MTWS

Volume IV: MTWS System Administration

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THE MTWS Documentation Suite

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Chapter 1 - INTRODUCTION

This manual applies to version 3.0 of the Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) system. This manual provides information and procedures for configuring the system hardware and software environment; and for installing and operating the MTWS application within that environment.

This manual assumes basic familiarity with the MTWS system. Volume I of the MTWS documentation suite identifies related documents; and provides an overview of the MTWS system. This manual also assumes proficiency in the Linux, Windows NT, and Windows 2000 operating systems; and proficiency with the relevant hardware.

Chapter 2 - SYSTEM CONFIGURATION

Section 1 - Overview

The MTWS system consists of the following hardware components.

a. Model Application Network (MAN) server.

b. Model System Control (MSC) server.

c. Model Display Station (MDS) workstation. The MDS workstation and its software is also known as Maui. The terms “MDS” and “Maui” are used interchangeably throughout this manual.

d. Combat Analysis and Review Toolkit (CART) server.

e. Combat Analysis and Review Toolkit (CART) clients.

Each of these components requires an underlying x86 (also known as IA-32) processor. MAN, MSC, and CART components require the Red Hat Linux version 7.2 operating system. MDS components require the Windows 2000 or Windows NT operating system.

Section 2 - System Hardware Configuration

This section identifies the recommended, and the minimum, hardware configuration for the MTWS system

MAN, MSC, and CART Server Hosts

The recommended hardware for each MAN, MSC, and CART host is:

o Dell 4600 with dual 1.8 GHz processors

o 3 x 18GB disk in a RAID 5 configuration (54 GB total)

o 1 Gb RAM.

o (1) 100 MB network interface card for MAN and CART hosts

o (2) 100 MB network interface cards for MSC host

o CD drive.

The minimum hardware for each MAN, MSC, and CART host is:

o 1.8 GHz x86 processor

o 40 GB hard disk drive

o 1 GB RAM.

o (1) 100 MB network interface card.

o CD drive.

For convenience, each of these hosts should have a dedicated monitor, keyboard, and pointing device. However, only the MSC host requires these.

Maui and CART Client Hosts

The recommended hardware for each Maui host is:

o (2) 2.0 GHz Pentium IV CPUs

o (2) 40 GB hard disk drives

o 1 GB RAM.

o CD drive.

The minimum hardware for each Maui host is:

o (1) 600 MHz Pentium III CPU

o (1) 40 GB hard disk drive

o 500 MB RAM.

o CD drive.

The recommended hardware for each CART client host is:

o (2) 2.0 GHz Pentium IV CPUs

o (2) 40 GB hard disk drives

o 2 GB RAM.

o CD drive.

The minimum hardware for each CART client host is:

o (1) 1.0 GHz Pentium IV CPU

o (1) 40 GB hard disk drive

o 2 GB RAM.

o CD drive.

Each of these hosts must have its own monitor, keyboard, and pointing device.

Network Configuration – MAN/Maui LANs

The recommended network configuration consists of two LANs – one for MAN, and one for Maui and CART hosts - with the MSC host serving as a "router" between the two LANs. This is the reason that two NICs are recommended for the MSC.

Note that, although two LANs is the recommended configuration, all MTWS hosts can reside on a single LAN. In this type of configuration, the lack of LAN bandwidth may become a significant problem.

Network Configuration – MTWS Hosts

The system supports one MSC host; one or two MAN hosts; one CART server host; and up to 200 Maui hosts. If two LANs are used , note the following restrictions.

(a) if two MAN hosts are used, ensure that both are on the same LAN.

(b) ensure that all Maui hosts are on the same LAN.

NOTE: Although the system supports two MAN hosts, the recommended configuration is a single MAN host. In all performance benchmarks to date, the throughput of a single MAN configuration either meets or exceeds that of a 2-MAN configuration.

Section 3 - System Software Configuration

This section addresses the system software configuration for the MTWS system.

MAN, MSC, and CART Server Hosts

Each MAN, MSC, and CART server host requires the Red Hat Linux version 7.2 operating system. If dual processors are used, a shared memory multi-processor (smp) kernel must be installed. Install/configure the O/S as described below.

Operating System Installation - Dell PowerEdge 4600

1) Login (or power up) the server on which you wish to install Red Hat Linux 7.2.

Put the Dell OpenManage Server Assistant Bootable CD v7.1 into the cdrom drive and reboot the system. Once the system boots off of the CD, the "Dell OpenManage Server Assistant GUI" will appear.

Click on "Click here for Server Setup" to continue.

2) "Set Date and Time" window will appear

Enter the correct date, time and time zone for you server

Click on "Continue"

3) "Select RAID Configuration Setting" window will appear

Choose RAID 5 – Striping with parity

"Select RAID Virtual Disk Size"

Choose Max Value ie. 34711 MB

Click on "Continue"

A warning window will pop up saying:

"One or more virtual disks have been found!

Are you sure you want to delete the existing virtual disk?"

Click on "Yes"

Another warning window will pop up saying:

"This action cannot be completed because the other program is busy.

Choose 'Switch To' to activate the busy program and correct the problem".

Click on "Switch To"

Another warning window will pop up saying:

"The system must be rebooted to recognize the new virtual disk.

Click OK to reboot the system. After rebooting, Server Setup will continue with the creation of the primary partition"

Click on "OK" to start reboot.

4) "Select Operation System" window will appear

Choose Red Hat Linux 7.2

Click on "Continue"

5) Configure Hard Drive

Uncheck the following checked boxes for: /var and /home

Change /tmp to /mtws and then make changes according to the following recommended values:

/root	6144 MB	
/boot	100 MB	
swap	2047 MB	
/usr	3072 MB	
/mtws	23266 MB	*Note – if installing a MAN server, use /spare.

Click on "Continue"

6) "Enter Red Hat Linux 7.2 Configuration Information" window will appear.

Enter in the appropriate information for the system you are installing.

System Name msc001 *Note - use appropriate name if a MAN server.

Domain Name (leave blank if not in a Domain)

Firewall None

Language English

Root Password Enter Appropriate Password

DNS Server (leave blank if you are not using DNS)

Default Gateway Enter Appropriate Gateway IP Address

1) Network Interface eth0 (1000MB Lan not in use)

Click on "Disable this NIC"

2) Network Interface eth1 (Used for 100MB MAN Lan)

Specify an IP Address ie. 192.6.24.50 *Note - use appropriate IP

Subnet Mask 255.255.255.0 Class C network

3) Network Interface eth2 (Used for 100MB MAUI Lan)

Specify an IP Address ie. 192.6.25.50 *Note – Disable for MAN server.

Subnet Mask 255.255.255.0 Class C network

Click on "Continue"

7) "Operating System Installation Summary" window will appear

Make sure "Save Installation Summary at /InstallSummary.htm" is check marked.

* NOTE:

Check the "Save Unattended Installation Script at /ks.cfg" box only if you want a copy of the output of the scripts ran/used to configure the system. If you check this box, a warning window will pop up. If you want to save installation script file, click "OK", otherwise click the cancel button.

Click on "Continue"

A Server Assistant window will pop up. Make sure the check box "Eject CD Automatically" is checked. It is located on the lower left corner of the window.

Click on "Next"

The "Dell Open Manage Server Assistant CD" will eject at this time.

Place your Red Hat 7.2 Disk 1 Installation CD into the cdrom drive.

Click on "Finish"

A "Dell OpenManage Server Assistant" window will pop up suggesting that you to go to the Red Hat website for any of the latest updates once the installation is complete.

Click on "OK"

The server will reboot and then start the Red Hat 7.2 installation.

When prompted to insert Disk 2, replace Disk 1 with Disk 2 and then press the {Enter} key on your keyboard to continue.

8) Once the system finishes installation of Red Hat 7.2 and the system reboots, login at the Console login prompt as "root".

The */etc/hosts* and */etc/sysconfig/network* files need to be edited. Use the vi editor to make your changes.

/etc/hosts: Make sure the file reflects what you put in for the MAN Lan and the MAUI Lan:

ie.	192.6.24.50	msc001		# MAN Lan
	192.6.25.50	msc001-D	msc001	# MAUI Lan

*NOTE – if MAN server use appropriate IP address
ie. 192.6.24.101 man001

You may add in your MAUI and CART workstation IP addresses at this time.

/etc/sysconfig/network: Make sure "HOSTNAME" matches what you put in */etc/hosts* file. If it doesn't match, make the appropriate change and save the file. Example: HOSTNAME=msc001.localdomain -- change to: HOSTNAME=msc001

From the command line prompt, run "Xconfigurator" to setup the

Xwindow system:

Type in: Xconfigurator {Enter}

The “Welcome” screen will appear.

Press the “Space Bar” to continue.

The “PCI Probe” screen will appear.

Make a note of the PCI card found.

Press the “Space Bar” to continue.

The “Monitor Probe” screen will appear.

If it finds the correct monitor, Press the “Space Bar” to continue.

If it doesn’t find the monitor, you will have to add the monitor manually by putting in the appropriate horizontal and vertical frequencies for that particular monitor before continuing.

The “Video Memory” screen will appear.

Use the arrow keys to choose the correct memory setting for your video card. The PowerEdge 4600 comes with a built-in ATI video card with 8MB of RAM. If you’re using a different video card, choose the appropriate value.

Use the “Tab” key on the keyboard to get to the “OK” button and press the “Space Bar” to continue.

The “Clockchip Configuration” screen will appear.

Choose “No Clockchip Setting (recommended)”, “Tab” to the

“OK” button and press the “Space Bar” to continue.

The “Select Video Modes” screen will appear.

Use the “Arrow” keys to go to the appropriate 8 bit mode setting and press the “Space Bar” to mark that box.

Mark the following 8 bit modes:

1280x1024

1152x864

1024x768

Then press the “Tab” key to move from 8 bit to 16 bit modes.

Mark the following 16 bit modes:

1280x1024

1152x864

1024x768

Use the "Tab" key to get to the "OK" button and press the

"Space Bar" to continue.

The "Starting X" screen will appear to test the settings you just put in your X configuration.

Note: You have 9 seconds to complete the next step.

Press the "Space Bar" to continue.

If the Gnome Desktop appears properly, click on the "Yes" button with your mouse.

Also, click the "Yes" button to start X at boot and reboot time.

Click on "OK" to continue back to the original root console login prompt.

Now reboot your server by typing in: reboot {Enter}

If "X" does not come up properly after you reboot, then you may have to rerun Xconfigurator or do some troubleshooting to find out why "X" is not starting.

9) You should have the Red Hat login screen after the system reboot.

Login in as "root" and edit the following system files to match the examples that are provided here: */etc/ftpaccess*, */etc/ftphosts*, and */etc/ftpusers*

/etc/ftpaccess -- should have the following:

```
class   all   real,guest,anonymous  *

email root@localhost

loginfails 5

readme  README*    login

readme  README*    cwd=*

   message /welcome.msg           login
```

```
message .message        cwd=*
compress        yes     all
tar             yes     all
chmod           no      guest,anonymous
delete          no      guest,anonymous
overwrite       no      guest,anonymous
rename          no      guest,anonymous
log transfers anonymous,real inbound,outbound
shutdown /etc/shutmsg
passwd-check rfc822 warn
```

/etc/ftphosts -- should look like the following:

```
# Example host access file
# Everything after a '#' is treated as comment,
# empty lines are ignored
allow root 192.6.24.*
allow root 192.6.25.*
allow soc 192.6.24.*
allow soc 192.6.25.*
allow mds 192.6.24.*
allow mds 192.6.25.*
```

/etc/ftpusers should look like the following. The line containing “root” should be deleted.

```
bin
daemon
```

adm

lp

sync

shutdown

halt

mail

news

uucp

operator

games

nobody

The following RPM's on your Red Hat Disk 2 CD should also be installed:

linuxconf-1.25r7-3.i386.rpm

gnome-linuxconf-0.67.1-1.i386.rpm

vim-enhanced-5.8-7.i386.rpm

vim-X11-5.8-7.i386.rpm

Put the CD into your CD-ROM drive and mount the drive with the following command:

Type in: mount /mnt/cdrom {Enter}

Change directory to */mnt/cdrom/Red Hat/RPMS* and then install the rpm using

The "rpm –i or rpm –U" command.

Reboot your system. After reboot, you can run the MTWS rpm installation as described in section 3.1

Operating System Installation - Other Manufacturer (Non-Dell PE 4600)

Boot system with Red Hat Linux 7.2 CD-ROM Disk 1.

If this is a re-installation, place the CD-ROM Disk 1 into the drive, and select "reboot" from the System menu on the login dialog. If this is an initial installation, place the CD-ROM Disk 1 into the drive, power off the system; then power it back on again.

The Select Language screen appears.

Select the language of choice. The default is English.

Press NEXT.

The Select Keyboard Configuration Screen appears.

Select keyboard configuration of choice or keep default

Press NEXT

The Select Mouse Configuration Screen appears/

Select mouse of choice

Press NEXT

The Welcome Screen appears

Select NEXT

The Select Installation Options Screen appears

Choose either

Workstation

Server

Laptop

depending upon the machine type on which you are installing. The default is Workstation

Press NEXT

The Choose Partition Options Screen appears

Check the Have Installer Partition checkbox

Press NEXT

Select Remove All Partitions on the system

If you have 2 disks, in the "which drives to use?" selection area, select both.

Leave the "Review" checkbox checked.

Press NEXT

A WARNING Screen appears

Select NEXT

The Partition Screen appears

If you have 1 disk, use the defaults, which are:

hda1 … a boot partition mounted on /boot

hda2 … a root partition mounted on /

hda3 … a swap partition with no mount point

If you have 2 disks, use the defaults, which are:

1st disk):

hda1 … a boot partition mounted on /boot

hda2 … a swap partition with no mount point

hda3 … a free partition with no mount point

(2nd disk):

hdb1 … a root partition mounted on /

Press OK

The disk will now be partitioned. When partitioning is complete select NEXT

NOTE: MTWS will operate correctly and efficiently using the default partition configuration. There is no need to change it. Changing it can have adverse effects on MTWS operations. If changing it is desirable/necessary for some reason, refer to the Red Hat documentation.

The Boot Loader Screen appears

Accept the defaults

Press NEXT

The GRUB Password Screen appears

The default is no GRUB password

Accept the default

Press NEXT

The Network Configuration Screen appears

Uncheck the Configure using DHCP checkbox

Enter IP address

Enter Net Mask = 255.255.255.0

The Network and Broadcast entries will fill automatically.

Enter Host Name

Enter Default Gateway. Use the IP address appropriate for your site.

Enter Primary DNS. Use the IP address appropriate for your site.

Enter Secondary DNS. Use the IP address appropriate for your site.

Press NEXT

The Firewall Configuration Screen appears

MTWS works correctly with no firewall. The selection you make here should be appropriate for your site. If you select HIGH or MEDIUM, you must allow incoming FTP and rsh. To do so, select FTP from the listed services; and enter 513 (the login port) in the "other ports" area to enable rsh.

Press NEXT

The Language Support Screen appears

Enter languages desired

Press NEXT

The Time Zone Screen appears

Click on desired area on map to view time zones

Click on the UTC tab

Choose a time zone, or choose a UTC offset.

DO NOT check the Daylight Savings time check box. MTWS computes exercise time based upon the system clock. If the system clock jumps forward or backward one hour, the exercise time will also jump forward or backward one hour, which is a very undesirable behavior.

Press YES

The Account Configuration Screen appears

Enter root password

Enter root password again to confirm

Press NEXT

The Select Package Group Screen appears

Select GNOME, KDE, and SOFTWARE DEVELOPMENT

Select Individual Packages

Press NEXT

The Individual Package Selection Screen appears

In addition to the default settings ensure that the following packages are selected:

Applications – Editors

VIM-X11

VIM-Enhanced

Applications – Internet

FTP

TELNET

System Environment – Daemons

rsh-server

Telnet – server

Wu-ftpd

If PC has a dual processor ensure the following package is selected

System Environment – kernel

kernel-smp

Press NEXT

The Video Configuration Screen appears

Choose Skip X Configuration.

Press NEXT

The About to Install Screen appears

Press NEXT

The Installation Screen appears

This process will take a few minutes

When prompted, insert the Linux Red Hat Version 7.2 CD-ROM Disk 2

Press YES

Installation continues

When installation is complete, the Create Boot Disk Screen appears

To create boot disk, follow onscreen instructions or

Check the Skip Boot Disk Creation checkbox

Press NEXT

Installation is now complete.

The system will reboot automatically.

After reboot, login as user root.

From the command line prompt, run “Xconfigurator” to setup the Xwindow system:

Type in: Xconfigurator {Enter}

The “Welcome” screen will appear.

Press the “Space Bar” to continue.

The “PCI Probe” screen will appear.

Make a note of the PCI card found.

Press the “Space Bar” to continue.

The “Monitor Probe” screen will appear.

Select “use default” and continue.

The “Starting X” screen will appear to test the settings you just put in your X configuration.

Note: You have 9 seconds to complete the next step.

Press the “Space Bar” to continue.

If the Gnome Desktop appears properly, click on the “Yes” button with your mouse.

Also, click the “Yes” button to start X at boot and reboot time.

Click on “OK” to continue back to the original root console login prompt.

Now reboot your server by typing in:

reboot {Enter}

If “X” does not come up properly after you reboot, then you may have to rerun Xconfigurator, or do some troubleshooting, to find out

why "X" is not starting.

You can now run the MTWS rpm installation script on the MTWS Installation CD.

Additional Operating System Configuration – MAN/MSC/CART Server

Following the basic installation of the operating system, several additional steps are necessary before the system is ready to support MTWS. This section describes operating system configuration items necessary to support the operation of the MAN, MSC, and CART server software. The following paragraph provides some background as to why these configuration items are needed.

The MSC host is the central "hub" for the MTWS system. The MSC sends data to (e.g., commands) and receives data from (e.g., database updates) all MAN hosts. The MSC sends data to (e.g., database updates), and receives data from (e.g., commands), all Maui hosts. The MSC sends data to (e.g., database updates), and receives data from (e.g., requests for initialization data), the CART server. If MTWS is communicating with the Joint Command & Control Attack System (JCAS), a part of the JQUAD system, MSC sends data to JQUAD. See **Operating with the Joint Training Confederation** in Chapter 4 for discussion of JQUAD considerations. All of the above are socket-based Transmission Control Protocol/Internet Protocol (TCP/IP) communications. In addition, Maui hosts use File Transfer Protocol (ftp) services to send files to (e.g., parametric data files), and to retrieve files from (e.g. batch files) the MSC.

MAN hosts perform simulation processing. Each MAN host receives data from (e.g., commands), and sends data to (e.g., database updates), the MSC host. If two MAN hosts are used, each MAN host passes database updates to the other MAN host, so that their databases stay synchronized. If MTWS is running as part of the Joint Training Confederation (JTC, formerly known as the Aggregate Level Simulation Protocol (ALSP) confederation), one MAN host sends data to (e.g., MTWS database updates), and receives data from (e.g., other model's updates), the JTC. See **Operating with the Joint Training Confederation** in Chapter 4 for discussion of JTC considerations. All of the above are socket-based TCP/IP communications.

The CART server host records and retrieves exercise data. The CART server host receives data from (e.g., database updates), and sends data to (e.g., requests for initialization data), the MSC. The CART server host receives data from (e.g., database queries), and sends data to (e.g., query results), CART client hosts. Communications with the MSC are socket-based TCP/IP communications. Communications with CART client hosts are via Open Database Connectivity (ODBC) drivers, and Hypertext Transfer Protocol (HTTP).

/etc/hosts or the Name Service Database

As described in the preceding operating system installation sections, the */etc/hosts* file must be configured to support inter-connectivity between MTWS components. MTWS will operate correctly with either file-based name service through */etc/hosts*, or with the Distributed Name Service (DNS) protocol. File-based name service through */etc/hosts* is recommended since DNS

can incur a performance penalty. Note that MTWS is **not** compatible with Network Information Service (NIS) name databases.

The following applies to */etc/host* entries for all MTWS components. Note that all entries are case-sensitive.

a. all hostnames must be six (6) characters long.

b. the name of the MSC host must be "msc001".

c. the name of a MAN host must be either "man001" or "man002".

d. the name of a Maui host must be "mdsxxx", where 'x' is lower case alphanumeric.

e. the name of a CART server host must be a valid Maui hostname; and it must have the alias "cartserver"

f. the "msc001", "man00x", "mdsxxx" name must the primary hostname; it cannot be an alias.

g. each */etc/host*s file must have a "localhost" entry in the format:

127.0.0.1 localhost.localdomain localhost

h. each */etc/hosts* file must have the host's own IP address, in the format:

<IP address> myhostname <alias, if desired>

On the MSC host, */etc/hosts* must contain an entry for each MAN host; each Maui host; and the CART server, if CART is to be used. If MTWS is communicating with the JQUAD system, MSC's */etc/hosts* file must contain an entry in the format:

<IP address> jquadhost

See section **Operating with the Joint Training Confederation** in Chapter 4 for discussion of JQUAD considerations

On a MAN host, */etc/hosts* must contain an entry for MSC; and for the other MAN host, if applicable. If MTWS is running as part of the Joint Training Confederation (JTC), the MAN host on which the ALSP application is running must contain an entry in the format:

<IP address> jtchost

See section **Operating with the Joint Training Confederation** in Chapter 4 for ALSP considerations.

On a CART host, */etc/hosts* must contain an entry for MSC; and for each CART client.

/etc/services

MTWS uses socket-based Transmission Control Protocol/Internet Protocol (TCP/IP) to pass messages among components; e.g., between MAN and MSC, between MSC and CART, etc. Ensure that */etc/services* on each MAN, MSC, and CART host contains the following entry.

```
Mtws      12753/tcp      # general MTWS communications
```

If MTWS is communicating with the JQUAD system, MSC's */etc/services* file must contain an entry in the format:

```
JQUAD   2000/tcp      jquad
```

See section **Operating with the Joint Training Confederation** in Chapter 4 for JQUAD considerations

If MTWS is running as part of the Joint Training Confederation (JTC), */etc/services* on the MAN host on which the ALSP application is running must contain entries in the format:

```
alsp_base_port   3000/tcp      alsp_base

alsp_monitor_port      3000/tcp      alsp_base
```

See section **Operating with the Joint Training Confederation** in Chapter 4 for ALSP considerations.

/etc/ sysconfig/network

Ensure that, in the */etc/sysconfig/network* file on each MAN, MSC, and CART host, "HOSTNAME" exactly matches the corresponding entry in */etc/hosts*. If it does not match, make the appropriate change. For example, change:

```
HOSTNAME=msc001.localdomain
```

to:

```
HOSTNAME=msc001
```

/etc/ftpaccess

This following is required to support File Transfer Protocol (ftp) operations on the MSC host. However, for convenience, we recommend that the */etc/ftpaccess* file on all MSC, MAN, and CART hosts adhere to the following example.

```
class   all   real,guest,anonymous  *

email root@localhost

loginfails 5

readme  README*    login

readme  README*    cwd=*

message /welcome.msg           login

message .message               cwd=*

compress                       yes             all

tar                            yes             all

chmod                          no              guest,anonymous

delete                 no              guest,anonymous

overwrite              no              guest,anonymous

rename                         no              guest,anonymous

log transfers anonymous,real inbound,outbound

shutdown /etc/shutmsg

passwd-check rfc822 warn
```

/etc/ ftphosts

This following is required to support File Transfer Protocol (ftp) operations on the MSC host. However, for convenience, we recommend that the */etc/ftphosts* file on all MSC, MAN, and CART hosts adhere to the following example.

```
# Example host access file

# Everything after a '#' is treated as comment,
```

```
# empty lines are ignored

allow root 192.6.24.*

allow root 192.6.25.*

allow soc 192.6.24.*

allow soc 192.6.25.*

allow mds 192.6.24.*

allow mds 192.6.25.*
```

/etc/ ftpusers

This following is recommended to support File Transfer Protocol (ftp) operations on the MSC host. However, for convenience, we recommend that the */etc/ftpusers* file on all MSC, MAN, and CART hosts adhere to the following example (the line containing "root" should be deleted). Note that users identified in this file are **denied** ftp access.

```
bin

daemon

adm

lp

sync

shutdown

halt

mail

news

uucp

operator

games

nobody
```

/.rhosts

The */.rhosts* file allows the super-user to log on to any of the Linux hosts without supplying a password. This can greatly aid the site administrator in the set-up of each Linux host since a script can be used to update system files. Every MTWS Linux hostname (e.g., man002) should be listed in the */.rhosts* file on each MTWS Linux host. The hostname may include a domain name for networked installations. These changes are not necessary for actual MTWS operation.

/etc/fstab

The */etc/fstab* file contains the list of both local and networked file systems that should be mounted at boot time. For each networked file system, access must be allowed (i.e., exported to) each man host. For security, unlimited access to all hosts should not be allowed. For all other hosts, the file will contain Network File System (NFS) mounting information used to access the file systems on the MSC.

NOTE

This file may not be the same for all non-MSC hosts since the device address of the boot disk may vary.

/etc/group

The */etc/group* file defines valid group names for the workstation. All MTWS user names (e.g., soc) require the group **mtws**. The group ID is left to the site administrator's discretion, but must be the same across all MTWS workstations. Failure to properly set the group name and group id will result in MTWS failures while reading and writing the */mtws* file systems. Normally, the group file may be set up on the MSC and copied to all other MTWS hosts.

/etc/passwd

The */etc/passwd* file defines valid user names and passwords for the workstation. MTWS requires the user names defined in Table 1. The user IDs and passwords are left to the site administrator's discretion, but must be the same across all MTWS workstations. Failure to properly set the user name and user id will result in MTWS failures while reading and writing the */mtws* file systems. Passwords should be selected so they are a minimum of 8 characters in length. They should contain one or more numeric or special characters. They should not be based on words or names. The */etc/group* file must be set up prior to adding the user names to the passwd file. Normally, the password file may be set up on the MSC and copied to all other MTWS hosts.

Table 1. Required MTWS User Names

User Name	Home	Group	Start-up Program	Login Environment
soc	*/mtws/soc*	mtws	*/bin/bash*	Shell
mds	*/mtws/mds*	mtws	*/bin/bash*	Shell

/etc/shells

The system file */etc/shells* defines which shells are considered valid by the system. For remote logins (including ftp), if the shell is not found in */etc/shells*, the login will be rejected. MTWS is based on the */bin/bash* shell. */etc/shells* must be present on every MAN, MSC, and CART host with the following contents:

```
/bin/sh
/bin/bash
/bin/bash2
/bin/ash
/bin/bsh
/bin/tcsh
/bin/csh
/bin/ksh
```

Creating and Configuring MTWS File Systems

MTWS software and data files may be distributed across one or more disks on the MSC. The MAN boxes use Network File System (NFS) to access this data. Each Maui workstation uses its own internal disk; and uses ftp network services to retrieve and store files from/to the MSC. The recommended minimum for MSC and MAN disk space is 18GB.

The MSC */mtws* file system must be mounted to the MAN hosts. This mounting requires that the file system be exported from the MSC for use by remote hosts; and mounted locally on each workstation that requires the file system.

