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Research Product 84-17

NATIONAL TRAINING CENTER DATA HANDBOOK

Presidio of Monterey Field Unit
Training Research Laboratory

July 1984

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NATIONAL TRAINING CENTER DATA HANDBOOK

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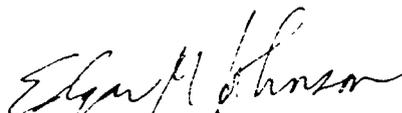


FOREWORD

The Presidio of Monterey Field Unit has a long history of involvement with army training systems and its Combined Arms Performance Team specializes in researching tactical performance.

The National Training Center (NTC) provides the most realistic engagement simulation and live fire Battalion task force tactical training available to a modern peacetime Army. Equally important, NTC's instrumentation allows transparent collection of data from which objective battlefield performance effectiveness can be derived. Together, these elements provide an environment where Army maneuver Battalions can undertake essential combined arms training which cannot be accomplished at home station due to physical limitations and prohibitive costs. Training data collected at the NTC help commanders evaluate their unit's performance and assist the Army to improve its overall training. In addition to this training role, the NTC also provides an environment to gather overall readiness data as well as information on the effectiveness of Army organizations, doctrine, procedures, tactics, and weapon systems under realistically simulated combat conditions.

This manual presents an overview of NTC data collection procedures and describes its various types of digitized information as well as audio and video recordings available from engagement simulation and live fire exercise histories. Data are discussed in terms of their content, calculation, and display and include those on battlefield status and events, tactical performance, communications, and subjective evaluations.


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NATIONAL TRAINING CENTER DATA HANDBOOK

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CHAPTER 1

INTRODUCTION

Learning to win in the fast-paced, dynamic combined-arms environment requires that Army units be challenged with realistic situations that demand rapid assessments, timely decision-making, and the effective employment of a mix of weapon systems. The Army's National Training Center (NTC) at Fort Irwin, California was established to meet this demand for an intensive combat training environment. At the NTC, battalion-sized armor and mechanized units train in highly realistic live-fire exercises and in force-on-force engagements in which they are confronted by an appropriately-sized opposing force. These exercises involve the full combined-arms operations of tanks, anti-tank missiles, mechanized infantry, artillery, air defense, engineers, electronic warfare, nuclear, biological, and chemical warfare, attack helicopters, and close air support aircraft involved in tactical scenarios designed to prepare battalions for critical wartime missions.

The force-on-force exercises use laser-based, engagement simulation instrumentation technology to provide a degree of realism in real-time casualty assessment second only to actual combat. This simulator, the Multiple Integrated Laser Engagement System (MILES), is used on all principal weapons and casualties are assessed when a weapon fires and the MILES laser hits a target. Since "killed" players are disabled and prevented from participating further in the battle, commanders and troops learn the immediate effects of their battle plans and orders using equipment and tactics similar to those of potential battlefield opponents.

Remarkable advances in electronic circuitry give the NTC the capability to support fast-paced training through the use of transparent instrumentation for recording and playing back combat action. These instrumentation systems are based on micro-electronics, clusters of fast computers, position location systems, and wide-screen display technology and include provisions for manually-input exercise data as well as audio and video recordings of critical field action. The bulk of this information is stored in a digitized history file for each exercise segment of a battalion's fourteen day engagement simulation and live-fire training period.

Now that the NTC's training support components are in place and multi-echelon combined-arms training is being conducted on a routine basis, increasing emphasis is being placed on the NTC's potential for addressing questions concerning training techniques, equipment, organizations, and doctrine. While the primary mission of the NTC is to serve as a combat training support facility rather than as a combat proving ground or research center, a by-product of unit training is the battalion exercise history data generated at the NTC. Even though there is a requirement to maintain unit anonymity, these data represent a powerful potential research base to support training technology research as well as addressing issues of tactics, doctrine, organization, and equipment effectiveness. This potential must be carefully nurtured and exploited since it is the only known capability of its type in the world today. If used effectively, NTC data will provide the essential complement to the Army's exploitation of high technology and may provide the Army with a decided advantage over its adversaries.

This manual provides a list of the various types of instrumented and noninstrumented data collected at the NTC. Additional information on most of these measures can be found in Science Applications Inc. publications NTC-1221-18, NTC-1262-19, and NTC-1221-29 (see Reference Section).

CHAPTER 2
NTC DATA COLLECTION

- I. Overview of NTC Instrumentation
 - A. Core Instrumentation
 - B. Range Data Measurement
 - C. Range Monitoring and Control

- II. Data Processing and Storage
 - A. Indirect Fire Casualty Assessment
 - B. Instrumented Raw Data
 - C. Data Management

I. OVERVIEW OF NTC INSTRUMENTATION

The NTC instrumentation system features three major subsystems: (1) Core Instrumentation Subsystem (CIS), (2) Range Data Measurement Subsystem (RDMS), and (3) Range Monitoring and Control Subsystem (RMCS). This system architecture is presented in Figure 2-1 along with the allocation of functional areas to subsystem components.

A. Core Instrumentation Subsystem (CIS)

The CIS provides real time data processing and display capabilities needed to monitor, command, and control the Engagement Simulation (ES) and Live Fire (LF) exercise activities. The CIS also provides the data processing and display; audio and video editing; and training material production capabilities needed to synthesize and present near real-time AARs and take home training packages. Finally, the CIS provides the data processing and display capabilities required to support Training Developments and Combat Developments research with NTC data.

The heart of CIS operations are the functions performed within the Exercise Monitoring and Control (EMC) and Training Analysis and Feedback (TAF) subcomponents. Each of the two EMC/TAF operation centers consist of eight stations and twenty-one operator positions within each Operations Center. Individual positions within the CIS are assigned unique functional responsibilities which include the following:

TAF OPERATIONS - Operators at this station are allocated the responsibility to analyze exercise data to extract important training feedback in order to meet the training objectives specified for each exercise segment. The Training Analysis and Feedback officer (TAFO) and his assistants structure the AAR and build materials to fill out this AAR structure during an ongoing exercise segment.

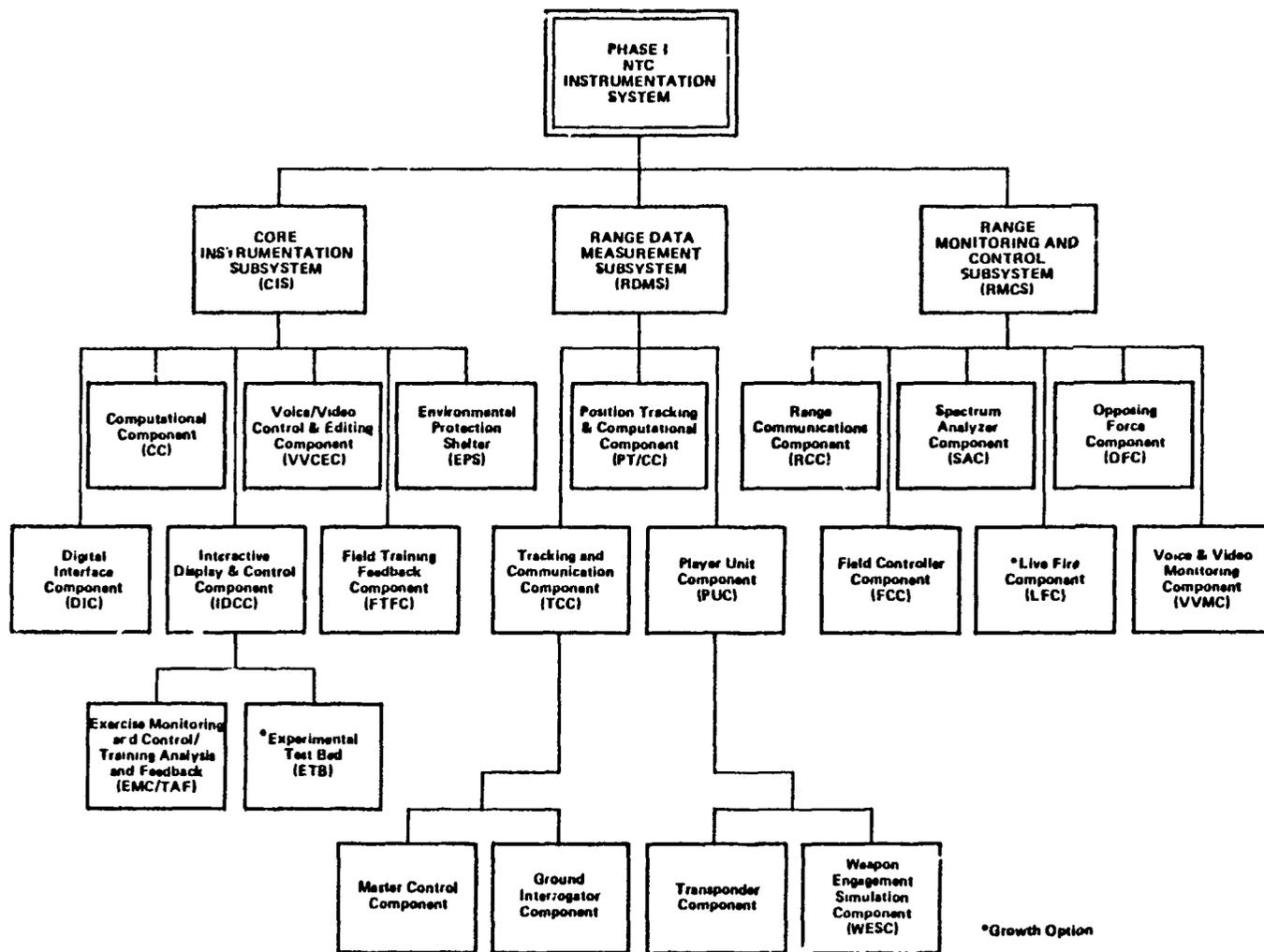


Figure 2-1

NTC Instrumentation System Architecture

COMPANY OPERATIONS - Operators at these stations are allocated the responsibility to monitor and analyze the activities of BLUEFOR line companies and their subordinate platoons.

EXERCISE OPERATIONS - Operators at this station are allocated the responsibility to monitor and control the training environment including directing Observers/Controllers (OCs) and fire marking teams and monitoring the status of NTC instrumentation hardware and software.

OPFOR, BN AND BDE OPERATIONS - Operators at this station are assigned the responsibility to direct the OPFOR and monitor BLUEFOR BN and BDE tactical and intelligence operations. When NBC effects are played, the NBC Analyst is accommodated at this station.

FIRE SUPPORT OPERATIONS - Operators at this station are assigned the responsibility to monitor and direct the simulation of indirect fire operations for both the BLUEFOR and OPFOR.

SUPPORT OPERATIONS - Operators at this station are assigned the responsibility to monitor and analyze all BLUEFOR combat support and combat service support operations.

As shown in Figure 2-1, the CIS consists of six major components: (1) Digital Interface Component (DIC), (2) Computational Component (CC), (3) Interactive Display and Control Component (IDCC), (4) Voice/Video Control and Editing Component (VVCEC), (5) Field Training Feedback Component (FTFC), and (6) the Environmental Protection Shelter (EPS).

The Digital Interface Component (DIC) provides an interface for all digital data communications between the CIS and the RDMS and RMCS subsystems.

The Computational Component (CC) performs computations in support of all CIS exercise monitoring, command, control, and training feedback activities. Computational processing performed includes: (1) state estimation for all instrumented players in the exercise; (2) real-time casualty assessment for direct and indirect fire weapon engagements; (3) real-time statistical analyses; and (4) range operations analyses.

The Interactive Display and Control Component (IDCC) provides the real-time interactive data display and control facilities required for CIS controllers to direct the NTC training exercise and provide near real time training data feedback. Specifically, the IDCC provides a digital background map; tactical symbology; engagement event data; statistical performance data; and keyboard and interactive menus to interactively control all aspects of the CIS.

The Voice/Video Control and Editing Component (VVCEC) provides facilities needed to record, archive, edit, and replay relevant audio and video data obtained by monitoring BLUEFOR and OPFOR field operations. It also provides an interactive system to assist tactical communications monitors in manually inputting COMM event data. Finally, the VVCEC provides similar recording, editing, and replay facilities for all video data collected in the field by two fixed video cameras remotely controlled from the CIS and eight mobile video cameras operated by the field video teams directed from the CIS.

The Field Training Feedback Component (FTFC) provides a self-contained, mobile display capability to present field AARs.

The Environmental Protection Shelter (EPS) provides the operational environment for CIS personnel and equipment.

B. Range Data Measurement Subsystem (RDMS)

The RDMS provides real time player position location and engagement event data on all instrumented players. As shown in Figure 2-1, the RDMS is composed of three major components: (1) Tracking and Communication Component (TCC), (2) Position Tracking and Computational Component (PT/CC), and (3) Player Unit Component (PUC).

The Tracking and Communications Component (TCC) consists of a number of stations that measure the range to individual players and provides a data link to the player.

The Position Tracking and Computational Component (PT/CC) consists of the hardware and software necessary to compute player position location data.

The Player Unit Component (PUC) serves as a communications link and includes a Transponder Component (TC) attached to a Weapon Engagement Simulation Component (WESC) unit. The WESC simulates direct fire weapons' effects, in support of free play ES between BLUEFOR and OPFOR elements, and its functions include: simulation of direct fire weapon cues, computation of direct fire casualty and damage, implementation of direct fire effects, and generation of firing and weapon effects events.

C. Range Monitoring and Control Subsystem (RMCS)

The RMCS provides the means to monitor and control activities on the ES and LF ranges. These capabilities include automated and human sensors and a communications component to tie these sensors together and connect them with the CIS.

As shown in Figure 2-1, the RMCS consists of six major components: (1) Range Communications Component (RCC), (2) Spectrum Analyzer Component (SAC), (3) Live Fire Component (LFC), (4) Voice and Video Monitoring Component (VVMC), (5) Field Observer/Controller Component (FOCC), and (6) Opposing Force Component (OFC).

The Range Communications Component (RCC) provides voice, digital, and video communications between RMCS components and the CIS.

The Spectrum Analyzer Component (SAC) provides the means to measure, record, and transmit all relevant EM emissions which may interfere with other NTC or non-NTC (i.e., GOLDSTONE) operations.

The Live Fire Component (LFC) supports the activities described in Chapter 4.

The Voice and Video Monitoring Component (VVMC) provides both fixed and mobile video recording elements to record key ES and LF engagements. The fixed video elements, being unmanned, are controlled directly from the VVCEC within the CIS. Mobile video teams are directed from the VVCEC component within the CIS in response to missions assigned by EMC or TAF operators.

The Field Controller Component (FCC) provides nonintrusive control of the BLUEFOR during ES exercises. Specific functions performed by the FCC include: enforcement of the rules of engagement; assessment of indirect fire casualties; implementation of indirect fire weapon effects cues (fire marking); range safety assurance; and recording and communication of BLUEFOR ES activities based on human observations.

The Opposing Force Component (OFC) simulates the opposing force during ES exercises between the BLUEFOR and CPFOR. Specific functions performed by the OFC include: simulation of all OPFOR operations (C3, maneuver, fire, administration, log, etc.); observation of BLUEFOR activities and the capability of communicating these observations to CIS personnel; and execution of CIS-specified OPFOR scenarios to achieve the desired training missions and goals.

II. DATA PROCESSING AND STORAGE

A. Indirect Fire Casualty Assessment

Capabilities provided in support of indirect fire events at the NTC include maintenance of pre-planned target lists and groups of targets lists as well as the processing of indirect fire missions.

The pre-planned target list consists of a maximum of 1,000 targets (500 BLUEFOR and 500 OPFOR) uniquely identified by force, target number, and target location which are operator input. The groups of targets list, also manually input, consist of a maximum of 50 groups of targets and each group is uniquely identified by force, group designation, and targets. Finally, a file of up to 500 active fire missions is maintained and includes schedule, on-call, and immediate missions. On-call missions are kept in this active mission file until either a "cancel" or "schedule" message is received.

For scheduled and immediate missions within range 60 seconds prior to their execution time, and using shell types HE, HERAP, WP, ICM, or DPICM, casualty assessment is performed on the basis of an alert message that identifies the mission and its scheduled execution time as well as recommended instrumented and uninstrumented personnel and vehicle casualties. This list of recommended casualties is then discussed with OCs, near the target location, who make the ultimate decision on casualty assessment. If a mission is out of range, neither casualty assessment processing nor an indirect firing vector display is provided. In addition, casualty assessment is not performed for missions using shell types HC, ILLUM, FASCAM, or CLGP.

B. Instrumented Raw Data

Instrumented raw data consists of information on player position, direct fire weapons events, and communications. Player position measurements are repeatedly processed to update the current position of each instrumented

player. However, instrumented ground and air (when added) player position measurements are used to update a player's position only if the player has moved a significant distance since its last update (nominally set at 16 meters). Instrumented player locations are then used to update the appropriate player performance statistics.

The position of the "center" of a tactical unit is computed once every 60 seconds and is based on the position of individual instrumented and uninstrumented (manually input) ground players within that unit. Only active ground players (i.e., those that are alive and attached to the unit), for whom at least one position measurement has been processed within the last fifteen minutes, are included in this computation.

For tanks, TOWS/SAGGERS, APCs, DRAGONS, VIPERs, cargo trucks, Vulcans, mortars, air players, ZSUs, MANPADs, and manpacks, the direction of movement is also computed and shown to the nearest 45° in azimuth.

Weapon events for direct fire weapon simulators are divided into two distinct categories: (1) a firing event when a weapon is fired and (2) a weapon effects event when a target experiences a simulated near miss, hit, or kill. To measure this second category, weapon firing events are "paired" with weapon effects events to assign a target to a weapon for computing player performance statistics. Weapon-target pairing is performed using time coincidence and the firer's weapon type code. When a pairing occurs between an OC's controller gun and a target, processing associated with the kill is performed and these effects are assigned to a controller category. Allocation of such OC weapon effects (to indirect fire and minefield events) is done using manual inputs.

For every weapon-target pairing, the weapon-to-target range is computed and this value (measured in kilometers to the nearest one tenth Km) is recorded as part of the pairing.

Separate "keying" messages are sent when a radio operator depresses and then releases a radio transmission key. For every key depression-release pairing, transmission time is computed along with the number of transmissions made.

C. Data Management

The NTC is capable of archiving: (1) player position, weapon and COMMO event data, (2) OC observations, (3) alert messages (e.g., controller gun events, indirect-fire firings, weapon-target pairings), and (4) free format, manually input messages. This information is stored in a Player History File (PHF) for each exercise segment that is a discrete portion of the overall ES or LF exercise. Segments are delineated by: natural breaks in the engagement, a transition between tactical missions, movement to a new terrain area, a major change in environmental conditions (i.e., weather), or by command decision. Accordingly, exercise segments are not fixed time segments; rather, their duration is determined by events. An exercise segment may last for up to 48 hours with the average duration being 8 to 12 hours.

The PHF for each rotation is organized as shown in Figure 2-2 and each segment consists of the following entities:

- A header that contains planning data describing the tactical mission and objectives of the exercise segment.
- Real-time position, weapon and COMMO events, alerts and kernel statistics recorded as time-tagged entries during the actual exercise.
- A trailer that contains an overall evaluation of the unit being trained.

The types of segment header data are depicted in Table 2-1. Engagement history data types are described in Chapters 3 to 6, and trailer data are not presently being entered.

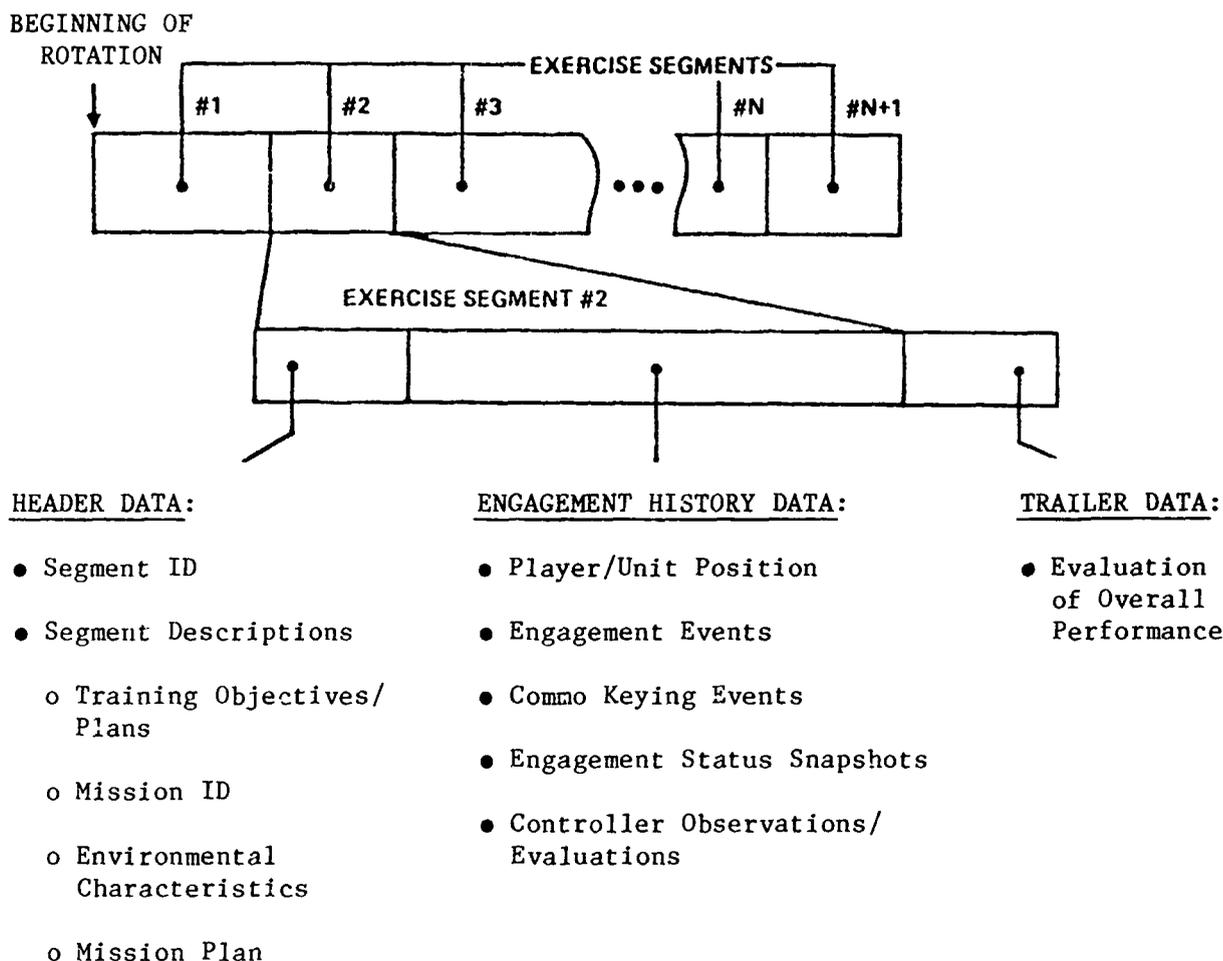


Figure 2-2

Player History File Structure

Table 2-1

Exercise Segment Header Information

Category	Content
Date	Day, Month Year
BLUEFOR Scenario	Scenario Number
OPFOR Scenario	Scenario Number
Intensity	BLUEFOR and OPFOR Low, Medium, or High Intensity for: Planning time Available Fire Support Artillery Mortar Nuclear Chemical Biological Smoke Air Defense Engineer EW
Training Objective	Key Training Objective
Visibility	Clear, Dust, Fog, or Rain
Day/Night	Day or Night Exercise
Battalion Designation	Numerical (not available) and Type Designation (i.e., INF, ARM, or CAV)
Battalion Day at NTC	Number of Previous Days at NTC
Battalion Usage of Scenario	Number of this Through Indicated Scenario
Assigned/Attached Units	Letter Designators

(continued on next page)

Table 2-1 (continued)

Exercise Segment Header Information

Category	Content
Battalion Mission	Movement to Contact Hasty Attack Deliberate Attack Exploitation and Pursuit Reconnaissance in Force Raid Defend in Sector Defend from a Battle Area Delay in Sector Delay Forward of a Specified Line for Specified Time Disengagement or Counterattack
Battalion Operations Modifier	Passage of Lines Hasty Attack Relief in Place Exploitation and Pursuit Road March or Occupation of Assembly Area
Company Mission	Movement to Contact Hasty Attack Deliberate Attack Exploitation and Pursuit Raid Occupy a Battle Position Hasty Defense Deliberate Defense Defend to Retain a Battle Position Create and Defend a Strongpoint (Deliberate Defense) or Patrol Operations
Company Operations Modifier	Passage of Lines Hasty Attack Relief in Place Exploitation and Pursuit Road March or Occupation of Assembly Area

CHAPTER 3

DIGITIZED HISTORY

I. Battlefield Status and Events

- A. Personnel Data
- B. Vehicle Data
- C. Indirect Fire Data
- D. Minefield Data

II. Players' Tactical Performance

- A. Global Side Panel Statistics
- B. Engagement Statistics
- C. Communications Data
- D. Elements of Information

I. BATTLEFIELD STATUS AND EVENTS

In addition to the statistics derived from instrumentation, various data are manually input for eventual calculations and summaries. These data reflect the task organization of the BLUEFOR and OPFOR units, personnel and equipment status, indirect fire support, and minefield events on the battlefield.

