

NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

**BEGINNER'S USER GUIDE FOR THE
MAGTF
TACTICAL WARFARE SIMULATION**

by

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June 2000

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MAGTF
TACTICAL WARFARE SIMULATION**

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Submitted in partial fulfillment of the
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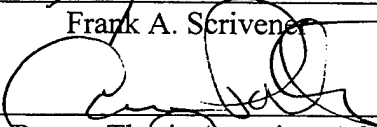
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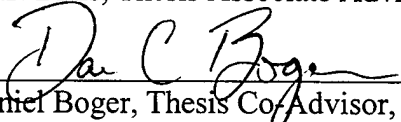
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ABSTRACT

The MAGTF Tactical Warfare Simulation (MTWS) is a multi-sided computer based gaming system, currently in use by the Marine Corps. Marine operations typically involve movement over land, sea, and air, and sustained operations often involve interaction with other services. MTWS's complexity supports the joint warfare nature of Marine Corps operations. This capability and complexity makes it ideally suited for an academic environment, and at the Naval Postgraduate School MTWS introduces students to a current service simulation, reinforces student coursework, and facilitates student research and experimentation. The drawback of a system so complex, though not difficult to learn how to use, is that MTWS is not always intuitive. While extensive documentation exists to support the system, it is for experienced users of the system. This thesis is tailored toward beginning users, no matter their level of operational experience, and will bridge the gap to the advanced documentation. It provides an overview of the system, explains graphical user interfaces (GUIs), provides instructions on how to develop and utilize units in the simulation, and furnishes reference charts for current U.S. weapon systems.

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EXECUTIVE SUMMARY

The MAGTF Tactical Warfare Simulation (MTWS) is a multi-sided computer gaming system, currently in use by the Marine Corps. Due to the complex nature of Marine Corps operations, MTWS supports the full range of military operations and is a capable simulator of joint military warfare and operations.

The complexity and joint nature of MTWS makes it ideally suited for an academic environment. MTWS has been fielded at the Naval Postgraduate School (NPS) in March of 1996. Since this time it has proven invaluable by providing students with exposure to a current service simulation, reinforcing coursework, and facilitating student experimentation. Additionally, NPS is developing an Asynchronous Distance Learning (ADL) program that is centered upon MTWS and its ability to interact with the Global Command and Control System (GCCS) and the Joint Maritime Command Information System (JMCIS).

Complexity is the strength of MTWS, but is also its drawback. While not difficult to learn how to use, the system is not always intuitive. There exists extensive documentation to support MTWS, but it does not benefit beginning users. This thesis will bridge the gap to the advanced documentation. The thesis will provide an overview of the system, explain screen layout, graphical user interfaces (GUIs), provide step-by-step instructions on developing and utilizing units in the simulation, and provide reference charts on symbology and current U.S. weapon platforms. It is tailored toward beginning users, no matter their operational background or service branch, and will guide them to a basic level of proficiency.

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I. INTRODUCTION

The Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) is a multi-sided computer-based gaming system currently utilized by the Marine Corps. Due to the complex nature of Marine Corps operations, MTWS supports the full range of military operations and is ideally suited to simulate joint military warfare. The increasing importance of joint military operations makes MTWS a worthy simulation for utilization and experimentation.

A. HISTORY

MTWS was developed as a successor to the Tactical Warfare Simulation, Evaluation, and Analysis System (TWSEAS), a system fielded in 1976. MTWS development started in 1990 and was fielded in 1995. [Ref. 1] MTWS is largely built upon the capabilities of TWSEAS, the most significant improvement being the use of open system standards and modern, commercial-grade Unix computers rather than militarized computer systems. TWSEAS utilized the AN/UYK-7 computer which represented 1960's technology, characterized by slow processing, textual input/output, teletype printers, expensive graphics display systems, and cumbersome monochrome displays. Additional improvements

over TWSEAS include enhancements to combat models that cover all major combat areas as well as modeling environmental factors, combat damage, logistics, fatigue, and intelligence reports. [Ref. 2]

The multi-sided gaming capability of MTWS adds realism to the simulation. MTWS allows for up to 26 workstations to be networked into a single gaming session in its standard configuration but has been networked with as many as 75 workstations in large joint exercises. [Ref. 3]

B. SYSTEM CONFIGURATION

An MTWS network consists of three types of computers, with at least one of each present in the network for the simulation to run. The MTWS System Control (MSC) is the primary interface unit that creates, loads, and controls simulations. Only one MSC is utilized in a network. [Ref. 4]

The MTWS Application Network (MAN) runs the simulation. A network can operate with only one MAN, but generally there are more, seven being the most. Utilizing multiple MANs allows for the distribution of combat models among them, which balances the load of the network and prevents a slowing of the simulation.

The MTWS Display Station (MDS) is the user interface with the simulation. The MDS displays the simulation and

allows the user to interact with it through command entries. MDSs in a network can number anywhere from 1 to 75.

Connectivity in an MTWS network is done through standard Ethernet connections. On the MSC there are two Ethernet ports; this allows connections to both the MAN and the MDS. The MSC is the heart of the network, and all information passed between the MAN and the MDS passes through the MSC. [Ref. 5]

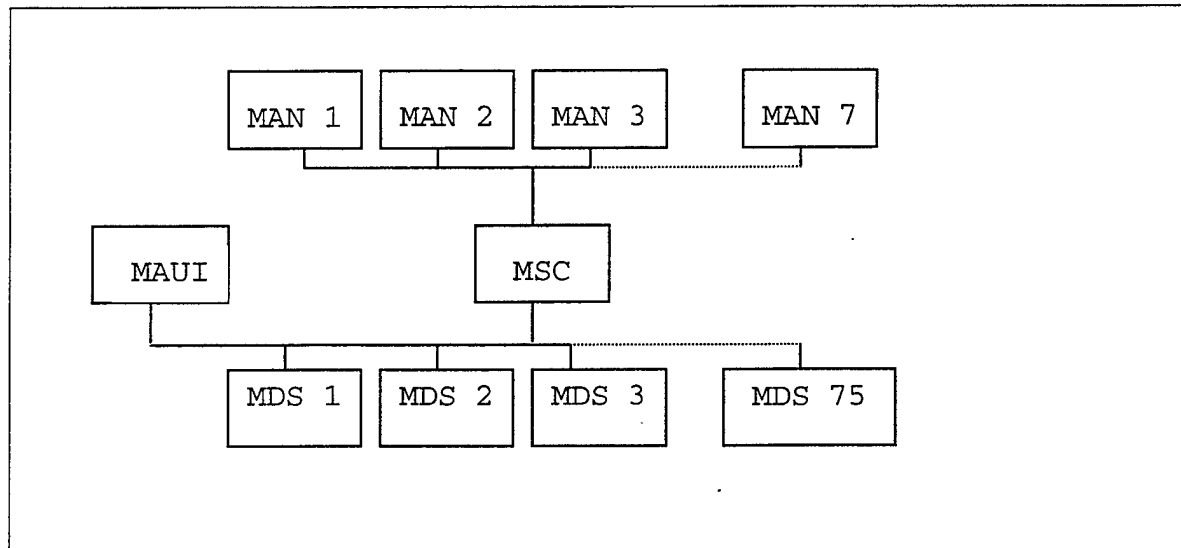


Figure 1. MTWS Network Configuration

The personal computer (PC) version of MTWS is called MTWS Advanced User Interface (MAUI). MAUI terminals and Unix-based MDS terminals can be networked in a simulation without any special configurations or hardware, just the Ethernet connections. [Ref. 6]

C. INTENDED USE OF THE SYSTEM

The designed use for MTWS is to train Marine Corps commanders and their staffs, primarily in Command Post Exercises (CPX). In this capacity, MTWS would be fielded near, but separate from, a commander's staff. The staff would conduct an exercise directing fictitious units. Receiving the commands via radio nets, would be company command grade officers who would then enter the commands into MTWS. As the commands are entered, utilizing the Spot Reports of the system, the station operator (e.g., company commander) provides the staff with feedback and situation reports of their command of the exercise.

In Field Exercises (FEX), MTWS was intended to be used in conjunction with actual fielded units. In this scenario, the commander and the staff would direct the fielded units while technicians or specialists listened to the communications and reports from the exercise umpires and replicated the action of the units in the system. Battle damage assessments would be computed by the system and relayed to the umpires. In FEXs, the MTWS system can record and replay the action of the exercise.

Until recently MTWS had not been utilized in the FEX mode but is often used in CPXs. [Ref. 7] Though it was intended for Company Commanders or equivalent officers to man the terminals for CPXs, the complexity of the system

requires a military support staff plus additional support from civilian technicians. In both CPXs and FEXs, MTWS is a tool to evaluate the performance of the commander and his staff. In addition to evaluation and tactical training, MTWS can also be a planning tool to develop courses of action for tactical operations or to simulate other realistic situations such as a coalition warfare scenario.

With single person or multi-person teams at each terminal, a gaming session could have a red and blue force as well as several non-aligned forces. Each force can be acting independently and seeking their own interests and objectives. Coalition warfare can be simulated with red and blue forces competing to form alliances with the non-aligned forces.

D. CURRENT USE AT NPS

Due to the complex nature of Marine Corps operations, and thus the complexity of any simulation of it, MTWS is ideally suited for an academic environment. Marine Corps operations generally utilize movement through land, air, and sea, all within a single operation. Because the Marines operate in coordination with the Navy and do not typically operate unsupported for extended periods of time, Marine Corps operations are also commonly joint warfare operations. MTWS replicates this joint nature of Marine operations by containing Army, Air Force, and Navy platforms and weapons

within its parametric database. Users can utilize any of these weapons or platforms in their simulations therefore the simulations can be centered on a branch of service other than the Marine Corps.

MTWS is currently fielded at the Naval Postgraduate School (NPS) in part by the Office of Naval Research, where it is used to conduct human-in-the-loop experiments as part of the Adaptive Architectures for Command and Control research program. It is supported by the Joint Command, Control, Communication, Computer, and Intelligence (JC4I) Curriculum and the Institute for Joint Warfare Analysis within NPS. MTWS provides JC4I students with exposure to a current and joint natured simulation that reinforces coursework and facilitates student experimentation.

NPS is developing an Asynchronous Distance Learning (ADL) program that will provide fleet personnel an inexpensive method in which to train in C4I and collaborative planning skills from remote locations. MTWS interfacing with C4I systems will be the basis of this training. [Ref. 8]

E. FUTURE OF MTWS

Currently there is an effort within the Department of Defense to develop the Joint Simulation System (JSIMS), a joint warfighting simulator for use by all branches of service. The joint nature of MTWS makes it a strong

candidate for an interim system until JSIMS is fielded. Capitalizing on this strength the developers of MTWS, Visicom, have begun to market the system internationally as the Joint Tactical Warfighting Simulator (JTWS). This is an effort to make the system desirable for foreign governments in search of a joint simulator for their own militaries. [Ref. 9]

Recent technical improvements to the system include a personal computer (PC) based user workstation vice the current Unix-based one. Use of PC-based networks will lower costs and allow for more flexibility. Unix-based networks are generally more expensive to operate and require specialized administrators. The new PC version, the MTWS Advanced User Interface (MAUI) is currently in beta testing. [Ref. 10]

There are numerous planned upgrades to the software, but the most significant underway are the C4I system interfaces. Under development is the ability for MTWS to import units and platforms into the Joint Maritime Command Information System (JMCIS) and the Global Command and Control System (GCCS). Fictitious scenarios could be played out on GCCS/JMCIS terminals networked with MTWS. A new level of realism would be injected into simulation when real world command and control systems are utilized during exercises.[Ref. 11] To date, one interface that has been

developed is the ability for MTWS to provide GCCS with Over The Horizon Targeting (OTH-Gold) and US Message Text Format (USMTF) message reports to stimulate the C4I system. [Ref. 12]

F. PURPOSE OF THESIS

The strength of MTWS is also a major drawback, complexity. While there is an abundance of documentation for the system, it is not intended for beginning users. Further complicating first time use is that the system, while not difficult to use, is not intuitive.

The purpose of this thesis is to bridge the gap to the advanced documentation that is available. This first time user's guide can be used in conjunction with instruction by a knowledgeable user or can be used as a self-instruction guide. Instructions are developed for users from any service branch no matter their operational background. This thesis will provide an overview of screen displays and their purposes, developing and utilizing units, glossary of terms, and charts for weapon, radar, and platform compatibility. Information is tailored toward U.S. forces and current U. S. weapon systems.

G. ORGANIZATION OF THESIS

This thesis, as a whole, is designed to be an instruction manual for MTWS version 2.1, released in

December, 1999. The structure of it is as follows: Chapter I provides background, history, and application of the system. Chapter II gives an overview of the basic layout and functions of the user display. Chapter III provides detailed instruction on how to develop and utilize units in the simulation. Appendices provide charts of platform weapons, aircraft/weapon/fuse compatibility, unit icon identification, and instructions on starting both an MDS terminal, and the MSC. A glossary of MTWS related acronyms and abbreviations is included as well.