Exporting MSC File Systems

File systems that require mounting on the MAN workstations must first be exported on the MSC. This exporting operation results in changes to the system file */etc/exports*. The steps for exporting a file system on the MSC are:

a. Edit the file */etc/exports*

b. Add the following to the file if it is not already there and save the changes:
/mtws man001(rw,no_root_squash,insecure)

c. From the command line, type in: **exportfs -a –v** {enter}

Mounting Remote File Systems

These instructions apply only to MAN hosts. The operator must be on the network in order to create mount points.

a. Edit the file */etc/fstab*

b. Add the following to the file if it is not already there and save the changes:
msc001:/mtws /mtws nfs exec,dev,suid,rw 1 1

c. From the command line, type in: **mount /mtws** {enter}

Synchronizing Time

Network Time Protocol (NTP) services can be used to synchronize the system times used by the MSC, MAN, and CART hosts. To configure NTP, set up the MSC as the NTP server, and the MAN and CART servers as clients by doing the following:

a. On the MSC only, change the date and time to the correct date/time group by typing in: date MMDDhhmm {enter}
where MM=month DD=date hh=hour mm=minute

b. Edit the file */etc/ntp.conf* on the MSC, MAN, and CART servers.

c. Add the following to the file if it is not already there and save the changes:
server xxx.xxx.xxx.xxx (IP address of MSC)

d. Edit the file */etc/ntp/step-tickers* on the MSC, MAN, and CART servers.

e. Add the following to the file if it is not already there and save the changes:
xxx.xxx.xxx.xxx (IP address of MSC)

f. From the command line on each server,
type in: **chkconfig –level 5 ntpd on** {enter}

g. From the command line on each server, type in: **service ntpd start** {enter}; or re-boot the systems in order: MSC, MAN, CART.

Third-Party Support Software

Perl

Perl version 5.6.0 is included with Red Hat Linux version 7.2. Perl is required on the MSC host for batch file conversion. For further information about Perl, see http://www.perl.com and the Red Hat documentation.

Linux CD Burning Software -- X-CD-Roast

The following rpms need to be installed to use a CD-RW drive in RedHat version 7.2, they are located in the MTWS Support folder of the MTWS RPM CD.

cdrtools-cdda2wav-1.11a21-1.i386.rpm
cdrtools-cdrecord-1.11a21-1.i386.rpm
cdrtools-libscg-1.11a21-1.i386.rpm
cdrtools-mkisofs-1.11a21-1.i386.rpm
xcdroast-0.98alpha10-1.i386.rpm

Once installed, the software needs to be configured as follows.

Click on 'Main Menu' --> 'Programs' --> 'Applications' --> 'X-CD-Roast'
A GUI will appear. Click on "Launch X-CD-Roast" to begin the configuration.
Another window will appear stating:
"No root configuration file found!
Please enter Setup and don't forget to add users who may also use X-CD-Roast"
Click on "OK" to continue.
The X-CD-Roast main menu GUI will appear.
Click on "Setup".

Click on the "CD Settings" Tab and change the "CD Writer Configuration" to the following:
CD Writer Device: 'Set to type of CD Writer'
CD Writer Mode: 'Autodetect'
CD Writer Speed: 'Set to preferred speed of writer and blank CD's'
CD Writer FIFO-Buffer-Size: 'Set to value you would like to use for buffer size'

Click on the "HD Settings" Tab
Enter in a path you would like to use for 'Temporary Image Storage Directory':
example: create a directory called */X-CD-Roast* and enter it in the
'Path:' window box and click on the "Add" button.

Click on the "Options" Tab and check the 'Windows style list selections' box
and make sure the 'Default Write Options' is set to "Disk-At-Once (DAO)"

The defaults for everything else should be fine.
Now click on the "Save configuration" button and the "Ok" button of the pop up window

and then click the "OK" button for the 'Setup' GUI.

To create a CD:

1. Click on the 'Create CD' button
2. Click on the 'Master Tracks' button
   and uncheck the 'Display directories only' box.
3. In the 'Master source' tab 'File/Directory view' box, choose the directory or files
   you wish to write to CD.
4. Click on the "Add" button. A popup window will appear. Choose if you would
   like full path names or just the file/directory name to be written to disk
   and click on "OK"
5. If this is a bootable CD you are creating, click on the 'Boot options' tab and
   select what type of boot options you would like.
6. Click on the 'Create session/image' tab
   a) make sure the 'Calculate automatically' check box is checked
   b) check the 'Create multi session CD' check box if you want to write to the
      end of your CD, otherwise keep the rest of the defaults.
   c) If you have a CD-RW disk, click on "Blank CD-RW" button to clean up disk. The default
      is good enough in any case, but if you'd prefer to fully blank your CD-RW you can,
      but it takes longer. Click on the popup window 'Blank CD-RW' button to continue.
   d) To write to your CD, click on the "Master and write on-the-fly" button.
      The CD will eject after it is finished.
7. Click on the "Back to main menu" button
8. Click on the "Exit" button when finished.

Maui Hosts

The recommended operating system is Windows 2000/Office 2000. Each Maui host that is to be used as a CART client workstation must have Microsoft Internet Explorer version 5.5 or later.

If Windows 2000/Office 2000 is not available, Windows NT Service Pack 5 or later, with Office 97, can be used instead.

Operating System Installation – Maui Hosts

Each Maui host requires the Windows NT, Service Pack 5 or later; or Windows 2000 operating system. Microsoft Office 97 or Office 2000 is also required. Each Maui host that is to be used as a CART client workstation must have Microsoft Internet Explorer version 5.5 or later. See Microsoft's documentation for instructions on how to install this software.

Additional Operating System Configuration – Maui Hosts

Following the basic installation of the operating system, several additional steps are necessary before the workstation is ready to support Maui. Most of these steps are performed as part of the Maui installation process as described in section 3.3. The following describes some additional, optional configuration issues, which are not addressed as part of the Maui installation.

Maui User Account

For convenience and simplicity, the username for the workstation should be **mds**, a username required by MTWS. The password should be the same as the user **mds** password on the MSC host.

Shared Network Data

To set up a Maui network to share data files such as ADRG maps, or overlay files, select a Maui workstation which will act as a "data server" and create a folder called *\MauiData\Maps* on a drive with enough disk space to support the expected number of ADRG and TIFF maps to be shared. Then create the following sub-folders

<DRIVENAME>:*MauiData\Maps\ADRG*

<DRIVENAME>:*MauiData\Maps\TIFF*

<DRIVENAME>:*MauiData\Maps\TRR*

<DRIVENAME>:*MauiData\Maps\Elevation*

Make the *MauiData* folder shared by selecting the folder in Microsoft Explorer or "my computer", and right clicking to obtain the menu, then select properties which will open up the properties sheet for this folder. Select the Sharing tab and then select the Shared As radio button. Enter the name MauiSharedData in the Shared Name field.

Then, on each workstation that will shared the “MauiSharedData” folder, including the one which contains the MauiSharedData folder, use network neighborhood to map a network drive as follows:

Drive: Z:

Path: *\\mdsxxx\MauiSharedData*

where mdsxxx is the workstation on which you created the shared folder.

Local Data

If maps are be stored locally on each workstation, set up a folder to store the ADRG maps by creating a folder on the drive in which Maui will be installed. If you are going to install Maui on the D drive, create a folder *D:\MauiData\Maps\ADRG* to hold the ADRG maps. For each map installed, create a sub-folder within the *ADRG* folder, and then copy the files from the ADRG CD to the sub-folder. For example, if you are installing the Camp Pendleton ADRG map, create a folder *D:\ADRG\CampPendleton* and then copy the contents of the CD into the *CampPendleton* folder.

Chapter 3 - MTWS INSTALLATION

Section 1 - MAN/MSC Hosts

This section describes installation of the MAN and MSC application software. The installation is provided in a Red Hat Package Manager (rpm) format.

Installing this software preserves the contents of the directories listed below. If any other directories/data should be saved, ensure that this is done prior to performing this installation. The following directories are preserved.

/mtws/db/cmd_entry/batch … this directory contains user-defined batch and master batch files.

/mtws/db/man … this directory contains exercise databases.

/mtws/db/parametric … this directory contains parametric data.

/mtws/db/terrain … this directory contains digitized terrain data.

Backup DLT Tape Drive

DLT tapes (DLT 1 40/80GB tape) are used to back up system data files. The DLT tapes should be labeled and stored in a safe place.

To remove the DLT tape, press the EJECT button near the unit opening. The status lights on the tape unit will begin to blink and the tape will be ejected. To load a DLT tape, insert it into the opening in the tape unit. If any resistance is encountered during insertion, remove it and try again. When successfully inserted, the DLT tape is pulled into the unit and some status lights on the unit begin to blink. When the lights stop blinking and remain steadily on, the tape is operational and ready for immediate use.

The "tar" commands are used to backup/restore files to a tape drive. Tar can be used to archive a group of files into another file or more commonly to write/restore a group of files to a tape drive.

Options	Description
c	create a archive (write to tape)
t	display files on archive (view only)
x	extract from archive (read from tape and write to disk)
v	verbose - display filenames
z	compress files (using gzip)
f	device name or file name to write to
directory or file	directory or file to use

Note: The following examples assume the device name of your tape drive is /dev/st0 (Default name of tape drive).

Command	What it does
tar cvf /dev/st0 /mtws	backup the entire MTWS directory to tape
tar tvf /dev/st0	view the contents of a tape
tar xvf /dev/st0	restore the entire contents of the tape

The "mt" commands can be used to erase, data compression, status and more. Please see the man pages for other options for the mt command.

Note: The following examples assume the device name of your tape drive is /dev/st0 (Default name of tape drive).

Command	What it does
/usr/sbin/mt -f /dev/st0 status	Gives tape status
/usr/sbin/mt -f /dev/st0 erase	Erases tape
/usr/sbin/mt -f /dev/st0 datcompression	Turn data compression on. This will make a 40GB tape an 80GB tape.

Install the software as follows.

Login to the MAN host as "root".
Insert the MTWS installation CD into the CD-ROM drive.
Bring up a term window and check to see if the CD-ROM mounted by entering:
df –h.
If there is no reference to */mnt/cdrom*, mount the drive manually by entering:
mount /mnt/cdrom {Enter}

Once the drive is mounted, change directory to */mnt/cdrom*/MAN-RPM-Install

To start the installation, enter:
./Setup-MAN-Install {Enter}

Once the command prompt returns, reboot the server by entering:

reboot {Enter}

Repeat the above steps for each MAN host. Note that the MAN rpm installation is required the first time v3.0 is installed. However, if v3.0 is re-installed at some later time, this step is not necessary. The MAN rpm installation only establishes the system configuration needed to run the MAN software. It does not install the MAN application software itself. The MAN and MSC applications are installed by the following steps.

Login to the MSC host as "root".
Insert the MTWS installation CD into the CD-ROM drive.
Bring up a term window and check to see if the CD-ROM mounted by entering:
df –h.

If there is no reference to */mnt/cdrom*, mount the drive manually by entering:
mount /mnt/cdrom {Enter}

Once the drive is mounted, change directory to */mnt/cdrom*/MSC-RPM-Install /

To start the MTWS installation, enter:
./Setup-MSC-Install {Enter}

Once the command prompt returns, reboot the server by entering:
reboot {Enter}

Section 2 - CART Server Host

This section describes installation of the CART server application software. The installation is provided in a Red Hat Package Manager (rpm) format. The CART Server is necessary for support of after-action review of the exercise. MTWS does not require a CART Server. If you do not intend to use CART, you can skip this section.

CART requires the following packages (or later versions of these packages) to be installed onto the CART server:

apache-1.3.20-16
apacheconf-0.8.1-1

mysql-3.23.49-3.i386
mysqlclient9-3.23.22-6.i386
mysql-server-3.23.49-3.i386
postgresql-libs-7.2.1-5.i386

perl-5.6.1-34.99.6.i386
perl-CGI-2.752-34.99.6.i386
perl-DBD-MySQL-1.2219-6.i386
perl-DBI-1.21-1.i386
libdbi-0.6.4-2.i386
libdbi-dbd-mysql-0.6.4-2.i386
gcc-2.96-98
flex-2.5.4a-15

bison-1.28-7

These packages are provided on the MTWS Installation CD. You may check for the presence of a package by entering the following command into a command shell:

rpm --query <package>

For example:
% rpm –query apache
apache-1.3.23-11
If your system returns a message "Package <package> is not installed", the rpm command can be used to install the package as follows:
rpm –install <files>
e.g.:
cd /mnt/cdrom/CART-RPM-Install
rpm –install apache-1.3.20-16.i386.rpm

The CART installation software is supplied on the MTWS V3.0 CD. To install CART onto the CART server perform the following steps.

1. Login as root
2. Insert the MTWS installation CD into the CART server CD-ROM
3. Open a shell.
4. Check to see if the CD-ROM mounted by entering:
    a. df –h
5. If there is no reference to /mnt/cdrom, then mount the drive manually by entering:
    a. mount /mnt/cdrom
6. Enter the following commands:
    a. cd /mnt/cdrom/MTWS-CART-RPM-Install
    b. ./Setup-CART-Install

The software for creating the reports are installed into the default apache directory structure /var/www. The exercise data is stored in the directory /var/lib/mysql. The remaining software is in /mtws/

Environment Variables in MTWS

The MTWS environment includes a set of key variables that the system uses to find resources, store files, and the like. These variables are listed in Tables 2 and 3 according to the MTWS component that uses them. All of these variables have been set to their defaults in the supplied files.

Table 2. MAN Environmental Variables

Defined in: */mtws/bin/MAN/Start_MAN*

Name	Function	Default Parameter
XAPPLRESDIR	Directory containing MAN X resource files	*/mtws/bin/app-defaults/man-app-defaults/*

EXERCISE_PATH	Directory in which MTWS exercises reside	*/mtws/db/man/*

Table 3. MSC Environmental Variables

Defined in: */mtws/soc/.profile*

Name	Function	Default Parameter
MTWS_ROOT	Base directory for MTWS program installation.	*/mtws*
MTWS_DATA	Directory for storage of MTWS data files	*/mtws/db*
MTWS_DEFAULT	Directory for MTWS defaults	*/mtws/db/default*
XAPPLRESDIR	Directory containing MSC X resource files	*/mtws/bin/app-defaults/msc-app-defaults/*
HELP_DIR	path to help files and RELEASE_NOTES	*/mtws/help/*
ALSP_HOME	ALSP home directory path	*/mtws/bin/ALSP/*
ALSPBIN	ALSP executables directory path	$ALSP_HOME
MDS_BITMAP_DIR	Bitmap directory for MDS applications	*/mtws/bin/app-defaults/bitmaps/*
EXERCISE_PATH	Directory in which MTWS exercises reside	*/mtws/db/man/*
TO_CONTROLLER_PATH	Path to controllers.txt file	*/mtws/db/current/configs/*
BASELINE_PATH	Baseline parametric data directory	*/mtws/db/parametric/baseline/*
USER_DEFINED_PATH	User-defined parametric data directory	*/mtws/db/parametric/user_defined/*
PARA_DATA_PATH	Directory in which Command Entry finds parametric data information	*/mtws/db/current/cmd_entry/para_data/*
SR_WORK	Directory containing Solicited report formats	*/mtws/db/rg/*

Section 3 - Maui Hosts

This section describes installation of the Maui software suite. To install this software you must be user ADMINISTRATOR, or a user that has ADMINISTRATOR privileges.

There are two folders of particular importance in the installation process. The first is the folder in which you install the software. The default, provided by the installation software, is *Mtws*. If both C: and D: drives are available, the default is *D:\Mtws*; if only a C: drive is available, the default is *C:\Mtws*. If the default is accepted, and if no *\Mtws* folder exists on

the drive, the installation will create it. We strongly recommend accepting this default; or selecting the drive with the most available space.

We strongly recommend accepting this default. The folder chosen at this time will be completely removed when Maui is re-installed. The reason for providing the *\Mtws* default is so that the re-installation process does not interfere with other software on the system – i.e., the Maui software, and only the Maui software, resides in that folder. In the discussions that follow, "the MTWS path" and "the MTWS folder" refer to the path/folder in which the software is installed.

The second folder of interest is *\MauiData*. This folder and its sub-folders contain various data files, including maps; overlays; reports; and log files generated during execution of the Maui software. If they do not already exist, the folders *\MauiData\MDMData* and *\MauiData\Snapshots* are created by the installation on the drive on which the installation is performed. For example, if *D:\Mtws* is chosen as recommended above, *D:\MauiData\MDMData* and *D:\MauiData\Snapshots* will be created if they do not already exist. The *MDMData* folder contains World Vector Shoreline maps; the *Snapshots* folder contains an example snapshot (a view of the tactical display database) included with the installation.

Much of the Maui software is written in Java, and therefore requires a Java Run-time Environment (JRE) in which to execute. If the JRE is not found on the workstation during Maui installation, the installation program will attempt to install it. By default, the JRE is installed on the drive defined by the TEMP environment variable. For example, if TEMP is set to *D:\TEMP*, the JRE is installed on the D: drive. If that drive does not have enough space to install the JRE, but does have enough space to launch the installation program, a message is displayed, indicating that there is not enough room to install the JRE.

If this problem occurs, do not continue with the installation. If you were to continue, portions of the installation would not be completed properly without the JRE. Instead, correct this problem by changing the TEMP environment variable to use a drive which has adequate space to install the JRE and Maui; and to hold data files such as maps, overlays, etc.

Saving Old Data

Installing Maui completely removes the MTWS path; i.e., all files in that path are deleted. If you wish to preserve any data files in that path, copy them to a location outside the MTWS folder prior to installing Maui. If you get an error message saying there is an access violation or locked file detected, make sure that you are NOT:

- Running any Maui software suite component.
- Pointing to the MTWS folder or sub-folders with any other application program
- Pointing to the MTWS folder or sub-folders in a DOS window

- Currently editing, or have an editor open which has a file from the MTWS folder or sub-folders in its history list (e.g. Word, NotePad)

If all else fails, reboot the machine. This will remove all existing links to files in the MTWS path on the drive in which Maui is installed. When the files you want to keep are backed up or moved from the MTWS folder or sub-folders, you can start or restart the installation process.

Installing from an installation CD

a. Insert the CD into the CD-ROM drive. If the Installation program does not startup automatically, from the Start menu, select the 'Run' option and type in the CDROM drive letter followed by: <driveLetter>:\v3.0-mb030212\Setup.exe. e.g.: if the drive letter is 'E', type in the following: E:\v3.0-mb030212\Setup.exe

b. If the installation program automatically starts, go to Paragraph b in Section "Launching the Installation Program".

c. If the installation program does not automatically start, select the Start button on the Windows taskbar, then choose Run. In the Run dialog box, type X:\SETUP, where X is the letter of your CD-ROM drive; then select the OK button.

d. Go to Paragraph b in Section "Launching the Installation Program".

Installing from a networked drive

a. Open Network Neighborhood by double-clicking on the Network Neighborhood icon on your desktop.

b. Locate the workstation computer name and shared folder containing the Maui installation program.

c. Find the file named Setup.exe.

d. Go to Paragraph b in Section "Launching the Installation Program".

Installing from your local drive

NOTE

The installation medium may be copied from a CD, or across the network, to your hard drive for an easier and faster installation. The entire folder in which the Setup.exe file resides must be copied to your local drive in order for the installation program to work properly. Make sure to remove this folder to free up this disk space when the installation has successfully completed.

a. Use Microsoft Explorer to find the file named Setup.exe.

b. Go to Paragraph b in Section "Launching the Installation Program".

Launching the Installation program

a. Double-click on Setup.exe to launch the installation program.

b. The installation program will recognize a previously installed version of Maui. Items d-h describe how to uninstall a previous installation. If there is no previously installed version on your computer, skip to Step **i**, otherwise go to the next step.

c. Even if you have deleted or renamed your MTWS folder, the installation program will determine if there is previously installed version on your machine, and provide you with three radio button options to [Modify], [Repair], or [Remove] the previous installation.

> **NOTE**
>
> **Putting a new Maui installation on your machine requires uninstalling, if it exists, the previously installed version. This un-installation process deletes the current installation's MTWS folder and all of its contents and sub-folders. If you want to save any or all of the contents of your MTWS folder, follow the instructions in the Saving Old Data section above.**

d. Select the [Remove] radio button option and then the [Next >] button.

e. A confirmation dialog box will appear asking if you really want to completely remove the selected application and all its components. Select the [OK] button.

f. The installation program will remove the previously installed files from their location on your hard drive. If you have moved the files to a location outside of the MTWS path, these files will not be disturbed by this un-install. The configuration settings will also be removed.

g. If, for any reason, the installation program cannot remove a file, it will ask you whether you want to Reboot" "Ignore" "Retry" and "Cancel". Select the [Cancel] option and make sure that you do NOT have any files locked as described in the Saving Old Data section above.

h. Reselect the Setup.exe program from this installation program folder to restart the installation program a second time.

i. Maui Installation

At this point the installation program should not encounter a previously installed version if Maui on your machine. The installation program will provide the series of scripted pages described below.

1) Uninstalling the JRE

   If the wrong version of the JRE is found, the Maui installation will first require that you to uninstall the JRE. Follow the JREHelp.txt instructions provided by the Maui installation to uninstall the current JRE.

2) Installing the JRE

   If no JRE is not found, the Maui installation will first require that you install the JRE. Follow the JRE installation instructions. When complete continue with the Maui installation Welcome step.

3) Welcome:

   Select the [Next >] button to continue.

4) Warning/Information:

   Select the [Next >] button to continue.

5) User Information:

   Name: Accept the default, or enter another name; any name is valid.

   Company: Accept the default, or enter your company name. If blank, provide a company name. The installation will not continue without an entry in the field.

   Select the [Next >] button to continue.

6) Choose the Destination Location:

   We strongly recommend accepting the default location (*d:\MTWS*). Use the [Browse] button to select a different location. Select the [Next >] button to continue.

WARNING !!

If you choose a location other than the default location, make sure to specify a drive and a target folder name, e.g., *d:\myMTWS or c:\myMaui.*

Omission of the folder name along with the drive name can cause serious problems when reinstalling Maui at a future date because reinstalls remove the currently installed version starting at its installed folder. If the installed folder is the root folder, ALL files in the root folder will be REMOVED!!!

7) Setup Type:

NOTE

DEFAULTS TO NO CART CLIENT INSTALLATION

If you wish to install the CART Client application, you must select the [Custom] setup and then select the CART component. The CART Client application is NOT installed under the [Typical] setup.

NOTE

NO TERRAIN GENERATOR INSTALLATION WHEN ONLY ONE HARD DRIVE

Due to a limitation in the Terrain Generator software, if only one physical or logical hard drive is present on the target installation system, TerrGen will not be installed, otherwise it will, by default be installed on the same drive as the rest of the Maui Software Suite.

Most users should select the [Typical] setup type. If computer space is critically short, the [Compact] setup type can be selected.

If you want to selectively install portions of the Maui software suite, select the [Custom] setup type.

Custom will display a screen with the check boxes for the components.

Select the [Next >] button to continue.

Select the components you wish to install and deselect the components you wish to omit.

Select the [Next >] button to continue.

8) Setup Status:

This screen should display the Setup Status list of files being installed as well as a status meter providing percent complete information.

During the setup, the installation program will:

- Install all required files for the selected MTWS applications
- Set the appropriate file access attributes
- Adds shortcut icons to the desktop and Start menu

9) Security Administrator Configuration window

The Security Administrator Configuration interface allows you to set up the Security Administrator user name and password. The default Security Name is the user account name of the currently logged in user. It is advised that you use this default account name and enter in that account's password in the "Security Password" field and the "Confirm Password" field. A 'Security Administrator' account name should be entered in if you require a different account (from the system administrator account) to administrator security related system operations. If you choose a different user name, be sure it is a valid account name for the local computer and/or domain. The only way to modify the password is to know the original password or to reinstall Maui.

See Appendix C for more information on Maui security administration.

10) Selection of configuration options:

A window will appear with checkbox options for the following:

- Modify HOSTS
- Check TEMP disk space
- Check Maui log file usage (option available only for Maui)
- Edit Maui resource data (option available only for Maui)
- Setup Communications (option available only for Apex and/or Maui)
- Send Command Entry Rulefiles to the MSC
- Display help on these options

Select any, all, or none of these options.

Select the [Next >] button to continue.

NOTE

If you select Display help on these options, a help window provides you with information about using these options. The help window will not close on its own; the help window should be closed when no longer needed.

11) Modify HOSTS

This option brings up the file: *C:\WINNT\system32\drivers\etc\HOSTS* in a text editor. This file must contain entries as specified in **/etc/hosts or the Name Service Database** in section 2. If the workstation will connect to the MSC (i.e., is not solely a CART client workstation), it must have an entry for the MSC. If the workstation is to be used as a CART client, it must have an entry for the CART server.

12) Check TEMP disk space

This option brings up an Information window with the current System Environment Variable setting for TEMP, the disk usage for the all drives.

Press the [OK] button.

This will bring up a Change System TEMP Environment Variable dialog box.

Press the [Yes] button to change the TEMP environment variable.

If you select [Yes] the Selection of Maui configuration options window is displayed with the available drives for the TEMP directory with the current TEMP drive selected.

Press the [Next>] button.

This will bring up the System Properties interface, allowing you to modify the TEMP environment variable via the environment tab. In the System Properties window, modify the TEMP and TMP variables by selecting the Environment tab.

In the System Variables area, verify that the list includes a variable for TEMP and TMP.

If it does not, create these variables by selecting any available variable from the System list and then modifying the name and value in the Variable and Value text field areas in the lower portion of the Environment tab.

Then click the [Set] button in the Environment Tab.

Also click on the [Apply] button at the bottom of the System Properties window. It is highly recommended that the TEMP and TMP System variables are both set to a folder called TEMP on a drive with at least 1GB of disk space that can be dedicated to Maui runtime swap space. This should be the drive on which Maui is installed.

For example, if you have installed Maui on your 'D' drive, both TEMP and TMP variables should have a value of D:\TEMP. You do not need User Variables TEMP or TMP, but if they are defined, they should be set to the same drive as the TEMP and TMP System Variables.

NOTE

After installing Maui, all other user accounts that may use Maui should be checked to see if they have TEMP and TMP User Variable settings defined. If they are defined, make sure they are set to the same drive as the System Variable settings. If they are not defined, the System Variables for TEMP and TMP will be used.

13) Check Maui log file usage

This option displays a window with the current log sub-folders.

- Press the [Next >] button to delete all log sub-folders and files.

- Press the [< Back] button to continue the installation without removing log files.

14) Edit Resource Data

Selecting this option will invoke the Resources Editor. This tool provides you with a means to modify or view resource settings (also called key-value pairs). Key-value pairs with section labels in blue are modifiable, such as MSC hostname, Maui print definitions, and port settings.

Key-value pairs with section labels in gray are read-only and provided primarily for information as to the file paths for data files used by Maui. It is strongly advised not to modify the *MTWS\Maui\resources.dat* file directly. This could result in undesirable behaviors during execution of the software.

The following is a brief description of the modifiable fields:

KEY	**Attribute**	**Description**
MSC_HOSTNAME	MSC001	Host name of MSC to which this workstation is connected.
HIGH_SPEED_LINE_SERVER		Name of the server for the networked high speed printer. Default is no high speed printer, so no value is entered in for this key.
HIGH_SPEED_LINE_PRINTER		Name of the printer for the networked high speed printer. Default is no high speed printer, so no value is entered in for this key.
LINE_PRINTER_PORT	LPT1	Port name for this local line printer.

