MTS
Movement Tracking System

User Manual

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Throughout this manual there are: **WARNINGS**, **CAUTIONS** and **NOTES**.

A WARNING
is a procedure which, if not followed,
may result in personal injury or death.

A CAUTION
is a procedure which, if not followed,
may result in hardware or software damage or failure.

A NOTE
provides the operator with additional information which
provides simplification to a step or an entire procedure.

WARNING

ELECTRICAL SHOCK CAN RESULT IF EQUIPMENT IS OPERATED WITHOUT PROPER GROUND.

DO NOT PLACE EQUIPMENT DIRECTLY ON WET GROUND, SNOW, OR ICE FOR OPERATIONS.

EQUIPMENT USES POWER LINE VOLTAGE. SERIOUS INJURY OR DEATH MAY OCCUR ON CONTACT. OBSERVE SAFETY PRECAUTIONS WHEN CONTACTING POWER CABLES OR PERFORMING MAINTENANCE.

BEFORE CONNECTING THE EQUIPMENT TO A POWER SOURCE, ENSURE ALL POWER SWITCHES ARE IN THE OFF POSITION.

IF USING EXTENSION CORDS, ONLY USE APPROVED, HEAVY DUTY CORDS.

THE PLGR WILL USE AN EXTERNAL POWER SOURCE. THE BA-5800 BATTERY WILL NOT BE USED. IMPROPER USE OF THE INTERNAL BATTERY IN CONJUNCTION WITH EXTERNAL POWER CAN RESULT IN AN EXPLOSION OF THE PLGR.

IMPORTANT All safety precautions should be read and understood prior to deploying the MOVEMENT TRACKING SYSTEM with MT2011 or MT2010.

WARNING **FCC Information for Unintentional Radiator Portions as per FCC 15.19, 15.21, and 15.105.**
"This equipment has been tested and found to comply with the limits for Class A digital devices, pursuant to Part 15 of the FCC Rules. Those limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense."

WARNING Changes or modifications not expressly approved by **Comtech Mobile Datacom (CMDC)** could void the user's authority to operate the equipment.

WARNING **FCC RF EXPOSURE INFORMATION**
To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 40 centimeters (16 inches) or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operation at closer than this distance is not recommended.

WARNING **FCC FREQUENCY COORDINATION AS PER FCC 25.203©, 25.251 and 101.103**
To satisfy FCC frequency coordination requirements, the user must ensure that they co-ordinate proposed frequency and power usage with other terrestrial and satellite users prior to transmission.

WARNING **MICROWAVE RADIATION: HAZARDS CAUSED BY ELECTROMAGNETIC FIELDS**
When in operation, i.e. "power on", the area immediately around the MT2011 or MT2010 antenna must be considered an Area of Restricted Occupancy.

Limit human exposure time to the area when the Movement Tracking System with MT2011 or MT2010 is in operation.

SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL.
2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER.
3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE, OR DRY ROPE OR SOME OTHER INSULATED MATERIAL.
4. SEND FOR HELP AS SOON AS POSSIBLE.
5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY RENDER FIRST AID, AS APPLICABLE.

WARNING

IF NBC EXPOSURE IS SUSPECTED,
ALL AIR FILTER MEDIA WILL BE
HANDLED BY PERSONNEL WEARING
FULL NBC PROTECTIVE EQUIPMENT.

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1. Safety

1.1 General Installation Information

The Movement Tracking System (MTS) described in this document will be installed in many standard Army vehicles including:

- FMTV (Appendix 14.1)
- HEMTT (Appendix 14-2)
- HET (Appendix 14-3)
- HMMWV (Appendix 14-4)
- PLS (Appendix 14-5)
- 900 series 5-ton trucks

There are two parts to the MTS installation:

(1) The A-Kit, which is permanently installed in the vehicle. The A-Kit has three primary parts:

(a) The control box and ruggedized computer mount inside the vehicle, (see Appendix 15.1.1 – 15.1.7);
(b) The transceiver mount which sits outside the vehicle (see Appendix 15.2.1 – 15.2.5);
(c) The cabling that connects 1.a and 1.b.

(2) The B-Kit is the equipment the user (operator) installs into the A-Kit.

Both kits can pose safety issues if they are not handled properly.

NOTE: In this section of the manual a "△" signifies a warning.

1.2 Health Hazards

MTS is designed to function without injuring the soldier. However proper installation and operation are necessary to prevent soldier injuries.

1.2.1 Driving Operation

MTS will be operated in a vehicle. MTS provides improved visibility and communications for transporters.

⚠ **WARNING:** The driver should never operate the MTS computer while the vehicle is moving. Only a passenger should operate the MTS computer in a moving vehicle. Driver operation of the MTS computer in a moving vehicle could cause an accident injuring the driver and passenger(s) as well as damaging the vehicle.

1.2.2 Bumping Injuries

The MTS A-Kits are installed so that they do not interface with normal vehicle operation. Where possible, MTS hardware has been placed where soldiers will not bang, bump, or otherwise run into the equipment. However soldiers should heed the following warnings:

⚠ **WARNING:** Use of engineer tape (or some other medium) to mark the equipment's location is advised if the equipment appears to affect a soldier's normal interaction with the vehicle.

⚠ **WARNING:** Soldiers should look and proceed with caution when entering all tactical vehicles.

1.2.3 Repetitive Stress Injuries

Repetitive stress injuries are caused by frequent and near constant use of a piece of equipment. Repetitive stress injuries are possible when working with computer equipment.

⚠ **WARNING:** The ruggedized computer (V2) has a small 6.5" screen and a small keyboard. The screen can cause eyestrain if used for extended periods without breaks. It is recommended that soldiers only use the computer when necessary to prevent repetitive stress injuries. Soldiers should use the computer when sending operational messages and to view the map and not for playing games or sending personal messages.

1.2.4 Electric Shock Injuries

MTS is a low voltage, low amperage system which under normal conditions should pose very little threat of electric shock. However, soldiers should take necessary precautions when working with electrical equipment:

⚠ **WARNING:** Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under certain conditions.

⚠ **WARNING:** Failure to power the Control Station from a grounded 110/220 AC outlet may result in serious injury (see section on Control Station Installation).

⚠ **WARNING: Never touch an exposed wire. If a piece of equipment appears damaged do not touch it.**

1.2.5 Procedures for Treating Victims of Electrical Shock:

(1) Do not try to pull or grab the individual.

(2) If possible, turn off the electrical power.

(3) If you cannot turn off the electrical power, pull, push or lift the person to safety using a dry wooden pole, or dry rope or some other insulated material.

(4) Notify your COC or send request for assistance ASAP.

(5) After the injured person is free of contact with the source of electrical shock, move the person a short distance away and immediately begin appropriate buddy aid (as required).

(6) Monitor and comfort casualty until help arrives or evacuate to nearest aid station as needed.

1.2.6 Radio Frequency Energy

The Movement Tracking System incorporates a radio transmitter, receiver, and antenna (the MT2011 or MT2010) that receive and send radio frequency (RF) energy. This energy is transmitted and received using satellites orbiting the earth.

The design of the MT2011 and MT2010 units complies with the updated (1992) ANSI standard for safe levels of human exposure to RF energy. This is published under the auspices of the American National Standards Institute and the Institute of Electrical and Electronics Engineers, and is called "ANSI/IEEE C95.1-1992, Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz.

The minimum separation distance between the MT2011 or MT2010 antenna and the user or bystander is 40cm (16 inches). The antenna is designed to mount on the top surface of a land vehicle, ship, or aircraft. It is inherent in the mounting configuration and use of the MT2011 or MT2010 antenna that the minimum separation distance be maintained or exceeded under all operational conditions.

⚠ WARNING: Soldiers must maintain the minimum safe distance from Functioning Antenna at all times!

2. Concept of Operations

2.1 Introduction

2.1.1 Overview

Movement Tracking System (MTS) is a global satellite communications system that provides text messaging and vehicle tracking capabilities for the U.S. Army. It allows a commander to determine where his vehicles are, what their status is, and to communicate with them in near real-time.

Because the system is satellite-based, telephone lines are not required for in-theater operations, and unlike line-of-sight radios, repeater stations are never necessary. As long as the MTS satellite transceiver has an unhindered view of the satellite, it will be able to communicate with other on-line MTS systems.

The three key features of the Movement Tracking System developed by Comtech Mobile Datacom (CMDC) are its ability to use a variety of in-orbit commercial satellites, it's near real-time communications speed, and its security features.

(1) Compatibility with Multiple Commercial Satellites
The MTS system can use many different types of commercial satellites. As a result it can interact with a satellite and operate in any region of the world.

(2) Real-time Messaging Speeds
A message is typically transmitted from one MTS-equipped vehicle to another in under 10 seconds.

(3) Information Security
The waveform used by Comtech Mobile Datacom's MTS is spread spectrum and exhibits a low probability of detection by unauthorized listening devices. In addition, the data is triple encrypted end-to-end to further prevent eavesdropping.

2.1.2 Message Routing Architecture

In normal operations, when an MTS user sends a message, the data packet is transmitted to the satellite, which relays it back down to the Comtech Mobile Datacom ground station switch. The switch sends the data packet back over the satellite to its intended destination. When the message is received, the destination returns an acknowledgement over the satellite to the switch, which forwards it to the message sender, verifying message delivery.

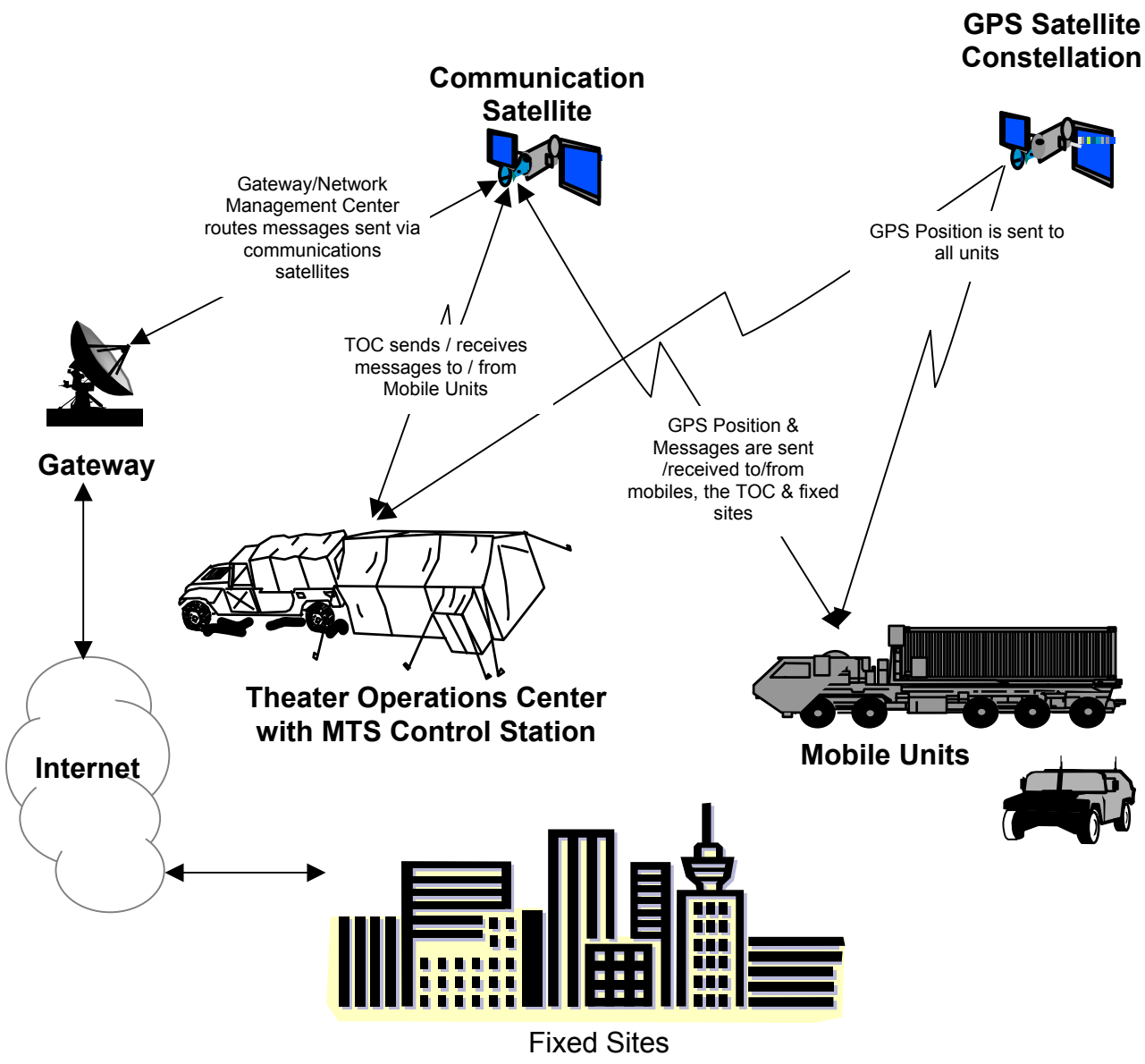


Figure 2-1 Concept of Operations

2.1.3 User Systems

The Movement Tracking System is made up of two configurations – the Control Station, and the V2 Mobile Unit.

(1) The **Control Station** provides command functionality for the MTS, and is typically operated from a mobile headquarters, such as a TOC. The Control Station operates independent of phone lines or Internet connections. A Control Station operator is responsible for coordinating vehicle movements using text messaging and theater map displays of MTS-equipped vehicles. The Control Station configuration consists of a laptop computer with CD-ROM drive for loading maps, a satellite transceiver with 100-foot cable, a Precision Lightweight GPS Receiver (PLGR) and a portable printer.

(2) The **V2** Mobile Unit is designated for permanent installation in a vehicle and consists of a satellite transceiver and ruggedized computer with appropriate cabling and a Precision Lightweight GPS Receiver (PLGR). It provides text messaging and maps of MTS-equipped vehicles including itself.

Each configuration comes pre-loaded with MTS Software to include the MTS Messager and TracerLink Mapping application.

2.2 About This Manual

This manual describes the installation and operation of the two MTS configurations. It also provides training information for MTS operators. The MTS configurations described in this manual are called B-Kits. The mounting hardware and wiring needed to install the B-Kits in each type of vehicle is called an A-Kit. A-Kits are unique to each type of vehicle. This manual does not cover the A-Kit installation. A diagram of the A-Kits is available in the Appendix of this document. This manual describes how to connect the B-Kit to the A-Kit and provides rough sketches of portions of the A-Kit to assist in basic hookup.

3. Installation and Setup

3.1 Opening a Transit Case

All MTS components when not in use should be stored within the system transit case. The transit case protects MTS components during shipment and storage. To open the transit case:

(1) Place the case with the handles down.

(2) Unfasten the butterfly clips on the outside of the case.

(3) Open the case.

NOTE: If the case does not open easily, verify that the four butterfly clips are unfastened. If the butterfly clips are all unfastened and the case still does not open, depress the pressure release valve on the side of the transit case.

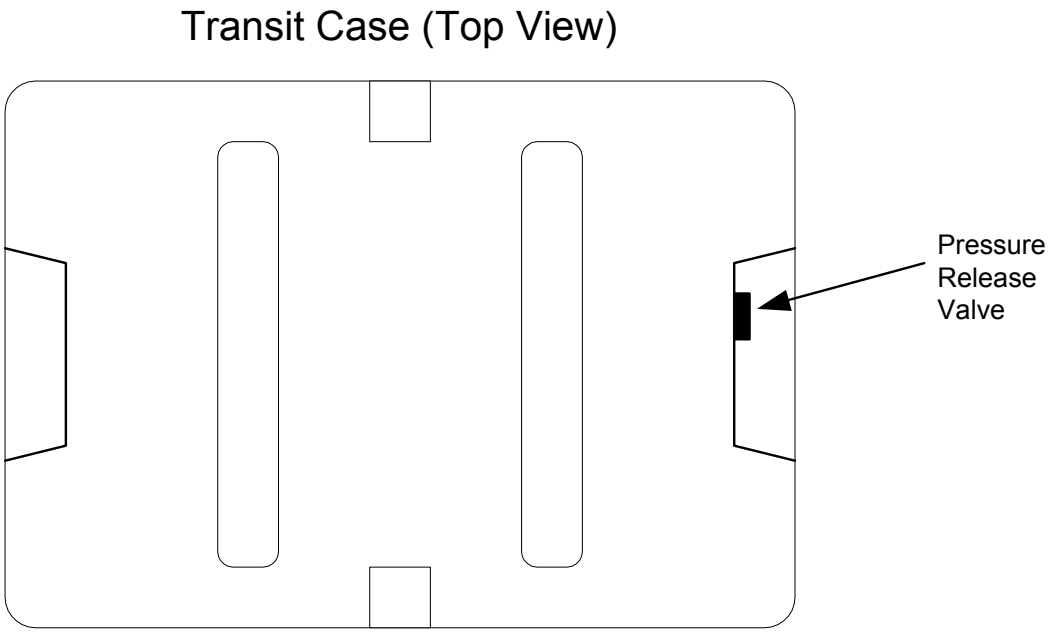


Figure 3-1 Transit Case (Top View)

3.2 Installing the Control Station Configuration

3.2.1 Equipment list

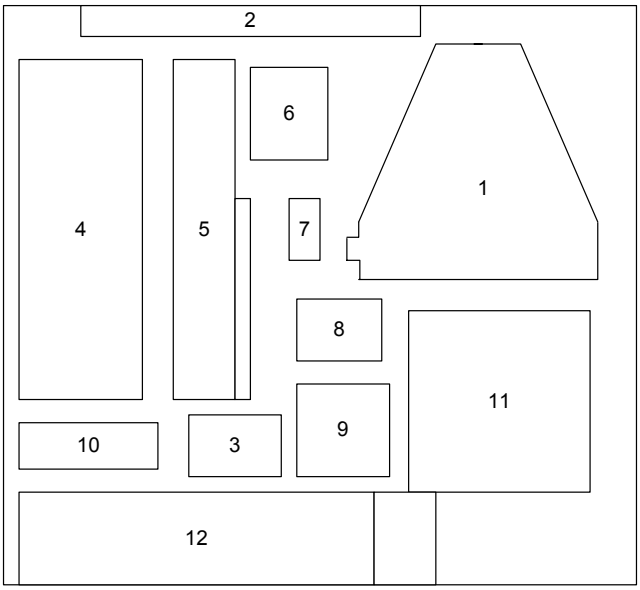
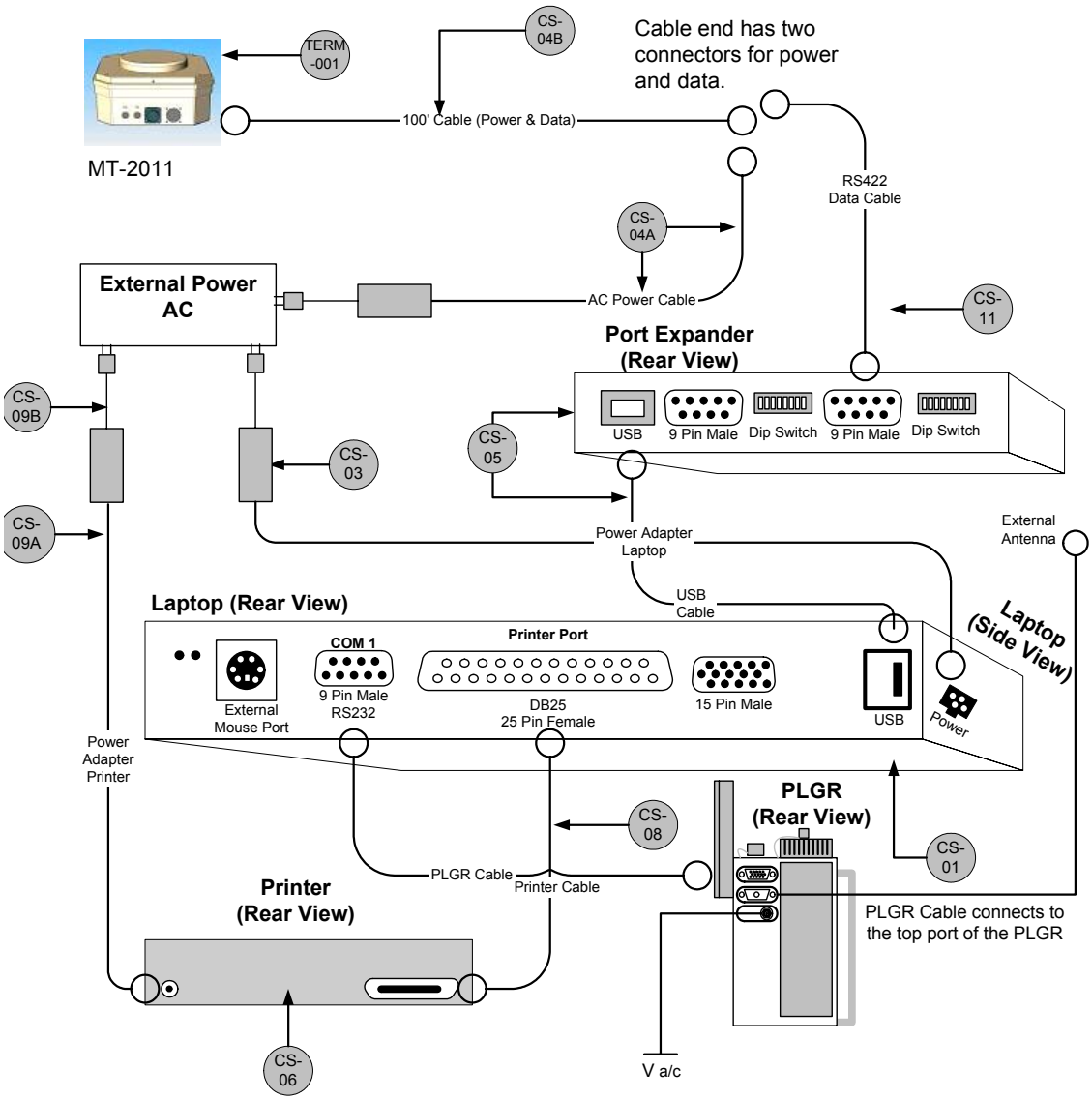


Figure 3-2 Control Station Transit Case Contents

MTS Part No	Item Description	Transit Case Location
MTS-TERM-002	Transceiver (Satellite Modem)	1
MTS-COV-01	Camouflage Cover	1
MTS-MAN-01	MTS Manual	2
	PLGR	3
MTS-CS-06	Printer	4
MTS-CS-01	Laptop Computer	5
MTS-CS-05A	Port Expander	5
MTS-CS-09A	Power Adapter, Printer	6
MTS-CS-10	Color Cartridge, Printer	8
MTS-CS-03	Power Adapter, Laptop	9
MTS-CS-02	Battery, Spare, Laptop	10
MTS-CS-04A	100’ Cable, Data, Power	11
MTS-CS-05B	Port Expander Cable	12
MTS-CS-11	Cable, Data, (Control Box to Computer)	12
MTS-CS-08	10’ Cable, Data, Printer	12
MTS-CS-09B	Power Cable, Printer	12
	PLGR External Antenna	12



Key to Understanding Connections

Cable with circle end represents operator made connections

Cable with a standard U.S. wall plug

NOTE: This diagram is not to scale.

Figure 3-3 Installation of Control Station Hardware

3.2.2 Control Station (CS) Component Installation (See Figure 3-3)

NOTE: Numbers in square brackets [#] denote part numbers in Figure 3-3.

CAUTION: Do not force any connectors. Doing so may damage pins.

3.2.2.1 CS Transceiver (MT 2011) installation

(1) Place the MT 2011 [TERM-001] in a location with a clear view of the sky, avoiding blockage or shadowing from trees and buildings.

(2) Connect the 100-foot power/data cable [CS-04B] from the side of the transceiver to the RS-422 cable [CS-11] and the power cable [CS-4A].

3.2.2.2 CS Laptop installation

(1) Using the USB Cable [CS-05B] connect the USB port on the laptop [CS-01] to the USB port on the port expander [CS-05A]. The Port Expander should already be fastened to the laptop with Velcro. If it has become detached, refasten the port expander to the laptop.

(2) Using the RS422 data cable [CS-11], connect the port expander [CS-05A] to the 100' cable [CS-04B]. Connect one end of the cable to the 9 Pin Male port labeled COM3 on the port expander device [CS-05A] and connect the other end to the RS422 port on the 100' cable [CS-04B].

(3) Connect the laptop power adapter [CS-03] to an AC power source. The power port on the laptop can be found on left side rear of the laptop. It does not need to be connected to the same AC power source as the Transceiver.

NOTE: The laptop can work on internal batteries for up to four hours per battery.

3.2.2.3 CS Printer installation

(1) Using the printer cable [CS-08] connect the printer to the laptop. One end of the cable will have a connector with a set of 25 pins; connect this end to the DB25 port (the large 25 pin port) on the rear of the laptop. Connect the other end of the cable to the printer.

(2) Using the printer power adapter [CS-09A & CS-09B] and printer cable connect the printer to an AC power supply.

3.2.2.4 CS PLGR installation

(1) Connect the 9 pin female RS232 port connector of the PLGR cable to COM1 port on the laptop computer. COM1 is the only RS232 on the laptop. Figure 3-4 shows the two connectors on a standard PLGR cable.

