

MTWS

Volume I: Introduction to the MTWS System

*THE MTWS Documentation
Suite*

TABLE OF CONTENTS

Introduction.....	1
General Overview	2
Mission.....	2
Simulation System	3
Interfaces	3
Developmental Background	4
System Capabilities.....	5
System Components.....	6
Exercise Preparation Utilities.....	6
Model Application Network (MAN)	7
Model System Control (MSC)	8
Model Display Station (MDS)	9
Model ALSP Translator (MAT)	10
Combat Analysis and Review Toolkit (CART)	10
JQUAD.....	10
System Architecture	10
Concept of Operations	11
Organization.....	12
Exercise Planning.....	144
Exercise Execution.....	144
Exercise Control.....	155
Exercise Termination.....	155
Figure 1 – MTWS Components.....	7
Figure 2 – MTWS Architecture.....	11
Figure 3 – Exercise Control Group.....	12
Figure 4 – Exercise Control Group with Response Cells.....	14

Volume I

Introduction to the MTWS System

Introduction

Commencing with Marine Air-Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) version 2.2, supporting documentation will be released in a suite of 6 documents intended to support the individual functional roles of the users of the system. Each document can be used independently of the others and serves to provide assistance to the different types of personnel that are associated with the system. When completed, the suite will consist of 6 sections:

- ?? Volume I – Introduction to the MTWS System (this document)
- ?? Volume II – Terminal Display Operating Procedures
- ?? Volume III – MTWS Exercise Preparation and Control
- ?? Volume IV – MTWS System Administration
- ?? Volume V – MTWS Exercise Analysis
- ?? Volume VI – MTWS Tactics, Techniques, and Procedures (TTP)

Volume I provides a general introduction to the system, a description of its components, its architecture, typical configurations, and potential uses. It is intended to broadly describe the nature of the system for those considering the use of MTWS or for familiarization with the program in general.

Volume II provides the MTWS terminal operator with sufficient information to be able to execute all necessary functions to control MTWS entities during an exercise. It explains the use of the MTWS display station, including descriptions of each of the display options and commands and use of the C4I interface.

Volume III provides instructions to the Control Staff of the MTWS system regarding how to create exercises, create and modify terrain, maintain parametric data, and prepare map files for the display system. This Section also describes the procedures for controlling the progress of an exercise (clock start, stop, rate, modes, etc).

Volume IV covers material pertinent to MTWS system administrators. This section contains hardware configuration and software installation instructions as well as instructions for use of the exercise monitoring tools and troubleshooting suggestions. Instructions for establishing Aggregate Level Simulation Protocol (ALSP) links and system administration procedures for the CART system are also contained in this section.

Volume V provides operational instruction for the users of the system's analysis and review system, Combat Analysis and Review Toolkit (CART).

Volume VI is a compendium of tips, hints, and work-arounds that have been collected from each of the MTWS user sites. In this section, instructions are provided for doing some of the more complex operations that MTWS performs (such as amphibious operations and air launched cruise missiles).

General Overview

Mission

The primary mission of the MTWS system is twofold: to provide a realistic simulated combat environment for commanders and their staffs to refine their decision-making skills and to assist in the Command and Control (C2) aspects of tactical field exercises. The use of MTWS provides military personnel with the opportunity to experience and acquire skill in combat operations without the expense and risk of taking real troops to the field. Specifically, the MTWS system provides the capability to process simulated and real units at the same time. Hence, the MTWS system supports integrated command post exercises (CPX) involving simulated units and field exercises (FEX) involving real units. The MTWS system supports the definition of real and simulated units, weapons, equipment, and combat-related events in its simulation. The system operates in both field and classroom environments.

The contemporary threat situations can range from low intensity conflict to full multi-theater level confrontation. To provide staff training for this range of threats, MTWS has been designed to accommodate existing and future weapons systems and tactics as well as representation of those systems and tactics in a wide variety of circumstances. MTWS provides:

- ?? Multi-sided support for combined land, sea, air and amphibious operations.
- ?? Model support for aggregate units from team to corps echelon levels.
- ?? Support for 100+ simultaneous user workstations.
- ?? Play that is affected by weather, fatigue, time-of-day and weapon characteristics.
- ?? Mapping, terrain features and elevation defined by real-world National Imagery and Mapping Agency (NIMA) data.
- ?? Support for after-action analysis and review.
- ?? A user-definable database of equipment and unit organizations.
- ?? An enhanced interface to deployed tactical Command, Control, Communications, Computer and Intelligence (C4I) systems.
- ?? Support for exercises at multiple remote sites.
- ?? A standardized interface to other military simulation systems.