LASER_PRINTER_ENABLED	N	A laser printer is accessible and enabled for this workstation (Y); or is not accessible/enabled (N).
CLIENT_REMOTE_PORT	12753	TCP/IP port number. This value must match the 'mtws' entry in the */etc/services* file on the MSC. See **/etc/services** in section 2.
SERVER_LOCAL_PORT	12753	TCP/IP port number. This value must match the 'mtws' entry in the */etc/services* file on the MSC. See **/etc/services** in section 2.
MAPVIEWLIMIT	4	Maximum number of map windows (internal to the main map window) that can be displayed at one time. As the number increases, workstation performance will decrease.
MAX_REPORTS	10	Maximum number of solicited report windows that can be open at one time.
MAX_SP_LINES	400	Number of lines displayed in Spot Report window before old reports fall off the top of the list.
MAX_ALERT_LINES	1000	Number of lines displayed in Alert window before old alerts fall off the top of the list.
ONLINE_TIMEOUT	20000	Number of milliseconds after which an attempt to go online to the MSC will timeout.
OFFLINE_TIMEOUT	20000	Number of milliseconds after which an attempt to go offline from the MSC will timeout.
TRANSMIT_TIMEOUT	120000	Number of milliseconds after which an attempt to receive a command or report request response will timeout.
MAX_CE_WINDOWS	5	Maximum number of command entry forms that can be displayed at one time.

MAX_MR_WINDOWS	5	Maximum number of solicited report request forms that can be displayed at one time.
MAX_COC_REPORT_WINDOWS	2	Maximum number of chain-of-command report windows that can be displayed at one time.
MAX_RIGHT_CLICK_ITEMS	20	The maximum number of objects that can be accessed by a right-button mouse click.
REUSE_BROWSER_WIN	Y	Use an open browser (Y), or open a new one (N), when starting a CART client report browser.
SERVER_DATABASE	jdbc:mysql://cartserver/cart	The database to which the CART client connects.
USER	cart	The user name with which the CART client connects.
MAX_CART_STEP	60	The number of minutes of data for which the CART client queries the server. Larger values result in higher memory utilization; smaller values result in slightly longer query times.

NOTE

This program is available only if you install Maui.

After Maui is installed, this program can also be run from the shortcuts created at install time. A shortcut is available for it in the MTWS Tools folder or from the Programs -> MTWS -> Maui -> Mau Resources Editor option from the Start menu.

15) Setup Communications

This option is selected by default. It runs Apex Login (if Apex is installed) and Maui Login (if Maui is installed) tools, which set up the Apex-to-MSC and Maui-to-MSC login/password files.

Apex Login:

When installing Apex without a networked MTWS suite available, click on the Cancel button and go to the next step.

Use the default user name of soc and enter in the soc password for your site. This establishes the username/password dataset used by Apex for connectivity to the MSC as user soc.

NOTE

This program is run automatically only if you install Apex.

After Apex is installed, this program can also be run from the shortcuts created at install time. A shortcut is available for it in the MTWS Tools folder or from the Programs-> MTWS-> Apex -> Apex Login option from the Start menu.

Maui Login:

When installing Maui without a networked MTWS suite available, click on the Cancel button and go the next step. Otherwise, use the default user name **mds** and enter in the **mds** password for your site.

This establishes the username/password dataset used by Maui for connectivity to the MSC as user **mds**.

NOTE

This program is run automatically only if you install Maui.

After Maui is installed, this program can also be run from the shortcuts created at install time. A shortcut is available for it in the MTWS Tools folder or from the Programs-> MTWS-> Maui -> Maui Login option from the Start menu.

16) Send Command Entry Rulefiles to the MSC

Batch file conversion is required for this installation. Use the utility program, Send RuleFiles, to send the uncompressed rule files and command entry files to the MSC. This

need only be run once to place the files on the MSC for the batch file conversion program to access.

17) Setup Complete:

The installation program will then ask whether you wish to reboot your system. Select the [Yes, I want to restart my computer now.] radio button; then select the [Finish] button to reboot your machine. This insures a complete Maui installation and correct configuration.

Section 4 - Parametric Data

Following installation of the MAN, MSC, CART, and Maui software, baseline parametric data must be made available to the MAN and MSC software. If this installation is an upgrade from a previous version, all user-defined parametric data sets must be converted before they are usable by this version.

Note that, because of their parametric data, pre-v3.0 exercises are incompatible with v3.0. Converting a pre-v3.0 parametric data set makes that data set compatible with v3.0; but pre-v3.0 exercises – i.e., those defined with parametric data prior to conversion to v3.0 – are still not compatible with v3.0. These exercises should be archived offline. Please contact MTWSHelp@titan.com for assistance in making a pre-v3.0 exercise compatible with v3.0.

Baseline parametric data is a component of Apex. It is the data set with which Apex is installed. The following steps must be taken in order to make it available to the MAN and MSC applications.

- Run Apex as administrator
- Launch Apex from a shortcut on the desktop, the MTWS Tools folder, or the Programs -> MTWS -> Apex -> Apex option from the Start menu.
- Select the Import/Export button from the main window.
- Select the Send button from the Import/Export window
- Select the ‘Apex Baseline to MSC Baseline’ option and click the ‘OK’ button.
- Click the ‘OK’ button in the (Warning! This function will overwrite the contents of your database!) dialog.
- Wait for the delete, populate and extract background operations to complete and then click on the ‘Submit’ button in the Send (Apex Baseline to MSC Baseline) window.

- Click the 'OK' button in the Apex warning "Are you sure you want to overwrite the directory /mtws/db/parametric/baseline" message window.

- In the "Send Apex Baseline to MSC Baseline" window, when the status bar displays the message, "Done sending files", click the 'Cancel' button.

The following steps must be taken in order to convert user-defined parametric data sets, so that they are useable by this version of MTWS.

- Back up the entire */mtws/db/parametric/user_defined* directory on the Linux side.

- To insure a clean import, make sure the Inbox is empty.

- On Apex, select Import/Export; select Retrieve.

- In Apex's Retrieve Dialog, select MSC User-defined to Apex Inbox; and from the pull-down menu, select the name of the parametric data set to be retrieved/converted.

- Select Submit.

- Select Populate. Use the pre-set Apex Inbox radio button, and click on OK.

- On the Linux side, delete the contents of the parametric data directory being converted.

- To insure a clean export, make sure the Outbox is empty.

- Select Extract. Select OK, which extracts the database to Apex's outbox.

- Select Send. Use the pre-set Apex Outbox to user-defined radio button, and click on OK.

- In the Send dialog, from the pull-down menu, select the name of the parametric data directory to which the data will be sent.

- Select Submit.

- Perform the above steps for each user-defined parametric data set.

Depending upon the version of the data set being converted, a message may be displayed during the conversion process, indicating that one or more files are missing from the data set. If this happens, the corresponding v3.0 baseline data is substituted for the missing data.

When the conversion process is complete, a dialog is displayed, from which a Populate Report is available. This report identifies changes made to the data during the conversion process to make it compatible with v3.0.

Only one parametric data set can reside in Apex at any point in time. Over time, users tend to create multiple versions of user-defined parametric data. MSC becomes the repository for these data sets. A user-defined data set can be created from BASELINE; or from another user-defined data set. The procedures described above for converting user-defined data sets for v3.0 compatibility use the same general procedures as those for creating or modifying a parametric data set. The following describes these procedures in general.

Select Import/Export->Retrieve on the main Apex screen to begin the process of bringing either baseline, or a user-defined, data set from the MSC to Apex. Once the desired data set is chosen, and the Submit button is selected, Apex begins the process of populating its "inbox" with the the data set. Once in Apex's inbox, its database must be "populated" with the data; this is done via the Import/Export->Populate option on the main Apex screen. After Apex's database has been populated, the data can be modified, reports can be obtained, etc. Once the desired modifications have been made, the data must be sent to the MSC, so that is can be used by the simulation. The first step in doing this is to "extract" the data to Apex's outbox; this is done via the Import/Export->Extract option on the main Apex screen. Once the data resides in Apex's outbox, it can sent to the MSC, via the Import/Export->Send option on the main Apex screen. Note that this option supports over-writing an existing data set; as well as creating a new data set.

TIFF Map Files (*.tif)

Once installed on the MSC, the TIFF map files can be downloaded from the MSC to the Maui Workstation. Using an FTP program on the workstations, 'get' the *.tif files from the */mtws/maps* directory on the MSC and place them into the *\MauiData\Maps\TIFF* folder on the workstation. These files are then immediately available for use by Maui. For help on using FTP on a workstation, consult Windows Help.

Terrain Data Files (*.trr)

Once installed on the MSC, the TRR terrain files can be downloaded from the MSC to the Maui workstation. Using an FTP program on the workstation, 'get' the TRR files from the */mtws/db/terrain* directory and subdirectories on the MSC; and place them into the *\MauiData\Maps\TRR* folder and corresponding subfolders on the workstation. Once there, use the Elevator application to convert them to TIFF images, which can then be loaded into Maui. The convention for files converted from TRR to TIFF is to place them into the *\MauiData\Maps\Elevation* folder and corresponding subfolders. For help on using FTP on a workstation, consult Windows Help.

Chapter 4 - Operating Procedures

Material in this paragraph is presented from a functional perspective; it identifies the operations a system operator can perform and describes how to do them. Generally, topics are discussed in the context of running an exercise from beginning to end.

The following conventions apply throughout:

a. The syntax "**MenuItem Sub-menuItem** --> **Sub-sub-menuItem** -->..." means:

1) **MenuItem** is visible on some (X-Windows) interface

2) When **MenuItem** is selected with the cursor, **Sub-menuItem** becomes visible on the interface

3) When **Sub-menuItem** is selected with the cursor, **Sub-sub-menuItem** becomes visible on the interface, and so on.

b. Select means go to that menu item/button and click on it.

c. Click on means position the cursor on the item/button and press the left mouse button.

d. When the terms host, station, and workstation are used; they all mean computer.

e. Tactical database means exercise entities created by the user by entry of commands (units, missions, etc.).

f. Sysop means System Operations.

Login Sequence

At the login screen, enter **soc** for the user name. At the password prompt, enter the password for user **soc** that you have defined for your site. See **Additional Operating System Configuration – MAN/MSC/CART, etc/passwd** in Chapter 2,

Specifying Mapping Datums

A file named */mtws/bin/MAN/sphere_config* is used by MAN, MSC, and Maui software to control the conversion of geographic locations between latitude/longitude, and Military Grid Reference System (MGRS), coordinate systems. (MGRS is often mistakenly referred to as Universal Transverse Mercator (UTM) format. There are references throughout MTWS to "UTM", which should properly be "MGRS".) The following procedure determines whether locations within a given spheroid will be converted using WGS84 mapping datum, or a local datum.

This file is read by the MAN/MSC/Maui software at start-up time only. If any MTWS software is currently running, it must be shut down prior to performing this procedure.

If not already logged into the MSC station, do so. Note that the MSC application software must not yet be started. Using a text editor, edit the file */mtws/bin/MAN/sphere_config*. Note that there is a list of spheroid names, and a corresponding value for each. A value of 0 (zero) means "use local datum"; a value of 1 (one) means "use WGS84 datum". For example, if the value for the Bessel spheroid is 1, and all other values are 0, locations within the Bessel spheroid will be converted using WGS-84 datum; and all other locations will be converted using their local datum. To determine the appropriate values for the relevant spheroids, examine the set of maps being used to support the exercise. Each map typically identifies the datum on which it is based.

As installed, local datum is used for all spheroids – i.e., all values are 0. If this file is modified to support a particular exercise, consider making a copy of the modified file. This practice is recommended because this file is not exercise-specific. Making exercise-specific copies of this file facilitates exercise management. For example, if an exercise is re-run several months after its initial run, and other exercises using other spheroid values have been run since then, the spheroid values used in the initial run can be easily restored. If this practice is followed, each copy of the *sphere_config* file should be kept in its corresponding exercise directory. The */mtws/bin/MAN/* directory is overwritten by a new installation; but the */mtws/db/man/…* exercise directories are not overwritten.

Starting MSC Software

To initiate execution of the MSC software, perform the following steps.

a. Log on to the MSC station as described above.

b. If MTWS is to be run in a non-ALSP configuration, select the **Start MTWS** icon on the task bar. In an ALSP configuration, select the **Start ALSP** icon on the task bar.

c. Select **System Control** --> **Admin** --> **Start MSC** from the System Operations window to start the remaining MSC programs.

d. Wait for a response to appear in the System Operations window indicating that MSC has started.

e. The **Exercise Status** display will indicate that the MDS net is down; i.e., no MDS can communicate with any MSC or MAN host. The MDS net can be enabled only after the **Start Applications** step. Refer to paragraph "MDS Interface".

f. Select the desired **display/print reports** features in the **Station Control** interface.

Creating an Exercise

To create a new exercise, perform the following steps.

a. Start the MSC software as described above.

b. Select **Exercise Control** --> **Database** --> **Exercise** --> **Create** from the System Operations window. The exercise create interface will appear.

c. Enter the desired **exercise name**, **start time** and **zone**, **parametric data set**, and **terrain area(s)** in the templates provided.

d. The values selected in step c can never be changed, except as described in paragraph "Saving an Exercise". If, at some later time, a different parametric data set or terrain values are desired, a separate exercise must be created.

NOTE

When creating an exercise for ALSP, use the baseline parametric database. This database is designed to support ALSP confederation exercises.

e. To create the exercise, click on the **Apply and Close** button on the exercise create interface after all desired values have been entered in step c. To abort the exercise creation, click on the **Cancel and Close** button instead.

f. Wait for a response to appear in the System Operations window indicating that the exercise has been created.

For discussion of another way to create an exercise, deriving one exercise from another, see paragraph "Saving an Exercise."

Starting or Restarting an Exercise

To start an exercise, perform the following steps.

a. Start the MSC software as described above.

b. If desired, create an exercise as described above.

c. Select **System Control** --> **Applications** --> **Load MAN** from the System Operations window to begin execution of the MAN software on the desired host(s). The MAN hostnames interface will appear with only valid hostnames selectable.

d. Select the hostname(s) on which the MAN software is to run.

e. Select the **OK** button in the System Operations window.

f. Wait for response(s) to appear in the System Operations window indicating that the Load MAN step is complete each of the designated host(s). There is one such response for each MAN. The MAN monitors will remain at the login screen.

g. Select **Exercise Control** --> **Database** --> **Exercise** --> **Load**. The exercise load interface will appear.

h. Select the desired exercise from those listed in the exercise load interface.

i. Select the **New**, **Start**, **Time**, or **End** button in the exercise load interface. If **Time** is chosen, enter the **exercise time** at which the exercise is to be loaded. The consequences of each choice are discussed individually in sections "Starting or Restarting and Exercise through Restarting an Exercise – End". If the exercise has never been loaded, **New** must be selected.

j. Click on the **OK** button on the exercise load interface, confirming the choices made in step i.

k. To abort the exercise load, click on the **Cancel** button on the exercise load interface.

l. Inspect and verify the message displayed in the System Operations window identifying the exercise name and the New/Start/Time/End option chosen in steps h and i. If any of information is incorrect, click on the Cancel button in the System Operations window.

m. To load the exercise, click on the **OK** button on the System Operations window. To abort the exercise load, click on the **Cancel** button on the System Operations window. If this option is chosen, steps (g) - (l) can be repeated.

n. Wait for response(s) to appear in the System Operations window indicating that the exercise has been loaded on the MAN host(s) designated in step (d).

o. Select **System Control** --> **Applications** --> **Start App** from the System Operations window to assign MAN functions to the desired host(s). The application/host mapping interface will appear with a list of MAN hosts and a button for each application. A default mapping of applications to MAN hosts is provided. This default mapping is the recommended distribution for a typical land/sea/air exercise.

p. To change the host for a selected application, select the desired MAN host by clicking on the MAN host selector. Once the MAN is selected, click on the application button for each application that is to run on the selected host.

q. When an application button is selected, the hostname label corresponding to that button changes to reflect the selected host.

r. Applications distribution should be selected to maximize CPU usage and minimize message traffic. A slow running application should NOT necessarily be run on a separate host. Metrics cycle times available from the MSC Status Window should be used as a measure to achieve the best overall performance for the exercise.

s. If acceptable, select the **OK** button on the System Operations window.

t. To abort the application start, click on the **Cancel** button on the System Operations window.

u. Wait for response(s) to appear in the System Operations window indicating that the applications have started on the MAN host(s) designated in step d.

v. At this point, Maui workstations can be allowed to connect to the MSC. Also, if data is going to be output to CART, it may be appropriate to start the CART server at this time. See **Enabling the MDS Interface** and **Starting the CART Server** sections below.

w. If the **New** option was chosen in step i, establish the initial tactical database by entering commands and/or submitting batch files.

   1) Then select **Exercise Control** --> **Database** --> **Exercise** --> **Initialize** from the System Operations window.

   2) Wait for a response to appear in the System Operations window indicating that exercise initialization is complete.

x. Select **Exercise Control** --> **Operation** --> **State** --> **Run** from the System Operations window.

   1) **This step must be performed or the database established in step v will be lost.**

   2) Putting the system into RUN state causes the exercise database to be saved to a set of files in the exercise directory. These files, and others like them, comprise the data set used to initialize the exercise in subsequent loads.

Enabling the MDS Interface

The MDS interface should be enabled after the **System Control**✍**Applications**✍**Start App** step has been completed, as described above. It cannot be enabled prior to this time. If

the exercise was loaded New, it is necessary to allow Maui workstations to come online, to enter commands to establish the exercise database. If the exercise was loaded at Start, Time, or End, then. Other than CART server considerations (see below), the exercise is ready to run, and Maui workstations should typically come online at this time.

To enable the MDS interface, select **System Control✍ Interfaces✍ MDS Net✍ Start.** Note that the MDS interface icon on MSC's exercise status window changes to relect the change in status.

Starting the CART Server

The CART server

Starting Maui Display Station Software

To initiate execution of the Maui MDS software, perform the following steps:

a. Log on to the Maui Display Station. Once login has completed and the standard arrow cursor appears, the workstation is available for use.

b. Find the Maui icon on the desktop and double-click on it to start up the Maui software. Once the software startup is complete, the four default Maui windows should appear: Station Control, Exercise Status, Spot Reports, and the map window.

c. In the **Station Control** window:

-- Click on the **User Privilege Level: 2** radio button.

-- Enter the **level 2 password** in the template provided.

-- If the MDS station is not to have level 2 privilege, click on the **User Privilege Level: ...0** or **User Privilege Level: 1** radio button, as appropriate.

-- If the Line Printer has been configured via the Resources Editor tool, select the **Print to Line Printer** features desired.

-- If the HSP has been configured via the Resources Editor tool, select the **Print to HSP** features desired.

d. In the **Spot Reports** window:

-- Select the **Select Controllers** button. The Controller Selection window will appear with the list of available controllers.

-- Select the controller(s) to be assigned to this MDS station.

-- Click on the **OK** button on the controller names interface.

e. In the Maui map window:

-- Select **Object Filters** option from the **Display Objects** menu. The **Object Filters** window will appear.

-- Select the display settings desired for this display station.

-- Click on the **OK** button in the **Object Filters** window.

f. In the **Station Control** window:

-- If the MDS station is not to have level 2 privilege, click on the **User Privilege Level: 0** radio button or **User Privilege Level: 1** radio button, as appropriate.

g. After the MSC software has been started, activate the **Station Control** window and click on the **On/Offline: On** button. This action enables Maui communications with the MSC and with the exercise (MAN).

Starting an Exercise - New

When an exercise is loaded with the New option, only the parametric data and terrain specified at the time of exercise creation (see paragraph “Creating an Exercise”) are loaded; the exercise's entire tactical database (if any) is deleted. In this context, "tactical database" refers to exercise entities created by the user through entry of commands -- units, missions, etc. The exercise time is set to the exercise start time specified at the time of exercise creation.

When an exercise is loaded with the New option, step v in paragraph “Starting or Restarting an Exercise” (database initialize) is required.

New is the only valid way to load an exercise that has no tactical database.

New is a convenient way to purge an exercise's tactical database while retaining its parametric data and terrain.

Restarting an Exercise - Start

When an exercise is loaded with the Start option, the parametric data and terrain specified at the time of exercise creation are loaded. The portions of the exercise's tactical database that were established before entering the RUN state when the exercise was last run are also loaded; all other portions of the tactical database are deleted. The exercise time is set to the exercise start time specified at the time of exercise creation.

As an example, consider the following situation:
¥ A new exercise is created; then
¥ Steps a through u in paragraph “Starting or Restarting an Exercise” are performed; then

- ¥ A unit named UNIT_1 is defined; then
- ¥ Steps v and w in paragraph “Starting or Restarting an Exercise” are performed; then
- ¥ A unit named UNIT_2 is defined; then
- ¥ The exercise is eventually terminated.

If this exercise were then (re-)loaded using the Start option, the tactical database would consist of UNIT_1 only; UNIT_2 would be deleted.

Loading an exercise with this option is one form of what is commonly known as a "restart".

When an exercise is loaded with the Start option, step v in paragraph “Starting or Restarting an Exercise” (database initialize) is unnecessary and cannot be performed; the **Exercise Control** --> **Database** --> **Exercise** --> **Initialize** menu selection is disabled in the System Operations window.

Restarting an Exercise - Time

When an exercise is loaded with the Time option, the parametric data and terrain specified at the time of exercise creation are loaded. The portions of the exercise's tactical database that were established before the specified time are also loaded; all other portions of the tactical database are deleted. The exercise time is set to the time specified during the exercise load operation (see 3.4.5, step i).

NOTE

Consult the Release Notes for the version being run for restart time constraints. As of this writing, the time specified should be one hour plus 9, 19, 29, 39, 49 or 59 minutes (e.g., 13:29, 23:09,or 7:59) or an even ten minute interval. The highest risk of restart failures occur with times ending in 7 or 8.

THIS NOTE APPLIES TO ALL CASES

Certain changes to parametric data -- in particular to /mtws/db/max_sizes -- may make an exercise unloadable. Exercise load can fail if one or more definitions in para_data_max_sizes are smaller than the corresponding definition at the time the exercise database was first defined. Using larger definitions than originally set in the exercise database does not cause a problem. For an exercise to be restarted correctly, all values in /mtws/db/max_sizes should be equal to or greater than those used when the exercise was created.

Restarting an Exercise - End

When an exercise is loaded with the End option, the parametric data and terrain specified at the time of exercise creation are loaded. The entire tactical database that was established when the exercise was last run is also loaded. The exercise time is set to one minute later than the time at which the exercise was terminated the last time it was run. To understand why the exercise time is determined this way, suppose an exercise was terminated at 1015. When restarted at the end, events that happened at 1015 have already occurred, and are included in the restart. Therefore, the time must now be 1016. Loading an exercise with this option is one form of restart.

WARNING: A restart at End should NOT be used if a graceful transition to SUSPEND mode and ADMIN state could not be performed. In this case, a restart from a time at least 10 minutes prior to the end should be used.

When an exercise is loaded with the End option, step v in paragraph "Starting or Restarting an Exercise" (database initialize) is unnecessary and cannot be performed; the **Exercise Control** --> **Database** --> **Exercise** --> **Initialize** menu selection is disabled in the System Operations window.

Saving an Exercise

Once an exercise has been loaded it may be saved. This operation can be used to create a new exercise with the same characteristics as the loaded exercise, except that the start time of the new exercise will be the current exercise time. To save the currently loaded exercise, perform the following steps:

a. If the exercise is in RUN state, select **Exercise Control** --> **Operation** --> **Mode** --> **Suspend** from the System Operations window.

b. Select the **OK** button on the System Operations window.

c. While the system is transitioning to Suspend mode, the MSC Status Window will flash a yellow SUSPEND. When the mode displayed in the MSC Status Window transitions to a solid red SUSPEND, this indicates that the exercise has been suspended.

d. Select **Exercise Control** --> **Database** --> **Exercise** --> **Save** from the System Operations window. The exercise save interface will appear.

e. Enter the name to be given to the saved exercise in the template provided on the exercise save interface.

f. Select either the **Overwrite** or the **Don't Overwrite** option on the exercise save interface.

NOTE

if the name entered in step e is the same as the name of the loaded exercise and if Don't Overwrite **is selected in step f, the command will be rejected.**

g. Select the **OK** button on the System Operations window.

h. Wait for a response to appear in the System Operations window indicating that the exercise has been saved.

If the loaded exercise is saved under a different name, a new exercise is created with the same characteristics as the currently loaded exercise, except that the start time of the new exercise is set to the current exercise time. If the loaded exercise is saved under the name of the currently loaded exercise and if the Overwrite option is selected, the start time of the (new) current exercise is changed to the current exercise time.

Exercise States and Modes

MTWS operates in three states -- Admin, Replay, and Run -- and two modes -- Suspend and Normal. All operations described in sections "Creating an Exercise" and "Starting or Restarting an Exercise" take place in Admin state; this is the default/initial state of the system when the software is initiated. See paragraph "Starting or Restarting an Exercise" (w) for the discussion of initial entry into Run/Normal.

Suspending an Exercise

To temporarily stop a running exercise, perform the following steps:

a. Select **Exercise Control** --> **Operation** --> **Mode** --> **Suspend** from the System Operations window.

b. Select the **OK** button on the System Operations window.

c. While the system is transitioning to Suspend mode, the MSC Status Window will flash a yellow SUSPEND. When the mode displayed in the MSC Status Window transitions to a solid red SUSPEND, this indicates that the exercise has been suspended.

This action causes the exercise clock to stop advancing, which effectively stops exercise activity. Note, however, that all exercise activity may not stop immediately after step c -- e.g., new alerts may continue to appear in the Alert Window on the MSC host for a short time (one minute or so) after this action has been performed. This is normal and is due to the fact that some MAN software processing is cyclical; if the exercise is suspended while this software is in the middle of a cycle, exercise activity will not cease until the cycle is complete. The transition of the MSC Status Window display to a solid red SUSPEND signifies the completion of all cycles.

Resuming an Exercise

To resume normal operation of a suspended exercise, perform the following steps:

a. Select **Exercise Control** --> **Operation** --> **Mode** --> **Resume** from the System Operations window.

b. Select the **OK** button on the System Operations window.

c. Wait for a response to appear in the System Operations window indicating that the exercise has been resumed.

d. Observe that alert(s) are displayed in the Alert Window on the MSC host that are generated by the MAN host(s) and that include the current exercise time.

NOTE

If there is not one such alert from each active MAN host, the resumption has failed. In this case, it is probably necessary to put all MDS stations off-line (see paragraph "Controlling Interfaces") and then perform a restart (see sections "Restarting an Exercise – Start" through "Restarting an Exercise – End").

.

Manipulating the Exercise Clock

The MTWS system operator has two ways to control the rate at which exercise time advances - Clock Advance and Clock Rate. Both are most useful for advancing rapidly through a portion of a running exercise (e.g., a part of the exercise of relatively little interest). Clock Rate may also be used to run the exercise more slowly than normal.

Clock Advance

To advance the exercise clock, perform the following steps.

a. Select **Exercise Control** --> **Clock** --> **Advance** from the System Operations window. The clock advance interface will appear.

b. Enter the **time** to which the clock should advance in the clock advance interface template.

c. To suspend the exercise when the specified time has been reached, select **Suspend** on the clock advance interface.

d. To continue normal running of the exercise when the specified time has been reached, select **Don't Suspend** on the clock advance interface.

e. Click on OK in the System Operations window.

f. Wait for a response to appear in the System Operations window indicating that the clock advance has been accepted.

The exercise time will be advanced as rapidly as possible to the specified time. During this time, all exercise activity will continue without omissions. When the specified time is reached, the clock rate is restored to the value it had before the Clock Advance operation.

Clock Rate

To set the exercise clock advance rate, perform the following steps:

a. Select **Exercise Control** --> **Clock** --> **Rate** from the System Operations window. The clock rate interface will appear.

b. Select the **desired clock rate** on the clock rate interface.

c. If desired, enter the **duration** for which the rate is to apply or the **exercise time** at which the rate is to expire on the clock rate interface.

