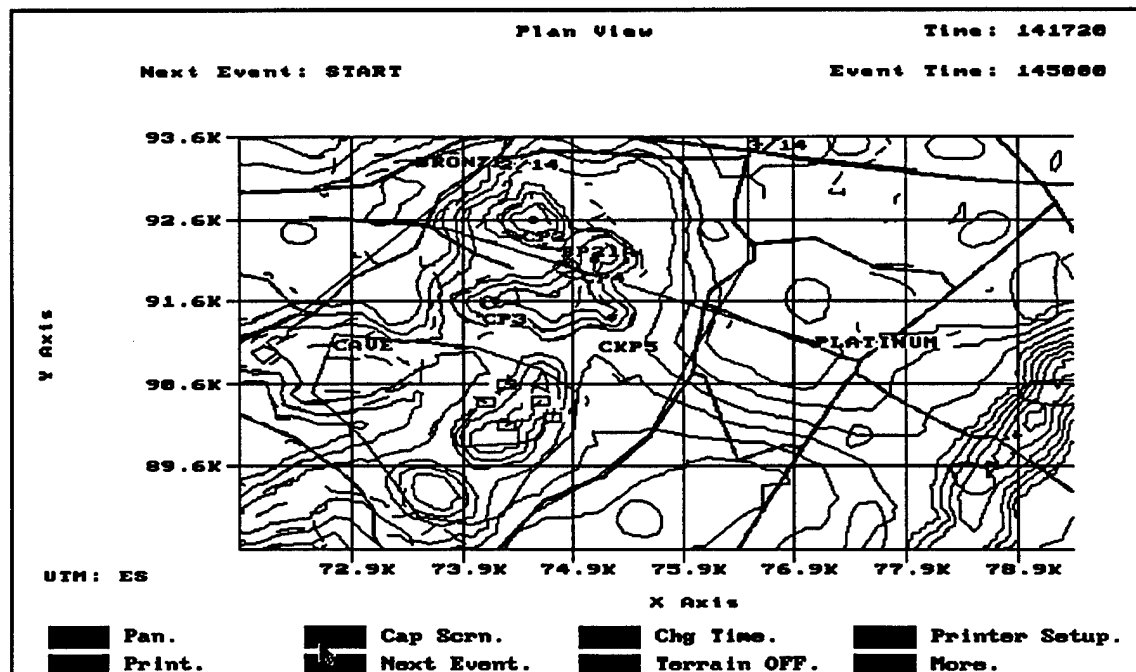


Figure 39. Electronic map with terrain features displayed.

Setting up the Printer

Black and white copies of all graphs, tables and screens can be made on your printer. However, you must input certain information into UPAS before you can use the printer function. The Plan View Display, Battle Flow Chart, Battle Snapshot, Fire Fight, and Exercise Timeline provide menus for you to set up your printer, but these menus are not contained in the graph and table utilities. Once you have set up the printer within any one of these utilities, it will be set up for all the After Action Review Aids, all graphs, and all tables within UPAS. The printer will remain set up even after it has been turned off.

To set up the printer, select any of the options from the After Action Review Menu. For all displays except the Plan View, press the <F4> key (or use the mouse to select the F4 icon) to call up the printer set up menus. For the Plan View, press the <F8> key to call up the backup menu of options and then press the <F1> key when the new menu appears. The first screen, shown in Figure 40 for the Plan View, prompts you to identify the type of printer you are using. If your specific printer is not among those in the menu, select a printer option that your printer can emulate. See the manual for your printer to determine what emulation capabilities are possible. If a manual is not available, or when in doubt, chose the Epson FX option. Many printers can be set to emulate the Epson FX option. Make sure that the printer settings are correct for the chosen option before you try to print. Use your mouse to move the icon to your selection and press the left button. Your selection will then be shown at the top of the screen. Move the icon to the "okay" box and press the left button when you are happy with the selection.

After you select a printer, another pop-up menu will ask you to identify the port to which your printer is connected. Figure 41 shows this menu. Use the mouse to move the icon to the appropriate choice and press the left mouse button. The name of the port you have selected should then appear in the box at the top of the screen. Move the icon to the "okay" box and press the left mouse button to record your selection.

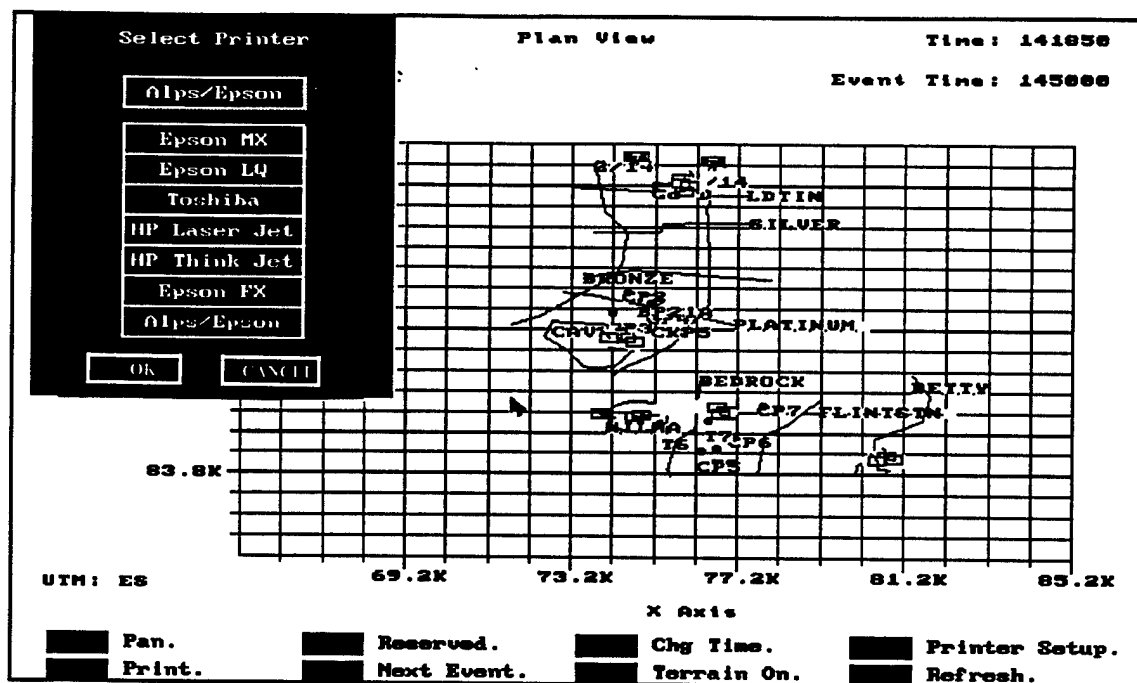


Figure 40. Printer selection menu screen.

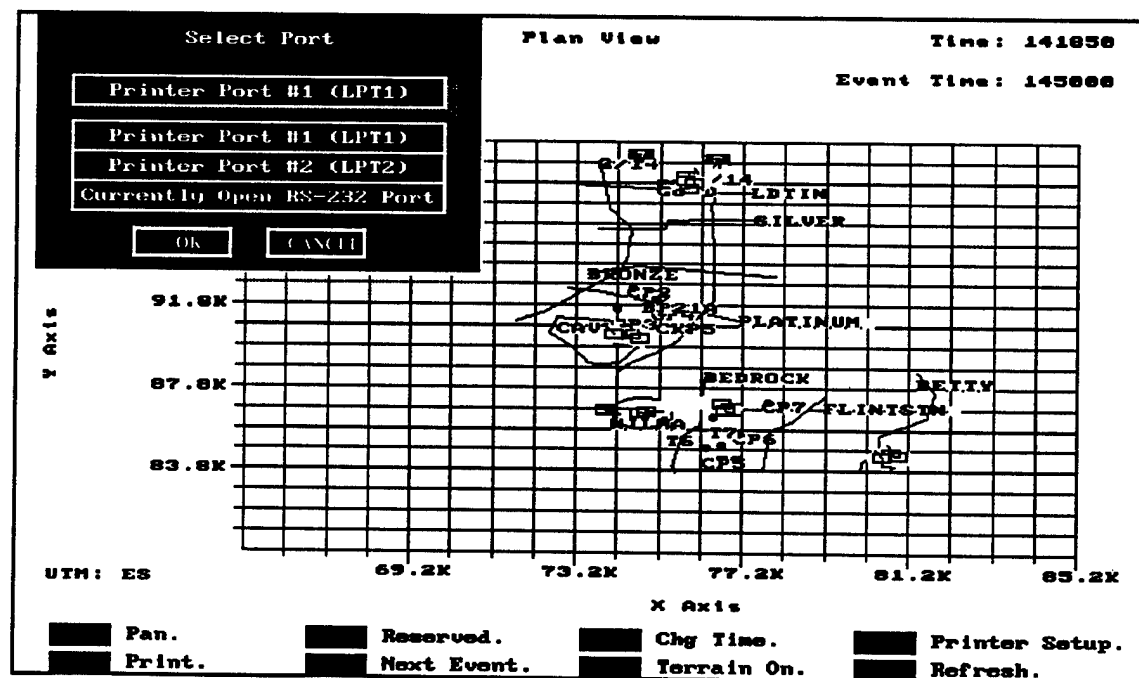


Figure 41. Printer connection screen.

You can print a black and white copy of an electronic map. You should keep in mind that certain information is lost when going from a screen display to a black and white hard copy. For example, a hard copy of a Plan View screen will not indicate whether the vehicles have been destroyed, and they will not indicate firing events.

Plan View Display

Select the Plan View option from the AAR Menu and a 20 kilometer by 20 kilometer grid map with unit control measures will be displayed (see Figure 42). UPAS automatically orients on that part of the terrain database that represents the center of mass of the REDFOR and BLUFOR units. The Plan View shows a replay of the exercise using red icons to represent REDFOR vehicles and blue icons to represent BLUFOR vehicles. A vehicle that has just fired will temporarily brighten in color. A vehicle that has been destroyed will change color permanently (BLUFOR to cyan and REDFOR to white).

You cannot adjust the speed of a replay. The icons move in simulated time (dependent on the system clock speed of your computer). When there is a large amount of action during an exercise (many firing events and vehicles moving), the speed of the replay will be slower than real time. When there is little action, the speed of the replay may be greater than real time.

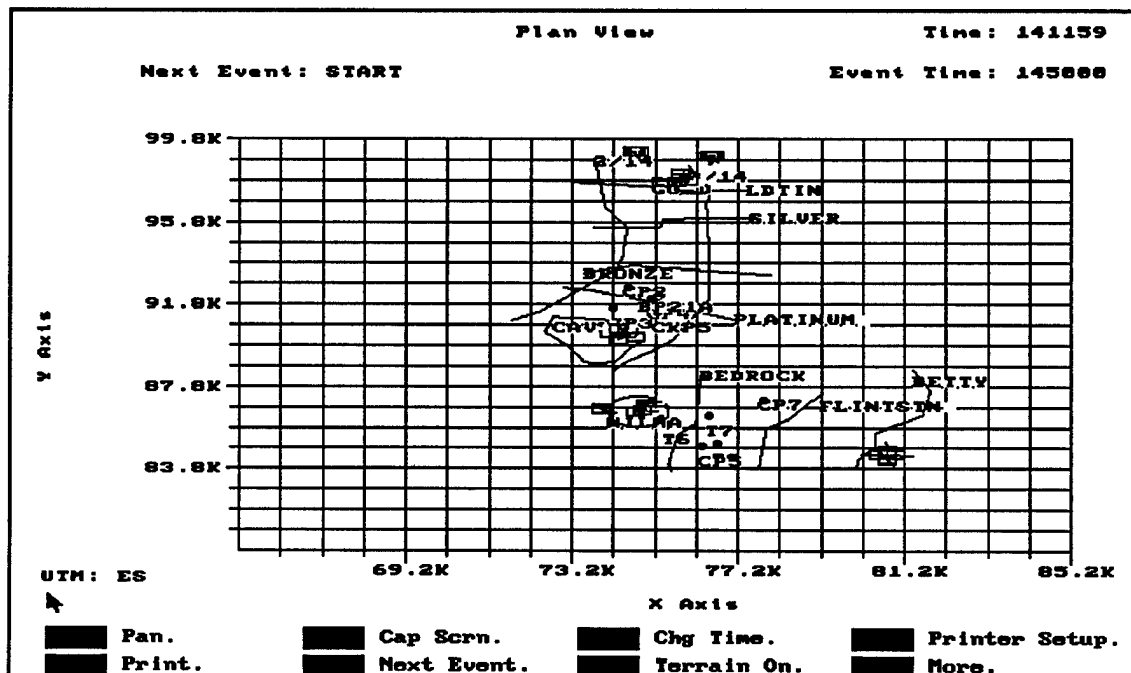


Figure 42. Initial Plan View Display screen.

Navigating in time through an exercise. When using the Plan View you will usually be interested in observing the action at specific points in time. For example, you may want to see how the unit reacted the first time it received fire from the enemy, or you may want to see if a unit crossed a phase line at the time specified in the operations order.

The UPAS Plan View provides two methods for changing the point in the battle being displayed. First, you can move forward or backward to a specific time by pressing the <F3> key. After you press this key, a screen will appear asking you to type in the new time you want to move to (Figure 43). Type in the military time down to the nearest second, such as "160000", and press the <Enter> key.

Second, the UPAS Plan View can move to the points in time addressed by the Master Event List. These are timed events input by you in the UPAS, as described on pages 22 and 23. Note that the top left portion of the Plan View provides the name of an event. This event is taken from the Master Event List. The right top part of the display indicates the time for the next event from the Master Event List (see Figure 44). To move to the time associated with the next event, press the <F6> key.