Simulation System

MTWS is an aggregate level simulation system providing state-of-the-art tactical command staff training. Its modeling breadth and flexibility enables users to represent and exercise a wide variety of combat scenarios to prepare leaders to face the military challenges of today's world.

MTWS is designed to support the training of commanders and their staffs in exercises involving live and simulated land, air and maritime forces at all operational command levels. The system supports all levels of command through Marine Expeditionary Force (MEF) and Joint Task Force (JTF).

MTWS can be used as a multi-sided war game, including red, blue, civilian, and non-aligned sides. With increased fidelity, the system can also be used to validate specific operational plans against a variety of enemy and environmental situations. Thus, command personnel may examine alternative tactical solutions (Courses of Action) on a “what if” basis. Detailed analysis of data and events relevant to each Course of Action can be performed using the analysis and review capabilities of CART.

MTWS incorporates a full spectrum of combat models including: Ground Combat, Air Operations, Fire Support, Maritime Operations, Combat Engineering, Intelligence and Logistics. Because the system is designed to provide realistic representation of forces from any military organization, a method for defining any existing or new weapons systems is provided. As a result, users of MTWS are not constrained by the limitations of predefined weapons or tactics.

Digital terrain data is used to provide modeling of trafficability, vegetation cover and elevation. Environmental conditions such as weather are also modeled, with resultant effects on ground and sea movement, air operations, and detections.

Interfaces

MTWS is Aggregate Level Simulation Protocol (ALSP) compliant, thereby providing an interface to the Joint Training Confederation (JTC). The interface to the JTC provides for message handling and translation between MTWS and other JTC participants when MTWS is engaged in joint exercises. This enables Joint and Combined exercises to be conducted with other service models as well as distant allied forces and disparate simulation systems.

MTWS has been designed to exchange data with operational systems, such as the Global Command and Control System (GCCS), using the standard tactical message formats of Over-the-Horizon-Targeting Gold (OTH Gold), and U.S. Message Text Format (USMTF). By extension, MTWS can be used to communicate with any C4I system that can accept similar message formats. The interface to C4I provides message management as well as translation services between MTWS and the C4I system.

The MTWS Documentation Suite – Volume 1
Introduction to the MTWS System

MTWS includes an analysis and review capability, providing a continuous historical and real-time visual interface to exercise data that allows analysts and observers to examine game events during and after exercise conduct. The Combat Analysis and Review Toolkit (CART) stores a concise time-based view of exercise activity in real-time, and makes the data available for review immediately or historically. It can also be used off-line; previously stored exercise data can be recalled and reviewed at a later date, at another facility, to further analyze exercise events or to train other analysts and observers.

Developmental Background

MTWS development began in July 1989 with initiation of system requirements analysis and system design activities in accordance with Department of Defense Standard (DOD-STD-2167A) guidelines. During software requirements analysis efforts, the Marine Corps revised the development approach to include full reengineering of the user interface. This resulted in significant revision to the Development Plan in May 1990. System Requirements Review and System Design Review were conducted in December 1990, followed by Software Specification Review in February 1991. The Preliminary Design Review was conducted in May 1991, followed by a Critical Design Review (CDR) in June 1992.

In October 1993, the Marine Corps identified a subset of software requirements that was considered essential to effective application of the MTWS system to meet training objectives. “Non-essential” software requirements (referred to as “deferred” requirements) were postponed for completion following initial fielding of the system. This led to identification of three developmental phases in a Revised Required Operational Capabilities (ROC) document from the Marine Corps Combat Development Command (MCCDC), drafted in June 1994 and formally approved in June 1995. Phase I Developmental Test was performed in October 1994, followed by Formal Qualification Test in February and March 1995. Acceptance Test was performed by the Marine Corps in April 1995 and the Phase I system (version 1.0) was accepted for field use in June 1995. Since the acceptance of MTWS version 1.0, development has been directed by the Configuration Control Board, prioritizing work on the system toward fulfillment of the highest priority functional needs. While this development did not necessarily follow the Phases as identified in the Revised ROC, many Phase II and Phase III requirements have been achieved (albeit not in the same manner as described in the Revised ROC).

MTWS versions have been released since June 1995 on a regular basis, providing additional capabilities and fixes to problems reported by MTWS users.