A. Personnel Data

Personnel data are presented in the following formats.

- TASK ORGANIZATION (Tables 3-1 and 3-2)
- PERSONNEL STATUS BY UNIT (Tables 3-3 and 3-4)
- PERSONNEL REPLACEMENT SUMMARY (Table 3-5 and Figure 3-1)
- CASUALTY SUMMARY (Table 3-6 and Figure 3-2)
- FRATRICIDE LOG (Tables 3-7 and 3-8)
- FRATRICIDES BY UNIT (Table 3-9 and Figure 3-3)

Table 3-1

Task Organization Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
FIRST COLUMN	Name of a unit defined in the system data base.
SECOND COLUMN	Names of units immediately subordinate to the above unit.
THIRD COLUMN	Names of units immediately subordinate to units named in the second column.
Similarly, for COLUMNS FOUR through SIX	
PLAYER STATUS	This column only applies to the lowest defined units (or players) in each chain of command. The entries LIVE, DEAD, and INACTIVE indicate whether the player is currently actively participating in the training exercise, has been killed as a result of the exercise, or is not participating in the exercise due to technical or administrative considerations.
DISPLAY CRITERIA	
Time	The display reflects the task organization at an operator-specified exercise time or, as a default, at the exercise time as displayed on the Tactical Display at the time of the display request.
Unit	Requestor specifies a unit for which task organization data is desired. The names of players and the PLAYER STATUS column will be displayed only if so specified by the requestor.
DISPLAY TYPE	Tabular

Table 3-3

Personnel Status by Unit Calculation

CONTENT	
<u>Column Heading</u>	<u>Data Description</u>
UNIT	Designation of unit for which uninstrumented battlefield casualty data is presented.
INITIAL STRENGTH	Initial strength (number of "active" personnel) of the named unit at the beginning of the current exercise segment.
WIA	For the named unit, the number of personnel recorded as wounded in action at the time specified in the display request.
KIA	For the named unit, the number of personnel recorded as killed in action at the time specified in the display request.
MIA	For the named unit, the number of personnel recorded as missing in action at the time specified in the display request.
CAPT'D	For the named unit, the number of personnel recorded as captured at the time specified in the display request.
CURRENT STRENGTH	For the named unit, the total number of active personnel line-organized to that unit at the time specified in the display request (i.e., INITIAL - WIA - KIA - MIA - CAPTURED = CURRENT STRENGTH).
CURRENT ATTACHED	The number of "active" personnel attached to the named unit as a result of unit task organization at the time specified in the display request. NOTE: This number also accounts for any "active" personnel detached from the named unit as a result of unit task organization at the time specified in the display request.

(continued on next page)

Table 3-3 (continued)

Personnel Status by Unit Calculation

<u>Column Heading</u>	<u>Data Description</u>
DISPLAY CRITERIA	
Time	The display reflects the personnel status for a specified unit at an operator-specified exercise time or, as a default, at the exercise time as displayed on the Tactical Display at the time of the display request.
Unit	The requestor specifies the unit for which personnel status data is desired. For BLUEFOR: the BN task force, companies A-D, cross-attached company, associated company components (i.e., plts, CP, FIST) or BN assets. For OPFOR: 1st, 2nd and 3rd BNs, companies 1-4 (for each of the three BNs), or associated company components (i.e., plts and HQ).
DISPLAY TYPE	Tabular

Table 3-4

Personnel Status by Unit Display

1	1	2	3	4	5	6	7	8
	0	0	0	0	0	0	0	0
PERSONNEL STATUS - A/2-123							DD MMM YY HH:MM	
UNIT	INITIAL	WIA	KIA	MIA	CAPT'D	CURRENT	CURRENT	
XXXXXXXXXXXX	STRENGTH	NNN	NNN	NNN	NNN	STRENGTH	ATTACHED	
	NNNN	NNN	NNN	NNN	NNN	NNNN	NNNN	

Table 3-5

Personnel Replacement Summary Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
Total number of BLUEFOR Casualties (WIA + KIA)	Manually entered and reflected in the Personnel Status display for each segment.
Total Personnel Replacements Requisitioned	Manually entered.
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Unit	The display includes all data for the battalion under training or an operator-specified company-level unit.
DISPLAY TYPE	Graph

Table 3-6

Casualty Summary Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
BLUEFOR CASUALTIES	Manually entered as reflected in the Personnel Casualty Summary tabular display for each segment.
PERCENT CASUALTIES	Total BLUEFOR casualties as a percentage of the initial strength.
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission types(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Unit	The display includes all data for the battalion under training or an operator-specified company-level unit.
DISPLAY TYPE	Graph

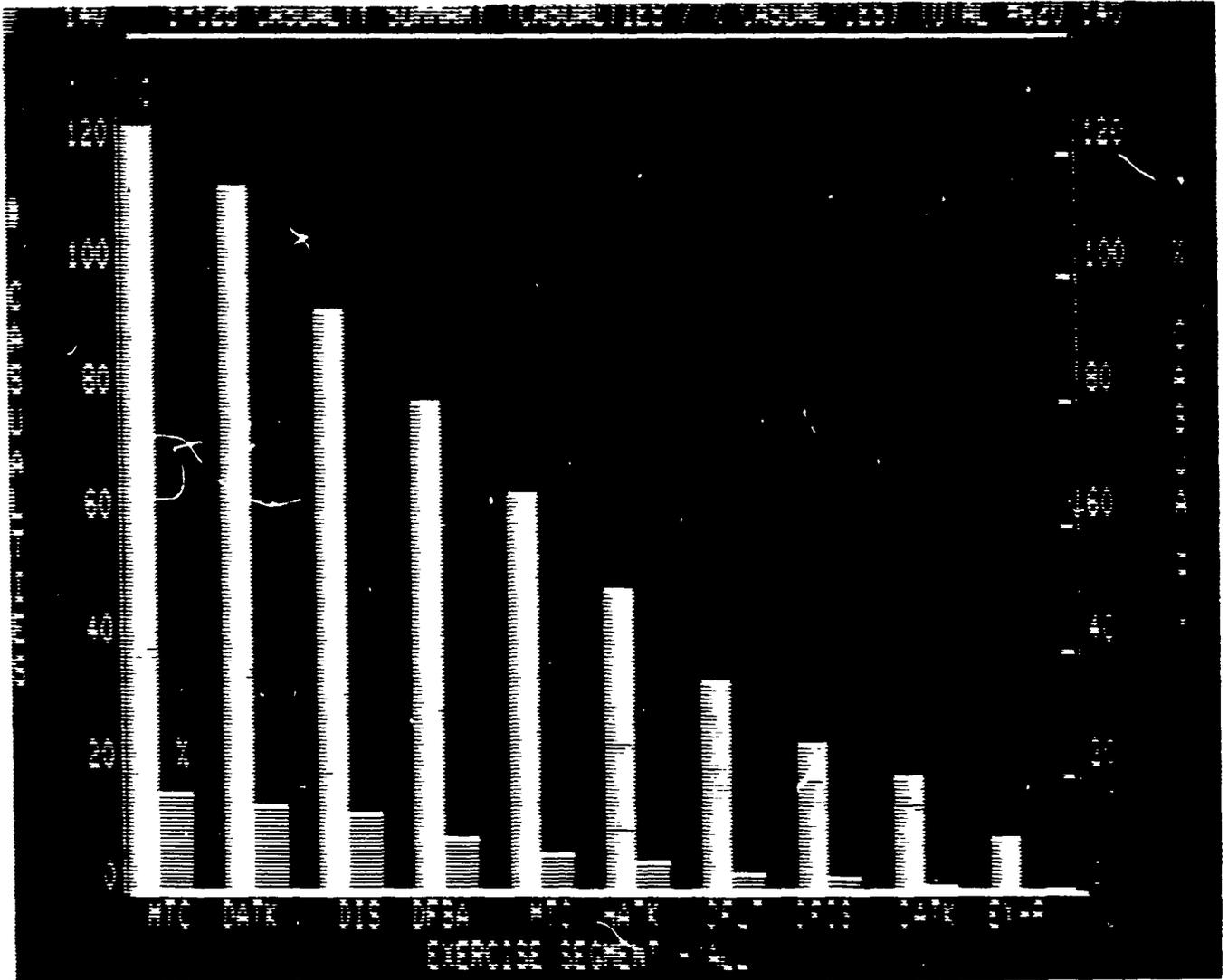


Figure 3-2
Casualty Summary Display

Table 3-7

Fratricide Log Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
TIME	Time of an ES pairing of a BLUEFOR weapon against a BLUEFOR target, or an OPFOR weapon against an OPFOR target.
FIRER	Name of the unit firing on the target.
FIRER LOC	UTM location of the firer.
WEAPON	Name of the weapon firing on the target.
TARGET	Name of the target unit/weapon.
TGT LOC	UTM location of the target.
EFFECT	The ES result of the pairing (i.e., Near-Miss, Hit, or Kill).
RANGE	The weapon-target range of the pairing in meters.
DISPLAY CRITERIA	
Time	The display will include all fratricide pairing data recorded for the current exercise segment, up to the time of the display request, or for an operator-defined time interval. The data will be ordered chronologically.
DISPLAY TYPE	Tabular

Table 3-8

Fratricide Log Display

1	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0
FRATRICIDE SUMMARY					DD MMM YY HH:MM - DD MMM YY HH:MM			
TIME	FIRER	FIRER LOC	WEAPON	RANGE				
HH:MM:SS	XXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXX				
TARGET:	XXXXXXXXXXXXXXXXXXXXXXXXXX	TGT LOC:	XXXXXXXXXX	EFFECT:	XXXX			

Table 3-9

Fratricides by Unit Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
The number of fratricides for each mission and for each company-level unit subordinate to the Battalion under training (i.e., Co. A, B, C, D, Cross-Attached Company, and Bn Asset companies).	RDMS Reports
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Unit	The display includes all data for the battalion under training or an operator-specified company-level unit.
DISPLAY TYPE	Graph

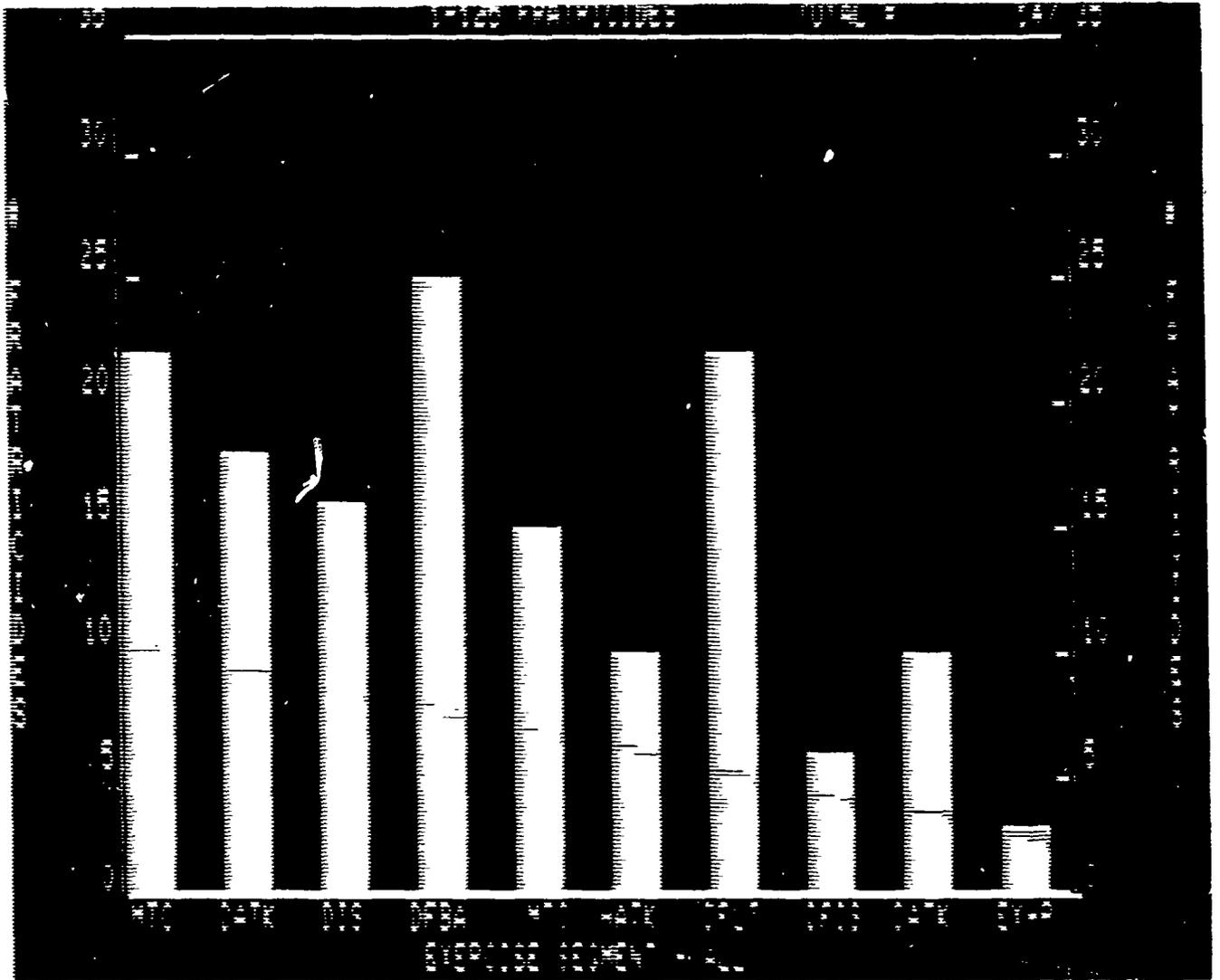


Figure 3-3

Fratricides by Unit Display

B. Vehicle Data

Vehicle data are presented in the following formats.

- VEHICLE STATUS BY UNIT (Tables 3-10 and 3-11)
- VEHICLE STATUS SUMMARY (Tables 3-12 and 3-13)
- VEHICLE LOSS SUMMARY-LOSS AMOUNT GRAPH (Table 3-14 and Figure 3-4)
- VEHICLE LOSS SUMMARY-LOSS RATIO BAR GRAPH (Table 3-15 & Figure 3-5)
- VEHICLE LOSS SUMMARY OF BLUEFOR/OPFOR LOSSES BY VEHICLE TYPE
(Table 3-16 and Figure 3-6)
- VEHICLE LOSS SUMMARY OF TOTAL BLUEFOR AND OPFOR VEHICLE LOSSES
(Table 3-17 and Figure 3-7)
- VEHICLE LOSSES BY CAUSE (Table 3-18 and Figure 3-8)
- VEHICLE REPLACEMENT SUMMARY (Table 3-19 and Figure 3-9)

Table 3-10

Vehicle Status by Unit Calculation

CONTENT	
<u>Column Heading</u>	<u>Data Description</u>
VEHICLE	List of standard vehicle types for BLUEFOR unit: as indicated on in Table 3-11; for OPFOR unit: T-72, BMP, BRDM-2, MTLB, ZSU23-4, JEEP, T-JCK, and 122 HOW.
INIT	For each vehicle of the named unit, the number of uninstrumented operational vehicles at the beginning of the current exercise segment for the named unit.
BATTLE LOSS	For each vehicle of the named unit, the number recorded as lost due to battle action at the time specified in the display request.
MAINT LOSS	For each vehicle of the named unit, the number recorded as lost due to maintenance requirements at the time specified in the display request.

(continued on next page)

Table 3-10 (continued)

Vehicle Status by Unit Calculation

<u>Column Heading</u>	<u>Data Description</u>
ADMIN LOSS	For each vehicle of the named unit, the number recorded as lost due to administrative requirements at the time specified in the display request.
OPER	For each vehicle the total number of operational vehicles line organized to the named unit (i.e., INIT - BATTLE LOSS - MAIN LOSS - ADMIN LOSS = OPERATIONAL)
ATTACHED	For each vehicle, the number of vehicles attached to the named unit as a result of unit task organization at the time specified. NOTE: This number will also account for any vehicles detached from the named unit as a result of unit task organization at the time specified in the display request.
DISPLAY CRITERIA	
Time	The display reflects a count of all uninstrumented vehicles for the specified unit, at an operator-specified exercise time or as a default at the time displayed on the Tactical Display at the time of the display request.
Unit	The requestor specifies a BLUEFOR or OPFOR unit for which vehicle status data is desired. For BLUEFOR: the BN task force, companies A-D, cross-attached company, associated company components (i.e., platoons, CP, FIST) or BN assets. For OPFOR: 1st, 2nd and 3rd BNs, companies 1-4 (for each of the three BNs) or associated company components (i.e., platoons and headquarters).
DISPLAY TYPE	Tabular

Table 3-11

Vehicle Status by Unit Display

1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0
VEHICLE STATUS -						DD MMM YY HH:MM	
VEHICLE	INIT	BATTLE LOSS	MAINT LOSS	ADMIN LOSS	OPER	ATTACHED	
TANK	NN	NN	NN	NN	NN	NN	NN
APC							
MORT CARR, 81MM							
MORT CARR, 4.2							
CARR, CP							
TOW							
VULCAN							
STINGER							
155 HOW							
RECOVERY VEH							
TRK UTIL 1/4 TON							
TRK AMB 1-1/4 TON							
TRK CGO 1-1/4 TON							
TRK CGO 2-1/4 TON							
TRK CGO 5 TON							
TRK CGO 8 TON							
TRK FUEL 1200 GAL							
TRK FUEL 2500 GAL							
TRK WRECKER 10 TON							
TRK DUMP							
BULLDOZER							
AVLB							
CEV							
GSR							

Table 3-12

Vehicle Status Summary Calculation

CONTENT	
<u>Column Heading</u>	<u>Data Description</u>
VEHICLE	List of vehicle categories, as indicated in Table 3-13.
INIT	For each vehicle category, the number of uninstrumented operational vehicles as defined at the beginning of the current exercise segment, for all BLUEFOR and OPFOR units.
BATTLE LOSS	For each vehicle category, the number recorded as lost due to battle action at the time specified in the display request.
MAINT LOSS	For each vehicle category, the number recorded as lost due to maintenance requirements at the time specified in the display request.
ADMIN LOSS	For each vehicle category, the number recorded as lost due to administrative requirements at the time specified in the display request.
OPER	For each vehicle category, the total number of operational vehicles (i.e., INIT - BATTLE LOSS - MAINT LOSS - ADMIN LOSS = OPERATIONAL).
DISPLAY CRITERIA	
Time	The display reflects the count of uninstrumented vehicles for all BLUEFOR and OPFOR units at an operator-specified exercise time or, as a default, at the time displayed on the tactical display at the time of the display request.
DISPLAY TYPE	Tabular

Table 3-13

Vehicle Status Summary Display

1	1	2	3	4	5	6	7	8			
	0	0	0	0	0	0	0	0			
VEHICLE STATUS - SUMMARY								DD MMM YY HH:MM			
BLUEFOR		BATTLE	MAINT	ADMIN	OPFOR		BATTLE	MAINT	ADMIN		
VEHICLE	INIT	LOSS	LOSS	LOSS	OPER	VEHICLE	INIT	LOSS	LOSS	LOSS	OPER
TANK	NN	NN	NN	NN	NN	T-72					
APC						BMP					
TOW						BRDM-2					
VULCAN						MTLB					
JEEP						ZSU23-4					
TRUCK						JEEP					
155 HOW						TRUCK					
REC VEH						122 HOW					
CEV											

Table 3-14

Vehicle Loss Summary - Loss Amount Graph Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
The total number of combat losses of BLUEFOR TANKs, TOWs, and APCs.	RDMS Reports
The total number of combat losses of OPFOR TANKs, BMPs and BRDMs.	RDMS Reports
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Force	The display includes data on TANKs, TOWs and APCs for BLUEFOR and on TANKs, BMPs and BRDMs for OPFOR.
DISPLAY TYPE	Graph

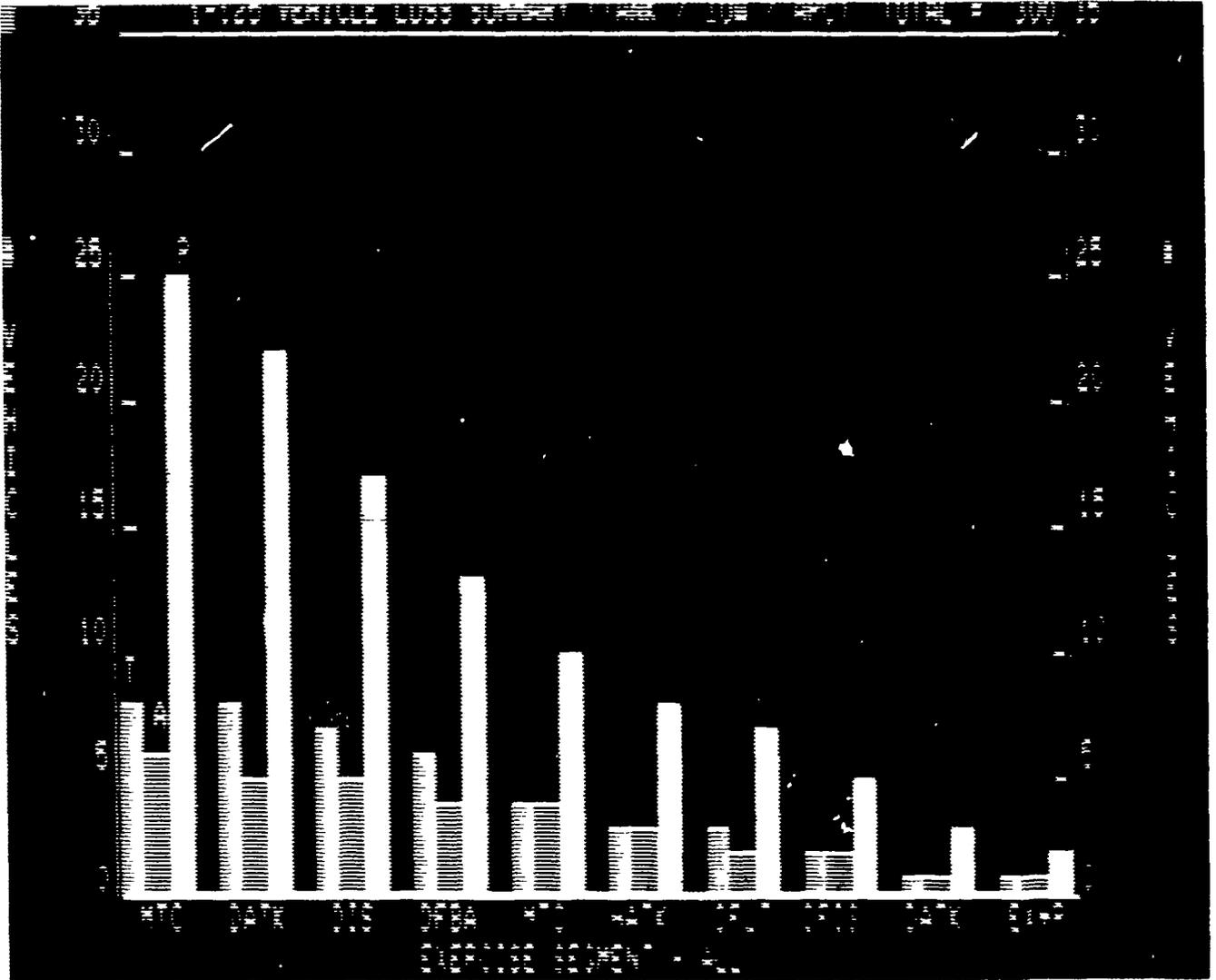


Figure 3-4

Vehicle Loss Summary - Loss Amount Graph Display

Table 3-15

Vehicle Loss Summary - Loss Ratio Bar Graph Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
LOSS RATIO	Total OPFOR vehicle (TANK, BMP, BRDM) combat losses divided by total BLUEFOR vehicle (TANK, TOW, APC) combat losses and total BLUEFOR vehicle combat losses divided by total OPFOR vehicle combat losses.
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
DISPLAY TYPE	Graph