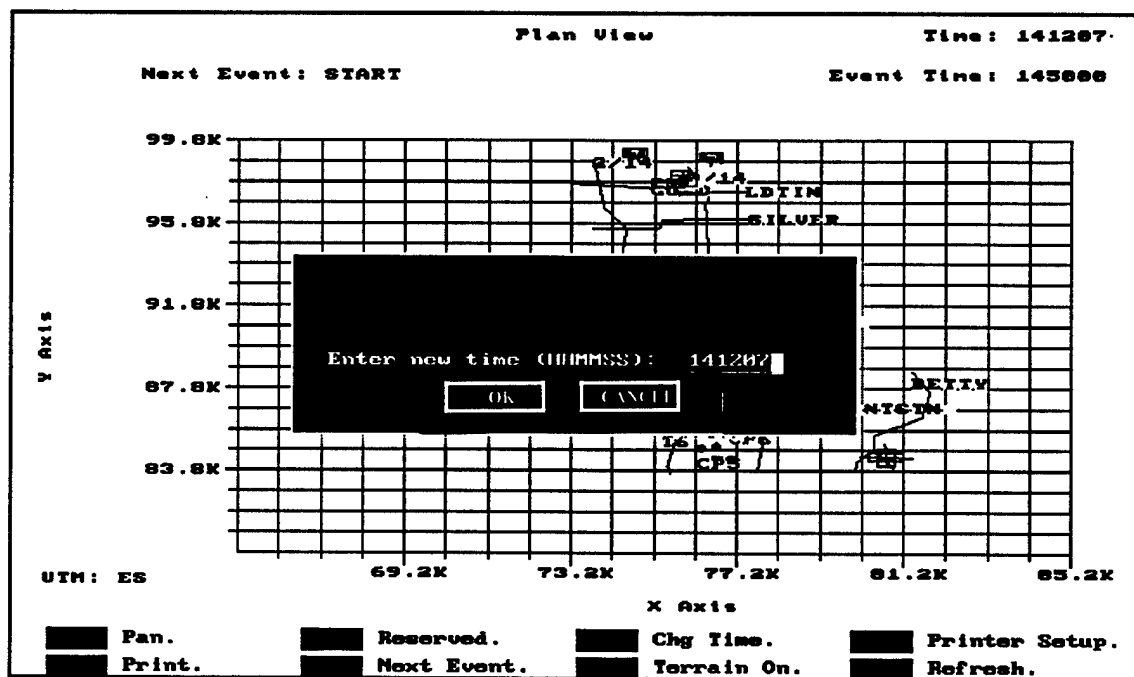


Figure 43. Screen for changing the time within a replay of an exercise on the Plan View Display

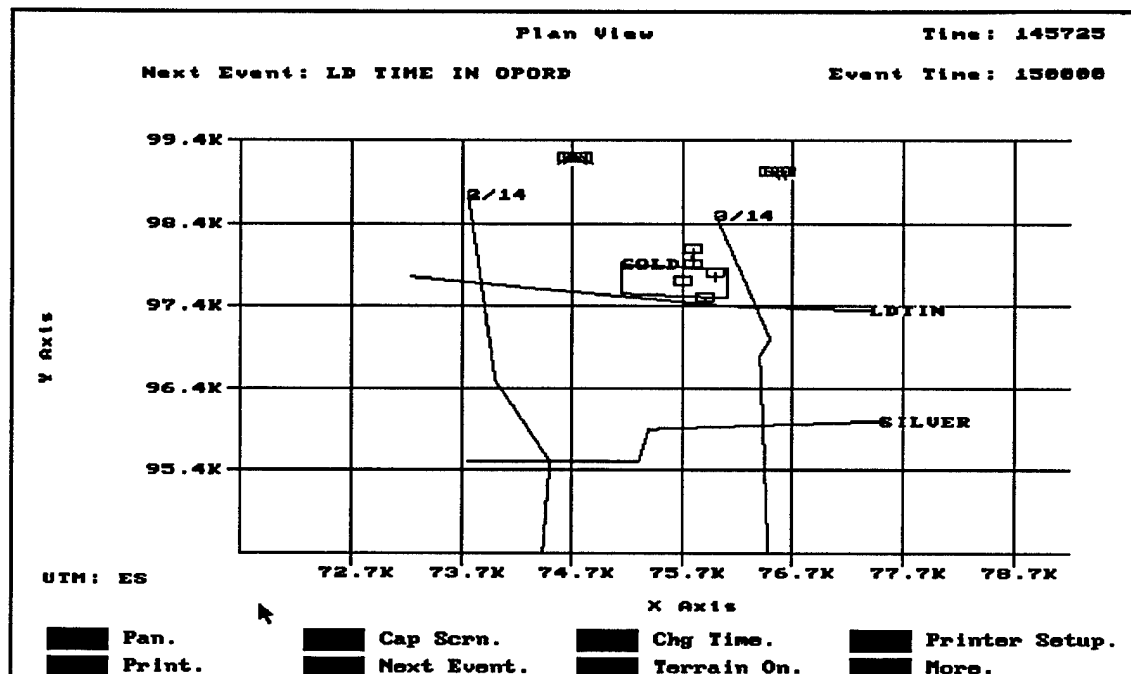


Figure 44. Plan View screen showing unit at the time when it should be crossing its line of departure.

Identifying individual vehicles. It is not possible to continuously display the IDs and bumper numbers of individual vehicles in the Plan View. However, the UPAS Plan View does have a vehicle ID function. Select the "More" option at the bottom of the Plan View screen or press the <F8> key to gain access to this function.

Select the option "Identify Vehicles" at the bottom of the screen or press the <F2> key. The icon will then change to an "X". Move the icon to the vehicle for which you want an ID or bumper number and press the left mouse button. The screen will then display the logical player number and the bumper number for the vehicle, as illustrated in Figure 45. If several vehicles are close together, the vehicle IDs and bumper numbers for all vehicles covered by the "X" icon will be displayed (see Figure 46). To remove the vehicle ID from the screen, select the "OK" box and press the left mouse button.

The replay will stop while you are in the vehicle ID mode. While you are in this mode, you can get vehicles IDs and bumper numbers for as many vehicles as you like. When you are ready to leave this mode, select a spot on the Plan View that does not contain a vehicle and press the left mouse button.

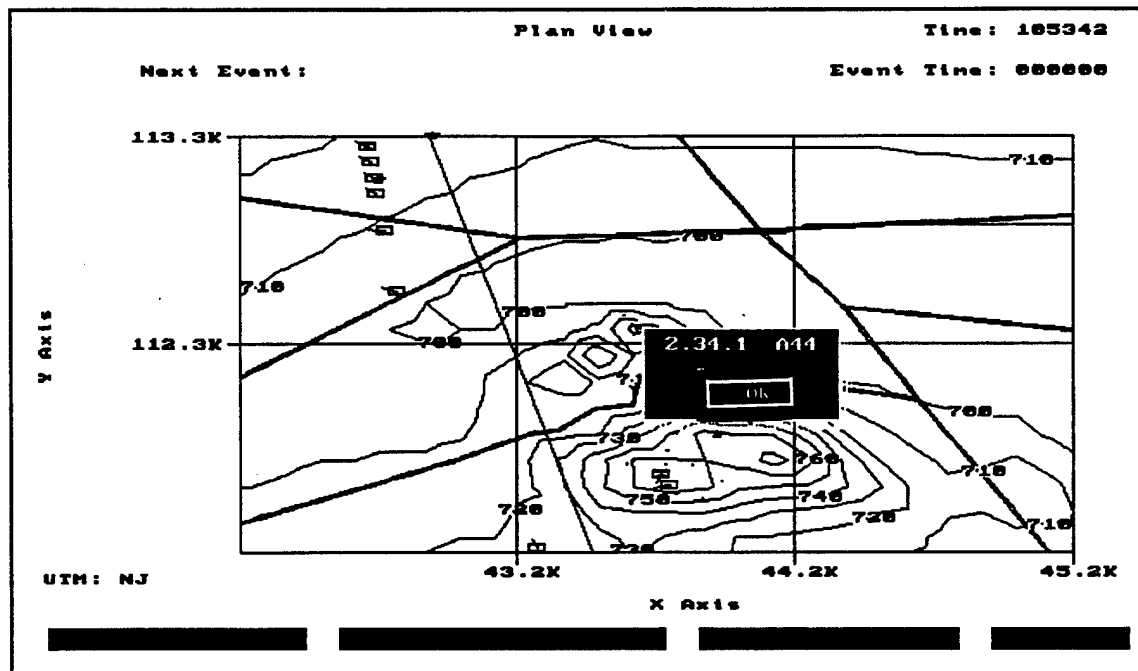


Figure 45. Plan View Display showing the logical player number and bumper number for a selected vehicle.

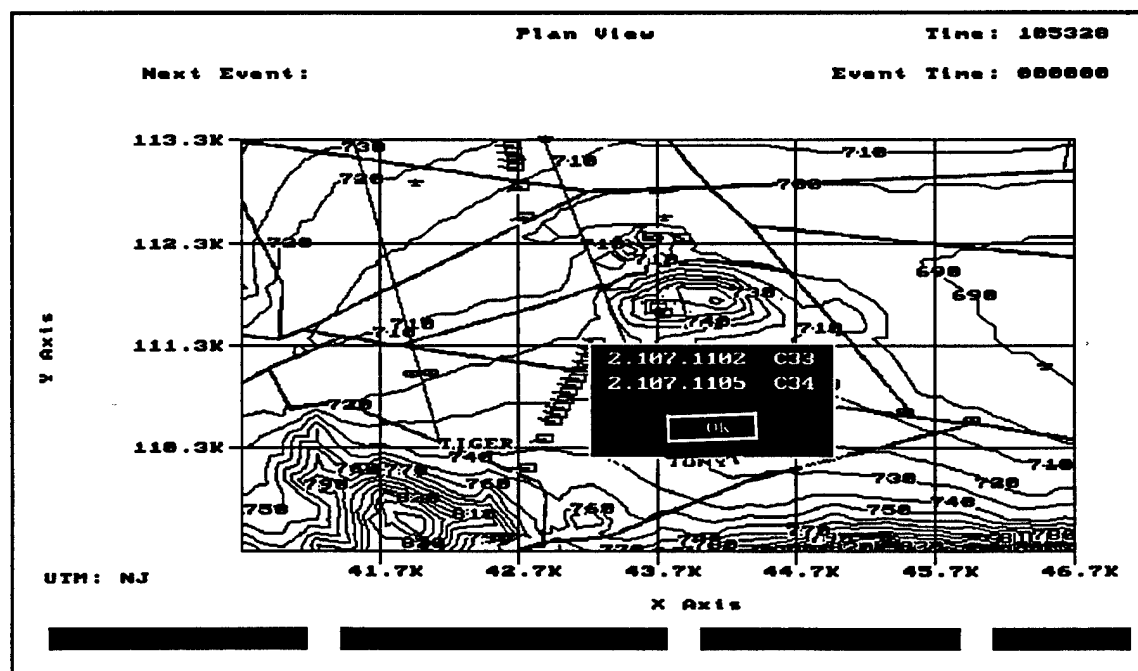


Figure 46. Plan View Display showing the logical player numbers and bumper numbers for multiple selected vehicles.

Displaying individual vehicles or platoons in aggregate. It is possible to display either each individual vehicle or each platoon in an aggregate form with the Plan View display. To gain access to the aggregate display function, select the "More" option at the bottom of the Plan View display or press the <F8> key.

When the options change, select the option "Display Type" at the bottom of the screen or press the <F3> key. Then, choose either the Individual or Aggregate display type from the pop-up menu shown in Figure 47. When the Aggregate display type option is selected, each platoon will be represented by a single icon located at the platoon's center of mass.

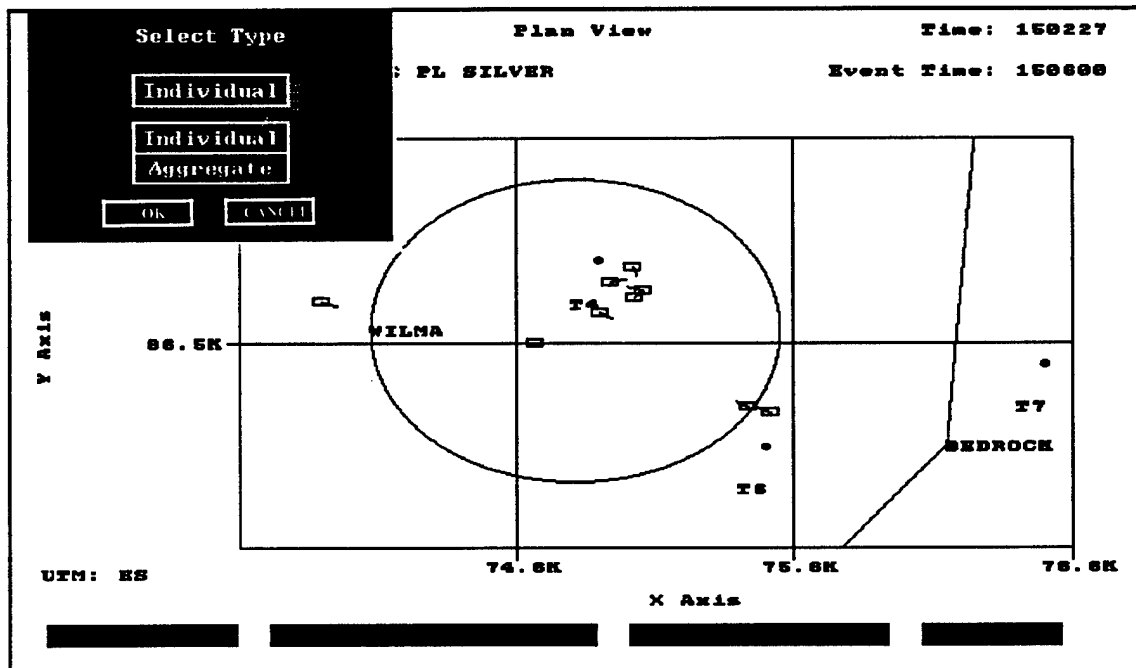


Figure 47. Pop-up screen for selecting Individual or Aggregate display type menu.

As shown in Figure 48, the vehicle ID function can be used to identify platoons in this display just as it was used to identify individual vehicles in the individual display type. The Plan View will always default to the individual vehicle display unless the aggregate display is specifically selected.

