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MTS Movement Tracking System

User Manual

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Tracerlink V2.0.11

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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

ELECTROCUTION 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. THE USE OF THE INTERNAL IN CONJUNCTION WITH EXTERNAL POWER CAN RESULT IN AN EXPLOSION OF THE PLGR.



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 which is 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, which is the MTS user equipment, 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, it is wise to take precautions to prevent unnecessary injuries.

1.2.1 Driving Operation

Two of the three standard MTS configurations will be operated in a vehicle. MTS is meant to provide improved visibility and communications for transporters.

- ⚠ WARNING:** Operating a computer in a moving vehicle could cause an accident that may injure the driver and passenger(s) as well as damage the vehicle. MTS computers should only be used in a moving vehicle if there is a passenger operating the computer. The driver should never operate the MTS computer while the vehicle is moving.

1.2.2 Bumping Injuries

The MTS A-Kits were installed in an unobtrusive place if possible. In other words, 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:** MTS equipment could be installed in the vehicle in a location where a tall person may run into it. It could be in a location where loading and unloading jeopardizes the device as well as the soldier. Use of engineer tape (or some other medium) to mark the equipment's location is advised if the equipment appears to be in the line of a soldier's normal interaction with the vehicle.
- ⚠ WARNING:** The devices installed inside the cab may be in a position where a driver or passenger would normally grab to mount the cab. The bracing for the ruggedized PC could protrude right where the driver or passenger's knee is located upon entering the vehicle. Soldier's should look, and proceed with caution when entering an unknown cab.

1.2.3 Repetitive Stress Injuries

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

- ⚠ WARNING:** If necessary precautions are not taken, extended interaction between the soldier and the visual display monitor as well as other equipment may cause temporary or permanent damage to operator health. 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 need only use the computer when sending required messages and to view the map. The computer is 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, it is always wise to take necessary precautions when working with electrical equipment. Please heed the warnings below:

- ⚠ WARNING:** Do not be misled by the term “low voltage.” Potentials as low as 50 volts may cause death under adverse conditions.

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

- ⚠ WARNING:** Never touch an exposed wire. If a piece of equipment appears damaged do not touch it. Never touch a piece of equipment to see if it is conducting electricity.

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) 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 start artificial respiration (if required).
-

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, its near real-time communications speed, and its security features.

(1) **Compatibility with Multiple Commercial Satellites**

The MTS system does not require proprietary satellites to function; it can use different types of commercial satellites. As a result, it provides flexibility in choosing a satellite in any region of the world. MTS-equipped vehicles can operate in all regions 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.