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II. OVERVIEW OF SYSTEM

At system start-up, MTWS displays four windows and seven icons (see Figure 1). The windows are the MTWS Tactical Display Window, Spot Reports, Status Window and the Command Entry. Icons are MTWS User, MTWS Display System (MDS) I/O, MTWS Display System Command Entry (MDSCE), Alert, MTWS System Control, MTWS System Operation, and Interstation Communication. This section will explain the purpose and functionality of these screen features.

A. MTWS TACTICAL DISPLAY WINDOW

The MTWS Tactical Display Window is the graphical display of the simulation. A world map is the center of the window, graphical user interfaces (GUI) are along the top, and information concerning the size and center of the map display, is across the bottom. Information conveyed across the bottom of the map display concerns the center and size of the map projection, in the following format:

Proj:Mercator **Center:**[lat long] [UTM] **Width:**[NM].

Mercator is the type of map display, UTM is Universal Transverse Mercator (an alternative coordinate system to



Figure 1. MTWS Start-up Screen.

latitude longitude primarily used for ground operations), and NM is Nautical Miles. When a user left clicks the mouse on the map display, a mark will be left on the display. The information bar will briefly display information concerning the location of the mouse mark:

Location: [lat long] [UTM] **Elevation:** [meters].

Left mouse clicks leave a mark on the map display. Click marks serve the purpose of marking waypoints for unit movements, placement of units into the display, and indicating target locations for fire missions.

The following menu options are at the top of the MTWS Tactical Display moving from left to right. These interfaces allow the user to manipulate the map display and will provide the user with information about what is displayed.

1. Map Options

a. Zoom In

Click on region that is desired to be enlarged. Shape box to area then double click to zoom.

b. Zoom Out (x5)

Automatically zooms out to area five times what is currently displayed.

c. Half Scale

Automatically scales map to half of what is currently displayed.

d. Double Scale

Automatically increases scale of map to double what is currently displayed.

e. Manual Scale

Allows for manually scaling field of view. User can adjust center and width of map display.

f. World View

Automatically returns map to full worldview, identical to what appears when simulation is started.

g. Predefined Maps

Lists maps that have been selected for an exercise or simulation. Selecting one from the available options will move the display to that map.

h. Re Center

Map will re-center on point selected by user. Click mouse pointer on spot desired to become new center of display.

i. Hand Pan

Allows slight adjustments of map display with the mouse pointer. When map is in desired position, click mouse.

j. Range Bearing

Click on point from which you want to reference distance. Move mouse pointer to the other location and click the mouse again. A range line and a blue box with distance data will appear. Click on the box to remove it and the distance line.

k. Coordinates

As the mouse pointer moves across the display, map coordinates will appear in a box adjacent to it. Double clicking mouse will remove it.

l. Group

This option has no functionality associated with it.

m. Map Features

Allows users to add latitude longitude lines or political boundaries to the map display.

n. Intensity/Contrast

Allows for adjustment of intensity and contrast in the display.

o. Map Countries

Each country is designated with a two-letter abbreviation. Click on a box, the country associated with the two letters will be identified. If the box is red the option is available to adjust the color of that particular country in the map display. If the box is white, that option is not available.

p. Map Manager

Imported digitized maps are accessed through this function. User has the option to scroll through the maps or to view maps by type. A box will appear on the display that will show exact region that the digitized map covers. Selecting + will display a selected map, - will remove it.

q. Auto Digitized Maps

When user is zoomed into a region, selecting this option will layer all available digital maps of that region,

into the display. As user zooms in closer, or out, any available maps that better suit the new scale will appear.

r. Elevation Legend

Selection of this option will present a color elevation legend into the left-hand corner of the display.

s. Depth Legend

Selection of this option will present a color depth legend in the right hand corner of the display.

t. Map Connections

Utility to select a specific map server that is connected to the network.

u. CD ROM Status

Displays the status of a workstation's CD ROM drive.

v. Overlays Status

Lists overlays that have been created and saved to disk. Overlays can be created, recalled or edited with this function.

2. Display Options

a. Locate

A function to locate units or objects. Unit names may be entered and the location of the desired unit will be provided. Additionally, this is a method of quickly filtering display to show missions, tracks, or objects.

b. Identify

Identifies unknown units or objects. Click on icon and system will identify it by name and provide mission and engagement status information as well.

c. Coord Util

Computes conversions between latitude/longitude and UTM coordinates.

d. Range Fans

Draws range fans around objects. Enter either latitude/longitude or UTM coordinates, range in either nautical miles or kilometers, and then the degrees of the fan. Click draw to display the fan.

e. Tactical Update Times

Allows users to view the times at the which system's tactical picture was updated by the MTWS System Control (MSC).

f. Small Font

This is grayed out and has no functionality associated with it.

g. Large Font

This is grayed out and has no functionality associated with it.

h. Clear Locations

Clears left click mouse marks from map display.

i. Restore Map Colors

This option has no functionality associated with it. In earlier versions of MTWS, map display colors could be manipulated.

3. Display Categories

The simulation facilitators will likely coordinate the functions under Display Categories. These functions provide filters to what is displayed at a workstation.

a. Display Objects

Filters specific objects, tracks, units or events from a workstation.

b. Display Environment

Filters for units assigned to specific control functions. Additionally, filters can be applied to display only Landing Forces, Aggressors, Neutrals, etc.

4. Interfaces

a. C4I Systems

Function will activate transmission of C4I formatted messages to real-world systems on networks (e.g., Global Command and Control System). Will also allow users to view OTH and USMTF messages sent or read.

B. SPOT REPORTS WINDOW

Spot reports are messages conveyed by the system, informing of relevant battlefield developments. Information conveyed includes: air mission launches, enemy detections, engagements, battlefield damage assessments, and casualties. Spot Reports follow the same general format: what the message is about, the mission it concerns, current position of the mission, the DTG of the message, the controller that monitors the unit, and the specific action taking place. The following is an example of a Spot Report:

AIR MSN RTB; SORTIE 1; 11PKN49493; 252037ZMAY00

AIRCON; AIR MISSION HAS REACHED BINGO; AIR MISSION WILL RTB

AIR MSN RTB refers to the type of Spot Report that is being displayed. SORTIE 1 is the unit or mission that Spot Report concerns. 11PKN49493 is the UTM point that the unit or mission is located, and 252037ZMAY00 is the DTG of this Spot Report. AIRCON is the controller that the unit or mission is associated with. AIR MISSION HAS REACHED BINGO; AIR MISSION WILL RTB conveys the event that has taken place, the purpose of the Spot Report. Bingo is the point in time when an air mission has only enough fuel to return to base, and RTB is an acronym for return to base.

C. MTWS COMMAND ENTRY WINDOW

The MTWS Command Entry Window develops and manipulates units in the simulation. Objects are built and missions established. Familiar buttons appear when using the Commands function: "Next" for accessing the next screen, "Previous" to return to the previous screen, "Iteration" for multiple entries such as waypoints for a flight path, "Transmit" enters current command into the simulation, "?" for information about the current Commands data window, "..." expands menu to allow user to view and select from all possible options, and "FORMAT" allows users to select a

format when entering information. Generally, FORMAT selections are LAT/LON, UTM, TACAN, or NAME, but may be tailored toward specific data fields.

1. Batch

This command is for more advanced use of the system, generally used in large exercises. Batch commands create a file containing multiple, predefined commands, often used to initialize a scenario or exercise. A simple example of a Batch File is one that, when initiated, would introduce into the Tactical Display all the Aggressor units for the current exercise or scenario.

2. Periodic

Allows user to predefine reports that will be generated at predetermined intervals. An example of possible use may be creating a report of the ammunition of an artillery battery, allowing the monitoring of ammunition supplies as they are decremented. Another example may be a report to monitor the number of casualties of a ground unit as it

engages the enemy. This function is used in conjunction with the Reports command.

3. Log

Log is a tool for administrators and simulation facilitators. It creates a log of all valid commands entered during an exercise.

4. Time

Time is a function that is utilized in conjunction with Batch. This allows batch files to be phased into a scenario over time. It creates more realistic scenarios by phasing in unit defining and unit mission commands at different, predetermined intervals.

5. Misc

This contains Print Enable, Print Disable, and History functions. History is a log of all previous Command Entry commands that were transmitted. Note that a command is not considered transmitted unless the system accepts it as a valid command. When the log appears, options available include Transmit, Recall, and Close. Transmit will

retransmit a selected command. Recall will bring the selected command back to the workstation. Select Close to close the log and view the selected command.

6. Commands

The Commands function is where units are defined and missions are developed. The Commands function is covered in Chapter III of this guide.

7. Reports

This allows the user to view reports tailored to the different warfare areas contained within the Commands function. Available reports are numerous and include: schedules, assets of units, unit attachments, task forces, predefined ordnance loads, track data, scheduled fire missions, and mission status reports.

8. Help

Two options available in Help are General and Current Command or Report. The "?" information option is different from Help in that it is tailored to a specific parameter

within a Command and Help is information about the Command as a whole.

D. MTWS EXERCISE STATUS WINDOW

This window provides the current status of the simulation. The format for the information is:

Exercise Name	State:	Mode:	Rate:	Time:	DTG	DTG
----------------------	---------------	--------------	--------------	--------------	-----	-----

Exercise Name is the name of the exercise that is currently loaded in the system. State is the current status of simulation, whether it is in Run, Replay, or Admin. Mode has three options, Normal, Resume, or Suspend. Rate is the simulation rate and can run between 0.0 and 10.0. Following Time there are two entries in the DTG format. One DTG conveys zulu time, the other may convey local time if the exercise or simulation is set up to run on it.

E. MTWS USER ICON

This icon does not appear on all versions of MTWS; this is not a function of MTWS, but rather a function of the workstation. It contains tools for the workstation such as Email, Text Editor, Terminal Lock, File Manager, Spell

Checker, Clipboard, and multiple others. These functions do not interact with the simulation.

F. MDS I/O ICON

This is a log of communications between the MDS and the MSC. It is primarily a tool for system administrators.

G. MDSCE ICON

Like MDS I/O, this is also a tool for system administrators to monitor and troubleshoot the system.

H. ALERT ICON

The Alert window conveys network administration information, specifically concerning network communications and errors.

I. MTWS STATION CONTROL ICON

The MTWS Station Control window allows users to adjust the user level of the terminal, arrange for how Spot Reports are conveyed, and place the workstation on or off line.

J. MTWS SYSTEM OPERATIONS ICON

Selecting EXERCISE CONTROL>>ASSIGN/DEASSIGN allows users to select or deselect controllers that will be displayed on the workstation.

K. INTERSTATION COMMUNICATION ICON

Interstation Communication is an email function in which messages can be conveyed to all stations under specific controllers or messages can be broadcasted to all workstations. When a workstation has email, the icon will change color. As of MTWS version 2.1 this functionality has been disabled and may be removed in future versions in favor of a standard email program. [Ref. 13]

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III. MTWS COMMAND ENTRY INSTRUCTIONS

This chapter will provide detailed instructions on developing and utilizing units. Combat areas that will be covered in this section include: air operations, ship operations, amphibious operations, ground operations, combat engineering operations, and combat support operations. A couple of the most common Reports commands will be covered as well.

In addition to the instructions in this section, guidelines for understanding button functions and graphical user interfaces are covered in Chapter II, within the MTWS Command Entry Window section.

For the instructions in this chapter, commands involving manipulating GUIs are in the format of COMMANDS>>GROUND>>UNIT>>DEFINE. Statements preceding colons are titles of fields for data entry. Information following the colon are guidelines for entering data. Not all fields require data; if there is nothing following the colon, then it is recommended that the field remain blank. Fields that require data have a req (required) to the top right of the data field; if there is an opt (optional) then data is not required.

A. TABLE OF ORGANIZATION/TABLE OF EQUIPMENT (TO/TE)

TO/TE is Table of Organization/Table of Equipment. MTWS's parametric database has predefined organizational structures and equipment for units, as well as platform and weapon performance characteristics.

If a user tries to define a unit that does not fit the predefinition then an error will occur and the command will not be accepted as valid. For instance, an error will occur if a user tries to station a Navy squadron aboard an aircraft carrier, because the parametric database does not have a Navy squadron defined within it, as it is tailored toward USMC units. The user has two options to overcome this: a USMC squadron can be stationed aboard the carrier, or "NO" can be selected for TO/TE. Selecting "NO" overrides the parametric database and allows the user to utilize any combination of equipment, alliance, and/or service branch.

While the parametric database is tailored toward USMC units, it is also evolving and will eventually better incorporate units of other services. Meanwhile, users can utilize the parametric database to develop units tailored to their needs, such as a Navy squadron. The database is easily changed and will allow for changes in performance characteristics of platforms and equipment.

B. INVALID COMMANDS

When a command is accepted by the system, in the Response data field, a Valid message will appear. An invalid message will be in the format:

Invalid: (PN:14) Invalid Table of Organization, Unit Define Command is Rejected.

To determine what field the error occurred in, verify data in the Current Command data field. For the above example, the Current Command field contained:

```
UNIT; DEFINE; ARTY1; LF; ARTILLERY; BATTERY; 105SES752211;  
ARTYCON1;; SIMULATED; FALSE; YES; USMC; MLRS; $
```

Viewing the data beginning to end, it is a Unit Define command. The name of the unit is Arty1, an artillery battery at position 105SES752211, and the selected Control Function is ARTYCON1. The two semi-colons represent a data field that did not require data and was therefore left blank. The beginning of the error message stated PN:14, meaning position number 14. Place the cursor in the field, move to the beginning and begin counting out 14 positions.