?? MTWS version 1.0	June 1995
?? MTWS version 1.1	August 1995
?? MTWS version 1.2	January 1996

The MTWS Documentation Suite – Volume 1
Introduction to the MTWS System

?? MTWS version 1.3	April 1996
?? MTWS version 1.4	November 1996
?? MTWS version 1.5	October 1997
?? MTWS version 1.7	October 1998
?? MTWS version 2.0	March 1999
?? MTWS version 2.1	December 1999
?? MTWS version 2.2	February 2001
?? MTWS version 2.3	January 2002
?? MTWS version 2.3.1	May 2002
?? MTWS version 3.0	February 2003

Since September 1998, emphasis has been focused on maintenance of delivered software through correction of System Change Requests (SCRs). Some new capabilities and upgrades have been added to MTWS since 1998, primarily through the reuse of prototyping efforts conducted by the Marine Corps and the maritime enhancement program sponsored by the United Kingdom (UK) Permanent Joint Headquarters (PJHQ).

Recent developments for MTWS include:

- (1) PC based workstation using the Windows NT or 2000 Operating System (O/S)
- (2) Porting the MTWS software to the Gnat compiler, Linux O/S, and PC platforms
- (3) Integration of the CART system with the MTWS software
- (4) Maritime enhancements to include submarine operations, anti-submarine operations, and maritime minefield operations

System Capabilities

MTWS supports the mission of combat simulation and training exercise control. It simulates combat command and control systems to produce, among trainees, the perception and experience of a dynamically changing combat environment. It provides a training setting which enables tactical decision-making, simulates the initiation of actions necessary to fully utilize and exploit all available combat, combat support, and combat service support capabilities. The training setting forces staffs to respond to the decisions and actions of an opposing force (OPFOR) whose combat capabilities are simulated at a corresponding level.

Depending upon exercise design, MTWS supports a variable number of controllers who, manning controller terminals in the Tactical Exercise Control Center, obtain data from MTWS for interactions with field umpires and/or simulated player units. MTWS provides simulation and control services for command post and/or field exercises, either independently or in conjunction with each other. MTWS supports exercises in which forces on any side may be composed of both real and simulated units

System Components

The MTWS system consists of a variety of components that provide a complete and integrated modeling and simulation system (see Figure 1). These components are used individually or in concert to create, control, operate, and evaluate an exercise.

Exercise Preparation Utilities

There are five utilities provided with the MTWS system that assist the exercise coordinator with the preparation of data and display files for an exercise.

- ?? **TerrGen.** TerrGen uses elevation and features files produced by the National Imagery and Mapping Agency (NIMA) and produces terrain files that can be used by MTWS to resolve trafficability and line-of-site calculations in the simulation. TerrGen also allows limited manipulation of terrain to suit the needs of the exercise participants.
- ?? **Elevator.** Using the MTWS terrain files produced by TerrGen, Elevator produces image files in TIFF format that are suitable for display on the Model Display Station (MDS). The display of the elevation data provides the MTWS operator with an appreciation of the terrain that the maneuvering units will have to negotiate.
- ?? **MapGen.** MapGen can convert CDRG files to GeoTIFF format. It also provides a utility to place registration coordinates at the four corners of any TIFF formatted NIMA image so that it will be displayed in the desired location. This utility provides the opportunity to “relocate” a map from its original location and place it in a new location for exercise purposes. It also allows a locally produced map or image (road map, city map, aerial imagery) to be scanned and registered to its appropriate location for display on the MDS.
- ?? **MapGenPlus.** MapGenPlus provides a utility to convert ADRG formatted NIMA images to GeoTIFF format. Both the MapGen and MapGenPlus applications are included with the MDS software.
- ?? **Apex.** Apex is a PC based editor for the MTWS parametric data. It provides the means to manipulate the underlying definitions of unit organizations, weapons and vehicle characteristics, and environmental factors which influence the outcomes of the simulation. Apex has a very robust report generation technique. Different parametric data can be defined for each individual exercise; so one exercise could be used to recreate the Desert Storm operation of 1990 while another creates an imaginary scenario occurring in 2020. The MTWS exercise generator (part of the Model System Control (MSC) and Model Application

The MTWS Documentation Suite – Volume 1
Introduction to the MTWS System

Network (MAN)) uses data files produced by Apex and terrain files produced by TerrGen to produce the exercise file.