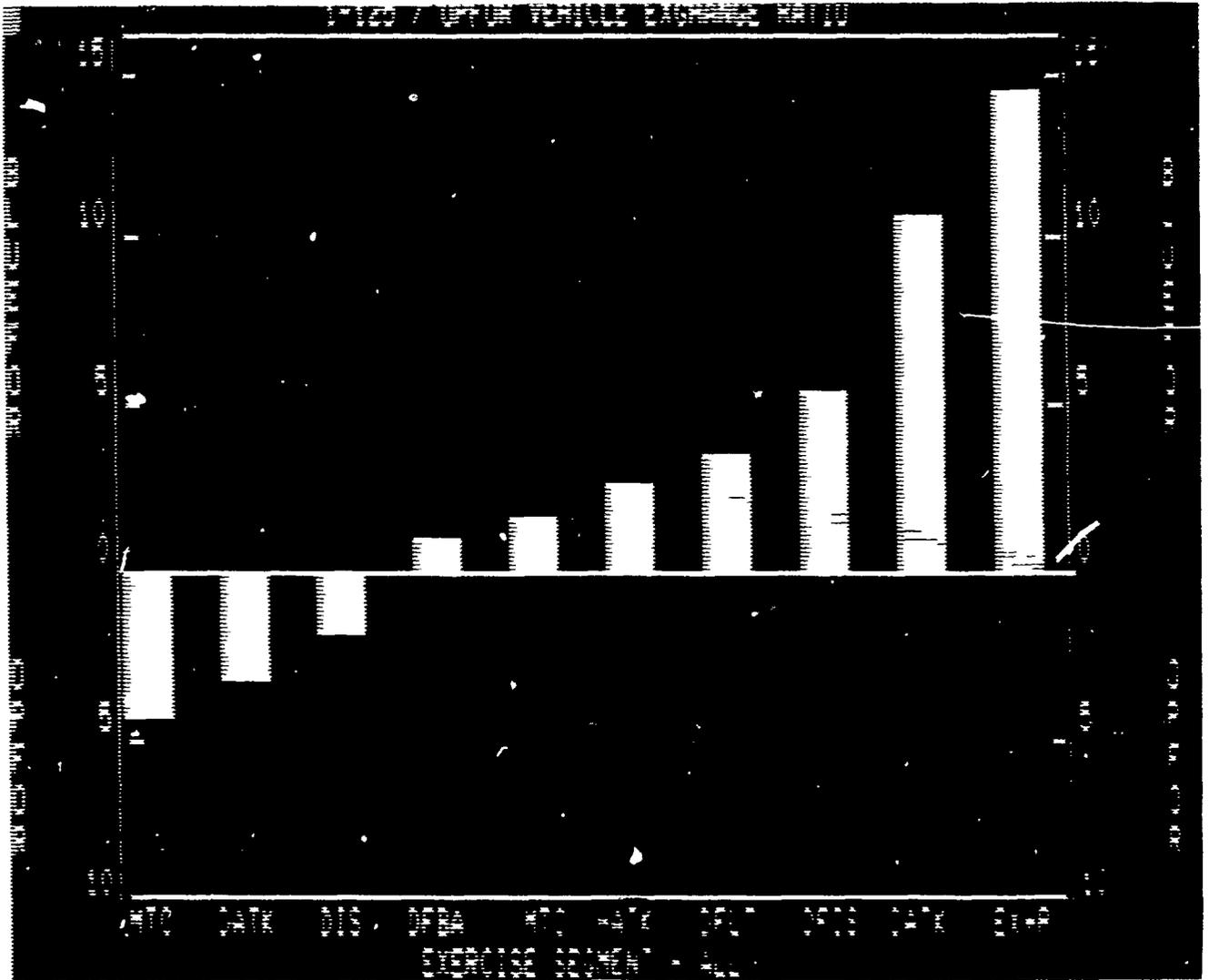


Figure 3-5

Vehicle Loss Summary - Loss Ratio Bar Graph Display

Table 3-16

Vehicle Loss Summary of BLUEFOR/OPFOR Losses by Vehicle Type Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
The total number of combat losses for BLUEFOR TANKs, TOWs, and APCs.	RDMS Reports
Total number of combat losses for OPFOR TANKs, BMPs, and BRDMs.	RDMS Reports
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Vehicle Type	The display includes all data for the vehicle type selected (i.e., TANK/TANK, TOW/BMP or APC/BRDM).
DISPLAY TYPE	Graph

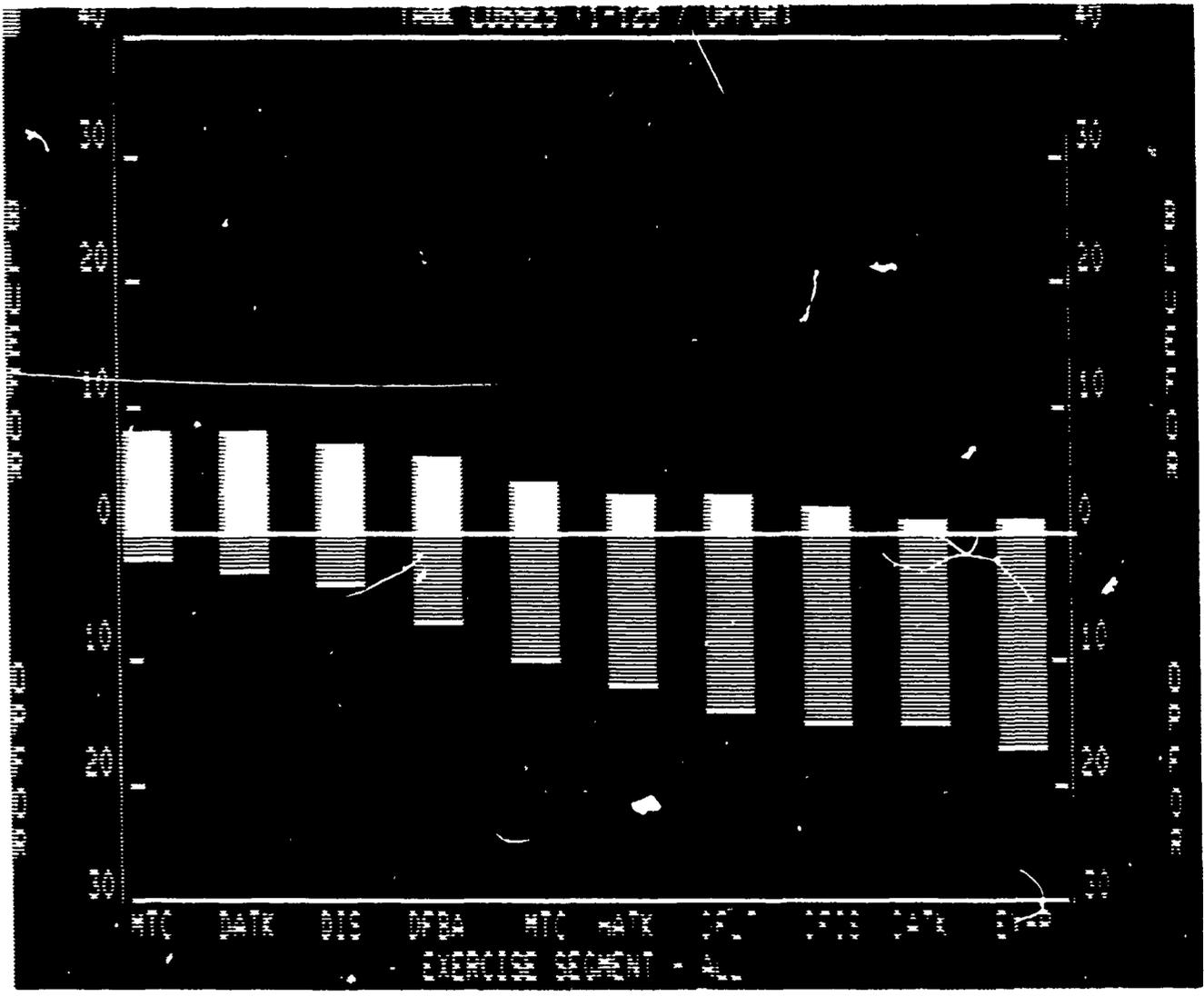


Figure 3-6

Vehicle Loss Summary of BLUEFOR/OPFOR Losses by Vehicle Type Display

Table 3-17

Vehicle Loss Summary of Total BLUEFOR and OPFOR Vehicle Loss Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
Total number of combat losses of all BLUEFOR TANKs, TOWs, and APCs.	RDMS Reports
Total number of combat losses of all OPFOR TANKs, BMPs, and BRDMs.	RDMS Reports
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
DISPLAY TYPE	Graph

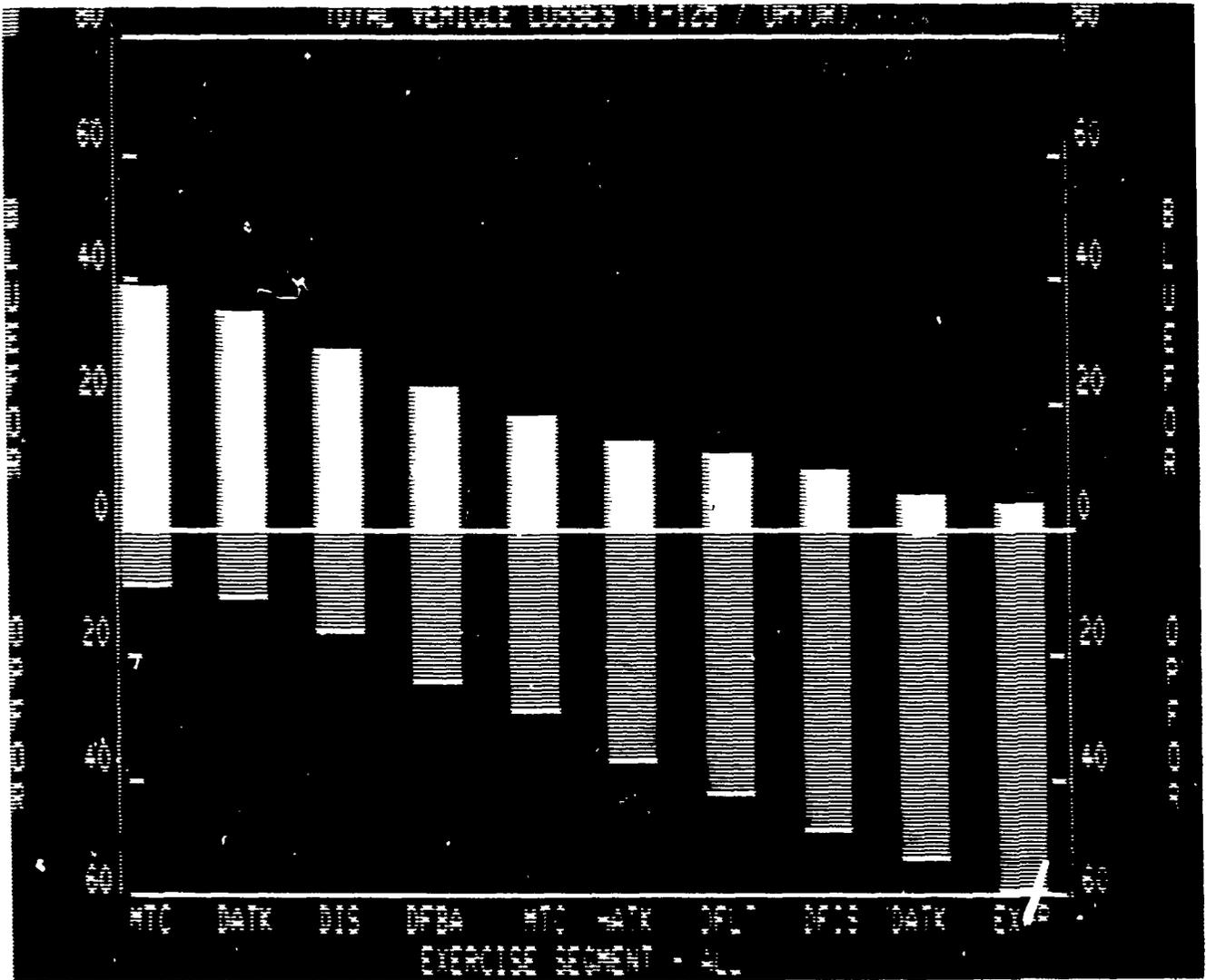


Figure 3-7

Vehicle Loss Summary of Total BLUEFOR and OPFOR Vehicle Losses Display

Table 3-18

Vehicle Losses by Cause Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
The number of combat losses of BLUEFOR TANKs, TOWs, and APCs for the following causes (OPFOR weapons):	RDMS Reports
TANK SAGGER 122MM	
DISPLAY CRITERIA	
Time of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Type of OPFOR Vehicle	The display includes data for the operator-selected OPFOR weapons (i.e., TANK, SAGGER, 122MM).
DISPLAY TYPE	Graph

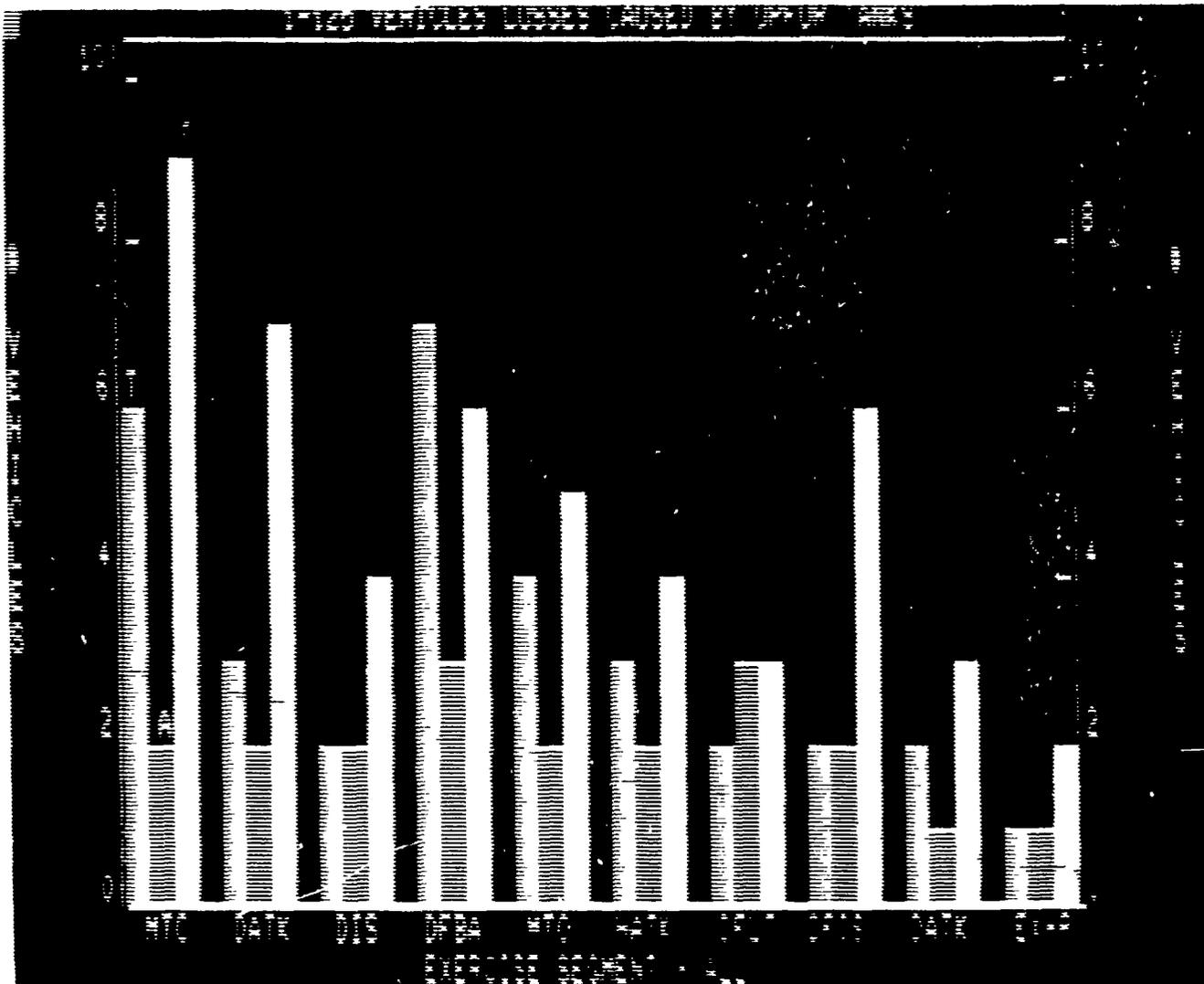


Figure 3-8

Vehicle Losses by Cause Display

Table 3-19

Vehicle Replacement Summary Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
Total number of BLUEFOR vehicles (TANKs, TOWs, and APCs) that are combat losses.	Manually entered via the Summary AAR interview menu.
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Unit	The display includes all data for the battalion under training or an operator-specified company-level unit.
DISPLAY TYPE	Graph

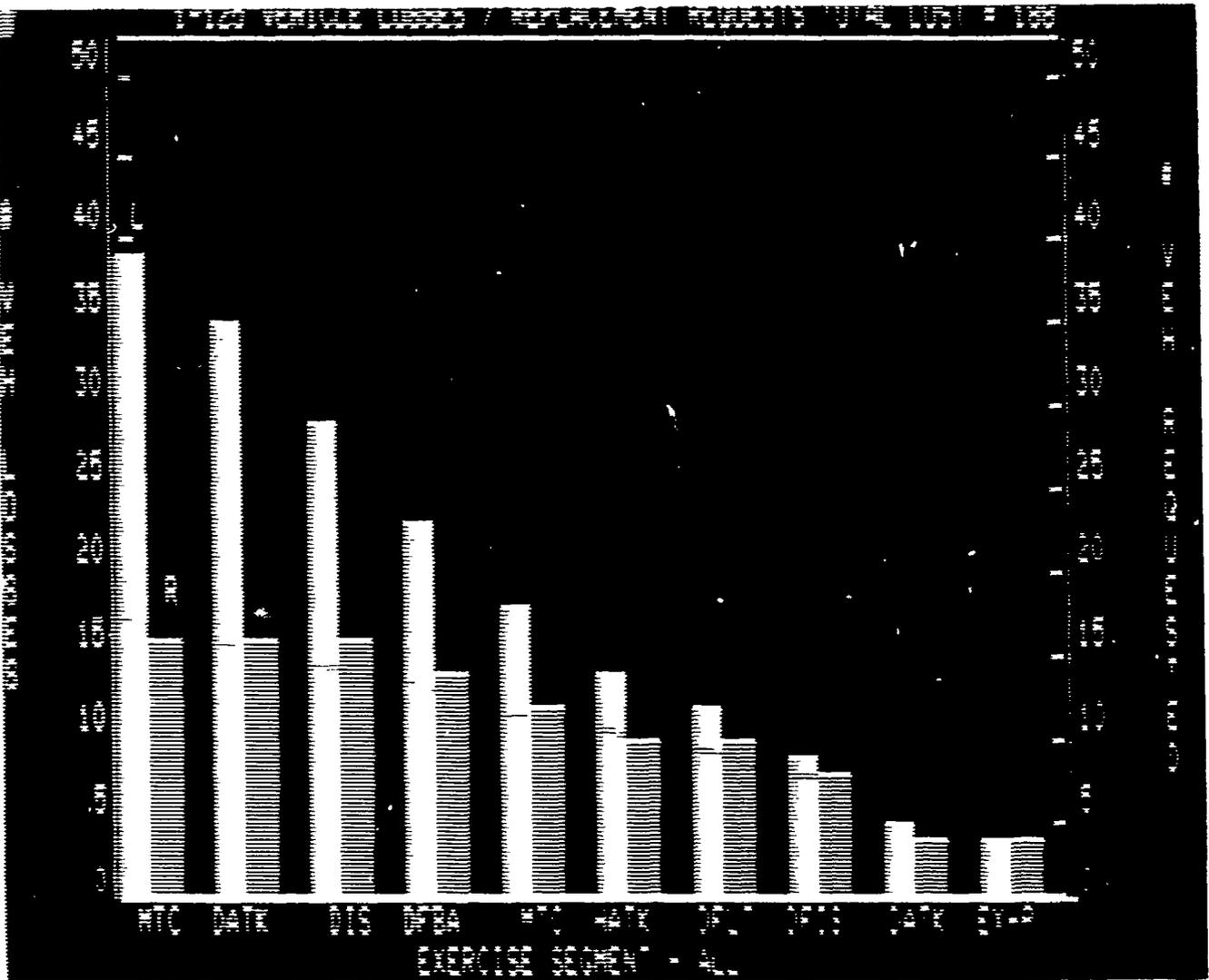


Figure 3-9

Vehicle Replacement Summary Display

C. Indirect Fire Data

Indirect fire data are presented in the following formats.

- FIRE SUPPORT LOG (Tables 3-20 and 3-21)
- FIRE MISSIONS REQUESTED WITHOUT A TARGET NUMBER (Table 3-22 and Figure 3-10)
- PERCENTAGE OF FIRE MISSIONS OUT-OF-RANGE (Table 3-23 & Figure 3-11)
- PRE-PLANNED TARGETS (Tables 3-24 and 3-25)
- GROUPS OF TARGETS (Tables 3-26 and 3-27)
- AVERAGE CASUALTIES/VEHICLE LOSSES PER FIRE MISSION (Table 3-28 and Figure 3-12)

Table 3-20

Fire Support Log Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
TIME	Time of mission execution.
TGTNR (IMMED)	Target number of target. "IMMED" if immediate mission with no target number assigned or group designation if applicable.
TGT LOC	UTM grid location for mission effects/delivery.
FIRING UNIT	Name designation of unit executing mission.
SHELL/FUSE	Type of shell/fuse combination used.
ROUNDS	Number of rounds of ammunition expended in firing.
EFFECT	Description of mission effects for uninstrumented personnel and vehicles (by type) and instrumented losses by player identification.

(continued on next page)

Table 3-20 (continued)

Fire Support Log Calculation

<u>Column Heading</u>	<u>Description</u>
DISPLAY CRITERIA	
Time	<p>All data on fire support missions will be displayed for the entire history at an operator-specified time range or, as a default, since the beginning of the history to the exercise time as displayed on the Tactical Display at the time of the display request.</p> <p>The fixed portion of this format occupies one line per entry, with effects on subsequent lines, with uninstrumented losses followed by instrumented losses by ID.</p> <p>In the event an immediate mission is input by the operator with no target number and the system determines that there is a target(s) on the pre-planned target list which is within 500 meters of the impact point specified for the immediate mission, an additional line will appear in the log entry for that mission as follows: TARGET(s) WITHIN 500 METERS: AANN. NOTE: Maximum number of targets included in this line will be 10.</p> <p>In the event a mission is out of range and therefore not "executed," MISSION OUT OF RANGE will appear as the mission effect.</p>
Force	<p>The operator specifies whether the display is for the BLUEFOR or OPFOR Fire Support Log.</p>
DISPLAY TYPE	Tabular

Table 3-21

Fire Support Log Display

	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0

FIRE SUPPORT LOG DD MMM YY HH:MM - DD MMM YY HH:MM

TIME	TGTNR	TGT LOC	FIRING UNIT	SHELL/FUSE	ROUNDS
DD HH:MM	AANNN	AANNNNNNNN	XX/NN-NNN	AAAAAA/AA	NNN
EFFECT:	WIA:NN	KIA:NN	(VEHICLE N)___	(VEHICLE N)___	(VEHICLE N)___ (VEHICLE N)___
INSTRUMENTED LOSS:	PLAYER ID	PLAYER ID	PLAYER ID		

Table 3-22

Fire Missions Requested Without Target Number Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
<p>For each exercise segment, the total number of Fire Mission Requests with the target given as a UTM coordinate rather than as a target number and, of that total, the number of requests where at least one pre-planned target was within 500 meters of the UTM location and thus could have been used as a target reference point.</p>	<p>Manual Input of Fire Mission requests, and computation of pre-planned targets in proximity of reported UTM locations.</p>
DISPLAY CRITERIA	
<p>Type of Mission</p>	<p>The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.</p>
<p>DISPLAY TYPE</p>	<p>Graph</p>