> **NOTE**
>
> **This parameter is optional. If it is omitted, the specified rate will remain in effect until the rate is set to a different value.**

d. Click on OK in the System Operations window.

e. Wait for a response to appear in the System Operations window indicating that the clock rate has been accepted.

The exercise time will be advanced at the specified rate for as long as specified. During this time, all exercise activity will continue without omissions.

Helpful Hints

Clock Rate and Clock Advance have equal precedence; i.e., if both operations are performed, the last one performed overrides the first. If a Clock Advance is done and followed by setting the Clock Rate to less than real-time, the exercise clock will advance at the rate specified in the Clock Rate operation. If the Clock Rate operation is done first and followed by the Clock Advance, the exercise clock will advance as rapidly as possible.

Controlling Engagements

The system operator can suspend or resume an individual direct fire engagement.

Before performing these operations, the operator must obtain the identifier of the engagement from the relevant spot report(s) or from the **ground engagement status** solicited report.

While a direct fire engagement is suspended, no weapons are fired and no ammunition is expended. However, ground movements will continue and units may still join or leave the engagement.

Suspending Engagements

To suspend an engagement, perform the following steps:

a. Select **Exercise Control** --> **Engagement** --> **Suspend** from the **System Operations window**. The engagement suspend interface will appear.

b. Enter the **ID** of the engagement.

c. If desired, enter the **duration** for which the engagement is to be suspended.

> **NOTE**
>
> **This parameter is optional. If it is omitted, the engagement will remain suspended until an** engagement resume **operation is performed.**

d. Click on OK in the System Operations window.

e. Wait for a response to appear in the System Operations window indicating that the engagement suspension has been accepted.

Resuming Engagements

To resume an engagement, perform the following steps:

a. Select **Exercise Control** --> **Engagement** --> **Resume** from the System Operations window. The engagement resume interface will appear.

b. Enter the **ID** of the engagement.

c. Click on **OK** in the System Operations window.

d. Wait for a response to appear in the System Operations window indicating that the engagement resume has been accepted.

Controlling Interfaces

The system operator has control over the state of the MDS network interfaces, and the HSP interface. This paragraph discusses operations to control the states of these interfaces. See paragraph "MAN/MDS Hosts On-Line" for discussion of operations to view the status of these interfaces.

The MDS interface must be enabled for an MDS station to communicate with the MSC. When the MSC software is started, the MDS net is disabled. The MAN net is always enabled when the MSC is running.

MDS Interface

The MDS interface is disabled whenever an exercise is being loaded. When the MAN applications have been started, this interface should be enabled.

The MDS interface should be disabled whenever is it necessary to restart the MSC and MAN software. The MDS interface will be automatically disabled if the MSC is shutdown or restarted.

Disable MDS Interface

To disable the MDS interface, perform the following steps:

a. Select **System Control** --> **Interfaces** --> **MDS Net** --> **Halt** from the System Operations window.

b. Click on OK in the System Operations window.

c. Wait for a response to appear in the System Operations window indicating that the interface has been halted.

d. Observe that the MSC Status Window (or the MSC Connections window) shows no users on-line.

Enable MDS Interface

To enable the MDS interface, perform the following steps:

a. Select **System Control** --> **Interfaces** --> **MDS Net** --> **Start** from the System Operations window.

b. Click on OK in the System Operations window.

c. Wait for a response to appear in the System Operations window indicating that the interface has been started.

Enabling this interface does not cause MDS stations to be put on-line. Once this interface is enabled, each MDS station must be put on-line individually as described in 3.4.3.4(g).

MAN Interface

As there is no reason to ever disable this interface, no mechanism is provided for doing so.

High-Speed Printer Interface

Enable HSP Interface

To enable the HSP interface, perform the following steps:

a. Select **System Control** --> **Interfaces** --> **HSP** --> **Resume** from the System Operations window.

b. Click on OK in the System Operations window.

c. Wait for a response to appear in the System Operations window indicating that the interface has been enabled.

Disable HSP Interface

To disable the HSP interface, perform the following steps:

a. Select **System Control** --> **Interfaces** --> **HSP** --> **Suspend** from the System Operations window.

b. Click on OK in the System Operations window.

c. Wait for a response to appear in the System Operations window indicating that the interface has been disabled.

Clear HSP Print Queue

To clear all pending print jobs from the HSP print queue, perform the following steps:

a. Select **System Control** --> **Interfaces** --> **HSP** --> **Clear** from the System Operations window.

b. Click on OK in the System Operations window.

c. Wait for a response to appear in the System Operations window indicating that the interface has been cleared.

Manipulating Terrain

Several operations are available to the system operator to manipulate the digitized terrain for an exercise. Note that these operations are in addition to the terrain definition portion of the exercise definition operation (see paragraph "Creating an Exercise").

Digitized Terrain Data

Digitized terrain data was obtained from the National Imagery and Mapping Agency (NIMA). The raw data contains elevation and terrain features and is in two formats: Digital Terrain Elevation Data (DTED) and Digital Feature Analysis Data (DFAD).

The raw data (elevation and terrain features) are then converted to elevation, trafficability and vegetation values in each 3-second (3") terrain data element. See Appendix A for conversion procedures.

The distance between adjacent lines of longitude is greatest near the equator, and diminishes toward the poles. Therefore, terrain data resolution is least near the equator.

a. From the equator to 50º, resolution is 3" latitude x 3" longitude.

b. From 50º to 70º, resolution is 3" x 6".

c. From 70º to 80º, resolution is 3" x 9".

d. From 80º to 90º, resolution is 3" x 12".

MTWS terrain files normally contain data cells 1º latitude by 1º longitude or 1200 x 1200 elements using 3" resolution. One file corresponds to 1.44 million terrain data points.

Any given exercise can incorporate data from several files that are loaded into memory. Up to 20 1º x 1º digitized terrain areas can be loaded, each of which is specified by two pairs of coordinates bounding the selected area. The system responds by loading the corresponding 1º x 1º files.

MTWS is required to run in real time; it is recommended that no more than four million terrain data points be resident in memory at any given time. This is equivalent to approximately 200 by 200 kilometers at 100-meter resolution.

In addition to the digitized terrain areas, the computer system operator can define tabletop terrain areas, areas with constant values of elevation, trafficability and vegetation. Procedures to define these tabletop terrain areas are described in paragraph "Loading/Removing Tabletop Terrain."

If non-contiguous areas (specific digitized terrain areas and/or tabletop areas) are specified, the system uses default terrain data for the unspecified areas. Default terrain data can be modified as required by using the procedure for modifying functional parametric data.

The MTWS system allows a maximum of 20 terrain areas to be loaded in memory at any given time; these can be any combination of specific digitized terrain areas and table-top areas; e.g., eight specific digitized areas and 12 tabletops. If both digitized and tabletop terrain are specified for a location, the digitized data will override the tabletop data. Digitized terrain areas may occupy less disk space but will occupy the number of cells in a finite information table as tabletop areas.

The 3" latitude resolution data from 0 to 90° can be pre-processed in MTWS to provide additional lower resolution files of 6" x 6" and 9" x 9". This provides the system operator with the option of loading in various resolutions. Resolution levels are referenced in the MTWS commands as High, Medium and Low, corresponding to 3" x 3", 6" x 6" and 9" x 9" resolutions, respectively. Lower resolution data may be used when high resolution is not required or desired.

Under certain circumstances, this may also have the effect of speeding up the system under heavy loading conditions. In general, use of lower resolution files should be considered when more than five digitized terrain areas are to be loaded. At 6" resolution, memory requirements are half that for 3" resolution; at 9" resolution, memory requirements are one-third.

Refer to Appendix A for terrain generation procedures. The terrain data can also be installed on a Maui Workstation for use with the Elevator utility. Once installed on the MSC, an FTP program can be run from a Maui Workstation to access and download these MSC resident files. For help on using FTP on a Maui Workstation, consult the Windows Help from the Start menu.

Loading Terrain

To load one or more terrain areas, perform the following steps:

a. Select **Exercise Control** --> **Database** --> **Terrain** --> **Load** from the System Operations window. The terrain load interface will appear.

b. Select **Low -**, **Medium -**, or **High-Resolution** from the terrain load interface.

c. Enter at least one pair of coordinates in the template provided in the terrain load interface.

d. Click on OK in the System Operations window.

e. Wait for a response to appear in the System Operations window indicating that the terrain definition has been accepted.

Removing Terrain

Terrain areas can also be removed. When terrain is removed from an area, that area reverts to the tabletop values defined in the parametric data for the exercise.

To remove one or more terrain areas, perform the following steps:

a. Select **Exercise Control** --> **Database** --> **Terrain** --> **Remove** from the System Operations window. The terrain remove interface will appear.

b. Select **Low -**, **Medium -**, or **High Resolution** from the terrain remove interface.

c. Enter at least one pair of coordinates in the template provided in the terrain remove interface.

d. Click on OK in the System Operations window.

e. Wait for a response to appear in the System Operations window indicating that the terrain removal has been accepted.

Loading/Removing Tabletop Terrain

The system operator can assign tabletop characteristics to a specified area. Tabletop means that all terrain points within the specified area have the same trafficability, cover, and elevation.

NOTE

Tabletop values defined by this operation can differ from those defined in the parametric data for the exercise.

To assign tabletop values to a terrain area or to restore an area's terrain values to those defined in the parametric data for the exercise, perform the following steps:

a. Select **Exercise Control** --> **Database** --> **Terrain** --> **TableTop** from the System Operations window.

The tabletop terrain interface will appear.

b. Enter the locations and the action (**LOAD** or **REMOVE**) to be performed.

> **NOTE**
>
> **If the** REMOVE **option is chosen, proceed to step (f). As a result of the REMOVE, the trafficability, cover, and elevation values for the region revert to the tabletop values defined in the parametric data for the exercise.**

c. Enter the **elevation** to be assigned to all points within the region defined by the specified locations.

d. For each type of trafficability to be defined, select a **trafficability value** from those provided. Then click on the button(s) for each type of trafficability (foot, tracked, wheeled) which is to have the selected value.

> **NOTE**
>
> **When a button is clicked, the label corresponding to that button displays the selected trafficability value.**

e. For each type of cover to be defined, select a **cover value** from those provided. Then click on the button(s) for each type of cover (air, ground) which is to have the selected value.

> **NOTE**
>
> **When a button is clicked, the label corresponding to that button displays the selected cover value.**

f. Click on OK in the System Operations window.

g. Wait for a response to appear in the System Operations window indicating that the tabletop terrain load/remove has been accepted.

Monitoring an Exercise

The system operator has access to several exercise monitoring operations.

Application Assignment

To obtain a report identifying which MAN applications are running on each MAN host, perform the following steps:

a. Select **System Control** --> **Applications** --> **Assignment Report** from the System Operations window.

b. Click on OK in the System Operations window.

Note that the information in this report can also be obtained from the Exercise Status window on the MSC host.

MAN/MDS Hosts On-Line

To determine which MAN or MDS hosts are on-line, perform the following steps:

a. Select the Users Online button on the MSC Status window. This will display the Connections window which will display a graph of all open connections.

Terrain Status

To obtain a report identifying the area(s) for which digitized terrain has been loaded, perform the following steps:

a. Select **Exercise Control** --> **Database** --> **Terrain** --> **Report** from the System Operations window.

b. Click on OK in the System Operations window.

A window will appear in which the coordinates of the lower-left and upper-right corner(s) of each area for which digitized terrain has been loaded are displayed.

Controller Assignment

To obtain a report identifying the controller(s) assigned to each MDS and MSC host, perform the following steps:

a. Select **Exercise Control** --> **Controller** --> **Assignment Report** from the System Operations window.

b. Click on OK in the System Operations window.

A window will appear which displays the name of each controller and the host(s) to which each is assigned.

Exercise Definition Summaries

Summary Report of Exercise Definition Parameters

To obtain a summary report of the exercise definition parameters (except terrain) for all defined exercises, perform the following steps.

a. Select **Exercise Control** --> **Database** --> **Exercise** --> **Summary Report** from the System Operations window.

b. Click on OK in the System Operations window.

A window will appear which displays, for each exercise residing on the system, the exercise name, start time and zone, and parametric data set identifier.

Summary Report of Terrain Parameters for Defined Exercises

To obtain a summary report of the terrain parameters for all defined exercises, perform the following steps.

a. Select **Exercise Control** --> **Database** --> **Exercise** --> **Terrain Report** from the System Operations window.

b. Click on OK in the System Operations window.

A window will appear which displays, for each exercise residing on the system, the exercise name and the terrain values defined at the time the exercise was defined.

Operating with the Joint Training Confederation

Configuring MTWS/ALSP Mapping Tables

When MTWS is to run in ALSP mode, the MTWS-to-ALSP and ALSP-to-MTWS enumerations mapping tables should be updated. These tables allow the ALSP simulations to agree on the definition for defined objects. MTWS is delivered with tables derived from the BASELINE parametric data set. The database builder should find out which ALSP enumeration list will be used for their particular exercise. If the proper ALSP enumeration list is unknown, the latest ALSP enumeration list can be downloaded at http://ms.ie.org/alsp.

The translation tables may be found in directory */mtws/bin/ALSP/tables*. Generally, you can ignore the following tables because they don't change very often:

CAPABLE_STATUS.AtoM	CAPABLE_STATUS.MtoA
FLIGHT_OPS.AtoM	FLIGHT_OPS.MtoA
FORMATION.AtoM	FORMATION.MtoA
MISSION.AtoM	MISSION.MtoA
POSTURE.AtoM	POSTURE.MtoA
ROLE.AtoM	ROLE.MtoA
SIDE.AtoM	SIDE.MtoA

SIZE.AtoM SIZE.MtoA

STATUS.AtoM STATUS.MtoA

TARGETS.AtoM TARGETS.MtoA

TYPE-Fuel.MtoA

In all mapping files, if a "#" (pound/number symbol) appears in the first column of the line, it is a comment and is not an entry. No blank lines may appear in the files, otherwise the rest of the entries will be ignored. Each valid entry MUST start with a tab and is delimited by a tab. If a "/" is part of the mapping or starts with a period (.), the quote (") character must surround the mapping. For example:

```
# This is a comment.

# tab                    tab

# |                      |

# V                      V

    MTWS_MAPPING    ALSP_MAPPING

    "MTWS/ALSP"             ".ALSP"

# end of file
```

Note

Files starting with "PD_" or ending with ".TXT" can be found in the /mtws/db/parametric/user_defined/<*para data file set*> directory.

The AMMO_TO_WEAPON file contains look-up values for MTWS ammunition and weapon dependencies. Multiple weapons can fire the same ammunition. The entire list in the PD_Ammo_IDs file should be in the left column of this file. The right column should contain the proper weapon that can fire the ammunition. A listing can be found in the WEPNB.TXT file.

The EMITTER-AIRCRAFT.MtoA file contains look-up values for the TYPE field of the MTWS "EMITTER" attribute in the "AIR" class. Since MTWS does not specify which emitter is associated with a particular aircraft, this file provides the information for transmission to ALSP. The entire list in the PD_Aircraft_Type_IDs file should be in the left column of this file. The right column should contain the proper emitter enumeration

from the ALSP enumerations list for object class AIR.FIXEDWING, AIR.HELICOPTER, AIR.CRUISE_MISSILE of attribute EMITTER.RADAR.TYPE.

The EMITTER-ALLRAD.MtoA file contains look-up values for the TYPE field of the MTWS "EMITTER" attribute in the "GROUND.MANEUVER.ALLRAD" class. The source file for the left column is the PD_PAR_Radar_IDs file. All shipboard radars should be removed. The right column should contain the proper emitter enumeration from the ALSP enumeration list for object class GROUND.MANEUVER.ALLRAD of attribute EMITTER.RADAR.TYPE.

The EMITTER-SHIP.MtoA file contains look-up values for the TYPE field of the MTWS "EMITTER" attribute in the "SEA.SURFACE.SHIP" class. The source file for the left column is the PD_PAR_Radar_IDs file. All non-shipboard radars should be removed. The right column should contain the proper emitter enumeration from the ALSP enumeration list for object class SEA.SURFACE.SHIP of attribute EMITTER.RADAR.TYPE.

The UNIT_EQUIPMENT.AtoM file contains look-up values for the ALSP "UNIT_EQUIPMENT" attribute in the "GROUND.MANEUVER.COMBAT" class. The source information for the left column is the ALSP enumeration list for object class GROUND.MANEUVER.COMBAT of attribute UNIT_EQUIPMENT.TYPE. The right column should contain the proper asset from the PD_Asset_IDs and PD_Aircraft_Type_IDs files.

The UNIT_EQUIPMENT.MtoA file contains look-up values for the MTWS "UNIT_EQUIPMENT" attribute in the "GROUND.MANEUVER.COMBAT" class. The source file for the left column is the PD_Aircraft_Type_IDs and PD_Asset_IDs files. For the PD_Asset_IDs file, only the following heading need to be mapped: Amphibious, Armored, Arty (Self-Propelled and Towed), Mobile Rocket Launchers, Transporter Erector Launchers, Radars, Tanks Vehicles, Weapons (Mortars, Infantry Weapons, Antitank Dumb Weapons, Antitank Guided Missiles, Surface-to-Surface Missiles and Surface-to-Air Missiles) and "TROOPS". The right column should contain the proper asset enumeration from the ALSP enumeration list for object class GROUND.MANEUVER.COMBAT of attribute UNIT_EQUIPMENT.TYPE.

The UNITTYPE-AD.MtoA file contains translation information for the MTWS "UNIT_TYPE" attribute in the "GROUND.MANEUVER.ALLRAD" and "GROUND.MANEUVER.SHORAD" class. The source file for the left column is the PD_Asset_IDs file. Only the assets listed under "Weapons - Surface-to-Air Missiles" need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for object class GROUND.MANEUVER.ALLRAD of attribute UNIT_TYPE.

The UNITTYPE-CM.AtoM file contains look-up values for the ALSP "UNIT_TYPE" attribute in the "AIR.CRUISE_MISSILE" class. The source information for the left column is the ALSP enumeration list for object class AIR.CRUISE_MISSILE of attribute

UNIT_TYPE. The right column should contain the proper asset from the PD_Asset_IDs under the heading “Cruise Missiles”.

The UNITTYPE-CM.MtoA file contains translation information for the MTWS "UNIT_TYPE" attribute in the "AIR.CRUISE_MISSILE" class. The source file for the left column is the PD_Asset_IDs file. Only the assets listed under “Cruise Missiles” need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for object class AIR.CRUISE_MISSILE of attribute UNIT_TYPE.

The UNITTYPE-FIXEDWING.AtoM file contains look-up values for the ALSP “UNIT_TYPE” attribute in the “AIR.FIXED_WING” class. The source information for the left column is the ALSP enumeration list for object class AIR.FIXED_WING of attribute UNIT_TYPE. The right column should contain the proper asset from the PD_Aircraft_Type_IDs.

The UNITTYPE-FIXEDWING.MtoA file contains translation information for the MTWS "UNIT_TYPE" attribute in the "AIR.FIXED_WING" class. The source file for the left column is the PD_Aircraft_Minus_CMs_IDs file. Only fixed-wing assets need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for object class AIR.FIXED_WING of attribute UNIT_TYPE.

The UNITTYPE-HELO.AtoM file contains look-up values for the ALSP “UNIT_TYPE” attribute in the “AIR.HELICOPTER” class. The source information for the left column is the ALSP enumeration list for object class AIR.HELICOPTER of attribute UNIT_TYPE. The right column should contain the proper asset from the PD_Aircraft_Type_IDs.

The UNITTYPE-HELO.MtoA file contains translation information for the MTWS "UNIT_TYPE" attribute in the "AIR.HELICOPTER" class. The source file for the left column is the PD_Aircraft_Minus_CMs_IDs file. Only rotary-wing assets need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for object class AIR.HELICOPTER of attribute UNIT_TYPE.

The UNITTYPE-SHIP.AtoM file contains look-up values for the ALSP “UNIT_TYPE” attribute in the “SEA.SURFACE.SHIP” class. The source information for the left column is the ALSP enumeration list for object class SEA.SURFACE.SHIP of attribute UNIT_TYPE. The right column should contain the proper asset from the PD_Aircraft_Type_IDs under the heading “Ships”.

The UNITTYPE-SHIP.MtoA file contains translation information for the MTWS "UNIT_TYPE" attribute in the "SEA.SURFACE.SHIP" class. The source file for the left column is the PD_Asset_IDs file. Only the assets listed under “Ships” need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for object class SEA.SURFACE.SHIP of attribute UNIT_TYPE.

The UNITTYPE-TBM.AtoM file contains look-up values for the ALSP “UNIT_TYPE” attribute in the “AIR.TBM” class. The source information for the left column is the ALSP enumeration list for object class AIR.TBM of attribute UNIT_TYPE. The right column

should contain the proper asset from the PD_Asset_IDs under the heading “Cruise Missiles”.

The WEAPON-AirToAir.AtoM file contains look-up values for the ALSP “WEAPON” parameter in the “ENGAGEMENT.AIR_TO_AIR” interaction. The source information for the left column is the ALSP enumeration list for interaction parameter ENGAGEMENT.AIR_TO_AIR of parameter WEAPON. The right column should contain the proper air-to-air ammunition from the PD_Ammo_IDs file under the “Ammo” heading.

The WEAPON-AirToAir.MtoA file contains translation information for the MTWS "WEAPON" attribute in the " ENGAGEMENT.AIR_TO_AIR " interaction. The source file for the left column is the PD_Asset_IDs file. Only the air-to-air assets listed under “Ammo” need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for interaction parameter ENGAGEMENT.AIR_TO_AIR of parameter WEAPON.

The WEAPON-AirToSurface.AtoM file contains look-up values for the ALSP “WEAPON” parameter in the “ENGAGEMENT.AIR_TO_GROUND” interaction. The source information for the left column is the ALSP enumeration list for interaction parameter ENGAGEMENT.AIR_TO_GROUND of parameter WEAPON. The right column should contain the proper air-to-surface ammunition from the PD_Ammo_IDs file under the “Ammo” heading.

The WEAPON-AirToSurface.MtoA file contains translation information for the MTWS "WEAPON" attribute in the " ENGAGEMENT.AIR_TO_GROUND " interaction. The source file for the left column is the PD_Asset_IDs file. Only the air-to-surface assets listed under “Ammo” need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for interaction parameter ENGAGEMENT.AIR_TO_GROUND of parameter WEAPON.

The WEAPON-GrdToAir.AtoM file contains look-up values for the ALSP “WEAPON” parameter in the “ENGAGEMENT.GROUND_TO_AIR” interaction. The source information for the left column is the ALSP enumeration list for interaction parameter ENGAGEMENT.GROUND_TO_AIR of parameter WEAPON. The right column should contain the proper surface-to-air ammunition from the PD_Ammo_IDs file under the “Ammo” heading.

The WEAPON-GrdToAir.MtoA file contains translation information for the MTWS "WEAPON" attribute in the " ENGAGEMENT.GROUND_TO_AIR " interaction. The source file for the left column is the PD_Asset_IDs file. Only the ground-based air defense listed under “Weapons – Surface-to-Air Missiles” need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for interaction parameter ENGAGEMENT.GROUND_TO_AIR of parameter WEAPON.

The WEAPON-GrdToGndArty.AtoM file contains look-up values for the ALSP “WEAPON” parameter in the

“ENGAGEMENT.GROUND_TO_GROUND.ARTILLERY” interaction. The source information for the left column is the ALSP enumeration list for interaction parameter ENGAGEMENT.GROUND_TO_GROUND.ARTILLERY of parameter WEAPON. The right column should contain the proper land-based indirect ammunition from the PD_Ammo_IDs file under the “Ammo” heading.

The WEAPON-GrdToGndArty.MtoA file contains translation information for the MTWS "WEAPON" attribute in the " ENGAGEMENT.GROUND_TO_GOUND.ARTILLERY " interaction. The source file for the left column is the PD_Asset_IDs file. Only the land-based indirect ammunition listed under “Ammo” need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for interaction parameter ENGAGEMENT.GROUND_TO_GROUND.ARTILLERY of parameter WEAPON.

The WEAPON-GrdToGndCC.AtoM file contains look-up values for the ALSP “WEAPON” parameter in the “ENGAGEMENT.GROUND_TO_GROUND.CLOSE_COMBAT” interaction. The source information for the left column is the ALSP enumeration list for interaction parameter ENGAGEMENT.GROUND_TO_GROUND.CLOSE_COMBAT of parameter WEAPON. The right column should contain the proper direct-fire ammunition from the PD_Ammo_IDs file under the “Ammo” heading.

The WEAPON-GrdToGndCC.MtoA file contains translation information for the MTWS "WEAPON" attribute in the " ENGAGEMENT.GROUND_TO_GOUND.CLOSE_COMBAT " interaction. The source file for the left column is the PD_Asset_IDs file. Only the direct-fire ammunition listed under “Ammo” need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for interaction parameter ENGAGEMENT.GROUND_TO_GROUND.CLOSE_COMBAT of parameter WEAPON.

The WEAPON-GrdToShp.AtoM file contains look-up values for the ALSP “WEAPON” parameter in the “ENGAGEMENT.GROUND_TO_SHIP” interaction. The source information for the left column is the ALSP enumeration list for interaction parameter ENGAGEMENT.GROUND_TO_SHIP of parameter WEAPON. The right column should contain the proper indirect ammunition from the PD_Ammo_IDs file under the “Ammo” heading.

The WEAPON-GrdToShp.MtoA file contains translation information for the MTWS "WEAPON" attribute in the " ENGAGEMENT.GROUND_TO_SHIP " interaction. The source file for the left column is the PD_Asset_IDs file. Only the indirect ammunition listed under “Ammo” need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for interaction parameter ENGAGEMENT.GROUND_TO_SHIP of parameter WEAPON.

The WEAPON-ShpToAir.AtoM file contains look-up values for the ALSP “WEAPON” parameter in the “ENGAGEMENT.SHIP_TO_AIR” interaction. The source information for the left column is the ALSP enumeration list for interaction parameter

ENGAGEMENT.SHIP_TO_AIR of parameter WEAPON. The right column should contain the proper surface-to-air ammunition from the PD_Ammo_IDs file under the "Ammo" heading.

The WEAPON-ShpToAir.MtoA file contains translation information for the MTWS "WEAPON" attribute in the " ENGAGEMENT.SHIP_TO_AIR " interaction. The source file for the left column is the PD_Asset_IDs file. Only the ship-based air defense listed under "Weapons – Surface-to-Air Missiles" need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for interaction parameter ENGAGEMENT.SHIP_TO_AIR of parameter WEAPON.

The WEAPON-ShpToGrd.AtoM file contains look-up values for the ALSP "WEAPON" parameter in the "ENGAGEMENT.SHIP_TO_GROUND" interaction. The source information for the left column is the ALSP enumeration list for interaction parameter ENGAGEMENT.SHIP_TO_GROUND of parameter WEAPON. The right column should contain the proper ship-based indirect ammunition from the PD_Ammo_IDs file under the "Ammo" heading.

The WEAPON-ShpToGrd.MtoA file contains translation information for the MTWS "WEAPON" attribute in the " ENGAGEMENT.SHIP_TO_GOUND " interaction. The source file for the left column is the PD_Asset_IDs file. Only the ship-based indirect ammunition listed under "Ammo" need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for interaction parameter ENGAGEMENT.SHIP_TO_GROUND of parameter WEAPON.