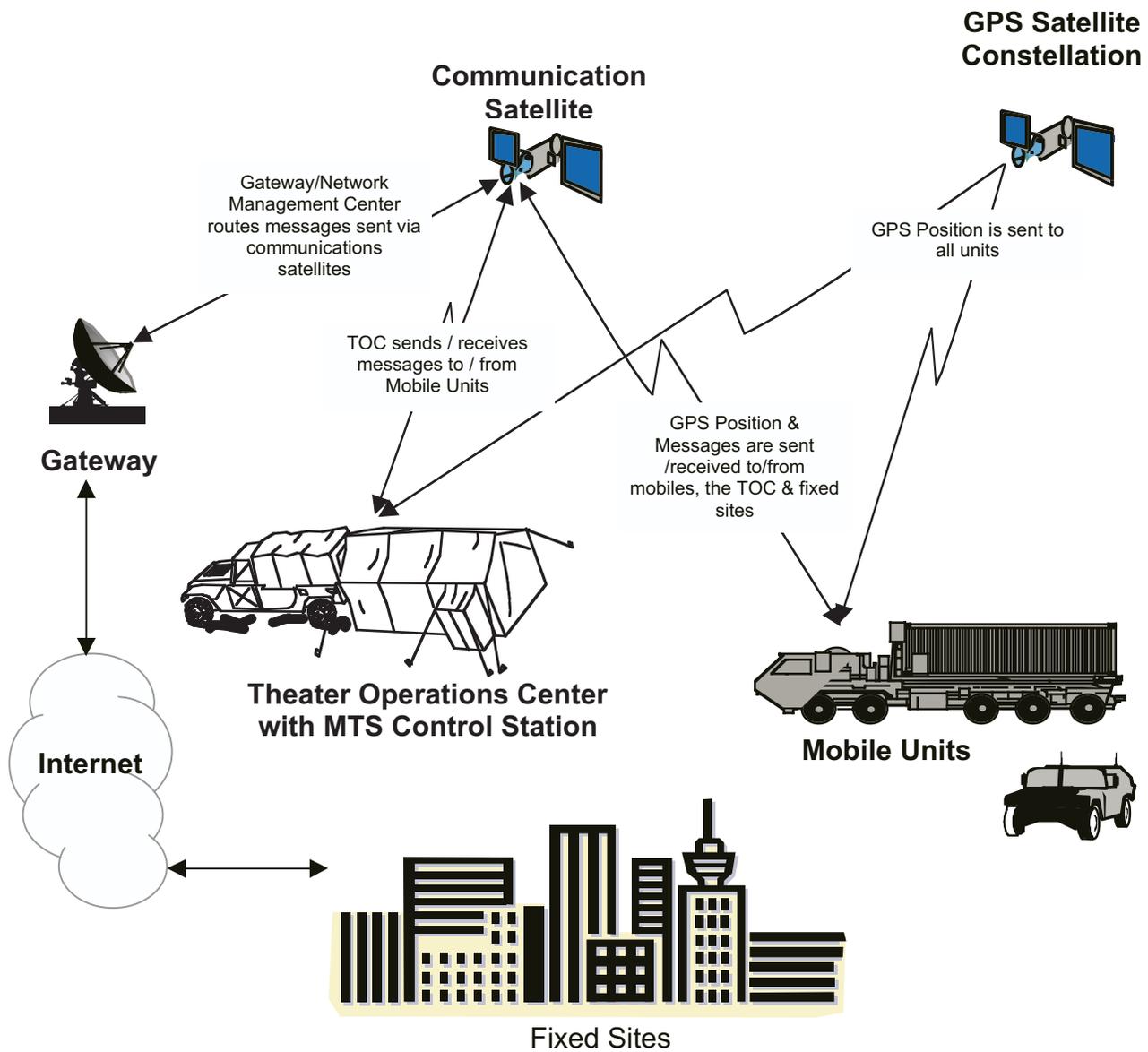


Figure 2-1 Concept of Operations

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 command tent or a parked van. 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 NIMA map loading, 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 using an installation kit designed for that 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 NIMA theatre maps displaying MTS-equipped vehicles including own unit.

Each configuration comes pre-loaded with MTS Software to include the MTS Messenger 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 does describe how to connect the B-Kit to the A-Kit and provides rough sketches of portions of the A-Kit to show the basic hookup.

3. Installation and Setup

3.1 Opening a Transit Case

The components of each MTS configuration, when not in use, should be stored within the configuration's transit case. The transit case is used to protect MTS components during shipment and storage. To open the transit case, follow these simple steps:

- (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 indeed 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.

Transit Case (Top View)

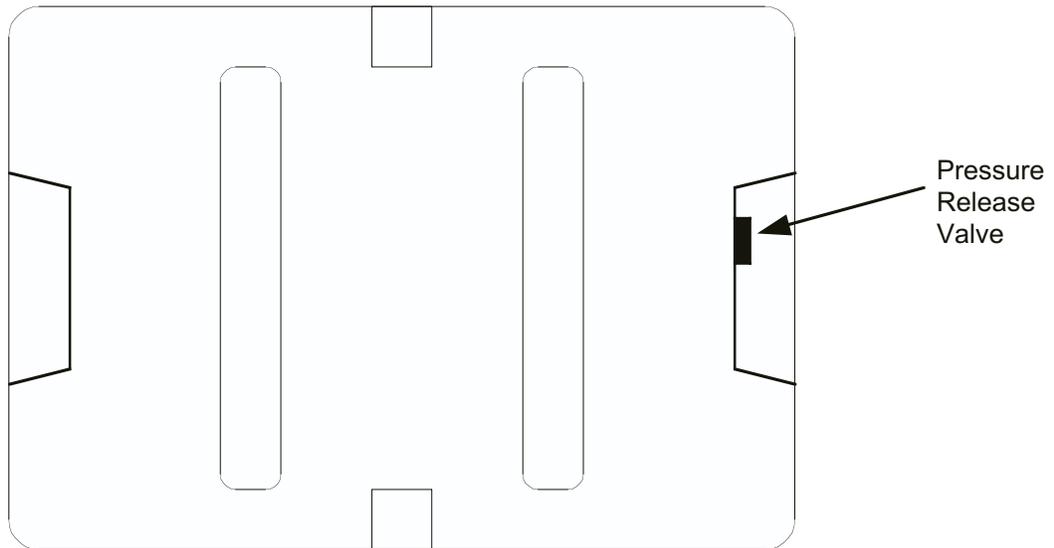


Figure 3-1 Transit Case (Top View)