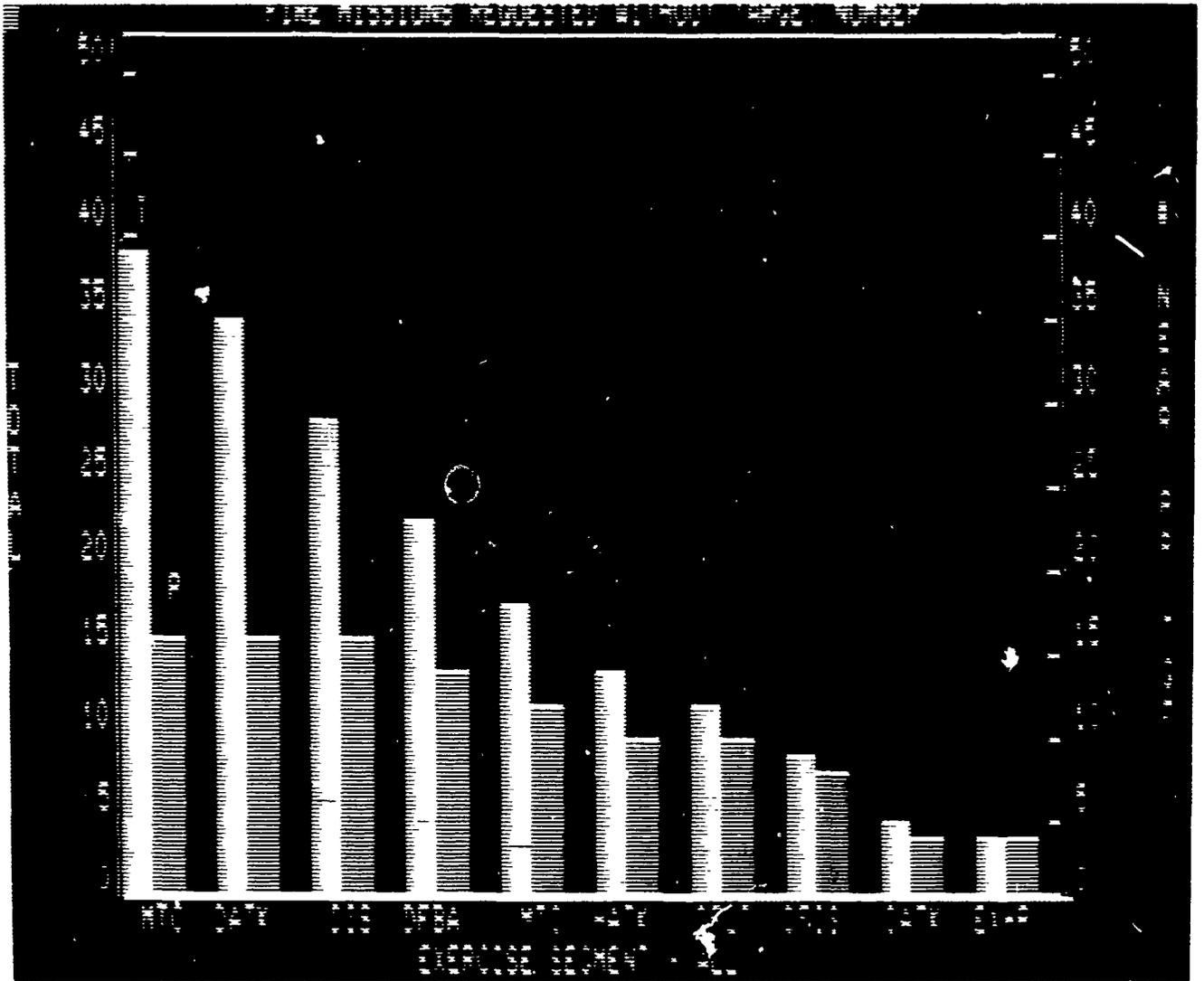


Figure 3-10

Fire Missions Requested Without Target Number Display

Table 3-23

Percentage of Fire Missions Out of Range Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each exercise segment, the percentage of all fire missions that were not executed because the target was out-of-range.	Manual Input of fire mission requests and computation of target ranges.
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
DISPLAY TYPE	Graph

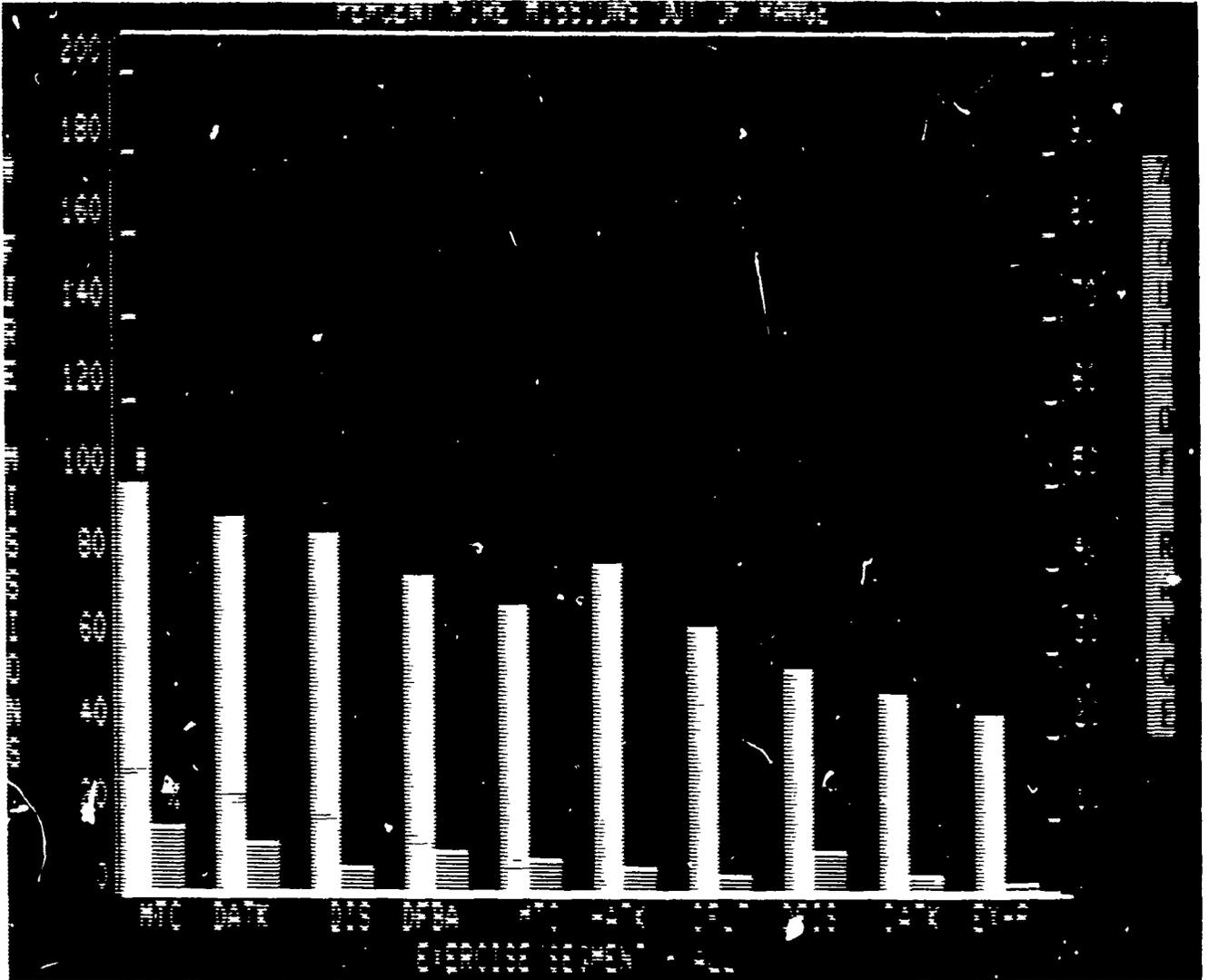


Figure 3-11

Percentage of Fire Missions Out of Range Display

Table 3-24

Pre-Planned Targets Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
FORCE	Force for which target list is requested.
LOCATION	If target list is requested for display in location proximity order, the UTM coordinate is specified by the operator for use in the ordering sequence of the list.
TGTNR	Target number of target.
TGT LOC	UTM coordinate of target.
DISPLAY CRITERIA	
Time	The display contains a list of all BLUEFOR or OPFOR targets identified in the system data base at an operator-specified exercise time or, as a default, to the exercise time as displayed on the Tactical Display at the time of the display request.
Force	The operator specifies whether the display is for BLUEFOR or OPFOR.
Sequence	The operator specifies the sequencing order in which the target list is to be presented (i.e., either alphanumeric or location proximity order). If the display is to be provided in location proximity order, the operator specifies the UTM coordinate upon which the list sequencing order will be based.
DISPLAY TYPE	Tabular

Table 3-25

Pre-Planned Targets Display

1	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0
PRE-PLANNED TARGETS							DD MMM YY HH:MM	
FORCE	LOCATION							
BLUEFOR	AANNNNNNNN							
OR								
OPFOR								
TGTNR	TGT LOC	TGTNR	TGT LOC	TGTNR	TGT LOC	TGTNR	TGT LOC	
AANNN	AANNNNNNNN	AANNN	AANNNNNNNN	AANNN	AANNNNNNNN	AANNN	AANNNNNNNN	
•	• •	•	• •	•	• •	•	• •	
•	• •	•	• •	•	• •	•	• •	

Table 3-26

Groups of Targets Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
FORCE	Force for which list is requested.
GROUP DESIG	Group designation for group of targets.
TGTNR	Target number of target(s) belonging to group.
TGT LOC	UTM coordinate(s) of targets belonging to group.
DISPLAY CRITERIA	
Time	The display contains a list of all BLUEFOR or OPFOR groups of targets identified in the system data base at an operator-specified exercise time or, as a default, to the exercise time as displayed on the Tactical Display at the time of the display request.
Force	The operator specifies whethe the display is for OPFOR or BLUEFOR. The display items are alpha-numerically ordered in accordance with the group desingations. The target number and location for each target belonging to a group of targets are presented in a list format beneath the associated group designation.
DISPLAY TYPE	Tabular

Table 3-27

Groups of Targets Display

1	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0	
GROUP OF TARGETS						DD MMM YY HH:MM			
FORCE BLUEFOR OR OPFOR									
GROUP DESIG ANN									
TGTNR AANN		TGT LOC AANNNNNNNN		TGTNR AANN		TGT LOC AANNNNNNNN		TGTNR AANN	TGT LOC AANNNNNNNN
• •		• • • •		• •		• • • •		• •	• • • •

Table 3-28

Average Casualties/Vehicle Losses Per Fire Mission Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
<p>For each exercise segment, the total KIA, WIA, and vehicle losses, both divided by the total number of executed fire missions (except HC, WP and illumination missions). Both numbers are multiplied by 100 to give a percentage casualty and loss value.</p> <p>DISPLAY CRITERIA</p>	<p>Manual Input of Fire Mission results.</p>
<p>Type of Mission</p>	<p>The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.</p>
<p>DISPLAY TYPE</p>	<p>Graph</p>

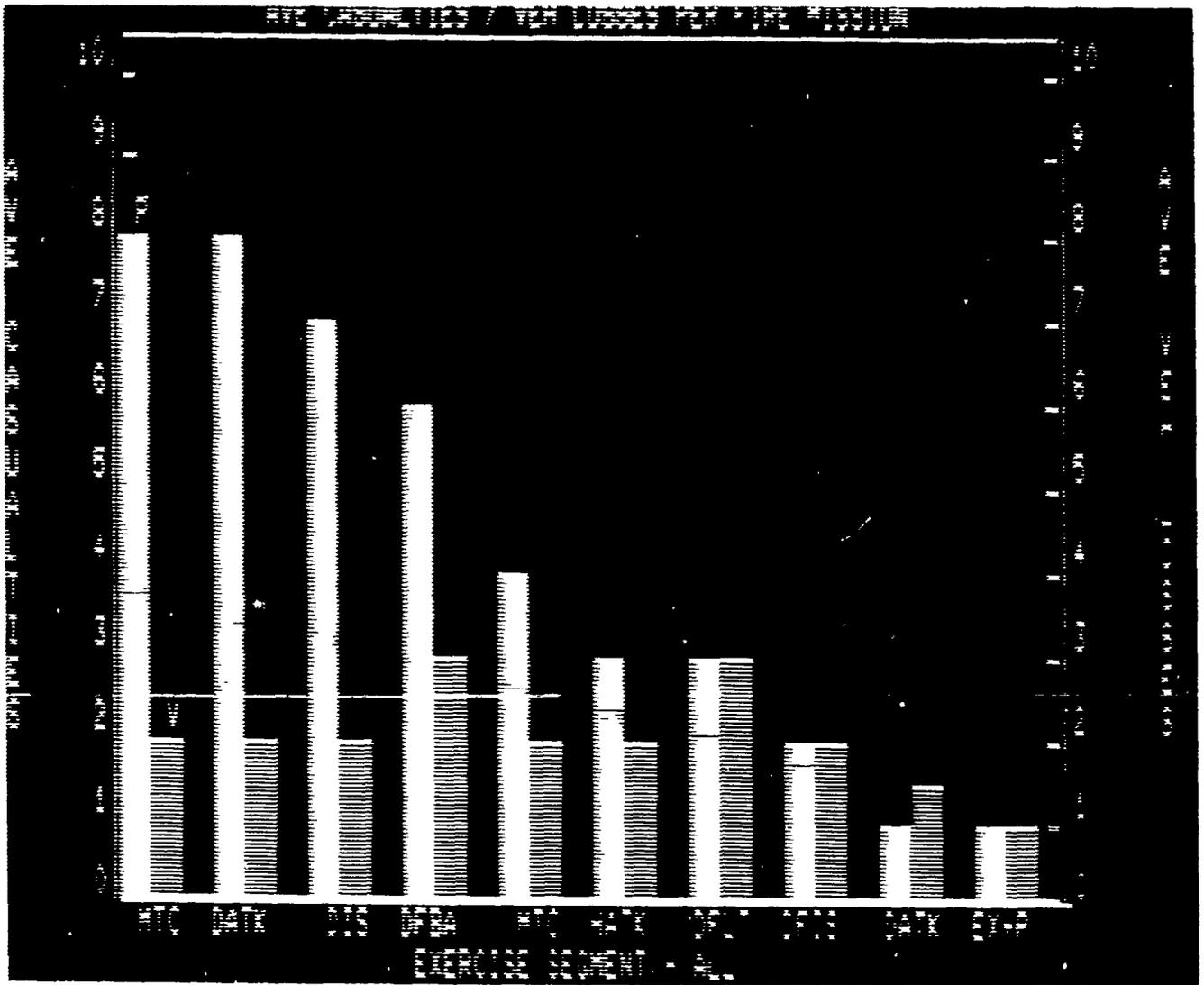


Figure 3-12

Average Casualties/Vehicle Losses Per Fire Mission Display

D. Minefield Data

Minefield data is presented in the following format.

- MINEFIELD EVENT SUMMARY (Tables 3-29 and 3-30)

Table 3-29

Minefield Event Summary Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
TIME	Encounter time for unit contacting minefield.
UNIT	Name identification of unit encountering minefield.
LOCATION	UTM grid coordinate of unit in contact with minefield.
TIME TO NEGOTIATE	Time duration reported for unit to complete negotiating minefield.
EFFECT	Description of unit losses attributed to the minefield event for uninstrumented personnel and vehicles (by type) and instrumented losses by player identification.
DISPLAY CRITERIA	
Time	<p>All data on minefield events will be displayed for the entire history at an operator-specified time range or, as a default, since the beginning of the history to the exercise time displayed on the Tactical Display at the time of the display request.</p> <p>The fixed portion of this format occupies one line per entry with effects on subsequent lines. Uninstrumented losses are followed by instrumented losses, by ID, for as many lines as necessary. The data are ordered by time.</p>
Force	The operator specifies whether the display is for BLUEFOR or OPFOR minefield events.
DISPLAY TYPE	Tabular

Table 3-30

Minefield Event Summary Display

	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
MINEFIELD EVENT SUMMARY				DD MMM YY HH:MM - DD MMM YY HH:MM				
TIME	UNIT	LOCATION	TIME TO NEGOTIATE					
DD HH:MM	XXXXXXXXXXXXXXXXXXXXXXXXXX	AANNNNNN	HH.H					
EFFECT:	WIA:NN KIA:NN (VEHICLE N)	(VEHICLE N)	(VEHICLE N)	(VEHICLE N)	(VEHICLE N)	(VEHICLE N)	(VEHICLE N)	(VEHICLE N)
INSTRUMENTED LOSS:	PLAYER ID	PLAYER ID	PLAYER ID	PLAYER ID	PLAYER ID	PLAYER ID	PLAYER ID	PLAYER ID

II. PLAYERS' TACTICAL PERFORMANCE

A. Side Panel Statistics

These measures represent nine indicators of overall engagement effectiveness, weapon effectiveness, movement, and communications. Their calculation and display is unique in that each measure can represent only one, albeit any, particular five-minute cumulative period. These statistics include the following.

- OVERALL FORCE VALUE. This value for each side is the sum of force value coefficients for all live instrumented and uninstrumented ground direct-fire weapon systems and player and no-player indirect-fire units.
- FORCE VALUE LOSS. This value is based on the total assigned player value lost during the period.
- FORCES-IN-CONTACT. When a weapon-target pairing occurs (near miss, hit or kill), the platoons to which the firer and the target are attached are considered to be in contact. Such a platoon is considered as being in contact only once during an update period and this measure is computed as a total number of BLUEFOR and OPFOR platoons in contact.

- FORCE ENGAGEMENT. When a weapon-target pairing occurs (near miss, hit or kill), the firer weapon is considered to be engaged. A weapon is counted as engaged only once during an update period and the force engaged on each side is the sum of force value coefficients for all ground direct-fire weapon systems and indirect-fire units.
- MEAN KILL-TO-FIRINGS RATIOS (BLUEFOR-OPFOR). The ratio of total firings to kills for BLUEFOR and OPFOR weapons.
- MEAN WEAPON FRACTIONAL KILL EFFECTIVENESS-TANK (TK AND ANTI-TANK (AT) (BLUEFOR-OPFOR). These measures are the total value of enemy players killed by friendly weapon type (TK and AT) divided by the total value of enemy players killed.
- MEAN KILL RANGE TANK (TK) AND ANTI-TANK (AT) (BLUEFOR-OPFOR). These values are the distance from weapon to target for weapon kills to the nearest tenth of a kilometer.
- MEAN RATE OF ADVANCE TOWARD OBJECTIVE (BLUEFOR-OPFOR). This value is the rate of advance projected on a line from the unit's current center of mass to a manually designated destination. An instantaneous (this period) and mean (across all periods to date) are computed for this measure expressed in kilometers per hour.
- AVERAGE COMMUNICATIONS DURATION (BLUEFOR-OPFOR). The average transmission duration (seconds) of transmissions.

B. Engagement Statistics

Engagement-related movement and weapons data are presented in the following formats.

- RATE OF MOVEMENT SUMMARY BY UNIT (Tables 3-31 and 3-32)
- WEAPON EFFECT ON OPFOR MOVEMENT (Table 3-33 and Figure 3-13)
- ENGAGEMENT ACTIVITY (Table 3-34 and Figure 3-14)
- BLUEFOR ENGAGEMENTS (Tables 3-35 and 3-36)
- OPFOR ENGAGEMENTS (Tables 3-37 and 3-38)
- FORCE VALUE (Table 3-39 and Figure 3-15)

- ENGAGED FORCE VALUE (Table 3-40 and Figure 3-16)
- FIRING ACTIVITY (Table 3-41 and Figure 3-17)
- FIRING SUMMARY BY UNIT (Tables 3-42 and 3-43)
- FIRING SUMMARY BY WEAPON TYPE (Tables 3-44 and 3-45)
- ENGAGEMENT RANGE SUMMARY-TANK/TOW (SAGGER) (Tables 3-46 and 3-47)
- ENGAGEMENT RANGE SUMMARY-DRAGON/VIFER (Tables 3-48 and 3-49)
- RANGE OF PAIRINGS (Tables 3-50 and Figure 3-18)
- RANGE OF PAIRINGS BY UNIT (Table 3-51 and Figure 3-19)
- RANGE OF PAIRINGS BY WEAPON TYPE (Table 3-52 and Figure 3-20)
- PERCENTAGE OF HITS AND KILLS FOR ALL WEAPONS (Table 3-53 and Figure 3-21)
- PERCENTAGE OF HITS AND KILLS FOR SINGLE WEAPONS (Table 3-54 and Figure 3-22)
- ROUNDS FIRED PER KILL FOR ALL WEAPONS (Table 3-55 and Figure 2-23)
- ROUNDS FIRED PER KILL FOR SINGLE WEAPONS (Table 3-56 & Figure 3-24)
- WEAPON EFFECTIVENESS VS. FIRING RATE BY WEAPON TYPE (Table 3-57 and Figure 3-25)
- AMMUNITION RESUPPLY SUMMARY BY AMMO TYPE (Table 3-58 & Figure 3-26)
- AMMUNITION RESUPPLY SUMMARY FOR ALL AMMO TYPES (Table 3-59 and Figure 3-27)

Table 3-31

Rate of Movement Summary by Unit Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
UNIT	Names of the units immediately subordinate to the unit of interest followed by the name of the unit of interest.
MOVEMENT RATE	Under the subheadings of CURRENT and AVG, the current and the average rate of movement for each unit in tenths of kilometers per hour.
LOCATION	Under subheadings of INITIAL and DESTINATION, the UTM coordinate (grid) of the location of an assigned destination in the maneuver plan for the unit, if any, and the location of the unit when the destination was entered into the system.
MOVEMENT RATE TO DESTINATION	Under the subheadings of CURRENT and AVG, the current and the average rate of movement toward the destination location, for each unit that has an assigned destination.
DISPLAY CRITERIA	
Time	The display contains all data for the current exercise segment up to the time of the display request, or data for an operator-defined time interval.
Unit	The requestor specifies a specific company/team, task force, BN asset, DIV/BDE asset, or the equivalent OPFOR elements. Data will be presented for the immediate subordinates of the named unit and then be summarized for the named unit.
DISPLAY TYPE	Tabular

Table 3-32

Rate of Movement Summary by Unit Display

	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0

RATE OF MOVEMENT SUMMARY - DD MMM YY HH:MM - DD MMM YY HH:MM

UNIT	MOVEMENT RATE		MOVEMENT RATE TO DESTINATION		LOCATION	
	CURRENT	AVG	CURRENT	AVG	INITIAL	DESTINATION
XXX/XXXXXXXXX	NN.N	NN.N	NN.N	NN.N	AANNNNNN	AANNNNNN

Table 3-33

Weapon Effect on OPFOR Movement Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
For each 5-minute period:	
OPFOR MOVEMENT RATE	The average rate of movement of designated OPFOR unit to an assigned destination (Km/Hr).
PERCENT. PAIRINGS	BLUEFOR: $\frac{\text{Hits} + \text{Kills}}{\text{Rounds Fired}} \times 100$
DISPLAY CRITERIA	
Time	The graph contains data for the last 24 time-periods (2 hours) from the time of the display request or for an operator-defined time interval.
Unit	The graph represents data for any operator-selected OPFOR unit.
DISPLAY TYPE	Graph

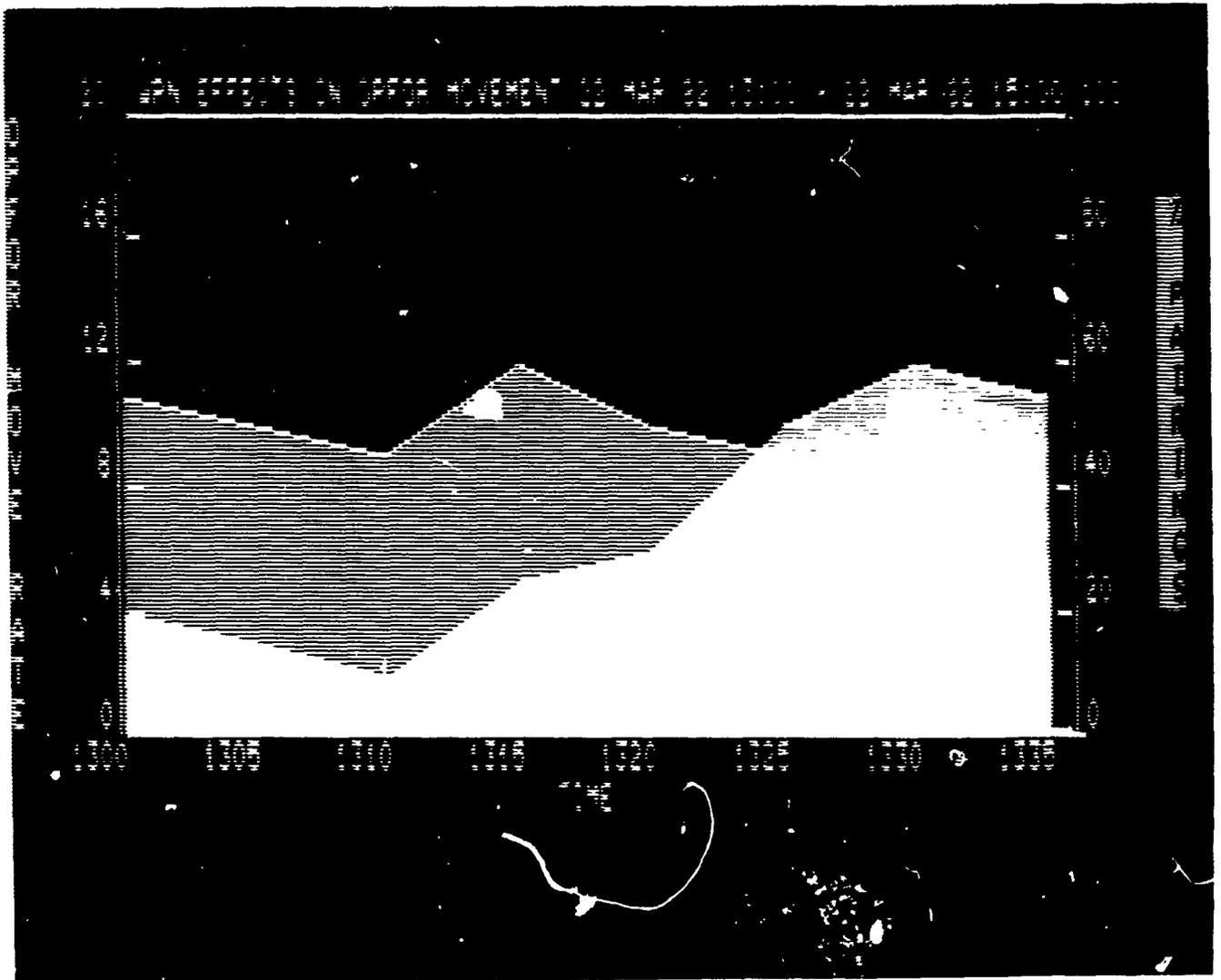


Figure 3-13

Weapon Effect on OPFOR Movement Display

Table 3-34

Engagement Activity Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
For each 5-minute period:	
Count of pairings (Near-Miss, Hit, or Kill) awarded to BLUEFOR TANKs, TOWs, DRAGONs, VIPERs, and OTHER weapons.	RDMS Reports
DISPLAY CRITERIA	
Time	The graph contains data for the last 10 time periods (50 minutes) from the time of the display request, or for an operator-defined time interval.
Unit	The graph represents data for any operator-selected BLUEFOR player unit.
DISPLAY TYPE	Graph