(2) Connect the 15 pin female connector of the PLGR cable to the top port of the PLGR. All ports on the PLGR can be found on the back of the device.

(3) Connect the remote PLGR antenna cable to the second port of the PLGR. Connect the remote PLGR "hockey puck" antenna to the antenna cable.

(4) Connect PLGR AC power adapter cable to the third PLGR port. Plug the PLGR power supply into the wall outlet making sure the voltage selector is in the proper position (110/220).

NOTE: The PLGR cable and PLGR are not included in the standard Control Station package.

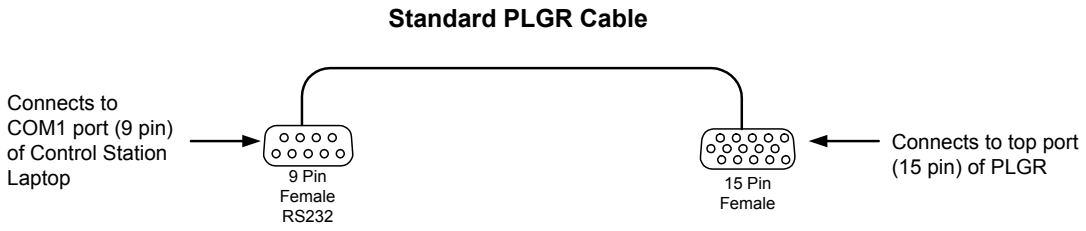


Figure 3-4 Control Station PLGR Cable Setup

3.3 Installing the V2 Configuration

3.3.1 Equipment list

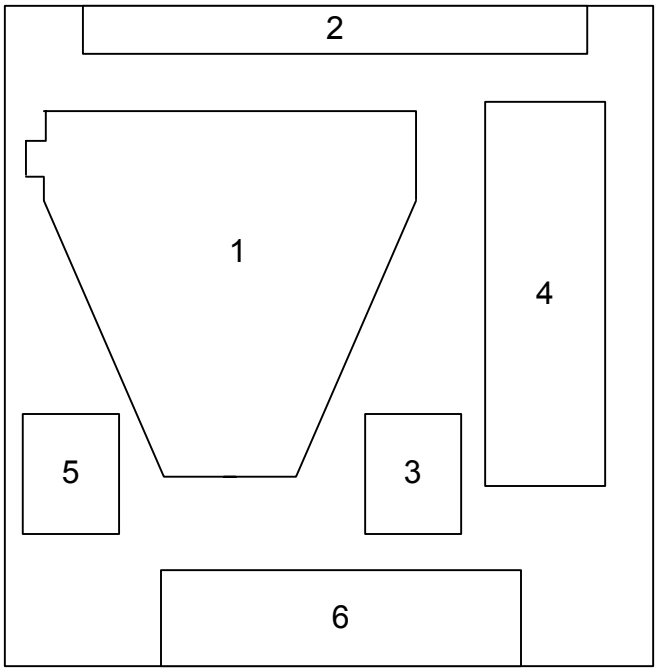
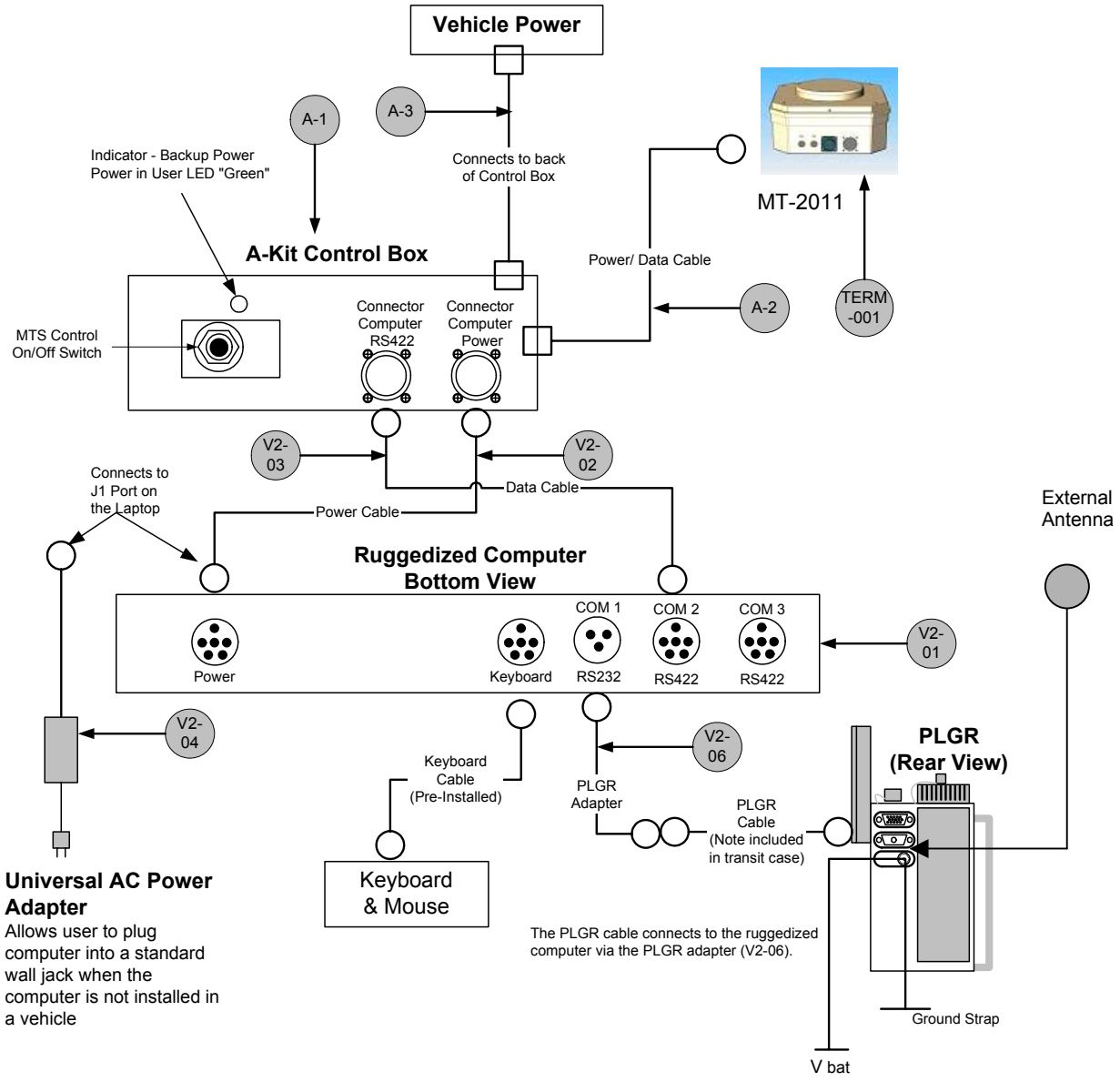


Figure 3-5 V2 Transit Case Contents

MTS Part No	Item Description	Transit Case Location
MTS-TERM-002	Transceiver (Satellite Modem)	1
MTS-COV-01	Camouflage Cover	1
MTS-MAN-01	MTS Manual	2
	PLGR	3
MTS-V2-01	Ruggedized Computer	4
MTS-V2-06	Cable, Data, PLGR	5
	PLGR External Antenna	5
MTS-V2-02	Cable, Data	6
MTS-V2-03	Cable, Power	6



Key to Understanding Connections

- Cable with square end represents fixed connections
- Cable with circle end represents operator made connections
- Cable with a standard U.S. wall plug

NOTE: This diagram is not to scale.

A-Kit Items

A-Kit items correspond to circled numbers in diagram, and are pre-installed in the vehicle. They do not reflect actual part numbers.

A-1. Control Box
A-2. MT-2011 Power and Data Cable
A-3. Vehicle Power Cable (Operators should not touch this cable).

Figure 3-6 Installation of V2 Hardware

3.3.2 V2 Component Installation

NOTE: These installation instructions assume that the vehicle has already been configured with an A-Kit. Numbers in square brackets [#] denote part numbers in Figure 3-6.

CAUTION: Do not force connections. Doing so may damage pins.

3.3.2.1 V2 Transceiver (MT 2010/MT 2011) installation

(1) Attach the transceiver [TERM-001] to the A-Kit mounting bracket on the roof of the vehicle.

(2) Attach the security lanyard found on the mounting bracket to the transceiver [TERM-001].

(3) Connect the A-Kit power/data cable [A-2] to the transceiver. The power/data cable is part of the A-Kit. It starts at the Control Box [A-1] and ends with a connector that attaches to the transceiver. When the transceiver is not mounted on the vehicle, the power/data cable connector should be securely stowed on the A-Kit mounting bracket to protect the cable connector.

3.3.2.2 V2 Ruggedized computer installation to the A-Kit

(1) Attach the ruggedized computer [V2-01] to the A-Kit mounting bracket located inside vehicle.

(2) Connect the data cable [V2-03] to COM 2 that is on the bottom side of the computer to the RS422 port on the A-Kit's Control Box [A-1].

(3) Using the computer power cable [V2-02] connect the power port on the computer to the power port on the A-Kit's Control Box [A-1].

3.3.2.3 V2 PLGR installation

(1) Connect the military connector on the PLGR adapter cable [V2-06] to the ruggedized computer's [V2-01] serial port COM 1. Figure 3-7 shows the connectors on the PLGR adapter cable [V2-06].

(2) Connect the 9 pin male connector on the PLGR adapter cable [V2-06] to the 9 pin female connector on the PLGR cable.

(3) Connect the 15 pin female connector of the PLGR cable to the top port of the PLGR. All ports on the PLGR can be found on the back of the device.

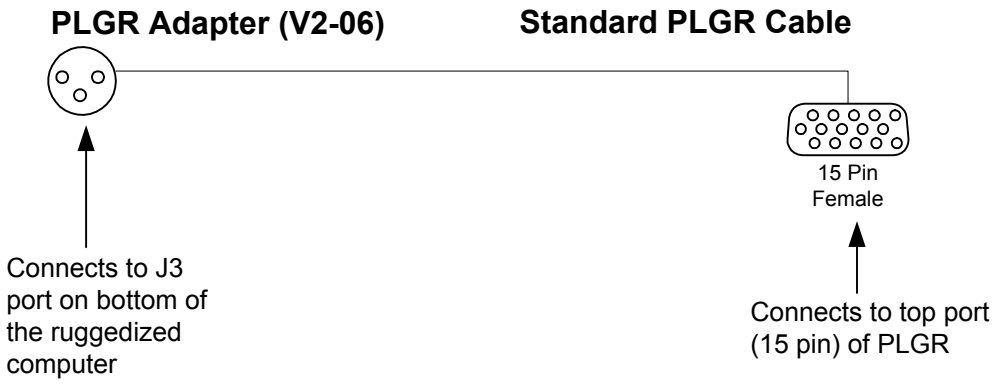


Figure 3-7 V2 PLGR Adapter connection to Standard PLGR Cable

4. Power On/Power Off Procedures

4.1 Control Station Power On/Power Off Procedures

4.1.1 Understanding the Control Station Configuration's Power Source

(1) The Control Station is designed to operate in a fixed location or in a contingency location such as a Tactical Operations Center (TOC). The Control Station laptop and the transceiver (MT2011) use external power and must be plugged into a power socket. The transceiver is powered on when it is plugged in, and its LEDs will light up.

4.1.2 Control Station Laptop Power On

(2) Press the power switch on the laptop computer. Wait for the computer to load/initialize software.

(3) When prompted, press **CTRL-ALT-DEL** to login.

(4) Eventually you will see a security window similar to the one in Figure 4-1. Read over the text in the window, and click OK if you agree to the terms.

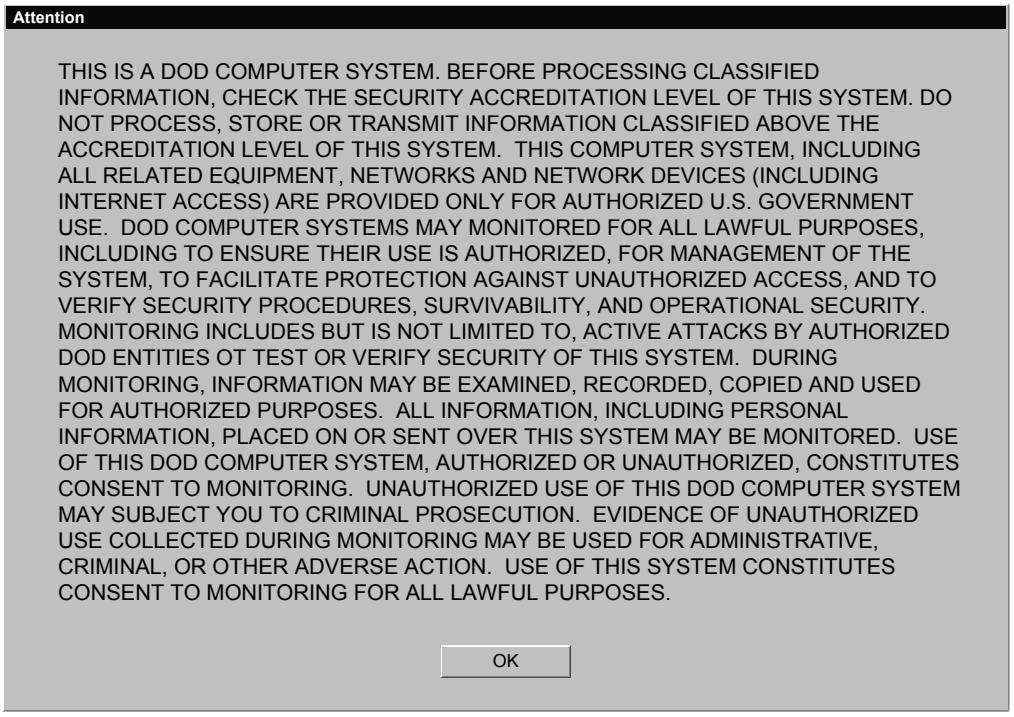


Figure 4-1 Security Warning

(5) Enter username and password, and then click **OK**. The Windows desktop should contain the MTS Messenger and Tracerlink icons. Start the MTS Messenger software to see if the cables to the computer are correctly attached. Go to **Section 5** of this manual to learn how to start the software.

4.1.3 Control Station Printer – Power On

The Control Station Printer can draw power from two sources, an internal battery or an AC wall outlet. Printer will power on when the top cover is opened, if it does not, press the power button. To turn the printer off, press the power button located on top of the printer. It is the button in the center, of the three available buttons.

(1) To turn the printer on, simply lift up the top cover or push the power button once. The small indicator light (in the center of the top of the printer) will illuminate if the printer is on.

4.1.4 Control Station Laptop Power Off

CAUTION: Improper shut down of system may result in data loss.

(1) Close all open applications (MTS Messenger, Tracerlink Vehicle Server, Tracerlink Map Viewer).

(2) Click the Start button in bottom left corner of the screen (see Figure 4-2).

Figure 4-2 Windows Start Button

(3) Select the Shut Down option. A window as in Figure 4-3 should pop-up.

Figure 4-3 Shut Down Window

(4) Select Shut Down and then click the Yes button (see Figure 4-3).

(5) When the following window appears (see Figure 4-4):

Figure 4-4 Shut Down Computer

(6) Press the Power ON/OFF button on the laptop.

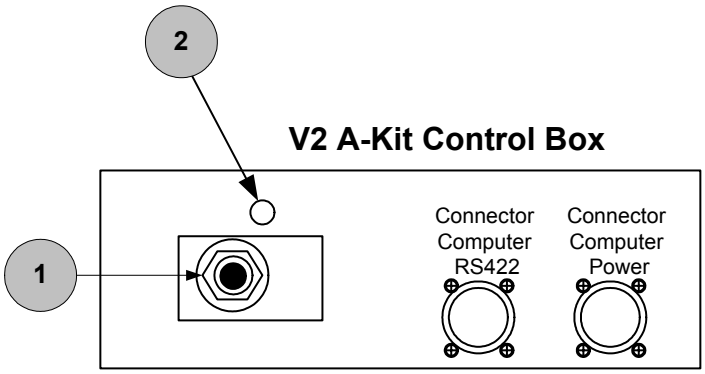
4.1.5 Control Station Printer – Power Off

To turn the printer off, simply push the power button again. The small indicator light (above the power button) will go out.

4.2 V2 Configuration Power On/Power Off Procedures

4.2.1 Understanding the V2 Configuration's Power Source

The V2 is designed to operate in a vehicle. The V2 is designed to operate with vehicle power. The transceiver and the ruggedized computer use a control box to draw power from the vehicle (see Figure 4-5).



1. Control Box Power Switch
2. Green LED Indicator

Figure 4-5 V2 A-Kit Control Box

If the vehicle is on, the V2 Configuration will draw power from the vehicle. If the Unit is drawing power the green LED will light up.

4.2.2 V2 Control Box – Power On

To turn on the V2 Control Box, first make sure that the vehicle is at least running on battery power. Flip the Power Switch (item 1 on Figure 4-5) to ON. If connected correctly, the LED lights on the transceiver (MT 2010/MT 2011) will illuminate.

4.2.3 V2 Ruggedized Computer – Power On

(1) The computer will power on automatically when the Control Box is turned on. Wait for the computer to load/initialize software.

(2) When prompted, press **CTRL-ALT-DEL** to login.

(3) Eventually you will see a security window similar to the one in Figure 4-6. Read over the text in the window, and click OK if you agree to the terms.

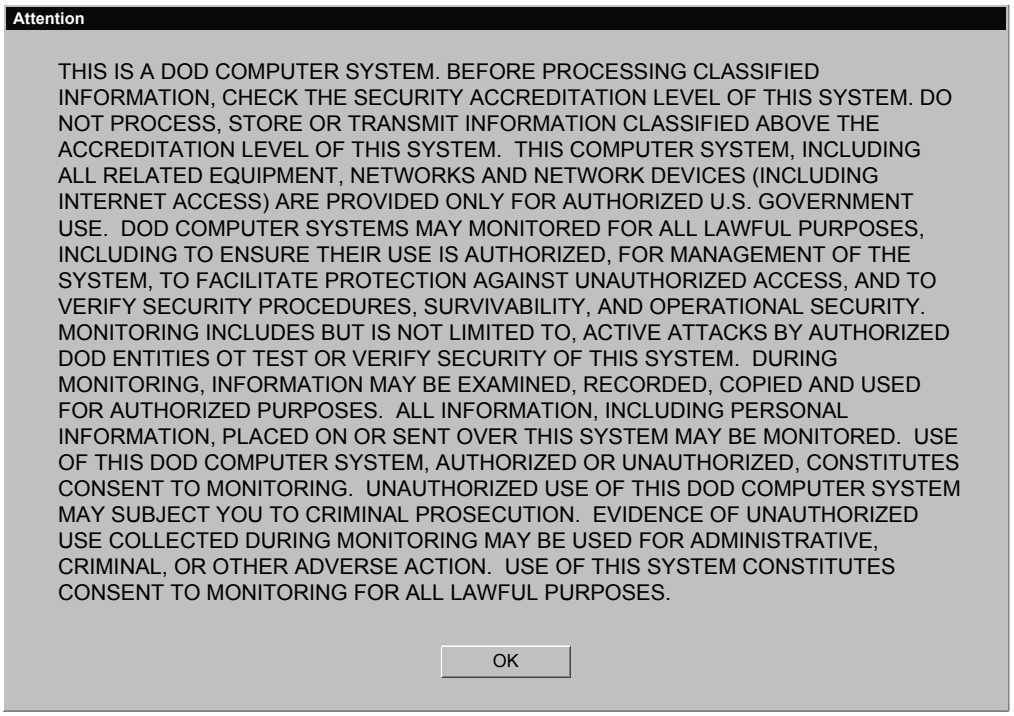


Figure 4-6 Security Warning

(4) Enter username and password, and then click **OK**. The Windows desktop should contain the MTS Messenger and Tracerlink icons. Start the MTS Messenger software to see if the cables to the computer are correctly attached. Go to **Section 5** of this manual to learn how to start the software.

4.2.4 V2 Power Off

CAUTION: Improper shut down of system may result in data loss.

(1) Close all open applications (MTS Messenger, Tracerlink Vehicle Server, Tracerlink Map Viewer).

(2) Click the **Start** button in bottom left corner of the screen.

(3) Select the **Shut Down** option.

(4) Select **Shut Down** and then click the **OK** button.

(5) When **It Is Now Safe To Turn Off the Computer** appears on the screen, press the Power ON/OFF button on the Control Box. Failure to turn off the Power ON/OFF button on the Control Box will allow the terminal to continue operation and drain the emergency battery.

4.3 Power On and configuration of the AN/PSN-V1 PLGR

(1) Press the ON button.

(2) Press the Menu Button.

(3) Press the right arrow until SETUP is flashing.

(4) Press up arrow until you see SETUP MODE

(5) Press the right arrow until FIX is flashing.

(6) Press the up arrow until CONT appears.

(7) Press the right arrow until you see an up and down arrow to the left of the letter P in the lower right of the screen.

(8) Press the up arrow until the Timer function appears in the lower part of the screen.

(9) Press the right arrow until the time value is flashing.

(10) Press the up arrow until OFF appears.

(11) Press POS.

The AN/PSN-V1 PLGR is configured correctly for use with MTS.

4.3.1 Power off the AN/PSN-V1 PLGR

Press OFF and wait for the timer, or press the OFF button two times to power down immediately.

5. MTS Messenger (V2, CONTROL STATION)

5.1 Starting MTS Messenger

NOTE: Your computer will be configured to open MTS Messenger automatically. If this function is not enabled, follow the steps listed below.

(1) To start MTS Messenger, double-click the MTS Messenger Icon located on the desktop.

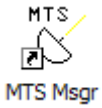


Figure 5-1 The MTS Messenger Icon

(2) Users will be prompted to enter their bumper number as in Figure 5-2.
   (a) Users can enter up to 32 characters including letters, number, spaces and dashes (-). Only the final 9 characters will be displayed on the map.

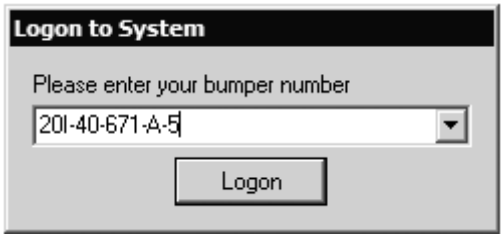


Figure 5-2 Logon Dialog

   (b) The previous three entered bumper numbers are saved in the drop down box.

(3) Users may be prompted to select the COM Port as in Figure 5-3.
   (a) Control Station users will select COM 3 on startup.
   (b) V2 users will select COM 3 (J4) on startup.

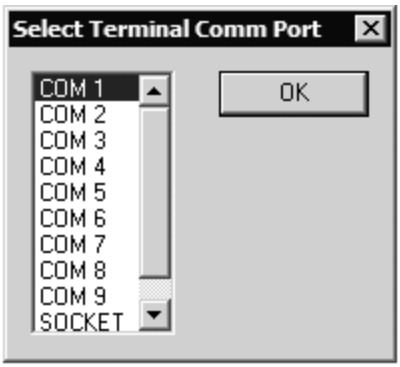


Figure 5-3 COM Port Select Window

If you receive the following error message indicating that the terminal failed to respond, go to section 8, Troubleshooting (see Figure 5-4).

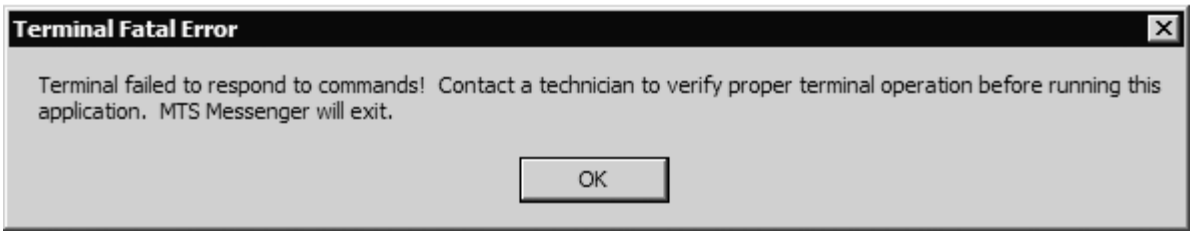


Figure 5-4 No Response from Terminal

(4) Users may be prompted to select the PLGR Com Port (Figure 5-5).
   (a) Control Stations users will select COM 1.
   (b) V2 users will select COM 1 (J3).