3.2 Installing the Control Station Configuration

3.2.1 Equipment list

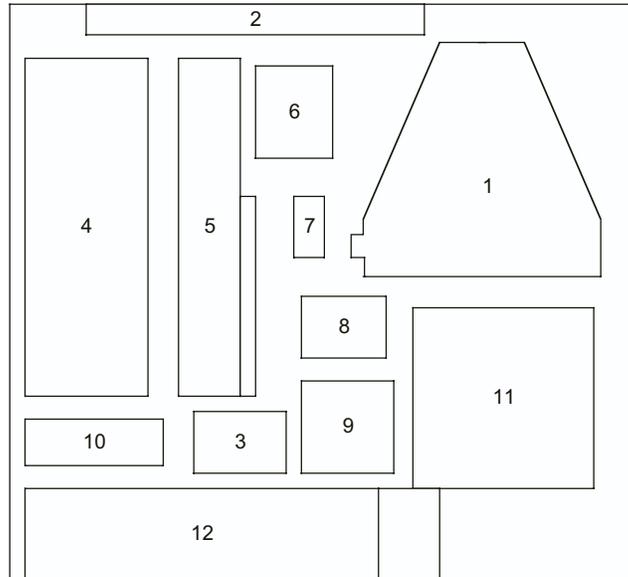


Figure 3-2 Control Station Transit Case Contents

MTS Part No	Item Description	Transit Case Location
MTS-TERM-001	Transceiver (Satellite Modem)	1
MTS-MAN-01	MTS Manual	2
	Open Cavity	3
MTS-CS-06	Printer	4
MTS-CS-01	Laptop Computer	5
MTS-CS-5A	Port Expander	5
MTS-CS-09A	Power Adapter, Printer	6
MTS-CS-07	Battery, Spare, Printer	7
MTS-CS-10	Color Cartridge, Printer	8
MTS-CS-03	Power Adapter, Laptop	9
MTS-CS-02	Battery, Spare, Laptop	10
MTS-CS-04B	100' Cable, Data, Control Box	11
MTS-CS-5B	Port Expander Cable	12
MTS-CS-04A	Control Box	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