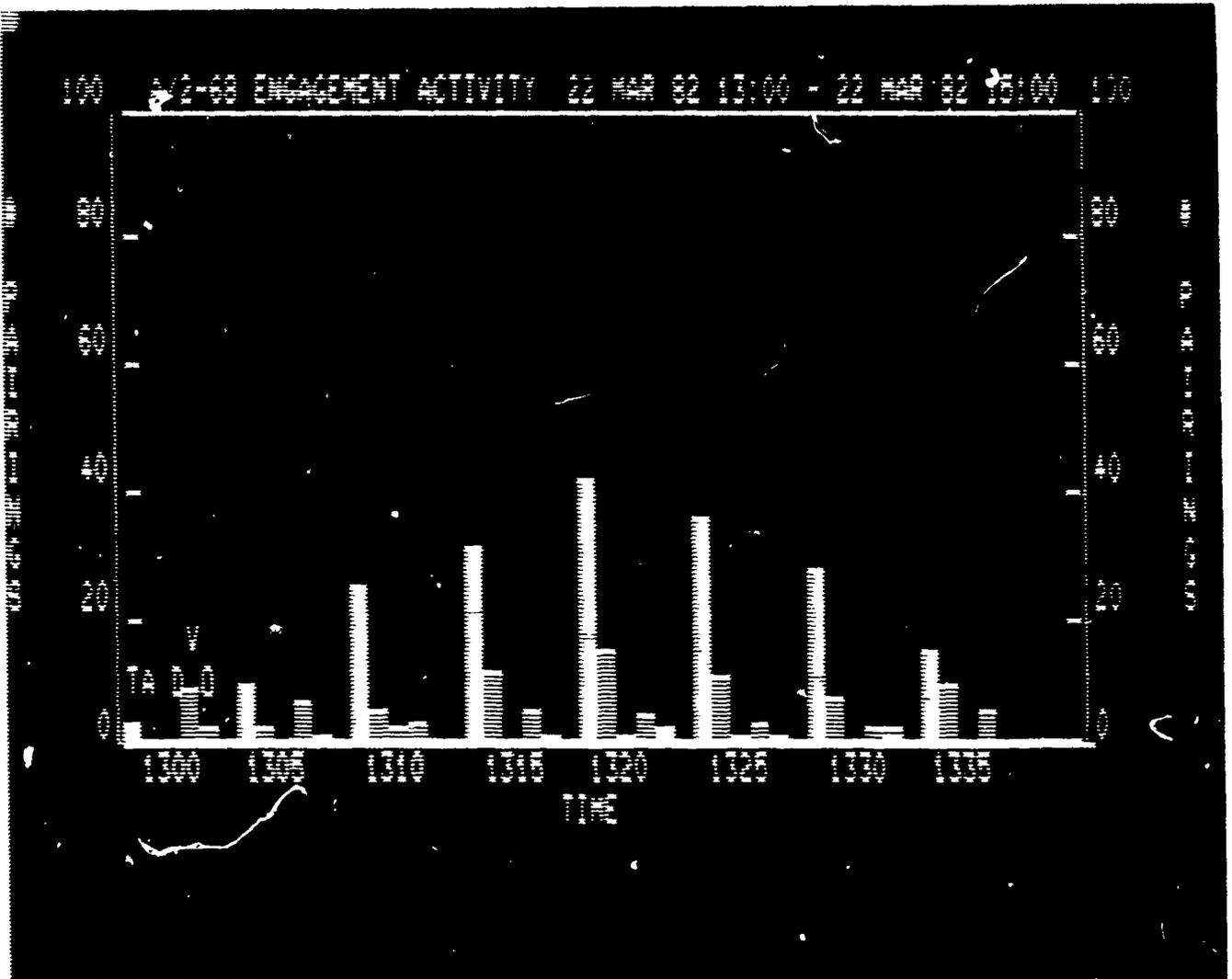


Figure 3-14

Engagement Activity Display

Table 3-35

BLUEFOR Engagements Calculation

CONTENT	
<u>Column heading</u>	<u>Description</u>
WEAPON	List of standard BLUEFOR weapon types (i.e., MAIN GUN, COAX, TOW, DRAGON, and VIPER), and OTHER.
TOTAL FIRINGS	For each weapon type in the WEAPON column, the count of firings recorded by engagement simulation.
T-72	Under subheadings of N/M, HIT, and KILL, the count of near-misses, hits, and kills recorded for each weapon against T-72 targets.
BMP	Same as for T-72, but for BMP targets.
BRDM-2	Same as for T-72, but for BRDM-2 targets.
ZSU23-4	Same as for T-72, but for ZSU23-4 targets.
DISPLAY CRITERIA	
Time	The display includes all data recorded for the current exercise segment up to the time of the display request, or for an operator-defined time interval.
Unit	The requestor specifies the DIV/BDE asset, BN asset, task force, a specific company/team or a platoon for which data is desired.
DISPLAY TYPE	Tabular

Table 3-36

BLUEFOR Engagements Display

1	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0
BLUEFOR ENGAGEMENTS -					DD MMM YY HH:MM - DD MMM YY HH:MM			
WEAPON	TOTAL FIRINGS	T-72 N/M HIT KILL		BMP N/M HIT KILL		BRDM-2 N/M HIT KILL		ZSU23-4 N/M HIT KILL
MN GUN	NNNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN
COAX								
TOW								
DRAGON								
VIPER								
OTHER								

Table 3-37

OPFOR Engagements Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
WEAPON	List of standard OPFOR weapon types (i.e., 1-72, BRDM-2 SAGGER, BMP SAGGER, BMP 73MM, SAGGER, 122MM) and OTHER.
TOTAL FIRINGS	For each weapon type in the WEAPON column, the count of firings recorded by engagement simulation.
TANK	Under subheadings of N/M, HIT, and KILL, the count of near-misses, hits, and kills recorded for each weapon against tank targets.
APC	Same as for tank, but for APC targets.
TOW	Same as for tank, but for TOW targets.
DISPLAY CRITERIA	
Time	The display includes all data recorded for the current exercise segment up to the time of the display request, or for an operator-defined time interval.
Unit	The requestor specifies the specific platoon, company, battalion, or division/regiment/battalion asset for which data is desired.
DISPLAY TYPE	Tabular

Table 3-38

OPFOR Engagements Display

1	0	0	0	0	0	0	0	0	
OPFOR ENGAGEMENTS		DD MMM YY HH:MM - DD MMM YY HH:MM							
WEAPON	TOTAL FIRINGS	TANK N/M HIT KILL			APC N/M HIT KILL			TOW N/M HIT KILL	
T-72	NNNN	NNN NNN NNN			NNN NNN NNN			NNN NNN NNN	
BRDM SAG									
BMP SAG									
BMP 73MM									
SAGGER									
122MM									
OTHER									

Table 3-39
Force Value Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
For each 5-minute period:	
BLUEFOR TOTAL FORCE VALUE	The sum of force value coefficients for all live instrumented and uninstrumented BLUEFOR ground direct fire weapon systems and BLUEFOR player and no-player indirect fire units identified in the system data base.
BLUEFOR ENGAGED FORCE VALUE	The sum of force value coefficients for all BLUEFOR ground direct fire weapon systems and indirect fire units that were engaged.
OPFOR TOTAL FORCE VALUE	The sum of force value coefficients for all live instrumented and uninstrumented OPFOR ground direct fire weapon systems and OPFOR player and no-player indirect fire units identified in the system data base.
OPFOR ENGAGED FORCE VALUE	The sum of force value coefficients for all OPFOR ground direct fire weapon systems and indirect fire units that were engaged.
DISPLAY CRITERIA	
Time	The graph contains up to 24 time-periods representing a two-hour time span up to the time of the display request, or for an operator-defined time interval.
DISPLAY TYPE	Graph

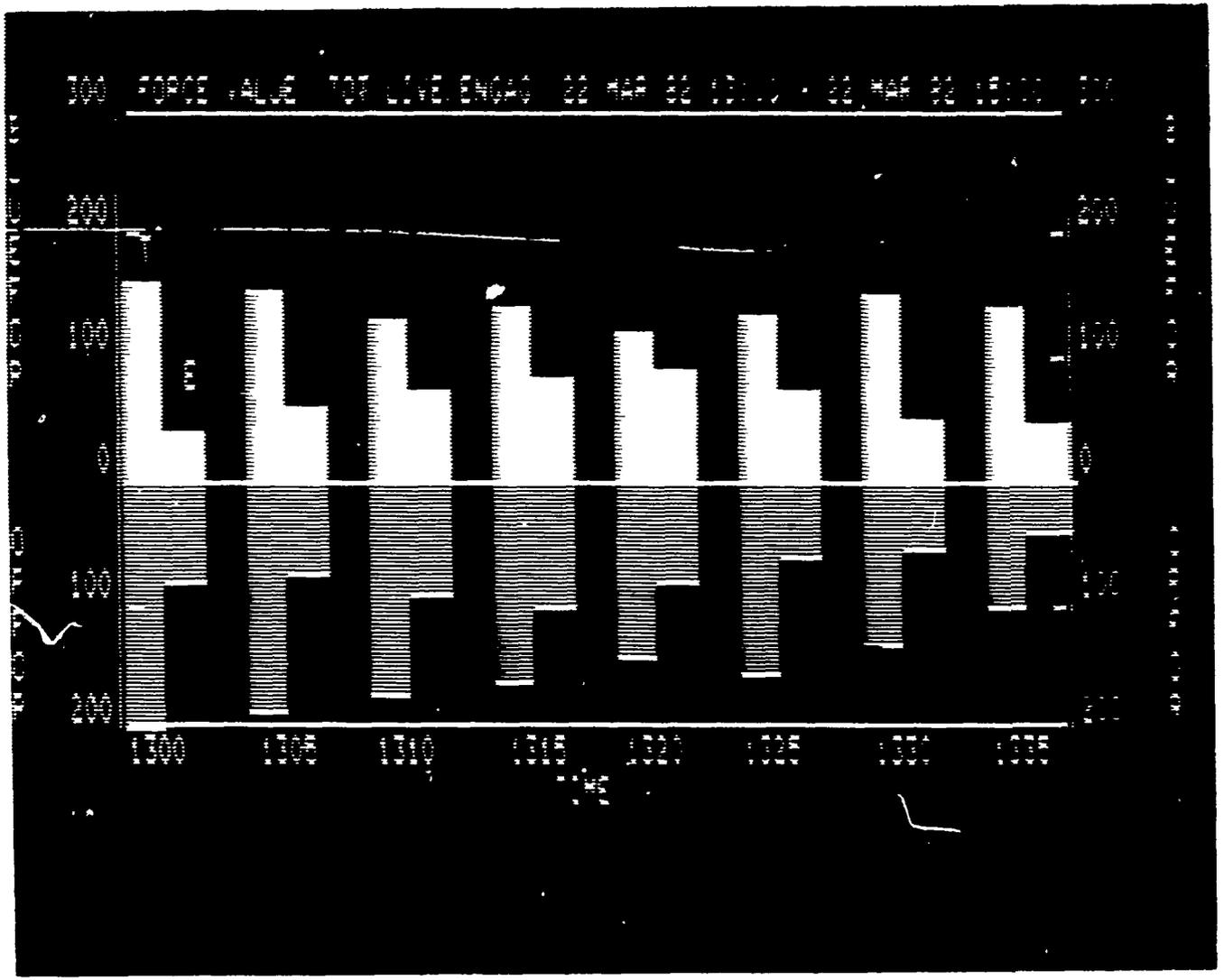


Figure 3-15
Force Value Display

Table 3-40

Engaged Force Value Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
<p>For each exercise segment, the maximum percentage of BLUEFOR total force value that was engaged during a five-minute period during the exercise segment. The percentage of force value engaged will be computed as follows:</p> $\frac{\text{Engaged Force Value}}{\text{Total Force Value}} \times 100$	<p>Force value of each BLUEFOR weapon type. For each five-minute period, the number of live BLUEFOR weapons with pairings by type, determined by RDMS reports.</p>
<p>DISPLAY CRITERIA</p>	
<p>Type of Mission</p>	<p>The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.</p>
<p>DISPLAY TYPE</p>	<p>Graph</p>

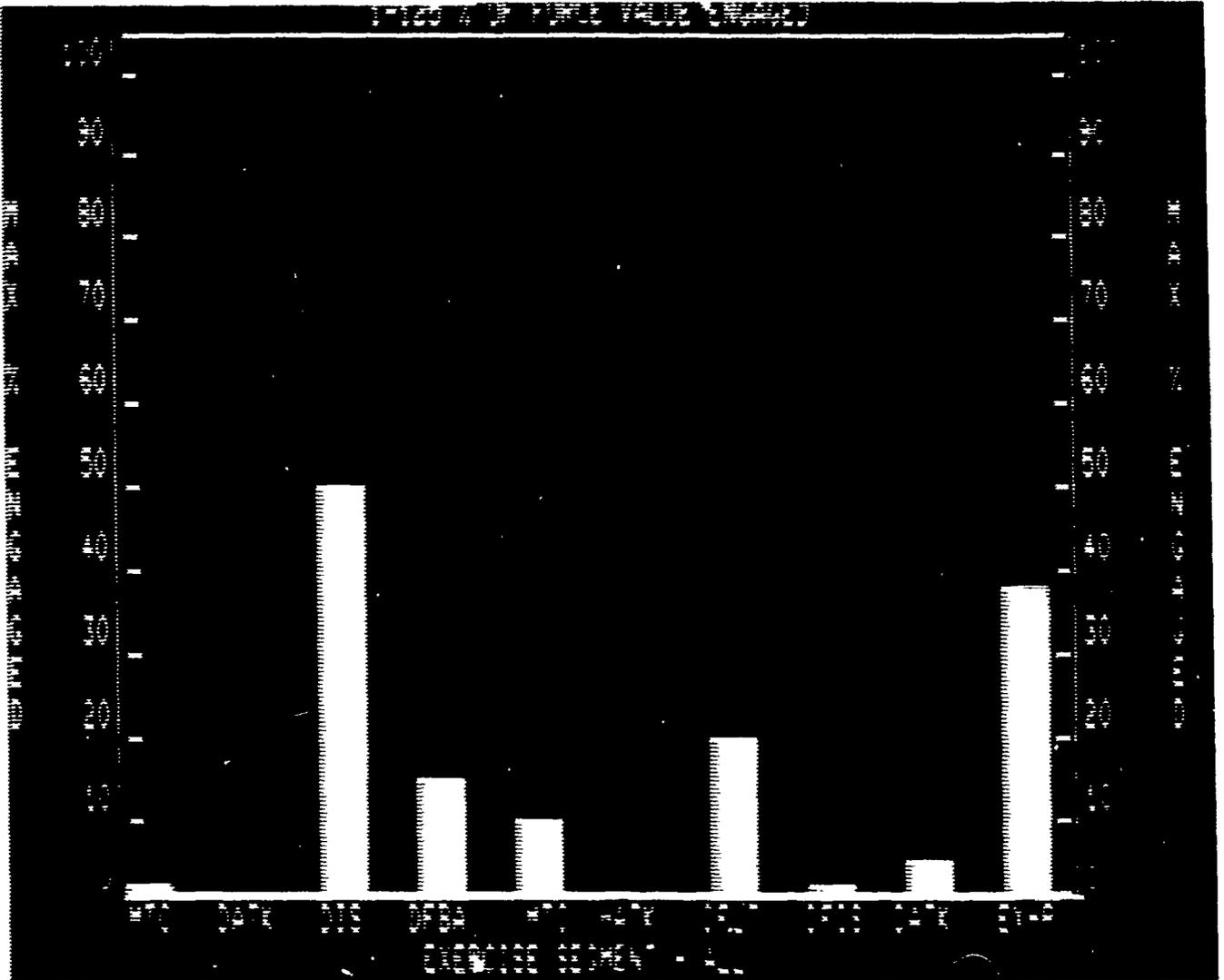


Figure 3-16
Engaged Force Value Display

Table 3-41

Firing Activity Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
For each 5-minute period:	
Roundsfired by BLUEFOR TANKs, TOWs, and DRAGONs, and VIPERs.	RDMS Reports
DISPLAY CRITERIA	
Time	The graph contains data for the last 15 time-periods (75 minutes) from the time of the display request, or for an operator-defined time interval.
Unit	The graph represents data for any operator-selected BLUEFOR unit.
DISPLAY TYPE	Graph

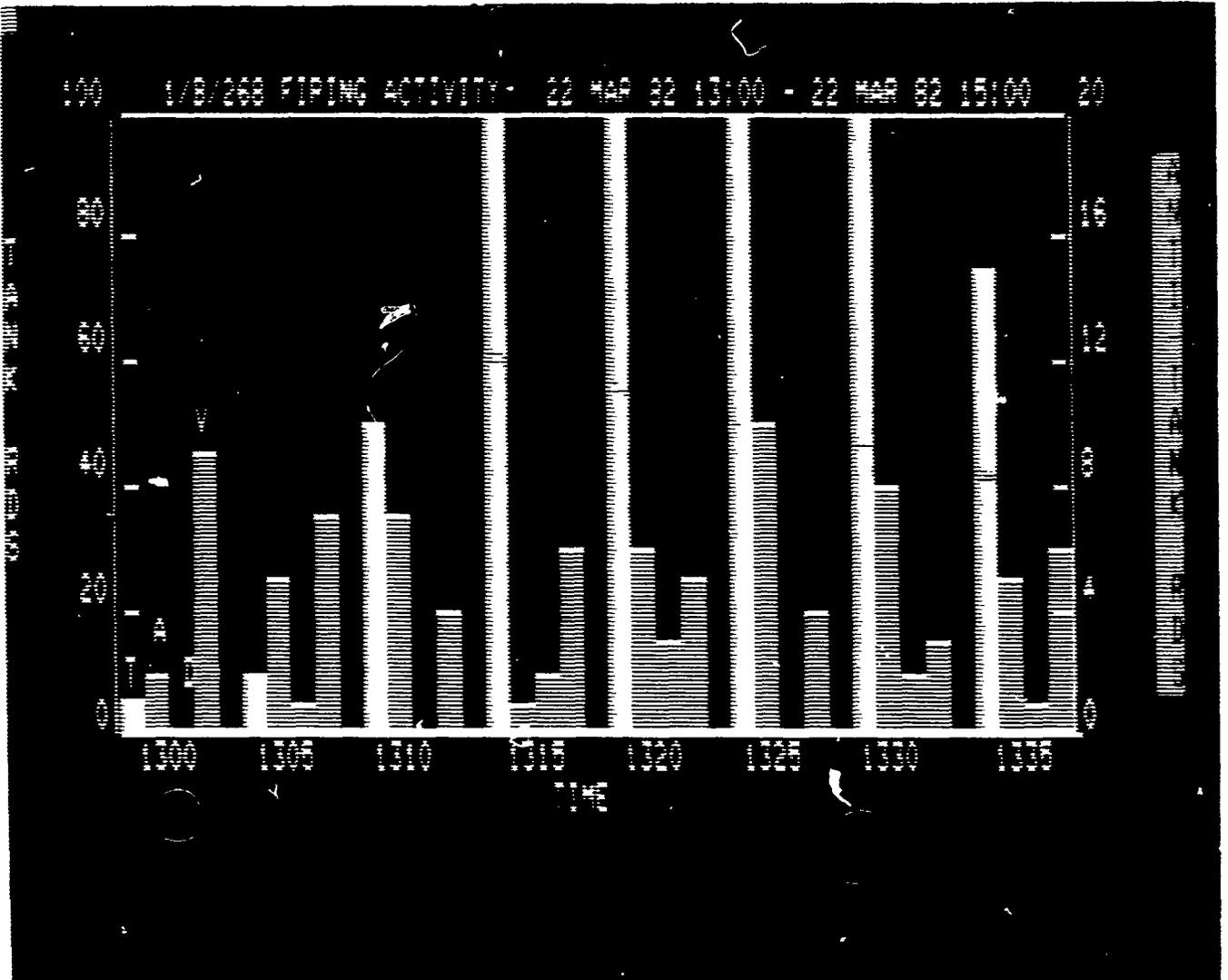


Figure 3-17
Firing Activity Display

Table 3-42

Firing Summary by Unit Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
WEAPON	List of weapon types to be included (i.e., for BLUEFOR: MN GUN, COAX, TOW, DRAGON, VIPER; or for OPFOR: MN CUN, COAX, SAGGER, and 122MM).
NUMBER LIVE	For each weapon, the number currently operational in the unit.
RDS FIRED	For the BLUEFOR: MN GUN, COAX, TOW, DRAGON, and VIPER; or the OPFOR: MN GUN, COAX, SAGGER, and 122MM, the count of rounds fired by the specified unit.
NEAR-MISS	For the BLUEFOR: MN GUN, COAX, TOW, DRAGON, and VIPER; or the OPFOR: MN GUN, COAX, SAGGER, and 122MM, the count of near-misses recorded for the unit and the percentage of near misses based on rounds fired.
HIT	For the BLUEFOR: MN GUN, COAX, TOW, DRAGON, and VIPER; or the OPFOR: MN GUN, COAX, SAGGER, and 122MM, the count of hits recorded for the unit and the percentage of hits based on rounds fired.
KILL	For the BLUEFOR: MN GUN, COAX, TOW, DRAGON and VIPER; or the OPFOR: MN GUN, COAX, SAGGER, and 122MM, the count of kills recorded for the unit and the percentage of kills based on rounds fired.
DISPLAY CRITERIA	
Time	The display contains all data for the current exercise segment up to the time of the display request, or for an operator-defined time interval.
Unit	The requestor specifies a specific platoon, a company/team, the entire task force, BN asset, DIV/BDE asset, or the equivalent OPFOR elements.
DISPLAY TYPE	Tabular

Table 3-43

Firing Summary by Unit Display

1	1	2	3	4	5	6	7	8
	0	0	0	0	0	0	0	0
FIRING SUMMARY -					DD MMM YY HH:MM - DD MMM YY HH:MM			
WEAPON	NO. LIVE	RDS FIRED	NEAR-MISS RDS PERCENT		HIT RDS PERCENT		KILL RDS PERCENT	
<u>FOR BLUEFOR:</u>								
MN GUN	NN	XXXXXX	NNNNN	NNN	NNNNN	NNN	NNNNN	NNN
COAX								
TOW								
DRAGON								
VIPER								
<u>FOR OPFOR:</u>								
MN GUN								
COAX								
SAGGER								
122MM								

Table 3-44

Firing Summary by Weapon Type Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
UNIT	Names of the units immediately subordinate to the unit of interest followed by the name of the unit of interest. Only units having the weapon system requested will be listed. For a company/team, the subordinate platoons will be listed; for the task force, the subordinate company/teams will be listed.
ROUNDS FIRED	For each unit listed in the unit column, the count of rounds fired by the requested weapon.
NEAR-MISS	For each unit, the count of near-misses recorded for the requested weapon and the percentage of near misses based on rounds fired.
HIT	For each unit, the count of hits recorded for the requested weapon and the percentage of hits based on rounds fired.
KILL	For each unit, the count of kills recorded for the requested weapon and the percentage of kills based on rounds fired.
DISPLAY CRITERIA	
Time	The display contains all data for the current exercise segment, up to the time of the display request, or all data for an operator-defined time interval.
Weapon	For the BLUEFOR, the requestor specifies MN GUN, COAX, TOW, DRAGON or VIPER. For the OPFOR, the requestor specifies MN GUN, COAX, SAGGER, or 122MM.
Unit	The requestor specifies a specific company/team, task force, BN asset, or DIV/BDE asset. Data will be presented for the immediate subordinates of the named unit and then summarized for the named unit. Only those units which possess the specified weapon system will be included in the display.
DISPLAY TYPE	Tabular

Table 3-45

Firing Summary by Weapon Type Display

1	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0
FIRING SUMMARY -		DD MMM YY HH:MM - DD MMM YY HH:MM						
	ROUNDS FIRED	NEAR-MISS RDS PERCENT	HIT RDS PERCENT	KILL RDS PERCENT				
XXXXXXXXXXXXXXXX	NNNNN	NNNNN NNN	NNNNN NNN	NNNNN NNN	NNNNN NNN	NNNNN NNN	NNNNN NNN	NNNNN NNN