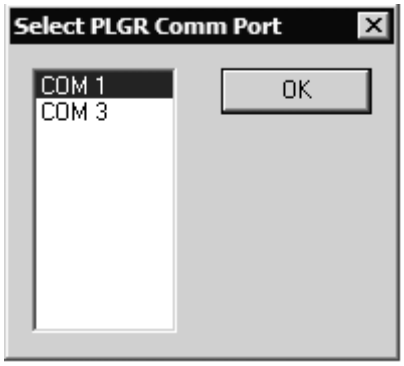


Figure 5-5 Select PLGR Com Port

5.1.1 Display Screen (Command Reference)

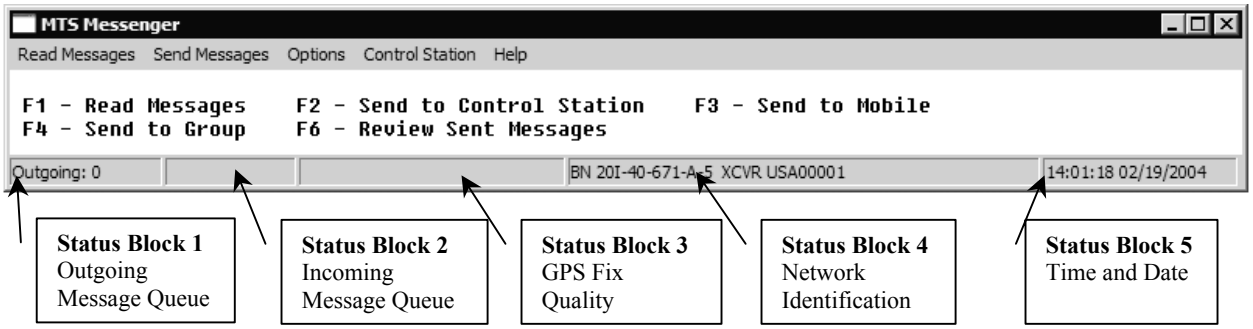


Figure 5-6 Main MTS Messenger Window (Command Reference)

After selecting the COM ports for the terminal and the PLGR, the standard display screen also known as the command reference, will appear (see Figure 5-6). The main window consists of a menu bar, a display screen, and a status bar broken into 5 blocks. If certain help menu functions are enabled, the display screen will show diagnostics information. Only system administrators will use those functions.

5.1.2 Display Screen – Status Blocks

The MTS Messenger Status Blocks can be found on the bottom of the display screen (command reference). The Status Blocks are numbered from left or outbox right starting with Block 1.

(1) Status Block 1 contains the outgoing messages queue. This should always be 0, unless a message has just been sent, then it will be 1 for an instant.

(2) Status Block 2 contains the incoming messages queue. It displays the number of unread messages.

(3) Status Block 3 contains the status of the PLGR. When the PLGR receives a valid GPS Fix, it will be displayed in the form of a FOM (Figure of Merit) number. A figure of merit of 5 or below will allow the MTS to report the unit's position. MTS positions will not be displayed with a FOM above 5.

(4) Status Block 4 contains the Bumper number (BN) and the transceiver ID (XCVR). The BN will appear after the network registration response has been received from the ground station.

(5) Status Block 5 contains the time in UTC. The time is retrieved from the GPS receiver inside the PLGR.

5.2 Network Registration

Once the main window (command reference) appears, wait for network registration. The bumper number and transceiver ID will appear in Status Block 4 at the bottom when network registration completes (see Figure 5-6). Network registration is the process in which a transceiver is recognized as an authorized node within the MTS network. During network registration, MTS Messenger sends a request message to the network every 2 minutes until a response is received. Until the initial network response comes back, you cannot send and receive messages to and from other units. If the transceiver is under trees, inside a building, or shadowed by a large object, it may not be able to communicate with the satellite, and therefore never receive a registration response. In that case, move the blockage or vehicle so the unit can communicate.

If the bumper number that you entered is already assigned to another transceiver, you will receive a warning message that the bumper number entered is not available (see Figure 5-7). You will then be assigned a default bumper number consisting of USA and a number (e.g. USA01234). To request a different bumper number take the Change Bumper Number option on the Options menu (see Section 5.5.5). Alternately you can request that a control station release the bumper number using the Release Bumper Number option on the Control Station menu (see Section 7.1.6) and then use the Change Bumper Number option on the Options menu (see Section 5.5.5).

Figure 5-7 Bumper Number in use warning

5.3 The Read Messages Menu

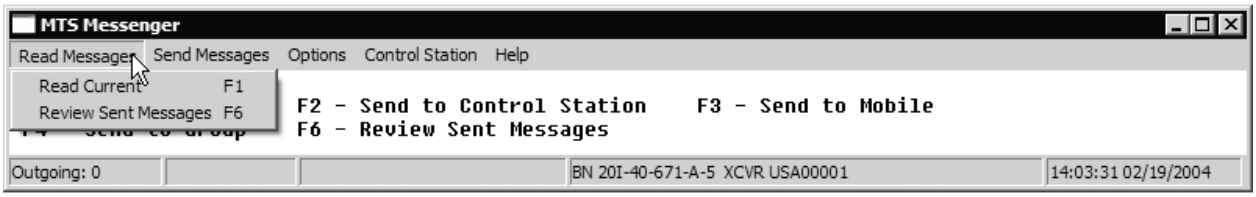


Figure 5-8 Read Messages Pull Down Menu

To read messages you have received and messages you have sent to other units you can either use the **Read Messages** pull-down menu (see Figure 5-8) with the mouse or the function keys on the keyboard (F1 and F6).

TIP: Using keyboard shortcuts such as the function keys (F1 and F6) and the tab key are easier and faster to use than the mouse once you are familiar with them.

5.3.1 Reading Received Messages

If the incoming messages queue indicator in Status Block 2 shows unread messages all of the Status Blocks will be red (see Figure 5-9).

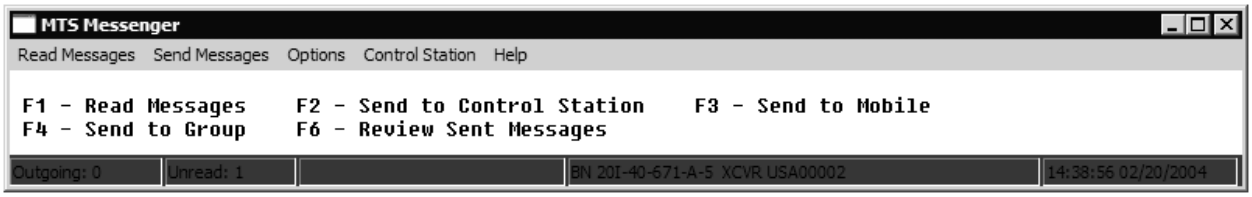


Figure 5-9 New Message

To read a message:

(1) Select **Read Messages → Read Current**, or press F1, to read messages. Figure 5-10 shows the window that will appear.

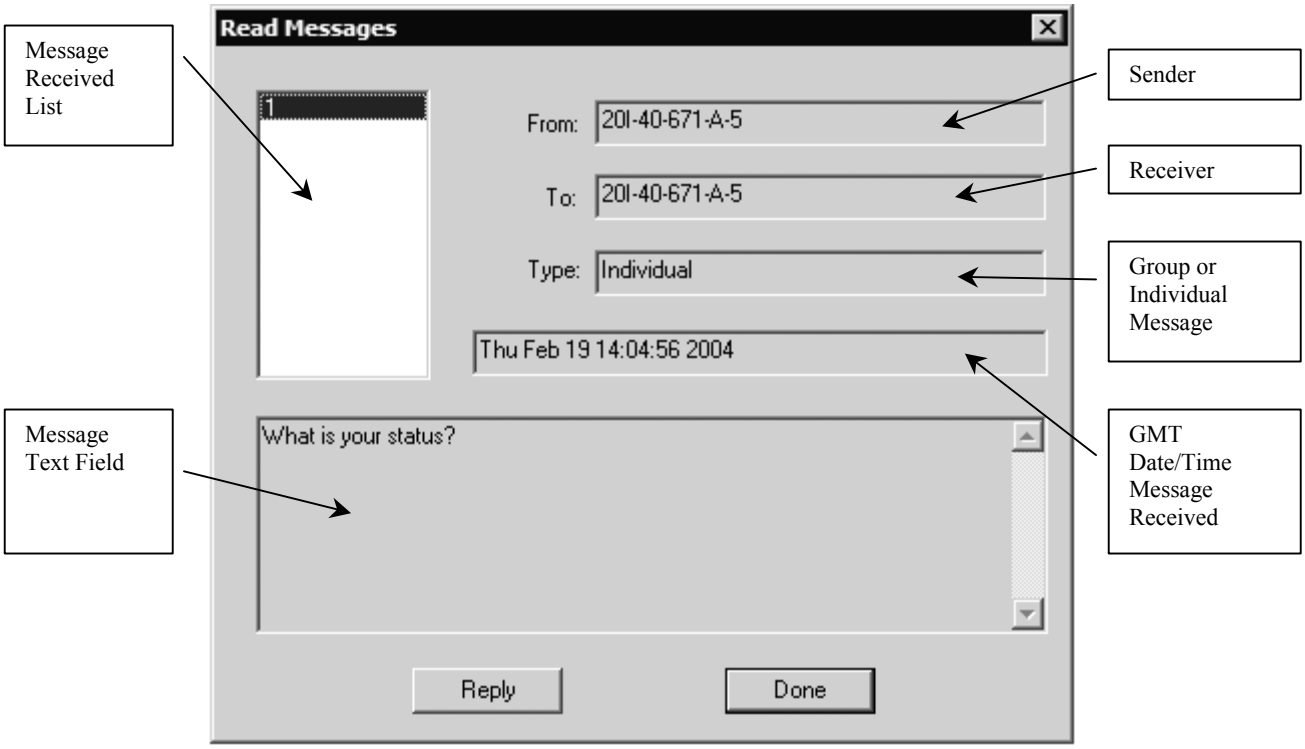


Figure 5-10 Read Current Messages

(2) In the **Message Received List**, click the message number you wish to read. It will default to the most recent message received. The text of the message will appear in the **Message Text Field**. Click the **Reply** button to return a message to the sender, or the **Done** button to go back to the main window. Use the up and down arrow keys to move between messages.

If you have not received any messages (for example right after you started MTS Messenger) and you selected **Read Messages → Read Current** via the pull down menu or by pressing F1, you will receive an error message as seen Figure 5-11.

Figure 5-11 Read Messages Error Window

5.3.2 Reviewing a Sent Message

To review the messages that you have sent:

(1) Select **Read Messages → Review Sent Messages** or press F6. Figure 5-12 shows the window that will appear. The **Message Sent List** contains all messages sent.

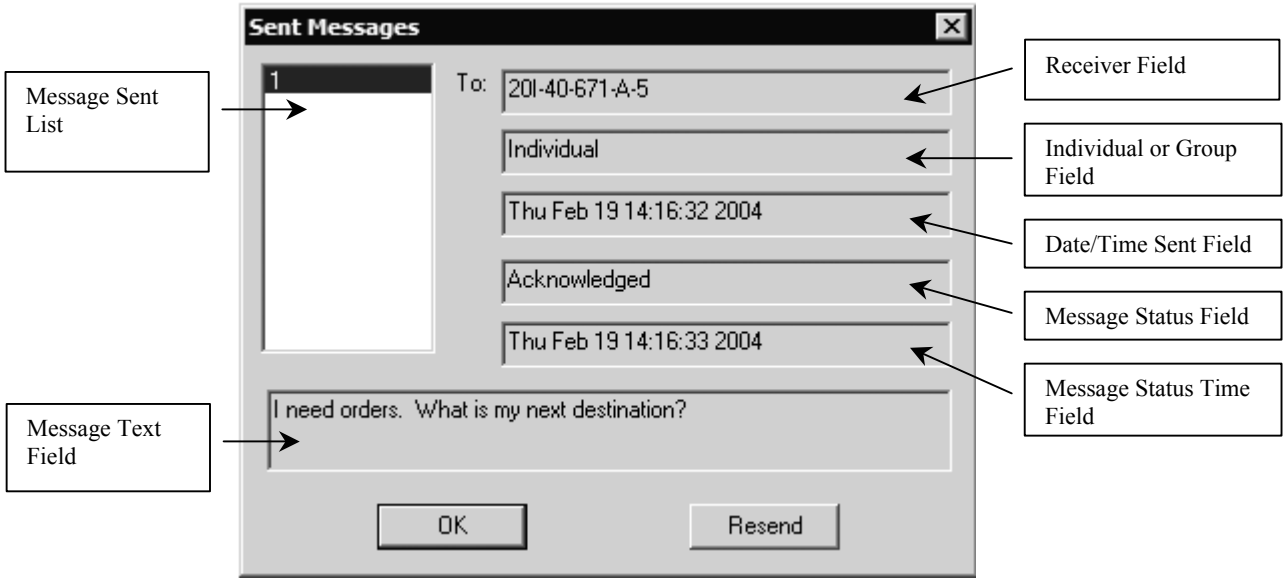


Figure 5-12 Review Sent Messages

(2) Select a message number by using the up and down arrows to move between messages in the **Message Sent List**. The text and status of the sent message will populate the other fields in the window. The **Message Status Field** indicates whether the message was received at its destination. A status of **Sent** means it was recently sent and there has been no response yet. A status of "**Acknowledged**" means the message was received. A status of "**Negative Acknowledged**" means it was not received because the destination was offline or not in view of the satellite. A status of "**Timed Out**" means the sending unit (you) was blocked and cannot communicate with the satellite. In the case of a message to the entire Control Group (see section 5.4.2), the "**Acknowledged**" status will contain a list of the units that actually received the message.

(3) **Note:** Once MTS Messenger is shut down all messages sent and received are deleted; they are not saved on the system.

5.4 The Send Messages Menu

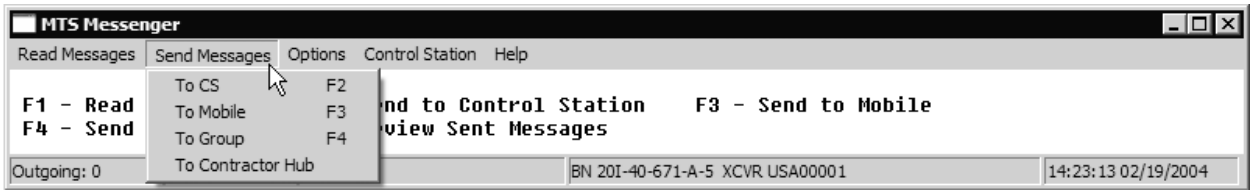


Figure 5-13 Send Messages Pull Down Menu

5.4.1 Sending a message to an Individual Unit (CS or Mobile)

To send messages to other units:

(1) Select the **Send Messages** pull-down menu (see Figure 5-13); or use one of the function keys on the keyboard (F2, F3 and F4).

TIP: Using keyboard shortcuts such as the function keys (F2, F3, and F4) and the tab key are easier and faster to use than the mouse once you are familiar with them.

(2) To send a message to a Control Station; select **Send Messages → To CS** or press F2. To send a message to a Mobile Unit select **Send Messages → To Mobile** or press F3. Figure 5-14 shows the window that will appear.

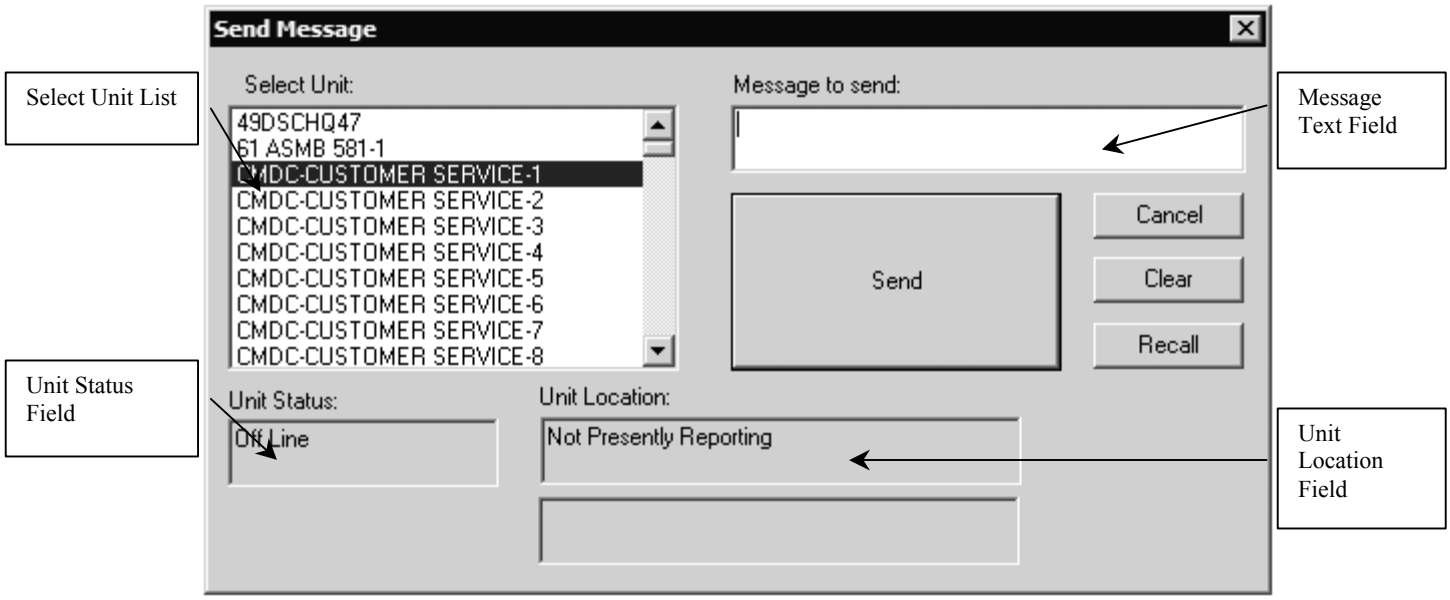


Figure 5-14 Send Message to a Control Station

(3) To choose a recipient for your message, choose a unit from **Select Unit List**. Before you type a message, check the **Unit Status Field**. This field will let you know if the intended recipient is on line or off line. The **Unit Location Field** will indicate the position of unit.

(4) Type your message into **Message Text Field**.

(5) Once satisfied that your message is complete press the **Send** button. Press the **Cancel** button to return to the main window without sending the message. Push the **Recall** button to load the last sent message into the Message Box. Press the **Clear** button to clear the message text field.

(6) Go to **Read Messages → Review Sent Messages** to see if the recipient received the message. See Reviewing a Sent Message in section 5.3.2.

5.4.2 Send a Message to All Members of the Control Group

To send a message to your entire group:

(1) Select **Send Messages → To Group**, or press F4, to send a message to all members of the Control Group except the sender. Figure 5-15 shows the window that will appear. Mobile units will only see one Control Group, while Control Stations might be members of several Control Groups. Control Stations will have to use the pull down menu to select the appropriate group.

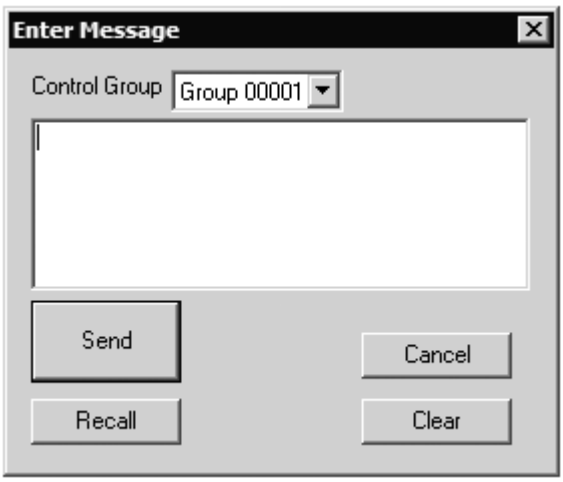


Figure 5-15 Send Message to Control Group Window

(2) Enter the text in the **Message Text Field** and press the **Send** button. Pressing the **Recall** button will load the message box with the text from the last message sent. To close the window without sending a message, press the **Cancel** button. To erase any text in the **Message Text Field** press the **Clear** button.

(3) After sending a message, go to **Read Messages → Review Sent Messages** to see if any group members received the message. See **Reviewing a Sent Message** in section 5.3.2.

5.4.3 Sending Messages Outside of Group

A unit can exist outside any Control Group. If a unit has not been assigned a Control Group the user will not be able to send a message to any other unit. If the user does attempt to send a message, the user will see one of the following messages (Figures 5-16, 5-17, 5-18):

Figure 5-16 No Control Station Known Message Window

Figure 5-17 No Mobile Known Message Window

Figure 5-18 No Groups Known Message Window

5.4.4 Sending messages to the Contractor Hub

To send a message to the Contractor Hub, Select **Send Messages** from the MTS Messenger menu, then select **To Contractor Hub** (see Figure 5.19).

Figure 5-19 Enter Message to Contractor Hub

5.4.5 Sending a Message to an Offline Unit

When sending a MTS message to a unit that is Offline, a dialog box will appear asking for confirmation before sending the message (See Figure 5-20). Units that are offline cannot receive messages and will not receive messages that were sent to them while they were offline. Units that have just signed on to the system will appear as offline until they send a position report to the server, however they can still receive messages. In general, sending messages to an offline unit is not recommended.

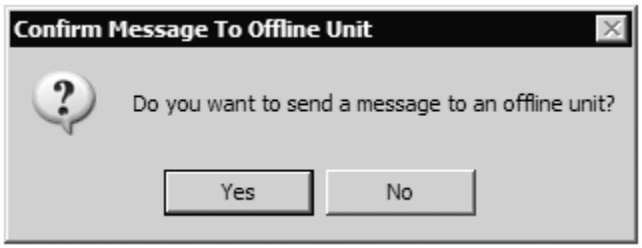


Figure 5-20 Confirm Message to Offline Unit dialog box

5.5 The Options Menu

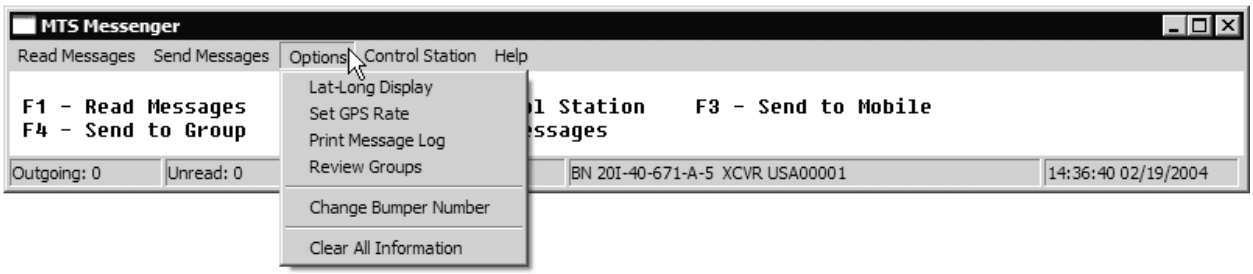


Figure 5-21 Options Pull Down Menu

5.5.1 Options → Lat-Long Display

The **Lat-Long Display** function changes the format of the position data displayed in the **Unit Location Field** of the **Send Message** windows. When Lat-Long is not selected, the **Unit Location Field** shows the data in MILGRID format (Figure 5-24). The default format is in MILGRID format. When Lat-Long is selected, the location of the unit is displayed in standard civilian Latitude and Longitude coordinates (Figure 5-23) and the option will have a check mark next to it on the menu (Figure 5-22).