Including the empty data field, represented by the two semi-colons, this will take you to MLRS. The error is a Table of Organization error because the USMC does not utilize the MLRS weapon system, and is therefore not represented in the parametric database.

C. CONTROL FUNCTION

Control Function is a required field when defining a unit in MTWS. When a Control Function is selected for a unit, the user must verify that the workstation is configured to receive reports from the selected Control Function. When a Control Function is selected and the workstation properly configured, reports will be received in the Spot Reports window. Double click the MTWS System Operation icon, then select EXERCISE CONTROL>>ASSIGN/DEASSIGN, to select or verify selected controllers displayed by the workstation. Generally, simulation facilitators or exercise controllers will establish Control Functions. Utilizing Control Functions allows for the simulation of command and control hierarchies, and data and communication links.

D. AIR OPERATIONS

This will provide instructions on establishing airfields and aircraft carriers, the two options for launching air missions. In addition to these, several other

commands must be entered into the system before air missions can be successfully entered. A squadron needs to be defined, assigned to an airfield or aircraft carrier, then outfitted with aircraft. Air missions carrying out a mission other than airborne early warning or reconnaissance require an ordnance load; therefore ordnance loads must be established before a mission is defined. Finally, when these entries have been made, the system will accept an air mission.

1. Airfields

Developing an airbase involves four sets of commands. First an airfield is established, then an aviation ordnance supply unit. The airbase will also require fuel, and the supply unit has none until it is allocated with the Assets Update command. Finally the airfield and supply base are associated together with the Link Airfield command. If you are unable to link the airfield and supply unit together it is most likely a result of the units being located too far apart. Utilize the `COMMANDS>>GROUND>>UNIT>>LOCATE` command to place them in closer proximity.

a. Airfield

COMMANDS>>AIR>>AIRFIELD>>DEFINE

Airfield ID: Enter desired airfield name

Airfield Location: Place mark on map display for desired location of airfield

Status: OPEN

Ordnance ID:

Fuel ID:

Air Squadrons ID(s):

NEXT

Runway ID(s):

Ownership: MTWS_OWNED

TRANSMIT

b. Aviation Supply Unit

COMMANDS>>GROUND>>UNIT>>DEFINE

Unit ID: Enter desired name of supply base, recommend Airfield Name + Supply (i.e., Ocean Supply)

Side Txt: LF

Unit Type: Select SUPPLY

NEXT

Hierarchy: COMPANY

Unit Location or Ship ID: Place mark on map display, very close to airfield, for location of supply base

Control Function: Select desired Control Function

Display Name:

Real or Simulated: SIMULATED

NEXT

LIDS Equipped: FALSE

Use TO/TE: YES

NEXT

Service/Alliance/Country: Select USMC

Supply Sub Type: Select AV_ORD

TRANSMIT

c. Aviation Fuel Allocation

COMMANDS>>GROUND>>ASSETS>>UPDATE

Unit or Cargo ID: Enter supply unit name

Asset Category: Select FUEL

NEXT

Gallons of Fuel Pos or Neg Integer: Recommend entering very large number (i.e., 1000000)

Rationale: INITIAL

Rationale Comment: INITIAL

TRANSMIT

d. Airfield Link

COMMANDS>>AIR>>AIRFIELD>>LINK

Airfield ID: Enter Airfield name

Ordnance Unit ID: Enter name of associated Supply unit

Fuel Unit ID: Enter name of associated Supply unit

Air Squadron ID(s): Enter name of associated Squadron(s)*

Runway ID(s):

TRANSMIT

*If user has not yet defined associated squadron(s), then leave this field blank

2. Aircraft Carriers

Unlike an airbase, an aircraft carrier does not require a fuel and aviation ordnance supply depot; the carrier serves as its own supply source. For ship operation commands, refer to the ship operations section of this chapter.

a. Aircraft Carrier

COMMANDS>>GROUND>>UNIT>>DEFINE

Unit ID: Enter desired Carrier Name

Side Txt: LF

Unit Type: Select SHIP

NEXT

Hierarchy: COMPANY

Unit Location or Ship ID: Place mark on map display for desired location of ship.

Control Function: Select desired Control Function

Display Name:.

Real or Simulated: SIMULATED

NEXT

Lids Equipped: FALSE

TO/TE: YES

Service: Select USN

Ship Sub Type: Select between JFK (conventional), and NIMITZ (nuclear) class carrier.

TRANSMIT

b. Aircraftcarrier Airfield

COMMANDS>>AIR>>AIRFIELD>>DEFINE

Airfield ID: Enter name of aircraft carrier

Airfield Location: Again, enter name of aircraft carrier

Status: OPEN

Ordnance ID:

Fuel ID:

Air Squadrons ID(s):

NEXT

Runway ID(s):

Ownership: MTWS_OWNED

TRANSMIT

3. Squadrons

Following the defining of an airbase or aircraft carrier, a squadron needs to be assigned. This section will cover defining the squadron, then outfitting it with aircraft. When the squadron is complete assign it to an airfield, utilizing the AIRFIELD>>LINK command to attach it.

a. Squadron

COMMANDS >> GROUND >> UNIT >> DEFINE

Unit ID: Enter desired squadron name

Side Txt: LF

Unit Type: Select AIR SQUADRON

NEXT

Hierarchy: Select SQUADRON

Unit Location or Ship ID: Enter name of carrier or airbase that squadron will be stationed at

Control Function: Select desired Control Function

Display Name:

Real or Simulated: SIMULATED

NEXT

LIDS Equipped: FALSE

Use TO/TE: YES

NEXT

Service: Select USMC *

Air Squadron Type: Select desired type of squadron

TRANSMIT

*No matter what type of aircraft or whether squadron will be based upon aircraft carrier, there will be less likelihood of Table of Organization type error if USMC is selected.

b. Squadron Aircraft

COMMANDS>>AIR>>AIRCRAFT>>DEFINE

Aircraft Type: Select desired aircraft type from menu

Squadron ID: Enter desired name of squadron

Mode 2 IFF: Enter 4 digit number

Definition Method: Select QUANTITY*

NEXT

Number of Aircraft: Enter desired number of aircraft type for squadron.

Rationale: INITIAL

Rationale Comment: INITIAL

TRANSMIT

*Choosing Quantity, MTWS will assign side numbers for each aircraft. Selecting Individual will result in the user assigning side numbers for each aircraft.

c. Squadron/Aircraftcarrier Link

COMMANDS>>AIR>>AIRFIELD>>LINK

Airfield ID: Enter airfield name

Ordnance Unit ID:

Fuel Unit ID:

Air Squadron ID(s): Enter name of associated squadron(s)

Runway ID(s):

TRANSMIT

4. Ordnance Loads

Ordnance loads are required for air missions, therefore an ordnance load must be established prior to defining the air mission. When developing them, ordnance loads need to be tailored to the aircraft they will be employed on.

COMMANDS>>ORDNANCE_LOAD>>DEFINE

Ordnance Load ID: Enter desired name of ordnance load

Side: LF

NEXT

Ordnance Type: Select desired ordnance type*

Number of Ordnance: Enter desired number of specified ordnance type

Fuse: Select desired type of fuse

ITER**

or

TRANSMIT**

*Refer to compatibility charts for aircraft/ordnance/fuses, located in Appendix A

**If more than one type of ordnance is desired for a Ordnance Load, then select Iteration, otherwise select Transmit

5. Ground Radar Activation

a. Radar Allocation

COMMANDS>>GROUND>>ASSETS>>UPDATE

Unit or Cargo ID: Enter name of airfield

Asset Category: Select ASSET

NEXT

Asset Type: Select desired radar type from menu

Quantity of Asset: Enter 1

Asset Damage Category: Select OPERATIONAL

Rationale: INITIAL

Rationale Comment: INITIAL

TRANSMIT

b. Radar Field Defined

COMMANDS>>INTELLIGENCE>>SEARCH_RADAR>>DEFINE

Radar Field ID: Enter name of radar field, recommend Airfield Name + _Radar, i.e. Ocean Radar

Radar Field Location: Place mark on map display at airfield that radar is desired

Radar Type: Select type that was previously allocated

Responsible Unit: Enter name of airfield

TRANSMIT

c. Radar Activated

COMMANDS>>INTELLIGENCE>>SEARCH_RADAR>>ACTIVATE

Search Field ID: Enter name used in Radar Field ID, i.e. Ocean Radar

TRANSMIT

6. Air Missions

Missions covered as examples are airborne early warning (AEW), attack, and combat air patrol (CAP).

a. Airborne Early Warning

E-2Cs are used if the mission originates from an aircraft carrier and E-3s when from an airfield. Usually, an AEW mission is performed in a high altitude orbit.

COMMANDS>>AIR>>AIR_MISSION>>DEFINE

Frag Number: Enter desired name for mission

Aircraft Type ID: Select E-2C for carrier originated mission, or E-3 for mission from airfield

Number of Aircraft: Select desired number of aircraft for mission, generally only 1 is needed

Squadron ID: Enter name of AEW squadron

Take-off Point: Enter either carrier or airfield name

Mode 1 IFF:

Mode 3 IFF:

Supported Unit:

NEXT

Mission Type: Select AEW

NEXT

Timed Event: TAKE_OFF

NEXT

Take-off Time: Leave blank for immediate launch or DDHHMMZMMYY for desired launch time

NEXT

Location: Place mark on map display for desired location of orbit point

Altitude: Recommended the HIGH be selected for AEW mission

Point Definition: Select ORBIT

Ordnance Type:

Ordnance Quantity:

Units or Cargo:

TRANSMIT

b. Combat Air Support (CAS)

For a CAS mission there must be a supported unit, and failure to fill in the Supported Unit data field will result in an error.

COMMANDS>>AIR>>AIR_MISSION>>DEFINE

Frag Number: Enter desired name for mission

Aircraft Type ID: Select squadron aircraft type

Number of Aircraft: Enter desired number of aircraft for mission

Squadron ID: Enter squadron name

Take-off Point: Enter airfield or carrier name

Mode 1 IFF:

Mode 3 IFF:

Supported Unit: If the mission is Combat Air Support, this field requires an entry. Enter name of unit the mission will support.

NEXT

Mission Type: Select CAS

NEXT

Ordnance Load: Enter desired name of ordnance load

Height of Burst:

Target Element: Select target type from menu

Alternate Target:

Timed Event: TAKE_OFF

NEXT

Take-off Time: Leave blank for immediate launch or DDHHMMZMMYY for desired launch time

NEXT

Location: Place mark on map display for location of attack

Altitude: Select altitude of flight

Point Definition: Select ATTACK

Ordnance Type:

Ordnance Quantity:

Units or Cargo:

TRANSMIT

c. Combat Air Patrol (CAP)

Combat air patrol (CAP) is the seeking out of aircraft-on-aircraft engagements. In order to engage another aircraft in air-to-air combat, an AEW mission must be operating in the proximity and tracking the target. A hostile aircraft must have a track number, which is provided by the AEW aircraft, before it can be engaged. A contact's track number is located next to its symbol and mission name on the MTWS Tactical Display. Additionally, every contact detected by the AEW mission will appear in the Spot Report window along with its designated track number, when it is initially tracked by the AEW mission.

Performing the mission involves first defining a CAP mission, designating a hostile track to engage, and then vectoring the CAP mission to engage it. In addition, a Divert command is included in this section. If the hostile track is too far, MTWS will not allow a CAP mission to vector and engage it. The Divert command will allow the CAP mission to get in closer proximity so that a Vector command may be repeated.

(1) CAP Air Mission

COMMANDS>>AIR>>AIR_MISSION>>DEFINE

Frag Number: Enter desired name for mission

Aircraft Type ID: Select squadron aircraft type

Number of Aircraft: Enter desired number of aircraft for mission

Squadron ID: Enter squadron name

Take-off Point: Enter name of originating airfield or carrier

Mode 1 IFF:

Mode 3 IFF:

Supported Unit:

NEXT

Mission Type: Select CAP

NEXT

Ordnance Load: Enter desired name of ordnance load

Height of Burst:

Target Element: Select AIRCRAFT

Alternate Target:

Timed Event: TAKE_OFF

NEXT

Take-off Time: Leave blank for immediate launch or DDHHMMZMMYY for desired launch time

NEXT

Location:

Altitude: Select altitude of flight

Point Definition: Select ATTACK

Ordnance Type:

Ordnance Quantity:

Units or Cargo:

TRANSMIT

(2) Hostile Track Designation

COMMANDS>>AIR>>AIR_TRACK>>DESIGNATE

Air Track ID: Enter air track desired to be designated

Track Designation: Select HOSTILE

Track Evaluation: EVALUATED

TRANSMIT

(3) CAP Mission Vector

COMMANDS>>AIR>>AIR_MISSION>>VECTOR

Air Mission ID: Enter name of air mission desired to be diverted to intercept/attack

Track Number: Enter track number of aircraft desiring to be attacked

Ordnance Type: If you desire to use a specific type of ordnance within the ordnance load, select choice.
User can leave this field blank

TRANSMIT

(4) CAP Mission Divert

COMMANDS>>AIR>>AIR_MISSION>>DIVERT

Air Mission ID: Enter name of air mission desired to be diverted

NEXT

Location: Place mark on map display for desired location to be diverted to

Altitude: Select desired altitude

Point Definition: Select ATTACK

Ordnance Type:

Ordnance Quantity:

Units or Cargo:

NEXT

Target Element: Select AIRCRAFT

TRANSMIT

E. CRUISE MISSILE OPERATIONS

In MTWS cruise missiles cannot be launched by ships, rather they are accomplished with either B-1B or B-52 bombers. The instructions for this section will assume that the user has an operational airfield at which there is stationed a squadron of either B-1B or B-52 bombers. Additionally, a cruise missile ordnance load must be defined.