The WEAPON-ShpToShp.AtoM file contains look-up values for the ALSP "WEAPON" parameter in the "ENGAGEMENT.SHIP_TO_SHIP" interaction. The source information for the left column is the ALSP enumeration list for interaction parameter ENGAGEMENT.SHIP_TO_SHIP of parameter WEAPON. The right column should contain the proper ship-based indirect ammunition from the PD_Ammo_IDs file under the "Ammo" heading.

The WEAPON-ShpToShp.MtoA file contains translation information for the MTWS "WEAPON" attribute in the " ENGAGEMENT.SHIP_TO_SHIP " interaction. The source file for the left column is the PD_Asset_IDs file. Only the ship-based indirect ammunition listed under "Ammo" need to be mapped. The right column should contain the proper asset enumeration from the ALSP enumeration list for interaction parameter ENGAGEMENT.SHIP_TO_SHIP of parameter WEAPON.

Decoding MTWS TEMPLATE_NAME Sent Over ALSP

The purpose of this section is to describe what MTWS sends in the TEMPLATE_NAME attribute in an ALSP message.

a. Unit defined, not using TOTE:

The unit's name (up to 14 characters), followed by a "_T" is sent in the TEMPLATE_NAME attribute. For example, if the unit name is "B/1/1" then "B/1/1_T" is

sent. Likewise, if the unit name is “3RDINFANTRYSQUAD”, then “3RDINFANTRYSQU_T” is sent.

b. Unit defined, using TOTE:

The following is the list of characteristics used to uniquely identify a TEMPLATE_NAME: Service/Alliance/Country (up to eight characters), unit kind in number format, hierarchy in number format, and unit subtype in number format. For example, if an USMC tank company of subtype M1A1 is defined, using the tables below, “USMC_0304080”.

Table 4 – Unit Kind Lookup

	0	1	2	3	4	5	6	7	8	9
0X	Ship	Civilian	Artillery	Tank	Infantry	Mortar	Motor Transport	Air Squadron	Light Armor	Motorized Rifle
1X	Engineer	Supply	Medical	Maintenance	Assault Amphibian	Reconnaissance	Anti-tank	Air Defense	Communication	Electronic Warfare
2X	CSS									

Table 5 – Hierarchy Lookup

	0	1	2	3	4	5	6	7	8	9
0X	Team	Squad	Section	Platoon	Company	Battery	Battalion	Squadron	MEU	Regiment
1X	MAG	Brigade	MEB	Division	MAW	Group	MEF	Corps	Civilian	

Table 4 – Unit Subtype Lookup

	0	1	2	3	4	5	6	7	8	9
0X	BELKNAP_CLASS	BURKE_CLASS	CA_CLASS	CARGO	CRRC	DET_SHIP	FRUNZE_CLASS	HQ_SHIP	JFK_CLASS	KARA_CLA
1X	KASHIN_CLASS	KIDD_CLASS	KIEV_CLASS	KIROV_CLASS	KRESTA_2_CLASS	KRIVAC_1_CLASS	KRIVAC_3_CLASS	LCAC	LCC	LHA
2X	LHD	LPD	LPD_AG_CLASS	LPH	LSD	LST	LST_AG_CLASS	MOSKVA_CLASS	NIMITZ_CLASS	OILER
3X	PERRY_CLASS	RRC	SLAVA_CLASS	SOVRENMNY_CLASS	SPRUANCE_CLASS	SUPPORT_SHIP	TICO_CLASS	TRUXTON_CLASS	UDALOY_CLASS	VA_CLASS
4X	SHIP_1	SHIP_2	SHIP_3	SHIP_4	SHIP_5	SHIP_6	SHIP_7	SHIP_8	SHIP_9	SHIP_10
5X	ARTY_105T	ARTY_122SP	ARTY_122SP_SNI	ARTY_122T	ARTY_122T_ABN	ARTY_152SP	ARTY_152T	ARTY_155SP	ARTY_155T	ARTY_203S
6X	ARTY_M198	COMPOSIT	DET_ARTY	HQ_ARTY	MLRS	MRL_SNI	MRL	RL_ABN	ARTY_1	ARTY_2
7X	ARTY_3	ARTY_4	ARTY_5	ARTY_6	ARTY_7	ARTY_8	ARTY_9	ARTY_10	DET_TANK	HQ_TANK
8X	M1A1	T62	T64	T72	TANK_ABN	TK	TK_LAI	TK_MRR	TK_SCOUT	TK_SNI
9X	TK_TR	TANK_1	TANK_2	TANK_3	TANK_4	TANK_5	TANK_6	TANK_7	TANK_8	TANK_9
0X	TANK_10	ABN_BMD	AIRBORNE	ANTI_ARMOR	DET_IFY	HMG_IFY	HQ_IFY	IFY_3	IFY_4	MG
1X	MOTORIZED	MP_DIV	MP_FSSG	SNI	TRUCK_IFY	WPN	IFY_11	IFY_12	IFY_13	IFY_14
2X	IFY_15	IFY_16	IFY_17	IFY_18	IFY_19	IFY_20	DET_MTR	HQ_MTR	MTR_120	MTR_120_AN
3X	MTR_60	MTR_81	MTR_81_LAI	MTR_82	MTR_82_SNI	MTR_1	MTR_2	MTR_3	MTR_4	MTR_5
4X	MTR_6	MTR_7	MTR_8	MTR_9	MTR_10	DET_MT	DS_TRANS	GS_LVS	GS_TRANS	HQ_MT
5X	MSSG_MOTOR_T	MT_AMMO	MT_CARGO	MT_POL	TRANS_LVS	TRUCK	TRUCK_DS	TRUCK_GS	MT_1	MT_2
6X	MT_3	MT_4	MT_5	MT_6	MT_7	MT_8	MT_9	MT_10	COMP_HELO	COMP_HELO_SOC
7X	DET_AS	HMA	HMH	HMH_DET	HML	HMLA	HMLA_DET	HMM	HQ_AS	MASS
8X	MATC	VMA	VMA_DET	VMAAW	VMFA	AS_1	AS_2	AS_3	AS_4	AS_5
9X	AS_6	AS_7	AS_8	AS_9	AS_10	DET_LA	HQ_LA	LAI	LAI_AD	LAI_MTR
0X	LAI_TOW	LAI_WPN	LAR	LAR_AD	LAR_MTR	LAR_TOW	LAR_WPN	LA_1	LA_2	LA_3
1X	LA_4	LA_5	LA_6	LA_7	LA_8	LA_9	LA_10	AAAV_MECH	AAV_MECH	BMP
2X	BMP_WPN	BRADLEY	BTR	BTR_WPN	DET_MR	HMG	HMG_MECH	HQ_MR	MR_1	MR_2
3X	MR_3	MR_4	MR_5	MR_6	MR_7	MR_8	MR_9	MR_10	ASLT_MR	BULK_FUE
4X	CMB_ENG	DET_ENG	ENG_ABN	ENG_BRIDGE	ENG_EQUIP	ENG_FSSG	ENG_MR	ENG_MRR	ENG_SNI	HQ_ENG
5X	MWSS	ENG_1	ENG_2	ENG_3	ENG_4	ENG_5	ENG_6	ENG_7	ENG_8	ENG_9
6X	ENG_10	AIR_DELVRY	ARTY	AV_ORD	BEACH_OPS	BSSG	DET_SUP	HQ_SUP	LANDING_SUPP	MAT_SUP
7X	MSSG	MSSG_SUP	MWSS_FW	MWSS_RW	ORD	ORD_GS	SUP	SUP_MR	SUP_SNI	SUP_TD
8X	SUP_1	SUP_2	SUP_3	SUP_4	SUP_5	SUP_6	SUP_7	SUP_8	SUP_9	SUP_10
9X	COL_CLR	DS_MED	FLD_HOSP	GS_MED	HQ_MED	MCSSD_MED	MED_DET	MSSG_MED	SHOCK_TRAUMA	SURG_SPT
0X	MED_1	MED_2	MED_3	MED_4	MED_5	MED_6	MED_7	MED_8	MED_9	MED_10
1X	AAAV	AAAV_SPT	AAV	AAV_SPT	DET_AAV	HQ_AAV	AAV_1	AAV_2	AAV_3	AAV_4
2X	AAV_5	AAV_6	AAV_7	AAV_8	AAV_9	AAV_10	CHEM	DET_RECON	DIV_RECON	FORCE_RECON
3X	HQ_RECON	LAI_RECON	RECON_BMP	RECON_BRDM	RECON_BTR	RECON_DA	RECON_MR	RECON_MTZD	RECON_RR	RECON_SN
4X	RECON_T64	RECON_1	RECON_2	RECON_3	RECON_4	RECON_5	RECON_6	RECON_7	RECON_8	RECON_9
5X	RECON_10	ASLT	ATK_76	ATK_ABN	ATK_LAI	ATK_MR	ATK_MRR	ATK_SNI	DET_AT	DRAGON
6X	HQ_AT	TOW	AT_1	AT_2	AT_3	AT_4	AT_5	AT_6	AT_7	AT_8
7X	AT_9	AT_10	AAA	AAA_14_5	AAA_37	AD_14_5	AD_ABN	AD_BMP	AD_BTR	AD_MR
8X	DET_AD	HQ_AD	LAAD	LAAD_A	LAAM	MACS	MSL_TECH	PATRIOT	SA_2	SA_3
9X	SA_6	SA_8	SA_9	AD_1	AD_2	AD_3	AD_4	AD_5	AD_6	AD_7
0X	AD_8	AD_9	AD_10	DET_EW	HQ_EW	RDF	RI	EW_1	EW_2	EW_3
1X	EW_4	EW_5	EW_6	EW_7	EW_8	EW_9	EW_10	CSSD_CSS	CSSE	DET_CSS
2X	DS_CSS	FSSG	GS_CSS	HQ_CSS	MCSSD_CSS	MSSG_CSS	CSS_1	CSS_2	CSS_3	CSS_4
3X	CSS_5	CSS_6	CSS_7	CSS_8	CSS_9	CSS_10	CSSD_MAINT	DET_MAINT	DS_MAINT	GS_MAINT
4X	HQ_MAINT	MALS_FW	MALS_RW	MCSSD_MAINT	MSSG_MAINT	MAINT_1	MAINT_2	MAINT_3	MAINT_4	MAINT_5
5X	MAINT_6	MAINT_7	MAINT_8	MAINT_9	MAINT_10	DET_COMM	HQ_COMM	RELAY_SITE	COMM_1	COMM_2
6X	COMM_3	COMM_4	COMM_5	COMM_6	COMM_7	COMM_8	COMM_9	COMM_10	DISPLACED	EPW

7X	NONE	REFUGEES	CIV_1	CIV_2	CIV_3	CIV_4	CIV_5	CIV_6	CIV_7	CIV_8
8X	CIV_9	CIV_10	HQ							

Starting MTWS and ALSP Translator Software

Initiate Execution of MSC Software

To initiate execution of the MSC software, perform the following steps:

a. Log on to the MSC station and select **Applications** --> **Start Sysop** --> **ALSP** from the root menu. See paragraph "Accessing the Root Menu" for procedures to access the root menu.

b. Select **System Control** --> **Admin** --> **Start MSC** from the System Operations window to start the remaining MSC programs.

c. Wait for a response to appear in the System Operations window indicating that MSC has started.

d. Select **System Control** --> **Applications** --> **Load MAN** from the System Operations window to start execution of the MAN software on the desired host(s). The MAN hostnames interface will appear.

e. Select the hostname(s) on which the MAN software is to run.

f. Click on **OK** button on the System Operations window.

g. Wait for **response(s)** to appear in the **System Operations window** indicating that the MAN software has started on the designated host(s). There is one such response for each MAN host.

h. Select **Exercise Control** --> **Database** --> **Exercise** --> **Load**. The exercise load interface will appear.

i. Select the desired exercise from those listed in the exercise load interface.

j. Select the **New**, **Start**, **Time**, or **End** button in the exercise load interface. If **Time** is chosen, enter the exercise time at which the exercise is to be loaded.

NOTE

The consequences of each choice are discussed individually in paragraphs "Starting an Exercise – Start" through "Starting an Exercise – End".

k. When the desired choices have been made, click on the **OK** button on the exercise load interface.

> **NOTE**
>
> **To abort the exercise load, click on the** Cancel **button on the exercise load interface.**

l. Inspect and verify the message displayed in the System Operations window, which identifies the exercise name and the New/Start/Time/End option chosen in steps i and j. If this information is incorrect or if an operator error occurred in selecting values from the exercise load interface, refer to the note in the following step.

m. To load the exercise, click on the **OK** button on the System Operations window.

> **NOTE**
>
> **To abort the exercise load, click on the** Cancel **button on the System Operations window. If this option is chosen, steps g through k can be repeated.**

n. Wait for response(s) to appear in the System Operations window indicating that the exercise has been loaded on the MAN host(s) designated in step d.

o. Select **System Control** --> **Applications** --> **Start App** from the System Operations window to assign MAN functions to the desired host(s). The application/host mapping interface will appear with a list of MAN hosts and a button for each application. A default mapping of applications to MAN hosts is provided. This default mapping is the recommended distribution for a typical land/sea/air exercise.

p. The ALSP windows will display by default on the MSC. They may be displayed on the ALSP MAN host by logging in to that MAN as user **soc** before selecting **Start App**. A second desktop has been provided on the MSC for use with ALSP.

q. To change the host for a selected application, select the desired MAN host by clicking on the MAN host selector. Once the MAN is selected, click on the application button for each application which is to run on the selected host.

r. Click on the **OK** button on the System Operations window.

> **NOTE**
>
> **To** abort **the application start, click on the** Cancel **button on the System Operations window.**

s. Wait for response(s) to appear in the System Operations window indicating that the applications have started on the MAN host(s) designated in step d.

t. Activate the MDS Station Control interface and click on the **On/Offline: ... On** button.

u. Proceed with loading any MTWS Batch Files that are to be loaded while in the Admin State.

NOTE

Units built without the TO/TE **parametric data will not be assigned ALSP identification numbers or appear on other simulation systems as ghosted units UNLESS the** Asset Update **command is used to update units with complex assets or troops before initializing the database.**

Initiate Execution of ALSP Translator

To initiate execution of the ALSP Translator, perform the following steps:

a. If the ALSP windows are being displayed on MSC, move the ALSP window to the ALSP desktop by clicking the left or right mouse button with the pointer over the icon. Select **Occupy Workspace** --> **ALSP Control**. Restore the front panel (the bottom left icon) to allow convenient access to both desktops.

b. Inspect the **alsp** window on the MSC or MAN.

c. The parameters displayed are:

1) LOOK AHEAD = 0.0167

2) ACTOR # = 6

3) NODE = (MAN number host)

4) CONFED = 1

5) START TIME = 0.00

6) ACTOR NAME = MTWS.

Some of these defaults may be set by editing **/mtws/bin/ALSP/Config.dat**.

The Look Ahead and Start Time units of measure are hours, so the look-ahead time is set to one minute (one hour divided by 60 minutes = 0.0167). The Start Time is changed only when joining an ALSP confederation exercise at a different time than the default MTWS exercise start time.

The register/filter box at the top of the alsp window displays the default register and filter data that are selected to be sent to the astream window. The register/filter attribute list

contains the information of which class, interactions, and object attributes to display or allow. The list can be added to by using the register/filter menu or deleted from using the **Delete selected** button.

d. Click on the **Start** button in the alsp window of the ALSP MAN. The astream, mstream, and database windows will appear on the ALSP MAN.

1) The astream window is used to join the ALSP confederation network, log ALSP messages, and display ALSP message traffic.

2) The mstream window is used to recover MTWS and ghosted objects and to enable the MTWS msc001 interface.

3) The database window is used to display a count of MTWS and ALSP (ghosted) objects. The count of MTWS entities will be equal to the number of objects defined in the MTWS database that are assigned identification numbers after object registration. The ALSP Entities Count will be the total of the Air.Count, Sea.Count, and Ground.Count objects after object registration.

e. On the astream window menu, select **Log_File --> OPEN --> logs directory** (/mtws/bin/ALSP/logs/). (This is an optional step, useful for troubleshooting)

f. Define a unique file name with the extension ".log" to capture the ALSP message traffic to the named particular log file for historical purposes.

g. Click on the **Connect** button in the astream window of the ALSP MAN.

h. Click on the **Join** button in the astream window of the ALSP MAN. Observe the Join message appear in the astream message window with the join parameters defined in the alsp window.

i. Wait for the **ID_REQUEST** message to appear in the astream window.

j. Click on the **Send** button in the alsp window to send filter information. The filter information will appear in the astream message traffic window.

k. Click on the **red interface arrow** in the mstream window and observe that the arrow is now green and pointing upward.

l. If the **New** option was chosen when loading the exercise, establish the initial tactical database by selecting **Exercise Control --> Database --> Exercise --> Initialize** from the System Operations window.,

m. Wait for a response to appear in the System Operations window indicating that exercise initialization is complete.

n. When MTWS is ready to pass objects to the ALSP confederation, select **RECOVER --> OWNED** from the mstream menu.

o. If other confederation systems have joined the confederation, select **RECOVER --> GHOSTED** from the mstream menu. The database window of the ALSP MAN will reflect the total count of ALSP entities in addition to a breakdown by Air.Count, Sea.Count, and Ground.Count. Ghosted objects should appear on the MDS if it is on-line.

p. Select **Exercise Control --> Clock --> Synchronization** from the System Operations window. The clock synchronization interface will appear. The current clock synchronization setting is shown as being selected in this interface.

q. Clock Synchronization overrides Clock Advance and Clock Rate settings which are faster than real-time. For example, if the Clock Rate has been set to twice real-time, exercise time will advance at twice real-time only if all MAN functions are capable of doing so. Otherwise, exercise time will advance at less than twice real-time.

r. Select **ENABLED** from the clock synchronization interface, then click on OK in the System Operations window.

s. If it is desired to run the exercise at this point, select **Exercise Control** --> **Operation** --> **State** --> **Run** from the System Operations window.

Ghosted objects (air missions, ships, and ground units from other simulation systems) will be displayed on the MDS as an MTWS-type object with a grey outline. As with an MTWS object, the object name for an ALSP object is assigned by the MTWS system and may be used in targeting. The format is ALSP_annnnn where a is the remote actor number and nnnnn is a sequence of five digits that ID the object. This number increments with each new object.

Spot reports can be received by assigning controller ALSP_CONT_1 to the MDS display. The ALSP object identification number is a different assignment which occurs for **outgoing** MTWS objects and **incoming** confederation objects. The numbers are only viewed in the ALSP Message Traffic box in the astream window on the ALSP MAN. This is the identification number assigned during object registration (create) and used in object updates and deletions. The format is ID(nnnnnn) where the first digit is the Actor Number (from the alsp window) followed by the new object's ID.

Suspend and Resume MTWS/ALSP

The Suspend and Resume operations of the MTWS system while operating in a confederation are identical to those executed in an MTWS stand-alone system. During a Suspend, the data received and displayed in the astream message traffic box is halted. When the Resume command is executed, data processing and display will continue.

WARNING !

Due to the ALSP Confederation's unique system status, the Suspend command will halt the entire confederation.

Obtain permission from Confederation staff before suspending the MTWS system.

Resign and Rejoin an ALSP Confederation

The Resign and Rejoin operations of the MTWS/ALSP system are critical processes that must be executed with care.

When resigning from a confederation, it is not normally required to halt the MTWS system. The Resign operation deletes the ALSP identification numbers for all MTWS objects in the confederation and therefore removes MTWS from any further confederation interaction. The ALSP Translator process is terminated and all four of the ALSP windows are closed on the ALSP MAN. The update and display of all ghosted objects on the MDS is halted.

The Rejoin operation is similar to an initial join operation except that the MTWS database is already established and only the ALSP MAN processes need to be started.

NOTE

Resigning from the Confederation may have an impact on other exercise participants. Always obtain permission from the Confederation staff before resigning.

Initiate Execution of a Resign from ALSP Confederation

To initiate execution of a Resign from the ALSP confederation without restarting the MSC, perform the following steps:

a. Select **Exercise Control** --> **Operation** --> **Mode** --> **Suspend**.

b. Click on the **OK** button on the System Operations window.

c. Wait for a response to appear in the System Operations window indicating that the exercise has been suspended.

d. Click on the **Resign** button in the alsp window of the ALSP MAN. A series of **Delete messages** will be sent to and displayed on the astream message traffic box. The alsp, astream, mstream, and database windows will disappear on the ALSP MAN.

e. Click on and **close** the Translator process icon on the MAN.

f. If MTWS must also be halted, continue with terminating the exercise as described in paragraph “Suspending an Exercise”.

NOTE

If MTWS is halted, the procedure for starting ALSP must be repeated. (See paragraph "Initiate Execution of MSC Software")

Initiate Execution of a Rejoin to ALSP Confederation

To initiate execution of a Rejoin to the ALSP confederation, perform the following steps:

a. On the ALSP MAN, open a terminal window from the root menu.

b. At the Unix prompt, change directory to /mtws/bin/ALSP/ by typing **cd /mtws/bin/ALSP** at the prompt.

c. To start the Translator, execute the **Start_Translator** command at the Unix prompt. The alsp window will appear. **Minimize** the Unix window.

d. Inspect the alsp window on the ALSP MAN. The parameters displayed are:

   1) LOOK AHEAD = 0.0167

   2) ACTOR # = 6

   3) NODE = (MAN number host)

   4) CONFED = 1

   5) START TIME = 0.00

   6) ACTOR NAME = MTWS.

e. MTWS should rejoin the ALSP confederation at a time slightly ahead of the current exercise time so that confederation time will continue to advance and MTWS will wait a short time to start processing. Otherwise, if MTWS is behind the current exercise time, all other confederation systems will be placed in a wait status while MTWS advances to the play time.

NOTE

The ALSP confederation staff should be consulted when an MTWS rejoin operation is to take place. The staff will supply the current game time and coordinate with other confederation members before granting permission to join.

f. Set the **Start Time** ahead of the confederation elapsed exercise time (e.g., ten minutes or .17) in the format **n.nn**. For example, if the confederation has been operating for three hours and 45 minutes, the Start Time to enter would be Ò3.92Ó (add .17 to 3.75 hours to produce the decimal number of 3.92).

g. Click on the **Start** button in the alsp window of the ALSP MAN. The astream, mstream, and database windows will appear on the ALSP MAN.

h. On the astream window menu, select **Log_File** --> **OPEN** --> **logs directory** (/mtws/bin/ALSP/logs/). (This step is optional).

i. Define a unique file name with the extension ."log" to capture the ALSP message traffic to the named particular log file for historical purposes.

j. Click on the **Connect** button in the astream window of the ALSP MAN.

k. Click on the **Join** button in the astream window of the ALSP MAN. Observe the Join message appear in the astream message window with the join parameters defined in the alsp window.

l. Wait for the **ID_REQUEST** message to appear in the astream window.

m. Click on the **Send** button in the alsp window to send filter information, which will appear in the astream message traffic window.

n. Click on the **red interface arrow** in the mstream window and observe that the arrow is now green and pointing upward.

o. Select **RECOVER** --> **OWNED** from the mstream menu.

p. If other confederation systems have joined the confederation, select **RECOVER** --> **GHOSTED** from the mstream menu.

q. Select **Exercise Control** --> **Operation** --> **State** --> **Run** from the System Operations window.

Terminating an Exercise

To terminate an exercise gracefully, perform the following steps:

a. **Suspend** the exercise as defined in paragraph "Suspending an Exercise". MDS inputs should be disabled as soon as possible after the MDS hosts have been notified of the SUSPEND. SUSPEND may still be flashing yellow on the MSC. All on-line MDS hosts have been notified when the following alert appears:

INFO : MAN_Control - For New advance rate of 0.000 , Current time is...

b. **Disable** the MDS interface as described in paragraph "Disable MDS Interface"

c. Select **Exercise Control** --> **Operation** --> **State** --> **Admin** from the System Operations window.

d. Wait for the MSC Status Window to indicate that Admin state has been entered.

e. Select **System Control** --> **Applications** --> **Halt MAN** from the System Operations window.

f. Wait for response(s) to appear in the System Operations window indicating that the MAN applications have halted.

g. Log out of the MSC or restart MTWS by pressing the left or right mouse button on the root window.

After performing steps a through f, it is still possible to perform various exercise-related functions:

a. The (terminated) exercise can be saved as described in paragraph "Saving an Exercise"

b. The MDS interface can be enabled as described in paragraph "MDS Interface".

c. Solicited reports can then be obtained from the MDS stations.

NOTE

At this point, although the MAN software is still technically active (the MAN processes are still running), it is effectively terminated -- the MAN can do nothing until this software (and the MSC software) is restarted as described in paragraph "Installing from your local drive".

JQUAD Interface

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

The MTWS-JQUAD communications interface is a TCP/IP socket connection between the MSC and the JQUAD host. To enable this interface, select **System Control** --> **Interfaces --> JQUAD --> Start**. To disable this interface, select **System Control** --> **Interfaces --> JQUAD --> Halt**. This interface can be enabled/disabled as many times as is needed.

Security Administrator Configuration

As described in section 3.3.3, during Maui installation, a new Security Administrator Configuration window allows the setup of a security administrator's user name and password. For normal users (non-security administrator account user), the security

administrator's user name and password is required in order to continue running Maui when data (e.g.: the loading of a raster map) is introduced into Maui at a higher classification level than Maui's current classification level.

MTWS exercise classification levels are set by the MSC. These classification level data sets are exercise-specific, copied to the exercise directory when creating an exercise. The security level of an exercise is defined at exercise creation time using the MSC's classification data. This data is controlled by the MSC's System Operations (Sysop) interface and should not be manually modified.

The security classification data is comprised of tuplets of

1. Classification level.

2. Red,Green,Blue (RGB) values which set the color of this classification level.

3. List of 0 or more aliases, names which equate to this classification level.

These classification levels are listed from low to high. That is, the lowest classification level (also the default classification level) is the first entry in the file; the highest classification level is the last entry in the file.

At initial install of MTWS and Maui, Maui has a local copy of the MSC's security classification levels.

At startup, Maui retrieves the currently loaded exercise's security classification data from the MSC. It renames and overwrites the local copy. If Maui cannot access the MSC's security classifications data, an alert is logged to the Maui alerts.log and a dialog box is displayed warning the user that the security classification file could not be found and allowing the user to continue at risk. Maui will use its local security classifications data. However, the fact that Maui could not retrieve the security classifications data from the MSC is symptomatic of the following possible problems:

- Maui started up before the exercise was loaded on the MSC (check to make sure the exercise load is complete, then restart Maui)

- There is a problem with FTP between Maui and the MSC (check the Alerts log)

- Not sure?! (see your Maui Security/System administrator)

Security classification checks are made based on security classification level comparisons between MTWS and Maui and between Maui and MTWS external inputs (e.g.: C4I or loading of raster maps into Maui).

To manually set the classification level in Maui:

- Start up Maui under the Security Administrator account (If you are not running Maui under the Security Administrator account you will not get the option to change the security classification level within the profile preference interface).

- Set Maui's user level to 2

- Select the 'Profile Preferences...' option from the 'Tools' menu.

- Select the 'Display' tab from the 'Preference' window. If you are properly running Maui under the 'security administrator' account you should see a 'Security Classifications' selection box.

- To set Maui's classification level to the lowest classification level, select the first entry in the drop down list.

- To set Maui's classification level to the highest classification level, select the last entry in the drop down list. (Again, as previously mentioned, levels are listed from lowest to highest)

The exercise's classification level can be modified during runtime, via the MSC's System Operations window. Note that, currently, Maui is not notified of this exercise security level change without going offline and back online.