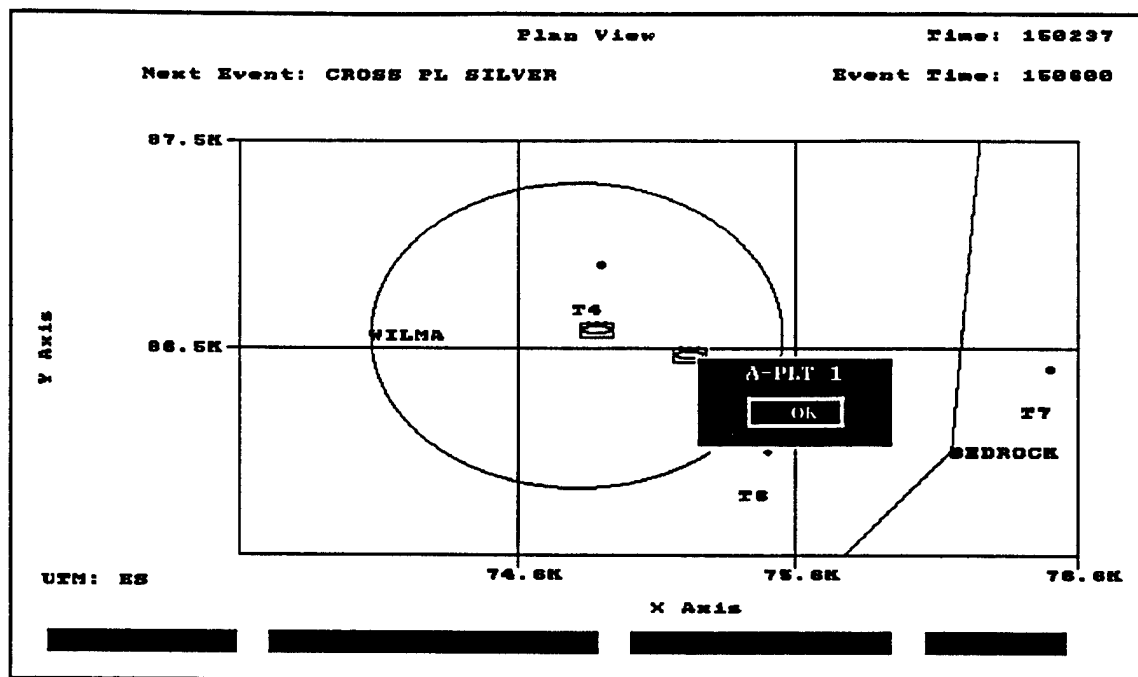


Figure 48. Plan View Display showing a platoon's identification in the aggregate display type mode.

Battle Flow Chart

The Battle Flow Chart traces the movement of a unit over a map display. Unlike the Plan View, use of the Battle Flow requires you to specify the side (red or blue), level (company or platoon), and unit to be addressed by the display.

Selecting the Side, Level, and Unit to be Displayed. Use arrow keys to select the Battle Flow option from the After Action Review menu and press <Enter>. The next screen will show a box with the options "red" and "blue." Use the arrow keys to select the side whose movement you wish to trace and press <Enter>.

The next screen will then ask you to select either a company-level or a platoon-level display. The platoon display traces the movement of all vehicles in a particular platoon, while the company display traces the movement of the company commander, XO, platoon leaders and platoon sergeants only. The next screen will provide a list of company options. After selecting a company (e.g., company A), press the <Enter> key and a menu of platoon options will appear (if you have selected a platoon-level display). Use the arrow keys to select a platoon and then press the <Enter> key. Note that you can view only one platoon at a time using the platoon-level Battle Flow. Figure 49 shows what a Battle Flow for a specific platoon might look like.

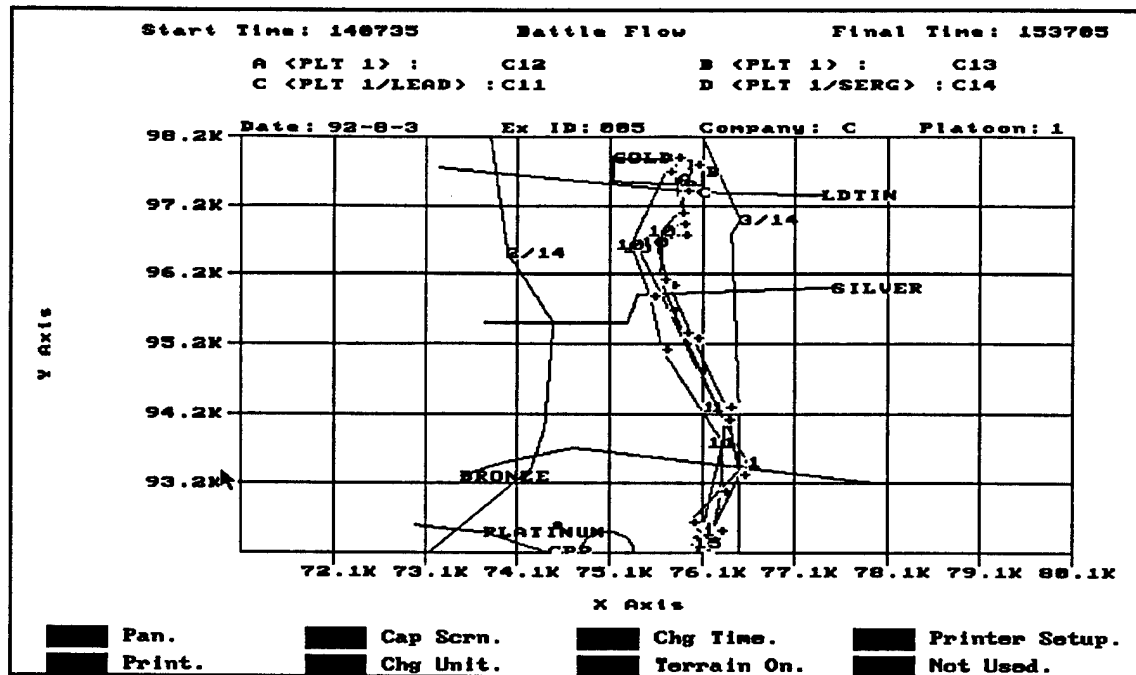


Figure 49. Battle Flow screen tracing the movement of a unit.

Using the Vehicle ID Legend. The traces for each vehicle are color-coded to match the legend at the top of the screen. For example, if the bumper number is displayed in purple in the legend, the trace will also be in purple. The legend is capable of displaying only four bumper numbers at a time. To view additional bumper numbers, you can scroll through the list using the <PgDn> key.

Movement of vehicles from the opposite side are not traced. Instead, only the initial positions of the vehicles are shown as red or blue circles.

Changing time parameters. The Battle Flow allows you to change the starting and end times as well as the time intervals at which vehicle positions are marked. This feature allows you to look at a unit's overall movement during an exercise or examine a unit's movement in detail for a critical event lasting only a few seconds. Figure 50 shows the pop-up screen that appears when you select the "change time" option at the bottom of the Battle Flow screen.

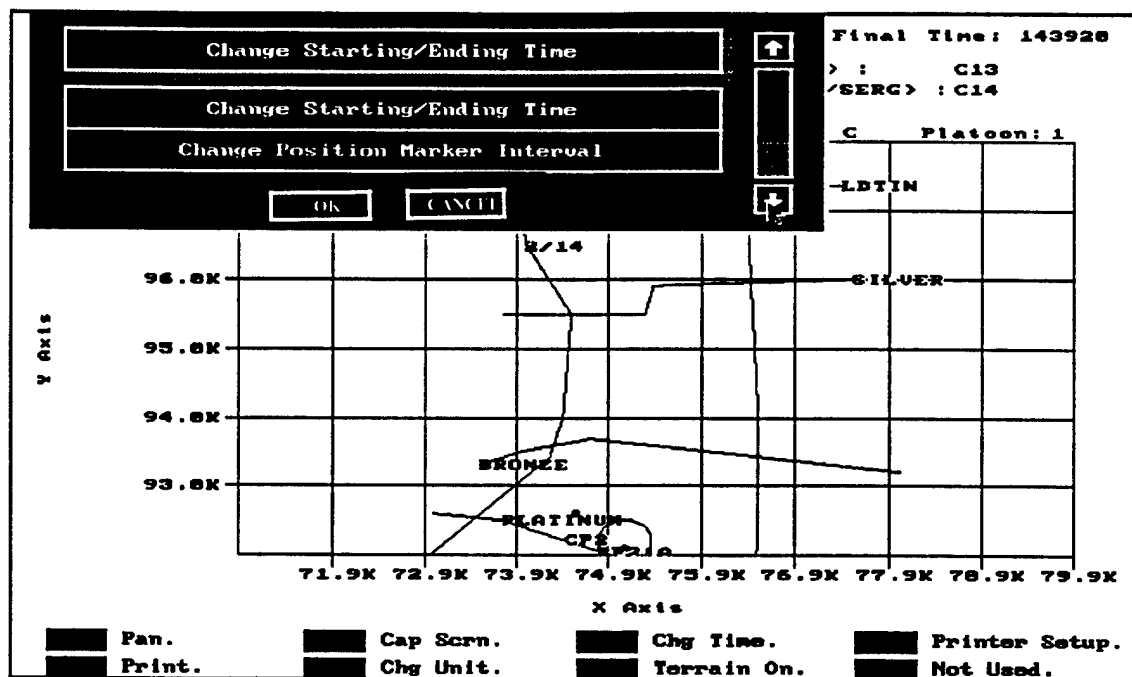


Figure 50. Pop-up screen for changing Battle Flow time parameters.

Move the mouse icon to the up and down arrows and press the left mouse button to cycle through the options. In addition to changing the period of time covered by the Battle Flow, you can change time markers. The Battle Flow uses two types of time markers, plus (+) signs and numerals, to record the passage of time on the movement traces. In general, you will mark positions with a plus sign at frequent intervals and positions with a numeral at longer intervals. For example, you can mark the location of a vehicle at one minute intervals with a plus sign and at five minute intervals with a numeral. In a long exercise you may want to use large intervals to avoid cluttering the screen with too many plus signs and numerals.

Changing the starting or ending time for a Battle Flow.
The initial start and end times for a Battle Flow correspond to the beginning and end times for the exercise file. You can change the start and ending times to support a specific measurement objective. For example, you may want to limit a Battle Flow to the initial one minute period after a unit is first fired upon by the enemy. You can change the start time and end times for a trace by selecting "Change Starting/End Time". The next screen, illustrated in Figure 51, will prompt you to type in the new starting time and new ending time. Times should be typed to the nearest second, in the format "hhmmss." For example 10:35:15 would be typed as "103515."

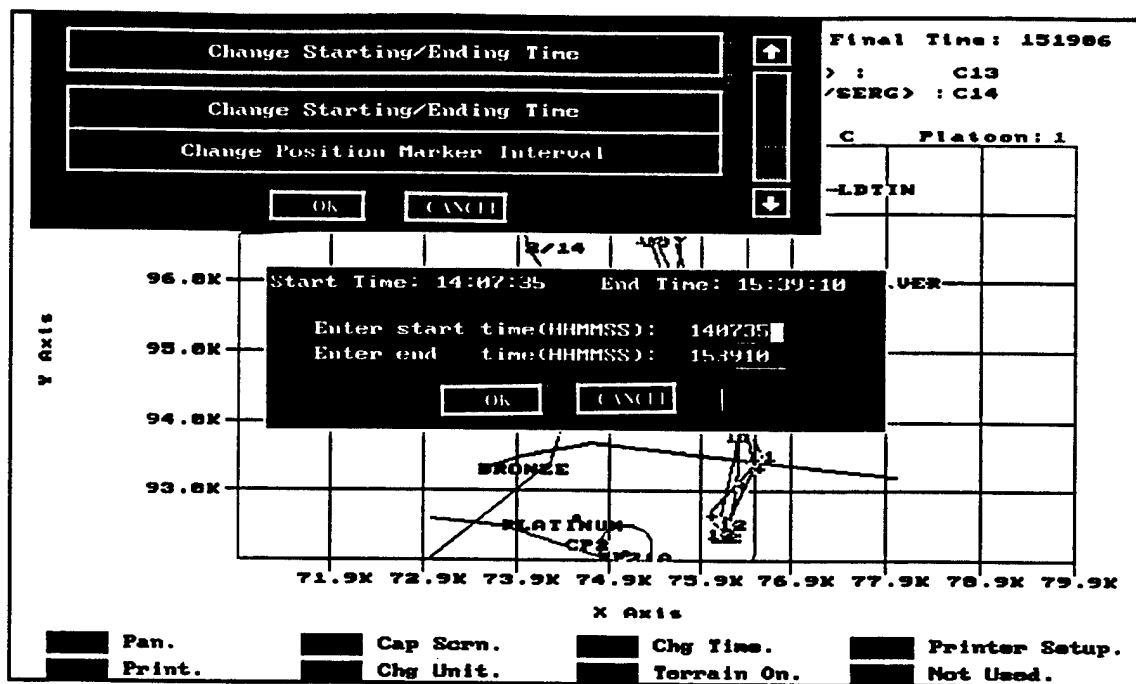


Figure 51. Pop-up menu for changing the beginning or end times for a Battle Flow.

Changing Marker Intervals. To change the interval at which positions are marked with plus (+) signs, select the "Change Position Marker Interval". A new pop-up screen will appear that allows you to type in a new marker interval (Figure 52). The default is 120 seconds. The UPAS allows you to use intervals as small as one second so that you can trace movements occurring during short periods of time.

To change the interval at which numerical markings appear, select the "Change Frequency of Numerical Marker Intervals" option. The pop-up screen shown in Figure 53 will appear. the default value is three minutes. Note that this option deals with minutes rather than seconds like the position marker.