The instructions in this section will start with providing air launched cruise missiles (ALCM) to the squadron. Next a bomber air mission will be defined followed by a cruise missile air mission that will be associated to it. Finally, an AIR_MISSION>>LAUNCH command will be given, to override the bomber mission's advanced launch time.

a. Cruise Missile Allocation

COMMANDS>>CSS>>ASSET>>UPDATE

Unit or Cargo ID: Enter name of B-1B squadron

Asset Category: Select ASSET

NEXT

Asset Type: Select ALCM from the Cruise Missiles category of menu*

Quantity of Asset: Enter desired number of missiles for squadron

Asset Damage Category: Select OPERATIONAL

Rationale: INITIAL

Rationale Comment: INITIAL

TRANSMIT

*Do not select ALCM-MSL under the Ammo category in menu.

b. Bomber Air Mission

COMMANDS>>AIR>>AIR_MISSION>>DEFINE

Frag Number: Enter desired name for mission

Aircraft Type ID: Select squadron aircraft type, either B-1B or B-52

Number of Aircraft: Enter desired number of aircraft for mission

Squadron ID: Enter squadron name

Take-off Point: Enter airfield name

Mode 1 IFF:

Mode 3 IFF:

Supported Unit:

NEXT

Mission Type: Select DAS

NEXT

Ordnance Load: Enter name of non-cruise missile ordnance load

Height of Burst:

Target Element: Select target type from menu

Alternate Target:

Timed Event: TAKE_OFF

NEXT

Take-off Time: Enter time in DDHHMMZMMYY format. Recommend launch time must be 2 plus hours out*

NEXT

Location: Place mark on map display for location of cruise missile launch

Altitude: Select altitude of flight

Point Definition: Select CM_LAUNCH

Ordnance Type:

Ordnance Quantity:

Units or Cargo:

TRANSMIT

*A 2 plus hour launch time will allow time for fully entering in the mission. The launch command will activate it.

c. Cruise Missile Air Mission

COMMANDS>>AIR>>AIR_MISSION>>DEFINE

Frag Number: Enter desired name for cruise missile mission

Aircraft Type ID: Select ALCM

Number of Aircraft: Enter desired number of aircraft for mission

Squadron ID: Enter squadron name

Take-off Point: Enter bomber mission name

Mode 1 IFF:

Mode 3 IFF:

Supported Unit:

NEXT

Mission Type: Select CM

NEXT

Ordnance Load: Enter name of cruise missile ordnance load

Height of Burst:

Target Element: Select target type from menu

Alternate Target:

Timed Event: TAKE_OFF

NEXT

Take-off Time:

NEXT

Location: Place mark on map display for location of attack

Altitude: Select altitude of flight

Point Definition: Select ATTACK

Ordnance Type:

Ordnance Quantity:

Units or Cargo:

TRANSMIT

d. Air Mission Launch

COMMANDS>>AIR>>AIR_MISSION>>LAUNCH

Air Mission ID: Enter name of air mission being launched

Launch Override: NO

TRANSMIT

F. SHIP OPERATIONS

Ship Operations will cover defining cruiser/destroyer type warships, performing basic ship operations as well as missile launches and gunfire support.

1. Ships

Defining a ship is identical to defining an aircraft carrier found in the previous section, except you will select a different class of ship from the menu.

COMMANDS>>GROUND>>UNIT>>DEFINE

Unit ID: Enter desired ship name

Side Txt: LF

Unit Type: Select SHIP

NEXT

Hierarchy: COMPANY

Unit Location or Ship ID: Place mark on map display for desired location of ship.

Control Function: Select desired Control Function

Display Name:

Real or Simulated: SIMULATED

NEXT

Lids Equipped: FALSE

TO/TE: YES

Service: Select USN

Ship sub-type: Select desired ship class from either Ticonderoga class cruiser, Perry class frigate, or Burke or Spruance class destroyers. Refer to ship chart in Appendix B.

TRANSMIT

2. Harpoon Missile Launch

The Harpoon missile is an anti-ship missile and is not used against land-based targets or aircraft.

COMMANDS>>FIRE SUPPORT>>FIRE_MISSION>>DEFINE

Fire Mission ID: Enter desired name of mission

Fire Mission Type: Options are: On_Call-Mission that is later activated with FIRE_ON_CALL command
SCHEDULED-Mission commences at designated DTG
CALL_FOR_FIRE-Mission commences as soon as it is entered

NEXT

Target: Enter target name or place mark on map display at location of desired target

Target Element: Select SHIP

Ordnance Type: NON_NUCLEAR

NEXT

Firing Unit: Enter name of ship firing missile

Firing Weapon: Select HARPOON-LNCHR

Number of Weapons Positive Integer: Enter 1

Number of Rounds Per Unit Positive Integer: Enter 1

Projectile Type: HARPOON-MSL

Fuse Type: Select NONE

NEXT

Duration of Fire:

Supported Unit:

Priority Mission?: Select YES

FPF Mission?: NO

Mission Observed?: Select YES

NEXT

Fire Distribution: CONVERGED

TRANSMIT

3. Naval Gunfire Mission

The gunfire support mission example will be an ON_CALL mission and its activating FIRE_ON_CALL command.

a. On Call Fire Mission

COMMANDS>>FIRE SUPPORT>>FIRE_MISSION>>DEFINE

Fire Mission ID: Enter desired name of mission

Fire Mission Type: Select ON_CALL

NEXT

Target: Enter target name

Target Element: Select target type from menu

Ordnance Type: NON_NUCLEAR

NEXT

Firing Unit: Enter name of ship firing gun

Firing Weapon: Select 5/54 NAV GUN

Number of Weapons Positive Integer: Enter 1

Number of Rounds Per Unit Positive Integer: Enter desired number of rounds

Projectile Type: Select 5IN-HE

Fuse Type: Select D

NEXT

Duration of Fire:

Supported Unit:

Priority Mission?: Select YES

FPF Mission?: NO

Mission Observed?: Select YES

NEXT

Fire Distribution: CONVERGED

TRANSMIT

b. Activating On Call Fire Mission

COMMANDS>>FIRE SUPPORT>>FIRE_MISSION>>FIRE_ON_CALL

Fire Mission ID: Enter name of ON_CALL mission

Time on Target: Blank for immediate mission, otherwise enter start time in DDHHMMZMMYY format

TRANSMIT

4. Activating Radar

Activating a ship's radar is a two step process that first involves defining the radar field, then activating the radar.

a. Radar Field Defined

COMMANDS>>INTELLIGENCE>>SEARCH_RADAR>>DEFINE

Radar Field ID: Enter desired name of radar field, recommend Ship Name + Radar, i.e., Tico Radar or DD985 Radar

Radar Field Location: Place mark on map display at location of ship

Radar Type: Select radar to activate *

Responsible Unit ID: Enter ship name

TRANSMIT

* Refer to ship radar compatibility chart in Appendix B

b. Activating Radar

COMMANDS>>INTELLIGENCE>>SEARCH_RADAR>>ACTIVATE

Radar Field ID: Enter name previously used to define field, i.e., Tico Radar or DD985 Radar

TRANSMIT

5. Move Ship

COMMANDS>>SHIP OPS>>SHIP_OPERATIONS>>MOVE

Movement Method: Select BY_SHIP or BY_TASK_FORCE, depending on situation

NEXT

Ship ID: Enter name of ship or task force, desired to be moved

Attachments: COLLOCATED

Move Override: YES

Desired Speed (knots) Integer 1-50: Enter desired speed

Speed Override: YES*

NEXT

Route Point: Mark point on map that ship is to move to. By using the Iteration button instead of transmit, a route with up to 9 waypoints and 1 endpoint, can be created.

Action Delay Time: If desired to pause ship prior to executing command, enter time in DDHHHHZMMMMYY format

NEXT

or

ITER

*Option will allow to enter a speed beyond which the ship class is capable

Movement Start Time: Enter time in DTG format when movement will start. Blank will move immediately

6. Ship Locate

Identical command to COMMANDS>>GROUND>>UNIT>>LOCATE, which can be used instead of the SHIP_OPERATIONS>>LOCATE command.

COMMANDS>>SHIP OPS>>SHIP_OPERATIONS>>LOCATE

Ship ID: Name of ship to desired to be relocated

New Ship Location: Place mark on map display at point which ship is desired to be relocated to

TRANSMIT

7. Miscellaneous Ship Commands

COMMANDS>>SHIP OPS>>SHIP_OPERATIONS>>HOLD

Holds a ship or a task force for a specified amount of time. Will not be involved in operations until time expires or RESUME command utilized.

COMMANDS>>SHIP OPS>>SHIP_OPERATIONS>>LOCATE

Use to instantaneously relocate a ship. Command is identical to COMMANDS>>GROUND>>UNIT>>LOCATE command.

COMMANDS>>SHIP OPS>>SHIP_OPERATIONS>>RESUME

Overrides/ends a HOLD command.

COMMANDS>>SHIP OPS>>SHIP_OPERATIONS>>REVERSE

Reverses the movement of a ship or task force

COMMANDS>>SHIP OPS>>SHIP_OPERATIONS>>SPEED

Allows adjustment of speed for a ship or task force under a MOVE command.

COMMANDS>>SHIP OPS>>SHIP_OPERATIONS>>STOP

Stops a ship or task force under a move command.

G. AMPHIBIOUS OPERATIONS

This section will cover defining an amphibious ship, setting launch hours, defining a landing site, and performing a landing with either aircraft or landing craft.

1. Amphibious Assault Ships

Defining an amphibious assault ship is identical to defining an aircraft carrier. The full set of instructions will be duplicated in this section.

a. Amphibious Assault Carrier

COMMANDS>>GROUND>>UNIT>>DEFINE

Unit ID: Enter desired ship name

Side Txt: LF

Unit Type: Select SHIP

NEXT

Hierarchy: COMPANY

Unit Location or Ship ID: Place mark on map for desired location of ship.

Control Function: Select desired Control Function

Display Name:

Real or Simulated: SIMULATED

NEXT

Lids Equipped: FALSE

TO/TE: YES

Service: Select USN

Ship sub type: Select desired ship class, LHA or LHD for amphibious carriers or LSD for troop and equipment carrying capability. Refer to ship chart in Appendix A

TRANSMIT

b. Amphibious Assault Carrier Airfield

COMMANDS>>AIR>>AIRFIELD>>DEFINE

Airfield ID: Enter name of aircraft carrier

Airfield Location: Again, enter name of aircraft carrier

Status: OPEN

Ordnance ID:

Fuel ID:

Air Squadrons ID(s):

NEXT

Runway ID(s):

Ownership: MTWS OWNED

TRANSMIT

c. Squadron

COMMANDS >> GROUND >> UNIT >> DEFINE

Unit ID: Enter desired squadron name

Side Txt: LF

Unit Type: Select AIR SQUADRON

NEXT

Hierarchy: Select SQUADRON

Unit Location or Ship ID: Enter name of carrier or airbase that squadron will be stationed at

Control Function: Select desired Control Function

Display Name:

Real or Simulated: SIMULATED

NEXT

LIDS Equipped: FALSE

Use TO/TE: YES

NEXT

Service: Select USMC *

Air Squadron Type: Select desired type of squadron

TRANSMIT

*No matter what type of aircraft or whether squadron will be based upon aircraft carrier, there will be less likelihood of Table of Organization type error if USMC is selected.

d. Outfitting Amphibious Assault Helo Squadron

COMMANDS>>AIR>>AIRCRAFT>>DEFINE

Aircraft Type: Select desired aircraft type from menu

Squadron ID: Enter desired name of squadron

Mode 2 IFF: Enter 4 digit number

Definition Method: Select QUANTITY*

NEXT

Number of Aircraft: Enter desired number of aircraft type for squadron.

Rationale: INITIAL

Rationale Comment: INITIAL

TRANSMIT

*Choosing Quantity, MTWS will assign side numbers for each aircraft. Selecting Individual will result in the user assigning side numbers for each aircraft.

e. Assault Ship/Airfield/Squadron Link

COMMANDS>>AIR>>AIRFIELD>>LINK

Airfield ID: Enter airfield name

Ordnance Unit ID: Enter name of associated supply unit

Fuel Unit ID: Enter name of associated supply unit

Air Squadron ID(s): Enter name of associated squadron(s)*

Runway ID(s):

TRANSMIT

*If user has not yet defined associated squadron(s), then leave this field blank

2. Landing Beaches

The define a beach command is the establishment of a ship-to-shore landing zone.