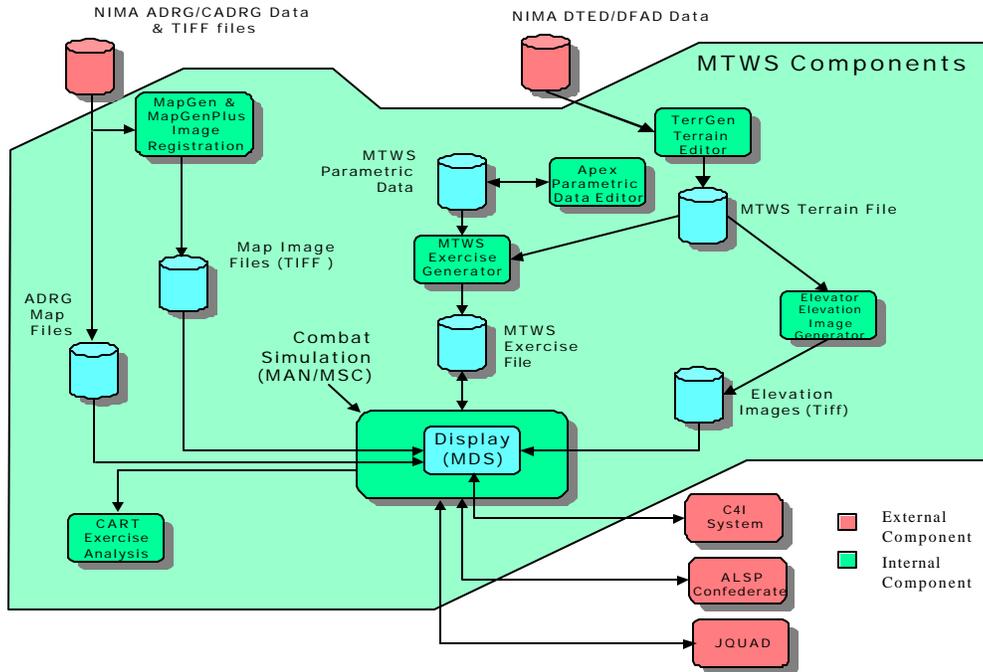


Figure 1 - MTWS Components

Model Application Network (MAN)

The MAN component of MTWS performs simulation processing to model all relevant aspects of tactical combat operations. The MAN performs simulation processing necessary to satisfy system requirements relating to military operations of units.

- ?? **Process Input Commands.** Commands for controlling activities of simulated exercise units are received and acted upon.
- ?? **Generate Unsolicited (Spot) Reports.** Information describing combat, combat support, and combat service support activities are formatted and addressed to the appropriate controllers. These reports keep the controllers apprised of the current situation. These reports are generally referred to as 'spot reports'.
- ?? **ALSP Interface.** MAN performs interface functions associated with ALSP, including confederation messages, the relay of information concerning ALSP-owned objects to MTWS, and of information concerning MTWS-owned objects to ALSP.

- ?? **Generate USMTF Message Bodies.** The USMTF message bodies generated by the MAN are sent to the display terminal where they are given message headers and routed to the appropriate recipients.
- ?? **Maintain Exercise Database.** An exercise database is maintained with current information pertaining to objects within the exercise. Operations that are performed on this database include initialization, re-initialization and modification both by command and by interactions within the simulation.
- ?? **Maintain Terrain Database.** A terrain database is constructed and maintained to allow the MAN CSCI to make use of terrain elevations and trafficability within the simulation.

Model System Control (MSC)

The MSC provides overall control of system execution and administration. The MSC provides orderly execution of each of the MTWS constituent parts on the distributed network of application workstations in order for the integrity of the exercise database to be maintained. This includes exercise time synchronization, as well as controlling the exercise states and modes. MSC routes input commands to the appropriate MAN or MSC application for processing and causes all valid input commands and unsolicited report requests to be stored for later recall. MSC provides data base storage and retrieval functions necessary to support system restart.