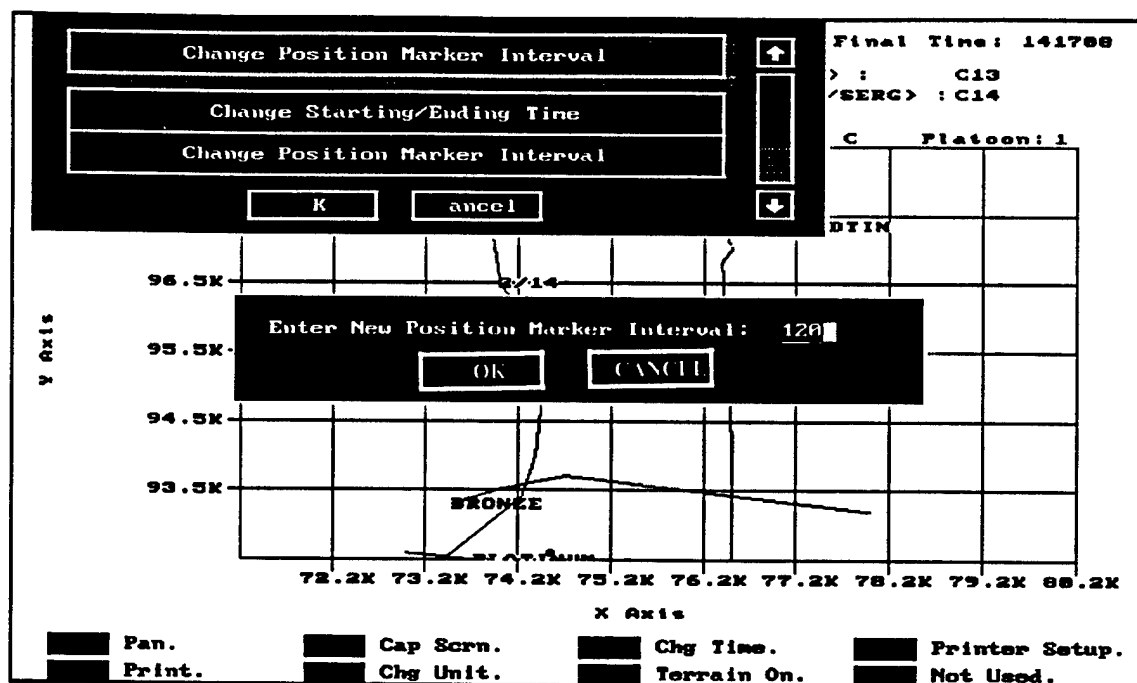


Figure 52. Pop-up screen for changing position marker interval.

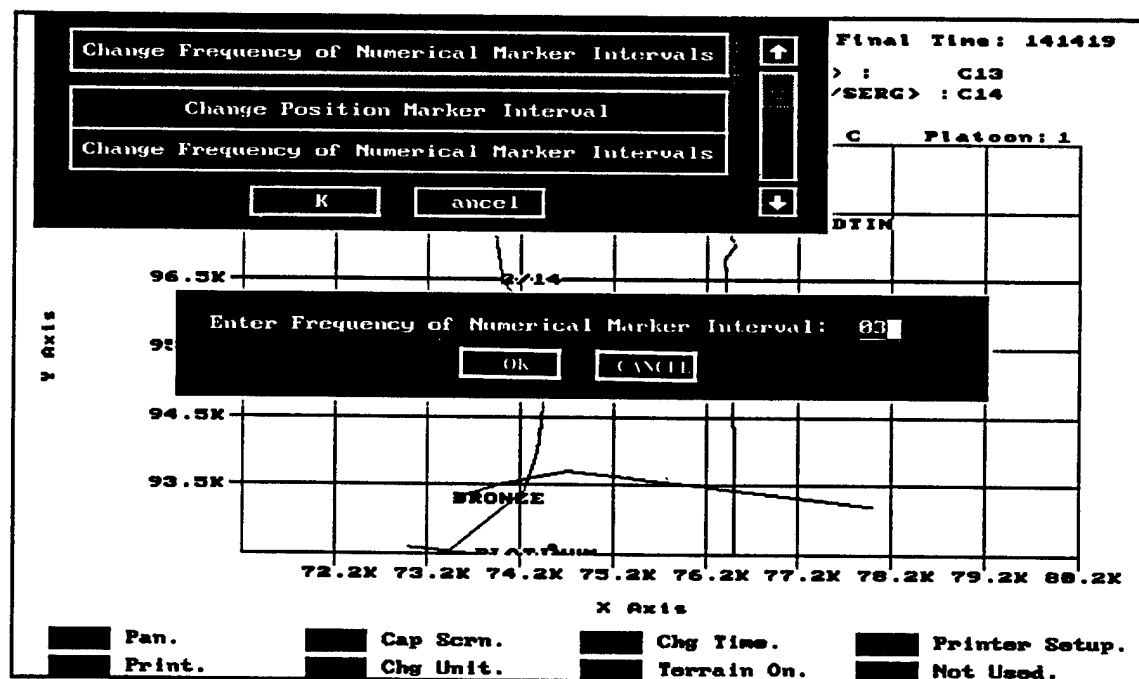


Figure 53. Battle Flow screen for changing numerical marker intervals.

Battle Snapshot

A Battle Snapshot is intended to provide a bird's-eye view of the battlefield at a specific point in time, showing the true orientation of vehicles and gun tubes. You may select as many points in time for Snapshots as necessary. For example, if a unit is ordered to change from one formation to another as it crosses a phase line, you might want one Snapshot before the crossing and a second Snapshot after the crossing to compare unit formations. The Snapshot also can display information about the line-of-sight (LOS) between friendly and enemy vehicles.

Selecting the Side, Level, and Unit to be Displayed. Use arrow keys to select the Battle Snapshot option from the After Action Review menu and press the <Enter> key. The next screen will show a box with the options "red" and "blue." Use the arrow keys to select the force you wish to examine and press <Enter>.

The next screen will then ask you to select either a company-level or a platoon-level display. The platoon display shows all vehicles in a particular platoon, while the company display shows vehicles of the company commander, XO, platoon leaders and platoon sergeants. The next screen will provide a list of company options. After selecting a company (e.g., company A), press the <Enter> key and a menu of platoon options will appear (if you have selected a platoon-level display). Use the arrow keys to select a platoon and then press the <Enter> key. Note that you can view only one company at a time or one platoon at a time, depending on the display selected.

Designating the Time for Battle Snapshots. After you select a unit, UPAS will ask you to type in the time for which the snapshot is to be prepared (see Figure 54). Unlike the Plan View and the Battle Flow, the Snapshot function is not animated. Therefore, you will need to know the specific times for which Snapshots are to be taken before you enter the Snapshot utility. Such times may be obtained from notes taken during the exercise, from times of interest noted when reviewing the exercise on the Plan View, Battle Flow, or Exercise Timeline, or from times specified in the unit's operational orders.

Using the Vehicle ID Legend. Figure 55 is an example of a Battle Snapshot screen. Note that there are two different sizes of vehicle icons. Large icons represent the vehicles designated for the snapshot, and small icons represent vehicles from the opposite force. Each large icon is color-coded to match the legend at the top of the screen. For example, if the bumper number is displayed in purple in the legend, the vehicle icon will also be in purple. The legend is capable of displaying only four bumper numbers at a time. To view additional bumper numbers, you can scroll through the list using the <PgDn> key.

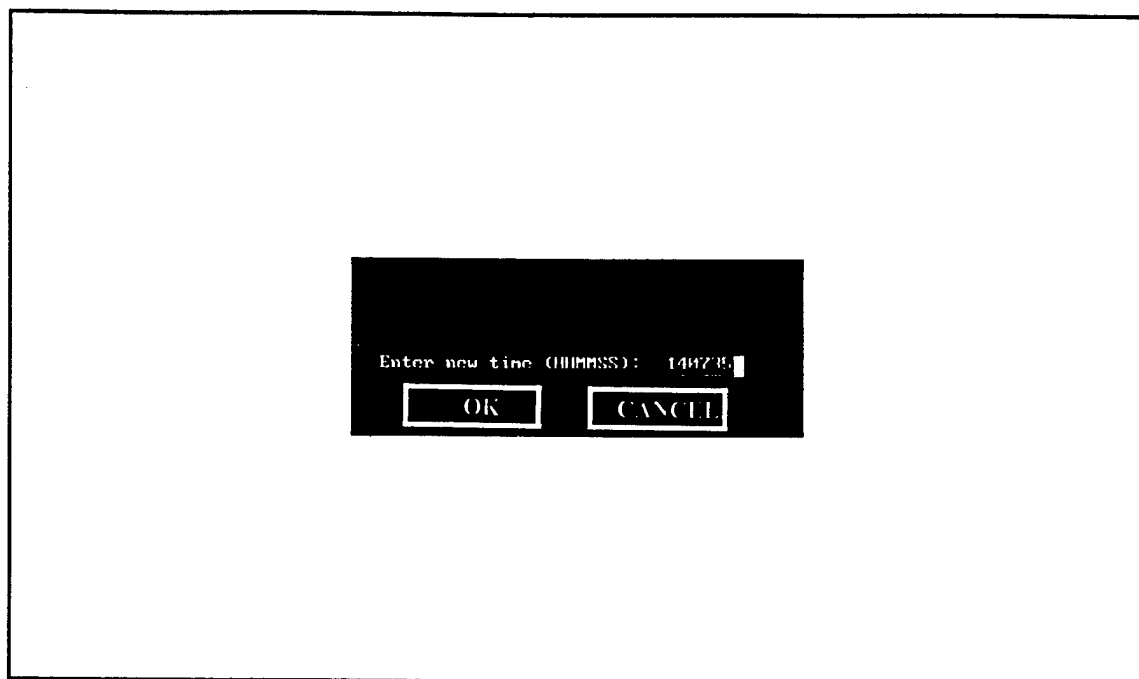


Figure 54. Screen for designating the time during an exercise at which a Battle Snapshot is to be made.

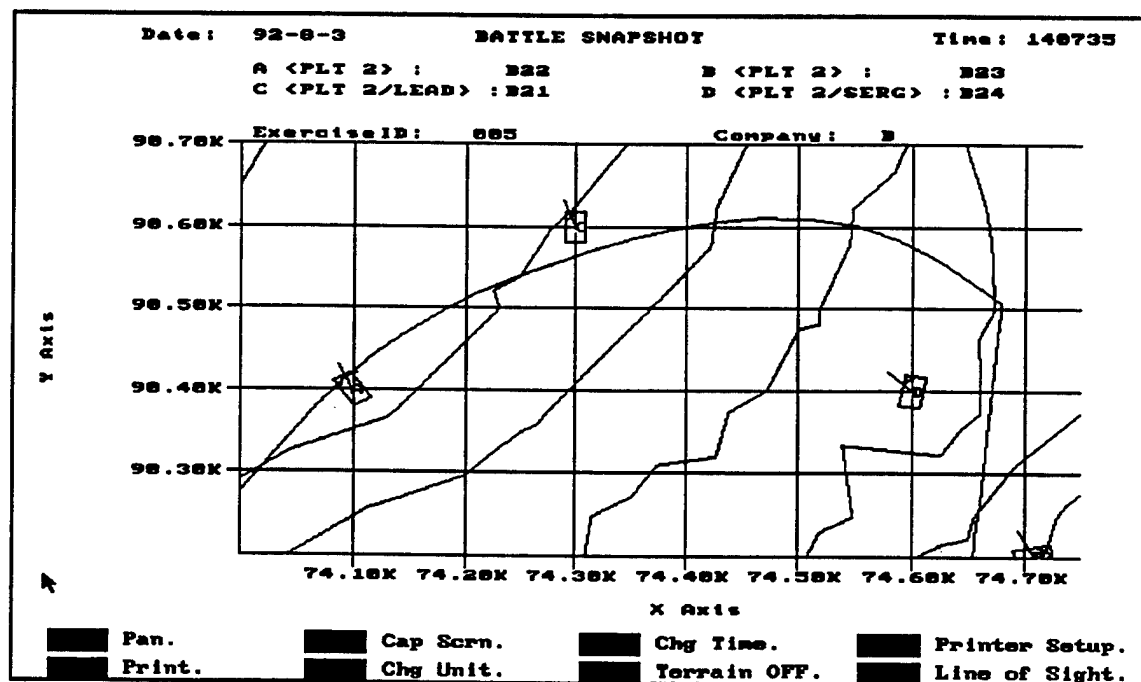


Figure 55. Battle Snapshot screen.

Using the Snapshot Line-of-Sight function. Press the <F8> key to gain access to the line-of-sight (LOS) function. The options at the bottom of the screen will then change to those shown in Figure 56. The Snapshot allows you to display LOS between a vehicle and either one designated vehicle on the other side or all vehicles on the opposite side.

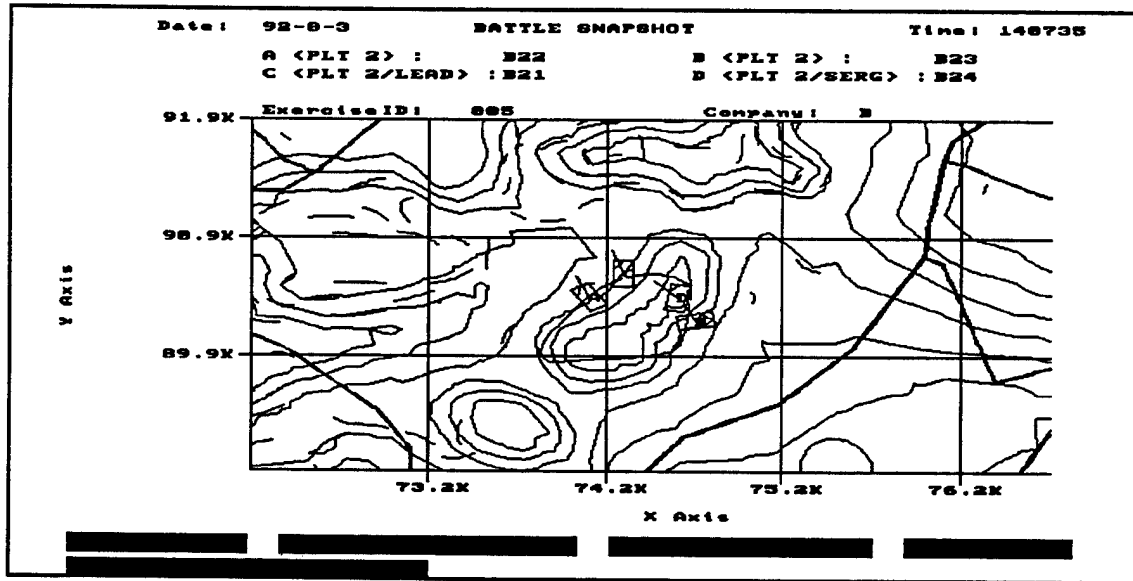


Figure 56. Battle Snapshot screen for selecting source and targets for line-of-sight displays.