COMMANDS>>STS>>BEACH>>DEFINE

Beach ID: Enter desired name of beach

Side: LF

Beach Endpoint: Place mark on map at point where beach extends to

Beach Endpoint: Place mark on map at point opposite side, where beach extends from

NEXT

Causeway Landside Endpoint: Place mark on map display at land point where vehicle causeway will extend to*

Causeway Seaside Endpoint: Place mark on map display at sea point where vehicle causeway will extend from*

LOD Endpoint: Place mark on map display at line of departure, where vehicles start landward

LOD Endpoint: Place mark on map display at other end of line of departure

Rendezvous Point: Place mark on map display at point behind LOD where vehicles meet

NEXT

Transport Area Definition Iter: 1(3-10): Requires at least three points. Marks area where vehicles originate from. Place mark on map display for first point, then rotate clockwise marking other points for Transport Area. As you left click map display UTM coordinates will appear in Transport Area Definition input field. Note that a concave shaped Transport Area will result in an error.

Underway Launch Line Endpoint: Place mark on map display at one end of Underway Launch Line

Underway Launch Line Endpoint: Place mark on map display at other end of Underway Launch Line

Beach Supply Area Unit ID:

TRANSMIT

*Causeways are optional

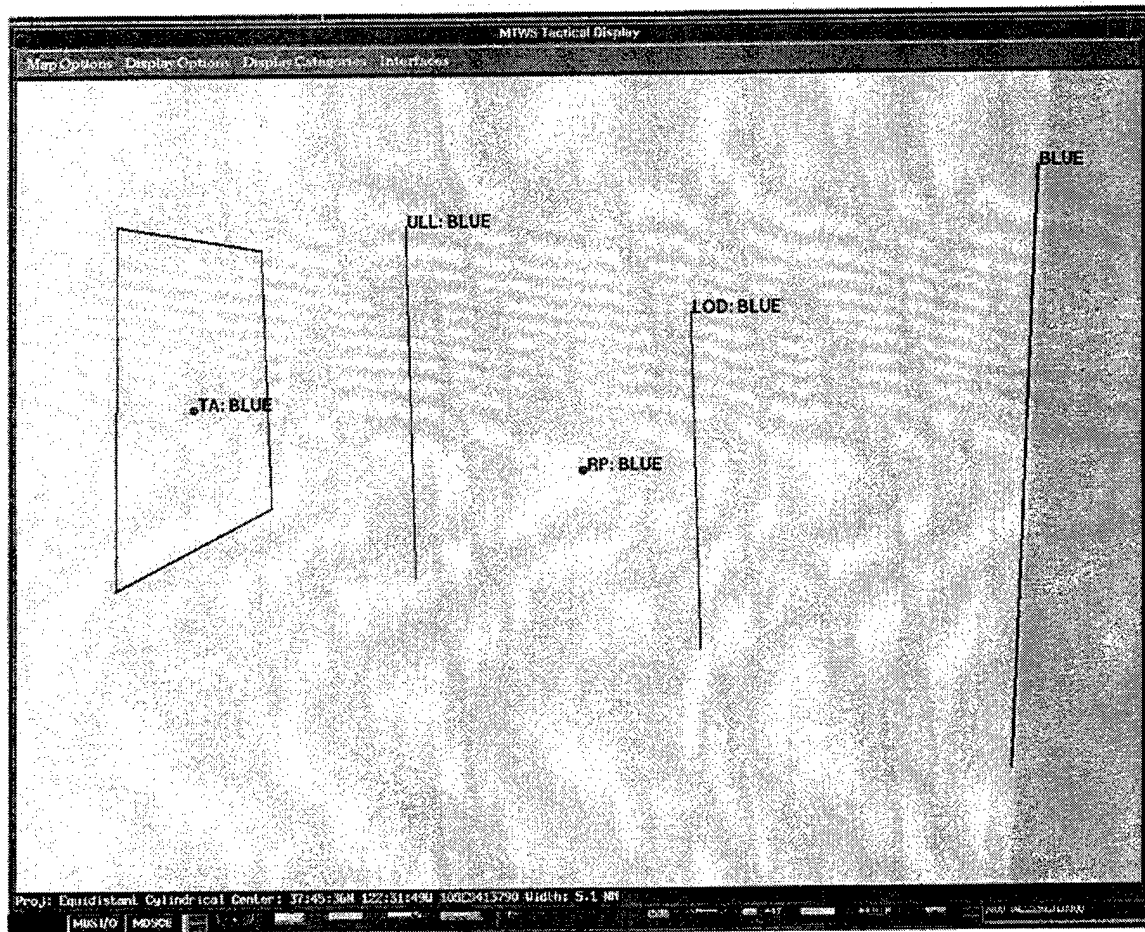


Figure 3. Defined Beach. Left to Right: Transport Area, Underway Launch Line, Rendezvous Point, Line of Departure, and Beach

3. Launch Hours

The purpose of the launch hour command is to set a time at which different units could coordinate an attack. Utilizing this reference time, a ship-to-shore movement can be scheduled with all involved referenced to it. No other prompting or initiating is required

COMMANDS >> STS >> A-Z_HOUR >> DEFINE

A-Z Hour ID ("A" - "Z"): Enter desired letter ID

Corresponding Exercise Time: Enter time movement is to commence, in DDHHMMZMMYY format

TRANSMIT

4. Landing Craft Ship-To-Shore Movement

This section on ship-to-shore movement assumes that the user has a defined landing beach and has either located defined units or defined new units for the assault. Units desired to be utilized in the assault need to be located on the amphibious ship performing the mission. The actual ship-to-shore movement requires a serial that is associated with a wave. This section will cover allocating landing craft to the ship, defining a serial, then a wave. A landing hour is required as a time reference, but the user may elect to reference one then use the Landing Hour command

to establish one, after the assault is planned and defined into the simulation.

a. *Allocating Landing Craft*

COMMANDS>>CSS>>ASSETS>>UPDATE

Unit or Cargo ID: Enter name of ship that is being allocated landing craft
Asset Category: ASSET

NEXT

Asset Type: LCAC (or other craft) listed under LANDING CRAFT
Quantity of Asset: Recommend entering 2
Asset Damage Category: OPERATIONAL
Rationale: INITIAL
Rationale Comment: INITIAL

TRANSMIT

b. *Serial*

COMMANDS>>STS>>SERIAL>>DEFINE

Serial ID: Enter desired name for serial
Side: LF
Ship ID: Enter name of ship, assault is originating from
Landing Method: USE OF LANDING CRAFT

NEXT

Cargo or Unit ID: Enter name of unit that is being moved to the beach (assaulting beach)
Destination Beach: Enter name of previously defined assault beach

NEXT

Landing Craft Type: Select desired type for assault
Number of Landing Craft: Enter number desired for assault

TRANSMIT

c. Wave

COMMANDS>>STS>>WAVE>>DEFINE

Kind of Wave: Select SCHEDULED

Wave ID: Enter desired name for assault movement

Display Name:

Side: LF

Beach ID: Enter name of previously defined assault beach

Landing Time: Enter landing hour +/- time for landing, i.e., B+00:30. B hour plus 30 minutes

Serial ID(s): Enter assault craft serials that have previously been defined

Specify Landing Craft and Quantity?: NO*

TRANSMIT

*Use this function for all landing craft to arrive at beach simultaneously

5. Aircraft Ship-To-Shore Movement

Aircraft assaults differ from landing craft assaults in that they do not require a wave. Air assaults require a specified landing zone (check point), a serial, and an air mission. Finally the **COMMANDS>>STS>>SERIAL>>ASSOCIATE** is utilized to pair the air mission and the serial. A landing hour is required as a time reference, but the user may elect to reference one, then use the Landing Hour command to establish one after the assault is planned and defined into the simulation.

a. Check Point

COMMANDS>>AIR>>CHECKPOINT>>DEFINE

Ground/Air Check Point ID: Enter desired name for landing point

Check Point Location: Place mark on map display for location of landing point

Side: LF

Is This a Landing Zone?: YES

TRANSMIT

b. Serial

COMMANDS>>STS>>SERIAL>>DEFINE

Serial ID: Enter desired name for serial

Side: LF

Ship ID: Enter name of ship, assault is originating from

Landing Method: USE OF LANDING CRAFT

NEXT

Cargo or Unit ID: Enter name of unit that is being moved to the beach (assaulting beach)

Destination Beach: Enter name of previously defined assault beach

NEXT

Landing Craft Type: Select desired type for assault

Number of Landing Craft: Enter number desired for assault

TRANSMIT

c. Air Assault Air Mission

COMMANDS>>AIR>>AIR_MISSION>>DEFINE

Frag Number: Enter desired name for assault mission

Aircraft Type ID: Select squadron aircraft type

Number of Aircraft: Enter desired number of aircraft for mission

Squadron ID: Enter squadron name

Take-off Point: Enter airfield name

Mode 1 IFF:

Mode 3 IFF:

Supported Unit:

NEXT

Mission Type: Select STS

NEXT

Timed Event: TAKE_OFF

NEXT

Take-off Time: Enter landing hour +/- time for landing, i.e., B+00:30. B hour plus 30 minutes

NEXT

Location: Enter name of designate Check Point

Altitude: Select altitude of mission

Point Definition: Select LAND

Ordnance Type:

Ordnance Quantity:

Units or Cargo:

TRANSMIT

d. Serial Associate

COMMANDS>>STS>>SERIAL>>ASSOCIATE

Serial ID: Enter name of air assault serial previously defined

Air Mission ID: Enter name of air assault mission previously defined

TRANSMIT

6. Miscellaneous STS Commands

COMMANDS>>STS>>ASSETS>>TRANSFER

Allows transfer of assets from one unit or task force to another unit or task force, immediately.

COMMANDS>>STS>>ASSETS>>ABANDON

Specified assets will "disappear" from system. They will no longer be a factor or be involved in exercise.

COMMANDS>>STS>>ASSETS>>UPDATE

Increments or decrements assets of a unit or a cargo, instantly.

COMMANDS>>STS>>BEACH>>CHANGE_LANDING_TIME

Changes landing time for a specified beach. All units involved in landing will implement change.

COMMANDS>>STS>>BEACH>>DELETE

Deletes a specified beach

COMMANDS>>STS>>BEACH>>MODIFY

Modifies attributes of a previously defined beach

H. GROUND OPERATIONS

Ground troops and tank units are employed with the same commands in MTWS. Utilize the GROUND>>UNIT>>MISSION command and select the type of mission. Examples provided here will utilize ground troops in a movement and a tank unit in an attack. Action commands given to ground units, may sound similar but have different effects. Seize is a primary command and Attack is an override command. They will do similar actions, but Attack will have little concern for losses. Hold will override Defend and will have little concern for losses while holding onto a position.

1. Ground Troops

a. Infantry Unit

COMMANDS>>GROUND>>UNIT>>DEFINE

Unit ID: Enter desired name of ground unit

Side Txt: LF

Unit Type: Select INFANTRY

NEXT

Hierarchy: Select desired size of unit

Unit Location or Ship: Place mark on map display for desired location of unit

Control Function ID: Select desired Control Function

Display Name:

Real or Simulated: SIMULATED

NEXT

LIDS Equipped: FALSE

USE TO/TE: YES

NEXT

Service/Alliance/Country: Select USMC

INFANTRY sub-type: Select desired type of infantry unit

TRANSMIT

b. Infantry Unit Move

COMMANDS>>GROUND>>UNIT>>MISSION

Unit ID: Enter name of unit desired to be moved

Mission: Select MOVE

Formation: Select COLUMN

Attachments:

Mission Type: MV_PLANS

NEXT

Move Override: YES

Desired Speed: Enter desired speed

Speed Override: Select yes if the speed desired is beyond a couple miles per hour

Movement Start Time: Leave blank for immediate start, otherwise enter start time in DDHHMMZMMYY format

NEXT

Route Point Coordinate: Place mark on map display for desired location of unit. Utilize the iteration function to create a route.

Route Point Delay Time: Enter time that unit is to wait before executing next route point.

TRANSMIT

or

ITERATION

2. Tanks

a. Tank Unit

COMMANDS>>GROUND>>UNIT>>DEFINE

Unit ID: Enter desired name of tank unit

Side Txt: LF

Unit Type: Select TANK

NEXT

Hierarchy: Select desired size of unit

Unit Location or Ship: Place mark on map display for desired location of unit

Control Function ID: Select desired Control Function

Display Name:

Real or Simulated: SIMULATED

NEXT

LIDS Equipped: FALSE

USE TO/TE: YES

NEXT

Service/Alliance/Country: Select USMC

TANK sub-type: Select M1A1

TRANSMIT

b. Tank Seize Mission

COMMANDS>>GROUND>>UNIT>>MISSION

Unit ID: Enter name of unit desired to be moved

Mission: Select SEIZE

Formation: Select LINE

Attachments:

Mission Type: MV_PLANS

NEXT

Move Override: YES

Desired Speed: Enter desired speed

Speed Override: Select yes if the speed entered is beyond capabilities of the tank

Movement Start Time: Leave blank for immediate movement, otherwise enter start time in DDHHMMZMMYY format

NEXT

Route Point Coordinate: Place mark on map display for desired location of unit. Utilize the iteration function to create a route.