Following is a brief description of the processing responsibilities of MSC:

- ?? **Message Routing.** MSC is considered the MTWS hub. It provides a gateway to MAN, MDS, and Maui. MSC accepts information from MAN, MDS, and C4I systems and routes all information to the proper MSC application, MAN application, or display terminal/controller.
- ?? **Exercise Control.** On the user interface at the MSC, control functions are made available to start, stop, and regulate the speed of the game clock. In addition, exercise configuration, assignment of database functions (at exercise initiation), and other exercise control functions are made available.
- ?? **Input Commands.** MSC ensures that all directives and commands are valid in the current state and mode before forwarding them to the appropriate MAN or MSC application for processing. MSC processes those commands that control the system or the exercise state and mode as well as solicited report requests.
- ?? **Generate Solicited Reports.** Information describing the system, combat, combat support, and combat service support activities is formatted and addressed to the requesting workstation. The on-demand reports at the MSC consist of System Control, Exercise Control, and Simulation information.
- ?? **Exercise Database.** An exercise database is maintained with current information pertaining to objects within the exercise. Operations performed on this database include initialization and modification, both by command and by interactions within the simulation. MSC periodically sends tactical database updates to all display terminals. Dynamic updates are archived for restart capabilities.

- ?? **Historical Database.** Historical data on the results of fire missions and air missions is maintained by MSC for reporting and restart purposes.

Model Display Station (MDS)

The display station component of MTWS provides the user interface to the system, including command entry, report request, solicited and unsolicited (spot) report outputs, and graphical display of maps and exercise objects. Also referred to by its development name, Maui, the display station also provides the interface to C4I systems. Originally the MDS was implemented on a Unix workstation. In 2001 the MTWS software was released with a PC version of the MDS that had been ported to an Intel[®] based platform running under Windows NT[®] or Windows 2000[®] .

In MTWS version 2.2, the Unix based MDS and the Windows based MDS coexisted. When version 2.3 was released in early 2002, the UNIX based MDS was discontinued. MDS provides the following services to the MTWS system:

- ?? **User Interface.** The terminal display provides a graphical user interface to display simulation objects on a map projection. The MDS has the capability of presenting multiple (up to four) map windows simultaneously to allow the monitoring of different aspects of the game's progress. The type of objects on the display can be controlled to suit the individual operator's requirements and can be modified as the game progresses. The terminal operator can control the display of maps, including map zoom and pan.
- ?? **Command Entry.** The display provides a facility to issue commands to the simulation objects to cause them to execute orders received from the exercise participants.
- ?? **Reports.** MDS supports the display and printing of unsolicited and solicited reports. Unsolicited reports are reports related to the units and/or air missions controlled by the controller (also referred to as Spot Reports). Solicited reports consist of information requested by the operator to provide additional or more detailed information.
- ?? **Control.** The display allows the operator to selectively control the information provided to the map display and provided as unsolicited reports (spot reports).
- ?? **Batch Tools.** MDS provides the means to generate, edit, and submit batch files that are used for scenario generation and exercise control.
- ?? **Other Tools.** The terminal display provides a variety of tools to the operator, including Locate and Identify units and other simulated objects, coordinate conversion utilities, range and bearing markers, and range fans. From the terminal display, the operator can also create overlays to depict operational plans.
- ?? **C4I Message Control.** The C4I control program is launched and operated from the terminal display. This provides the operator with the means to start, stop, and regulate the messages being sent to a C4I system.

Model ALSP Translator (MAT)

The MAT provides an external interface for participation in JTC exercises. The MAT component runs inside one of the MANs and enables the MTWS system to connect to and interoperate with other constructive simulation systems for joint warfare training. The MAT provides the services through which a system operator interacts with the JTC. The MAT services include connecting and joining the confederation; connecting to MTWS; restoration from a save; composing and sending object and interaction filter messages; logging ALSP messages sent and received; and search facilities to display information about owned and ghosted objects.

Combat Analysis and Review Toolkit (CART)

CART is a dynamic analysis tool that provides a continuous historical and real-time visual interface to the data generated by the MTWS game. CART stores a concise view of each exercise, making the data accessible during the progress of the exercise, or after the exercise is complete, the data can be recalled and reviewed at a later date to further analyze the exercise or to train analysts and observers. The two main CART analysis tools are the map display and a web based report generator. The CART Client (display station) allows the operator to view exercise replay, and specify which information is displayed in the map, thus performing the function of filtering the output used in generating corresponding report data. The map display and report data can be exported to the appropriate Microsoft Office software for incorporation in exercise briefings and after action reports.

JQUAD Interface

The JQUAD interface is used to pass battle damage assessment (BDA) air mission information directly to JCAS (Joint Command & Control Attack System), one of four joint models in the JQUAD system. The other three models in JQUAD are: JECEWSI, Joint Electronic Combat Electronic Warfare Simulation; JOISIM, Joint Operational Intelligence Simulation; and JNETS, Joint Network Simulation. The JQUAD interface can only be used in JTC exercises where both MTWS and JQUAD are members of the confederation.