Table 3-46

Engagement Range Summary - TANK/TOW (SAGGER) Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
MN GUN	N/M, HIT, KILL, and TOTAL.
TOW or SAGGER	Same as for MN GUN, except for (BLUEFOR) TOW or (OPFOR) SAGGER weapon engagements.
RANGE INTERVALS	Under subheadings of 200-meter range intervals, the number of near-misses, hits, kills, and total weapon pairings for the MN GUN and TOW or SAGGER weapons.
DISPLAY CRITERIA	
Time	The display contains all data for the current exercise segment up to the time of the display request, or for an operator-defined time interval.
Unit	The requestor specifies a specific platoon, company, the BN task force, BN asset, DIV/BDE asset, or the OPFOR element for which data is desired.
DISPLAY TYPE	Tabular

Table 3-47

Engagement Range Summary - TANK/TOW (SAGGER) Display

	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0

ENGAGEMENT RANGE SUMMARY - DD MMM YY HH:MM - DD MMM YY HH:MM

RANGE INTERVALS IN KILOMETERS

0- .2- .4- .6- .8- 1.0- 1.2- 1.4- 1.6- 1.8- 2.0- 2.2- 2.4- 2.6- 2.8- 3.0-
 .2 .4 .6 .8 1.0 1.2 1.4 2.6 2.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2

MN GUN
 N/M
 HIT
 KILL
 TOTAL

TOW or SAGGER (as applicable)
 N/M
 HIT
 KILL
 TOTAL

Table 3-48

Engagement Range Summary - DRAGON/VIPER Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
DRAGON	N/M, HIT, KILL, and TOTAL.
VIPER	Same as for DRAGON, except for VIPER weapon engagements.
RANGE INTERVALS	Under subheadings of 200-meter range intervals, the number of near-misses, hits, kills, and total weapon pairings for DRAGON and VIPER.
DISPLAY CRITERIA	
Time	The display contains all data for the current exercise segment up to the time of the display request, or for an operator-defined time interval.
Unit	The requestor specifies a specific platoon, company, or the BN task force for which data is desired.
DISPLAY TYPE	Tabular

Table 3-49

Engagement Range Summary - DRAGON/VIPER Display

1	1	2	3	4	5	6	7	8		
	0	0	0	0	0	0	0	0		
ENGAGEMENT RANGE SUMMARY -					DD MMM YY HH:MM - DD MMM YY HH:MM					
RANGE INTERVALS IN KILOMETERS										
	0-	.1-	.2-	.3-	.4-	.5-	.6-	.7-	.8-	.9-
	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
DRAGON	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN
N/M										
HIT										
KILL										
TOTAL										
VIPER										
N/M										
HIT										
KILL										
TOTAL										

Table 3-50

Range of Pairings Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each mission type and weapon type (TANK, TOW, DRAGON):	
Number of near-misses for each range.	RDMS Reports
Number of hits for each range.	RDMS Reports
Number of kills for each range.	RDMS Reports
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Unit	The display includes all data for the battalion under training or an operator-specified company-level unit.
Weapon	The display includes all data for the BLUEFOR weapon selected by the operator (i.e., TANK, TOW or DRAGON).
DISPLAY TYPE	Graph

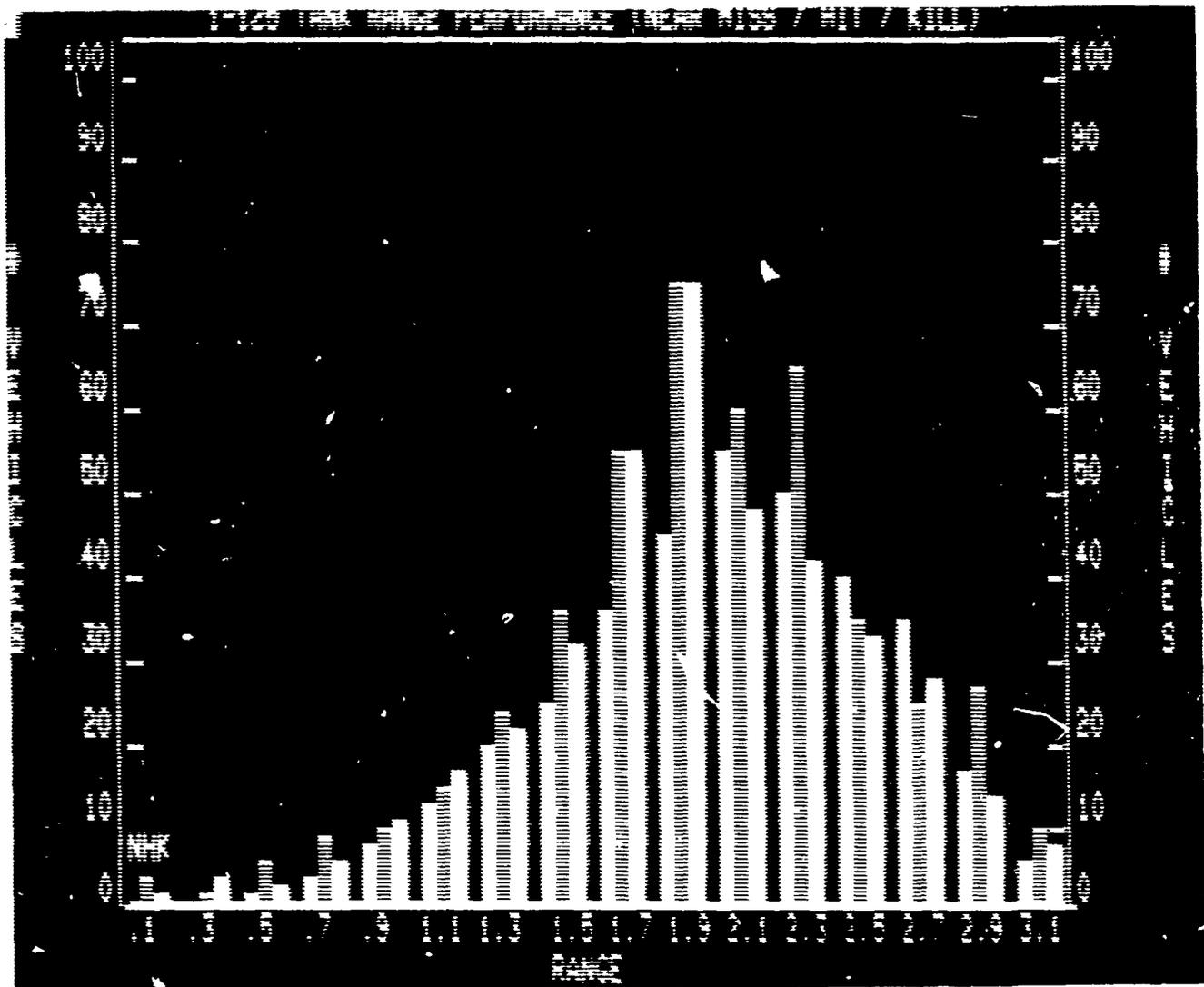


Figure 3-18
Range of Pairings Display

Table 3-51

Range of Pairings by Unit Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
For each 200 meter range (.1 to 3.1 km):	
Count of Pairings (Near-Miss, Hit, Kill) BLUEFOR TANKs, TOWs, DRAGONs, and VIPERs.	RDMS Reports
NOTE: The centers of successive 200-meter range intervals are expressed in units of kilometers (e.g., .5 includes all ranges from 400-599 meters).	
DISPLAY CRITERIA	
Time	The display contains all data for the current exercise segment up to the time of the display request, or for an operator-defined time interval.
Unit	The graph can represent data for the entire battalion or for specific companies or platoons, based upon operator selection.
DISPLAY TYPE	Graph

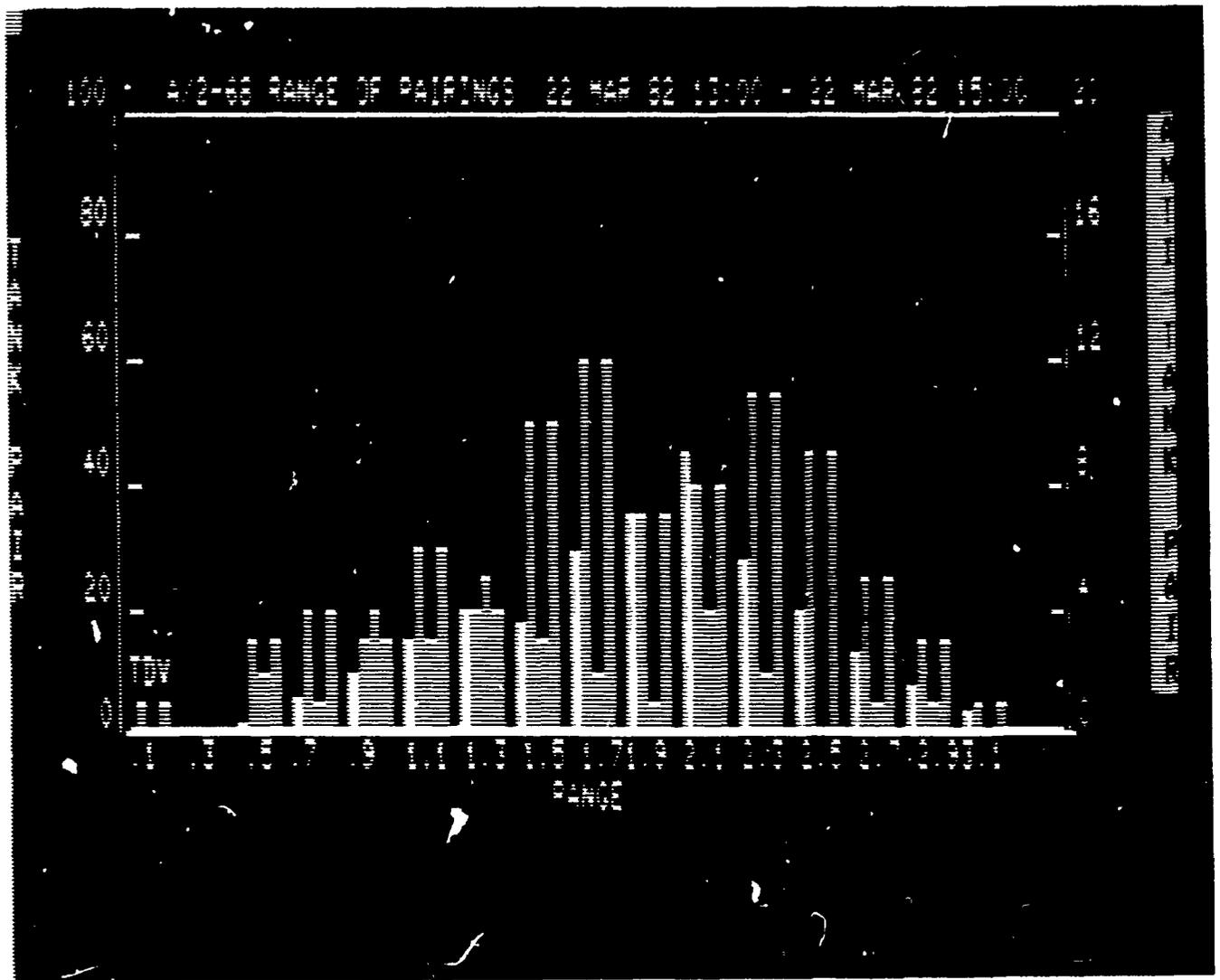


Figure 3-19
 Range of Pairings by Unit Display

Table 3-52

Range of Pairings by Weapon Type Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
For each 200-meter range (.1 to 3.1 km):	
NEAR-MISS	Count of near-misses for a selected weapon type from RDMS Reports.
HIT	Count of hits for a selected weapon type from RDMS Reports.
KILL	Count of kills for a selected weapon type from RDMS Reports.
NOTE: The centers of successive 200-meter range intervals are expressed in units of kilometers (e.g., .5 includes all ranges from 400-599 meters).	
DISPLAY CRITERIA	
Time	The graph contains all data for the current exercise segment up to the time of the display request, or for a specific operator-defined time interval.
Unit	The graph represents data for the entire battalion or for specific companies, based upon operator selection.
Weapon Type	The graph represents all data for a particular weapon type [i.e., Tank (T), TOW (A), DRAGON (D) or VIPER (V)], based upon operator selection.
DISPLAY TYPE	Graph

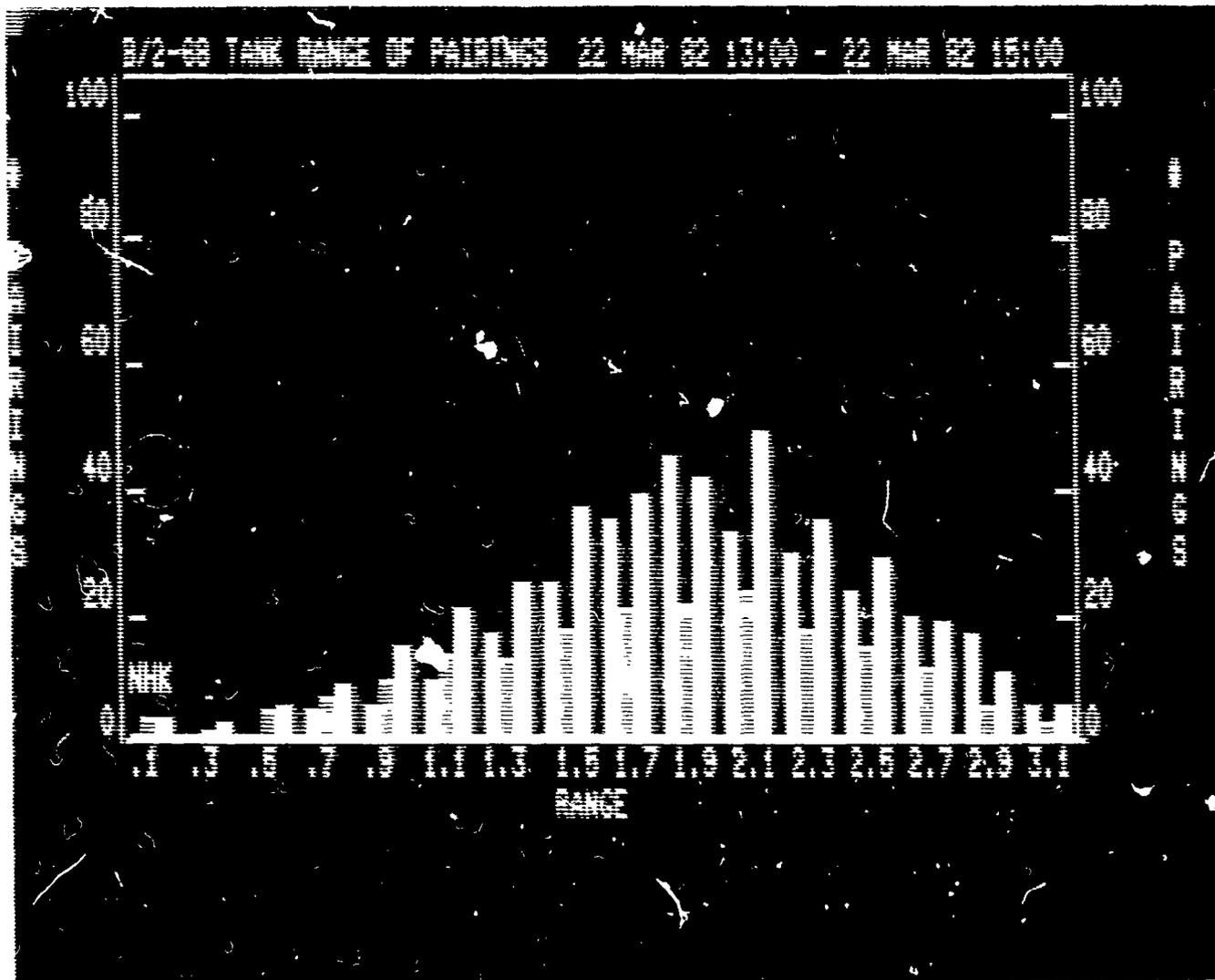


Figure 3-20

Range of Pairings by Weapon Type Display

Table 3-53

Percentage of Hits and Kills for All Weapons Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
<p>The percentage of hits and kills for each mission, and for each major BLUEFOR weapon (TANK, TOW, DRAGON), i.e.,</p> $\frac{\text{Hits + Kills}}{\text{Rounds Fired}} \times 100$	<p>RDMS Reports</p>
<p>DISPLAY CRITERIA</p>	
<p>Type of Mission</p>	<p>The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.</p>
<p>Unit</p>	<p>The display includes all data for the battalion under training or an operator-specified company-level unit.</p>
<p>DISPLAY TYPE</p>	<p>Graph</p>

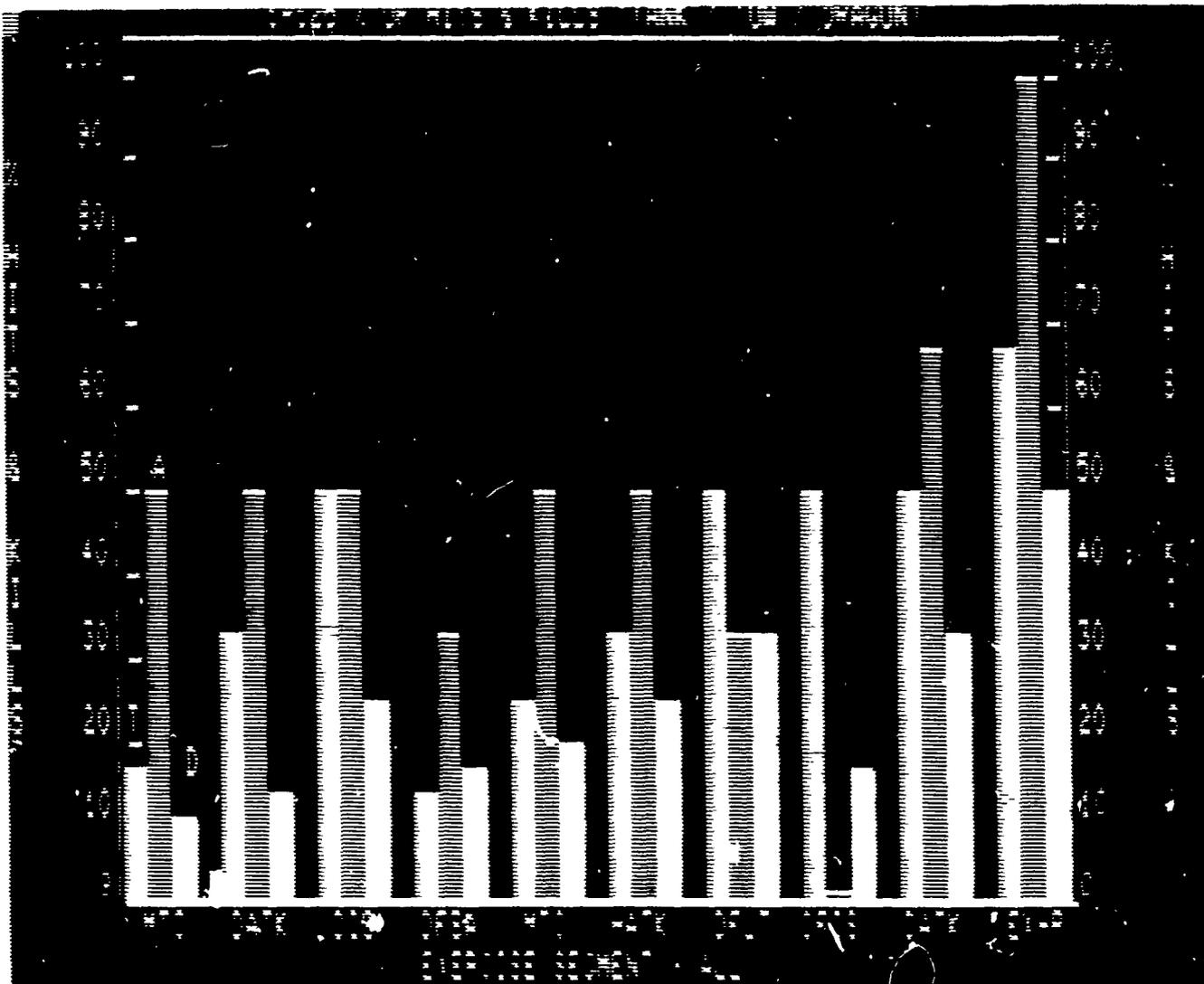


Figure 3-21

Percentage of Hits and Kills for All Weapons Display

Table 3-54

Percentage of Hits and Kills for Single Weapons Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
<p>The percentage of hits and kills for each mission, and for a selected major BLUEFOR weapon (TANK, TOW, DRAGON), i.e.,</p> $\frac{\text{Hits + Kills}}{\text{Rounds Fired}} \times 100$	<p>RDMS Reports</p>
<p>DISPLAY CRITERIA</p>	
<p>Type of Mission</p>	<p>The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.</p>
<p>Unit</p>	<p>The display includes all data for the battalion under training or an operator-specified company-level unit.</p>
<p>Weapon</p>	<p>The operator specifies the BLUEFOR weapon (TANK, TOW, DRAGON) for which data will be provided.</p>
<p>DISPLAY TYPE</p>	<p>Graph</p>

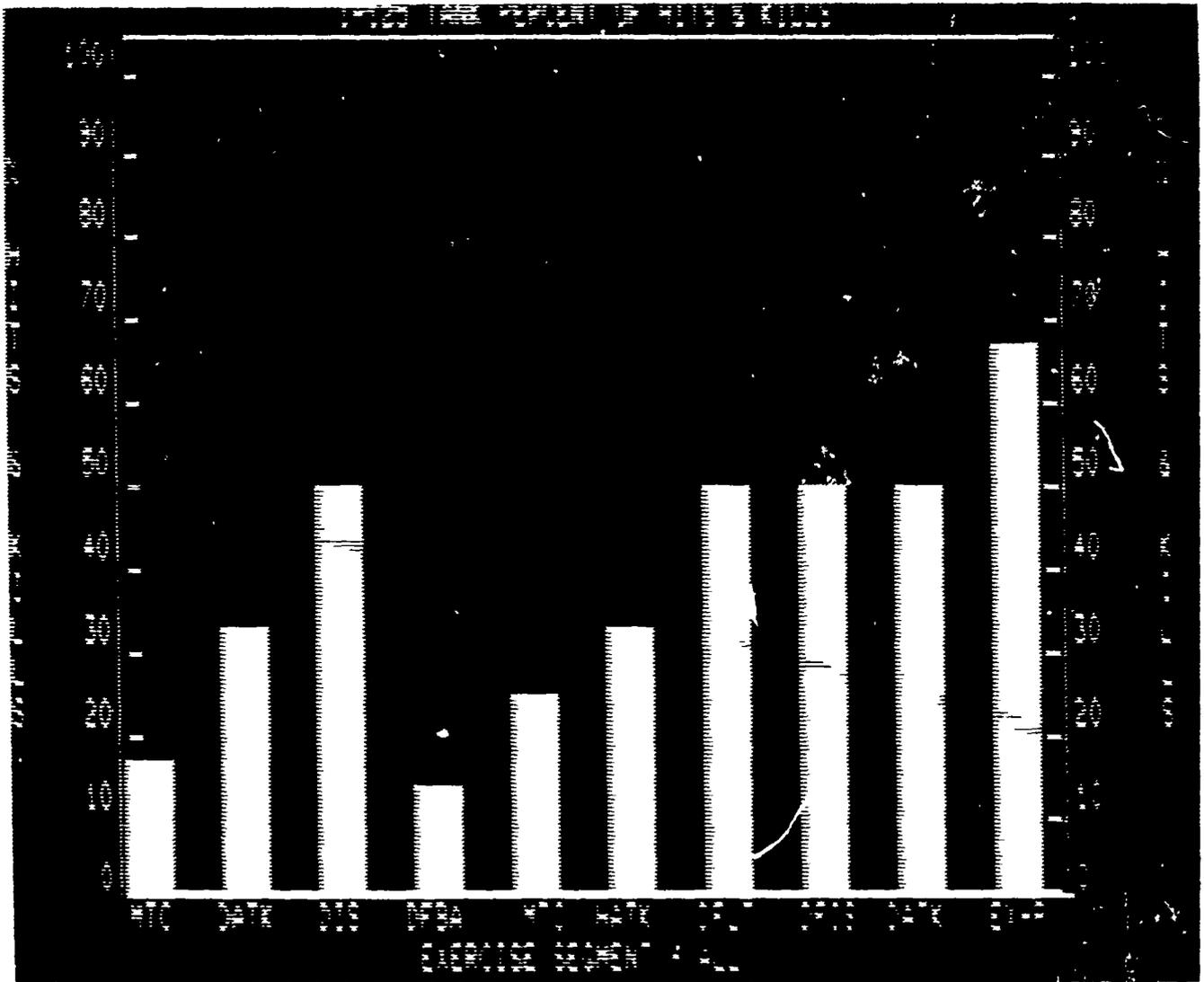


Figure 3-22

Percentage of Hits and Kills for Single Weapons Display

Table 3-55

Rounds Fired Per Kill for All Weapons Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each mission, and for each major BLUEFOR weapon (TANK, TOW, DRAGON), the number of rounds fired per hit or kill.	RDMS Reports
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Unit	The display includes all data for the battalion under training or an operator-specified company-level unit.
DISPLAY TYPE	Graph