Route Point Delay Time: Enter time that unit is to wait before executing next route point.

TRANSMIT

or

ITERATION

*Units will move abreast of each other

3. Fire Support

This section will provide guidance on establishing an artillery battery and performing fire support missions. Fire support missions from a battery are nearly identical to those performed from ships. Consult the naval gunfire section in this chapter for an example of an on-call mission.

a. Artillery Battery

COMMANDS>>GROUND>>UNIT>>DEFINE

Unit ID: Enter desired name of artillery unit

Side Txt: LF

Unit Type: Select ARTILLERY

NEXT

Hierarchy: Select desired size of unit

Unit Location or Ship: Place mark on map display for desired location of unit

Control Function ID: Select desired Control Function

Display Name:

Real or Simulated: Simulated

NEXT

LIDS Equipped: False

USE TO/TE: Yes

NEXT

Service/Alliance/Country: Select USMC

ARTILLERY sub-type: Select desired artillery battery*

TRANSMIT

* Current artillery batteries for USMC: 105-ARTY-HOW, 155MM-ARTY-HOW. U.S. Army utilizes: M-198, 155SP, and MLRS. If user utilizes Army batteries, select NO on TO/TE and utilize the ASSETS>>UPDATE command to furnish troops, artillery pieces, and ammo.

b. Scheduled Fire Support Mission

COMMANDS>>FIRE SUPPORT>>FIRE_MISSION>>DEFINE

Fire Mission ID: Enter desired name of mission

Fire Mission Type: Select SCHEDULED

NEXT

Target: Enter target name or place mark on map display at target location

Target Element: Select target type from menu

Ordnance Type: NON_NUCLEAR

NEXT

Firing Unit: Enter name of unit firing

Firing Weapon: Select artillery type (155MM-ARTY-HOW)

Number of Weapons Positive Integer: Enter 1

Number of Rounds Per Unit Positive Integer: Enter desired number of rounds

Projectile Type: Select ammunition type (155MM-HE)

Fuse Type: Select desired fuse type (D)

NEXT

Duration of Fire:

Supported Unit:

Priority Mission?: Select YES

FPF Mission?: NO

Mission Observed?: Select YES

NEXT

Fire Distribution: CONVERGED

TRANSMIT

c. Fire Support Quick Mission

The fire support quick mission performs a fire support mission, with MTWS determining artillery pieces and ammunition to be utilized. This would be a factor if the battery possessed different artillery pieces and ammunition types.

COMMANDS>>FIRE SUPPORT>>FIRE_MISSION>>DEFINE_QUICK_MISSION

Fire Mission ID: Enter desired name for artillery mission

Target: Enter target name or location

Firing Unit: Enter name of unit firing

Projectile Type: This is optional in a Quick Mission

Supported Unit:

TRANSMIT

4. Ground Unit Locate

The ground unit locate command can be utilized to relocate any ground unit, and can be utilized on ships as well.

COMMANDS>>GROUND>>UNIT>>LOCATE

Unit ID: Enter name of unit desired to be relocated

Unit Location: Mark point on map display where unit is desired to be relocated to

TRANSMIT

I. COMBAT ENGINEERING

Combat engineering functions are utilized to create and remove objects in the map display. This section will cover developing an engineering unit, creating and dismantling a minefield, creating a river in the display, and then building a bridge over it. If a combat engineering unit is not located close enough to perform a mission, then the GROUND>>UNIT>>LOCATE command can be utilized to place the unit in closer proximity to the project. An additional command will be the Force Completion command which will immediately complete any task that the combat engineers are involved in.

1. Combat Engineering Unit

COMMANDS>>GROUND>>UNIT>>DEFINE

Unit ID: Enter desired name of ground unit

Side Txt: LF

Unit Type: Select INFANTRY

NEXT

Hierarchy: Select desired size of unit

Unit Location or Ship: Place mark on map display for desired location of unit

Control Function ID: Select desired Control Function

Display Name:

Real or Simulated: SIMULATED

NEXT

LIDS Equipped: FALSE

USE TO/TE: YES

NEXT

Service/Alliance/Country: Select USMC

CE sub-type: Select CMB_ENG

TRANSMIT

2. Build A Minefield

COMMANDS>>CE>>CE>>CONSTRUCT

CE Object ID: Enter desired name of minefield

Unit ID: Enter name of unit constructing minefield

Start Time: Leave blank to start immediately, otherwise enter start time in DDHHMMZMMMY format

CE Class Object: Select OBSTACLE

NEXT

Kind of Obstacle: Select MINE

NEXT

Side: LF

Kind of Minefield: AH-MED is anti-helicopter medium density

AP-HIGH is anti-personnel high density

AS-LOW is anti-ship low density

AT is anti-tank

Mixed is a combination of land mines

Area Coordinates: Place marks on map display in a clockwise rotation. Ensure that shape is not concave.

TRANSMIT

3. Remove A Minefield

COMMANDS>>CE>>CE>>REMOVE

CE Object ID: Enter name of combat engineering constructed object, desired to be removed

Unit ID: Enter name of unit to remove object

Start Time: Leave blank to start immediately, otherwise enter time in DDHHMMZMMMY format

TRANSMIT

4. Create A River

COMMANDS>>CE>>CE>>CREATE

Object ID: Name of object that is being created

Object Class: NATURAL_TERRAIN

NEXT

Kind of Feature: RIVER

NEXT

River Type: RIVER

Width in Meters: Enter desired width of river

Line Coordinates: Place marks on map display for route that you desire river to take

TRANSMIT

5. Bridge

COMMANDS>>CE>>CE>>CONSTRUCT

CE Object ID: Enter desired name of object that is being constructed

Unit ID: Enter name of CE unit that is constructing object

Start Time: Leave blank to start immediately, otherwise enter start time in DDHHMMZMMYY format

NEXT

Improved Surface Kind: Select Bridge

NEXT

Bridge Type: Select type of bridge desired

Bridge Location: Place mark on map display at point where bridge is desired

Obstacle Being Bridged: Enter name of obstacle*

TRANSMIT

*Ensure that obstacle name is entered and not type of obstacle.

6. Force Completion

COMMANDS>>CE>>CE>>FORCE_COMPLETION

CE Object ID: Enter name of object that is desired to be completed immediately

TRANSMIT

J. MEDICAL EVACUATION

This section will provide instruction on developing a hospital and performing an evacuation. An evacuation is complex, first involving developing a cargo of wounded, developing an air mission, then loading the cargo on the mission. For the example mission provided, the hospital will not be utilized, but rather the wounded will be returned to where the air mission originated.

1. Field Hospital

COMMANDS>>GROUND>>UNIT>>DEFINE

Unit ID: Enter desired name of hospital unit

Side Txt: LF

Unit Type: Select MEDICAL

NEXT

Hierarchy: Company

Unit Location: Place mark on map display for desired location of hospital unit

Control Function ID: Select desired Control Function

Display Name:

Real or Simulated:

NEXT

LIDS Equipped: NO

Use TO/TE: Select NO*

TRANSMIT

*For this particular unit, it is recommended that user not utilize Table of Organization/Table of Equipment.

2. Medevac

a. Medevac Cargo

COMMANDS>>CSS>>CARGO>>DEFINE

Cargo ID: Enter desired name of cargo load

Asset Category: Select NO_ASSET

NEXT

Troops/No Troops: Select TROOPS

NEXT

Number of Troops Positive Integer: Enter number of troops requiring medevac

Troop Damage Category: Select appropriate category from the menu, best describing condition of troops

NEXT

Gallons of Fuel:

Gallons of Water:

Quantity of Rations:

Requesting Unit ID: Enter the name of the unit where the troops are located/attached

Supplying Unit ID: Enter name of unit supplying medevac

TRANSMIT

b. Medevac Air Mission

COMMANDS>>AIR>>AIR_MISSION>>DEFINE

Frag Number: Enter desired name for mission

Aircraft Type ID: Select helicopter squadron aircraft type

Number of Aircraft: Enter desired number of aircraft for mission

Squadron ID: Enter squadron name

Take-off Point: Enter airfield name

Mode 1 IFF:

Mode 3 IFF:

Supported Unit:

NEXT

Mission Type: Select MEDEVAC

NEXT

Timed Event: TAKE_OFF

NEXT

Take-off Time: Leave blank for immediate launch, otherwise enter time in DDHHMMZMMYY format.

NEXT

Location: Place mark on map display for location of medevac cargo

Altitude: Select altitude of mission

Point Definition: Select LAND

Ordnance Type:

Ordnance Quantity:

Units or Cargo:

TRANSMIT

c. Load Patients Onto Medevac

With this command the patients are loaded onto the helicopter and when they reach their ultimate station, they are unloaded automatically.

COMMANDS>>CSS>>CARGO>>LOAD

Cargo ID: Enter designated name of medevac load

Unit or Air Mission ID: Enter name of air mission assigned to pick up medevac load

TRANSMIT

K. REPORTS

MTWS has numerous predefined reports that cover all combat areas. This section will provide examples of two reports commonly utilized. The ordnance load report will provide the user with a listing of all defined ordnance loads as well as all types of ordnance that are contained within them. The ground unit asset report will list all assets associated with a unit.

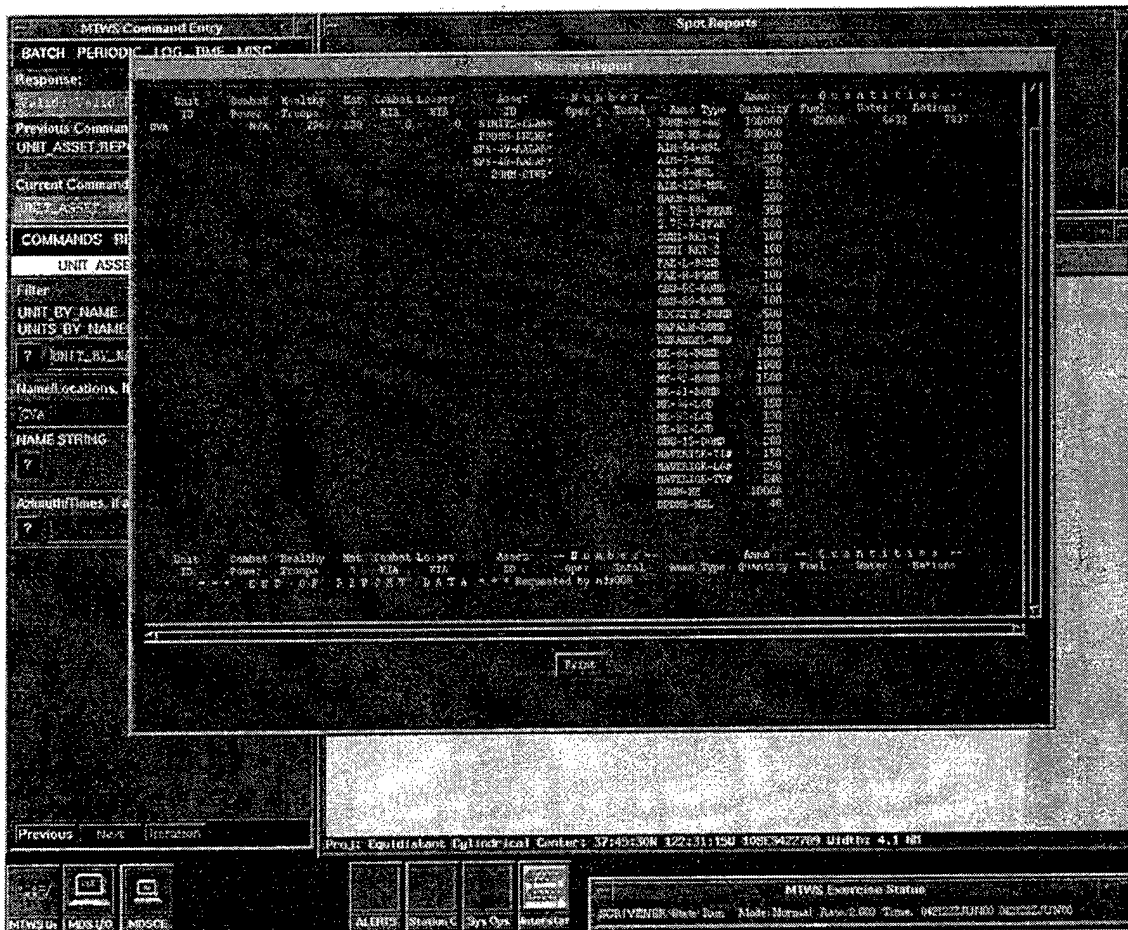


Figure 4. Expanded Reports Window.