To modify the exercise's classification level during run time, from the Sysop interface, select the exercise->modify menu option and then select the 'new' exercise security level. Remember to notify all Maui operators to put their Maui's off and then on line to have this security level modification take affect on each Maui.

The Security Administrator Configuration tool which is launched when installing Maui (see the section on INSTALLATION) is available in from the "Security Administration Configuration" shortcut in the "MTWS Tools" folder on the desktop or the Programs->MTWS->Tools from the Start Menu.

You must be logged under the Security Administrator user account in order to use this tool. If you try to run this tool under any other account a "User Name Error" dialog window will appear and you will not be able to run the tool.

You can use this tool to modify the security administrator account should the password become compromised. Launch the tool and enter in the new security administrator account and/or new password.

If you change the "Security Name" a "User Name Warning" dialog will be displayed warning you that you are about to change the account name from <oldname> to <new name> and that only the <new name> will be able to change the security username and password (from here on in).

Select the "Yes" option if you wish to continue.

The "Security Admin Login" dialog will appear when a security violation such as introduction of data into an “online” Maui which is at a higher level than that of the currently running exercise.

When the "Security Admin Login" dialog will appears the follow can occur:

1. Security Login Successful

Enter the current name and password of the security administrator's account, (set up at install time, or modified via the security administrator configuration tool) and click the "OK" button. If correct, the login dialog window will go away allowing you to continue to use Maui or take any further corrective actions necessary.

2. Security Lockout

You are given 3 attempts to enter the correct current name and password of the security administrator's account. After the third attempt, Maui will be shut down, if running. Any subsequent attempt at starting up Maui will bring the Security Login interface up and require the correct name and password of the security administrator's account be entered in before Maui can be successfully started up.

3. Security Login Cancelled

If you cancel out of the Security Login interface, Maui will be shut down, if running, and any subsequent attempt at starting up Maui will bring the Security Login interface up and require the correct name and password of the security administrator's account be entered in before Maui can be successfully started up.

4. Security Administrator's account is not properly configured

If the security administrator account is not properly configured a dialog window will be displayed with the following warning: "Security administration has not been set up properly. Proceeding in this state may pose a security violation.

Are you sure you want to continue?

[Yes] [No] "

This state can occur if the security administration configuration step is skipped (Canceled) during installation.

If you continue (click "Yes" button) you may have problems with Maui should a security violation occur. To remedy this problem, click the "No" button and run the Security Administrator Configuration tool to set up the security administrator account as described in Appendix C of this document.

5. Security Administrator Account is Corrupt

If the security administrator account becomes corrupt, Maui starts up or a security violation occurs, a dialog window will be displayed.

To remedy this situation run the Security Administrator Configuration tool to set up the security administrator account as described in the in Appendix C of this document.

Security dialog messages can occur under the following conditions:

1. Maui is set to a lower level than the current exercise (same results/response whether under security administrator user or non security administrator account).

state: Maui is offline.

action: Click the "On" button attempt to go online.

results: The "Classification Modification" dialog appears with the warning:

"The current MTWS exercise's classification level is at a higher level than Maui.

Maui's classification level has been raised from <old level> to <new level>."

response: Click the "OK" button and, provided the MDS net is enabled,

Maui's security classification level is raised to the security classification level of the current exercise.

2. Maui is set to a higher level than the current exercise (same results/response whether under security administrator user or non security administrator account)

state: Maui is offline.

action: Click the "On" button attempt to go online.

results: The "Status: Online" text is yellow and blinks until a timeout occurs. At this time Maui's status text will change to "Status: Offline" in red text and a dialog box will be displayed which states:

"Maui timed out while going online.

Please see your Maui system administrator for further assistance."

response: Click the "OK" button.

When running Maui under the Security Administrator account, you can modify the security classification level via the profile preferences.

3a. Introduction of higher level data into Maui while online

(under security administrator user account).

state: Maui is online and at the same level as the current exercise.

action: An attempt is made to load a map or Maui receives C4I data at a higher level than the current exercise.

results: 1. Maui's status text will change to "Status: Offline" in red text

2. The "Security Violation" dialog appears with the message:

"A security violation has occurred.

Maui has encountered data at a higher classification level than the current exercise. Maui has been forced offline and its classification level will now be raised from <old level> to <new level>.

Please alert your system administrator."

3. A "SECURITY VIOLATION !!" dialog will appear on the MSC with the hostname of the offending Maui box as well as the time of the violation.

response: Click the "OK" button in the Security Violation dialog on the Maui and the "OK" button in the Security Violation dialog on the MSC, and proceed as specified by your site security administration procedures.

3b. Introduction of higher level data into Maui while online

(under non security administrator user account)

state: Maui is online and at the same level as the current exercise

action: An attempt is made to load a map or Maui receives C4I data at a higher level than the current exercise.

results: 1. Maui's status text will change to "Status: Offline" in red text

2. The "Security Violation" dialog appears with the message:

"A security violation has occurred.

Maui has encountered data at a higher classification level than the current exercise. Maui has been forced offline and its classification level will now be raised from <old level> to <new level>.

Please alert your system administrator."

3. A "SECURITY VIOLATION !!" dialog will appear on the MSC with the hostname of the offending Maui box as well as the time of the violation.

response: Click the "OK" button in the Security Violation dialog on the Maui and the "OK" button in the Security Violation dialog on the MSC. Because a security violation has occurred, the "Security Admin Login" dialog will appear.

The security administrator account login name and password must be entered to be able to continue to use Maui.

Enter in the security administrator account login name and password that were entered in at installation time (the security administrator should know this information).

4a. Loading a higher level map when offline (under security administrator user account)

state: Maui is offline.

action: An attempt is made to load a map at a higher level than Maui's current classification level.

results: The "Classification Modification" dialog appears with the warning:

"The data being loaded into Maui has a classification level which is at a higher level than Maui. Maui's classification level has been raised from <old level> to <new level>."

response: Click the "OK" button and the Maui's security classification level is raised to the map's security classification level.

4b. Loading a higher level map loading when offline (under non security administrator user account)

state: Maui is offline.

action: An attempt is made to load a map at a higher level than Maui's current clasification level.

results: The "Classification Modification" dialog appears with the warning:

"The data being loaded into Maui has a classification level

which is at a higher level than Maui. Maui's classification level has been raised from <old level> to <new level>."

response: Click the "OK" button and the Maui security classification level is raised to the map's security classification level, however, the Security Administrator Login dialog window appears requiring the Security Administrator to enter in their user name and password before the user can continue.

Chapter 5 - CART Operating Procedures.

Starting the CART Software.

The software needed to run the CART Server is started up during the CART Server boot process. No additional user action is required other than switching on the machine and waiting for the boot process to complete. Once booted, the CART Server is capable of recording exercises (see section **Error! Reference source not found.**) and serving information to the CART clients (see Volume V of the MTWS Documentation Suite).

Using CART reports on the CART Server.

Managing exercises and the access permissions for workstations may be performed from the CART Server. To start the reports:

Start the Mozilla web browser on the CART Server.

Type: "http://localhost/cgi-bin/index.pl" into the address bar and press return.

From the menu bar select Edit->Preferences.

In the Preferences dialog box click on the button marked "Use Current Page" and then click "OK".

Monitoring and Managing the CART Exercises.

Exercise Status.

To view the exercise state, perform the following steps.

1. login into the CART server.
2. start the internet browser.
3. In the address bar, type 'localhost/cgi-bin/index.pl' and press return.
4. Your browser will display a menu of options. From the Menu page select "Exercise Status".

A report page such as that shown below will be presented:

Server Status

Up

Connected

mdscrt

159.62.131.60

Exercise Data

TEST

210800UJAN03

220259UJAN03

UNCLASSIFIED

BASELINE

CART release i3.0

The first table titled Server Status, shows which services are up. The database should always be 'up'. If the database is not up, there is a problem with the system that must be corrected before CART will work. See Section ?? for more information on the CART database.

CART Data Capture shows whether the CART server is currently connected to MTWS. If this shows as connected then CART is recording an exercise from the MSC. The CART clients may connect to CART whether or not the CART data capture is connected.

The exercise data shows information on the current exercise (if any.) When CART is first installed, no database is selected and this table is not shown. The table shows:

1. Exercise name: CART records the name used when originally creating the exercise on the MSC.
2. Start time: The game time that the exercise started.
3. Most recent update: The most recent complete minute of data that has been received from the MSC. Typically this is updated on CART just after the MSC has changed minute, but is one minute behind the time shown on the MSC. NOTE: Until an exercise has run for a complete minute this time is not available. CART clients cannot connect to the CART Server until this time is shown.
4. Classification: The classification shows the exercise's classification as defined when creating the exercise.
5. Parametric Data: The Parametric Data used for the exercise, either 'BASELINE' or the name of the user defined parametric data.
6. The build of CART that recorded the exercise. The current build of CART will show "CART release v3.0". Future CART clients may not be compatible with exercises recorded with the current CART server.

This screen will update every 15 seconds.

Exercise Manager.

From the CART Reports Main Menu click on "Exercise Manager".

A report showing information such as the following. is displayed:

EXERCISE MANAGER

	EXERCISE NAME	CLASSIFICATION	PARAMETRIC DATA	CART VERSION	DATE	START	STOP
	TEST (active)	UNCLASSIFIED	BASELINE	CART Release V3.0	Thu Jan 23 14:54:08 2003	210800UJAN03	210901UJAN03
	TEST (TEST_v001)	UNCLASSIFIED	BASELINE	CART Release V3.0	Tue Jan 21 11:23:18 2003	080800UNOV02	081148UNOV02

	EXERCISE NAME	CLASSIFICATION	PARAMETRIC DATA	DATE	CART VERSION	START	STOP
	TEST (TEST_v002)	UNCLASSIFIED	BASELINE	CART Release V3.0	Wed Jan 22 15:39:33 2003	210800UJAN03	220259UJAN03
	LF_DEMO (LF_DEMO)	UNCLASSIFIED	BASELINE	CART Release V3.0	Thu Jan 16 14:44:41 2003	232032UOCT02	232353UOCT02
	LF_DEMO (LF_DEMO_v002)	UNCLASSIFIED	BASELINE	CART Release V3.0	Thu Dec 12 17:54:50 2002	120901UDEC02	131112UDEC02
	V3.0-STRESS (V3_0_STRESS_v003)	UNCLASSIFIED	BASELINE	CART Release V3.0	Fri Dec 13 09:11:50 2002	110300UDEC02	110445UDEC02
	STRESS (STRESS_v008)	UNCLASSIFIED	BASELINE	CART Release V3.0	Thu Dec 19 07:21:53 2002	110300UDEC02	110337UDEC02

Activate Delete

The form shows the databases that have been saved to the CART server. Each line describes information about a single database. Exercises are listed alphabetically except for the first, which is the currently selected exercise. The fields are the same as those listed in the Exercise Status form described above.

To delete an exercise select the radio button to the left of the exercise name and click the "Delete" button. To select a different exercise, select the radio button to the left of the exercise name and select Activate.

When the CART Data Capture is running, the "Activate" button is disabled to prevent the system database becoming corrupted.

Controlling Access to CART Reports.

When first installed only the CART server is permitted to run the CART reports, and only through the network loopback address '127.0.0.1'. The following steps will enable CART Clients to access the reports:

Permitting machines to access the CART Reports.

1. Determine and make a note of the IP address of the CART client. If you do not know the machines IP address each of the following steps should provide the information:

   a. On the Windows Desktop click on the "CART Reports" Icon. If the machine has not been added to the CART access list, a security message will be shown. The bottom line of the message will show the machines IP address.

   b. From Maui or the CART client select the menu Help->About … On the about box click on the "System Info …" button. The IP address of the client is shown on the third line of the "System Info" dialog box.

c. Start a "Command Prompt" from the Windows Start Menu by selecting "Programs->Accessories->Command Prompt". Type "ipconfig" into the window and press return. The IP address is shown in the resulting output.

2. On the CART Server start the Mozilla Web Browser.

3. From the CART Reports main menu select the "Add Workstation to Access List" link.

4. A new page will be shown. In this new window type the IP address noted from step 1.

5. Check the "Reports" box.

6. Click the Enable box.

7. Reports from the Client will be immediately enabled, and the IP address will be added to the table shown on the current form.

Workstations can also be assigned permissions to change the security settings, and to manage exercises by selecting the "Security", and "Administration" check boxes. In general, this is not necessary. The ability to manage exercises is a powerful but also potentially very destructive feature and should be limited in its use.

Removing report access from a workstation.

1. Using the steps described in Step 1 of the previous section determine the IP address of the CART Client.

2. On the CART Server select "Remove Workstation from Access List".

3. In the form enter the IP Address of the CART client.

4. Click on the"Remove access for computer" button.

Miscellaneous Security features.

From the Report Generator main menu, the link "Access Permissions by Terminal" shows all the terminals that are able to access the CART reports.

The link "Reset Access Permissions" will ask for confirmation, and if accepted will remove access to the CART reports from all machines. After executing this function, no machine will be able to access the reports. To enable the cart server to allocate access permissions again, start a shell on the CART server and type:

```
/mtws/bin/dbcreate/addUser 127.0.0.1
```

Chapter 6 - Diagnosing System Problems

This paragraph discusses some common system problems, how to diagnose them, and, in some cases, how to solve them. This discussion is not exhaustive.

Section 1 - Alerts

Each primary MSC host has an Alert Window interface to display messages (alerts) which inform the viewer of a variety of system conditions. Typically, an alert consists of two lines of text: the first line contains the textual information; the second includes the time, date, process ID, and hostname on which the alert was generated. The MSC Alert Window displays alerts generated by the MSC host and by the MAN host(s).

Each alert message is prefaced by **INFO, WARN**, or **ERROR**. Generally, only those prefaced by **ERROR** should be of concern to the system operator.

Alert Log Files

All alerts displayed by a given host are saved in an "alert log" file; the full path name of this file is **/var/tmp/alertlog**. Each time the MSC software is initiated on that host, the alertlog file is copied to a file whose full path name is **/var/tmp/<timestamp>alertlog.bak** and a new (initially empty) **/var/tmp/alertlog** file is created. At this point on the MSC host, **/var/tmp/<timestamp>alertlog.bak** contains the MAN and MSC alerts from the previous exercise and **/var/tmp/alertlog** contains the MAN and MSC alerts for the current exercise. All files in the /usr/... directories are local to each host.

Viewing the Alert Log

To view the contents of /var/tmp/alertlog, display the MTWS root menu and select **Alert Log** --> **Examine Log** on the root menu. See paragraph “Accessing the Root Menu” for procedures to access the root menu. A window will appear displaying the beginning of the file.

Printing the Alert Log

To print the contents of /usr/tmp/alertlog, select display the MTWS root menu and select **Alert Log** --> **Print Log** on the root menu

Notes on Alerts

During system start-up, several alerts may be displayed, the initial text of which is given below; ignore them.

ERROR: Trace_Support ... NAME_ERROR ...

ERROR: Para_Data_Max_Sizes ... NAME_ERROR ...

Each MAN and MSC software component generates an alert which identifies the version of the software which is running. These alerts have the form:

INFO: ... RELEASE xxx DD MM YY ...

where "xxx" is the release ID; "DD MMM YY" are the day, month, and year that this version of the software was created. Since each MAN and MSC software component generates this alert, there will be several of these generated on each host.

Maui and CART Client Alerts

The Maui software generates its own alerts log, system error log , and system output log local to the Maui Display Station on which the application is running. The alerts.log file can be accessed by selecting the **Alerts Log…** option from the **Help** menu in the Maui Map window. This file as well as the System_Err.log and System_Out.log files can be found in the installed drive's *\MauiData\Logs\Maui* folder for Maui; and in *\MauiData\Logs\CART* for CART logs. At each startup of Maui, any existing log files in this folder are moved to a backup folder with a folder name determined by the date and time at which the log files were originally created.

Note: These log files should be cleared out periodically, or when no longer needed. The option to remove them is also made when installing the Maui software.

CART Diagnostic Files

The CART Software generates the following Alert logs.

The Raw Data Processor (RDP), which communicates with the MSC and generates the database, creates the following files:

?? */mtws/bin/output*. This file contains the contents of messages sent from the MSC to CART, along with any diagnostics and error messages generated by the RDP.

In general this file should contain only the following:

CART messages descriptions and contents of message data i.e.

Message recieved with MUI=76 ((null)) 1114 bytes of data.Length of inStr=1115
inStr=300800UJAN03
troop,new,-436776326, 1417: 37; 1401: 6; 1402:INITIAL; 1403: 358; 1404: 0; 1405: 0; 1406: 0; 1407: 0;

A recurring warning message that states "db_interface.c: No object class assigned: XXX".

The presence of other messages in this file ts is an indication of a possible error or malfunction. Note the contents of this file can be edited to re-generate a CART database

and can be useful for diagnosing purposes. If reporting a possible CART problem to Titan, please keep a copy of the CART output file.

?? *lan_xmit.log, lan_listener.log*: contain diagnostics related to setting up, transmitting and receiving information to the MSC.

?? *Restart_CART.output, Restart_CART.log*: contain information, diagnostics, and errors relating to setting up new databases.

Each of these files is deleted each time the system is started.

The Report Generator logs errors in the file */var/log/httpd/error_log*, and records an entry for every web page served in the file */var/log/httpd/access_log*. These files are archived every week. Archived files are stored for 4 weeks and then deleted.

Mysql maintains a log file in */var/log/mysqld.log*. It is archived every week and the archived file is removed after a month.

CART Alerts

During normal operation, CART will generate 'Info' messages describing connection and disconnection processing. These are routed to the MSC and can be seen in the normal MSC alerts window if 'INFO' messages are being shown.

Section 2 - MTWS Diagnostic Utilities

Message Queue Monitor

To invoke the message queue monitor (**Qmon**) on any MTWS Unix host, open a terminal window and enter **/mtws/bin/MSC/Qmon**. Qmon periodically examines the message queues that pertain to the host on which it is running and updates its display to reflect the number of bytes (byte count) in each queue. Qmon displays a series of color-coded vertical scales labeled with the queue capacities (in bytes) and the current byte count for each queue. Each scale is displayed in green, yellow, or red, depending on whether the queue's byte count is relatively low, medium, or high, respectively. This application should be used with caution during an actual exercise.

To terminate Qmon, select **Close** from its window menu, which is accessed by clicking on the button in the upper left corner of the window.

Disk Utilization Monitor

A disk utilization monitor program named **chkdsk** runs automatically on the MSC host whenever the MSC software is initiated. This program periodically monitors the disk utilization on MSC; if capacity utilization (the percentage of the disk that is in use) exceeds

a threshold value, a red terminal window is displayed which lists the utilization of each disk mounted on MSC. Otherwise, this window remains iconified.

If disk utilization on the MSC root disk exceeds the threshold value, one of the following actions may be appropriate.

a. Select **Clean-up log files** from the root menu. This cleans up old copies of alert logs and update logs. It will not affect any exercise saved on disk.

b. Remove any extra exercise directories, excluding the current exercise. This can be done either by writing the directory(ies) to tape and then deleting them or by moving the directories to another disk. Simply deleting these directories is **not** recommended. All exercises are in the directory path **/mtws/db/man**.

For example, if there are two exercises, E1 and E2, with E1 the current exercise, exercise E2 can be written to tape with the command **tar cv /mtws/db/man/E2.** E2 can then be removed with the command **rm -rf /mtws/db/man/E2**.

To restore an exercise directory from a tape written using the **tar** command described above, enter the command **tar xv**.

c. Remove any other unneeded files from the disk (e.g., core files).

d. Back-up older snap-shot files for the current exercise to disk. For extremely long exercises with significant activity, the exercise directory in /mtws/db/man may begin to consume the entire disk. The files with older time stamps may be archived to tape. Under no circumstances should anything saved over the last hour be removed from the exercise directory or a restart of the exercise will not be possible.

The red terminal window displayed by chkdsk can be re-iconified. However, unless some action is taken to reduce the percentage utilization of the disk, the window will be continually re-displayed each time chkdsk does its periodic check. If the disk that is causing the re-display of the window is irrelevant to the conduct of the exercise, the best solution is to move the window so that most of it is off the screen and is therefore not obscuring the remaining MSC windows.

Connection Monitoring

If MSC is unable to transmit to an MDS station for an extended period of time, MSC will put that MDS station off-line. Click the Users-Online button on the MSC status window. A window showing MAN/MDS connections with the MSC is displayed. All active connections are shown in green; inactive connections are shown in red.

Metrics Screens

Metrics are collected for the MTWS system which show current quantities and levels of activity across the system. Metrics are collected for all MAN periodics and for each host communicating with the MSC. Database and Cycler metrics are available by clicking on

the respective button in the MSC status window. Host and connection metrics are available by selecting clicking on any host button or connection line in the Connections Window (see 4.2.3). Detailed information on the information displayed is available through the help interface on each of the metrics screens.

Section 3 - MAN Software

General

On each active MAN host, the following processes should be running:

a. man_sim -- the simulation program

b. man_buffer – MAN I/O buffer

c. lan_listener -- Input message processor. There will be more than one instance of this process.

d. lan_xmit -- Output message processor

e. Lan_Control -- network status report generator

The remainder of this paragraph refers to portions of the MAN process.

MAN Cyclical Applications

Many MAN applications are cyclical; they transmit start and finish messages to the MSC each time they process a cycle. The information from these messages is displayed in the Cycler Metrics window (see 4.2.4). Ideally, all cycles will complete in 60 seconds or less. If any cycle time consistently exceeds 60 seconds, the task is not running as fast as desired. If this happens, any of the following actions may be appropriate:

a. Ensure Clock Synchronization is enabled as described in paragraph “Manipulating the Exercise Clock”.

b. Reduce the exercise Clock Rate as described in paragraph “Clock Rate”.

c. Terminate the exercise gracefully as described in paragraph “Suspending an Exercise” then restart it at **End**, as described in paragraph “Restarting an Exercise – End”, choosing a different application/host mapping.

MAN Intelligence (IN) Application

The IN MAN application maintains several databases which are fixed in size. Consequently, ground detection anomalies sometimes occur. For example, sometimes a ground detection does not occur, even though all required criteria are met. If this happens, look for the following alert on MSC:

ERROR: Full_Store_Error in Grd_Intel_Tracks ...

This means that the system has actually made the detection, but is unable to store, report, or display it because IN's database is full.

MAN Process Becomes Inoperative

If any MAN process dies or becomes inoperative, a system restart is the only solution; there is no way to restart only a portion of the MAN software.

MAN Message Queues

On each MAN host there are three important message queues:

a. TCP_XMIT - All message transmissions from a MAN host are buffered in the TCP_XMIT queue.

b. MAN_COM - All messages received by a MAN host are buffered first in the MAN_COM queue.

It is sometimes useful to use Qmon to examine the state of these queues if:

a. The time between the entry of a command and receipt of the response seems unusually long or the responses are not received at all. (NOTE: This does not apply to solicited report requests.)

b. There is a sudden change in any of the MAN cycle times discussed above.

c. One or both of the MAN cycle times seem unusually long.

If the TCP_XMIT queue is relatively full (colored red) and the byte count remains constant, then that host is unable to send data to some other MAN host or to MSC. This can cause processing in this host to cease; it is incapacitated (hung) trying to transmit. The source of this problem usually lies in the host to which it is trying to transmit.

The MAN_COM queue will often be relatively full. As long as the byte count changes over time, there is usually no problem. If the MAN_COM queue becomes full, then other MAN hosts and MSC will be unable to send messages to that host -- their TCP_XMIT queues will start to fill.

If any MAN message queue becomes full and its byte count remains constant for more than one minute (approximately -- ideally, no message queue should exhibit this behavior for more than ten seconds or so), the most likely final result is that the system will need to be restarted.

Section 4 - MSC Software

General

MSC Host Configured to Receive Spot Reports

The MSC host is configured to receive all spot reports. The spot reports process (mds_spot) saves all spot reports received by the station in the file **/tmp/Spot_Report_Log**. If a hard copy record of these reports is desired, it is often convenient to configure the station to NOT print them automatically, but rather to wait until the exercise is complete and then print the file **/tmp/Spot_Report_Log**. The advantage of doing this is that the spot report print-out will not be interspersed with extraneous data.

Processes Running on MSC Hosts

On each MSC host, the following processes should be running:

a. msc_dbm -- database manager and solicited report generator

b. msc_control-- message router

c. sysop -- primary system operator interface

d. status_window-- exercise status display

e. station_control -- station control interface

f. spot_rpts – spot report processor

g. sol_rpts -- solicited report processor

h. alert_window -- alerts display management

i. lan_listener -- input message processor; there will be more than one instance of this process

j. lan_xmit -- output message processor

k. lan_control -- network status report generator

MSC Message Queues

Each MSC host has three important message queues:

a. TCP_XMIT - All message transmissions from an MSC host are buffered in the TCP_XMIT queue.

b. MSC_CTRL - Most messages received by an MSC host are buffered first in the MSC_CTRL queue.

c. MSC_DBM. - From the MSC_CTRL queue, messages destined for MSC_DBM_Control are buffered in the MSC_DBM queue.

It is sometimes useful to use Qmon to examine the state of these queues if:

a. The time between the entry of a command or solicited report request and receipt of the response seems unusually long or if the responses are not received at all.

NOTE **Solicited reports are generated by MSC, not MAN.**

b. An MDS station is unable to go on-line.

If the TCP_XMIT queue is relatively full (colored red) and the byte count remains constant, then MSC is unable to send data to some MAN or MDS host. This can cause processing in MSC to cease (it is hung trying to transmit). The source of this problem usually lies in the host to which it is trying to transmit.

Section 5 - Maui Software

Processes running on Maui Hosts

When Maui is running, it uses the Java Runtime Environment as its parent process to spawn the following tasks:

a. Maui map window

b. Station Control

c. Spot Reports

d. Exercise Status

e. One task for every window opened in Maui

To view these tasks, go to an open area in the task bar and click on the right mouse button. Then select **Task Manager** option from the resulting menu. This will bring up the Windows NT Task Manager window. The **Applications** tab should display, at a minimum, the above mentioned tasks.

Select the Processes tab to view the Java Runtime Process (javaw.exe) CPU, CPU Time, and Memory Usage.

Select the Performance tab to view the overall CPU Usage, CPU Usage History. Memory Usage and Memory Usage History, and other Maui Display Station system statistics. This is also a quick way to identify how many CPUs are being used by the Maui Display Station. Note that MTWS/Maui v2.3 requires the CPU limit to be set at 1 even if the system is equipped with more than one processor.

Maui Troubleshooting

Below are some solutions to common problems encountered while setting up and running Maui. In most cases, check the Alerts log or System Error log either before or after trying the suggested solution(s).

Problem: When installing Maui a fatal error window appears with the message, "Failed to access kernel".

Solution: Check your TEMP drive space setting. If it is too small, or non-existent, the Maui Installation program will fail due to the lack of temp space required to run it.

Problem: When clicking the **Online** button in the Station Control window Maui doesn't go online.

Solution:

- Make sure the Maui host file (c:\WINNT\system32\drivers\etc\hosts) has the correct IP address for the msc001.

- Make sure the Maui resources file (accessed via the Maui Resources Editor, available from the MTWS Tools desktop folder) has the Maui CLIENT_REMOTE_PORT and SERVER_LOCAL_PORT set to the same **mtws** service number as the one set on the MSC in the /etc/services file.

- On the MSC, make sure the Maui Station in question has been added to the /etc/host file or, if DNS is used, that this station's IP and hostname have been added to the name server.

- Make sure the MDS interface is enabled on the MSC.