To select the vehicle from which LOS is to be displayed, select the "source" option or press the <F1> key. The icon will then take the form of a "plus" sign. Use the icon to move to the vehicle of interest and then press the left mouse button. The ID of the source vehicle will be displayed at the bottom of the screen.

To display LOS between the source vehicle and each of the other vehicles on screen, select the "all targets" option or press the <F3> key. A solid green line between the source vehicle and a target vehicle indicates that the vehicles have LOS. A dashed red line indicates that LOS is broken by contour lines, other terrain features, or man-made features.

To assess LOS between the source vehicle and a single target vehicle, select the "selected targets" option or press the <F2> key. The icon will then turn into a "plus" sign that you can move to the vehicle of interest and press the left mouse button.

You can add LOS data for additional vehicles by repeating the process of selecting a source and target vehicles for each source vehicle you wish to add. Until you press the <F4> key or select the "erase" option to erase the LOS data and return to the main Snapshot screen, you can continue adding LOS data to the Snapshot.

Figure 57 shows an example of a Battle Snapshot in which LOS has been assessed among the four vehicles in an armor platoon after they have occupied defensive positions.

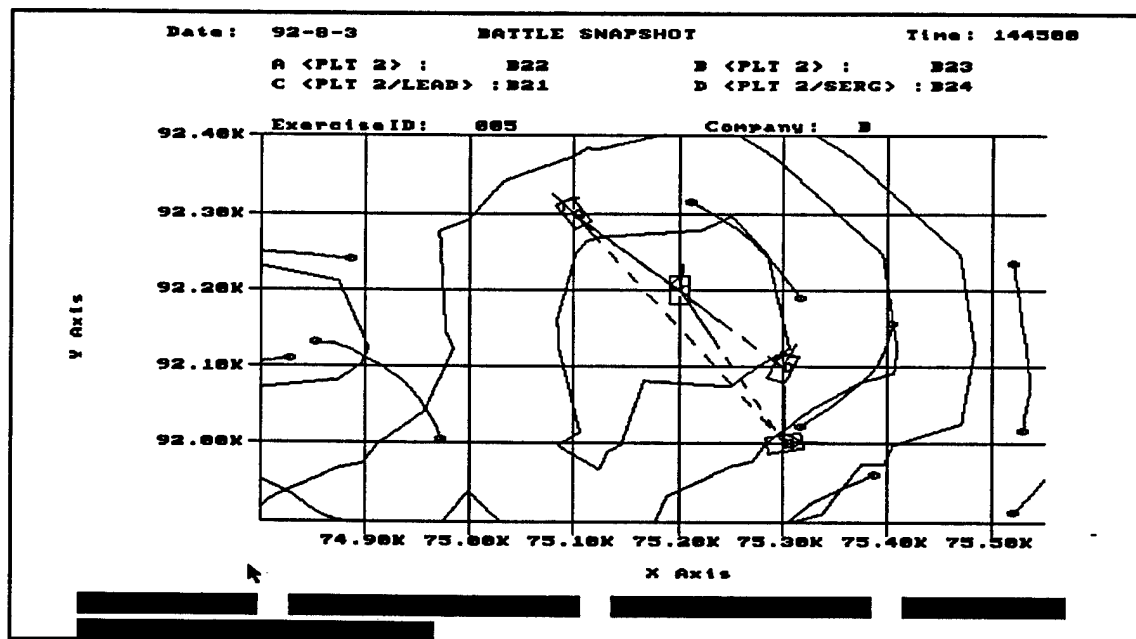


Figure 57. Battle Snapshot screen showing line-of-sight (or non-line-of sight) among the four vehicles in a platoon occupying a defensive position.

Fire Fight Display

Early feedback from trainers at the Fort Knox, Kentucky Combined Arms Tactical Training Center (CATTC) indicated the need for a map display to help examine how well a unit covers the battlefield with direct and indirect fires. The Fire Fight Display, illustrated in Figure 58, is intended to meet this need.

Shot lines extend from the position of the firing vehicle (indicated by a red or blue vehicle icon) to point of impact. Misses are shown with white lines and hits or kills with green lines. A kill is indicated by a dead vehicle icon (using the same color coding system as the UPAS Plan View Display) at the point of impact. The Fire Fight Display also shows artillery impact areas with a white rectangular icon.

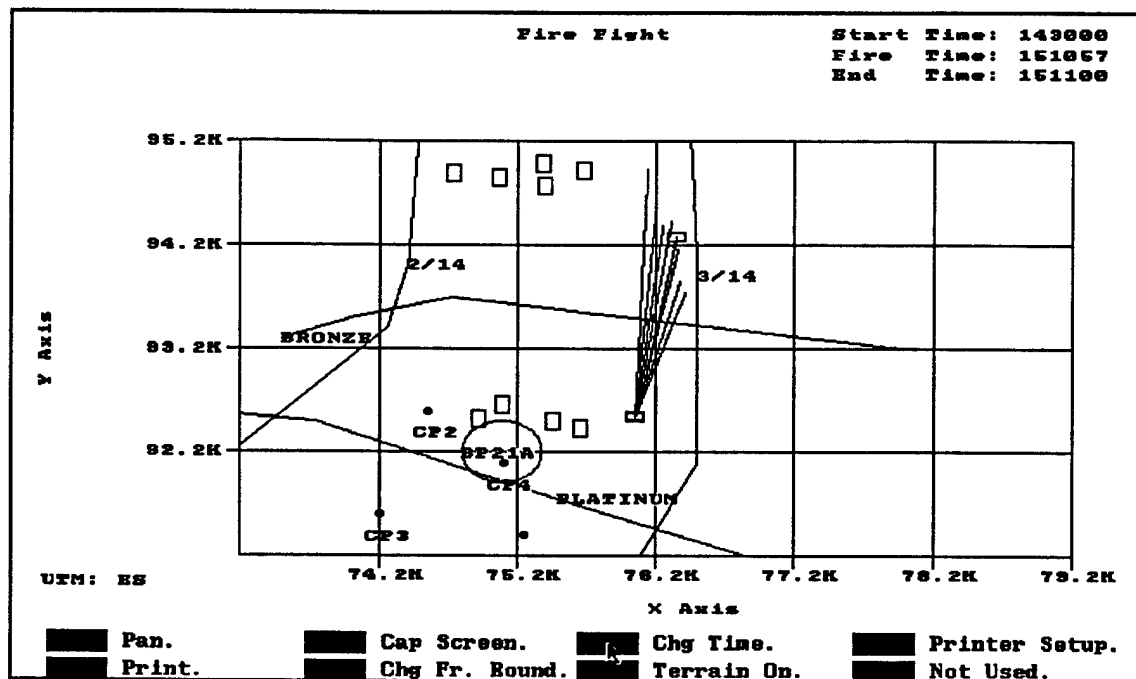


Figure 58. Sample Fire Fight Display.

Selecting Period to be Covered by a Fire Fight Display. The Fire Fight default summarizes firing events over an entire exercise. To limit the firing events to those occurring during a specific period press the <F3> key. This will call up the screen shown in Figure 59. Type in the start time using the hhmmss format and press the <Enter> key. UPAS will then prompt you to type the end time.

Sampling Plan for Displaying Fires of Rapid Fire Weapons. Weapons capable of firing at a high rate, such as the 25 MM gun on the M2, can clutter the Fire Fight with shot lines. To help fix this problem, we have added the capability to sample fires for these weapon systems. You have the option of displaying all rounds fired, or using any sampling plan (e.g. show every third round) you wish. To change the display of shot lines, press the <F6> key. When the screen shown in Figure 60 appears, type in the number for the sampling plan you want to use. For example, if you type "2", every other round will be displayed. If you type "4" every fourth round will be displayed. Note that the sampling plan applies only to misses. All rounds resulting in a hit or kill will be displayed.

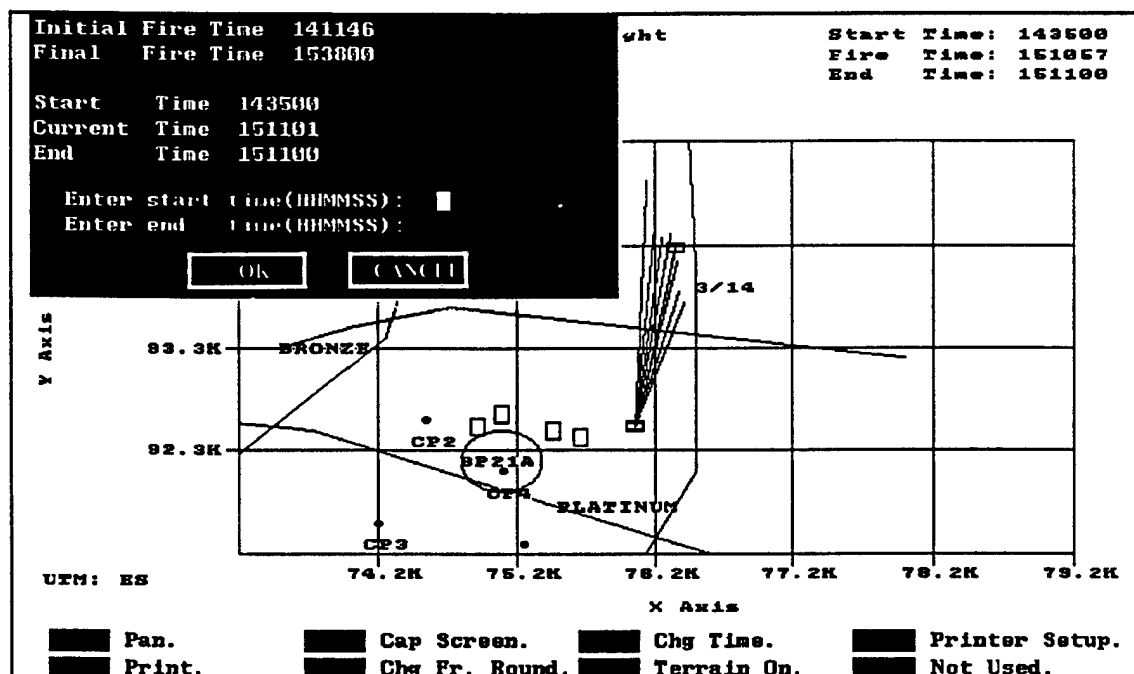


Figure 59. Screen for changing period of time covered by Fire Fight display.

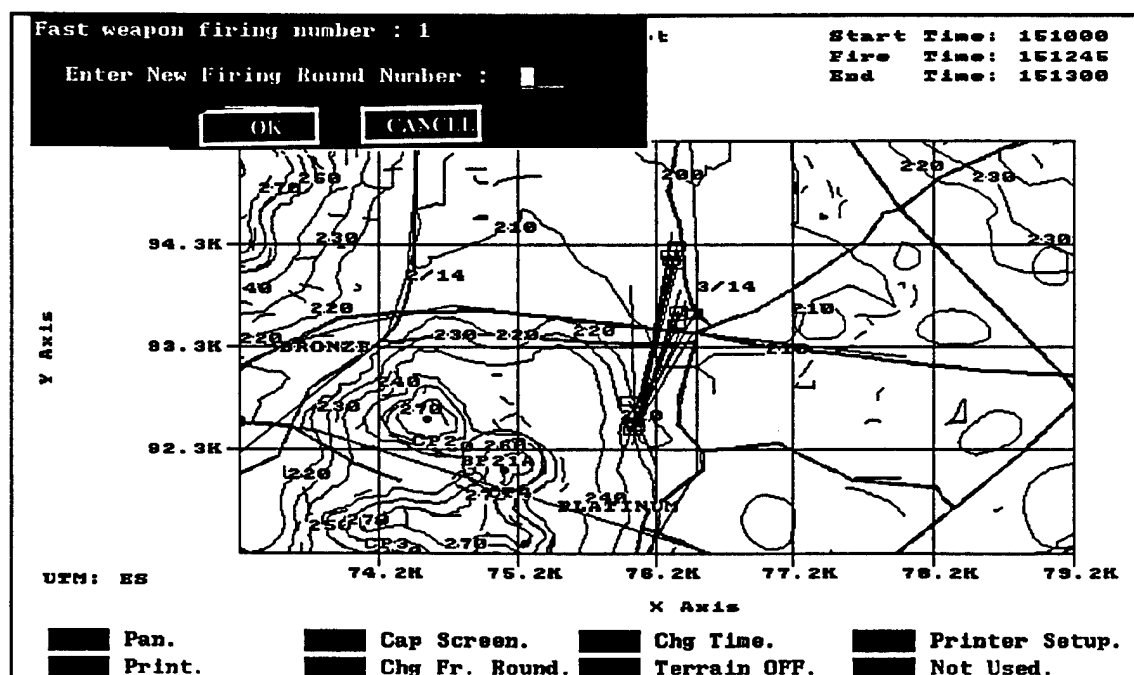


Figure 60. Screen for selecting sampling plan for display of rounds fired for rapid fire weapons.

Exercise Timeline

The Timeline describes firing, movement, and communication events as a function of time and control measures. It helps to make more obvious how different kinds of events are related in time. It can be used by itself to assess unit performance. For example, one might use the Timeline to find out if a platoon in the offense halted soon after being engaged by the enemy and promptly reported contact. The Timeline can also be used to identify points that warrant examination using other UPAS data displays, such as picking out interesting times for Snapshots.

When you select the Exercise Timeline option from the After Action Review Menu, the first screen will ask to select a force, red or blue. The subsequent screen will ask whether you want a company-level or platoon-level display. The company-level display provides a separate timeline for each platoon in the company. The next two screens will ask you to select the company and platoon (if appropriate) to be addressed by the Timeline.