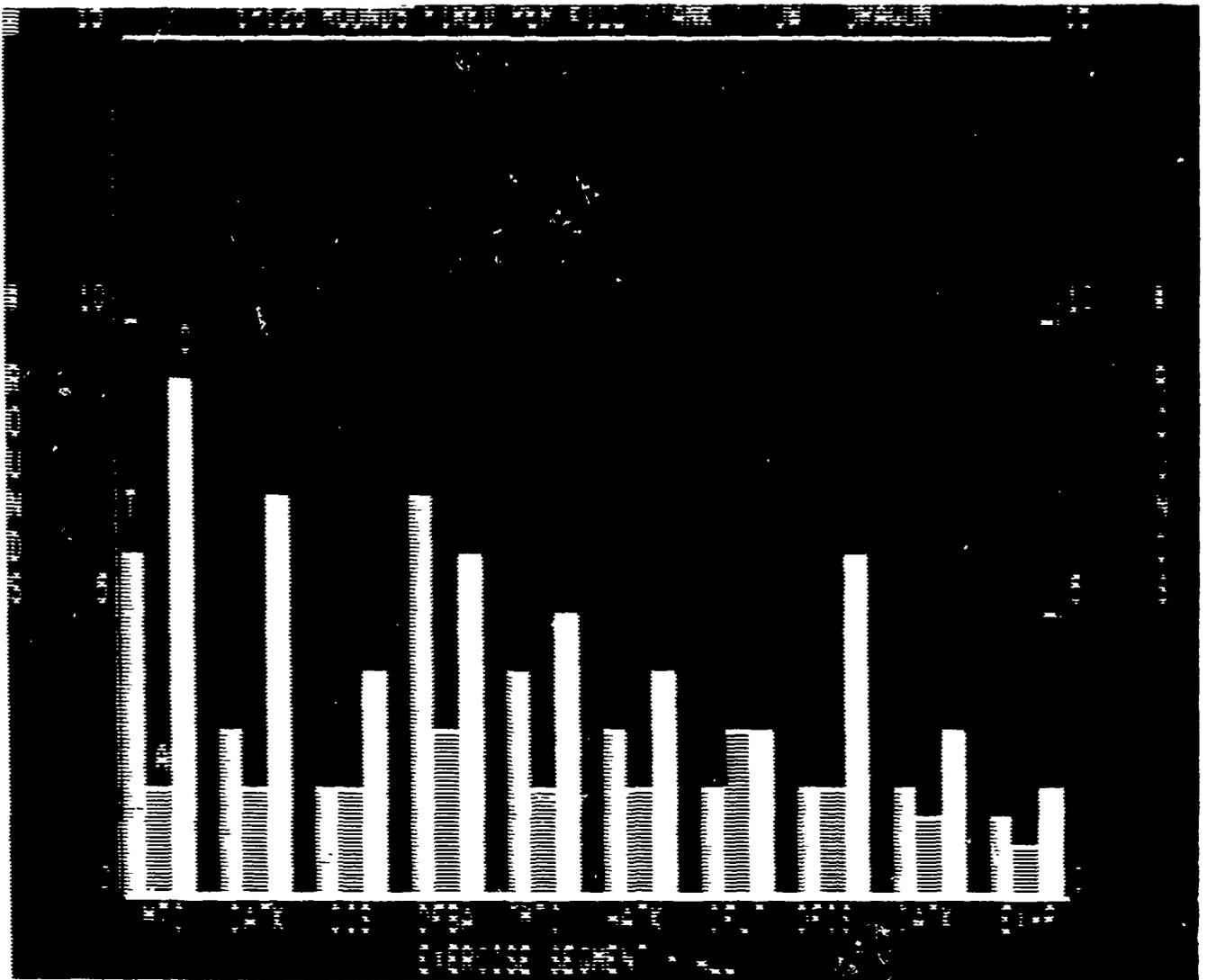


Figure 3-23

Rounds Fired Per Kill for All Weapons Display

Table 3-56

Rounds Fired Per Kill for Single Weapons Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each mission, and for a selected major BLUEFOR weapon (TANK, TOW, or DRAGON), the number of rounds fired per hit or kill.	RDMS Reports
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Unit	The display includes all data for the battalion under training or an operator-specified company-level unit.
Weapon	The display includes all data for the BLUEFOR weapon selected by the operator (i.e., TANK, TOW, or DRAGON).
DISPLAY TYPE	Graph

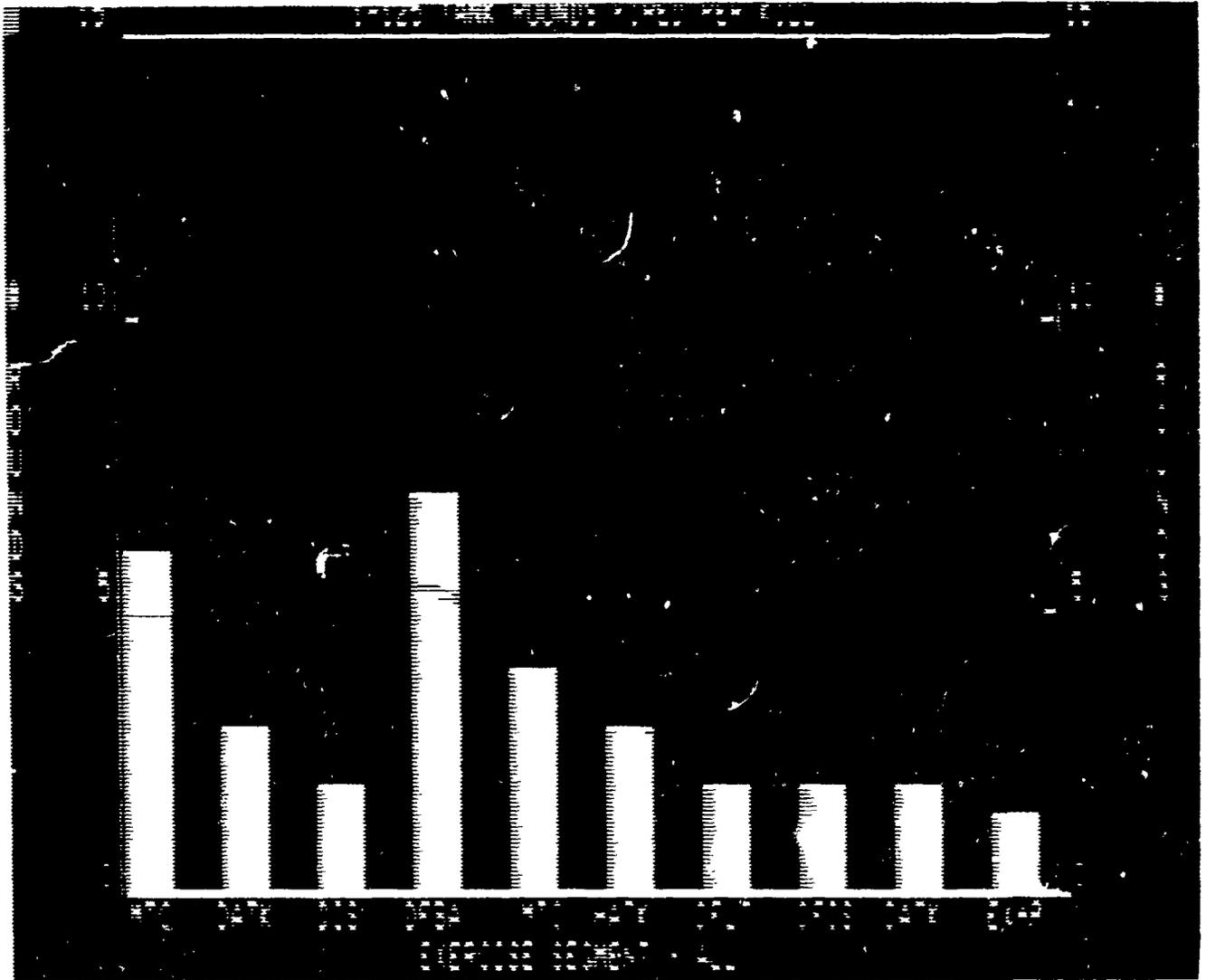


Figure 3-24

Rounds Fired Per Kill for Single Weapons Display

Table 3-57

Weapon Effectiveness Vs. Firing Rate by Weapon Type Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
Rounds per minute	
Percent of Hits/ Kills	$\frac{\text{Hits} + \text{Kills}}{\text{Rounds Fired}} \times 100$
<p>NOTE: The value of 1 in the abscissa includes all firing rates between 0 and 1.5. All other rates are rounded to the nearest integer.</p>	
DISPLAY CRITERIA	
Time	The graph contains all data for the current exercise segment up to the time of the display request, or for an operator-defined time interval.
Unit	The graph represents data for the entire battalion or for specific companies or platoons, based upon operator selection.
Weapon Type	The graph represents all data for a particular weapon type based upon operator selection.
DISPLAY TYPE	Graph

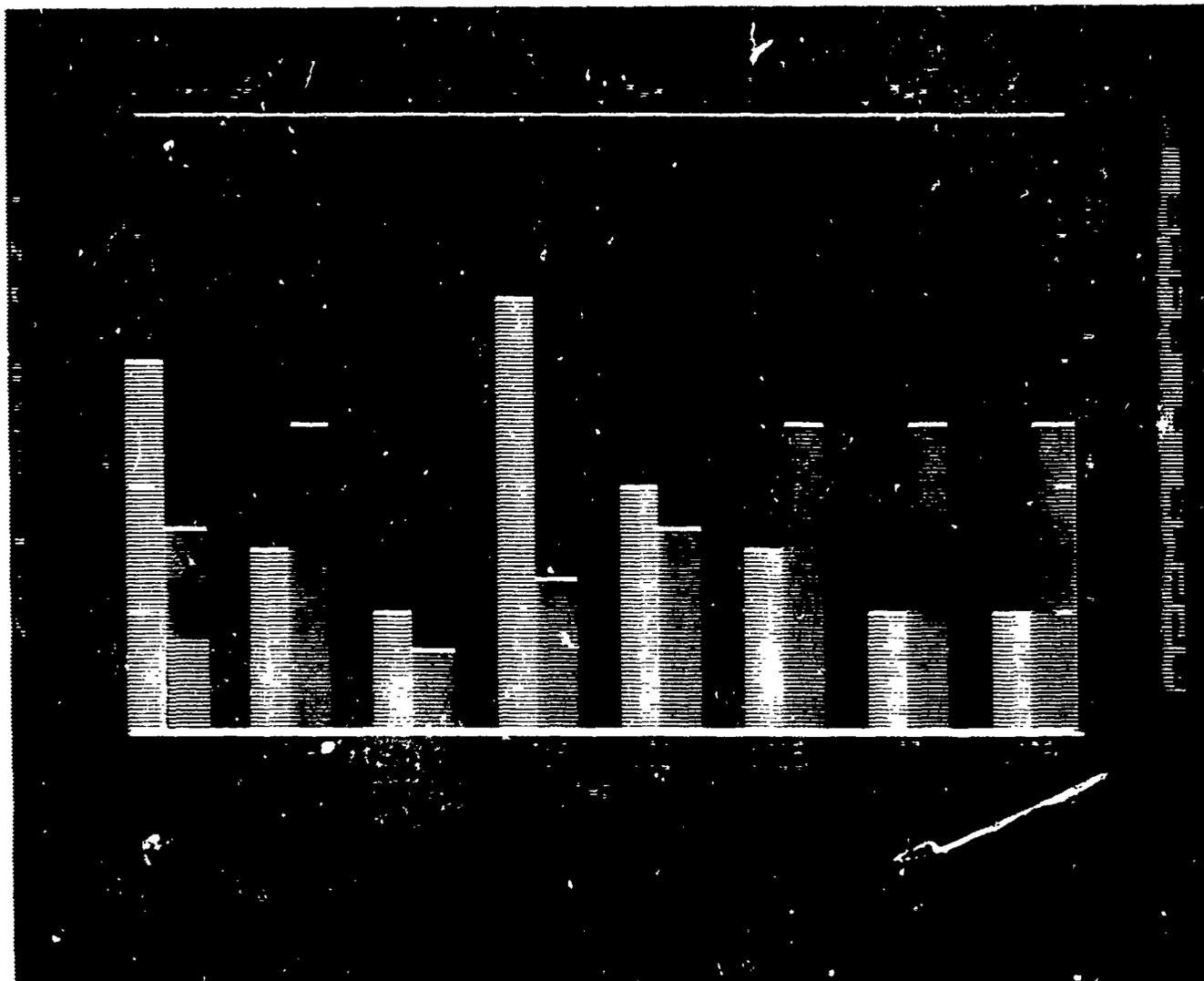


Figure 3-25

Weapon Effectiveness Vs. Firing Rate by Weapon Type Display

Table 3-58

Ammunition Resupply Summary by Ammunition Type Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
Number of rounds fired.	RDMS Reports
Number of rounds requisitioned.	Manually entered.
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data are provided.
Unit	The display includes all data for the battalion under training or an operator specified company-level unit.
Ammunition Type	The operator may select to display a single BLUEFOR ammunition type (i.e., MAIN GUN, TOW or DRAGON).
DISPLAY TYPE	Graph

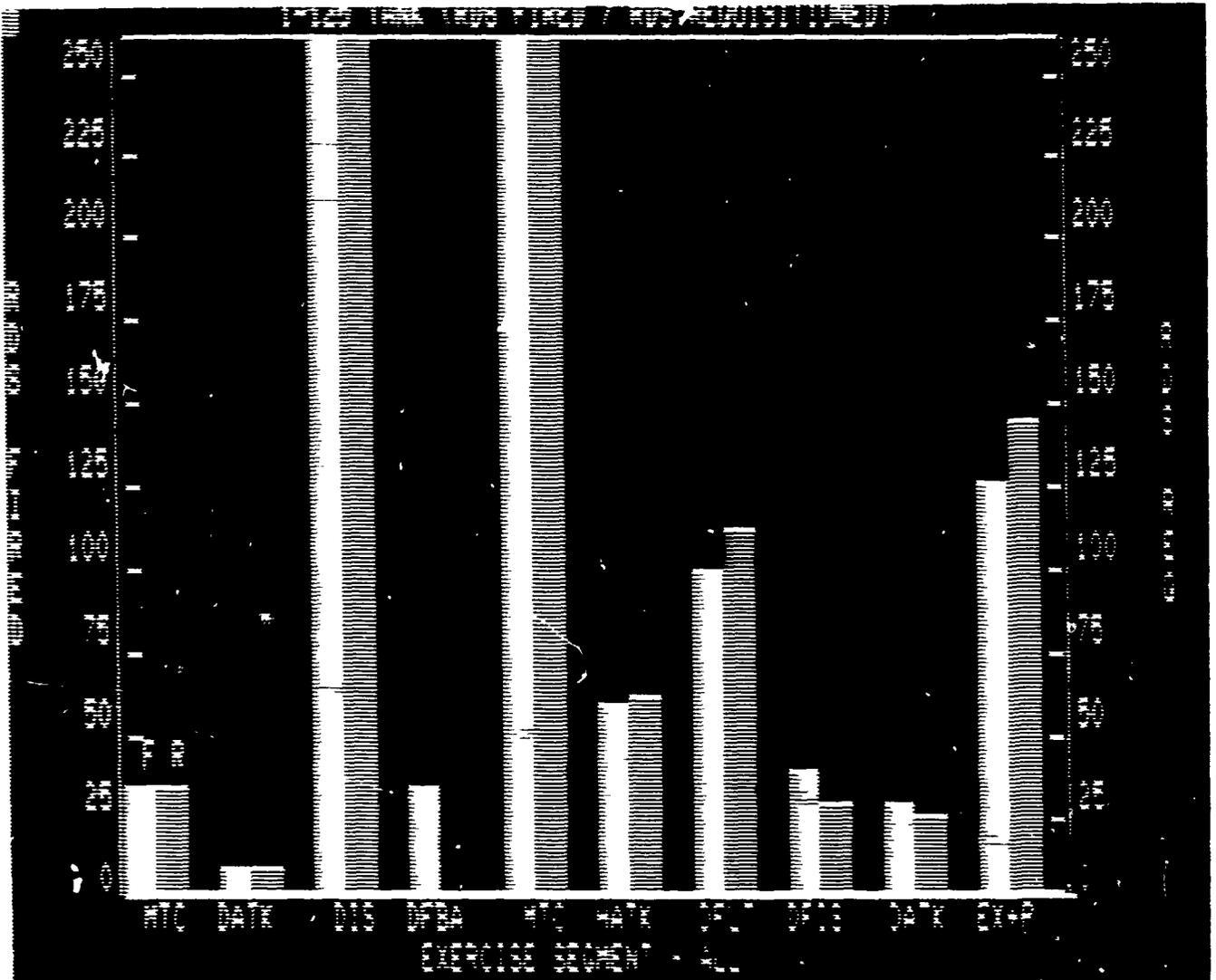


Figure 3-26

Ammunition Resupply Summary by Ammunition Type Display

Table 3-59

Ammunition Resupply Summary for All Ammunition Types Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
Number of rounds fired.	RDMS Reports
Number of rounds requisitioned.	Manually entered.
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types or a category of mission types (i.e., offensive or defensive operations) for which data are provided.
Unit	The display includes all data for the battalion under training or an operator specified company-level unit.
Ammunition Type	The operator may select to display a summary for all ammunition types.
DISPLAY TYPE	Graph

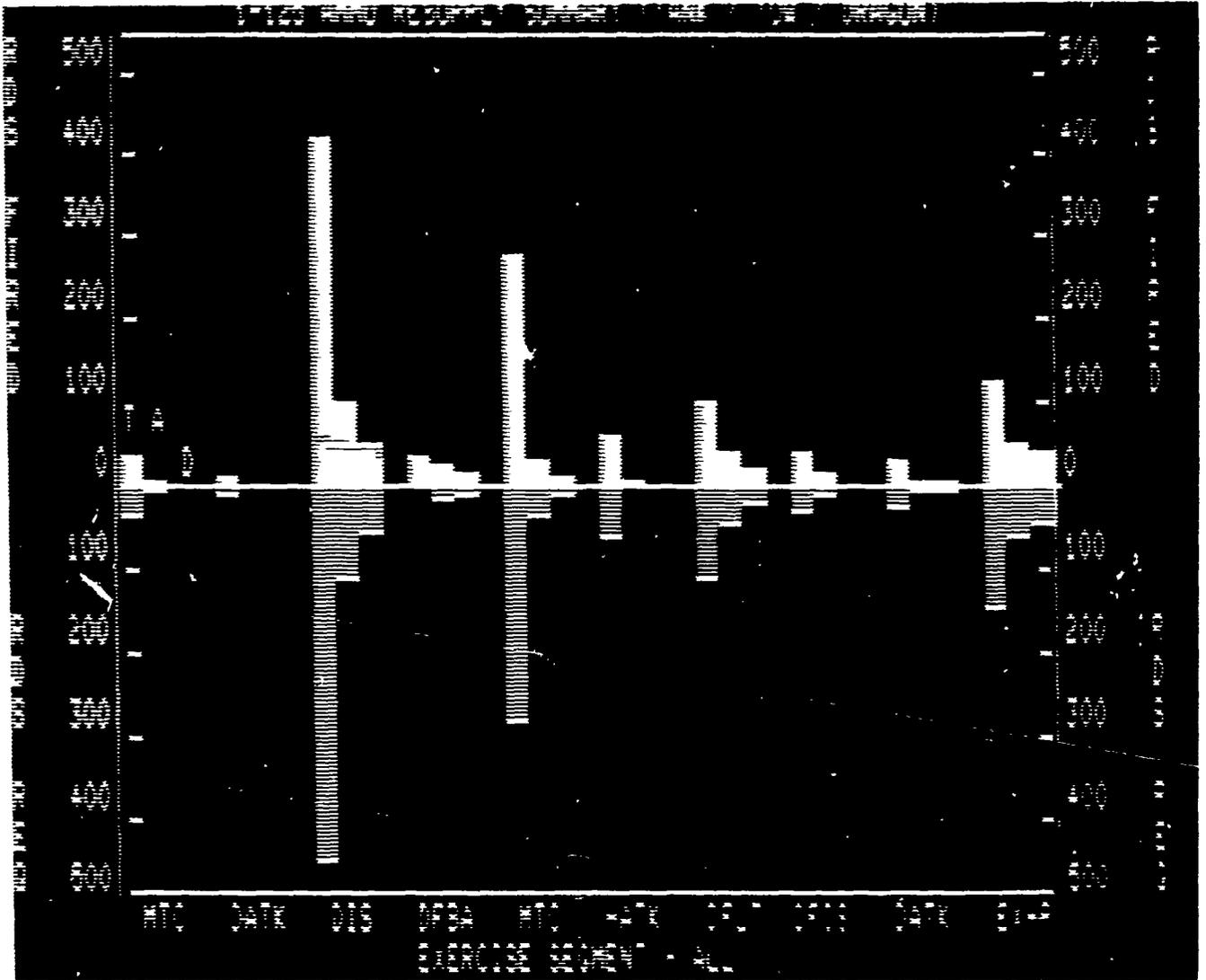


Figure 3-27

Ammunition Resupply Summary for All Ammunition Types Display

C. Communications Data

The RDMS transmits a COMMO keying event message each time an instrumented radio is keyed by its operator; separate keying messages are sent when the operator depresses and then releases the transmission key. After a key depression event is paired with a key release event, the transmission time associated with this event is computed.

The ensuing COMMO data is presented in the following formats.