Problem: When Maui successfully goes online, but no symbols appear.

Solution: Look at the Maui alerts log, accessible via the 'Help' menu to bring up the Alerts window. Verify that there are no errors display relative to controller lists, generating log files, or any other errors spelling out problems with symbol definition. The latter could be indicative of a mismatch between Maui versions and MTWS (Unix) versions.

Problem: In standalone mode, when trying to run the 'static demo', no symbols appear.

Solution: Verifiy that the standalone folder has a subfolder named Snapshot which contains snapshot sample *.sos files and corresponding folders in its subfolder, data.

Problem: All Maui windows close at once and a Windows NT or Dr. Watson window appears with the message that an access violation has occurred.

Solution: At this point, the problem is fatal for this run of Maui. You will have to restart Maui. Prior to restarting:

- Make sure that you are running in single processor mode, if you have a multiprocessor system. If so, make sure to reboot your machine in single processor mode.

Also check your Alerts log and System Error log for possible other causes for this software failure.

You must restart your Maui software.

Problem: Maui runs slower than normal.

Solution: - Make sure that you have a multiprocessor system you are utilizing both processors. Also verify that no extraneous applications such as Microsoft Office products, C2PC, or Internet Explorer are running (potentially robbing Maui of processor memory and processing time). For the same reason, it is also not advised to run any Java application which launches its own runtime environment.

Problem: Maui runs slower and the hard drive makes lots of noise.

Solution: Check your TEMP drive space setting. If it is too small and Maui is running a memory intensive session, a high amount of paging (frequent swapping in and out of data to the hard drive) will occur. Try cleaning up your hard drive of excess files both in your temp drive and your other application (e.g. Internet Explorer) temp space. If your TEMP drive is on a drive with minimal free space and you have another drive with more free space, consider changing the location of your TEMP drive. This option is made available to you at install time. Consult your Windows NT manual or online help for instructions on changing/modifying your TEMP drive space. Also, see section 3.3.3.5.

Problem: A message appears that says your system is running low on memory.

Solution: The minimum memory requirements are 512 MB RAM. If you get a low on memory system message, check to see how many tasks and processes are running on your system. Close any tasks that you do not need while running Maui. For example, close Internet Explorer or other web-browsers, and Microsoft Office tools such as Excel, Word. Disable any animated screen savers (the preferred screen saver setting for Maui Display Stations is **Blank Screen**).

Problem: Maui will not load, stating it can't load the color map.

Solution: Check your Color Palette setting in the **Settings** tab of the **Display Properties** window. This window can be accessed by clicking the right mouse button in an open area of your desktop and selecting the **Properties** option from the drop down menu. Then, select the **Settings** tab in the **Display Properties** window. Maui requires the display's color palette setting be set to **65536** or **True Color** in order to display its Raster Graphic maps.

Problem: Maui doesn't remember window settings.

Solution: Make sure the read only file attribute is not set for the file MTWS\Maui\data\profile.default\profile

See Appendix B for additional information related to Maui's C4I interface.

Section 6 - CART Troubleshooting

Normal operating state.

Processes:

When connected to MTWS the following processes, all owned by the MTWS user "soc", should be visible on the CART server:

??/mtws/bin/Start_CART: Start_CART is the shell script that starts (directly or indirectly) all CART server processes. It is invoked by the MSC after the user selects the Menu MTWS->CART->Start from the Sysop window.

??alerts-cart: routes alert messages to the MSC

??lan_listener (multiple copies) and lan_xmit: These processes handle the communications between CART and the MSC.

??rdp: The raw data processor creates the CART database, translates MTWS messages and inserts exercise information into the database.

When attempting to identify the source of a problem, the command "ps –augxw | grep soc" should show all these processes. The absence of one or more of these processes is indicative of a problem.

In addition, CART uses the third party, off-the-shelf software packages MySQL and Apache.

The command "/etc/init.d/mysqld status" should show a list of running processes. If the MySQL deamon is not running, CART will be unable to add new data to the database, or report on existing exercises. The root user should be able to start the MySQL deamon with the command "/etc/init.d/mysqld start". If this fails, re-installation of mysql should be

considered. If the mysqld can be started, it is likely that the boot process is not starting the deamon. Add a link from the appropriate run level directory (etc/rc.d/rcX.d)_to the mysqld file to fix this.

The operation of the Apache software can be tested by the command "/etc/init.d/httpd status". Again a list of the running processes should be returned. If Apache is not running, the CART Reports will not be available. Again "/etc/init.d/httpd start" should fix the problem. Linking this script to the appropriate run level directory should ensure correct startup in future.

Message Queues:

During normal operation the following queues should be present.

0x000007da
0x000003e9
0x000007d1
0x000003e8
0x000003ea
0x000007d8

The command 'ipcs –q' should show each of these queues, repeated operations of the command should show that the queues are either empty or rapidly changing in size (that is, messages are being placed on the queue and then immediately taken back off). At times of heavy processing, and particularly while starting an exercise, a small backlog of messages may show. Each queue is allocated 64K of memory and should use the majority of this allocation very infrequently. Periods of more than a few seconds with a large and unchanging allocation of memory on the queue are indicative of a problem.

Memory Usage:

Server memory usage and CPU usage is typically small. Periodic use of "top" as described below may be carried out by those interested.

Problems during Startup

When the MTWS->CART->Start option is selected from the Sysop window, after a brief handshake CART needs to decide what to do with the current exercise.

If the exercise is a new exercise, or an existing exercise is being loaded which is run from 'Start' the existing CART exercise database is archived and a new CART exercise database is created.

If the exercise is an existing exercise and is being run from END, CART will check its own end time. If the exercise end time recorded by MTWS is the same as that in the CART

exercise database, the new data will be added to the existing CART exercise database. Otherwise the existing database is archived and a new CART exercise database is created.

If the exercise is being run from the middle of an exercise i.e. from a specified time, then the existing CART exercise database will be copied to create an archive, and the original exercise will be deleted from the specified time through to the end of the exercise database. The new data will join with the preexisting exercise to form a coherent whole database.

In general operation of these procedures should not create problems, but the archive process is sensitive to the ownership of files in the */mtws/bin* directory and can fail if there is insufficient available disk space in the system. If a problem is noted when starting the CART server, check the file */mtws/bin/Restart_CART.output*. The file's timestamp should be fresh and the contents should be similar to:

```
starting cart: Thu Jan 30 16:34:13 PST 2003
0 0 0210232032
DBD::mysql::st execute failed: Can't find file: './cart/change_unit_init_flag.fr
m' (errno: 24) at cart_db.pm line 335.
DBD::mysql::st execute failed: File '/var/lib/mysql/cart/change_unit_front.MYD'
not found (Errcode: 24) at cart_db.pm line 335.
RestartCART.pl 1 <BR>
startState=0
startMode=0
startTime=0210232032
Database archived successfully
```

The "DBD::mysql" messages are normal warnings and do not impede operation. Note that joining the end of an exercise does not require an archive operation.

Chapter 7 - O/S Utilities

CPU Utilization

The Linux operating system includes a CPU utilization monitoring program called "top". This utility can be of general use when diagnosing system problems. Refer to the relevant Linux documentation for information on how to use **top.**

APPENDIX A

MTWS TERRAIN GENERATION PROCEDURES

APPENDIX A: MTWS TERRAIN GENERATION PROCEDURES

Section 1 - Overview

The MTWS terrain database is a set of files containing digitized terrain information for wargaming simulation. These files contain terrain elevations, trafficability indexes for various modes of travel, and vegetation indexes for air and ground coverage. Produced from Defense Map Agency (DMA) elevation and features data, the terrain database is used by the MTWS Application Network (MAN) simulation software to facilitate movement and intelligence processing.

MTWS geographic data consists of digitized DTED/DFAD (Digital Terrain Elevation Data/Digital Feature Analysis Data) terrain data files, and displayable map image files. The MAN software uses the digitized terrain data to support movement and intelligence processing. The Maui software uses the map image files to support its tactical display.

Several software utilities support the creation and manipulation of these files.

(1) TerrGen - generates digitized DTED/DFAD terrain data ('trr') files. These files support MAN's movement and intelligence processing.

(2) Elevator - generates a displayable image file, using a 'trr' file as its input. This enables the Maui user to have a visual depiction of the elevation data in the MAN's terrain database.

(3) smpadrg - converts an Arc Digitized Raster Graphic (ADRG) format map image to a Tagged Image File Format (TIFF) map image.

(4) MapGen - converts a Compressed ADRG (CADRG) format map image to a TIFF-format map image. MapGen also supports geo-registration of TIFF maps - i.e., a map image can be positioned anywhere on the earth's surface.

Section 2 - TERRGEN Terrain Creation

TerrGen Overview

An MTWS digitized terrain file contains terrain elevations, trafficability indexes for various modes of travel, and vegetation indexes for air and ground coverage.

It contains terrain elevations, trafficability indexes for various modes of travel, and vegetation indexes for air and ground coverage. Produced from Defense Map Agency (DMA) elevation and features data, the terrain database is used by the MTWS Application Network (MAN) simulation software to facilitate movement and intelligence processing.

The MTWS Terrain Database is generated by the TerrGen software package running on a Windows PC such as a Maui Workstation. It is then transferred from the Windows PC to the MAN network file system (NFS) using standard File Transfer Protocol (FTP) software running on the PC.

The Terrain file generation is a 2-pass process through the TerrGen program.

The first pass creates an intermediate file, called the CFE (Combined Features and Elevation) file. If not DMA DFAD is not present on the CD or hard-drive a 'default' features file is created.

The second pass through the TerrGen program uses the features file created in the first pass, to create the terrain data file (.TRR).Currently MTWS only requires a major feature code consisting of basic soil features (codes 901-980). The minor feature code is for future expansion if another set of features is also required, such as urban areas. When installed on a Windows PC, e.g.: on the D drive, the MTWS Terrain Generator program is installed in a folder called Terrain.

This folder, D:\Terrain, contains the following:

Folders in D:\Terrain

combined
elev
features
font
mtws

Files in D:\Terrain

DOS4GW.EXE
FEA_XLAT.TBL
TERRGEN32.EXE
TERRGEN.BAT
TERRGEN.EXE

TerrGen Setup

The location of the DTED data is hard coded in the script D:\Terrain\TERRGEN.BAT, as follows: SET CDROMDSK=d:\DTED\

If necessary, correct the specified drive name (hard drive, CDROM drive) where the DTED data exists: e.g.: SET CDROMDSK=e:

View the DTED data to make sure you have valid E/W and N/S data for a given area. Note that not every degree within a range of degrees is necessarily covered by a given DTED database. For example, the DTED dataset, TCD DTED111 36"E 54"N to 66"N 36"E to 72"E, may contain 56"N 69"E and 56"N 71"E, but not include 56"N 70"E.

Find and note the desired degrees (E/W N/S) data cell of interest and verify that it is contained on the CD, e.g.: 43"E 64"N would be found at E:\DTED\E043\N63.DT1

Running TerrGen

Either from a dos window or explorer window, go to the folder where TerrGen resides, e.g.: D:\Terrain and launch TerrGen.bat.

Introductory information is displayed describing the MTWS Terrain Generator program. Read and then 'PRESS ANY KEY WHEN READY!' The screen will be split into 2 columns/panels. The initial menu will appear on the left side and a blank map area on the right side. As the mouse pointer is moved over the menu items they will change from green to yellow and help information associated with a menu item will appear below. Any time the mouse is moved away from the menu area, general help information for the entire menu is displayed. SELECT OPERATION is the first menu panel displayed after the initial window.

SELECT OPERATION menu provides you with the following options:

Select Terrain Data: select MTWS or MCC terrain data file for display or build new terrain file from combined files.

Select Combined File: select combined file (type '.CFE') for display, or build new combined file from DMA elevation and features data.

Exit: Return to DOS, Any operation in progress will be terminated.

From the **SELECT OPERATION** menu, click on the **Select Operation** option. Click the **Select Combined File** option. The **SELECT COMBINED FILE** menu will appear. Click on the **Create CFE File** option.

SELECT COMBINED FILE: Select combined file (type '.CFE') for display, or build new combined file from DMA elevation and feature data. Provides you with the following options:

Create CFE File: Create new CFE file for the one degree cell and feature codes entered by the user. Lat/Lon degrees must be entered as integer values. File will be created on RAM disk, if available; otherwise hard disk will be used. Press ESC to abort the command.

Check CFE Files: Check CFE files for coverage of area entered by user, with the specified features codes. May require multiple CFE files.

Load CFE File: Displays all CFE files in the map areas. User will select desired file by clicking LEFT mouse button on filename.

Delete CFE File: Displays all CFE files in the map areas. User will select file to delete by clicking LEFT mouse button on filename.

Exit: Select combined file (type '.CFE') for display, or build new combined file from DMA elevation and features data.

Creating the CFE features File

After selecting the **Create CFE File** option. The operator will be prompted to enter the following items into the keyboard input area at the lower left of display:

At lower left corner of the screen, after the "prompt": "Enter longitude of lower left corner of one degree cell as nnnE[W] or [-]nnn". Enter the E/W one-degree cell and then hit return. e.g. 117W.

At lower left corner of the screen, after the "prompt": "Enter latitude of lower left corner of one degree cell as nnN[S] or [-]nn". Enter the N/S one-degree cell and then hit return. e.g.: **33N.**

At lower left corner of the screen, after the "prompt": "Enter major features codes in 'from-to' format. Must be integers between 101-980." Enter the major feature codes to be processed in the DMA features file. Normally this entry will be **901-980** to process basic soil types. See DMA documentation for all possible feature codes.

At lower left corner of the screen, after the "prompt": "Enter minor features codes in 'from-to' format. Must be integers between 101-980." Enter in the minor features codes to be processed. Normally there are none, so just press **Enter**.

At lower left corner of the screen, after the "prompt": "Enter default feature code. Must be integer between 101 and 980. Enter the default feature code. It must be given and is normally **901**.

At lower left corner of the screen, after the "prompt": "Enter default elevation, or press **Enter** to allow TerrGen to determine default elevation." Enter default elevation. If not given TerrGen will calculate average elevation for one-degree cell. The default or average is used in case elevation is not given for terrain elements. Press **Enter** to accept TerrGen's default.

Provides you with the following options: **Hard Disk:** DMA elevation data on hard disk. **CDROM:** DMA elevation data on CDROM. **Exit:** Select the appropriate option, e.g.: if it is on a CDROM, select CDROM. It will pause a moment while it processes the selection, displaying the following instructional/status message in the lower left corner of the screen: "CDROM load input - load elevation CDROM data before menu." Make sure CDROM data is in CDROM drive.

When ready, use your mouse to select the **Exit** option. It will pause a moment while it processes the selection, displaying the status message in the lower left corner of the screen. When complete a fractal image will be displayed on the right panel of the screen and the **FEATURES SOURCE** menu is displayed in the left panel as described in the next step.

Provides you with the following options: **Hard Disk:** DMA features data on hard disk. **CDROM:** DMA features data on CDROM. **Exit.** Note, selecting either Hard Disk or CDROM will generate the error... "No **FEAPATH** in environment". You must still select either Hard Disk or CDROM to continue. If not on the CD or hard-drive a 'default' features file (.CFE) is created. The menu panel will then change to **SELECT TERRAIN FILE** menu: No DMA Features found for this location. The menu will then change back to **Select CFE FILE.**

When processing is done, a new prompt will appear: At lower left corner of the screen, after the prompt, enter CFE filename ('.CFE' appended). Use the format e[w]NNNn[s]NN. e.g.: **w117n33,** which will generate the CFE file, w117n33.cfe.

When processing is done, click the **Exit** option to return to the **SELECT OPERATION** menu.

Creating the .Trr Terrain File

From the **SELECT OPERATION** menu, click on the **Select Terrain Data** option. The **SELECT TERRAIN FILE** menu will appear. Click on the **Create Terrain File** option.

SELECT TERRAIN FILE: provides you with the following options:

Create Terrain File: Create new MTWS terrain file for the one-degree cell and feature codes entered by the user. Lat/Lon degrees must be entered as integer values. Press ESC to abort the command.

Edit Terrain File: Change MTWS terrain database elevation, trafficability, or coverage data within a user defined area.

Delete Terrain File: (this option is not implemented). Display all terrain files in the map area. Select file to delete by clicking RIGHT mouse button on the filename.

Verify Xlate Table: (this option is not implemented). The MTWS terrain data translation table will be checked for validity. See environmental variable: TRANSLATEFILE for path and filename.

Exit: Return to DOS

After selecting the **Create Terrain File** option. The operator will be prompted to enter the following items into the keyboard input area at the lower left of display:

At lower left corner of the screen, after the prompt: Enter longitude of lower left corner of one-degree cell as nnnE[W] or [-]nnn". Enter in the E/W one-degree cell and then hit return. e.g.: **117W**.

At lower left corner of the screen, after the prompt: Enter latitude of lower left corner of one-degree cell as nnN[S] or [-]nn". Enter in the N/S one-degree cell and then hit return. e.g.: **33N.**

At lower left corner of the screen, after the prompt: Enter major features codes in 'from-to' format. Must be integers between 101-980. Enter the major feature codes to be processed in the DMA features file. Normally this entry will be **901-980** to process basic soil types. See DMA documentation for all possible feature codes.

At lower left corner of the screen, after the prompt: Enter minor features codes in 'from-to' format. Must be integers between 101-980. Enter in the minor features codes to be processed. Normally there are none, so just press **Enter**.

At lower left corner of the screen, after the prompt: Enter default feature code. Must be integer between 101 and 980. Enter the default feature code. It must be given and is normally **901**.

At lower left corner of the screen, after the prompt: Enter default elevation, or press **Enter** to allow TerrGen to determine default elevation." Enter default elevation. If not given TerrGen will calculate average elevation for one-degree cell. The default or average is used in case elevation is not given for terrain elements. Press **Enter** to accept TerrGen's default. It will pause a moment while it processes the selection, displaying the status message in the lower left corner of the screen.

Section 3 - SELECT TERRAIN FILE

At lower left corner of the screen, after the prompt: Enter MTWS Terrain Data filename ('.TRR' appended). Use the format e[w]NNNn[s]NN. e.g.: **w117n33,** which will generate the TRR file, w117n33.trr.

Installing TerrGen TRR files in the MTWS Terrain 'Database'.

FTP the .TRR file(s) generated from TerrGen on the Windows PC to the MSC terrain database path, /mtws/db/terrain/high using FTP on the Windows PC.

After the terrain file has been transferred to the MTWS terrain database, the terrain compression program, hosted on the HP/UX computer, must be run.

Running Terrain Compression.

This program performs two functions: First it adjusts the foot, tracked and wheeled trafficability factors according to the terrain gradient, that is, the standard deviation of the slope around the terrain point; and second, it compresses the high accuracy (normally 3 seconds) terrain file into a medium accuracy (6 second) and/or low accuracy (9 second) files. These compressed files are stored in the "/mtws/db/terrain/medium" and "/mtws/db/terrain/low" directories, respectively. To run the terrain compression program enter the command compress_terrain; and follow the prompts provided by the program. A sample run is provided:

```
$ compress_terrain
MTWS TERRAIN GRADIENT ANALYSIS
```

Enter 'C' to continue, any other key to stop: **c**
Enter Terrain Compression Factor
Low (9 second)
Medium (6 second)
Both

: **Both**

Enter Lower Left coordinate of area to be analyzed.
Southern and Western hemispheres will be negative integers.
Enter Longitude: **118** and Latitude: **33.**
Enter Upper Right coordinate of area to be analyzed.
Enter Longitude: **117** and Latitude: **34.**
Processing Longitude: **118** and Latitude: **33**.
Trafficability already adjusted for database.
Start low (9 second) compression.
File Create Error - Can't write medium/low compressed file Terrain File Write Error.
Start medium (6 second) compression.
File Create Error - Can't write medium/low compressed file Terrain File Write Error.
Processing Longitude: **118** and Latitude: **34.**
Trafficability already adjusted for database.
Start low (9 second) compression.
File Create Error - Can't write medium/low compressed file Terrain File Write Error.
Start medium (6 second) compression.
File Create Error - Can't write medium/low compressed file Terrain File Write Error.
Processing Longitude: **117** and Latitude: **33.**
Trafficability already adjusted for database.
Start low (9 second) compression.
File Create Error - Can't write medium/low compressed file Terrain File Write Error.
Start medium (6 second) compression.
File Create Error - Can't write medium/low compressed file Terrain File Write Error.
Processing Longitude: **117** and Latitude: **34.**
Trafficability already adjusted for database.
Start low (9 second) compression.
File Create Error - Can't write medium/low compressed file Terrain File Write Error.
Start medium (6 second) compression.
File Create Error - Can't write medium/low compressed file Terrain File Write Error.

Cells Processed: Enter 'C' to continue, any other key to stop: **#.**

Section 4 - TERRGEN Terrain Editor

To edit a terrain data file, start up TERRGEN as described in the previous section.

From the **SELECT OPERATION** menu, select the **Select Terrain Data** option.

Then select the **EDIT TERRAIN FILE** option.

EDIT TERRAIN FILE

Select MTWS Terrain Data file and image type, then define area with mouse and enter modifications. Entire area will be changed to the new value(s).

Select Terrain File

MTWS Terrain Data file and their locations, will be displayed in the map area.

Select desired file by clicking left mouse button on filename.
File will be opened and elevation image displayed.

Then select the Exit option to go back to the EDIT TERRAIN FILE menu.

Select Image

Select Terrain Data image for editing.
The elevation image is the default image displayed when the file is selected.
The options are:
- **Display Elevation**
- **Display Features**
- **Display Combined**
- **Exit**

Select **Display Elevation** to display the elevation image for the terrain data file selected in the previous step.

Then select the **Exit** option to go back to the **EDIT TERRAIN FILE** menu.

Line Definition

Defines linear area of a specified width in meters.
The shape is defined by connecting one or more vectors.
The options are:
- **Enter Width**
- **Start Vectors**
- **End Vectors**
- **Cancel**

Enter Width

Enter width in meters. Value must be between 50-10000 meters.
This value must be entered fore Start Vectors is selected.
Press ESCAPE to abort input.
- At lower left corner of the screen, after the "prompt":

"Enter width in meters"
Enter in the width in meters and then hit return.
e.g.: 1000

Then select Start Vectors location. Continue selecting vector end points by clicking left mouse button on locations.

Select End Vectors when line defintion is complete

Shape Definition

Defines a formless area. The shape is generated by holding the left mouse button down at the start point and dragging the mouse around the area to be changed.

Modify Terrain Data

Enter change value for elev, traffic or cover.
These value(s) will be entered for all terrain elements in the defined area.
Enter mass change value for terrain data item(s), then select 'Update Data Base' to generate new terrain data, o r'Cancel'. Press ESCPE to abort keyboard entry.

The options are:

- Elevation
Enter elevation in meters.
Value must be between -5000 - 10000 meters.

This value will mass change all elevation entries in the enclosed area.

Enter -20000 to cancel prior entry.

- Foot Traffic

Enter foot traficability value as follows:
-1 - Cancel change
0 - Water
1 - Impassable
2 - Slow
3 - Fair
4 - Medium
5 - Fast
This value mass changes enclosed area.

- Tracked Traffic

Enter tracked traficability value as follows:

-1 - Cancel change
0 - Water
1 - Impassable
2 - Slow
3 - Fair
4 - Medium
5 - Fast
This value mass changes enclosed area.

- Wheeled Traffic

Enter wheeled traficability value as follows:
-1 - Cancel change
0 - Water
1 - Impassable
2 - Slow
3 - Fair
4 - Medium
5 - Fast
This value mass changes enclosed area.

- Air Coverage

Enter air coverage value as follows:
-1 - Cancel change
0 - Open
1 - Light
2 - Medium
3 - Dense
This value mass changes enclosed area.

- Ground Coverage

Enter ground coverage value as follows:
-1 - Cancel change
0 - Open
1 - Light
2 - Medium
3 - Dense
This value mass changes enclosed area.

Update Database

Clicking on this item causes all terrain elements in the enclosed area to be updated with the selected mass change value(s)

- Cancel

Cancels all selected mass change values.
Too late if 'Update Data Base' has alread been selected.
Returns to prior menu.

Cancel

Cancel Terrain File edit and return to prior menu.
Too late if area has already been updated with changes.

Exit

Return to prior menu.

Note: For more information, see Appendix A of the v2.3 CSOM, DCN 16.

Manipulating Terrain

Several operations are available to the system operator to manipulate the digitized terrain for an exercise. Note that these operations are in addition to the terrain definition portion of the exercise definition operation.

Loading Terrain

To load one or more terrain areas, perform the following steps:

Select **Exercise Control** --> **Database** --> **Terrain** --> **Load** from the System Operations window. The terrain load interface will appear.

Select **Low -**, **Medium -**, or **High-Resolution** from the terrain load interface.

Enter at least one pair of coordinates in the template provided in the terrain load interface.

Click on OK in the System Operations window.

Wait for a response to appear in the System Operations window indicating that the terrain definition has been accepted.

Removing Terrain

Terrain areas can also be removed. When terrain is removed from an area, that area reverts to the tabletop values defined in the parametric data for the exercise.

To remove one or more terrain areas, perform the following steps:

Select **Exercise Control** --> **Database** --> **Terrain** --> **Remove** from the System Operations window. The terrain remove interface will appear.

Select **Low -**, **Medium -**, or **High Resolution** from the terrain remove interface.

Enter at least one pair of coordinates in the template provided in the terrain remove interface.

Click on OK in the System Operations window.

Wait for a response to appear in the System Operations window indicating that the terrain removal has been accepted.

Loading/Removing Tabletop Terrain

The system operator can assign tabletop characteristics to a specified area. Tabletop means that all terrain points within the specified area have the same trafficability, cover, and elevation.

> **NOTE**
>
> **Tabletop values defined by this operation can differ from those defined in the parametric data for the exercise.**

To assign tabletop values to a terrain area or to restore an area's terrain values to those defined in the parametric data for the exercise, perform the following steps:

Select **Exercise Control** --> **Database** --> **Terrain** --> **TableTop** from the System Operations window.

The tabletop terrain interface will appear.

Enter the locations and the action (**LOAD** or **REMOVE**) to be performed.

> **NOTE**
>
> **If the REMOVE option is chosen, proceed to step (f). As a result of the REMOVE, the trafficability, cover, and elevation values for the region revert to the tabletop values defined in the parametric data for the exercise.**

Enter the **elevation** to be assigned to all points within the region defined by the specified locations.

For each type of trafficability to be defined, select a **trafficability value** from those provided. Then click on the button(s) for each type of trafficability (foot, tracked, wheeled) which is to have the selected value.

NOTE

When a button is clicked, the label corresponding to that button displays the selected trafficability value.

For each type of cover to be defined, select a **cover value** from those provided. Then click on the button(s) for each type of cover (air, ground) which is to have the selected value.

NOTE

When a button is clicked, the label corresponding to that button displays the selected cover value.

Click on OK in the System Operations window.

Wait for a response to appear in the System Operations window indicating that the tabletop terrain load/remove has been accepted.

Section 5 - Transferring MTWS Terrain Data Base to MTWS Network

Files are transferred to the MAN (MTWS Application Network) file system using the FTP software in the PC.

The MTWS terrain database generated by TerrGen resides in the directory specified by the **MTWSPATH** environment. Observe the current directory by displaying the file **<regional directory>.bat**, containing the current TerrGen environment. This can be accomplished in windows using **NotePad** and opening **<regional directory>.bat**.