Figure 61 provides an example of an Exercise Timeline. By default, the top and bottom lines cover the time between the start and end of the exercise. You may choose specific start and stop times for the Timeline by selecting the Change Time option or pressing the F6 key.

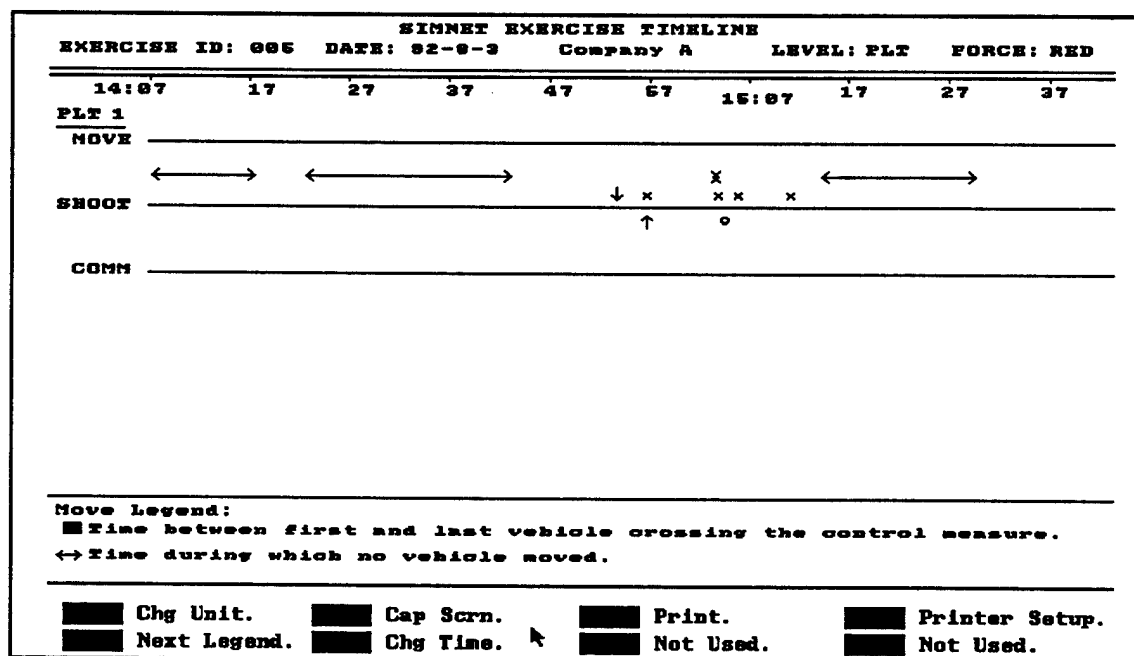


Figure 61. Exercise Timeline showing halts, crossing of control measures, initial firing events, and casualties inflicted or sustained.

The second line describes movement of the platoon as a function of time and control measures. The bars at the bottom of this line indicate when the first and last vehicle of a unit crossed a control measure. For Start, Release, and Check Points, vehicles within 50 meters of the point are considered to have crossed. For the Line of Departure and Phase Lines, vehicles must actually have crossed the line. Vehicles are considered to have departed the assembly area when they are 100 meters from its center, and vehicles are considered to have reached the objective when they are within 100 meters of its center. Disabled or destroyed vehicles are, of course, not included when computing the time when the first and last vehicle crossed a control measure. The Timeline also indicates the beginning and ending of periods in time when the entire platoon was halted.

The third line provides information about the time of direct and indirect firing events. The information provided about firing events is described below.

- o A small square is used to indicate when the platoon receives artillery fire (defined as artillery or mortar mission within 500 meters of any platoon vehicle).
- o An arrow pointed down indicates when the first enemy direct fire was received by the platoon, regardless of whether this fire resulted in a hit, kill, or miss. (A platoon is considered to have received direct fire if there is an impact within 500 meters of any vehicle in the platoon).
- o An arrow pointed up indicates when the platoon first delivers fire on the enemy (defined as the platoon's first firing event, regardless of result).
- o A small x indicates points in time when an enemy vehicle is destroyed
- o A small circle is used to indicate a point in time when a friendly vehicle is destroyed.

The fourth line provides information about the timing and type of communications over the tactical radio network. The commo line of the Timeline for each platoon and the company HQ will indicate when each of five types of tactical communications are transmitted by the platoon (or HQ) over the company net. An order will be indicated by an "O", a report will be indicated by an "R", a call for fire will be indicated by an "F", and a request for information will be indicated by a question mark. Tactical communications that do not fall into one of these four types will be classified as miscellaneous and indicated with an "M" on the Timeline.

The use of this feature requires that you maintain a log of radio messages during exercises and input these communications data at the end of the exercise. Once this feature is implemented fully, it can be used to assess whether units report critical information over the radio network.

A data collector will be required to collect communications data and load it into the UPAS in order to use the communications portion of the Exercise Timeline.

Due to the large number of symbols used in the Timeline, the legends for all of these symbols cannot be displayed at the same time. To cycle through the movement, shooting, and communication legends, select the option "Next Legend" or press the <F5> key. Figure 62 shows the legend for firing events as opposed to the legend of movement events shown in Figure 61.

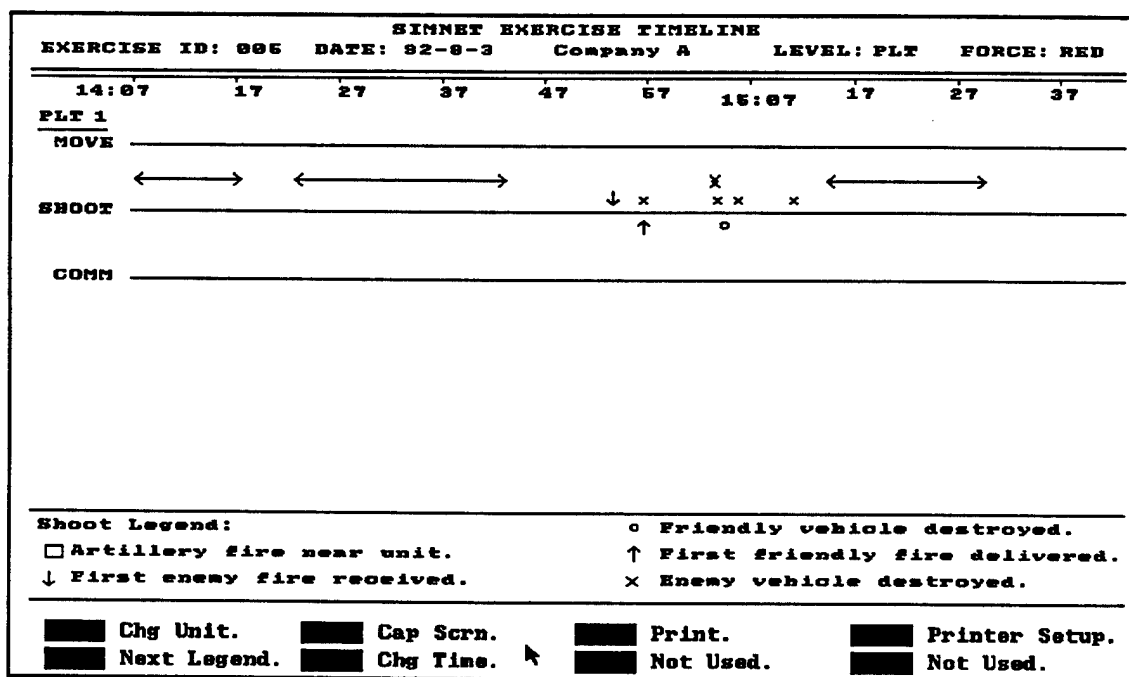


Figure 62. Legend of firing events included in the Exercise Timeline.

Saving Screens and the AAR Presentation Manager

Saving Screens. The Plan View, Battle Flow, Battle Snapshot, Fire Fight, and Exercise Timeline allow you to save screens of interest and add comments to these screens. To save screens, select the "Cap Scrn" option or press the <F2> key. A pop-up screen will then prompt you to type up to two lines of comments for the screen, as shown in Figure 63. Each saved screen is automatically placed in the active exercise directory and named according to the type of data display and number of saved screens already created by using that display (within that particular exercise directory). For example, all Battle Snapshots are named "ssht" with a number beginning with ssht0001.

The screens you can save include Battle Snapshots with LOS displays. To save these screens you must press the <ESC> key to leave the LOS function without erasing the LOS displays.

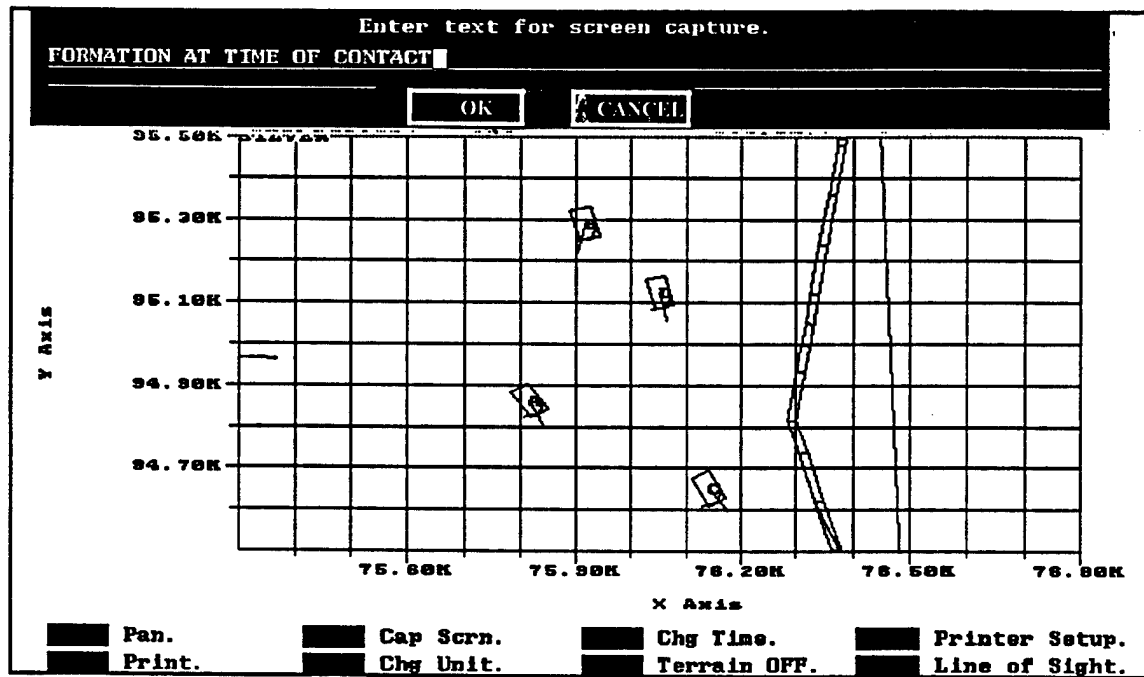


Figure 63. Battle Snapshot screen being saved with trainer comments.

AAR Presentation Manager. To view the screens that have been saved, select the option "Screen Image File Display" from the AAR menu. The next screen contains a pop-up menu of exercise directories. When you choose the exercise you want, a list of saved screens contained in that exercise directory will appear, as shown in Figure 64. Use the mouse to select the saved screen you want to display and press the left mouse button. The box at the top of the screen will then display the screen you have selected. Select the "OK" box and press the left mouse button to display the screen. Figure 65 shows a saved screen with the comments added by a trainer.

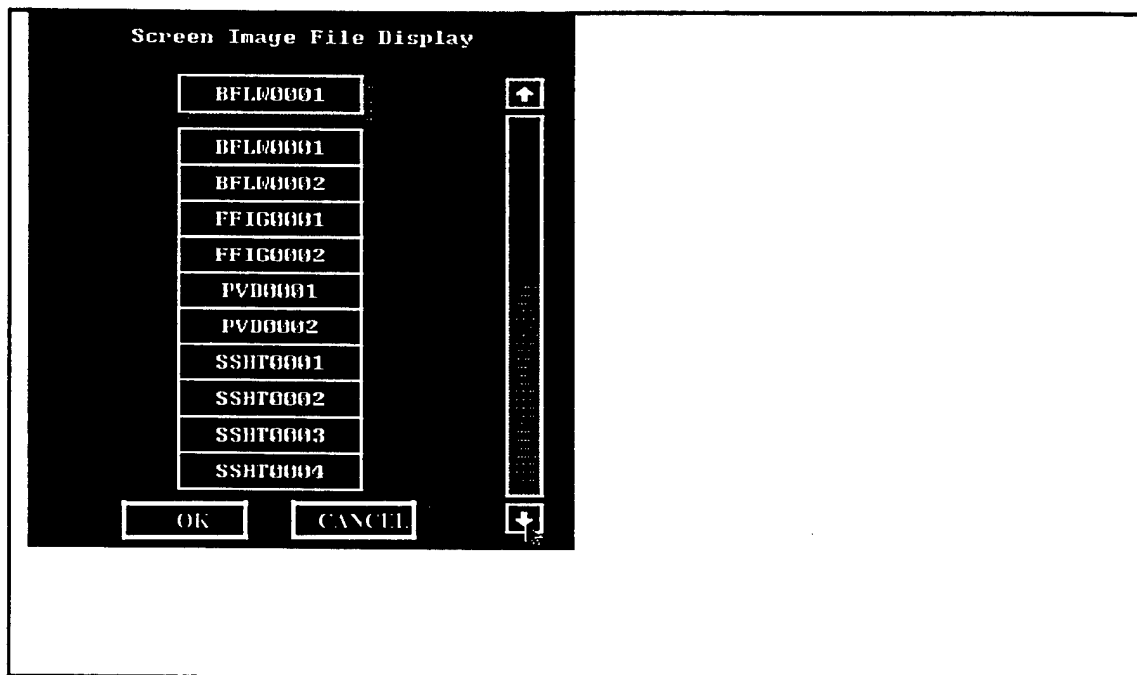


Figure 64. Menu of saved screens for After Action Review Presentation Manager.