- RADIO TRANSMISSION SUMMARY (Tables 3-60 and 3-61)
- RADIO TRANSMISSION ACTIVITY (Table 3-62 and Figure 3-28)
- LENGTH OF RADIO TRANSMISSIONS (Table 3-63 and Figure 3-29)

Table 3-60

Radio Transmission Summary Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
UNIT	Names of the units immediately subordinate to the unit of interest followed by the name of the unit of interest.
NUMBER OF TRANSMISSIONS	For each unit listed in the UNIT column, the count of recorded transmissions.
AVG LENGTH	For each unit, the computed average length of transmissions in seconds.
NUMBER OVER 25 SEC	For each unit, the count of transmissions over 25 seconds but less than 55 seconds in length.
NUMBER OVER 55 SEC	For each unit, the count of transmission over 55 seconds in length.
DISPLAY CRITERIA	
Time	The display contains all data for the current exercise segment up to the time of the display, or for an operator-defined time interval.
Unit	The requestor specifies a specific platoon, company/team, task force, BN asset, or DIV/BDE asset. Data are presented for the immediate subordinates of the named unit that posses instrumented radios. The data are summarized for the named unit and only transmission in excess of two seconds are considered.
DISPLAY TYPE	Tabular

Table 3-61

Radio Transmission Summary Display

1	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0	
TRANSMISSION SUMMARY					DD MMM YY HH:MM - DD MMM YY HH:MM				
UNIT	NUMBER OF TRANSMISSIONS		AVG LENGTH		NUMBER OVER 25 SEC		NUMBER OVER 55 SEC		
XXXXXXXXXX	NNNNN		NNN SEC		NNN		NNN		

Table 3-62

Radio Transmission Activity Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
For each 5-minute period:	
Number of instrumented radio transmissions	RDMS Reports
Average length of radio transmissions	RDMS Reports
DISPLAY CRITERIA	
Time	The graph contains data for the last 24 time-periods (two hours) from the time of the display request, or for an operator-defined time interval.
Unit	The graph represents data for any operator-selected BLUEFOR unit.
DISPLAY TYPE	Graph

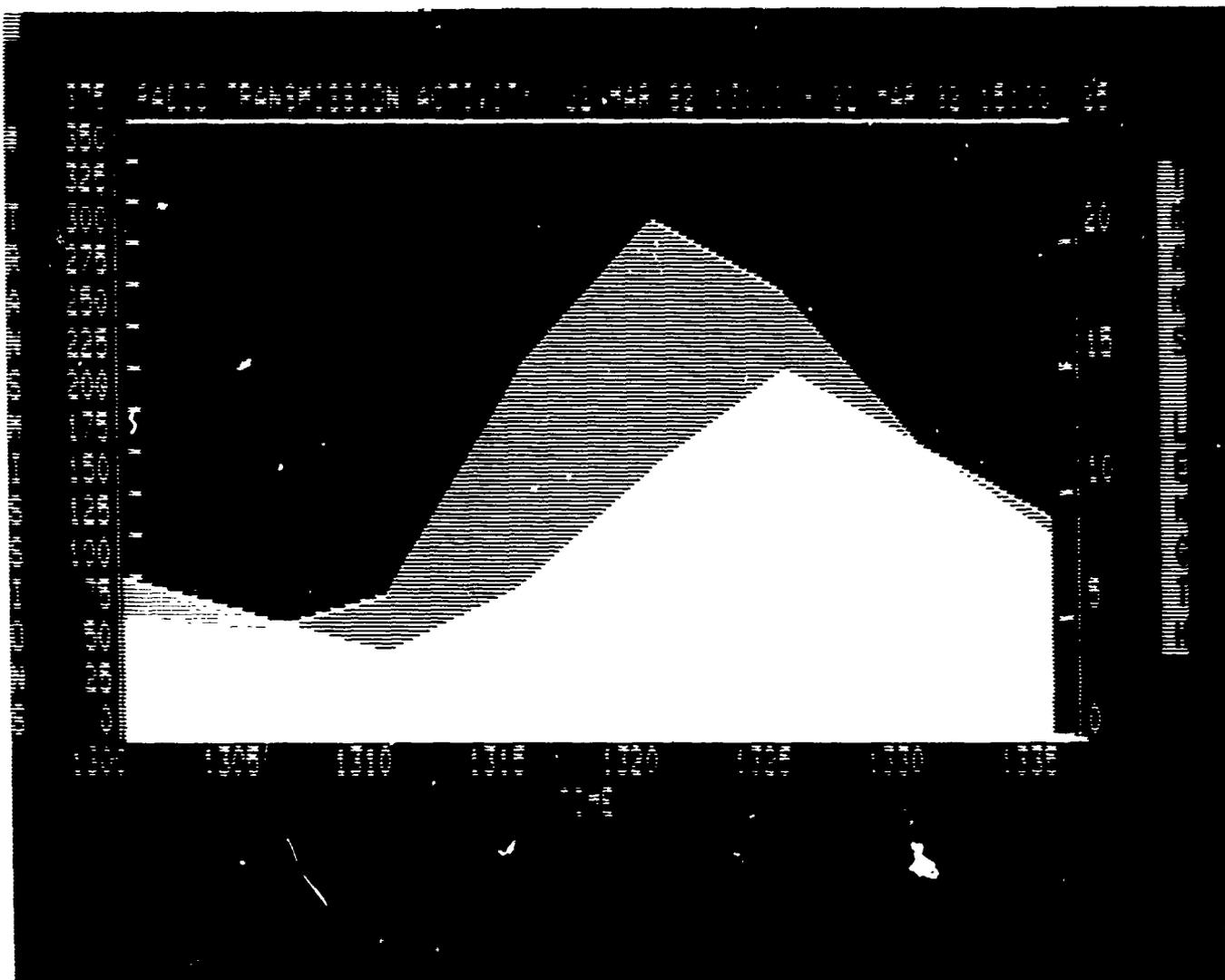


Figure 3-28

Radio Transmission Activity Display

Table 3-63

Length of Radio Transmissions Calculation

CONTENT	
<u>Data Description</u>	<u>Data Source</u>
For each Mission:	
Number of transmissions over 25 seconds and less than 55 seconds in duration.	RDMS Reports
Number of transmissions over 55 seconds in duration.	RDMS Reports
DISPLAY CRITERIA	
Type of Mission	The operator specifies individual segment(s), individual mission type(s), all mission types, or a category of mission types (i.e., offensive or defensive operations) for which data will be provided.
Unit	The display includes all data for the battalion under training or an operator-specified company-level unit.
DISPLAY TYPE	Graph

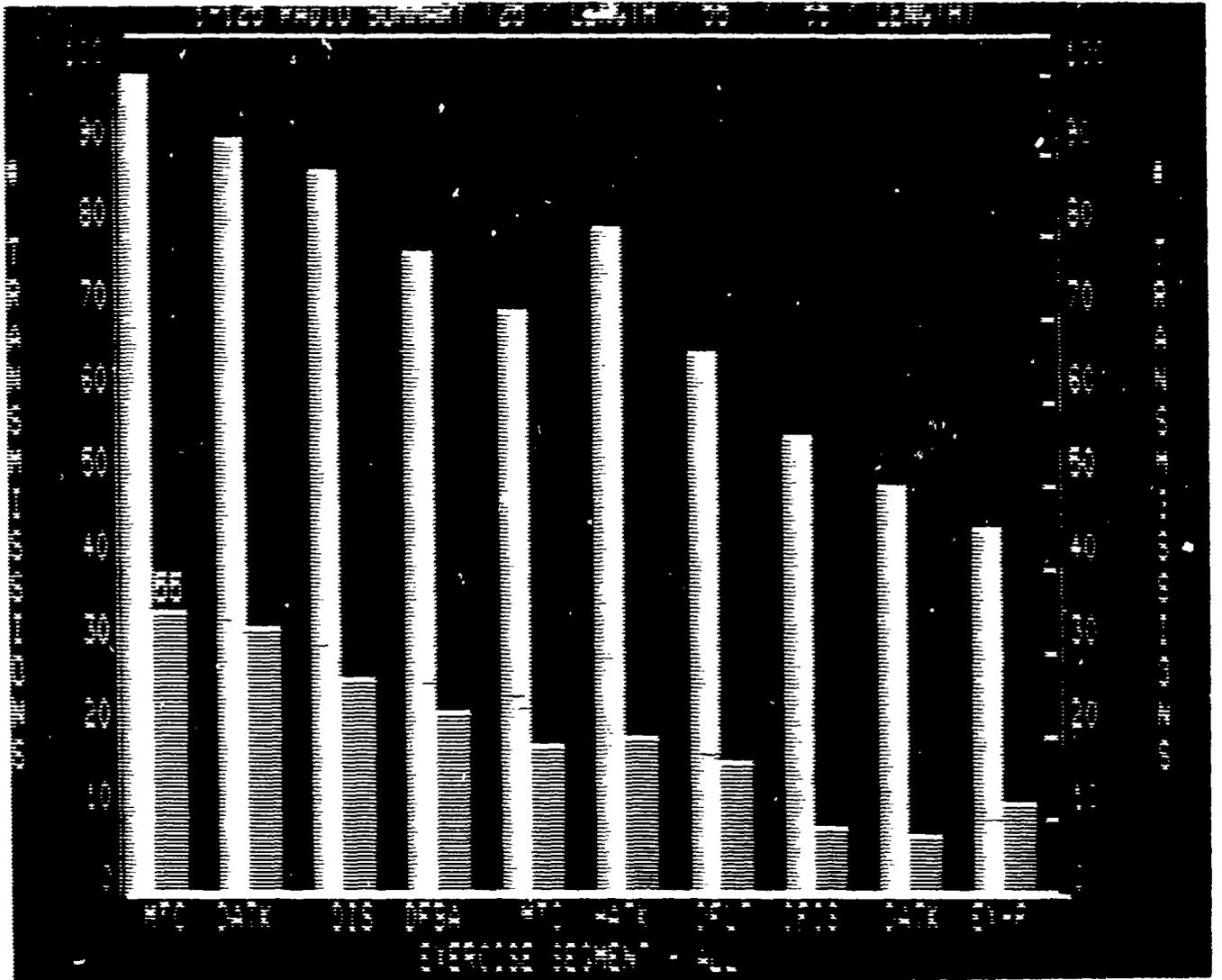


Figure 3-29

Length of Radio Transmissions Display

D. Elements of Information

Field controllers will provide periodic assessments of unit performance measured against a set of Elements of Information (EI) covering all aspects of combat operation (target acquisition, maneuver, fire, communication, command and control, logistics and administration). The specific set of EIs to be reported for each unit selected for assessment will be chosen at the beginning of an exercise segment to meet the training objectives specified for that segment, from the 300 available EIs. Once selected, the set of EIs will remain fixed during the exercise segment. Assessments will be provided in the form of ordinal values ranging from zero (0) to (9) as follows:

- 0 = no observation - data not included in sample
- 1 = very poor performance
- 2
- 3 = poor performance
- 4
- 5 = nominal expected performance proficiency
- 6
- 7 = good performance
- 8
- 9 = excellent performance

The particular tasks that have EI measures are currently under revision and composite EI data will be presented in the following formats:

- ELEMENTS OF INFORMATION BY ELEMENT (Tables 3-64 and 3-65)
- ELEMENTS OF INFORMATION BY UNIT (Tables 3-66 and 3-67)

Table 3-64

Elements of Information by Element Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
EI	Assigned three-digit number of the desired EI followed by the 40-character title of the EI.
UNIT	Name of the unit for which the EI data has been collected, or BLUEFOR to indicate OPFOR controller observations of BLUEFOR activities in general.
VALUE	A digit, 0 to 9, indicating the most recent evaluation of the EI for the unit.
TIME	The time of the most recent report of this EI for the unit.
OC	Three-digit identifier of the observer/controller who made the EI report.
DISPLAY CRITERIA	
EI	The requestor specifies the EI number for which data are desired and data will be presented for all units that have had data reported for the specific EI.
DISPLAY TYPE	Tabular

Table 3-65

Elements of Information by Element Display

1	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0
ELEMENTS OF INFORMATION							DD MMM YY HH:MM	
EI: NNN, Title of the EI - up to 40 characters								
	UNIT	VALUE	TIME	OC				
	XXXXXXXXXXXX	N	NNNNNN	NNN				

Table 3-66

Elements of Information by Unit Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
SELECTED EI	The text string associated with each of the EI included in the display.
UNIT	Name of the unit for which data is desired, or BLUEFOR to indicate OPFOR controller observations of BLUEFOR activities in general.
EI	Horizontal list of up to ten Elements of Information numbers to be reported on for this unit (or BLUEFOR units in general) for this exercise segment.
TIME	Time of report of the list of Elements of Information.
MEAN VALUE	The average OC value assigned for each EI category for the selected time period.
DISPLAY CRITERIA	
Time	The data are chronologically ordered for the current exercise segment up to the time of the display request, or for an operator-defined time interval.
Unit	The requestor specifies the unit for which EI data is desired, or BLUEFOR. Each line of data contains the time of an EI report followed by the values (0-9) reported for each EI number listed at the top of each column.
DISPLAY TYPE	Tabular

Table 3-67

Elements of Information by Unit Display

1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0
ELEMENTS OF INFORMATION				DD MMM YY HH:MM - DD MMM YY HH:MM			
UNIT: (UNIT NAME OR BLUEFOR)							
SELECTED EIs:							
NNN	ASSOCIATED	TEXT	STRING				
NNN	ASSOCIATED	TEXT	STRING				
NNN	ASSOCIATED	TEXT	STRING				
NNN	ASSOCIATED	TEXT	STRING				
NNN	ASSOCIATED	TEXT	STRING				
NNN	ASSOCIATED	TEXT	STRING				
NNN	ASSOCIATED	TEXT	STRING				
NNN	ASSOCIATED	TEXT	STRING				
NNN	ASSOCIATED	TEXT	STRING				
NNN	ASSOCIATED	TEXT	STRING				
EI	NNN	NNN	NNN	NNN	NNN	NNN	NNN
TIME							
NNNNNN	N	N	N	N	N	N	N
MEAN VALUE	N	N	N	N	N	N	N

CHAPTER 4

LIVE FIRE EXERCISES

- I. Live Fire Range Operations
- II. Direct Fire Weapon Event Data Processing
- III. Indirect Fire Casualty Assessment
- IV. Statistical Data Processing

I. LIVE FIRE RANGE OPERATIONS

The Live Fire Exercise Area simulates the movement of OPFOR troops by alternately raising and lowering up to 1,024 plywood targets that are silhouettes of weapons systems present in an OPFOR Motorized Rifle Regiment (MRR). Individual targets represent one or more weapons systems (e.g., BMP, BRDM, tank) although those targets representing more than one system represent weapons of the same type. Targets simulate OPFOR movement to attack by rising at a specified band, remaining up until the weapons systems represented by the targets would have covered the space between bands, and then lowering a few seconds before a related target in the next nearer band rises. The targets simulate OPFOR movement to retreat by reversing the above process.

Bands are swathes of targets scattered near a defined distance from the central BLUEFOR company position. For example, the distance of the further band (Sierra) is 9500 meters from the central company position, while that for the nearest band (Alpha) is 500 meters. Generally, from band to band, each target is related to one in another band.

The Live Fire Exercise Area is designed to represent the MRR elements of a Motorized Rifle Division (MRD) conducting a deliberate attack on a U. S. battalion-sized force. Standard OPFOR doctrine stipulates that an MRD, of the type simulated, attacks in two echelons with each echelon comprised of one MRR. The distance between the two MRRs of the MRD, the divisional interechelon distance, is usually between 15 and 30 kilometers. In turn, each MRR attacks in two echelons and its regimental echelons are generally spaced between 5 and 15 kilometers apart. The distance between these BNs, which comprise the regimental echelons, is referred to as the regimental interechelon distance.

These factors are taken into consideration in the design of the live fire scenario responded to by the battalion under training. Such scenarios are structured to meet the particular training requirements of the unit and include specification of the following factors.

- The number of OPFOR MRRs in the exercise (1-2)
- The number of OPFOR BNs to take part in the exercise (1-3 per MRR, for a total of 6 possible BNs)

- The number of OPFOR companies to take part in the exercise (1-4 per BN, for a total of 24 possible companies)
- Minimum divisional interechelon distance (MDID)
- Minimum regimental interechelon distance (MRID)
- Initial divisional interechelon distance (IDID)
- Initial regimental interechelon distance (IRID)
- Which targets to use and how many weapons systems each target represents
- PK tables (both mobility and catastrophic)
- Up to twenty preset delays including:
 - type of delay
 - location of delay
 - duration of delay
- Scheme of maneuver by company
- Rate of advance (1 to 40 KPH) by unit
- Rate of firing by weapon type by distance
- Starting target band
- Scheduling of BLUEFOR preplanned CAS which may result in catastrophic or mobility kills of OPFOR silhouette players
- Election of the Retreat Option

When a hit message is received from a target, the PK table is used to determine whether the hit was a catastrophic kill, a mobility kill, or a simple hit. If a catastrophic kill is determined for a silhouette player, black smoke is emitted by that target mechanism and it cannot fire for the (approximately) two minutes during which the smoke is visible. If the target is hit again during this two minute period--even if it represents more than one silhouette player--that hit is entered into the statistical category "hitting a catastrophically killed target" and the other weapons system(s) which the target represents shall not register a hit or kill. After the two minutes are up, if the target represents more than one weapons system, the target may continue transmitting fire messages and another weapons system can register a hit or kill.

If the hit is determined to be a mobility kill for a silhouette player, the target will remain up and continue firing. However, associated targets in following bands will not be raised. (If the target represents other

silhouette players who have not received kills, those active players shall continue to raise associated targets in following bands.) The next catastrophic kill which the target receives shall be assigned to the silhouette player who has previously received the mobility kill since this player has a much higher probability of receiving a catastrophic kill than does a mobile weapons system.

At any point during a live fire exercise, the rate of OPFOR movement by unit may be altered, casualty effects due to BLUEFOR decisions to use CAS may be entered, and the Retreat Option may be selected. It is also possible to alter the path of the individual OPFOR companies involved in the scenario. Thus, if the BLUEFOR does something which would change the battle decisions of OPFOR troops, the scenario can be modified to accurately reflect those changes.

During scenario execution, some predefined control is automatically exercised. For instance, if the Retreat option has not been selected by the time the first echelon of the first MRR has approached within 500 meters of the central BLUEFOR company defensive position, the OPFOR echelon is halted. The second echelon of the first MRR will continue to advance until it also arrives at a position 500 meters from the central company position plus the defined MRID. At this time, the Retreat Option is selected or an overrun of the central company position is simulated. If it is chosen to simulate an overrun, the targets which represent the first regimental echelon are lowered. The targets of the second regimental echelon then continue to advance until they reach the position which the first regimental echelon occupied before its associated targets were lowered. At this point, the choice of retreating or simulating an overrun is made again. If it is chosen to simulate an overrun for both echelons of the first MRR and there is no second MRR, the scenario is ended. If there is a second MRR, the same control options exist for its two echelons. All overrunning echelons are considered to have exited from the scenario and no statistical information on the overrunning units is kept. If the overrun option was selected and the decision later made to retreat, overrunning echelons shall not participate in the retreat.

II. DIRECT FIRE WEAPON EVENT DATA PROCESSING

Direct fire weapon events include: (1) firing events when weapons are fired and (2) weapon effects events when targets experience MILES-simulated near misses, hits or kills as well as ballistic hits or kills. These various types of direct fire weapon events are then processed and some weapon firing events are "paired" with weapon effects events, received from the physical target mechanisms, to assign a target to a weapon for computing ground player performance statistics. In accordance with the limited weapon effects event data currently available from the physical target mechanisms, weapon-target pairings may be calculated only from events involving BLUEFOR TOW, DRAGON, or VIPER. For all other firing events (i.e., OPFOR weapons systems or BLUEFOR weapons systems other than the TOW, DRAGON or VIPER), a direct firing message is generated and appropriate firing statistics are updated. However, pairings are not made between non-MILES firing events and targets.

III. INDIRECT FIRE CASUALTY ASSESSMENT

OPFOR doctrine stipulates usage of indirect fire before an attack and BLUEFOR doctrine includes using indirect fire in the defensive posture to button-up OPFOR weapons systems. The capability of scheduling and attributing casualties to indirect fire missions is currently provided during live fire segments. However, due to the special circumstances of the Live Fire Exercise Area, some modifications were made to indirect fire processing.

OPFOR indirect fire missions are similar to those in ES segments but differ in that they are planned by a Live Fire Exercise Area Operator rather than by the OPFOR commander in the field. The operator enters the desired indirect fire mission(s) and, from that point on, indirect fire processing is as currently provided in ES segments. A file is maintained consisting of active fire mission items and each of these is uniquely identified by force, target, firing unit, weapon, shell, fuse, number of rounds, charge (when applicable), and mission execution time. If the firing unit is out of range 60 seconds before the scheduled mission time, neither casualty assessment nor a firing vector display is provided for the mission. For each mission found to be within range at least 60 seconds before the scheduled mission time (unless using shell types HC, ILLUM, FASCAM or CLGP), casualty assessment is performed.

BLUEFOR LF indirect fire processing is somewhat different from indirect fire processing in ES segments. All of the above capabilities are maintained except that no OPFOR casualties shall be attributed to indirect fire missions unless a target mechanism registers a ballistic hit (which shall be processed as any target ballistic hit and shall not be attributed to the indirect fire mission).

OPFOR casualties due to BLUEFOR use of CAS, FASCAM, and Attack Helicopters are assigned to silhouette players based upon the location and time of the attack.

IV. STATISTICAL DATA PROCESSING

As in ES segments, the LF enhancement processes player position, weapon events, COMMO keying events, and OC observations during the LF segment in order to generate summary statistics. With the exception of those statistics related to weapon events, statistics generated during LF segments include all those maintained during ES segments. However, for LF data, statistics are maintained on a player level and may also be aggregated to higher levels in accordance with operator-defined task organization.

Target status data are processed in real time during the LF segment to generate statistics specific to the requirements of a LF exercise. These unique LF data are presented in the following formats:

- LIVE FIRING ACTIVITY BY PLAYER(S)/UNIT (Tables 4-1 and 4-2)
- LIVE FIRE TARGET ENGAGEMENTS BY TARGET(S)/BAND (Tables 4-3 and 4-4)
- LIVE FIRE TARGET HOLE STATUS BY TARGET(S)/BAND (Tables 4-5 and 4-6)

Table 4-1

Live Firing Activity by Player(s)/Unit - Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
PLAYER ID	List of individual BLUEFOR players for which information is to be displayed.
WEAPON TYPE	The weapon(s) assigned to the player(s) for which information has been requested. Some players may have two weapon types.
TOTAL RDS FIRED	The count of total rounds fired, both ballistic and MILES, for each player. For players with two weapon types, the count will be broken down by weapon type.
DISPLAY CRITERIA	
Time	The display shall include cumulative target engagement information for an operator-specified time or, as a default, for the exercise time as displayed on the tactical display at the time of the display request.
Player(s)/Unit	The requestor specifies a single player, all players, or a player unit.
DISPLAY TYPE	Tabular

Table 4-2

Live Firing Activity by Player(s)/Unit - Display

1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0
LIVE FIRE:BLUEFOR FIRING ACTIVITY						DD MMM YY HH:MM	
PLAYER ID	WEAPON TYPE		TOTAL RDS FIRED				
ANN	AAAA		NNN				
	AAAA		NNN				
ANN	AAAA		NNN				
ANN	AAAA		NNN				
ANN	AAAA		NNN				
	AAAA		NNN				

Table 4-3

Live Fire Target Engagements by Target(s)/Band - Calculation

CONTENT	
<u>Column Heading</u>	<u>Description</u>
HOLE ID	List of targets, by hole identification number, for which information is to be displayed.
RDS FIRED	The count of rounds of Smokey Sams and Hoffman devices fired by each target.
HITS	The number of ballistic, TOW, DRAGON and VIPER hits received by each target.
KILLS	The number of ballistic, TOW, DRAGON and ? kills received by each target.
DISPLAY CRITERIA	
Time	The target shall include cumulative target engagement information for an operator-specified time or, as a default, for the exercise time as displayed on the tactical display at the time of the display request.
Target(s)/Band	The requestor specifies a single target, a band of targets, or all targets. This display shall only include occupied target holes.
DISPLAY TYPE	Tabular

Table 4-4

Live Fire Target Engagements by Target(s)/Band - Display

1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	0		
LIVE FIRE:TARGET ENGAGEMENTS -									
							DD MM YY HH:MM		
HOLE ID	RDS FIRED	HITS RECEIVED				KILLS RECEIVED			
		BALLISTIC	TOW	DRAGON	VIPER	BALLISTIC	TOW	DRAGON	VIPER
AANN	NNN	NNN	NN	NN	NN	NNN	NN	NN	NN
AANN									
AANN									
AANN									
AANN									
AANN									

Table 4-5

Live Fire Target Hole Status by Target(s)/Band - Calculation

<u>Column Heading</u>	<u>CONTENT</u> <u>Description</u>
HOLE ID	List of target holes for which information is to be displayed.
LOCATION (UTM)	The location of each target hole provided in Universal Transverse Mercator coordinates.
HOLE STATUS	Specifies whether or not the target hole is occupied by a target mechanism. Possible values are OCCUPIED and NOT OCCUPIED.
TARGET TYPE	Specifies the target type (if any). Values may be BMP, TNK (tank), BRDM, MAN (manpack), 122 (122MM SP Howitzer), ZSU (ZSU23-4), or SA9.
AZIMUTH	Specifies the azimuth (horizontal) of the target from a line perpendicular to the central company position, in degrees.
TARGET STATUS	Specifies whether or not the target mechanism (if any) is operational. Possible values are OPERNL (operational) NON-OP (non-operational), and RUNWAY (runaway). If a target is runaway, both RUNWAY and NON-OP shall be displayed.
TARGET POS	Specifies the position of the target mechanism. Possible values are UP and DOWN.
PYROTECHNIC LOAD	The number of Gunfire Simulation (GFIRE), Steel on Steel (STEEL) and Black Smoke (BLK) pyrotechnics which were loaded into the target mechanism at the beginning of the current exercise.
DISPLAY CRITFRIA	
Time	The display shall include target status information for an operator-specified time or, as a default, for the exercise time as displayed on the tactical display at the time of the display request.
Target(s)/Band	The requestor specifies a single target hole, a band of target holes, or all target holes.
DISPLAY TYPE	Tabular

Table 4-6

Live Fire Target Hole Status by Target(s)/Band - Display

1	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0
---	--------	--------	--------	--------	--------	--------	--------	--------

LIVE FIRE:TARGET HOLE STATUS -							DD MMM YY HH:MM		
HOLE ID	LOCATION (UIM)	HOLE STATUS	TARGET TYPE	AZIMUTH	TARGET STATUS	TARGET POS	PYROTECHNIC GFIRE	LOAD STEEL	BLK
AANN	AANNNNNNNN		AAAAA	NNN			NN	NN	NN
AANN									
AANN									
AANN									

CHAPTER 5

AUDIO AND VIDEO TAPE HISTORY

I. Audio Recordings of Commo

II. Video Recordings

I. AUDIO RECORDINGS OF COMMO

The BLUEFOR tactical radio nets monitored are listed in Table 5-1 and up to 40 nets may be recorded.

Table 5-1

BLUEFOR Tactical Radio Nets Monitored

Bde	Army Hel/AC
Bde TACP	AVN CO CTRL
Bn TOC	CASAC
Bn TACP	CBT TRN
Co CDR	CSC
Co TRN	FA FDC
Plt	FIST
Plt AT	FLD TRN
Plt Engr	4.2 FDC
Plt SCT	FSO TOC
Plt VUL	GSR
Plt WPM	MAN-PAD
	TACC

II. VIDEO RECORDINGS

Both fixed and variable position video cameras record selected battlefield events under the control of exercise directors.

REFERENCES

- Science Applications Inc., Requirements Design Specification for the NTC Core Instrumentation Subsystem Software (500 Player System). Volume I, NTC-1221-18 (24 May 1982).
- Science Applications Inc., EMC/TAF Operating Manual for the NTC Core Instrumentation Subsystem (CIS) (500 Player System), NTC-1262-19 (15 September 1982).
- Science Applications Inc., Requirements Design Specification for the NTC Core Instrumentation Subsystem Software (500 Player System). Supplement. Integration of the Live Fire Exercise Area, NTC-1221-29 (1 December 1982).