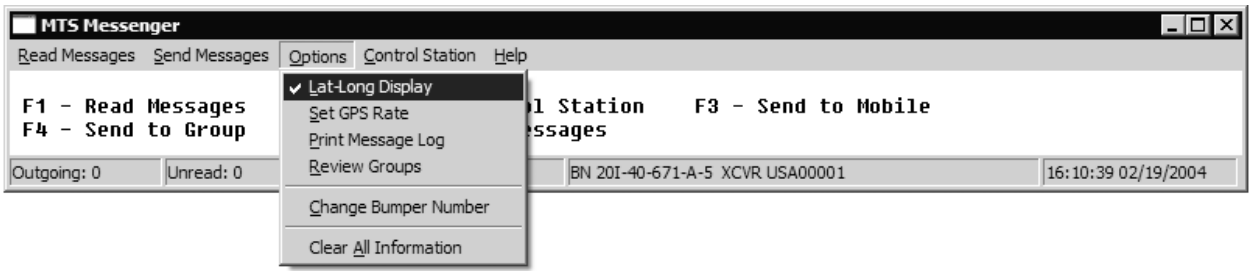


Figure 5-22 Checked Lat-Long Display Menu Option

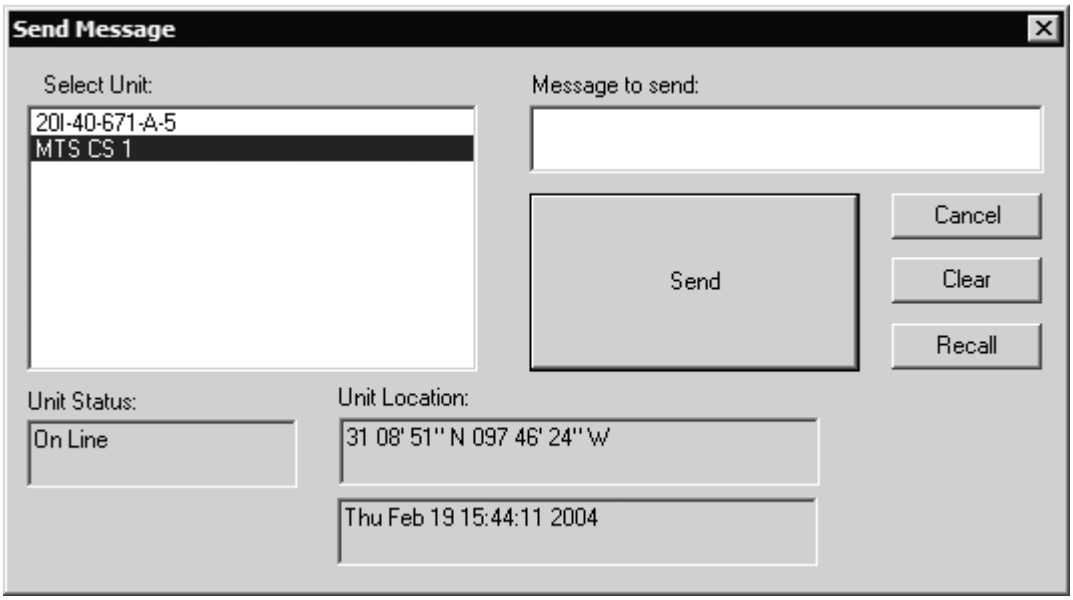


Figure 5-23 Lat-Long Display

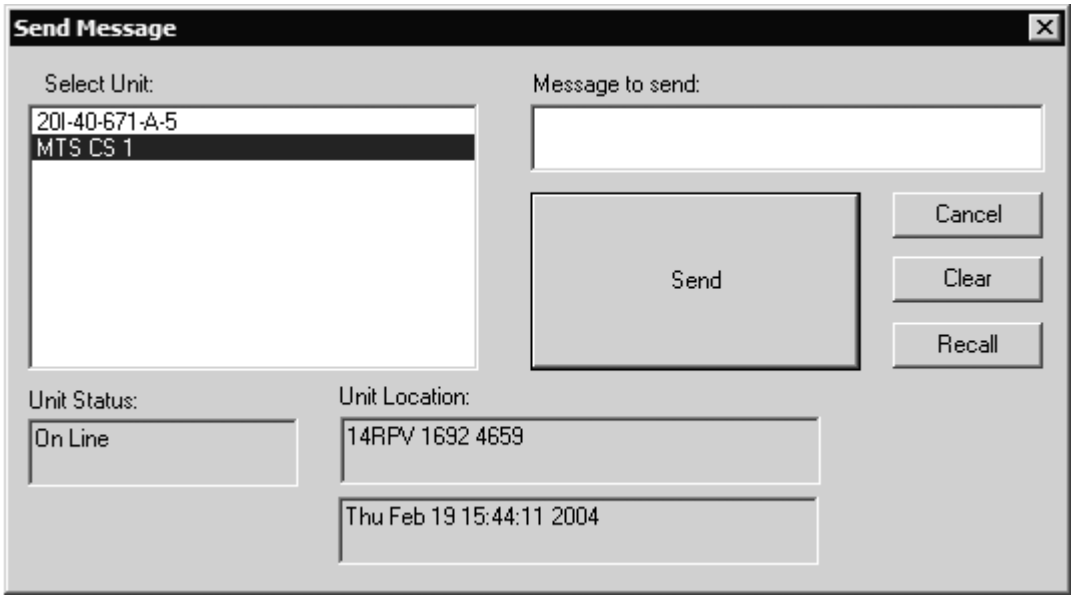


Figure 5-24 MILGRID Display

5.5.2 Options → Set GPS Rate

Set GPS Rate allows the user to increase the GPS reporting that the terminal sends back to the Control Station (see Figure 5-25). The default rate for MTS is five minutes (300 seconds). The minimum rate is also five minutes.

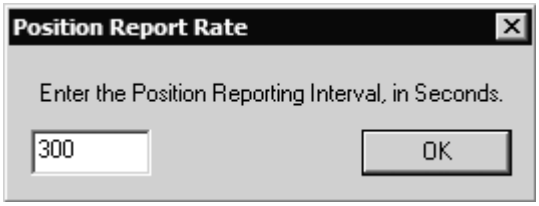


Figure 5-25 Position Report Rate

5.5.3 Options → Print Message Log

The **Print Message Log** is only available to Control Station computers that are connected to a printer. The Print Message Log option creates a message log file, spools it to the default printer and then disappears. Pressing the Cancel button will stop the printing of the file. A **Print Log File Message** window (Figure 5-26) will pop-up to confirm that the file is printing.

Figure 5-26 Print Messages Window

If there is no printer attached to the computer, the following two messages will be displayed (Figures 5-27 and 5-28):

Figure 5-27 Print Error

Figure 5-28 Print Error Message Window

5.5.4 Options → Review Groups

To Review the vehicles assigned to various groups, select **Review Groups** from the **Options Menu** of MTS Messenger. The **Review Control Groups** window will appear (Figure 5-29). Select a group from the **Select Control Group.** The vehicles assigned within the selected group will be displayed in the Vehicles in Group box.

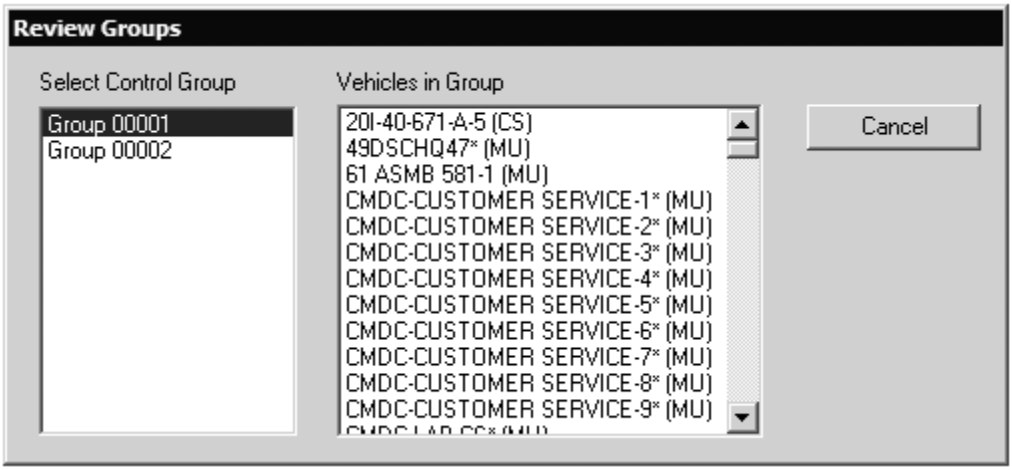


Figure 5-29 Review Control Groups

5.5.5 Options → Change Bumper Number

To change your bumper number, select **Change Bumper Number** from the **Options Menu** of MTS Messenger. The logon dialog will be displayed as if MTS Messenger was just started (see Figure 5-30 and Section 5.1 (2)).

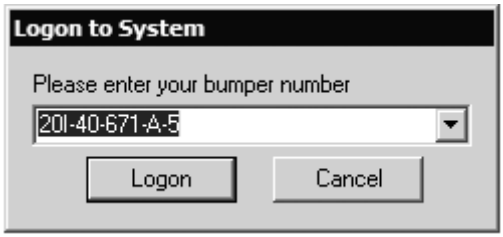


Figure 5-30 Change Bumper Number

5.5.6 Options → Clear All Information

DO NOT USE THIS OPTION UNLESS DIRECTED TO BY COMTECH CUSTOMER SERVICE.

To delete all locally stored group and bumper number information, select the **Clear All Information** option from the **Options Menu** on MTS Messenger. Selecting this option will cause a warning to appear (see Figure 5-31). If **Yes** is selected at the warning message, all locally stored information (except messages) will be immediately deleted. This information will then be downloaded again from the server, while the information is being downloaded you will not be able to see any groups, units, or bumper numbers and may make MTS Messenger unusable for 45 minutes or more.

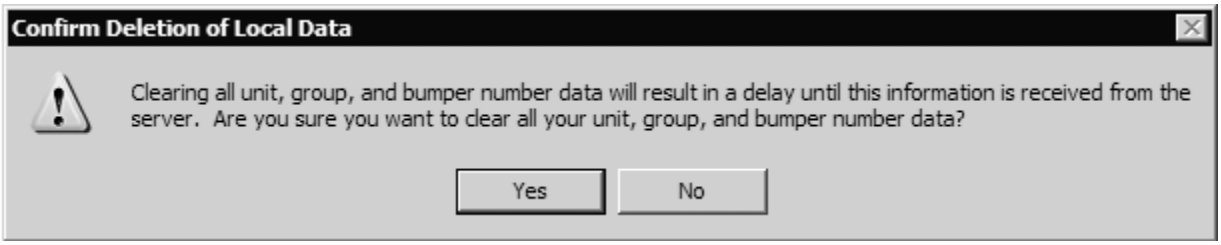


Figure 5-31 Clear All Information Warning

6. TracerLink Mapping, Version 2.0.11 (Control Station and V2)

TracerLink is the Commercial-Off-The-Shelf (COTS) mapping software package that comes standard with every Control Station and V2 configuration. TracerLink and MTS Messenger work simultaneously so that users can send messages and view their position (and the position of others in their group) at the same time. Figure 6-1 shows TracerLink and MTS Messenger on a user's screen.

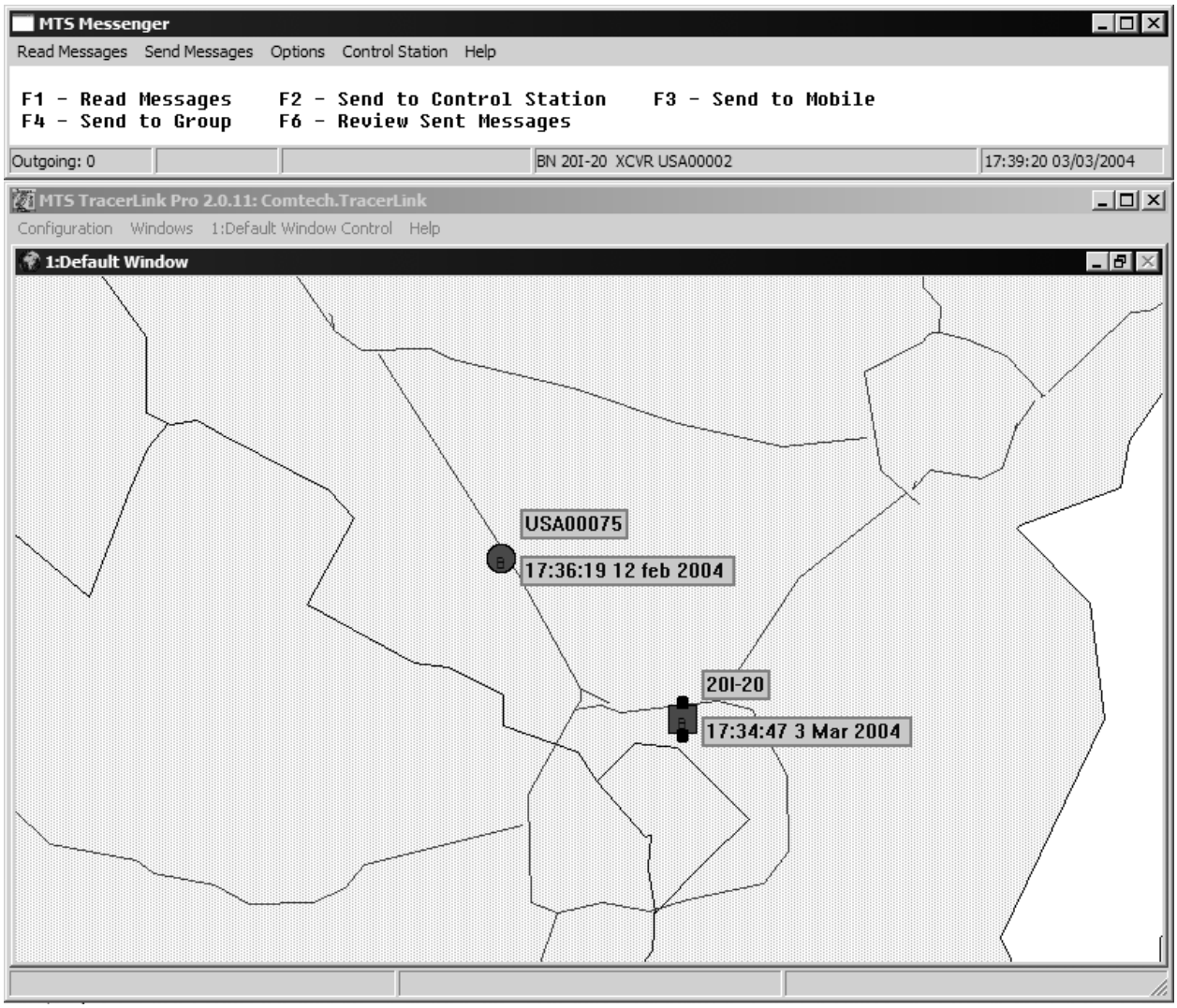


Figure 6-1 MTS Messenger and Tracerlink Startup

Contained within this section is a condensed version of the TracerLink Pro user and configuration manual explaining key functions and actions. This description assumes all map configuring has been done. The TracerLink Pro Manual is available upon request from Comtech Mobile Datacom, but is not included in the transit case.

6.1 Starting TracerLink

Double-click the **Tracerlink Launcher** icon (see Figure 6-2) located on the desktop to start the TracerLink application. Tracerlink connects to the MTS Messenger program over a TCP/IP socket to receive position data. **In order for TracerLink to function, MTS Messenger must be running.**

An alternative but slightly more complicated method to start TracerLink requires the user to double click the **TracerLink Vehicle Server** icon (see Figure 6-3) and the **TracerLink Map Viewer** (see Figure 6-4) icon. The user should first startup the Vehicle Server. After the Tracerlink Vehicle Server window opens, the user should minimize it. Next double-click on the Tracerlink Map Viewer icon.

Figure 6-2 Tracerlink Launcher Icon

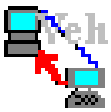


Figure 6-3 Tracerlink Vehicle Server Icon

Figure 6-4 Tracerlink Map Viewer Icon

6.2 The Windows

When Tracerlink starts, it runs two processes, each with its respective window. They are the Vehicle Server, and the Map Viewer. Figure 6-5 shows the Vehicle Server window. If started automatically by the Tracerlink Launcher icon, the window starts in the minimized view. If a user decides to start Vehicle Server directly, rather than using the TracerLink Launcher Icon, the Vehicle Server window will not automatically open minimized. When open, the window will appear as in Figure 6-5. The status bar in the lower left of the window will say “COMM ACTIVE” when the Vehicle Server has successfully connected to MTS Messenger. If this is not visible the map will not receive any position reports and will not display any vehicles. The center status bar at the bottom displays the last position report received from MTS Messenger.

Figure 6-5 Tracerlink Vehicle Server Window

The second Tracerlink process is the Map Viewer (see Figure 6-6).

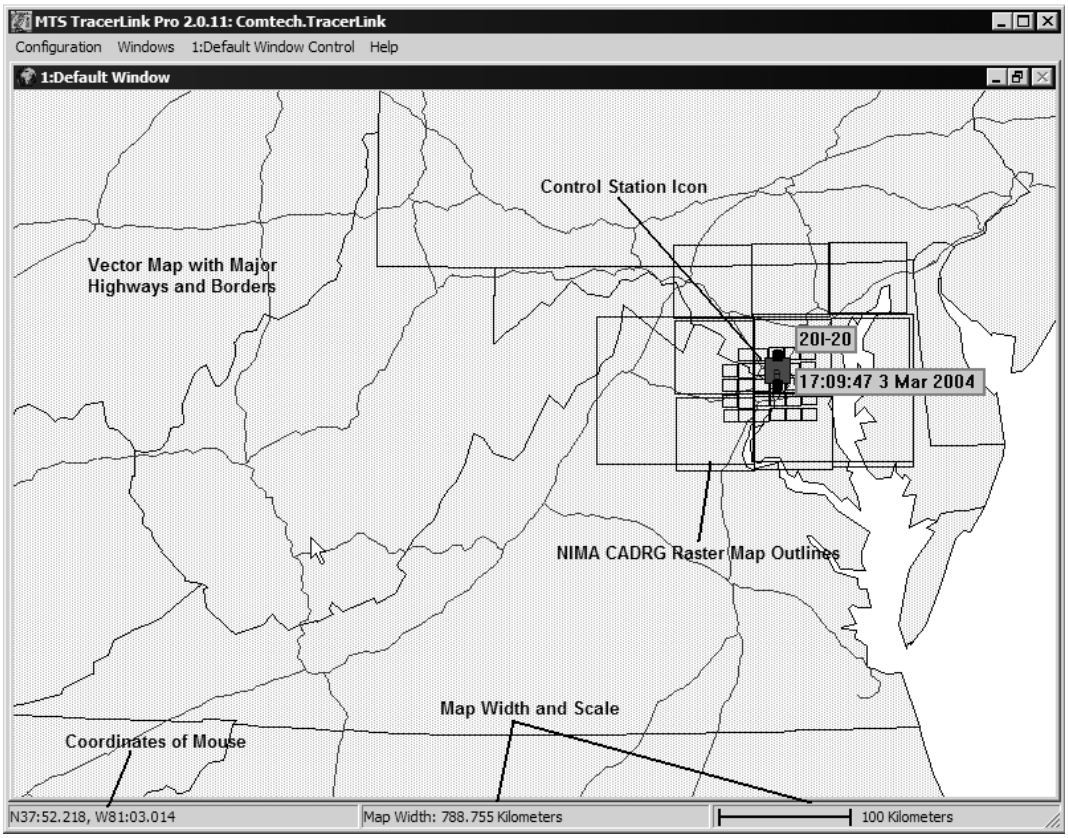


Figure 6-6 Tracerlink Map Viewer

6.3 The Maps

The Tracerlink software can display several popular map formats. MTS supports local area NIMA CADRG (Compressed Arc Digitized Raster Graphics) maps and world coverage vector maps. The world vector maps give the user large-scale perspective, and the CADRG raster maps give high detail when the user zooms in. When zoomed out to a large scale, the CADRG maps are not visible, only black rectangular outlines are visible. As the user zooms in, the CADRG maps will load and be visible.

Tracerlink also supports reading NIMA CADRG raster maps directly off a NIMA CD-ROM.

6.4 Symbols

Tracerlink displays various symbol shapes and colors to convey information to the user; square symbols represent Control Stations, while round symbols represent Mobile Units.

A square lug on top of the symbol indicates the unit is turned on and transmitting. No lug on top indicates the unit is turned off, and the position on the map is the last known position of that vehicle. When turned on, MTS units send a position report every five minutes to the satellite ground station. The MTS system will display an icon as off if the ground station has not received a position report in over ten minutes from a particular vehicle.

The color of the symbol indicates the Control Group the vehicle belongs to. All vehicles in the same Control Group will be the same color.

A square lug on the bottom of a symbol indicates the vehicle is reporting valid GPS. If a unit is powered on, but is not reporting valid GPS, then the location of the icon on the screen reflects the last known position of the vehicle, and may not reflect the current position of the vehicle. See Figure 6-7 for an example of the symbols.

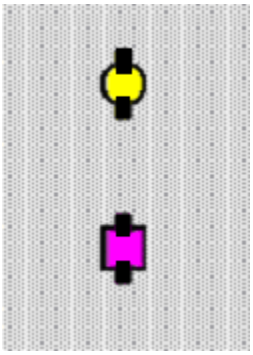


Figure 6-7 Symbols Representing Mobile Units and Control Stations

6.5 Right Click Pop Up Menu

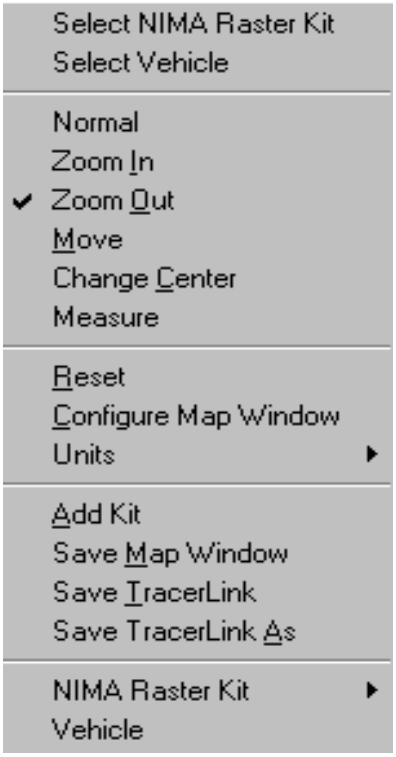


Figure 6-8 Right Click Pop Up Menu

The fastest and easiest way to use many of the functions in TracerLink is to activate the **Right Click Pop Up Menu** (see Figure 6-8). To activate this menu, simply right click your mouse on the Map Viewer.

6.5.1 Select NIMA Raster Kit

Go to Section **6.7 NIMA CADGR Maps** for more details on this function.

6.5.2 Select Vehicle

Go to Section **6.6 Server Vehicle Kit Control Window** for more details on this function.

6.5.3 Zooming the Map

Zooming in provides more detail for a specific area, while zooming out is a way to show less detail, but more geographic area. The zoom function, works a bit like a camera's zoom lens. A user can zoom in multiple times to get very close to a specific location. Or the user can zoom out and get very far from the same location.

To zoom, right click on the map to show the pop up menu, (see Figure 6-8). Select **Zoom In** or **Zoom Out**. Click on the map at the point you wish to become the center of the map. The map will zoom with the point clicked becoming the new center of the map.

Zoom In also supports window zooming. Click the left mouse button and drag it to form a box around the area you wish to see enlarged.

TIP: While zooming in or out, the user can click the mouse several times and the software will skip the intermediate redraws. So instead of clicking, waiting, clicking, and waiting, just click several times and wait once.

6.5.4 Change Center

Panning is a way to move north, south, east, or west while staying at the same zoom level. Right click the mouse over the map to pop up the menu (see Figure 6-8), select **Change Center**. Click on the map and the map will move with the point clicked becoming the new center of the map.

6.5.5 Pan a Map (Move)

An alternate method of panning the map is to use the **Move** function. Right click the mouse over the map to pop up the menu (Figure 6-8), select **Move**. The cursor becomes a hand. Click on the map and hold down the left mouse button, then drag the map to the desired position. When you release the mouse, the map will redraw in the new position.

6.5.6 Measure Distances on Map

Distances on the map can be measured as the crow flies. Right click on the map to pop up the menu (Figure 6-8), and then select **Measure**. Click and drag the cursor from point A to point B on the map. Before releasing the mouse button, look at the scale display at the bottom of the map window (see Figure 6-9). It displays the distance in kilometers, nautical miles, or statute miles. Once you release the mouse, the distance measurement will disappear.

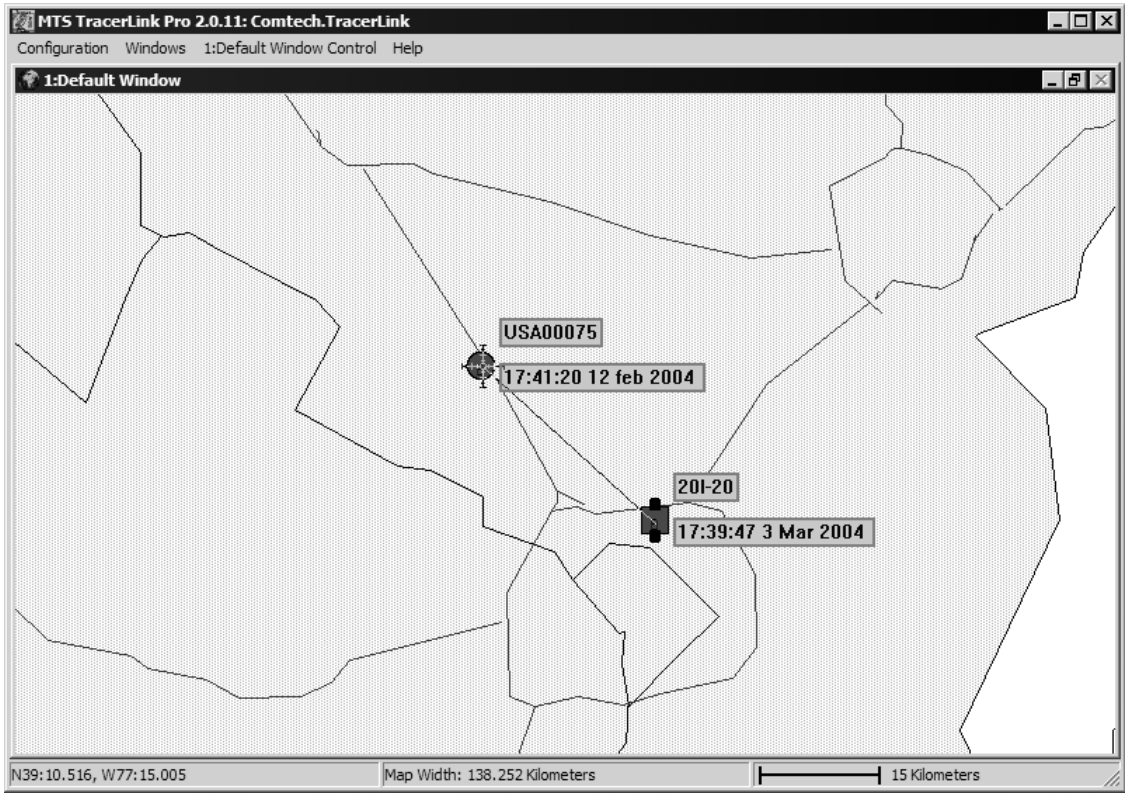


Figure 6-9 Map Showing Measure Distances Function

6.5.7 Reset Map to Initial View

Sometimes it is possible to zoom so far out or so far in the user becomes disoriented. Do a map Reset to return the map to the view seen at startup. Right click on the map (Figure 6-8) and select **Reset**.