1. DEFINED ORDNANCE LOADS REPORT

REPORTS>>AIR>>ORDNANCE LOAD

Report ID: AIR_ ORDLORD_ DEFN_RPT

NEXT

Filter: Select ORD_LOAD_ALL

Name/Locations if applicable:

Azimuth/Times if applicable:

TRANSMIT

2. UNIT ASSETS SUMMARY REPORT

REPORTS>>GROUND>>UNIT ASSET

Report ID: Select UNIT_ASSETS_SUM_RPT

NEXT

Filter: Select UNIT_BY_NAME

Name/Locations if applicable: Enter name of desired unit for summary report

TRANSMIT

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APPENDIX A: AIRCRAFT/ORDNANCE/FUSE COMPATIBILITY CHART

AIRCRAFT DESIGNATOR NAME	COMPATIBLE ORDNANCE	FUSE						
		Q	D	MT	VT	CP	DC	NONE
A-10A ARDVARK	MK-81-BOMB	X	X	X	X		X	
	MK-82-BOMB	X	X	X	X		X	
	MK-83-BOMB	X	X	X	X			
	MK-84-BOMB	X	X	X	X			
	MK-117-BOMB	X	X	X	X		X	
	NAPALM-BOMB	X						
	MK-81SE-BOMB	X	X	X	X		X	
	MK-82SE-BOMB	X	X	X	X		X	
	CBU-52-BOMB			X				
	CBU-59-BOMB			X				
	DURANDEL-BOMB	X	X					
	FAE-L-BOMB			X				
	FAE-H-BOMB			X				
	ROCKEYE-BOMB			X				
	MK-82-LGB	X	X	X	X			
	MK-83-LGB	X	X	X	X			
	MK-84-LGB	X	X	X	X			
	30MM-DU-AC							X
	MAVERICK-IIR-MSL	X	X	X	X			
	MAVERICK-LG-MSL	X	X	X	X	X	X	
	MAVERICK-TV-MSL	X	X	X	X	X	X	

AIRCRAFT DESIGNATOR NAME	COMPATIBLE ORDNANCE	FUSE						
		Q	D	MT	VT	CP	DC	NONE
AV-8B HARRIER	MK-81-BOMB	X	X	X	X		X	
	MK-82-BOMB	X	X	X	X		X	
	MK-83-BOMB	X	X	X	X			
	MK-84-BOMB	X	X	X	X			
	MK-117-BOMB	X	X	X	X		X	
	NAPALM-BOMB	X						
	MK-81SE-BOMB	X	X	X	X		X	
	MK-82SE-BOMB	X	X	X	X		X	
	CBU-52-BOMB			X				
	CBU-59-BOMB			X				
	DURANDEL-BOMB	X	X					
	FAE-L-BOMB			X				
	FAE-H-BOMB			X				
	ROCKEYE-BOMB			X				
	ZUNI-RKT-2	X						
	ZUNI-RKT-4	X						
	2.75-7-FFAR	X						
	2.75-19-FFAR	X						
	20MM-HE-AC							X
	MAVERICK-IIR-MSL	X	X	X	X			
	MAVERICK-LG-MSL	X	X	X	X	X	X	
	MAVERICK-TV-MSL	X	X	X	X	X	X	
B-1B LANCER	MK-81-BOMB	X	X	X	X		X	
	MK-82-BOMB	X	X	X	X		X	
	MK-83-BOMB	X	X	X	X			
	MK-84-BOMB	X	X	X	X			
	MK-117-BOMB	X	X	X	X		X	
	ALCM-MSL	X	X	X	X	X	X	
B-52 STRATO- FORTRESS	MK-81-BOMB	X	X	X	X		X	
	MK-82-BOMB	X	X	X	X		X	
	MK-83-BOMB	X	X	X	X			
	MK-84-BOMB	X	X	X	X			
	MK-117-BOMB	X	X	X	X		X	
	ALCM-MSL	X	X	X	X	X	X	
EA-6B PROWLER	HARM-MSL	X	X	X	X	X	X	
	STD-ARM-MSL	X	X	X	X	X	X	
	SHRIKE-MSL	X	X	X	X	X	X	
F-14 TOMCAT	AIM-54-MSL							X
	AIM-9-MSL							X
	AIM-7-MSL							X

AIRCRAFT DESIGNATOR NAME	COMPATIBLE ORDNANCE	FUSE						
		Q	D	MT	VT	CP	DC	NONE
F-15 EAGLE	MK-81-BOMB	X	X	X	X		X	
	MK-82-BOMB	X	X	X	X		X	
	MK-83-BOMB	X	X	X	X			
	MK-84-BOMB	X	X	X	X			
	MK-117-BOMB	X	X	X	X		X	
	DURANDEL-BOMB	X	X					
	FAE-L-BOMB			X				
	FAE-H-BOMB			X				
	ROCKEYE-BOMB			X				
	MK-82-LGB	X	X	X	X			
	MK-83-LGB	X	X	X	X			
	MK-84-LGB	X	X	X	X			
	AIM-120-MSL							X
	AIM-9-MSL							X
	AIM-7-MSL							X
F-16 FALCON	MK-81-BOMB	X	X	X	X		X	
	MK-82-BOMB	X	X	X	X		X	
	MK-83-BOMB	X	X	X	X			
	MK-84-BOMB	X	X	X	X			
	MK-117-BOMB	X	X	X	X		X	
	DURANDEL-BOMB	X	X					
	FAE-L-BOMB			X				
	FAE-H-BOMB			X				
	ROCKEYE-BOMB			X				
	MK-82-LGB	X	X	X	X			
	MK-83-LGB	X	X	X	X			
	MK-84-LGB	X	X	X	X			
	HARM-MSL	X	X	X	X	X	X	
	STD-ARM-MSL	X	X	X	X	X	X	
	SHRIKE-MSL	X	X	X	X	X	X	
	AIM-120-MSL							X
	AIM-9-MSL							X

AIRCRAFT DESIGNATOR	COMPATIBLE ORDNANCE	FUSE						
		Q	D	MT	VT	CP	DC	NONE
F-18 HORNET	MK-81-BOMB	X	X	X	X		X	
	MK-82-BOMB	X	X	X	X		X	
	MK-83-BOMB	X	X	X	X			
	MK-84-BOMB	X	X	X	X			
	MK-117-BOMB	X	X	X	X		X	
	DURANDEL-BOMB	X	X					
	FAE-L-BOMB			X				
	FAE-H-BOMB			X				
	ROCKEYE-BOMB			X				
	MK-82-LGB	X	X	X	X			
	MK-83-LGB	X	X	X	X			
	MK-84-LGB	X	X	X	X			
	NAPALM-BOMB	X						
	MAVERICK-IIR-MSL	X	X	X	X			
	MAVERICK-LG-MSL	X	X	X	X	X	X	
	MAVERICK-TV-MSL	X	X	X	X	X	X	
	WALLEYE-MSL	X	X	X	X	X	X	
	AIM-9-MSL							X
F-18D HORNET	MK-81-BOMB	X	X	X	X		X	
	MK-82-BOMB	X	X	X	X		X	
	MK-83-BOMB	X	X	X	X			
	MK-84-BOMB	X	X	X	X			
	MK-117-BOMB	X	X	X	X		X	
	DURANDEL-BOMB	X	X					
	FAE-L-BOMB			X				
	FAE-H-BOMB			X				
	ROCKEYE-BOMB			X				
	MK-82-LGB	X	X	X	X			
	MK-83-LGB	X	X	X	X			
	MK-84-LGB	X	X	X	X			
	NAPALM-BOMB	X						
	MAVERICK-IIR-MSL	X	X	X	X			
	MAVERICK-LG-MSL	X	X	X	X	X	X	
	MAVERICK-TV-MSL	X	X	X	X	X	X	
	WALLEYE-MSL	X	X	X	X	X	X	
	AIM-9-MSL							X
P-3 ORION	BULLPUP-MSL	X	X	X	X	X	X	

AIRCRAFT DESIGNATOR NAME	COMPATIBLE ORDNANCE	FUSE						
		Q	D	MT	VT	CP	DC	NONE
AH-1W COBRA	HELLFIRE-MSL	X	X	X	X	X	X	
	TOW-MSL							X
	ZUNI-RKT-2	X						
	ZUNI-RKT-4	X						
	2.75-7-FFAR	X						
	2.75-19-FFAR	X						
AH-64A APACHE	AIM-9-MSL							X
	20MM-HE-AC							X
	HELLFIRE-MSL	X	X	X	X	X	X	
	ZUNI-RKT-2	X						
	ZUNI-RKT-4	X						
	2.75-7-FFAR	X						
UH-60 BLACKHAWK SEA HAWK	2.75-19-FFAR	X						
	AIM-9-MSL							X
	20MM-HE-AC							X

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APPENDIX B: SHIP WEAPONS SYSTEMS AND RADAR CHART

PLATFORM NAME AS DISPLAYED IN MENU	PLATFORM TYPE	PLATFORM DESIGNATOR	PLATFORM WEAPON SYSTEMS	PLATFORM RADARS
BLUE RIDGE LCC	COMMAND SHIP	LCC	20MM CIWS BPDMS LNCHR	SPS-48 RADAR SPS-40 RADAR
ARLIEGH BURKE BURKE_CLASS	DESTROYER	DDG	20MM CIWS HARPOON LNCHR STD-SM-2 LNCHR	SPY-1D RADAR
KIDD KIDD_CLASS	DESTROYER	DD	20MM CIWS 5/54 GUN HARPOON LNCHR STD-SM-2 LNCHR	SPS-48 RADAR
JOHN F. KENNEDY JFK_CLASS	AIRCRAFT CARRIER	CV	20MM CIWS	SPS-48 RADAR SPS-49 RADAR
LOS ANGELES	SUBMARINE	SSN	HARPOON LNCHR	
NIMITZ NIMITZ_CLASS	NUCLEAR AIRCRAFT CARRIER	CVN	20MM CIWS	SPS-48 RADAR SPS-49 RADAR
OLIVER HAZARD PERRY PERRY_CLASS	FRIGATE	FFG	20MM CIWS STD-SM-2 LNCHR	SPS-49 RADAR
SEAWOLF	SUBMARINE	SSN	HARPOON LNCHR	
SPRUANCE SPRUANCE_CLASS	DESTROYER	DD	20MM CIWS 5/54 GUN HARPOON LNCHR STD-SM-2 LNCHR	SPS-40 RADAR

TAWARA LHA	AMPHIBIOUS ASSAULT CARRIER	LHA	20MM CIWS 5/54 GUN BPDMS LNCHR	SPS-40 RADAR SPS-52 RADAR
TICONDEROGA TICO_CLASS	CRUISER	CG	20MM CIWS 5/54 GUN HARPOON LNCHR STD-SM-2 LNCHR	SPY-1B RADAR
WASP LHD	AMPHIBIOUS ASSAULT CARRIER	LHD	20MM CIWS	SPS-48 RADAR SPS-52 RADAR
WHIDBEY ISLAND LSD	AMPHIBIOUS DOCK LANDING SHIP	LSD		SPS-49 RADAR

APPENDIX C: MTWS SYMBOLOGY



Light Air
Defense/
Air Traffic
Control



Engineering



Communications



Tank
Motorized



Motorized
Reconnaissance



Motorized
Infantry



Mortar



Artillery



Assault
Gun



Anti-Tank



Reconnaissance



Aviation



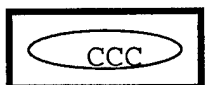
Infantry



Military
Police



Medical



Amphibian
Assault



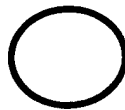
Anti-Aircraft
Battery



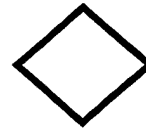
Mobil Anti-
Aircraft



Unknown
Surface
Track



Friendly
Surface
Track



Hostile
Surface
Track



Unknown
Air Track



Friendly
Air Track



Hostile
Air Track



Ship



Squad



Section



Platoon



Company/
Battery



Battalion/
Squadron



Regiment/
Air Group



Brigade



Division/
Air Wing

APPENDIX D: BRINGING MTWS NETWORK UP

Starting MTWS System Control (MSC)

1. Enter user name.
2. Enter password.

System Control icon will appear.
3. Right click: Start Sysop>>MTWS.

Alerts, MTWS System Control, and Status for Exercise windows will appear.
4. In MTWS System Operations window: System Control>>Admin>>Start>>MSC.

Click OK.

Command Valid: MSC Started will appear.
5. In MTWS System Operations window: System Control>>Applications>>Load
MAN.

Select desired MANs.

Click OK.

Valid Command: APP_LOAD_MAN will appear.
6. In MTWS System Operations window: Exercise
Control>>Database>>Exercise>>Load.

Select desired exercise.

Click OK.

Click OK.

7. In MTWS System Operations window: System Control>>Applications>>Start App.
Click OK>
Valid Command: APP_START will appear
8. In MTWS System Operations window: System Control>>Interfaces>>MDS_Net>>Start.
Valid Command: Interface is Started MSC_MDS will appear.
9. In MTWS System Operations window: Exercise Control>>Operation>>State>>Run.
Valid Command: STATE_RUN will appear.

Starting MTWS Display Station (MDS)

1. Enter user name.
2. Enter password.
MTWS User icon will appear.
3. Right click mouse: MTWS>>Start MDS>>Without CBT.
4. Double click Station Control icon.
5. Select User Privilege Level 2.
6. Enter User Privilege Level 2 password.
7. Select On Line.