System Architecture

The MTWS system is designed to operate on a distributed network of servers and workstations (see Figure 2). The current MTWS system consists of one MSC connected via an internal network to one or two MANs. The MSC and MAN CPUs were originally Hewlett Packard J210 Series computers, operating on HP-Unix and configured with 10GB and 2GB (respectively) of disk space and at least 512 MB of RAM. The current MSC and MAN CPUs are Dell 4600 dual processor servers operating on Linux Red Hat

7.2 and are configured with three 18 GB disk drives in a RAID 5 configuration (striping with parity) and 1 GB of RAM.

The MAT, operating as a component inside of one of the MANs, provides a link to the JTC (when necessary). On a second LAN, the MSC is connected to the display stations. Where all display stations are not located locally, a connection over a Wide Area Network (WAN) is possible. The original PC workstations were dual 500MHz Pentium II CPUs with 512MB RAM and a 18GB hard disk, the latest workstations are dual 2.0 GHz Pentium IV CPUs with 1 GB of RAM and two 40 GB hard drives. The C4I interface runs as a program within the MDS. The display performs the function of filtering the output to the C4I system. The JQUAD interface program runs on the MSC.

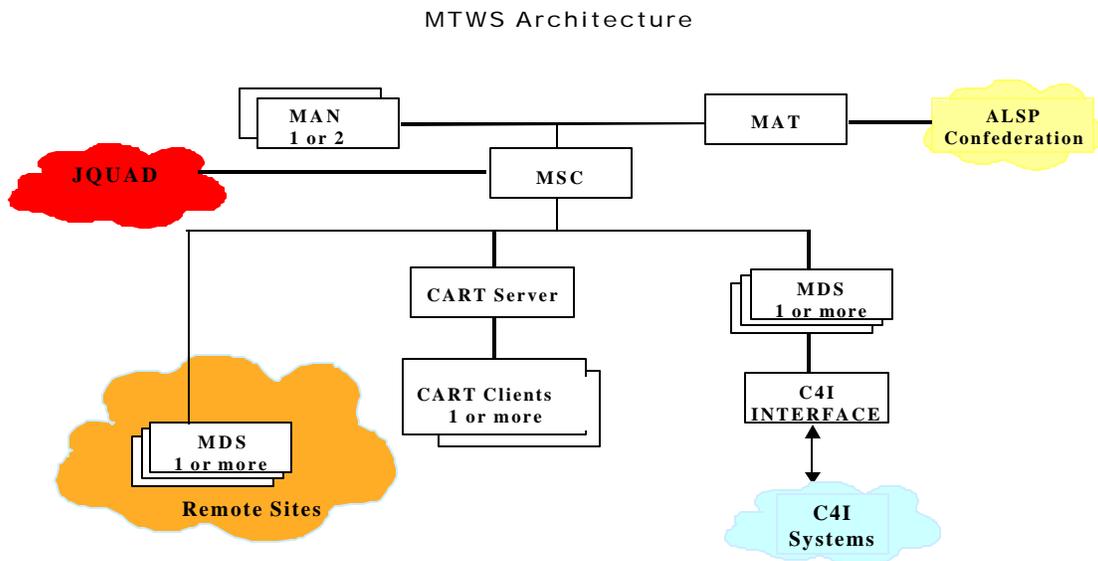


Figure 2 - MTWS Architecture

Concept of Operations

MTWS is primarily used in Command Post Exercises to provide a realistic environment in which a military unit commander and his staff (training audience) is trained in fire support coordination and tactical decision-making. Under the direction of the Commander conducting the exercise, the Exercise Director supervises the planning, organization, and conduct of the exercise. Unit training objectives are the focus; MTWS is the simulation system tool that drives the exercise. MTWS can also support mission rehearsals and Course of Action (COA) analysis. This section will discuss a typical Exercise Control Group operation to support a Command Post Exercise where the simulation workstations are not available to the training audience.

Organization

- ?? **Exercise Director.** Officer in charge of overall coordination of the exercise. The ‘honest broker’ who controls the exercise and ensures that the training audience achieves its training objectives.
- ?? **Exercise Control Group.** The Exercise Director’s staff that controls the various functions and events of the exercise. Includes the White Cell (higher headquarters (HHQ) and adjacent units), OPFOR (opposing forces), Simulation Control, and Response Cells (see Figure 3).