6.5.8 Configure Map Window

NOTE: Only experienced users should use this function. More details about this function are available in the TracerLink Pro Installation and Operation manual.

6.5.9 Units – Changing Units of Measure

Right click on the map (Figure 6-8) and select **Unit**. Select whether you want the map in Kilometers, Nautical Miles or Statue Miles.

6.5.10 Add Kit

NOTE: Only experienced users should use this function. More details about this function are available in the TracerLink Pro Installation and Operation manual.

6.5.11 Save TracerLink Window Configuration

NOTE: Only experienced users should use this function. More details about this function are available in the TracerLink Pro Installation and Operation manual.

The user can save the map window configuration. This will save the size and location of the window on the screen, the maps loaded, and the zoom level and center of the map. Right click on the map (Figure 6-8), and select **Save Tracerlink**. If the user doesn't want to overwrite the previous configuration, select **Save Tracerlink As**. This will allow the user to save to a different filename.

6.6 Server Vehicle Kit Control Window

The **Server Vehicle Kit Control Window** is a powerful tool that lets the user change the icons (and thus the vehicles) s/he can see on the screen. Using the Server Vehicle Kit Control tools, the user can perform some of the following functions:

- Trace a vehicle's route.
- Hide a vehicle, or display a vehicle that was previously hidden.
- Hide / display a vehicles name and last position report time.

Figure 6-10 Server Vehicle Kit Control Window

These functions require that the user bring up the **Server Vehicle Kit Control** window (Figure 6-10), also known as the vehicle kit window. There are two ways to bring the window up.

Right click the mouse and choose **Select Vehicle** on the pop up menu. This will change your cursor into a hand with a pointed finger. Left click on the map (with the hand) either over a vehicle's icon or over a bare spot. If you clicked over a vehicle's icon, the vehicle kit window will display the clicked vehicle(s) in the pane. If you clicked over a bare spot on the map, the vehicle kit window will be empty. Figure 6-

10 shows an example where the user clicked on Comtech Mobile Datacom's headquarters in Germantown, Maryland. There were six icons at the location where the user clicked.

The second method to open the **Server Vehicle Kit Control** window is to slowly slide the cursor off the right side of the map. When you approach the edge of the map the **Kit Bar** (Figure 6-11, highlighted) will appear. Select the **Vehicle** image at the top.

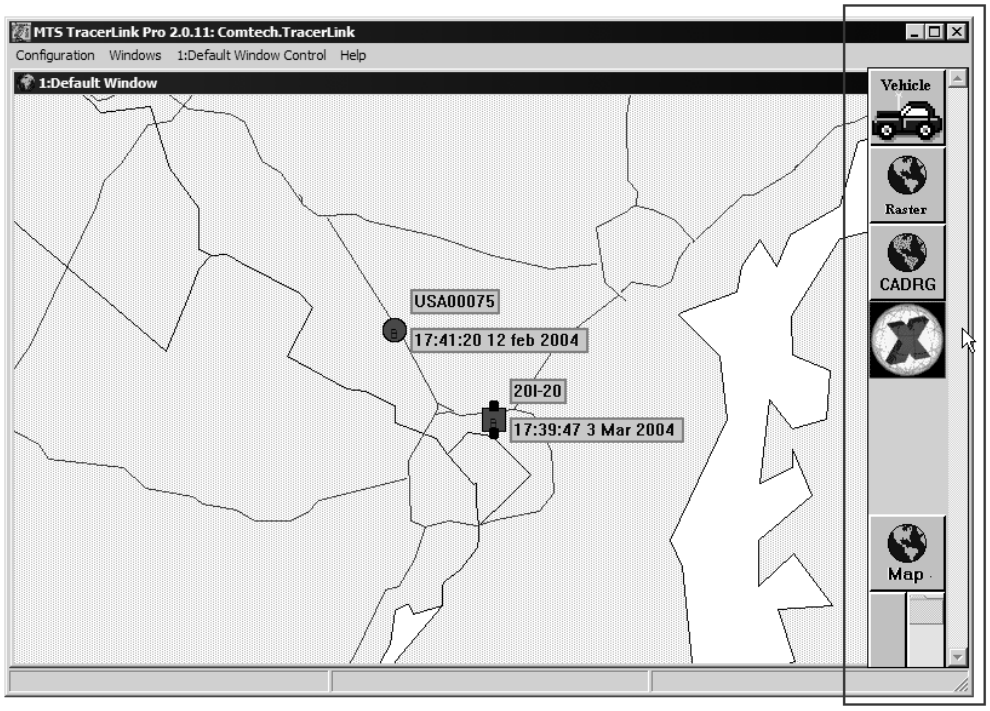


Figure 6-11 Kit Bar

Once the **Server Vehicle Kit Control** window is up (Figure 6-10), you will see a number of tabs within the window.

- Assignments
- Selection
- Server

The **Assignments** tab and the **Selection** tab show the same data but in different view formats. The **Assignments** tab shows all the vehicles in a hierarchical fleet view while the **Selection** tab only shows the vehicles that were clicked upon by the mouse. For example, Figure 6-12 shows one vehicle in the **Selection** tab because there was one vehicle (icon) in the location that the user clicked upon. Alternatively the **Assignments** tab shows several more vehicles, not just the vehicle selected.

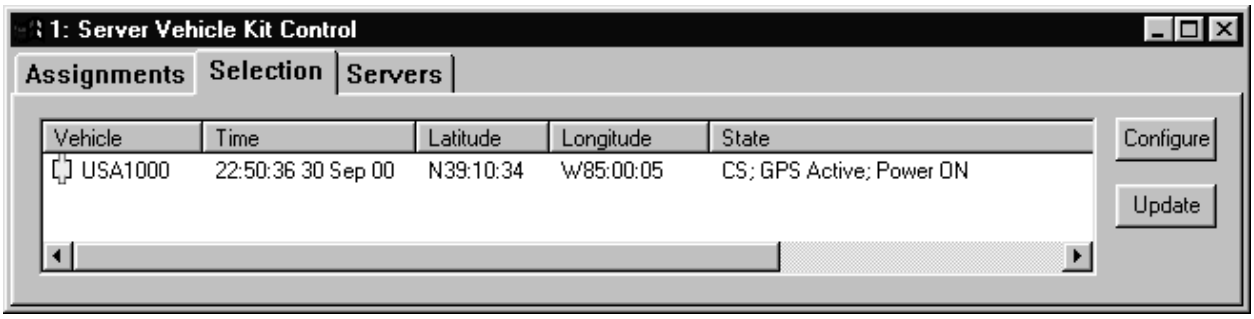


Figure 6-12 Selection Tab (Compare with Figure 6-13)

Figure 6-13 Assignments Tab (Compare with Figure 6-12)

In many cases it is easier to select a vehicle by clicking on it on the map, and when the **Selection** tab of the 'Server Vehicle Kit Control' window appears, operate on the vehicle in that pane. In cases where the icon is not on the map, due to it being hidden or off the edge of the map, it is necessary to go to the **Assignments** tab, open the fleet containing the vehicle and operate on the vehicle there.

6.6.1 Autotrack

The map can automatically pan to keep a moving vehicle within the map view. Whenever the vehicle moves off the edge of the map, the map will automatically shift. To enable Autotrack:

(1) Right click on the map to get the pop up menu.

(2) Choose the **Select Vehicle** option from the pop up menu.

(3) Click on the vehicle you wish to track. The **Server Vehicle Kit Control** window will open with the **Selections** tab containing a list of vehicles.

(4) Right click on the vehicle you wish to track, and select **State → Track**.

If the vehicle you wish to track is off the map, use the **Assignments** tab instead of the **Selections** tab to make the change.

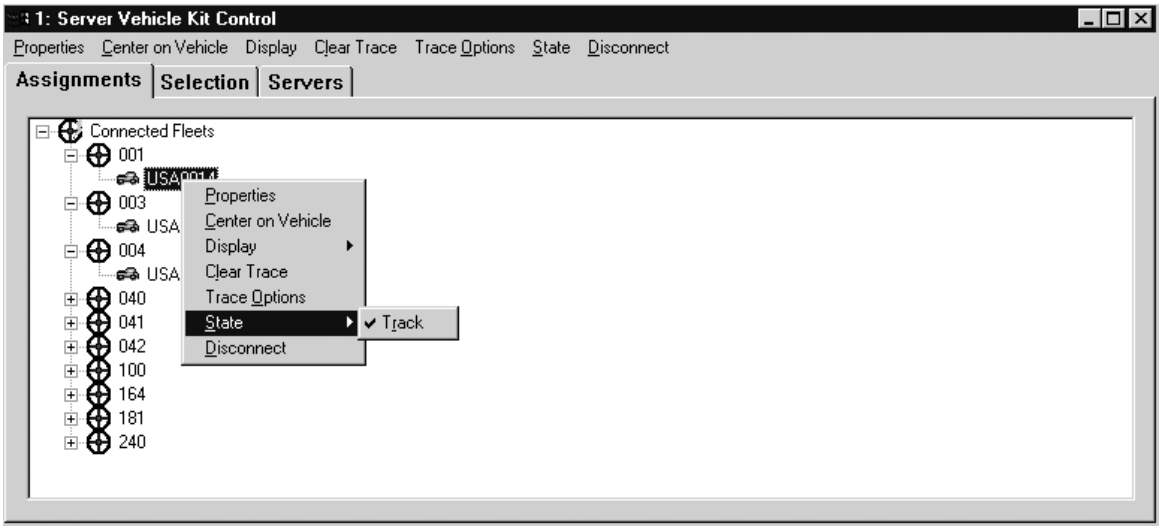


Figure 6-14 Autotrack

6.6.2 Trace

The map can draw trace lines that show the history of a vehicle's travels. To enable the Trace function:

(1) Right click on the map to get the pop up menu (Figure 6-8).

(2) Choose the **Select Vehicle** option from the pop up menu.

(3) Click on the vehicle you wish to trace. The **Server Vehicle Kit Control** window will open with the **Selections** tab containing a list of vehicles.

(4) Right click on the vehicle you wish to Trace, and then select **Display → Trace** (see Figure 6-15).

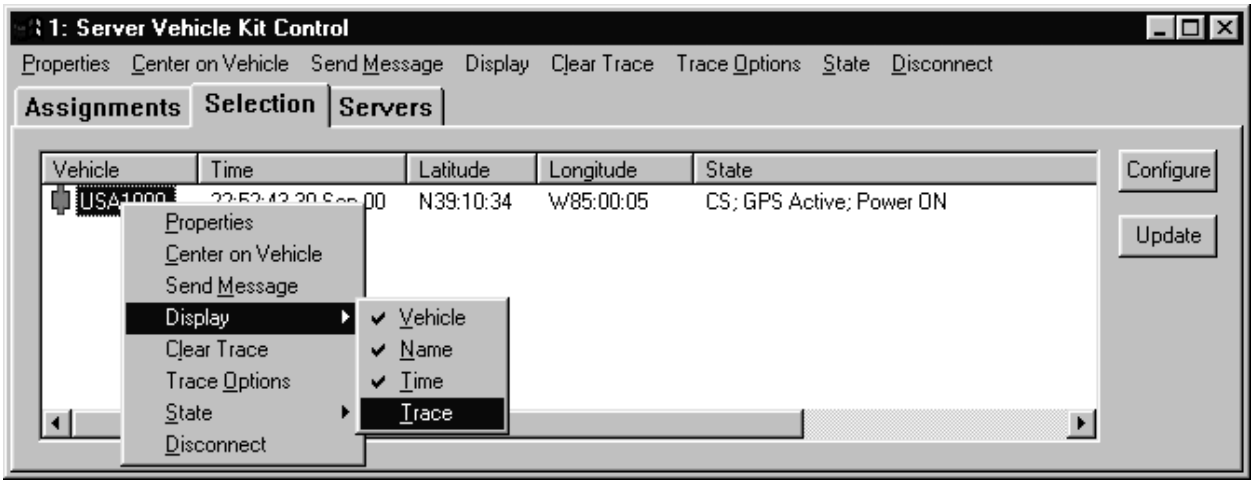


Figure 6-15 Tracing a Vehicle

6.6.3 Hiding and Showing an Individual Vehicle's Name

The map can display a tag next to the symbol on the map showing a vehicle's name. In order to show/hide a vehicle's name follow the steps below:

(1) Right click on the map to get the pop up menu (Figure 6-8).

(2) Choose **Select Vehicle**.

(3) Click on the vehicle that you wish to name (un-name). When the **Server Vehicle Kit Control** window pops up it will list the vehicles.

(4) At this point you can turn the vehicle's name on (or off). To turn the name on, right click on the vehicle name in the **Server Vehicle Kit Control** window and select **Display → Name** (see Figure 6-16).

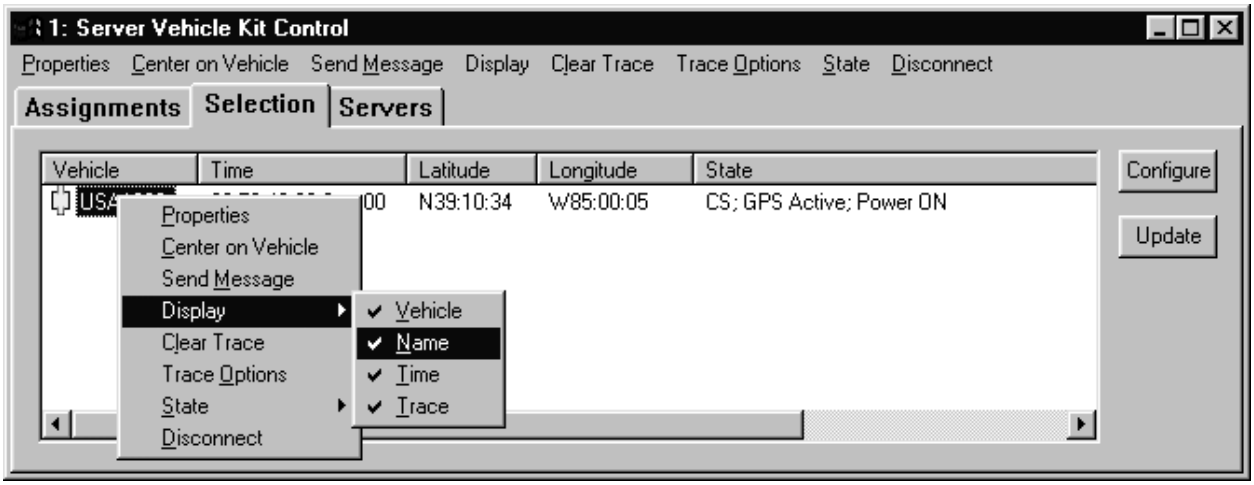


Figure 6-16 Display Vehicle's Name

6.6.4 Hiding and Showing Entire Control Groups

There are times when a user may want to show or hide an entire group (fleet) of vehicles. To hide a visible group of vehicles or show a hidden group of vehicles:

(1) Right click on the map to get the pop up menu (Figure 6-8).

(2) Choose **Select Vehicle**.

(3) Click on the map so that the **Server Vehicle Kit Control** window pops up.

(4) Next, select the **Assignments** tab. The various Control Groups will be listed with expandable plus boxes next to each one.

(5) Right click on a Control Group (e.g. 001,002,003, etc.), and select **All Vehicles → Hide** (see Figure 6-17). If a Control Group is already hidden, to show it, simply select **All Vehicles → Show**.

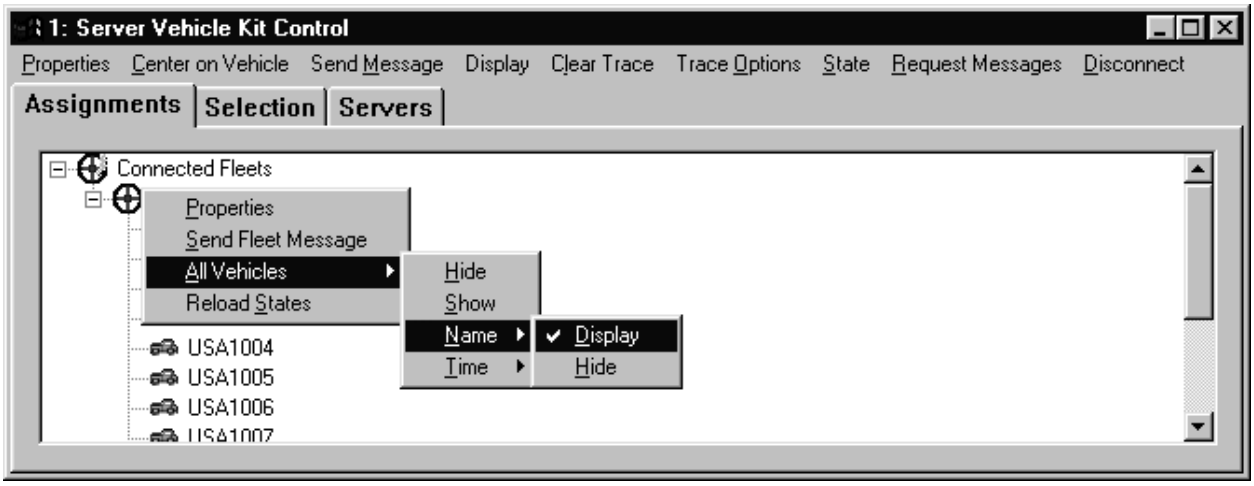


Figure 6-17 Hiding and Showing a Group of Vehicles

6.6.5 Displaying and Hiding Individual Vehicles

There are times when a user may want to show or hide a single vehicle. To hide a visible vehicle or show a hidden vehicle, follow the steps below:

(1) Right click on the map to get the pop up menu (Figure 6-8).

(2) Choose **Select Vehicle**.

(3) Click on the map with the mouse so that the **Server Vehicle Kit Control** window pops up.

(4) Next, select the **Assignments** tab (see Figure 6-18).

(5) Once you see the Control Groups listed under the **Assignments** tab (Figure 6-18), open a Control Group (e.g. 001,002,003, etc.) by clicking on the plus sign (+) next to the group.

(6) Next, right click on the individual vehicle, and select **Display → Vehicle**. If the vehicle was already displayed it will be hidden. If it was hidden it will be displayed. A hidden vehicle will have a ⊘ on it indicating that it is hidden or not displayed on the map.

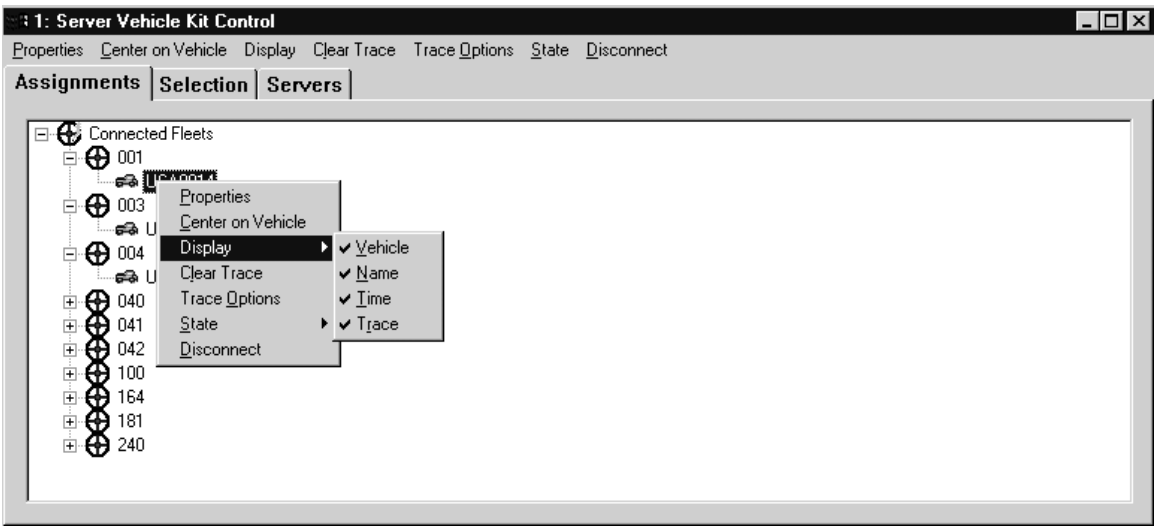


Figure 6-18 Hiding and Showing an Individual Vehicle

6.6.6 Displaying and Hiding Name Labels for an Entire Control Group

(1) Right click on the map to get the pop up menu (Figure 6-8).

(2) Choose **Select Vehicle**.

(3) Click on the map with the mouse so that the **Server Vehicle Kit Control** window pops up.

(4) Next, select the **Assignments** tab.

(5) Once you see the Control Groups listed under the **Assignments** tab, right click on the fleet and select **All Vehicles → Name → Display** or **All Vehicles → Name → Hide** (see Figure 6-19).

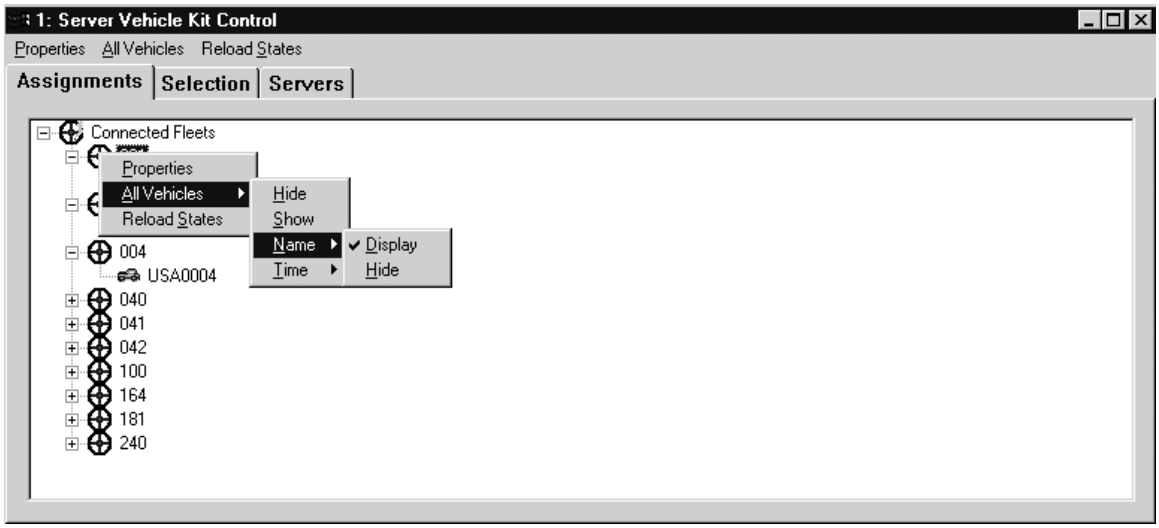


Figure 6-19 Hiding and Showing the Names of All Vehicles in a Fleet

6.6.7 Displaying and Hiding Report Time Labels for an Individual Vehicle

The map can display a tag next to the symbol on the map showing the time of the last position and status report from that vehicle.

(1) Right click on the map to get the pop up menu (Figure 6-8).

(2) Choose **Select Vehicle**.

(3) Click on the map with the mouse so that the **Server Vehicle Kit Control** window pops up.

(4) Next, select the **Assignments** tab (see Figure 6-20).

(5) Right click on a vehicle, and select **Display → Time,** (see Figure 6-20). If the time was not previously displayed, it will be. If the time was previously displayed, it will be turned off.

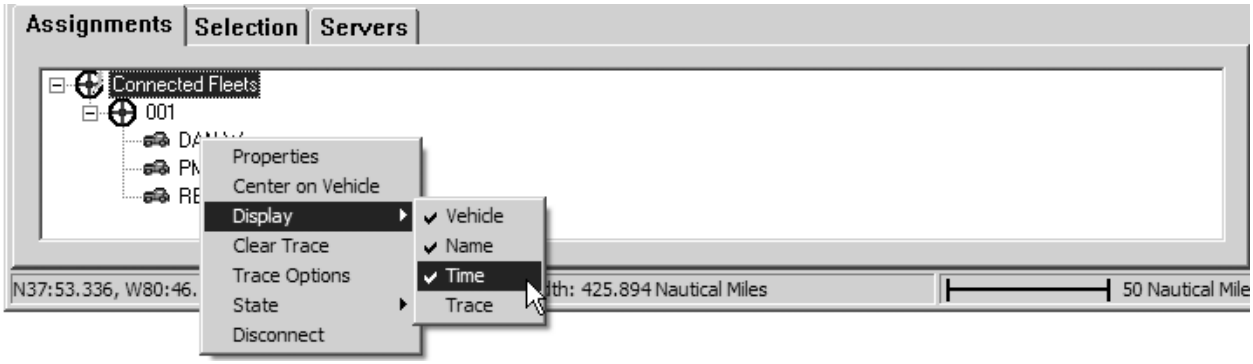


Figure 6-20 Hiding and Showing the Position Report Time for a Vehicle

6.6.8 Displaying and Hiding Report Time Labels for an Entire Control Group

The last report time for all vehicles in a Control Group can be displayed and hidden via a single command in the **Assignments** tab of the **Server Vehicle Kit Control** window. This saves the user from performing the command on each individual vehicle in the fleet.

(1) Right click on the map to get the pop up menu (Figure 6-8).

(2) Choose **Select Vehicle**.

(3) Click on the map with the mouse so that the **Server Vehicle Kit Control** window pops up.

(4) Next, select the **Assignments** tab (see Figure 6-21).