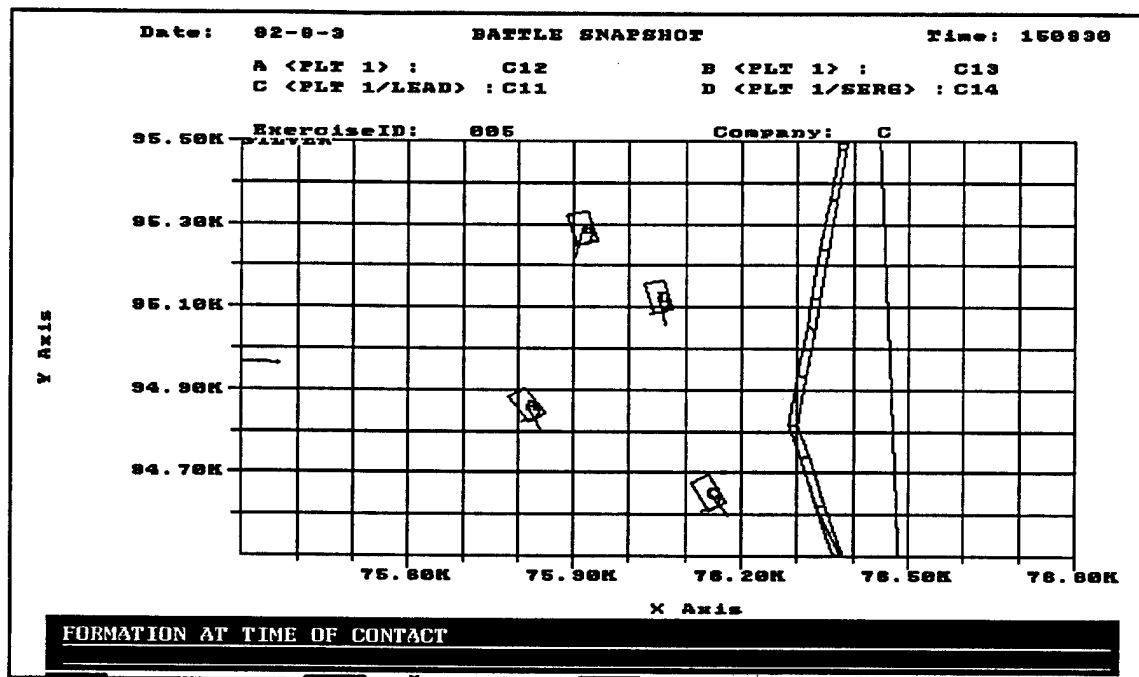


Figure 65. Display of saved screen with trainer comments.

Battle Scorecards

Battle Scorecards summarize the effects of direct and supporting engagements over an entire exercise. To gain access to these scorecards, select the Battle Scorecard option from the Data Summary Menu. The next screen (see Figure 66) will provide a menu of two scorecard options. Examples of these scorecards are provided as Table 4 and Table 5.

Each of the scorecards requires approximately four minutes for generation the first time they are prepared for a particular exercise. Subsequently only about a minute is required to recall a table that has been generated previously.

What happens after you select a scorecard from the menu depends on whether the scorecard has been generated previously. If it has, then you will see a display like that shown in Figure 67. Simply press <Esc> to call up the table, unless you want to regenerate the table from scratch for some reason.

To print a copy of a Battle Scorecard when it is displayed on your screen, press <F2>. To exit from a scorecard, press <Esc> and then type "y".

Battle Scorecard
Direct Fire Weapon System Summary Fire Support Summary
Use up or down arrow keys to highlight selection. <Enter> to accept. <Escape> to return to Previous Menu.

Figure 66. Battle Scorecard Menu screen.

Type Any Key to Regenerate Battle Scorecard Type <ESC> to Display Existing Battle Scorecard
Table Already Exists

Figure 67. Screen displayed when a Battle Scorecard has already been generated for exercise data.

Table 4

UPAS Direct Fire Weapon System Summary Table.

Side	Firing Weapon	Firing Ammo	SHOTS	MBT_H	MBT_K	IFV_H	IFV_K	OTH_H	OTH_K	TOT_H	TOT_K
B	US M1	US M392A2 - 105mm/KP	95	4	4	0	1	0	0	4	5
		US M456A1 - 105mm/SCP	87	0	0	6	5	0	0	6	5
		Total	182	4	4	6	6	0	0	10	10
R	USSR T72M	US M392A2 - 105mm/KP	1	0	1	0	0	0	0	0	1
		US M456A1 - 105mm/ SCP	1	0	0	0	0	0	0	0	0
		Total	2	0	1	0	0	0	0	0	1

Table 5

Fire Support Summary Table.

Side	Firing Weapon	Firing Ammo	SHOTS	MBT_H	MBT_K	IFV_H	IFV_K	OTH_H	OTH_K	TOT_H	TOT_K
B	US M106A1	US M329 - 107mm/HE	60	3	0	2	1	0	0	5	1
		US M107- 155mm/HE	80	4	1	1	1	0	0	5	2
		Total	140	7	1	3	2	0	0	10	3
R	USSR M1943	US MM329- 107mm/HE	40	2	1	0	0	0	0	2	1
		US M107 - 155mm/HE	0	0	0	0	0	0	0	0	0
		Total	40	2	1	0	0	0	0	2	1

UPAS Utilities Menu

When you select the Utilities option from the UPAS main menu, the screen shown in Figure 68 will appear. The graph editor and table editor options are used to create or modify the tables and graphs contained in the menus of graph and table options described on pages 26 through 30. Instructions for using these editors are provided in the UPAS Advanced User's Guide.

Utilities
Set Data Path Summary Graphics Editor Summary Text Table Editor
Use up or down arrow keys to highlight selection. <Enter> to accept. <Escape> to return to Main Menu.

Figure 68. Utilities Menu screen.

Overview of the Performance Measurement and NTC Archive Database Options

Procedures for using the Performance Measurement and NTC Archive Database options from the UPAS Main Menu are provided in the Advanced UPAS User's Guide. These are tools for research and training development that are being used to improve the quality of feedback provided by the UPAS. Each of these tools is described briefly below.

The NTC Archive Database function allows the user to analyze exercise data loaded into the SIMNET/NTC database using Structured Query Language (SQL). This feature makes it possible to examine data in ways that are not covered by the menus of tables and graphs already contained within the UPAS. This feature can also be used in conjunction with UPAS graph and table editors to add new tables and graphs to these menus.

The NTC Archive Database contains data tables patterned after those used to archive data from NTC exercises. The UPAS tables differ from the NTC tables in that they contain certain types of information that are automatically collected from SIMNET exercises. For example, both the NTC archives and the SIMNET/NTC database contain a table called the Ground Player Location Table (GPLT) that contains time-tagged data on vehicle locations throughout an exercise. The SIMNET version of the table contains additional information about each vehicle including the amount of fuel and ammunition available, the speed of the vehicle, the engine speed, and the odometer reading. A complete list of the time-tagged data in the UPAS NTC Archive Database is presented in Table 6.

Note that the user can choose to convert exercise data with or without the GPLT. Because the GPLT is by far the largest of the data tables, there may be some cases in which you do not want it included in the conversion. For example, if you have limited hard disk space, converting the exercise data with the GPLT included may prevent you from completing the conversion. There are some drawbacks to converting exercise data without the GPLT. For instance, you can not use the Timeline display without the GPLT.

Table 6

Exercise Data Contained in the UPAS NTC Archive Database.

Direct Firing Events

- o Time of firing event
- o ID of firing vehicle and target vehicle
- o Type of weapon system and type of ammunition employed
- o Location of firing vehicle and target vehicle expressed in terms of X-Y-Z UTM grid coordinates and in terms of polar coordinates
- o Range of engagement
- o Results of engagement expressed as a hit, kill, or miss
- o Identification of firing events that are fratricidal

Vehicle Location and Status

- o Time of vehicle location or vehicle status update
- o ID of vehicle
- o Location of vehicle expressed in terms of X-Y-Z UTM coordinates and in terms of relative coordinates
- o Speed of movement
- o Odometer reading
- o Number of liters of fuel remaining
- o Rounds of ammunition remaining
- o Direction of movement
- o Turret azimuth
- o Operational status of vehicle (fully operational, destroyed, communication loss, or mobility loss)

Indirect Firing Events

- o Time of indirect fire missions
- o Type of shell employed
- o Number of rounds employed
- o Location of target
- o Result of engagement

The UPAS Performance Measurement system allows the user to link performance standards to specific UPAS data sources (graphs, tables, Plan View, Battle Flow, Battle Snapshot, Exercise Timeline, and Scorecards) that can be used in deciding whether a unit met each standard. Figure 69 shows a Performance Measurement Screen allowing users to call up data sources that can be used for a sample standard. In many cases more than one measure might be used to assess unit performance with respect to standard, and the link with data sources is actually made through measures of performance. Note that the user can also record the results of the application of the standard.

The Performance Measurement system is a flexible system that can be easily modified in response to lessons learned about measuring unit performance. Tools built into the Performance Measurement System allow the user to change tasks, standards, measures of performance, and data sources in response to lessons learned.

Evaluate Task	
Company A/Platoon 1 Conduct Assault Task 33 Unit suppresses enemy fires. MOP Type: Automated Number of rounds fired by each side over time MOP Display Format: Table	Performance Standard: Execution of the assault effectively destroys the enemy's capability to fight. MOP Comments Rating:
Use arrow keys to View MOPs. Use Page UP/Dn keys to Advance to next Performance. <F1> to Evaluate Automated MOP. <F2> Edit Comments. <F3> Edit Rating. <Esc> for previous menu.	

Figure 69. Performance Measurement Screen.

Appendix A: UPAS Hardware and Software Requirements

Computer

The Unit Performance Assessment System (UPAS) will run on an IBM AT or compatible computer with a VGA adapter and monitor. Due to the need to process information quickly after an exercise, it is recommended that UPAS be employed on a 486 system running at 50 megahertz or higher. It is also strongly recommended that at least four megabytes of expanded memory be added to the basic system through the use of RAM expansion boards compatible with your system. The system should also include a 350 megabyte, or higher, hard disk.

Tape Drive

Due to the large amount of data produced during SIMNET exercises it is not practical to save exercise data on floppy disks. Instead, an internal or external tape drive is recommended. At present most UPAS systems employ the Jumbo Trakker tape backup system made by Colorado Memory Systems (800 South Taft Avenue, Loveland, CO 80537).

Ethernet Board

The ethernet board used to connect the UPAS to SIMNET network is a 3COM Board 503.

Printer

Any printer that supports the Epson MX, Epson FX, Epson LQ, Hewlett Packard LaserJet, or Hewlett Packard Ink Jet interfaces can be used.

Commercial Software Packages

The UPAS employs the XDB relational database management system from XDB System, Inc (Address: 7309 Baltimore Avenue, College Park, Maryland 20740; Telephone: 301-779-6030). UPAS is designed to run with the XDB DBMS Version 2.40 with the XDB-XM option.

UPAS Software

UPAS software includes executable code and a SIMNET terrain database. The current terrain database addresses the Fort Knox training area. It is composed of a single 32.7 megabyte file called "Knox".

Modifying Config.sys and Autoexec.bat Files

The "config.sys" file should read as follows:

```
DEVICE=C:\DOS\SETVER.EXE
DEVICE=C:\DOS\HIMEM.SYS
BREAK=ON
BUFFERS=30
FILES=50
INSTALL=C:\DOS\SHARE.EXE
DEVICE=C:\DOS\ANSI.SYS
DOS=HIGH
SHELL=C:\DOS\COMMAND.COM C:\DOS\ /E:1024 /P
STACKS=9,256
```

The "autoexec.bat" file should read as follows:

```
PATH=C:\DOS;C:\BN\UT;C:\BN\WP;C:\XDB\;C:\MOUSE
SET COMSPEC=C:\DOS\COMMAND.COM
SET GLOB=C:\ETC\GLOB.EXE
@SET ROOTDIR=C:
@SET CD PATH=.;\
@SET TMP=C:\TMP
@SET TMPDIR=C:\TMP
@SET TEMP=C:\TMP
@SET XDBCFCFG=C:\XDB
@SET DOS16M==@1088.1700
C:\MOUSE\MOUSE
DOSKEY /BUFSIZE=1000
```

Loading UPAS Software

UPAS executable code combined with the "Knox" terrain database file requires over 50 megabytes of memory. The most reasonable way to load UPAS on your hard drive is to copy it from a tape using your tape backup system. Two directories must be loaded; the UPM directory containing the executable code and the TDB directory containing the terrain database.

Reducing Competition Among Peripheral Devices

The settings of the various peripheral devices must be checked to make sure that they do not interfere with the performance of the ethernet board. Otherwise, the UPAS data collection system might not work, or might work intermittently.

Appendix B: UPAS Data Files

The UPAS directory, \upm\ddds, contains database files which are database definition templates for UPAS database tables. Most of these files are XDB system files maintained and used only by XDB and need not concern the user. Files with the extension ".tab" are the database files for the corresponding tables. For instance, the database file for the firing event table (FET) is called FET.TAB. Index files are suffixed by ".IDX", such as PVWT.IDX being the index file for the PVWT table. These database files define all the fields in the records for the UPAS database tables. The use of these database files is transparent to the user who never has to modify or delete any of them directly.

Each UPAS exercise is assigned a specific UPAS directory, the name of which is selected by the user. For example, the user might select \upm\fnsim3 for a particular exercise. If that directory does not already exist, the system will create that directory and copy all the template files from \upm\ddds into this newly created directory. Note that the database still contains no exercise specific data up to this point until exercise data has been collected and data conversion has been performed on the collected data. The process of the data conversion is to insert the collected data into the database tables.

The following database tables contain exercise specific data inserted by the UPAS data conversion module.

MID - The mission identification table contains information about the mission's date, starting time, and ending time.

PSIT - The player state initialization table contains the vehicle ID, bumper number, vehicle code, and side for each vehicle.

GPLT - The ground player position location table contains information about the location and status of each vehicle as a function of time.

FET - The firing event table contains information about each direct fire, such as the time, firer's vehicle ID, firer's location, weapon type, and ammunition used in the direct fire.