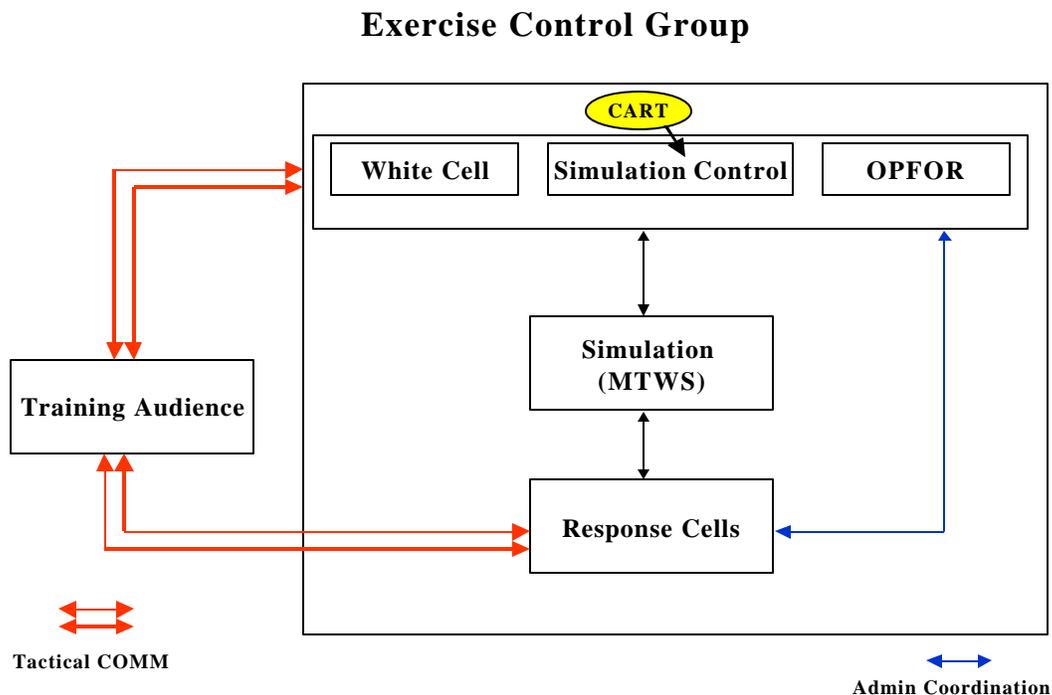


Figure 3 - Exercise Control Group

- **White Cell.** Acts as the HHQ and adjacent units and provides HHQ support functions for the exercise (intelligence, logistics, fire support, and air support). The White Cell Commander will develop scripted events and an exercise game path under the direction of the Exercise Director. The intelligence section of the White Cell will prepare intelligence summaries prior to the beginning of the exercise and also provide intelligence updates during the exercise.
- **OPFOR.** The opposing force. Controls OPFOR response cell, operates under the direct control of the Exercise Director, stimulates exercise

The MTWS Documentation Suite – Volume 1
Introduction to the MTWS System

activity using enemy structure and doctrine. The OPFOR Commander coordinates closely with the White Cell Commander and Simulation Control to drive the scenario and control the tempo of the exercise in accordance with the exercise game path.

- **Simulation Control.** Control Group organization normally staffed by contractor instructor/controllers (I/C's) and system administration personnel that operate the MTWS system and provide both operational and technical MTWS support for the exercise. Simulation control personnel will build the friendly and OPFOR unit databases, adjust the MTWS parametric data, and setup the response cells in accordance with the Exercise Director's instructions. Simulation control personnel will also assist in developing an exercise control plan, training MTWS controllers and terminal operators, and briefing response cell personnel.
- **Response Cells.** Cells are established for both OPFOR units and subordinate/supporting units of the training audience. The response cell personnel for the training audience are usually from subordinate or supporting units and normally include an OIC, various staff officers, MTWS controllers, and MTWS terminal operators. The response cells input the training audience commander's tactical operations orders for execution in MTWS and provide the training audience with combat results and status reports from their subordinate units. The MTWS controllers are responsible for filtering the MTWS display and report information (ground truth) and passing realistic combat reports, using unit SOP, to the training audience via tactical communication systems. Response cell personnel are part of the Exercise Control Group; they receive some training during the exercise but their primary role is to provide support for the training audience (see Figure 4).
- **Training Audience.** The primary unit being trained, the unit commander and his staff. Normally the training audience is at one level or tier. An example would be a battalion commander and his staff with the battalion subordinate units manning the response cells. In larger exercises, there may be additional tiers in the training audience such as both a division commander/staff and regiment commanders/staffs. The training audience should have no direct visibility into MTWS. They should depend upon tactical communications (voice and/or data) from the MTWS controllers and C4I interfaces with the MTWS system.