(5) Once you see the Control Groups listed under the **Assignments** tab right click on the fleet name, and select **All Vehicles → Time → Display** or **All Vehicles → Time → Hide**, (see Figure 6-21).

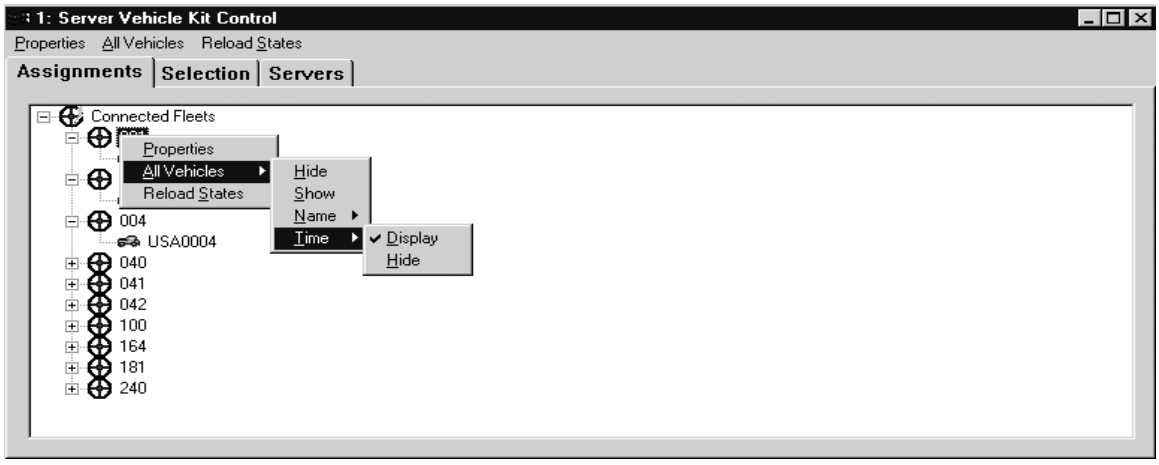


Figure 6-21 Hiding and Showing the Position Report for a Fleet of Vehicles

6.6.9 Center on Vehicle

If a vehicle is not shown on the map, the **Center on Vehicle** function can be invoked to find the vehicle. This will move the map to show the vehicle in the center.

(1) Right click on the map to get the pop up menu (Figure 6-8).

(2) Choose **Select Vehicle**.

(3) Click on the map with the mouse so that the **Server Vehicle Kit Control** window pops up.

(4) Next, select the **Assignments** tab.

(5) Open the Control Group, right click on the vehicle you wish to find, and select **Center on Vehicle** (see Figure 6-22).

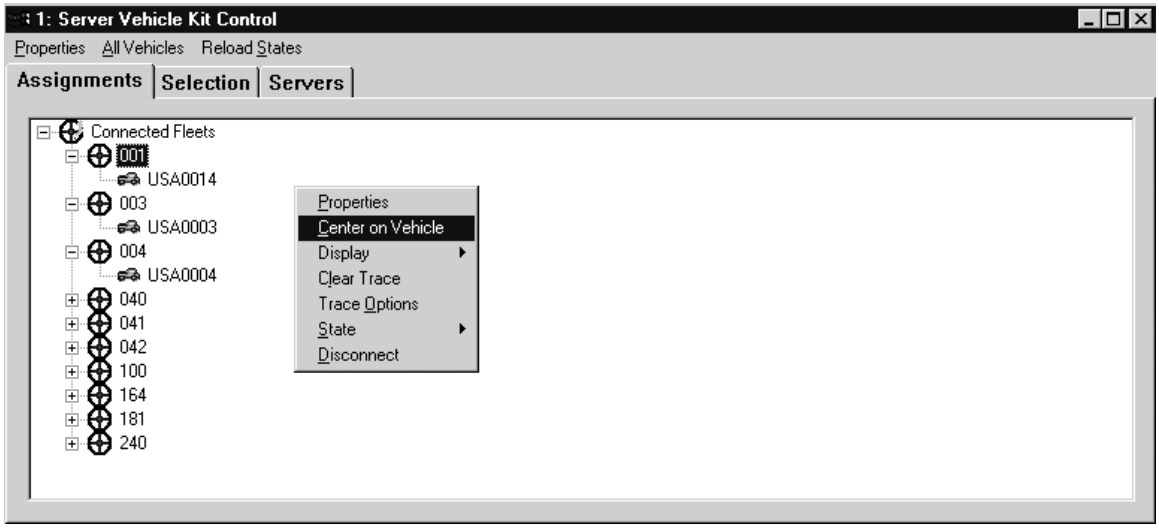


Figure 6-22 Centering the Map on a Vehicle

6.7 NIMA CADRG Maps

Tracerlink includes the capability to view CADRG (Compressed ARC Digitized Raster Graphics) maps. There are two ways in which CADRG maps can be viewed, directly from a CD that has CADRG maps on it, or via the computer's hard drive. Viewing from a CD is recommended when a user only needs to see CADRG maps for a short period of time, or if the CD will be permanently available to the user. Viewing CADRG maps from the hard drive require the user to load (or copy) the CADRG maps to the hard drive. Viewing the maps from the hard drive is recommended for users who need to see CADRG maps of an area but will not have permanent/constant access to a CD with the CADRG maps.

6.7.1 Viewing CADRG Maps from a Compact Disk

To configure your TracerLink Configuration to read NIMA CADRG maps directly from a compact disk follow the steps below:

(1) Insert a CD (which has NIMA CADRG maps on it) into the Control Station laptop's CD player.

(2) Open the NIMA Raster Kit Control window by using the Kit Bar. To open the Kit Bar slowly slide the cursor off the right side of the map. When you approach the edge of the map the Kit Bar will appear. Select the CADRG button on the Kit Bar. After you have selected this button, NIMA Raster Kit Control will open (see Figure 6-23).

Figure 6-23 NIMA Raster Kit Control Window

(3) Once you have the NIMA Raster Kit Control window, you will need to go to the appropriate folder on the CD where the NIMA CADRG maps are stored. To view what is on the CD double click on the **My Computer** icon, (see Figure 6-24).

Figure 6-24 My Computer Icon

(4) The **My Computer** window should open, (see Figure 6-25).

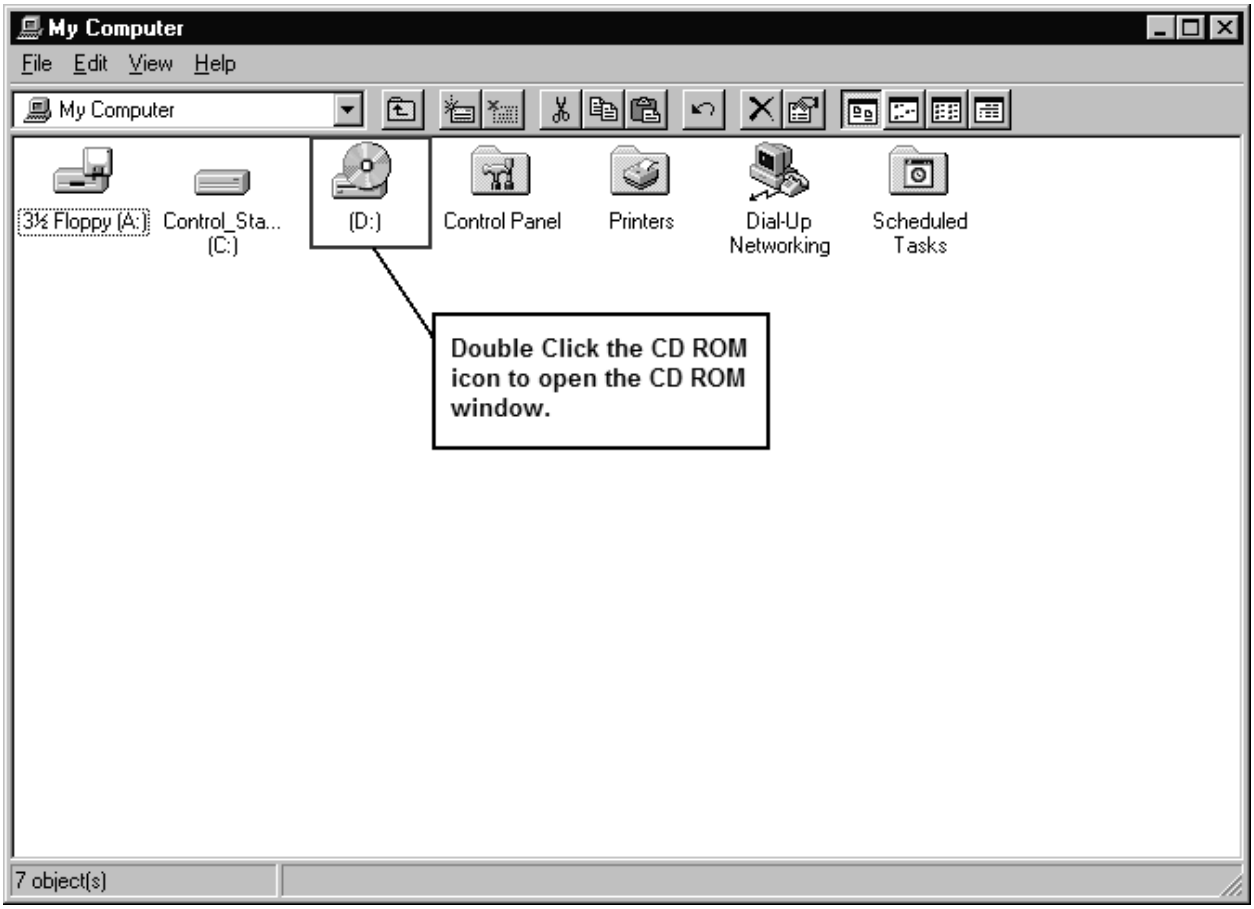


Figure 6-25 My Computer Window

(5) Double click on the CD ROM icon (see Figure 6-25). The CD ROM drive on the Control Station laptop will typically be labeled with the letter "**D**".

(6) Once you have opened the CD ROM, you will need to find the maps. Every CD ROM may have a slightly different filing method of storing the maps. Therefore you will need to be able to recognize when you have found the CADRG map files. Individual CADRG map files will be saved as a group into one folder. The folder containing the map files may be located several levels within the file structure. In other words you may need to double click on several folders before you find the map files. An example of a folder of CADRG files is included in Figure 6-26. As Figure 6-26 illustrates there can be hundreds of CADRG maps files in one folder.

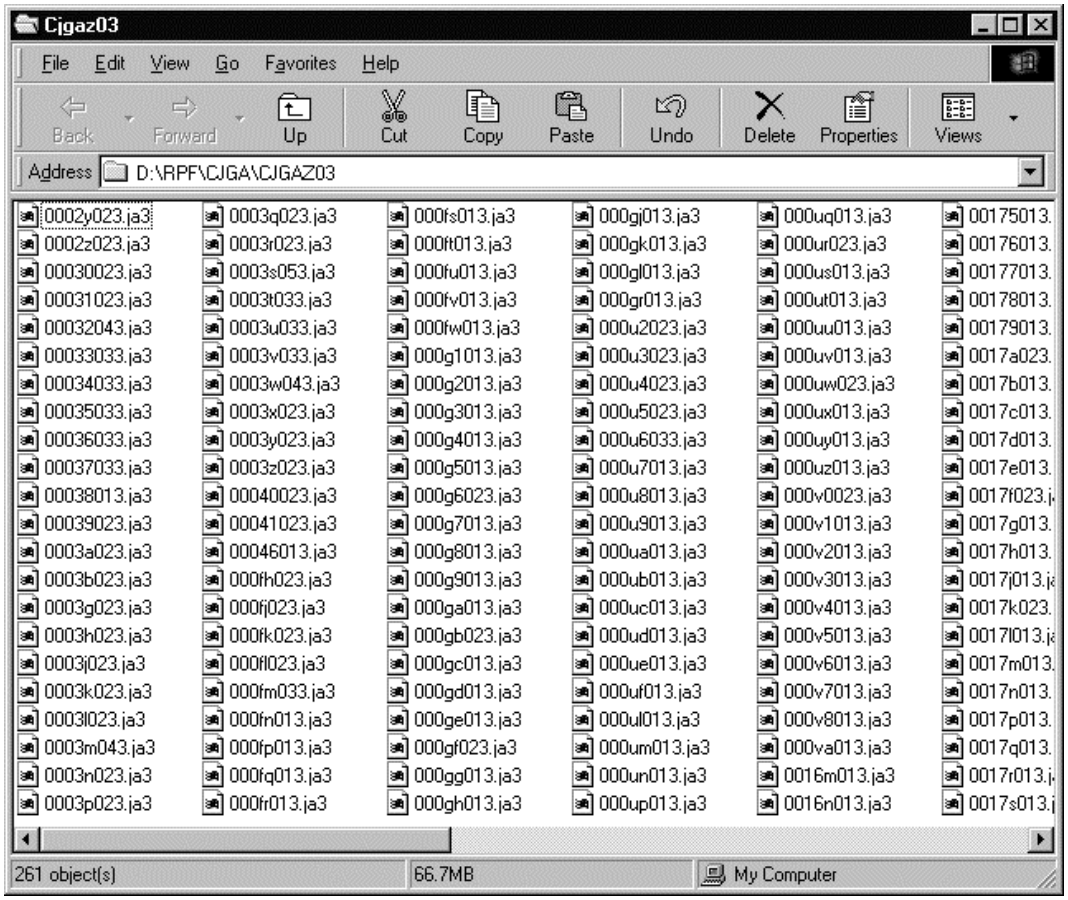


Figure 6-26 NIMA CADRG Map Files

(7) Once you have found the individual map files, go to the **Edit** menu option. Choose the **Select All** option. This will highlight all the files in the window.

(8) Maximize your TracerLink Map Viewer window if it was minimized. Now you should have at least three windows open and maximized (visible) simultaneously, the Map Viewer, the CADRG Map files, and the NIMA Raster Control Kit window (see Figure 6-27).

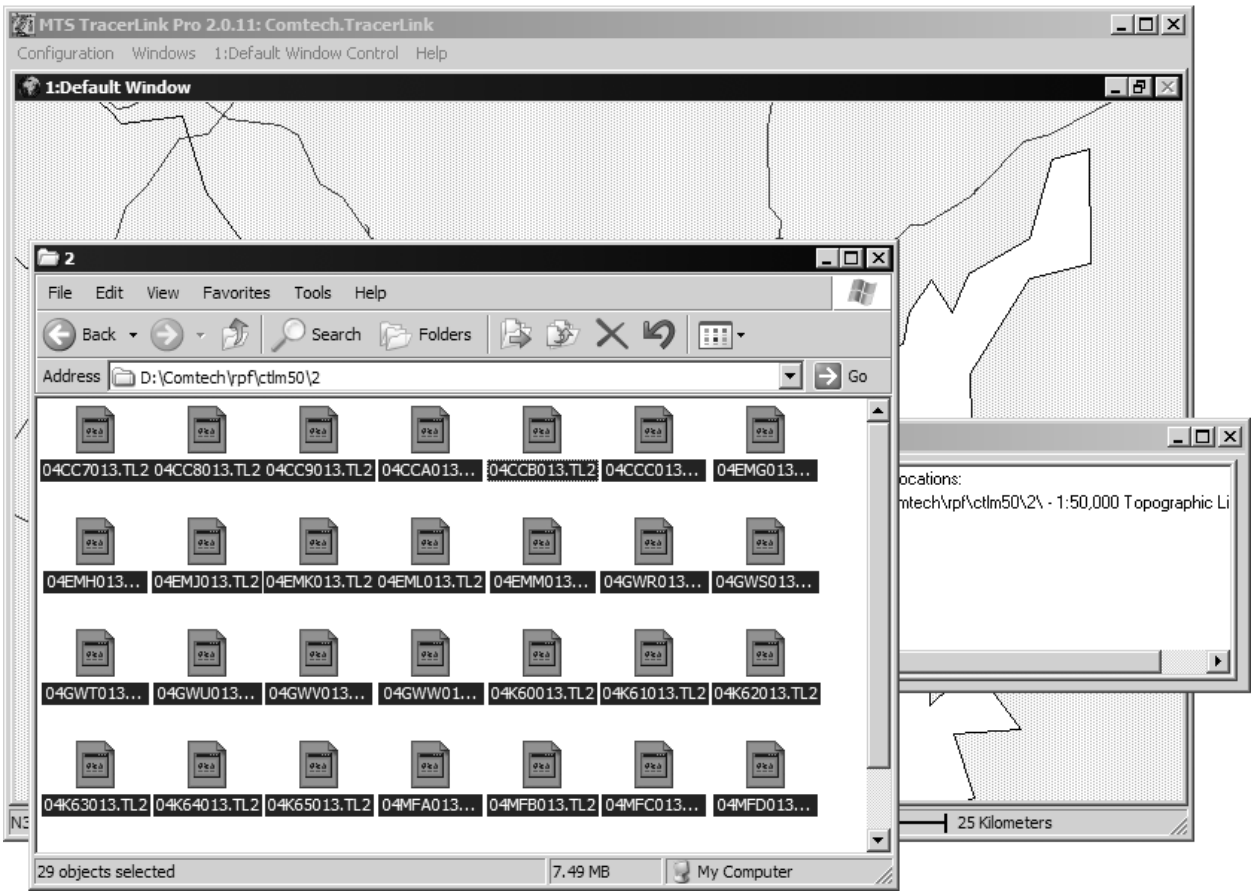


Figure 6-27 TracerLink Map Viewer open with the CADRG Map Files Folder Open

(9) Click your mouse on the selected files. Then drag the files on to the map. A cross or plus sign (+) will appear next to your arrow (cursor) indicating that you are about to add maps to the configuration. Let go of the mouse.

(10) The maps should begin loading into the **NIMA Raster Control Kit** window. If you want to verify that it is loading correctly, check the **NIMA Raster Control Kit**. You should see a blue bar next to the words "Building a Table of Contents," (see Figure 6-28). If this blue bar does not appear you are not loading the maps correctly.

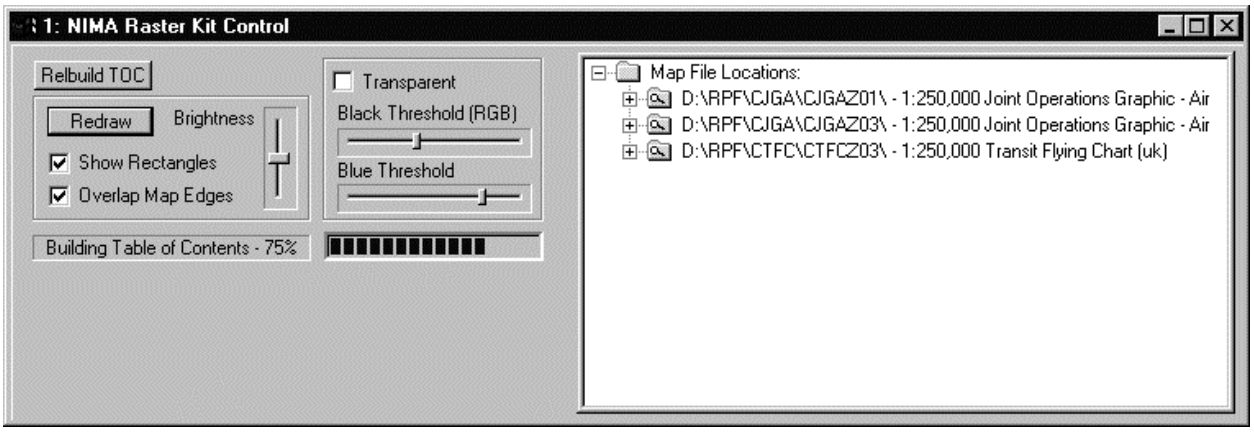


Figure 6-28 NIMA Raster Kit Control Window Showing the Maps Loading

(11) It is now possible to close the CADRG Map folder and the **NIMA Raster Kit Control** window (unless you want to load more maps from the CD).

NOTE: When reading directly from a CD the maps are not saved to the hard drive. Before exiting TracerLink, you will be asked if you want to save the configuration. If you do save the configuration, you will need the CD to view the CADRG maps in your subsequent sessions of TracerLink. If you want to save the configuration and not use the CD in the future, you will need to load the maps on the computer (see next section).

6.7.2 Loading NIMA CADRG Maps to the Computer's Hard Drive

The section above described how to view NIMA CADRG maps from a CD. Viewing maps directly from a CD is good for temporary situations where you will not need the maps for a long period of time. If you believe that you will need the NIMA CADRG maps for a long time, you should load the maps to the appropriate map folder on the hard drive. In order to do this you will need a CD with NIMA CADRG maps on it.

To load the maps to the hard drive follow steps below:

(1) Double click the My Computer icon, (see Figure 6-24).

(2) Double click on the CD ROM icon (see Figure 6-25). The CD ROM drive on the Control Station laptop will typically be labeled with the letter "E."

(3) Once you have opened the CD ROM, you will need to find the maps. Every CD ROM may have a slightly different filing method of storing the maps. Therefore you will need to be able to recognize when you have found the CADRG map files. Individual CADRG map files will be saved as a group into one folder. The folder containing the map files may be located several levels within the file structure. In other words you may need to double click on several folders before you find the map files. An example of a folder of CADRG files is included in Figure 6-26.

(4) Open Microsoft Windows Explorer, and then find the CADRG Maps folder of TracerLink Pro. The Maps folder can be found in the following directory path (see Figure 6-29):

C:\Program Files\Miletus Associates\TracerLink Pro\Maps\CADRG

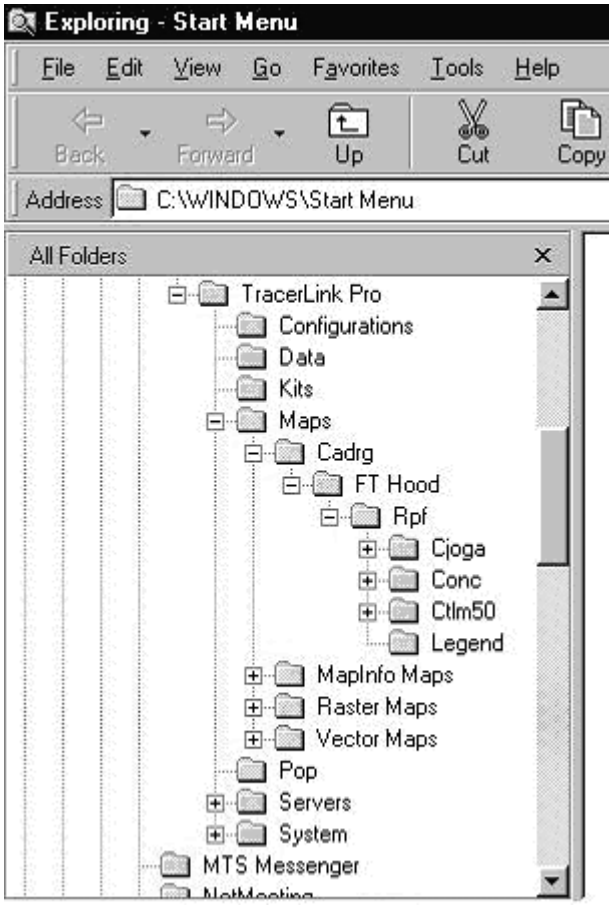


Figure 6-29 TracerLink CADRG Map Folder Location in Windows Explorer

(5) Drag the CADRG Maps folder on the CD into the TracerLink Pro Maps CADRG folder. This will copy the maps from the CD onto the hard drive.

6.7.3 Viewing CADRG Maps Directly from the Hard Drive

Once the maps are copied over to the hard drive, you can configure the TracerLink to view the NIMA CADRG maps from your hard drive rather than the CD. The steps that follow are the same as reading the maps from the CD.

(1) Find the CADRG Maps folder (on your hard drive) that you want to see in your TracerLink Map Viewer. Once you have opened the folder and you can see the CADRG map files (see Figure 6-26) go to the Edit menu option. Choose the Select All option. This will highlight all the files in the window.

(2) Open the NIMA Raster Kit Control window by using the Kit Bar as seen in Figure 6-11. To open the Kit Bar slowly slide the cursor off the right side of the map. When you approach the edge of the map the Kit Bar (Figure 6-11) will appear. Select the CADRG button on the Kit Bar. After you have selected this button, NIMA Raster Kit Control will open, (see Figure 6-23).

(3) Maximize your TracerLink Map Viewer window if it was minimized. Now you should have at least three windows open and maximized (visible) simultaneously, the Map Viewer, the CADRG Map files, and the NIMA Raster Control Kit window (see Figure 6-27).

(4) Click your mouse on the selected NIMA CADRG files. Then drag the files on to the map. A cross or plus sign (+) will appear next to your arrow (cursor) indicating that you are about to add maps to the configuration. Let go of the mouse.

(5) The maps should begin loading into the NIMA Raster Control Kit window. If you want to verify that it is loading correctly, check the NIMA Raster Control Kit. You should see a blue bar next to the words "Building a Table of Contents," (see Figure 6-28). If this blue bar does not appear you are not loading the maps correctly.

(6) Save the TracerLink configuration.

6.8 Configuring TracerLink to Show Specific NIMA Maps

The **Select NIMA Raster Kit** allows the user to select specific maps from a group of NIMA maps. The user views only the maps selected from the CD-ROM or Hard Drive. To enable the **Select NIMA Raster Kit** function:

(1) Load maps from a CD-ROM or the Hard Drive.