IFMF - The indirect fire mission fire table contains information about each indirect fire (e.g. mortar, howitzer), including the time, the firer's vehicle ID, target location, weapon type, and ammunition used in the indirect fire.

PET - The pairing event table contains information about each impact (whether it is a ground impact or a vehicle impact), including the time, the firer's vehicle ID and location, target location, target vehicle's ID if hit, weapon type and ammunition used, firing range, and result of impact.

IFCT - The indirect fire casualty table contains information about each indirect fire casualty, including time, firing vehicle's ID, target vehicle's ID, and target location.

COMMO - The communication table contains information on the time of radio communications and the message type.

Some of the tables contain constant data and are not specific to each exercise. They are listed below:

PVWT - The Player/Vehicle/Weapon Code table is a translation table that translates the vehicle code into the corresponding vehicle type string and the weapon code into the corresponding weapon type string.

MENU - The menu table defines the menu prompts used in some UPAS menus and the return codes to be returned from the menu when the user selects the corresponding menu choices.

INTER - The inter table links definitions of graphs with menus.

GRAPH - The graph titles and legend table defines the graph titles and the legends used for the x and y axes in the UPAS's graphs.

TABLE - This table contains the definitions for data summary tables.

SQL - The query command table defines the query commands used by the UPAS's tables and graph modules. These query commands are used to retrieve the required information prior to displaying the corresponding tables and graphs. The query commands for the various tables and graphs can be defined by the user by running the UPAS's table editor and graph editor modules.

There are some tables which contain information entered by the user when running some of the UPAS modules. This information is not broadcast over the network. These tables are listed below:

CMT - The control measure table contains the names and coordinates of the control measures entered by the user when running the UPAS's control measure module.

PLTORG - The platoon organization table defines the organization of each platoon and company involved in the exercise. This information is entered by the user when running the platoon organization module.

Besides the XDB database table files, there are some other files suffixed by ".DAT". These files provide intermediate data storage for the UPAS modules and their use are transparent to the user. The ".DAT" files are listed below:

\$upm.dat - This raw data file contains data consisting of data packets collected over the network.

\$sec.dat - This file defines the position of the data packets in \$upm.dat which are spaced one second apart in time. This file is used to support a quick search feature for UPAS data displays. It is this file that, for example, allows the user to jump from one point in time to another in an exercise almost instantaneously.

convert.dat - This data file contains information about whether data conversion has been performed on \$upm.dat and the corresponding conversion interval used.

\$cs.dat - This data file contains information about the positions of the Status Change data packets in \$upm.dat.

\$midasci.dat - This data file contains information about the exercise's starting time, ending time, and the vehicle ID's used for data filtering.

event.dat - This data file stores all the master events entered by the user when running the UPAS master event module.

Appendix C:
UPAS Executable Files

The UPAS directory, "\upm", contains all the executable files used by UPAS. The executable files are listed and briefly described in the table below.

Table C-1.

Names and Descriptions for UPAS Executable Files.

<u>File Name</u>	<u>Description</u>
bflow.exe	Battle Flow Module
cntmea.exe	Control Measure Module
dell.exe	Used for clearing UPAS database files prior to data conversion
dspscr.exe	Used to run the AAR Presentation Manager
edpms.exe	Performance Measurement Edit Module
extml.exe	Exercise Timeline Module
ffight.exe	Fire Fight Display Module
g_editor.exe	Graph Editor Module
graph.exe	Graph Display Module
index.exe	Index File Creation Module
lose.exe	Used to indicate when directory already contains exercise data.
logo.exe	UPAS Logo Display Module
mel.exe	Master Event List Module
ntc.exe	Data Conversion Module
ntexted.exe	Table Editor Module
ntextev.exe	Table Display Module
plot.exe	Graph Plotting Module
plt.exe	Platoon Organization Module
pms.exe	Performance Measurement Display Module
prepms.exe	Performance Measurement Pre-data Entry Module
sdp.exe	Set Data Path Module
sshot.exe	Battle Snapshot Module
subupm.exe	Setup for Data Subset Module
super.exe	UPAS Main Module
upf.exe	Data Collection Module
upm.bat	Batch file to load/unload xdb engine and invoke UPAS
viewpdu.exe	View PDU Module
viewplan.exe	Planview Module

Appendix D: Capability to Create Subsets of Exercise Data

The UPAS allows you to make subsets of exercise data based upon time. This option might be used to reduce the time required to prepare certain data summaries, and it might be used to reduce the stored to support a specific research project. You would want to use this option only in situation where you want to create a file covering only a relatively small part of the exercise (e.g., 60 percent or less).

Units are often interested in obtaining data breakouts covering fire events quickly after an exercise to find out, for example, if there were any fratricides. For lengthy exercises, or exercises in which there are large numbers of entities involved, substantial time is required to load data into a relational database before graphs and tables of firing events can be prepared. The amount of time required to perform this task can be reduced in cases where large portions of the exercise take place prior to the initiation of fires (e.g., a long movement prior to contact) by loading only data collected after the initiation of fires.

Similarly, researchers have the problem of reducing the amount of exercise data that must be stored to support research projects. For example, a researcher might want to analyze how moving platoons and/or companies react to initial contact with enemy. This researcher could use the UPAS option to create data subsets by creating files covering the period five minutes before contact through five minutes after contact for many exercises.

After you select the "Create UPM Subset Data" option, you will see the screen shown in Figure D-1. You can specify the path for the new directory by adding a subdirectory (e.g., changing the path shown in the Figure to c:\upm\findave\fire) or by creating a new directory (e.g., c:\firedata).

Type in new starting and ending times without using colons. After you have identified new time limits for the file and named the directory in which data are to be saved, press the <F1> key to create the new data subset. The screen will first tell you that it is loading NTC data tables into the directory and then it will tell you it is creating a time index. The output of these activities will be empty NTC data tables into which data can subsequently be loaded and an exercise data file called "\$upm.dat" that contains a portion of the "\$upm.dat" file for the entire exercise.

The system will return you to the data collection menu when it has created the new data file. To load these data into the NTC database, you should set the data path to the subdirectory where the file is maintained and then run the NTC data conversion option.

Setup For Data Subset	
Original Data Path:	C:\UPM\K3920803\
Original Starting Time:	14:07:20
Original Ending Time:	15:39:10
New Data Path:	C: \UPM\K3920803\Fire
New Starting Time:	145100
New Ending Time:	153910
<F1> Create data subset. Up to 35 characters for each path. <ESC> Quit without saving. Use arrow keys (<-,>) to move. <Enter> Data Path or New Time.	

Figure D-1. Screen for defining a new data subset.

Appendix E: Changing Origin of Terrain Databases

The origin of a terrain database, in terms of UTM coordinates, is critical information, because position network located data for entities and firing events are expressed relative to the origin of the terrain database. A problem in using the UPAS was encountered when a new version of a GRAF terrain database was created that used an origin differing from that of the previous version. As a result, discrepancies were observed in the locations of entities and firing events between SIMNET displays (using the new terrain database) and UPAS displays (using the previous terrain database).

The Institute for Simulation and Training (IST) developed a "fix" for the discrepancy between vehicle locations shown on the SIMNET Plan View versus UPAS Plan View for the GRAF terrain database that can be applied for other terrain databases. The "fix" involved loading an offset value for the X axis and Y axis. This offset value is then considered by all of the displays that reflect vehicle locations (Plan View, Snapshot, Battle Flow, Firefight, and Timeline).

The UPAS After Action Review menu now contains the option "set terrain offset". When you select this option, a new screen will appear reporting the current offset values and asking if the user wants to change the X and Y offsets. Type "y" and press <enter> to change offsets. A positive value for an X offset moves vehicles to the east and a negative value moves vehicles to the west. Similarly, a positive value for the Y offset moves vehicles to the north and a negative value moves vehicles to the south. When the system asks if you want to change byte swapping status, respond by typing "n" and pressing <enter>.

Appendix F:
UPAS Job Aid

Aggregate and Individual Entity Icons in Plan View

To change from individual entity icons to aggregate (platoon) icons,

- o click on "more" at the bottom of the screen.
- o click on "display type" at the bottom of the screen.
- o click on "aggregate", then click on "OK"

To change from platoon icons to individual,

- o click on "more" at the bottom of the screen.
- o click on "display type" at the bottom of the screen.
- o click on "aggregate", then click on "OK"

- o click on "more" at bottom of screen to return to regular plan view

Battle Snapshot Line-of-Sight

Click on "Line of Sight" at bottom of screen.

To select vehicle from which intervisibility will be assessed,

- o click on "source" at bottom of screen.
- o move "X" icon to entity from which line of sight calculations are to be made click

To select vehicles with which intervisibility of source vehicle is to be assessed,

- o if intervisibility is to be examined with all other vehicles click on "all targets" at bottom of screen

- o if intervisibility with only some other vehicles is to be assessed,
 - click on "selected targets" at the bottom of the screen.
 - move the "X" icon to a target and click
 - to add more targets, repeat process of clicking on "selected target" and moving icon to target and clicking.

To include more source vehicles in the display, repeat the above process for selecting a source vehicle and one or more target vehicles.

To print or capture a screen showing the line of sight information, press <ESC> to return to the regular Snapshot function keys.

To remove the line of sight displays, click on "erase" at the bottom of the screen.

Control Measure (CM)

Select side with mouse click.

Add CMs by type as follows:

- o To select type of CM,
 - select "type" at bottom of screen.
 - Select CM type and then click OK.
- o To add a CM,
 - select "add" at bottom of screen.
 - Type name of CM (e.g., Tiger) and then click OK.
 - To show location of CM:
 - . For points, move icon to location and click.
 - . For areas, move icon to boundary, click, and drag icon to opposite boundary before releasing mouse button.
 - . For lines, click and drag for each line segment, and then press right mouse button when finished with a line.

To delete a CM,

- o select "delete" at the bottom of the screen
- o click on the name of the CM to be deleted and click OK.

To exit press <ESC>

Data Conversion

Warning: Make sure that the terrain database format path specified in the set data path screen matches the data you are converting.

To select a data conversion interval other than 5 minutes, type in number of minutes.

To start data conversion press <F1>

Graphs

To select a type of graph, use arrow keys to highlight selection and press <Enter>

To define parameters (side, weapon type, ammunition type, etc.),

- o use arrow keys to highlight selection or selections
- o press <Enter> after each selection is highlighted
- o and then press <F1> after all selections have been made.

To change the scale of the graph after it has been displayed,

- o press <F2>
- o Type in new values
- o press <Enter> to accept value and move to another field
- o press <F1> to see the graph with the new scale.

To print the graph, press <F2>

To capture the screen and add written comments,

- o press <F3>
- o type up to two lines of comments when you are prompted to enter text
- o click on OK when finished.

Master Event List

For first event,

- o Press <F2>
- o Type first event (up to twenty characters)
- o Press <Enter> to move to time column
- o Type hour
- o Press <Enter> to move to minute column
- o Type minutes
- o Press <Enter>

For subsequent events,

- o Press <F4> to append another event
- o Type event (up to twenty characters)
- o Press <Enter> to move to time column
- o Type hour
- o Press <Enter> to move to minute column
- o Type minutes
- o Press <Enter>

To insert an event,

- o move cursor immediately below where event is to be inserted and press <F3>
- o Type event
- o Press <Enter> to move to time column
- o Type hour
- o Press <Enter> to move to minute column
- o Type minutes

To save entire list, press <F1>

To edit an event,

- o use arrow keys to select event
- o press <F2> to start

To delete an event,

- o use arrow keys to select event
- o then press <F9> to delete

Warning: Avoid Typing "26" as a minute entry.

Map Display Scale

To change the center of the map display without changing the scale,

- o when the new center is at a location already displayed on the map,
 - click on "pan",
 - move the "+" icon to what will be the new center of the display and click
 - click on "no change"
- o when the new center is at a location off the current map display,
 - click on "pan"
 - move the "+" icon to a point off the map and click
 - type in the coordinates for the new center then click on "OK"
 - click on "no change"

To change the center of the map display and the scale

- o when the new center is at a location already displayed on the map,
 - click on "pan",
 - move the "+" icon to what will be the new center of the display and click
 - click on the new scale values (or select the "X x Y" option and type in new values) then click on "OK"
- o when the new center is at a location off the current map display,
 - click on "pan"
 - move the "+" icon to a point off the map and click
 - type in the coordinates for the new center then click on "OK"
 - click on the new scale values (or select the "X x Y" option and type in new values) then click on "OK"

To change the scale without changing the center of the display,

- o double click on "pan"
- o click on the new scale values (or select the "X x Y" option and type in new values) then click on "OK"

Platoon Organization

To select force, use arrow key to highlight force and press <Enter>

To select company, use arrow key to highlight and press <Enter>

To select platoon, use arrow key to highlight and press <Enter>

To load information about platoon leader or platoon sergeant, press <F2>

To load information about other vehicles press <F3>

Type SIMNET ID numbers in site.host.ID format.

To move from one vehicle to another, press <Enter>

To save the data, press <F1>

To exit, press <ESC>.

Terrain Features in Map Displays

To remove terrain features from a map, click on "terrain off" at bottom of screen.

To add terrain features without contour lines,

- o click on "terrain on" at bottom of screen.
- o click on "hide" and then click on "OK"

To add terrain features and contour lines without elevations,

- o click on "terrain on" at bottom of screen.
- o click on "show" and then click on "OK"
- o click on "turn off" and then click on "OK"

To add terrain features and contour lines with elevations,

- o click on "terrain on" at bottom of screen.
- o click on "show" and then click on "OK".
- o click on "turn on" and then click on "OK"
- o to accept the default contour interval of 10 meters, click on "OK".
- o to specify another contour interval, type in the interval (with or without a decimal point) and click on "OK".

Vehicle and IDs in Plan View Display

To call up the SIMNET IDs and bumper numbers for entities,

- o Click on "more" at bottom of screen.
- o Click on "identify vehicles" at bottom of screen
- o Move "x" icon to vehicle or group to be identified and click

To call up the IDs and bumper numbers for a second entity or group of entities,

- o click on "OK"
- o move "x" to second vehicle or group

To exit the identification mode,

- o click on "OK"
- o move "x" icon to an area where there are no entities and click