Exercise Control Group with Response Cells

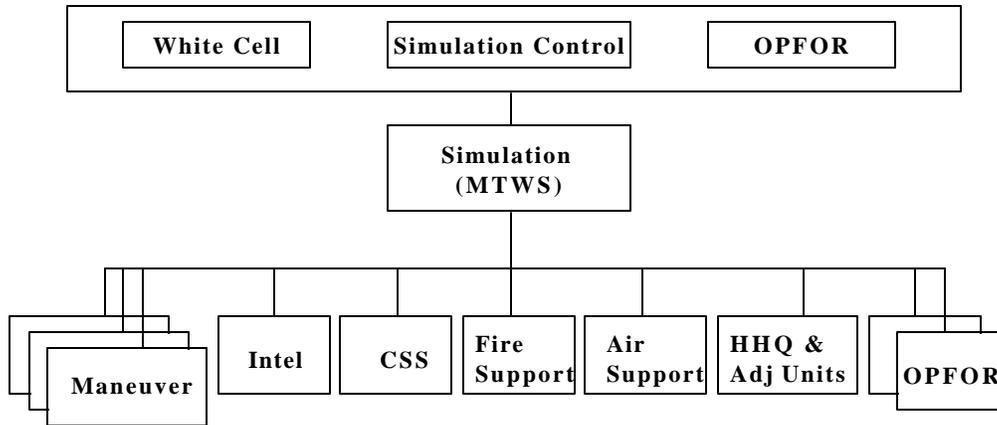


Figure 4 – Exercise Control Group with Response Cells

Exercise Planning

The Exercise Director will normally develop exercise milestones and assignments for the exercise and conduct three primary planning meetings (initial, main, and final) with the training audience. The focal point of exercise planning is the training objectives. Simulation control personnel will normally be involved in this planning effort to advise exercise personnel on MTWS capabilities and ensure that the MTWS exercise database is built correctly, parametric data is reviewed with training audience personnel, necessary terrain and map files are available, and training/rehearsal time is built into the exercise schedule. The rehearsal schedule should include various types of combat operations that will take place during the exercise. The exercise planning schedule must allow simulation control personnel adequate time to complete and test the exercise database prior to the exercise training and rehearsal. The security classification of the exercise is also a major consideration in exercise planning.

Exercise Execution

Prior to the beginning of the exercise, the training audience locates their command post as planned and establishes doctrinal communications paths to their response cells. Training for the MTWS terminal operators and controllers will normally occur during this time period. During the final part of terminal operator training, the controllers will also be trained and response cell personnel will be briefed. The exercise rehearsal will include the training audience and all control group sections. After the rehearsal, simulation control personnel will make final adjustments to the exercise database. At STARTEX, the operation in the training audience command post should reflect a real-

world situation. Communication procedures and information flow with a real unit in the field or a response cell controlling simulated units should be the same.

Exercise Control

The Exercise Director will utilize the four integral sections of the exercise control group to control the conduct of the exercise. Simulation Control regulates the progress of the game by speeding up (or slowing down) the game clock, modifying the results of an engagement, and performing system checks and backups. Simulation Control is also responsible for stopping the exercise when requested, doing restarts, and ensuring the Combat Analysis and Review Toolkit (CART) is available during the exercise for adjudication and review of major exercise events. The White Cell controls scripted events and intelligence data while the OPFOR directs enemy actions and reactions. MTWS controllers in the Response Cells ensure reports being passed to the training audience are realistic and consistent.

Exercise Termination

When the end of an exercise is declared, the Exercise Director will announce ENDEX to the Exercise Control Group. Simulation control will stop the game clock and terminate communications from the display terminals to the MSC, preventing any additional commands from being entered in the database. The exercise files will be saved to tape for future use. CART will be made available for post-exercise analysis. If the exercise is classified, the hard disks from the various MTWS computers will be removed and stored in a security container appropriate to the level of classification of the exercise until they can be scrubbed of all data in accordance with current DoD security procedures.