(2) Create a destination folder. See example below for instructions on how to create a destination folder.

(a) Open **Microsoft Windows Explorer** (see Figure 6-30).
(b) Double click on the icon for the **hard drive "C"** to view contents.
(c) Double click on the **Program Files** folder icon to view contents.
(d) Double click on the **Miletus Associates** folder icon to view contents.
(e) Double click on the **TracerLink** folder icon to view contents.
(f) Double click on the **Maps** folder to view its contents. Your Windows Explorer should look similar to Figure 6-30.

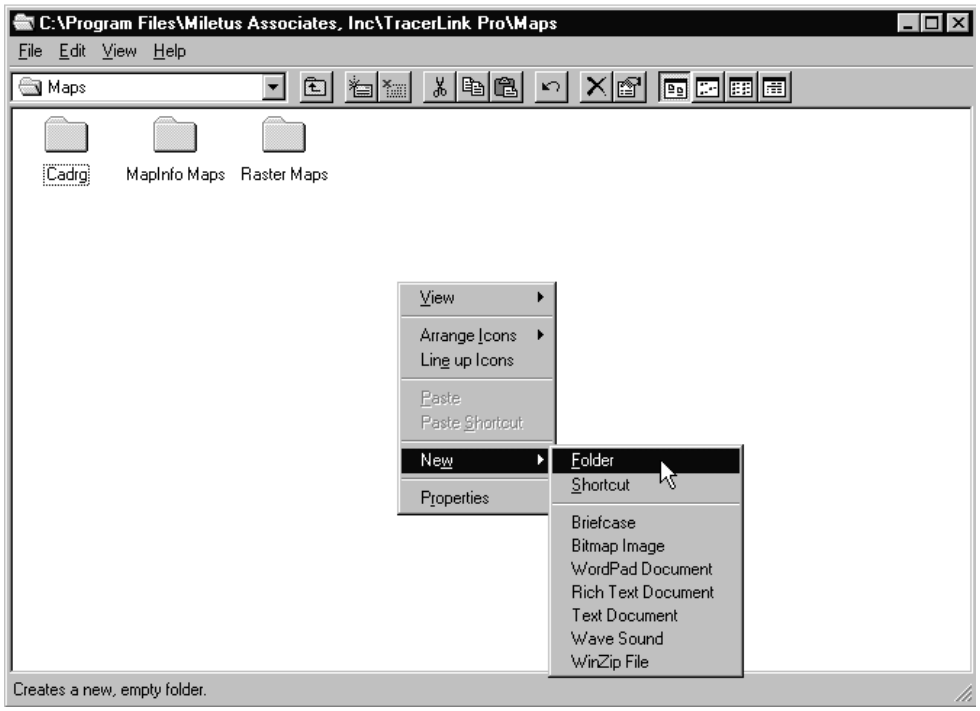


Figure 6-30 Creating a Destination Folder

(g) Right click your mouse on the right pane of Windows Explorer.
(h) Select New, then Folder. A New Folder will be created. Type a name for the new folder.

(3) Select the TracerLink Pro window and right click on the map, choose the **Select NIMA Raster Kit** option from the Pop-Up menu. The Cursor will change to a globe with an arrow.

(4) Use this cursor to select map area.

(5) Open the **NIMA Raster Kit Control** window (see Figure 6-28).

(6) Press Copy Selection button on the NIMA Raster Kit Control window. The user will be prompted to copy to the destination folder.

(7) Find the destination folder created in Step 2.G above.

(8) Remove map file group from the NIMA Raster Kit Control window (see Figure 6-31). On the **NIMA Raster Kit Control** window, select the map file group to be removed. Right click on the map file group folder. Click on **Remove File** Group. The **Delete File Group** window will open. Click **Yes**.

NOTE: The method of loading new map configurations to the MTS systems are as follows:

- **Control Stations will be loaded by using a pre-configured CD Rom inserted into the Control Stations internal CD slot.**
- **V2 computers will be loaded by using a PCMCIA hard drive with the pre -configured map files loaded.**

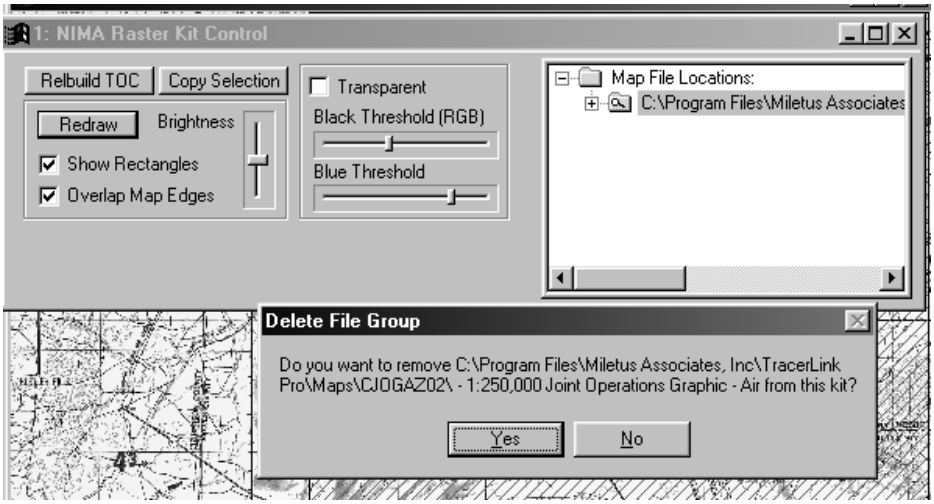


Figure 6-31 Remove Map Files

(9) Open the newly created destination folder.

(10) Select and drag the files in the destination folder to the Map Viewer until you see a cross (+) symbol. Release the mouse and the maps will load into the Map Viewer.

7. Control Station Functions

7.1 The Control Station Menu

The Control Station menu (Figure 7-1) gives the user of a Control Station the ability to create, modify, and delete control groups. Each control group consists of one or more vehicles and is assigned a unique numeric identifier.

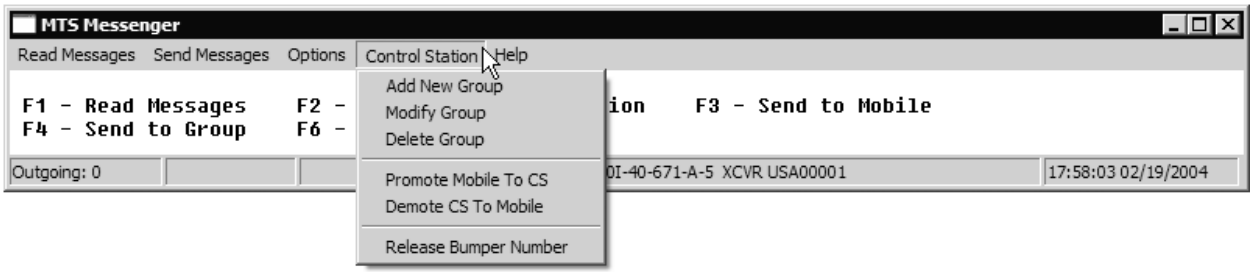


Figure 7-1 Control Station Menu

7.1.1 Control Station → Add New Group

To create a new Control Group, select Add New Group from the MTS Messenger Control Station menu. MTS units can be added to the new group. Mobile units will be removed from their existing group and added to the new group while Control Stations will be added to the new group and remain in their existing group. This allows the Control Station operator, System Administrator, or CSSAMO the ability to customize control groups to suit the mission (see Figure 7-2).

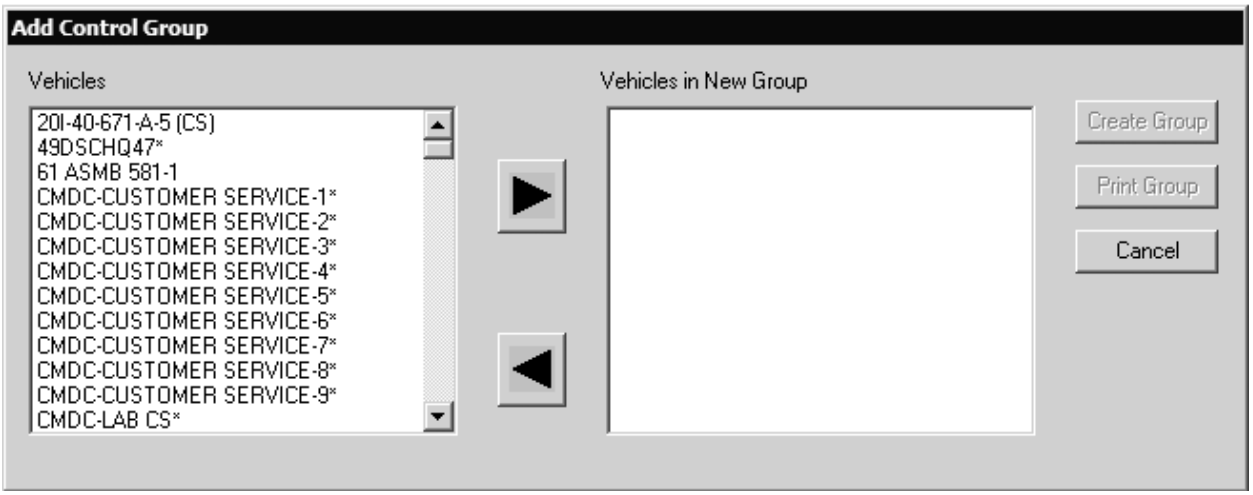


Figure 7-2 Add Control Group Dialog

(1) Select **Control Station → Add New Group** menu option.

(2) To add a vehicle, the Control Station operator should select one or more vehicles from the list on the left. To select more than one vehicle the operator can hold down the Ctrl key and click on individual units (see Figures 7-3 and 7-4).

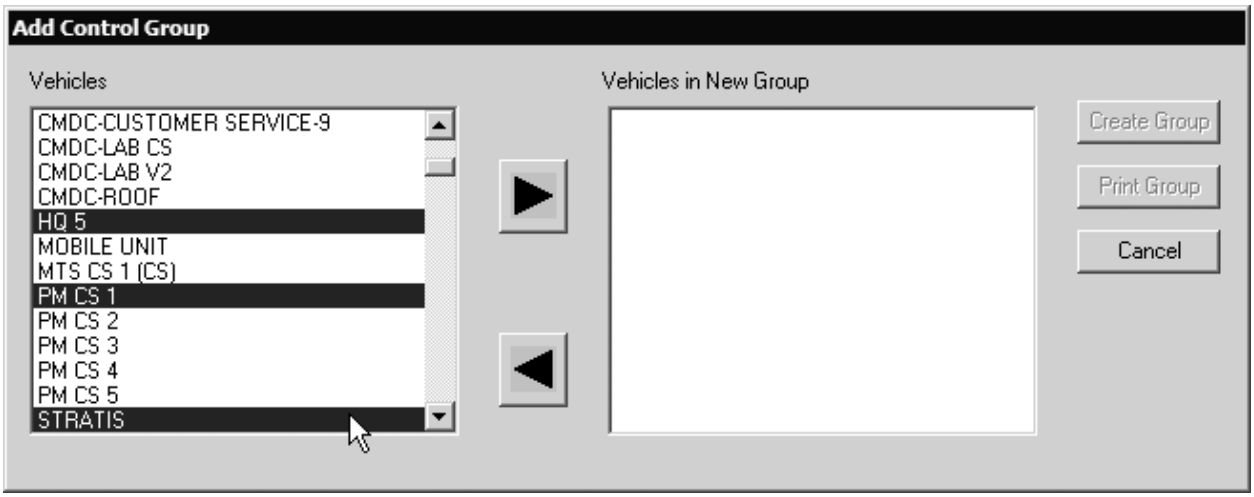


Figure 7-3 Selecting several units

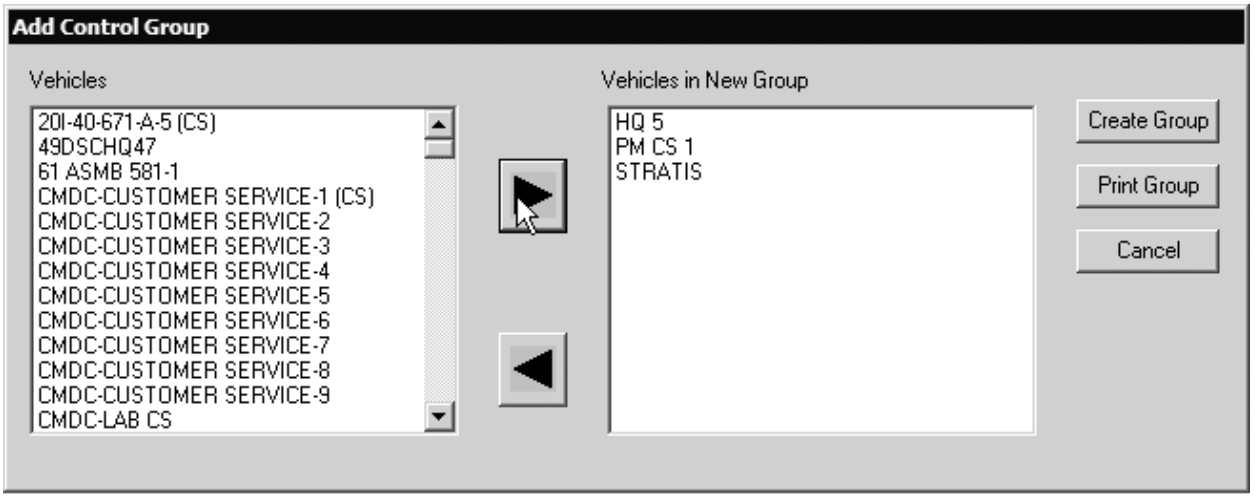


Figure 7-4 Several units added to the new group

The operator may also select one unit, hold down the Shift key and select another unit, all units between the two selected units in the list will then be selected (see Figures 7-5 and 7-6).

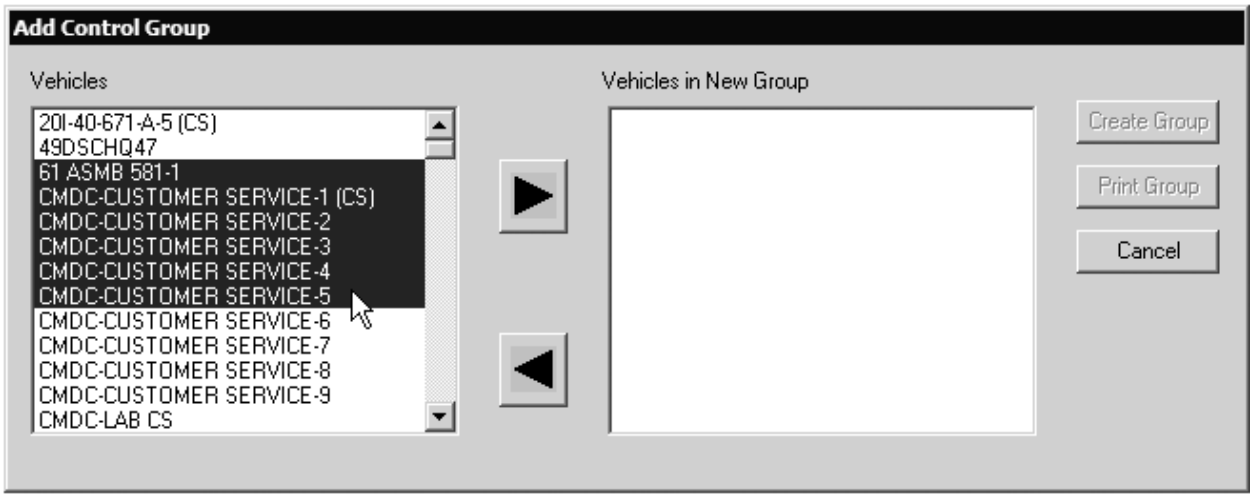


Figure 7-5 Selecting a range of units

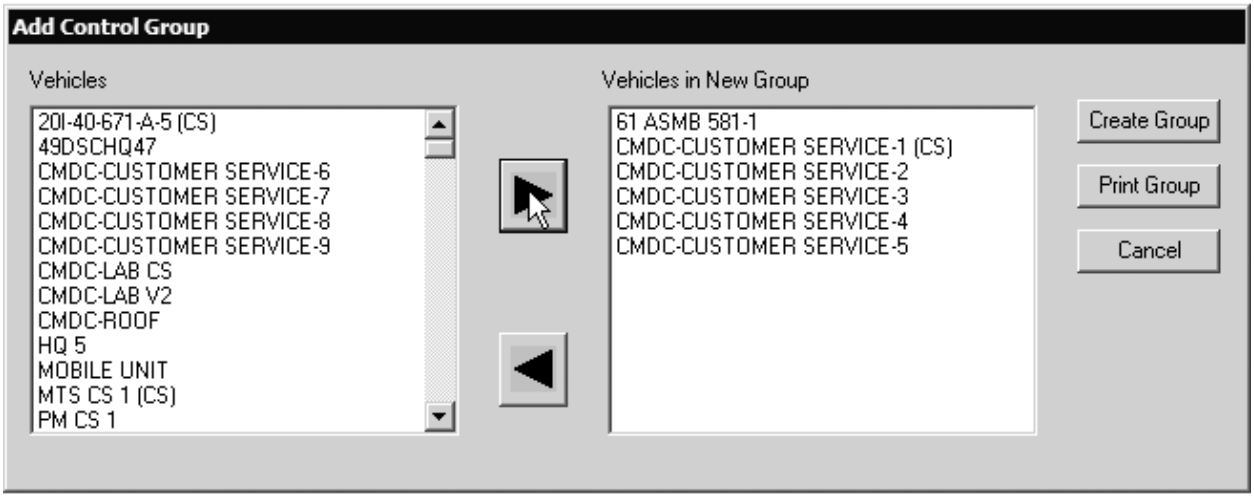


Figure 7-6 Range of units added to new group

(3) Once one or more vehicles have been selected press the ► button to move the vehicles to the new group. The ◄ button can be used to remove vehicles from the new group.

(4) Before creating the Control Group, the Control Station operator can print the pending Control Group, by pressing the **Print Group** button.

(5) Once all vehicles have been specified for the pending group, the user presses the **Create Group** button. The user can cancel creation of a group by pressing the **Cancel** button.

NOTE: The maximum size for a Control Group is 11,000 vehicles. If a user attempts to create a group that exceeds 11,000 vehicles, MTS Messenger will issue an error message. The maximum number of simultaneous Control Groups is 255. Units not in service should not be assigned a Control Group.

(6) After the user presses the **Create Group** button, the following messages are displayed:

Figure 7-7 Sent Create Group Request Message

When the group is successfully created the user will receive the following message (Figure 7-8).

Figure 7-8 Added to Group Message

If MTS Messenger is unable to create a group because there are already the maximum number of groups create, the following message box (Figure 7-9) will be displayed and the user will have to delete an existing group before the new group can be created (see Section 7.1.3).

Figure 7-9 Create Group Failed - Too many groups

Finally, if the user has been demoted to a mobile unit (see Section 7.1.5) while creating the group the user will receive a message indicating that the request was not authorized (see Figure 7-10).

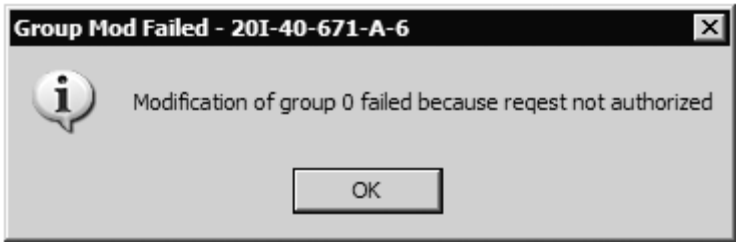


Figure 7-10 Create Group Not Authorized

NOTE: MTS Messenger learns of vehicles, their positions, and any new groups through the various messages. Because of this, there will be a lag of about five minutes between the time a unit is added to a group and the time a unit can see and send messages to other units in its group. MTS Messenger will only allow a unit to see units in its Control Group(s). Mobile units can only be in a single Control Group; therefore, if multiple requests for Control Groups are received and the same unit is in the requests, the unit is actually added to the Control Group of the last received request. Control Stations can be in more than one group.

7.1.2 Control Station → Modify Group

To modify an existing group, select **Modify Groups** from the MTS Messenger **Control Station** menu. MTS units can be moved from one group to another. This allows the Control Station operator, System Administrator, or CSSAMO the ability to customize control groups to suit the mission.

(1) Select **Control Station → Modify Group**, the Modify Control Group dialog box will appear (see Figure 7-11).

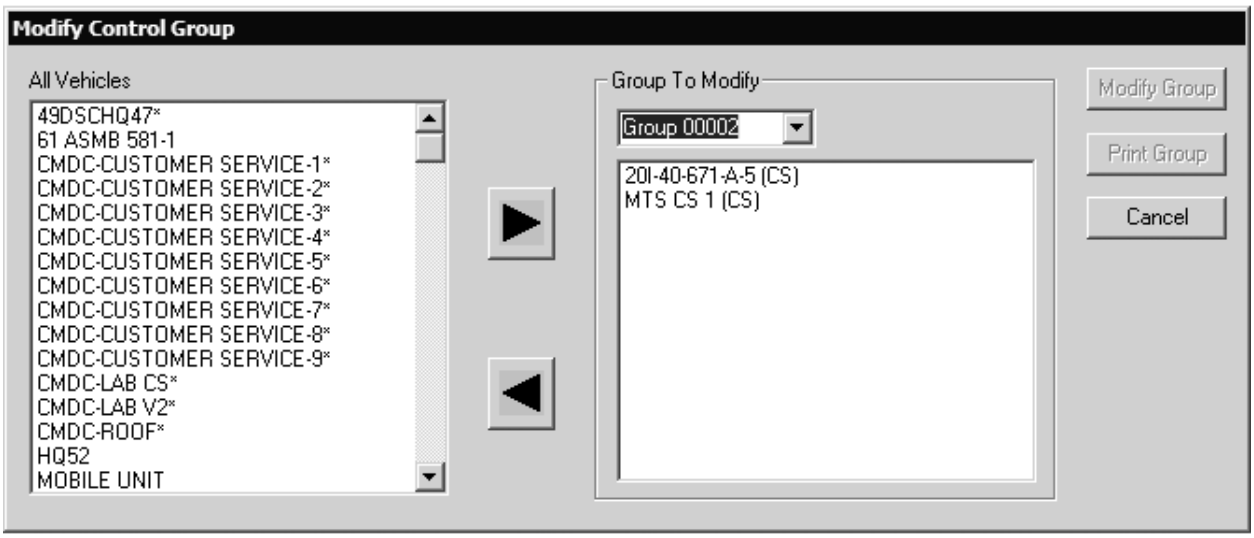


Figure 7-11 Modify Control Group Dialog

(2) Select the control group to be modified from the drop down box on the right (see Figure 7-12).

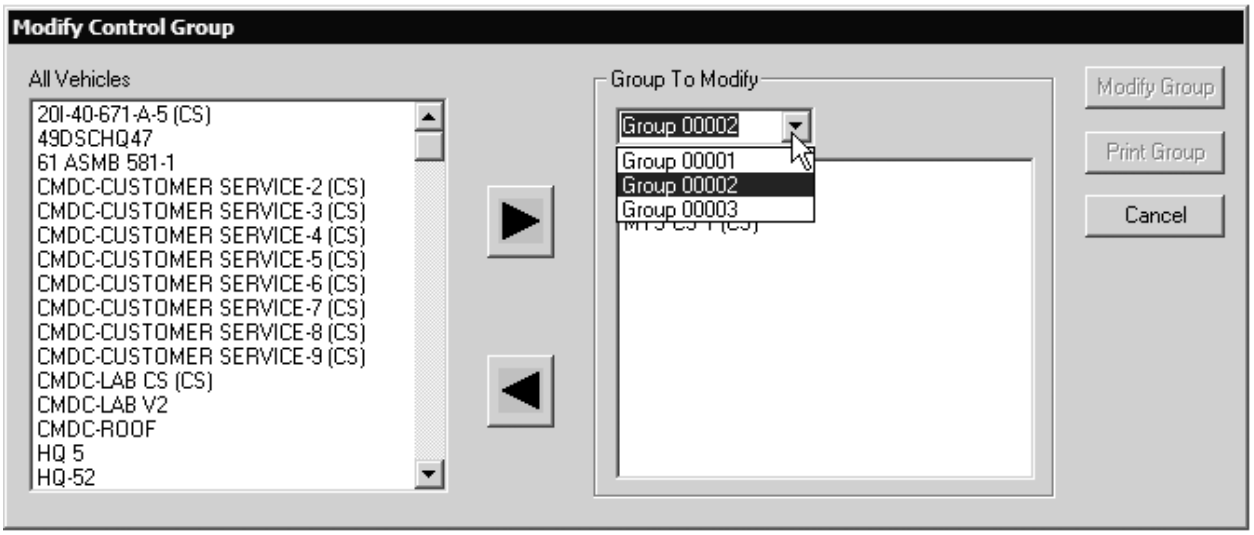


Figure 7-12 Select a Control Group to Modify

(3) Select vehicles and press the ► and ◄ buttons to add and remove vehicles from the selected group. The shift and Ctrl key can be used to select multiple vehicles as described in 7.1.1.