GLOSSARY OF MTWS-RELATED ABBREVIATIONS AND ACRONYMS

A-Z Hours	Supporting Arms Reference Times
AA	Air-to-Air, Amphibious Assault
AAA	Anti-Air Artillery
AAM	Air-To-Air Missile
AARM	Anti-Air Radiation Missile
AAS	Air-to-Surface
AAV	Assault Amphibious Vehicle
AAW	Air-to-Air Weapon
AC	Chemical Agent Hydrogen Cyanide, Aircraft, Air Cover
ACA	Airspace Coordination Area
ACE	Air Combat Element
AD	Air Defense
ADZ	Air Defense Zone
AEW	Airborne Early Warning
AG	Aggressor
AGAIR	Aggressor Air Control
AGARTY	Aggressor Artillery Control
AGCON	Aggressor Control
Aggressor	Enemy Force

AGL	Above Ground Level
AIM	Air Intercept Missile
AIRCON	Air Control
AIRDEF	Air Defense Control
AIZ	Air Intercept Zone
ALCM	Air Launched Cruise Missile
ALSM	Air Launched Surface Missile
Ammo	Ammunition
AN	Alphanumeric
AO	Air Operations
AOA	Amphibious Operations Area
AOAD	Air Operations Air Defense constituent capability
AOAM	Air Operations Air Mission constituent capability
AOAR	Air Operations Air Reconnaissance constituent capability
AOC	Air Operations Command
AOCF	Air Operations Command Function
AOEW	Air Operations Electronic Warfare
AP	Air Processing; or Anti-Personnel
ARM	Anti-Radiation Missile
Armed Recce	Armed Air Reconnaissance
ARTY	Artillery
ARTYCON	Artillery Control

AS	Air-to-Surface
ASAP	As Soon As Possible
ASM	Air-to-Surface Missile
ASQ	Air Squadron
AT	Anti-Tank
ATF	Amphibious Task Force
ATGM	Anti-Tank Guided Missile
ATK	Anti-Tank
ATO	Air Tasking Order
AWACS	Airborne-Warning and Control System
AWC	Actual Water Consumption
A-Z Hours	Supporting Arms Reference Times
BDA	Battle-Damage Assessment
Bde	Brigade
BL	Boundary Line
Bn	Battalion
BSA	Beach Support Area
Btry	Battery
BWC	Basic Water Consumption
C4I	Command, Control, Communications, Computers and Intelligence
CA	Casualty and Damage Assessment
CAAT	Area Target CA

CACF	CA Command Function
CAL	Caliber
CAMF	Minefield CA
CANO	Non Battle CA
CAOB	Barrier or Obstacle CA
CAP	Combat Air Patrol
CAPT	Point Target CA
CAS	Close Air Support
CASLIM	Casualty Limit
CASW	Special Weapons CA
CATF	Commander, Amphibious Task Force
CBU	Cluster Bomb Unit
C2	Command and Control
CC	Close Combat or Clock Control
CDA	Casualty Damage Assessment
CE	Combat Engineer(s)(ing)
CECF	CE Command Function
CECON	Combat Engineer Control
CF	Command Function
CFE	Combined Features and Elevation
CFL	Coordinated Fire Line
CFR	Counter Fire Radar

CG	Carrier Group
CIFS	Close-In Fire Support
CIV	Civilian
Class	The general group that a widget belongs to.
CLGP	Cannon Launched Guided Projectiles
CM	Cruise Missile
Cmd	Command
COLO	Collocated
COM	Communications
Configs	Configurations
COZ	Crossover Zone
CP	Command Post or Concrete-Piercing or Control Point
Cpl	Corporal
CSS	Combat Service Support
CSSCON	Logistics Control
CSSET	Equipment Evacuation Teams
CSSME	Medical Evacuation CSS Teams
CSSRP	Resupply/Personnel Replacement
CSSRT	Equipment Repair CSS Team
Ctl	Control
CTRL	Control
CV	Conventional Powered Aircraft Carrier

CVN	Nuclear Powered Aircraft Carrier
CVTF	Aircraft Carrier Task Force
CW	Communications and Electronic Warfare or "Causeway"
DAS	Deep Air Support
DIV	Division
DMZ	De-Militarized Zone
DP	Drop Point
DTED	Digital Terrain and Elevation Data
DTG	Date-Time Group
DUI	Data Unique Identifier
EC	Exercise Control
ECCM	Electronic Counter-Countermeasures
ECM	Electronic Countermeasures
ENG	Engineering
Enr	Enroute
ENV	Environment
ESM	Electronic Support Measures or Electronic Surveillance Measures
ETS	Effective Troop Strength
EW	Electronic Warfare
EZ	Engagement Zone
F-Kill	Firepower Kill
FAC	Forward Air Controller

FARP	Forward Arming and Refueling Point
FASCAM	Family of Scatterable mines
FASCAMAT	Scatterable mines, anti-tank
FEBA	Forward Edge of the Battle Area
FFA	Free Fire Area
FFE	Fire for Effect
FIFO	First In, First Out
Flids	Light Intensification Device Factor
FLT	Flight
FM	Fire Mission
FMC	Field Maneuver Controller
FMF	Fleet Marine Force
FMFLANT	Fleet Marine Force Atlantic
FMFM	Fleet Marine Force Manual
FMFPAC	Fleet Marine Force Pacific
FO	Forward Observer
FPF	Final Protective Fire
FRAG	Fragmentary Order
FRDCP	Formation and Range-Dependent Combat Power
FROG	Free Rocket Over Ground
FS	Fire Support
FSA	Fire Support Area

FSCF	Fire Support Command Function
FSCL	Fire Support Coordination Line
FSSG	Force Service Support Group
FT	Foot Trafficability
Gal	Gallon
GB	chemical nerve agent Sarine
GC	Ground Combat
GCCF	Ground Combat Command Function
GCCS	Global Command and Control System
GCI	Ground Controlled Intercept(s)
GD	Designation for the chemical nerve agent Soman
GES	Ground Emplaced Sensor
GID	Group Identification
GLCM	Ground Launched Cruise Missile
GM	Ground Movement
GND	Ground
GPS	Global Positioning System
Grd	Ground
GSR	Ground Surveillance Radar
H-Hour	Planned time of arrival of surface assault elements
H&S	Headquarters and Support
HARM	High Speed Anti-Radiation Missile

HAW	Heavy Antitank Weapon
HD	Designation of a chemical blister agent
HE	High Explosive
HELO	Air Helicopter Control
HF	High Frequency
HL	Designation of a chemical blister which is a Mustard-Lewisite mixture
HLZ	Helicopter Landing Zone
HMMWV	High Mobility Motorized Wheeled Vehicle
HOB	Height of Burst
HOW	Howitzer
HQ	Headquarters
Hr	Hour
HST	Helicopter Support Team
ICM	Improved Conventional Munitions
ICMDP	Improved Conventional Munitions, Dual Purpose
ID	Identification or Identifier
IFF	Identification Friend or Foe
IFR	In Flight Refueling
IFY	Infantry
ILLUM	Illumination
IN	Intelligence
INCON	Intelligence Control

INF	Infantry
Info	Information
I/O	Input/Output
Init	Initialize
Intel	Intelligence
IR	Infrared
JMCIS	Joint Maritime Command Information System
JOG	Joint Operations Graphic (Map Format)
JP	Jet Propelled
KB	Kilobytes
Kbytes	Kilobytes
K-Kill	Catastrophic Kill
KBPS	Kilobytes Per Second
KIA	Killed in Action
Km	Kilometer
Kph	kilometers Per Hour
Kt	Knot (nautical miles per hour)
KT	Kiloton
LA	Light Armored
LAAD	Light Anti-Air Defense
LAAM	Light Anti-Air Missile
Lat/Lon	Latitude/Longitude

LAV	Light Assault Vehicle
LAW	Light Antitank Weapon
Lb	Pound
LC	Landing Craft
LCAC	Landing Craft Air Cushion
LCpl	Lance Corporal
LED	Light-Emitting Diode
LF	Landing Force
LG	Laser-Guided
LHA	Helicopter/VSTOL-capable amphibious assault ship
LIDS	Light Intensification Devices
LMG	Light Machine Gun
LOD	Line of Departure
LOGCON	Logistics Control
LOS	Line-of-Sight
LPD	Landing Platform Dock
LPH	Landing Platform Helicopter
LSD	Landing Ship, Dock
LST	Landing Ship Tank
LtCol	Lieutenant Colonel
LZ	Landing Zone
M	Meter

M-Kill	Mobility Kill
MADR	Maximum aural detection range
MAE	Mean Area of Effectiveness
MAG	Marine Air Group
MAGTF	Marine Air Ground Task Force
MAINT	Maintenance
MAJ	Major
MAN	MTWS Application Network
MAN-COMM	Man Communications
MANCON	Maneuver Control
MAW	Marine Air Wing or Medium Antitank Weapon
Mbps	Megabit Per Second
Mbytes	Megabytes
MCAS	Marine Corps Air Station
MDS	MTWS Display System
MEB	Marine Expeditionary Brigade
MED	Medical
MEDEVAC	Medical Evacuation
MEF	Marine Expeditionary Force
MEU	Marine Expeditionary Unit
MF	Mine Field
Mgmt	Management

MHz	MegaHertz
Mi	Mile
Mil	Military
MIZ	Missile Intercept Zone
MM	Millimeter
MOGAS	Motor Gasoline
MOPP	Mission Oriented Protective Posture
MORTCON	Mortar Control
MOV	Movement
MRL	Multiple Rocket Launcher
MRLS	Multiple Rocket Launcher System
MSC	MTWS System Control
Msg	Message
MSL	Mean Sea Level or Missile
MSLS	Missiles
Msn	Mission
MT	Motorized Transport
MTI	Moving Target Indicator
MTR	Mortar
MTTR	Mean Time To Repair
MTS	Marine Tactical Systems
MTWS	Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation

MV	Movement
MWSG	Marine Wing Support Group
NB	Nuclear, Biological, and Chemical Warfare Capability
NBC	Nuclear/Biological/Chemical
NFA	No Fire Area
NFL	No Fire Line
NGF	Naval Gun Fire
NGFCON	Naval Gunfire Control
NIMA	National Imagery and Mapping Agency
NM	Nautical Miles
NTCS	Naval Tactical Command System
NTDS	Naval Tactical Data System
NUC	Nuclear
OL	Ordnance Load
ONC	Operational Navigational Chart
OPFOR	Opposing Force (Aggressor)
Ops	Operations
ORD	Ordnance
ORDLOAD	Air Ordnance Load
OTH	Over The Horizon
PLRS	Position Location Reporting System
POW	Prisoner of War

PU	Pick-Up Point
RAD	Radiation Absorbed Dose or "Radioactive"
RAO	Reconnaissance Area of Operation
RAP	Radar-Assisted Projectile
RDF	Radio Direction Finding
RECCE	Reconnaissance
RECON	Reconnaissance
Rein	Reinforced
Req	Requirement
RFA	Restricted Fire Area
RFL	Restricted Fire Line
RGB	Red-Green-Blue
RI	Radio Intercept
RLT	Regimental Landing Team
RP	Rendezvous Point
RPG	Rocket-Propelled Grenade
RPV	Remotely Piloted Vehicle
RT	Real Time
RTB	Return to Base
SA	Surface-to-Air
SAC	Service, Alliance or Country
SAM	Surface-to-Air Missile

SAW	Squad Automatic Weapon
SG	Strike Group
Sgt	Sergeant
SIGINT	Signals Intelligence
SLAR	Side-Looking Airborne Radar
SLBM	Sea Launched Ballistic Missile
SLCM	Sea Launched Cruise Missile
SMAW	Shoulder-Mounted Assault Weapon
SNCO	Staff Non-Commissioned Officer
SNI	Soviet Naval Infantry
SOC	System Operator Console or Control
SPAWAR	Space and Naval Warfare Systems Command
Spec	Specification
Spotrpt	Spot Report
Squawk(s)	IFF settings
SS	Surface-to-Surface
SSM	Surface-to-Surface Missile
Std	Standard
STS	Ship-To-Shore
STSCON	Ship-To-Shore Control
SUP	Supply
TA	Transport Area

TAC	Tactical Air Controller
TACAN	Tactical Air Navigation
TACP	Tactical Air Control Party
TBD	To Be Determined
TD	Terrain
TF	Task Force
TK	Tank
TLAM-N	Tactical Land Attack Cruise Missile with a Nuclear Warhead
Tnk	Tank
TOT	Time or Target
TO/TE	Table of Organization/Table of Equipment
TOW	Tube Launched, Optically Tracked, Wire Command Link, Guided Missile System
TPT	Transport
UHF	Ultra High Frequency
UMV	Unit Movement
US	United States
USA	United States Army
USAF	United States Air Force
USMC	United States Marine Corps
USN	United States Navy
UTM	Universal Transverse Mercator

UW	UnderWater
VHF	Very High Frequency
VSTOL	Vertical Short Take-Off and Landing
VTOL	Vertical Take-Off and Landing
VX	Designation of a chemical nerve agent
Warn	Warning
WC	Water Consumption
WIA	Wounded In Action
WP	White Phosphorus
Wpn	Weapon
WT	Wheeled Trafficability
WX	Weather
WZ	Weather Zone
XMIT	Transmit
ZULU	Time referenced to Greenwich Mean Time

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