In MS-DOS, enter the command **type <regional directory>.bat** or enter the **set** command, which displays the current environment. It is necessary to know the **MTWSPATH** directory when running FTP. Following is the step by step procedure for transferring a MTWS terrain data base to the MTWS Network:

(1) Click on the **Norton DOS** icon; Windows will open a DOS window. This is a good time to find the MTWSPATH directory by entering the **set** command, if

necessary.

Enter the command **n** to activate the network.

(2) Make sure you are in the drive where the database files are located. Enter the command **ftp <host>** where **<host>** is the name of a HP model 400 computer acting as a gateway on the MTWS network.

Examples: Computer names at the development site are **mapper** and **hp5**.

Other MTWS network computers can be used if they are listed as hosts in \etc\machine.db.

(3) When the **enter user** prompt appears, enter a valid user name and the MTWS password.

When accepted, FTP is ready.(Do ftp for EACH file).

a. Enter the command **binary**. It is imperative that this command is entered to insure the file transfers correctly.

If not entered, the high order bit of each byte is dropped, because the data is assumed to be text and data transfer will terminate when the first Ctrl Z (End of Text, byte value 026) is encountered.

b. Enter the command **lcd <MTWSPATH directory>**. This sets the local directory to the directory containing the MTWS terrain data base. Example:

lcd \terrain\mtws\wc_usa

(4) Enter the command **cd /mtws/db/terrain/save** to select the MTWS network's terrain directory.

(5) Enter the command **put <filename>.trr**, where filename is the name entered during TerrGen processing.

Example: **put w117n32.trr**. The MTWS terrain data files are approximately 6 Megabytes in size so the transfer may take up to 30 minutes, depending upon the network load.

(6) When transfer is complete, enter the command **quit** to exit FTP. Then enter the command **exit** to return to Windows.

Moving files to MTWS terrain data base

(1) Move the files just entered from /mtws/db/terrain/save to /mtws/ db/terrain/high. (In DOS shell).

mv <filename> /mtws/db/terrain/high

(2) After the terrain file has been transferred to the MTWS terrain data base, the terrain compression program, hosted on the HP700 computer, must be run.

Running Terrain Compression

This program performs two functions: First it adjusts the foot, tracked and wheeled trafficability factors according to the terrain gradient, that is, the standard deviation of the slope around the terrain point; and second, it compresses the high accuracy (normally 3 seconds) terrain file into a medium accuracy (6 second) and/or low accuracy (9 second) files.

These compressed files are stored in the "/MTWS/db/terrain/medium" and "/MTWS/db/terrain/low" directories, respectively.

To run the terrain compression program enter the command **compress_terrain**; further operator entry is assisted by the program.

Section 6 - Editing MTWS Terrain Database

This feature of TerrGen allows the operator to modify regions of an existing MTWS terrain data base. Essentially the operator can change any or all MTWS terrain data items for data elements within a user defined area.

The operator first defines the area to be changed, either a linear area consisting of vector(s) of a specific width, or an amorphous shape drawn by dragging the mouse pointer around the area.

After defining the area to change, the operator selects the data item change(s) within the area. Specifically, the operator may set all elevations within the area to a constant value, as well as the trafficability factors--foot, tracked and wheeled--and the coverage indexes--air and ground.

After specifying the change(s), the defined area of the MTWS terrain data base is modified.

When the changes are complete, it is necessary to transfer the modified MTWS terrain data base to the MAN NFS using FTP (see section 6..) The modified MTWS terrain data base can be restored to its original state by performing the "Create Terrain Data" function again. Since the associated CFE file should be available, this operation will only take a few minutes.

NOTE

While TerrGen is in the edit mode, the longitude/latitude displays in the lower left of the screen whenever the mouse pointer is in the image area. Also, the operator can click the left mouse button to display the elevation, trafficability and coverage indexes for that location.

Following is the step by step procedure for editing MTWS terrain data:

(1) From the initial menu click on **Select Terrain Data**. The Select Terrain File menu is displayed
(2) Click on **Edit Terrain File** to display the Edit menu.
(3) The first required operation is to select the MTWS data base to be modified. This is accomplished by clicking on **Select Terrain File**. The file names of all MTWS terrain data bases currently available, along with their locations, are displayed in the map area.
(4) Move the mouse pointer to the desired filename (the filename will change from red to yellow) and click. If the associated CFE file is available the elevation image will display; otherwise, an error message is displayed. If the associated CFE is not available it must be regenerated by selecting **Select CFE File** from the main menu.
(5) After displaying the elevation image, the operator has the option of selecting the features or combined image, if they are more appropriate for the type of terrain editing. This is accomplished by clicking on **Select Image**.

When the desired image is displayed, the operator must decide which shape will best define the area to be modified. The operator can choose **Line Definition** which enables defining a linear shape of connecting vectors, at a specific width, or **Shape Definition**, which defines an amorphous (formless) shape.

a. If **Line Definition** is selected, another menu is displayed, showing the selections required for defining a linear shape.

(1) Click on **Enter Width** to enter the width of the linear shape, in meters.
(2) Click on **Start Vector** to begin defining the linear shape. Then move the mouse pointer to the location in the image where the linear shape begins.
(3) Click the left mouse button at the start location and at each successive vector end point required to define the linear shape.

When the final vector end point is selected, the operator has the choice of accepting the linear definition by clicking on **End Vector**, or cancelling the definition by clicking on **Cancel**. If the definition is accepted then the shape is outlined with white vectors.

b. If **Shape Definition** is selected, the operator is instructed to move the mouse to the location where the shape begins, then "drag" (hold left button down while moving the mouse) around the shape. After releasing the left button, the shape is enclosed and outlined in white.

The operator may cancel the shape definition by clicking on **Cancel**.

After defining the shape, the next step is to specify which terrain data item(s) is(are) to be mass changed within the shape.

(1) Click on **Modify Terrain Data**; another menu is displayed containing each terrain data item. The operator will click on each item to be modified and enter the mass change value.

(2) After all items are chosen, select **Update Terrain Data Base** to mass change the defined area in the MTWS terrain data base or **Cancel** to cancel the operation.

(3) Exit the edit function and return to the main menu. Accomplish this by clicking on the last item of each menu.

Section 7 - MTWS Terrain Database Generation

Table 7, "Translation," specifies trafficability and cover indexes for use by MAN (MTWS Application Network) simulation software. The trafficability indexes FT (Foot Trafficability), TT (Tracked Trafficability), and WT (Wheeled Trafficability) may range in value from 0 - 5, where zero is worst and 5 is best. The cover indexes AC (Air Cover), and GC (Ground Cover) may range in value from 0 - 2, where zero is worst cover and 2 is best cover.

NOTE

The trafficability indexes represent best movement rates over even terrain. An adjustment in trafficability according to terrain conditions in the direction of movement is necessary.

The MTWS features to trafficability/coverage indexes translation table is specified by the TerrGen environmental variable TRANSLATEFILE. It may be modified using a text editor.

After modification it is recommended that the table be verified by clicking on the "Verify Xlate Table" item in the "Create Terrain File" menu before using to create a MTWS terrain data base.

FIC TABLE: MTWS as of January 4, 1994

Table 7: Translation (Continued)

100:	FT 2, TT 2, WT 2, AC 2, GC 2
900:	FT 3, TT 3, WT 3, AC 2, GC 2
901-902:	FT 5, TT 5, WT 5, AC 0, GC 0
906:	FT 4, TT 4, WT 4, AC 0, GC 0
907:	FT 3, TT 3, WT 2, AC 0, GC 0
908:	FT 1, TT 2, WT 2, AC 1, GC 0
909:	FT 1, TT 1, WT 1, AC 1, GC 0
910:	FT 3, TT 2, WT 2, AC 0, GC 0
911:	FT 3, TT 2, WT 2, AC 0, GC 0
912:	FT 3, TT 2, WT 2, AC 0, GC 1
913:	FT 4, TT 4, WT 4, AC 0, GC 0
914:	FT 2, TT 1, WT 1, AC 0, GC 0
915:	FT 5, TT 5, WT 5, AC 2, GC 2
916:	FT 5, TT 5, WT 5, AC 0, GC 0
920:	FT 4, TT 4, WT 4, AC 1, GC 1
921:	FT 3, TT 2, WT 2, AC 0, GC 0
922:	FT 2, TT 1, WT 1, AC 0, GC 0
923:	FT 2, TT 1, WT 1, AC 0, GC 1
924:	FT 1, TT 1, WT 1, AC 0, GC 1
925:	FT 4, TT 3, WT 3, AC 0, GC 0
926:	FT 4, TT 4, WT 4, AC 0, GC 0
927:	FT 4, TT 5, WT 4, AC 0, GC 0
928:	FT 5, TT 5, WT 5, AC 2, GC 2
929:	FT 5, TT 4, WT 4, AC 1, GC 1
930-933:	FT 0, TT 0, WT 0, AC 0, GC 0
934:	FT 1, TT 1, WT 1, AC 0, GC 0
940-943:	FT 0, TT 0, WT 0, AC 0, GC 0
944:	FT 0, TT 0, WT 0, AC 1, GC 1
945:	FT 4, TT 4, WT 4, AC 1, GC 1
946:	FT 2, TT 3, WT 3, AC 1, GC 1
947:	FT 3, TT 1, WT 1, AC 0, GC 0
948-949:	FT 0, TT 0, WT 0, AC 0, GC 0
950:	FT 3, TT 3, WT 3, AC 2, GC 2
951:	FT 3, TT 2, WT 2, AC 1, GC 2
952:	FT 3, TT 2, WT 2, AC 1, GC 1
953-954:	FT 3, TT 2, WT 2, AC 1, GC 1
955:	FT 3, TT 4, WT 4, AC 1, GC 1
956:	FT 3, TT 2, WT 2, AC 1, GC 2

960:	FT 3, TT 4, WT 4, AC 1, GC 1
961:	FT 2, TT 2, WT 2, AC 1, GC 1
962:	FT 2, TT 2, WT 2, AC 0, GC 0
963-967:	FT 1, TT 1, WT 1, AC 0, GC 0
980:	FT 5, TT 5, WT 5, AC 0, GC 0
999:	

FIC 100, the first entry, is the default entry. If the feature code being processed is not in this table then the FIC 100 entry will be used. "FIC TABLE:" is the table identifier and must be on the first line; the end table identifier is "999:". Anything following is ignored by table processing and may be comments.

Appendix B

C4I Interface Notes

Appendix B – C4I Interface Notes

Section 1 - Introduction

This Appendix describes aspects of the MTWS Command, Control, Communications, Computers, Intelligence (C4I) interface which are not directly addressed in Maui's C4I Help screens.

Section 2 - System Considerations

The MTWS/C4I interface is implemented through the Maui user station.

Multiple simultaneous MTWS/C4I connections can be supported. Each Maui host can output data to as many as six C4I hosts simultaneously. Each Maui host can receive data from one C4I host. The number of C4I connections has no impact upon the simulation (MAN or MSC) software. For example, there is no known negative impact upon the performance of the simulation.

All messages sent to and received from C4I systems are logged locally on the Maui host on which the message was sent/received. These logs are the \MauiData\C4I\logs directory on the disk on which the Maui software is installed. This directory should be inspected periodically. As explained in Maui's C4I Help, the user can modify the names of the files to which messages are logged. Therefore, multiple versions of these log files may accumulate over time.

Any C4I host should be configured to support inputs from a single Maui only. Each Maui generates message and object identifiers for the messages it outputs. From a C4I system perspective, these identifiers should be unique. Since all Maui's use the same algorithm for generating these identifiers, connecting multiple Maui's to a single C4I system will generate conflicting information in the C4I system – a given identifier may (and almost certainly will) refer to different objects, depending upon the Maui from which it is received.

MTWS passes JUNIT/JPOS, CTC, DEL (delete unit/contact), and OPNOTE Over-the-horizon Targeting GOLD (OTG) messages to C4I systems. All OTG messages from MTWS to C4I systems are generated by the Maui software. Maui generates OTG messages only when directed by the station operator, as described in Maui's C4I Help.

MTWS passes INTREP, TACREP, TACELINT, SENREP, RECCEXREP, and IIR U.S. Message Text Format (USMTF, or MTF) messages to C4I systems. All MTF messages from MTWS to C4I systems are generated by the simulation (i.e., the MAN) software, which passes them to Maui, which in turn passes them on to the C4I system. The MAN software always generates MTF messages, regardless of the presence or absence of an MTWS/C4I connection.

As with OTG messages, Maui passes MTF messages to C4I only when directed by the station operator.

MTWS receives and processes JUNIT/JPOS and DEL (unit) messages from C4I systems. No other OTG messages are processed by MTWS.

MTWS also receives and processes ATO (air tasking order) MTF messages from C4I systems. The receiving Maui host passes an ATO message to the simulation, which creates air missions as specified in the ATO. The ATO software was written as a prototype to test the concept of automatic generation of air missions in MTWS. This software has significant restrictions; for example, a limited set of aircraft types is supported. This software has not been maintained. For further information on MTWS ATO processing, please contact the MTWS Help line at Titan Corporation, Tactical Systems Division (619) 278-2030 or mailto:MTWSHelp@titan.com.

NOTE: the C4I-IN tab in Maui's main C4I window has a Message Types button. This button brings up the Enable C4I Messages by Type pane, which includes an ATO button. This button should be dithered (non-functional) but is not. C4I operators should be advised that the ATO capability is not be used.

To the extent specified above, MTWS conforms to the Operational Specification for Over-the-horizon Targeting GOLD, Revision C, Change 2, September 1999; and to USMTF User Formats, March 2000.

Appendix C

MAUI SECURITY PROCEDURES

APPENDIX C – MAUI SECURITY PROCEDURES

Section 1 - Overview

The Maui workstation is used to support exercise scenarios from the UNCLASSIFIED to the SECRET level of classification. Security procedures and requirements for operating Maui workstations in a classified environment are described in this Appendix. All Maui workstations should be configured to comply with these requirements for both unclassified and classified exercises.

General Notes

1) These instructions only apply to Windows NT. Windows 2000 instructions are similar but not the same.

2) In order for the registry instructions to work properly for administrators, administrator account(s) must be configured to be in a different group or set of groups than user accounts.

For example, an administrator's account should only be part of the /MDSXXX\Adminstrators group in the following list:

BUILT IN\Account Unknown	Special Access
CREATOR OWNER	Full Control
Everyone	Special Access
MDSXXX\Administrators	Full Control
MDSXXX\Power Users	Special Access
SYSTEM	Full Control

Likewise, a user should not be part of the administrators group, but either the group Everyone, or a separate group such as USER. If an administrator is in the same group as a user, installing Maui will not work properly.

Section 2 - Security Procedures and Requirements

Passwords

Passwords should be a minimum of six characters, contain one or more numeric and one or more special characters, one upper case letter, and should not be based on words or names with these features (such as Johnny-1).

Ensure that accounts do not continue to have passwords that are easy to identify.

Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Account from the menu
4) Select "At Least..Characters" in Minimum Password Length section.
5) Select "6" in character box.
6) Click "OK" button after you are done.

There is no GUI or logic in the system that helps to enforce part of this requirement. It is the responsibility of the Administrator who is setting the password to follow these rules.

Password Aging

Ensure that no user account is exempt from password aging policies.

Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Account from the menu
4) Select "Expires in .. Days" in Maximum Password Age section.
5) Select "180" (suggested value is 6 months or 180 days
6) Click "OK" button when done.

Account Lockout

Set the account lockout to a value that allows repeated attempts in cases of typographical errors, and yet prevents brute-force attacks. Set the lockout duration to a moderate value, such as 30 minutes.

Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Account from the menu
4) Select "Account lockout"
5) Select "4" in "Lockout after..bad logon attempts" section
   (Suggested value is 4 or less).
6) Select "30" in "Reset count after..minutes" section as
   (Suggested value is 30 minutes or more)
7) Click "OK" button after you are done.

Unique Password Count

Use the system manager to set the unique-password count to a value equal to or greater than the system policy requires to disallow reuse of passwords.

Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Account from the menu
4) Select "Remember..Passwords" in Password Uniqueness section.
5) Select "24" (suggested value)
6) Click "OK".

Notes:
For this to be effective, an age value should be specified for Minimum Password Age (Allow Immediate change should not be selected). In other words,
do security procedure 2.2 first before this procedure.

Active Administrator Account

Disallow 'administrator' account name by renaming the administrator account.

Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select "rename" on the User menu
4) Type a new administrator name in "Change To:" text field.
5) Click "OK".

Note:
A user name cannot be identical to any other user or group name of the computer being administered. It can contain up to 20 uppercase or lowercase characters except for the following: " / \ [ ] : ; | = , + * ? < > ". A user name cannot consist solely of periods (.) and spaces.

Adding Or Modifying Programs

Prevent users from adding or modifying programs executed on abnormal program termination.
Prevent users from adding or modifying programs executed on startup.
Prevent users from adding or modifying programs executed during installation or removal.

Steps:
1) Select Start -> Run.
2) Type in regedt32 and click the OK button.
3) In the Registry Editor window, select the HKEY_LOCAL_MACHINE tree if not already selected.
4) Select the Software\Microsoft\Windows NT\CurrentVersion\AeDebug folder from the tree HKEY_LOCAL_MACHINE.
5) Select Security -> Permissions... from the Registry Editor main menu.
6) Notice the list of users and groups in the Registry Permissions window:

BUILT IN\Account Unknown	Special Access
CREATOR OWNER	Full Control
Everyone	Special Access
MDSXXX\Administrators	Full Control
MDSXXX\Power Users	Special Access
SYSTEM	Full Control

7) Leave the Administrators, System, and Power Users alone. For all the other groups and users that have a type of access equal to "Full Control", select the item and select "Read" in the Type of Access combobox.
8) Leave the Administrators, System and Power Users alone. For all the other groups and users that have a type of access equal to "Special Access", double click on the item. In the Special Access window, unselect the following if they are selected:
   Set Value
   Create Subkey
   Create Link
   Delete
   Write DAC
   Write Owner
   Click the OK button when done in the Special Access window.
9) Click the OK button when done in the Registry Permissions window.

Cached Data Objects

Prevent cached data object hacking.
Steps:
1) Select Start -> Run.
2) Type in regedt32 and click the OK button.
3) In the Registry Editor window, select the HKEY_LOCAL_MACHINE tree if not already selected.
4) Select SYSTEM\CurrentControlSet\Control\SessionManager from the tree HKEY_LOCAL_MACHINE.
   Note: Some workstations have two folders named Session Manager. You should

change both to ensure optimum performance.

5) Look for the following in the list of values:
"Protection Mode: REG_DWORD: 0x1". If this value already exists, then this is already implemented. If this value already exists but is not 0x1, double click on the item and go to step 9.
6) Select Edit -> Add Value... from the Registry Editor main menu.
7) In the Add Value window, type in "Protection Mode" for the Value Name, and select "REG_DWORD" as the Data Type.
8) Click the OK button when done in the Add Value window.
9) Type in "1" and then click the OK button when done in the DWORD Editor window.

Notes:
The machine must be restarted for this change to take effect.

Preventing Malicious Commands

Prevent users from adding or modifying programs executed by the system.

Steps:
1) Select Start -> Run.
2) Type in "regedt32" and click the OK button.
3) In the Registry Editor window, select the HKEY_LOCAL_MACHINE tree if not already selected.
4) Select the Software\Classes\CLSID\{000C103E-0000-0000-C000-000000000046}\InProcServer32 folder from the tree HKEY_LOCAL_MACHINE.
5) Select Security -> Permissions... from the Registry Editor main menu.
6) Highlight the "INTERACTIVE" group.
7) Select "Read" in the Type of Access combobox.
8) Click the OK button when done in the Registry Permissions window.

Adding Print Drivers

Prevent malicious users from adding Trojaned drivers that can divert data or possibly execute malicious commands.

Steps:
1) Select Start -> Run.
2) Type in regedt32 and click the OK button.

3) In the Registry Editor window, select the HKEY_LOCAL_MACHINE tree if not already selected.
4) Select SYSTEM\CurrentControlSet\Control\Print\Providers\LanMan Print Services from the tree HKEY_LOCAL_MACHINE.

5) Look for the following in the list of values:
"AddPrinterDrivers: REG_DWORD: 0x1". If this value already exists, then this is already implemented. If this value already exists but is not 0x1, double click on the item and go to step 9.
6) Select Edit -> Add Value... from the Registry Editor main menu.
7) In the Add Value window, type in "AddPrinterDrivers" for the Value Name, and select "REG_DWORD" as the Data Type.
8) Click the OK button when done in the Add Value window.
9) Type in "1" and then click the OK button when done in the DWORD Editor window.

Notes:
The machine must be restarted for this change to take effect.

Anonymous FTP

Prevent users from using anonymous FTP to access a machine.

Steps to determine if an FTP server is currently running on a machine:
1) Select Start -> Run.
2) Type in "cmd" and click the OK button.
3) Type in "ftp <IP address of this machine>" For example, "ftp 200.200.200.200"
4) If the response is like the following then an FTP server is not running:
> ftp: connect: Connection refused
5) If the response is asking for a password, type in "anonymous" and then press Enter. If this is allowed, anonymous FTP is being allowed and must be disabled.

Steps to prevent anonymous FTP:
1) Remove or uninstall the FTP server.

Notes:
1) Even though an FTP server may not currently be running, it may still be installed.
2) Because there are numerous FTP servers that can be installed on a machine, removing or uninstalling an FTP server is application specific.

Prevent Hacking Through FTP

Prevent users from hacking using FTP by preventing users from reading FTP versions.

Steps to determine if an FTP server is currently running on a machine:
1) Select Start -> Run.
2) Type in "cmd" and click the OK button.
3) Type in "ftp <IP address of this machine>" For example, "ftp 200.200.200.200"
4) If the response is like the following then an FTP server is not running:
> ftp: connect: Connection refused
5) If the response is asking for a password, type in "anonymous" and then press Enter. If this is allowed, anonymous FTP is being allowed and must be disabled.

Steps to prevent FTP hacking:
1) Remove or uninstall the FTP server.

Notes:
1) Even though an FTP server may not currently be running, it may still be installed.
2) Because there are numerous FTP servers that can be installed on a machine, removing or uninstalling an FTP server is application specific.

Displayed SMTP Version

Prevent users from hacking using a mail server by removing the version from the SMTP banner.
Steps
1) Remove or uninstall the mail server.

Notes:
Because there are numerous mail servers that can be installed on a machine, removing or uninstalling an mail server is application specific.

Preventing NULL or Anonymous Login

Prevent hackers from using a NULL or anonymous login to obtain useful information on account policy.

Ensure that the account policy is set to good security values, such as limiting the number of unsuccessful logins and setting minimum password lengths. This may discourage hackers that retrieve this information from the system. Note security procedures 2.1 through 2.4.

Restricting Access To Event Logs

Prevent guests and unauthorized users from reading the System and Application

event logs.

Steps to prevent unauthorized access to System event log:
1) Select Start -> Run.
2) Type in regedt32 and click the OK button.
3) In the Registry Editor window, select the HKEY_LOCAL_MACHINE tree if not already selected.
4) Select SYSTEM\CurrentControlSet\Services\EventLog\System from the tree HKEY_LOCAL_MACHINE.
5) Look for the following in the list of values:
"RestrictGuestAccess: REG_DWORD: 0x1". If this value already exists, then this is already implemented. If this value already exists but is not 0x1, double click on the item and go to step 9.
6) Select Edit -> Add Value... from the Registry Editor main menu.
7) In the Add Value window, type in "RestrictGuestAccess" for the Value Name, and select "REG_DWORD" as the Data Type.
8) Click the OK button when done in the Add Value window.
9) Type in "1" and then click the OK button when done in the DWORD Editor window.
Notes: The machine must be restarted for this change to take effect.
Steps to prevent unauthorized access to Application event log:
1) Select Start -> Run.
2) Type in regedt32 and click the OK button.
3) In the Registry Editor window, select the HKEY_LOCAL_MACHINE tree if not already selected.
4) Select SYSTEM\CurrentControlSet\Services\EventLog\Application from the tree HKEY_LOCAL_MACHINE.
5) Look for the following in the list of values:
"RestrictGuestAccess: REG_DWORD: 0x1". If this value already exists, then this is already implemented. If this value already exists but is not 0x1, double click on the item and go to step 9.
6) Select Edit -> Add Value... from the Registry Editor main menu.
7) In the Add Value window, type in "RestrictGuestAccess" for the Value Name, and select "REG_DWORD" as the Data Type.
8) Click the OK button when done in the Add Value window.
9) Type in "1" and then click the OK button when done in the DWORD Editor window.

Notes: The machine must be restarted for this change to take effect.

Scheduling Priority Privilege

Remove rights to this privilege from all users and groups except administrators to prevent users from altering the normal scheduling of tasks.

Steps:

1) Select Start -> Programs -> Administrator Tools(Common) -> User Manager.

2) From the User Manager window, under Policies, select User Rights.

3) At the bottom of the User Rights Policy window, check the checkbox for Show Advanced User Rights.

4) From the pull down menu located next to "Right:", select "Increase Scheduling Priority".

5) For all users EXCEPT the administrators, select the user to highlight them and then click the Remove button.

6) Click the OK button and exit the User Manager.

Closing Open Echo Port

Prevent malicious users from utilizing an open echo port in a DoS attack.
Steps:
1) From Windows explorer, open the following file:
C:\WINNT\system32\drivers\etc\Services using any editor such as Notepad.

2) Place a '#' character in front of the 2 lines that have echo as their service name.

Closing Open Chargen Port

Prevent malicious users from utilizing a chargen port in a DoS attack.
Steps:
1) From Windows explorer, open the following file: C:\WINNT\system32\drivers\etc\Services using any editor such as Notepad.
2) Place a '#' character in front of the 2 lines that have chargen as their service name.

Auditing Successful Logons

Enable the auditing of successful logons using the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools -> User Manager.
3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Success" check box for "Logon and Logoff".

Auditing Successful Shutdowns

Enable the auditing of successful shutdowns using the NT system manager.

Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Success" check box for "Restart, Shutdown, and System" .

Auditing Successful Security Policy Changes

Enable the auditing of successful security policy changes using the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Success" check box for "Security Policy Changes".

Auditing Successful User/Group Changes

Enable the auditing of successful user and group management changes using the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Success" check box for "User and Group Management".

Auditing Unsuccessful User/Group Changes

Enable the auditing of unsuccessful user and group management using the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.

3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Failure" check box for "User and Group Management".

Auditing Unsuccessful File/Object Accesses

Enable the auditing of unsuccessful file/object accesses using the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Failure" check box for "File and Object Access".

Auditing Unsuccessful Logons

Enable the auditing of unsuccessful logons using the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Failure" check box for "Logon and Logoff".

Auditing Unsuccessful Process Tracking

Enable the auditing of unsuccessful process tracking using the NT system manager.

Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Failure" check box for "Process Tracking".

Auditing Unsuccessful Restarts

Enable the auditing of unsuccessful shutdowns using the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.

3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Failure" check box for "Restart, Shutdown, and System".

Auditing Unsuccessful Security Changes

Enable the auditing of unsuccessful security policy using the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.

3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Failure" check box for "Security Policy Changes".

Auditing Unsuccessful Users Rights Usage

Enable the auditing of unsuccessful user rights use through the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Failure" check box for "Use of User Rights".

Auditing Unsuccessful User and Group Management

Enable the auditing of unsuccessful user and group management, using the NT system manager.
Steps:
1) Login as an administrator.
2) Select Start -> Programs -> Administrator Tools (Common) -> User Manager.
3) Select Policies -> Audit from the menu bar in the User Manager window.
4) Select "Audit These Events" radio button.
5) Select the "Success" check box for "User and Group Management".