(4) Before modifying the Control Group, the Control Station operator can print the pending Control Group, by pressing the **Print Group** button.

(5) Once all vehicles have been specified for the pending group, the user presses the **Modify Group** button. The user can cancel modification of a group by pressing the **Cancel** button.

NOTE: The maximum size for a Control Group is 11,000 vehicles. If a user attempts to create a group that exceeds 11,000 vehicles, MTS Messenger will issue an error message. Units not in service should not be assigned a Control Group.

(6) After the user presses the **Modify Group** button, the following messages are displayed (see Figure 7-13):

Figure 7-13 Sent Modify Group Request Message

When the group is successfully modified the user will receive the following message (Figure 7-14).

Figure 7-14 Added to Group Message

If MTS Messenger is unable to modify the group because the group is currently being modified the following message box (Figure 7-15) will be displayed and the user can begin the process of creating the group again.

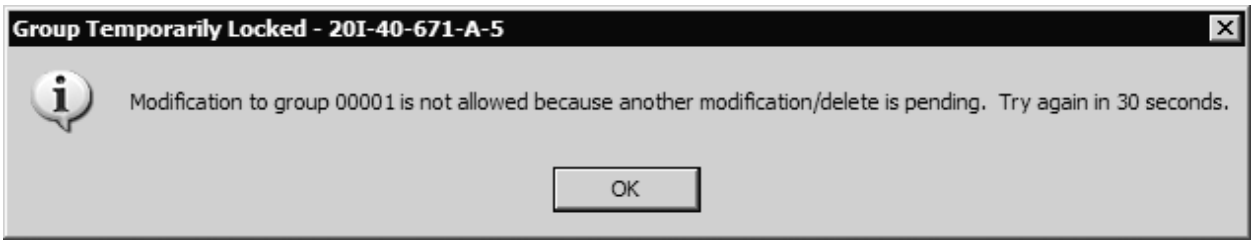


Figure 7-15 Group Not Modified Message

Finally, if the user has been demoted to a mobile unit (see Section 7.1.5) while modifying the group the user will receive a message indicating that the request was not authorized (see Figure 7-16).

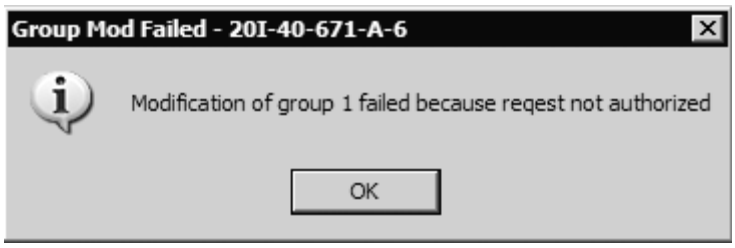


Figure 7-16 Modification of Group Not Authorized

NOTE: MTS Messenger learns of vehicles, their positions, and any new groups through the various messages. Because of this, there will be a lag of about five minutes between the time a unit is added to a group and the time a unit can see and send messages to other units in its group. MTS Messenger will only allow a unit to see units in its Control Group(s). Mobile units can only be in a single Control Group; therefore, if multiple requests for Control Groups are received and the same unit is in the requests, the unit is actually added to the Control Group of the last received request. Control Stations can be in more than one group.

7.1.3 Control Station → Delete Group

To delete an existing group, select **Delete Group** from the MTS Messenger **Control Station** menu. This allows the Control Station operator, System Administrator, or CSSAMO the ability to delete a group that is no longer needed.

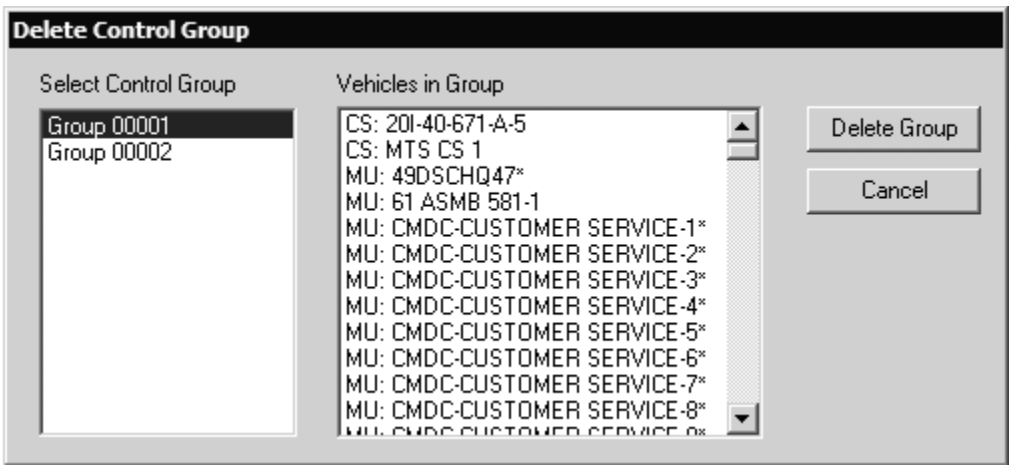


Figure 7-17 Delete Control Group

The **Select Control Group** list box shows all of the groups. For a selected Control Group, the **Vehicles in Group** list box identifies all the vehicles in a selected group.

(1) If the Control Station user wishes to delete a Control Group, select a group in the **Select Control Group** list box (Figure 7-17) and press the **Delete Group** button.

(2) The operator will be asked to confirm that they wish the group to be deleted (see Figure 7-18).

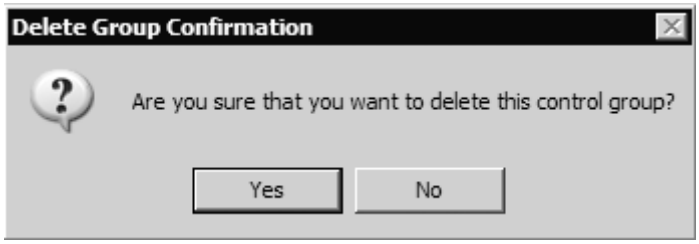


Figure 7-18 Confirm Group Deletion

If the group is successfully deleted a window will be displayed (see Figure 7-19).

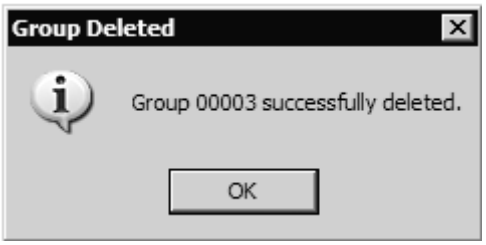


Figure 7-19 Group Successfully Deleted

Otherwise a message will be displayed indicating that the delete request failed (see Figure 7-20).

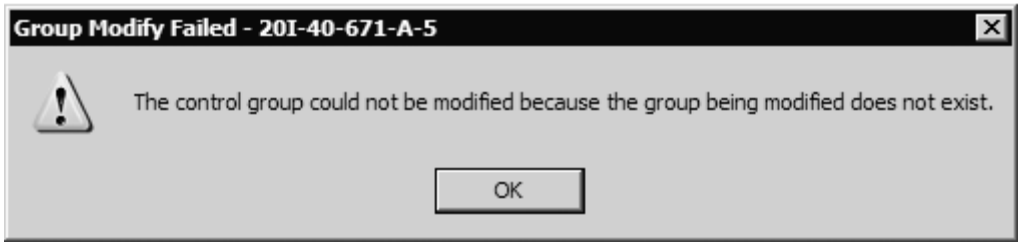


Figure 7-20 Delete Request Failed

Also, if delete group requests have been restricted the user will receive a message from the server indicating that the group delete request was denied and what unit to contact to delete the group (see Figures 7-21 and 7-22).

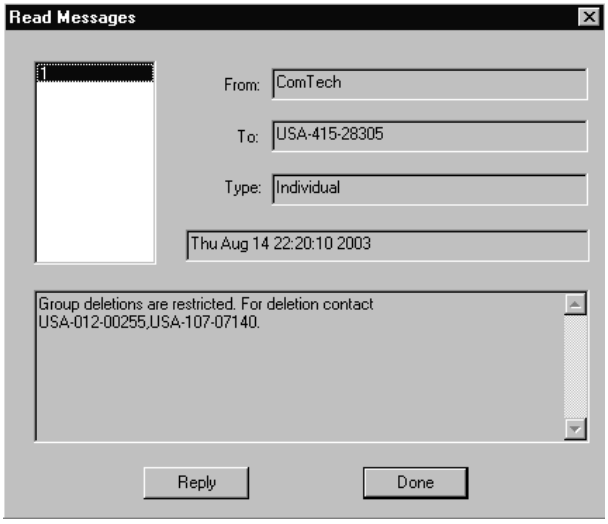


Figure 7-21 Delete Request Denied

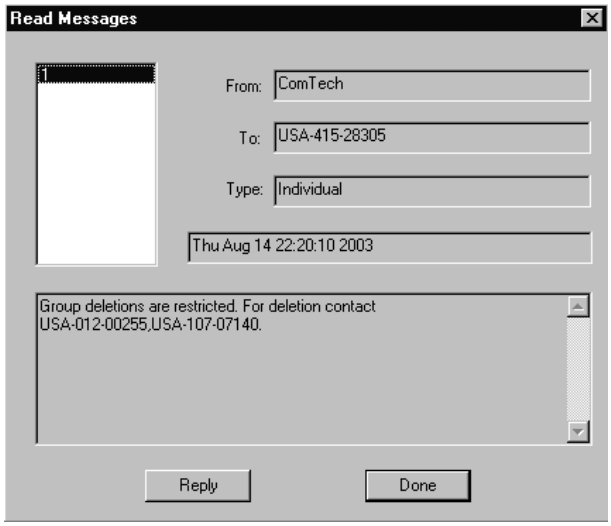


Figure 7-22 Delete Group Restricted

Finally, if the user has been demoted to a mobile unit (see Section 7.1.5) while selecting what group to delete the user will receive a message indicating that the request was not authorized (see Figure 7-23).

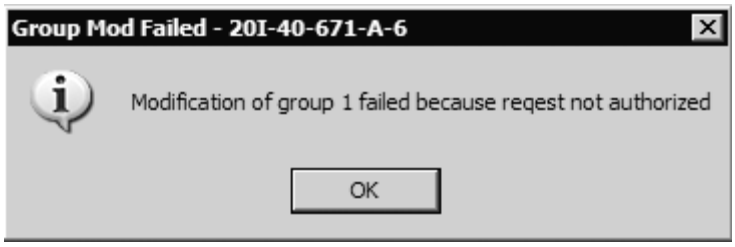


Figure 7-23 Delete Group Not Authorized

7.1.4 Control Station → Promote Mobile to CS

Under certain situations a Mobile Unit may need to be promoted to Control Station status. To promote a unit follow these steps:

(1) Select **Control Station → Promote Mobile to CS** on the MTS Messenger menu bar (see Figure 7-24).

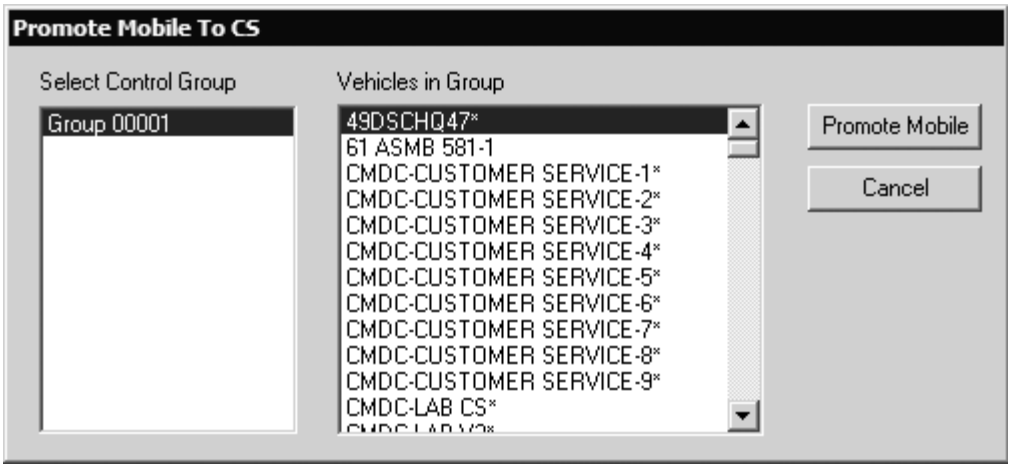


Figure 7-24 Promote Mobile to CS Dialog Box

(2) Select a Control Group.

(3) Identify and select the unit within the Control Group that should be promoted. Press the **Promote Mobile** button.

(4) A window will be displayed that confirms that the mobile unit was promoted to a control station (see Figure 7-25). The mobile unit will be notified of its new status in about five minutes.

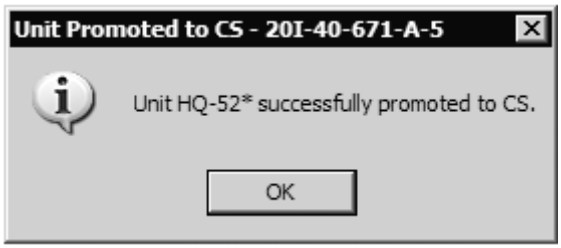


Figure 7-25 Promotion Confirmation

If the user attempts to promote a unit that has already been promoted or if the user has been demoted to a mobile unit while choosing what unit to promote a message will be displayed indicating that the promotion request failed (see Figure 7-26).

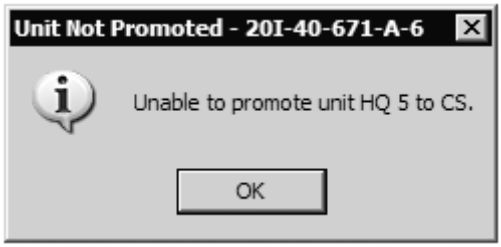


Figure 7-26 Promotion Request Failed

7.1.5 Control Station → Demote CS to Mobile

Under certain situations a Control Station may need to be demoted to Mobile Unit status. To demote a unit follow these steps:

(1) Select **Control Station → Demote CS to Mobile** on the MTS Messenger menu bar. (See Figure 7-27).

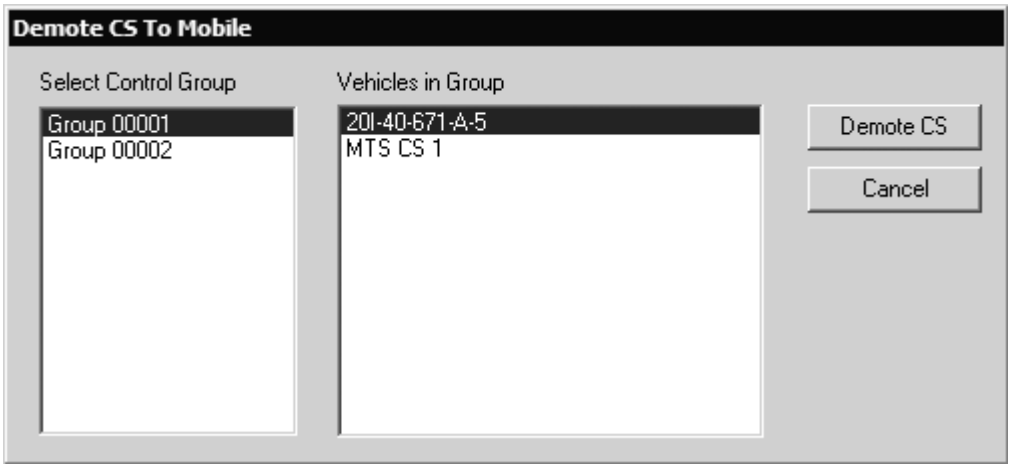


Figure 7-27 Demote CS to Mobile Dialog Box

(2) Select a Control Group.

(3) Identify and select the unit within the Control Group that should be demoted. Press the **Demote CS button** (Figure 7-27)

NOTE: If the Control Station is assigned to more that one group, it cannot be demoted. The unit MUST be deleted from all groups. The Modify Control Groups function allows the Administrator to delete the unit from its group.

(4) A window will be displayed that confirms that the mobile unit was demoted to a mobile unit (see Figure 7-28). The mobile unit will be notified of its new status in about five minutes.

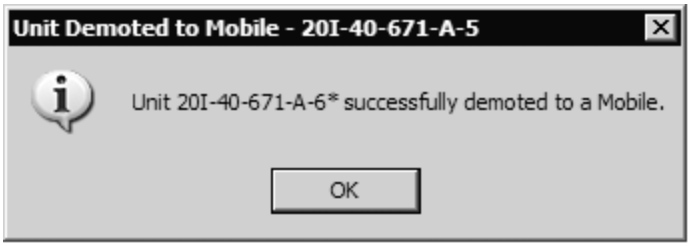


Figure 7-28 Demotion Confirmation

If the user attempts to demote a unit that has already been demoted or if the user has been demoted to a mobile unit while choosing what unit to demote a message will be displayed indicating that the demotion request failed (see Figure 7-29).

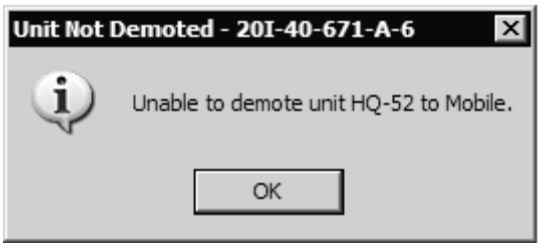


Figure 7-29 Demotion Request Failed

7.1.6 Control Station → Release Bumper Number

(1) To release a bumper number that is assigned to a unit select the Release Bumper Number option on the Control Station menu (see Figure 7-30).

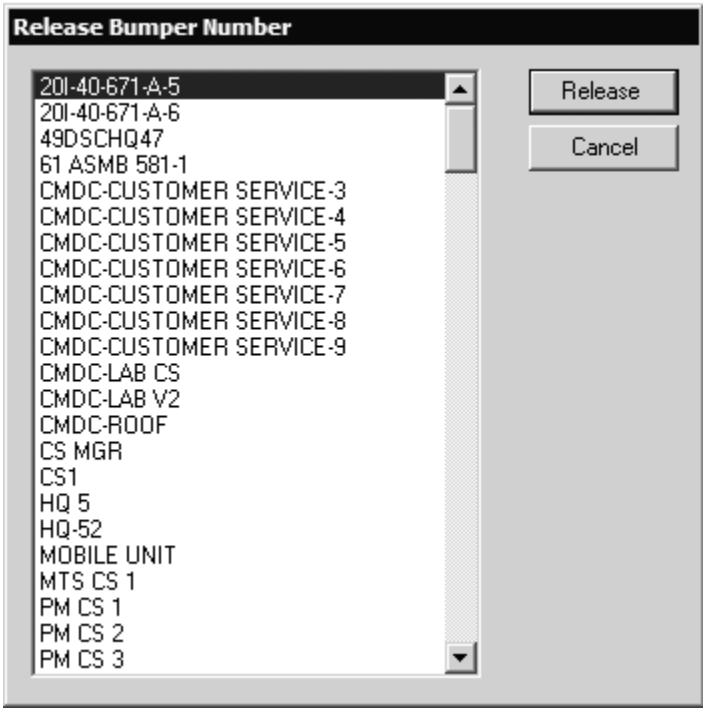


Figure 7-30 Release Bumper Number Dialog

(2) Select the Bumper Number that you wish to delete.

(3) Press the **Cancel** button to exit the dialog.

(4) Press the **OK** button.

(5) You will see a confirmation message that the request was sent (see Figure 7-31).

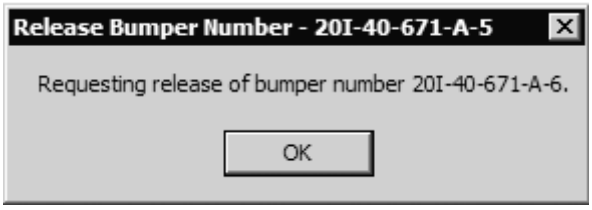


Figure 7-31 Release Bumper Number Request Sent

(6) If you have selected a Bumper Number that belongs to a vehicle that is not in one of your control groups you will be asked to confirm the request (see Figure 7-32).

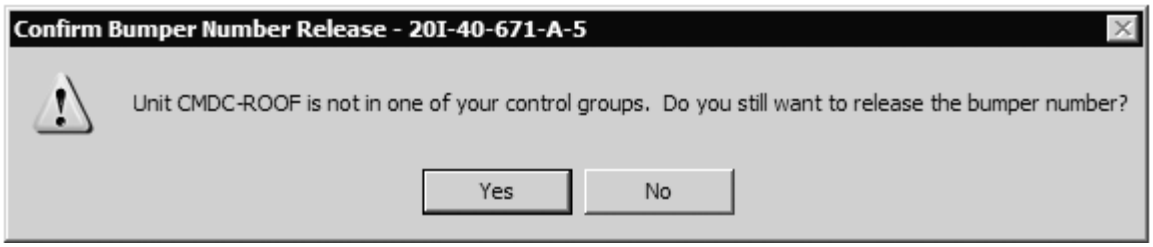


Figure 7-32 Unit not in Group Warning

(7) Press the **Yes** button if you still want to release the bumper number.

(8) If you press the **No** button the dialog will remain and you will be able to select a different bumper number to release.

(9) If the Bumper Number is successfully released you will receive a confirmation message (see Figure 7-33).

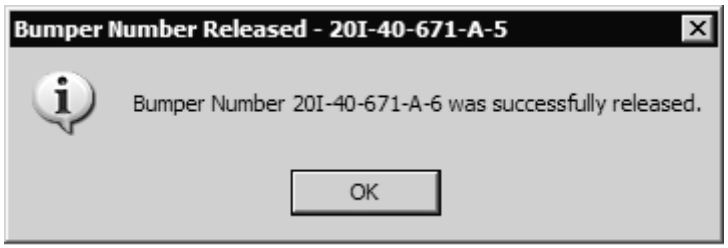


Figure 7-33 Bumper Number Successfully Released

7.2 The Help Menu

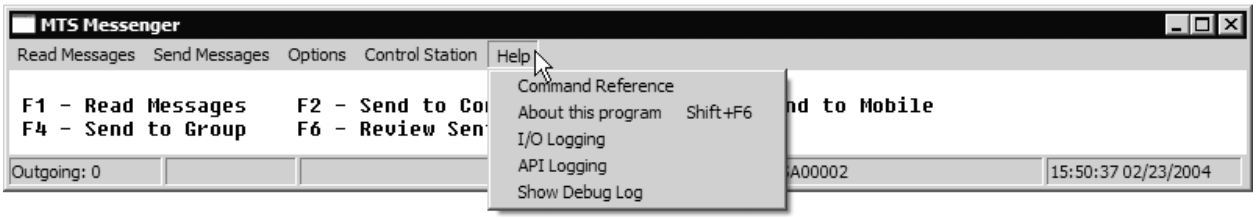


Figure 7-34 The Help Menu

7.2.1 Help → About this program

To determine the MTS version loaded on your computer, select **Help** from the MTS Messenger menu. Select **About this program** (see Figure 7-35).

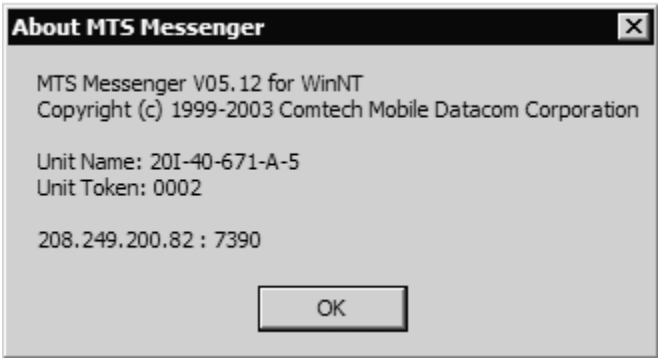


Figure 7-35 About MTS Messenger

7.2.2 Help, Other menu options.

Other help menu options are System Administrator tasks and are described in section 9.

8. Troubleshooting

8.1 Control Station

8.1.1 Can't logon to windows

Be sure that you have correctly typed your **username** and **password**. Passwords are case sensitive, so ensure that the Caps Lock key is not depressed. If you are still unable to log on, contact your Control Station Operator or the unit CSSAMO. If they are not able to resolve the issue, they will contact the Comtech Mobile Datacom Support Center.

8.2 Control Station and V2

8.2.1 Error message when starting MTS Messenger

Figure 8-1 No Response from Terminal Error Message

(1) Close MTS Messenger.

(2) Restart MTS Messenger. When starting MTS messenger, be sure that the correct COM port has been selected. If you select the incorrect COM port MTS Messenger will not start. Power down the transceiver, and power it back up (per the instructions in this manual).

- Control Station configurations should use COM3
- V2 configurations refer to Errata Sheet for COM port configuration.

If you still see the error message in Figure 8-1, go to step 3.

(3) Restart MTS Messenger (per the instructions in this manual). If you still see the error message in Figure 8-1, contact your Control Station Operator or the unit CSSAMO. If they are not able to resolve the issue, they will contact the Comtech Mobile Datacom Support Center.

8.3 Call Support

Should you encounter other problems please contact your Control Station Operator, System Administrator, or the unit CSSAMO. If they are not able to resolve the issue, they will contact the Comtech Mobile Datacom Support Center.