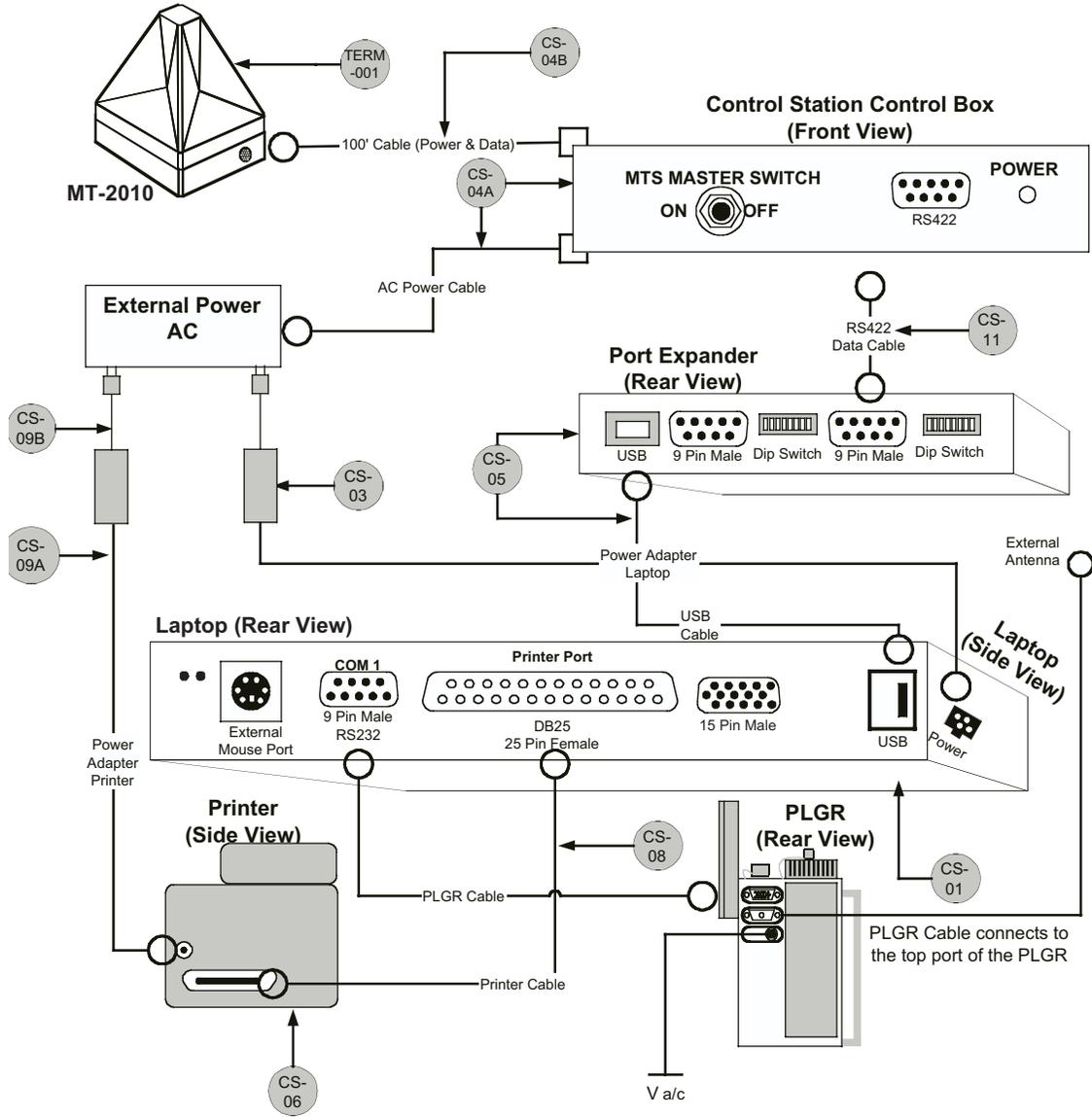


Figure 3-3 Installation of Control Station Hardware

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

NOTE: Numbers in square brackets [#] refer to the numbers in Figure 3-3.

CAUTION: Do not force cables into place. Doing so may cause damage to pins.

3.2.2.1 CS Transceiver (MT 2010) installation

- (1) Place the MTS 2010 [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 Control Box to the side of the transceiver.

3.2.2.2 CS Laptop installation

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

CAUTION: Do not connect the USB cable into the lower laptop USB port. Doing so may result in incorrectly configured port assignments upon start-up.

- (4) Using the RS422 data cable [CS-11], connect the port expander to the Control Box. Connect one end of the cable to COM3 on the port expander device [CS-05] and connect the other end to the RS422 port on the Control Box [CS-04A].
- (5) 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 necessarily need to be the same AC power source as the Control Box.

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

3.2.2.3 CS Printer installation

- (6) 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.
- (7) Using the printer power adapter [CS-09A & CS-09B] and printer cable connect the printer to the AC power supply.

3.2.2.4 CS Control Box Installation

- (8) Plug the Control Box [CS-04A] power cable to an AC power source. The Control Box can take AC power input with the following characteristics, 85 – 256 VAC, and 47 – 440Hz.

3.2.2.5 CS PLGR installation

- (9) 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.
- (10) 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.
- (11) Connect the remote PLGR antenna cable to the second port of the PLGR. Connect the remote PLGR “hockey puck” antenna to the antenna cable.
- (12) 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 is not included in the standard Control Station delivery, however the cable should be included with a PLGR.

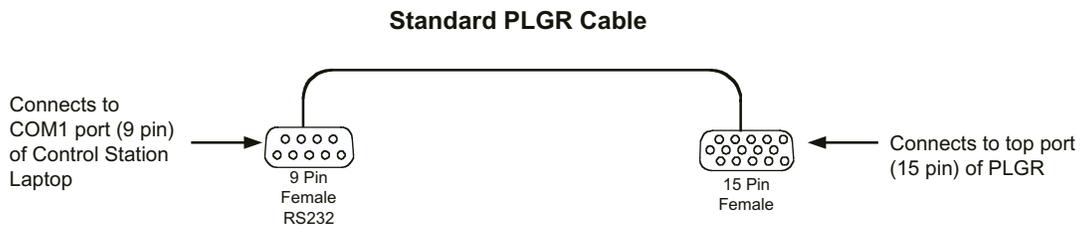


Figure 3-4 Control Station PLGR Cable Setup

3.3 Installing the V2 Configuration

3.3.1 Equipment list

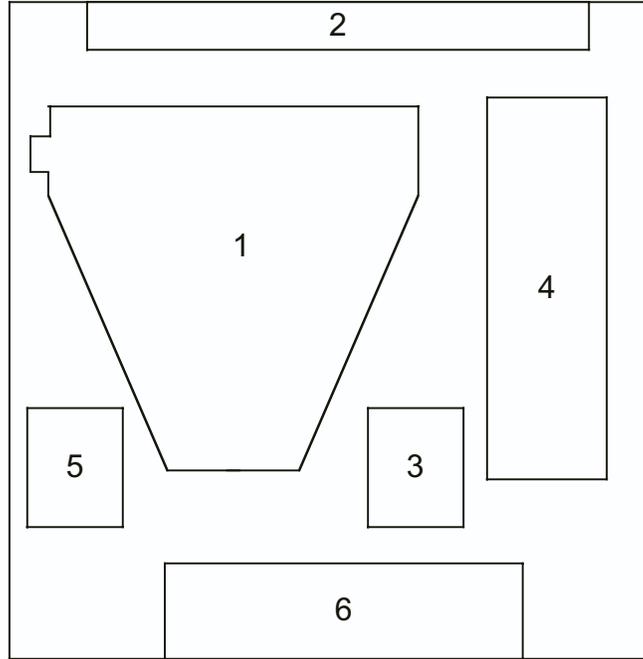
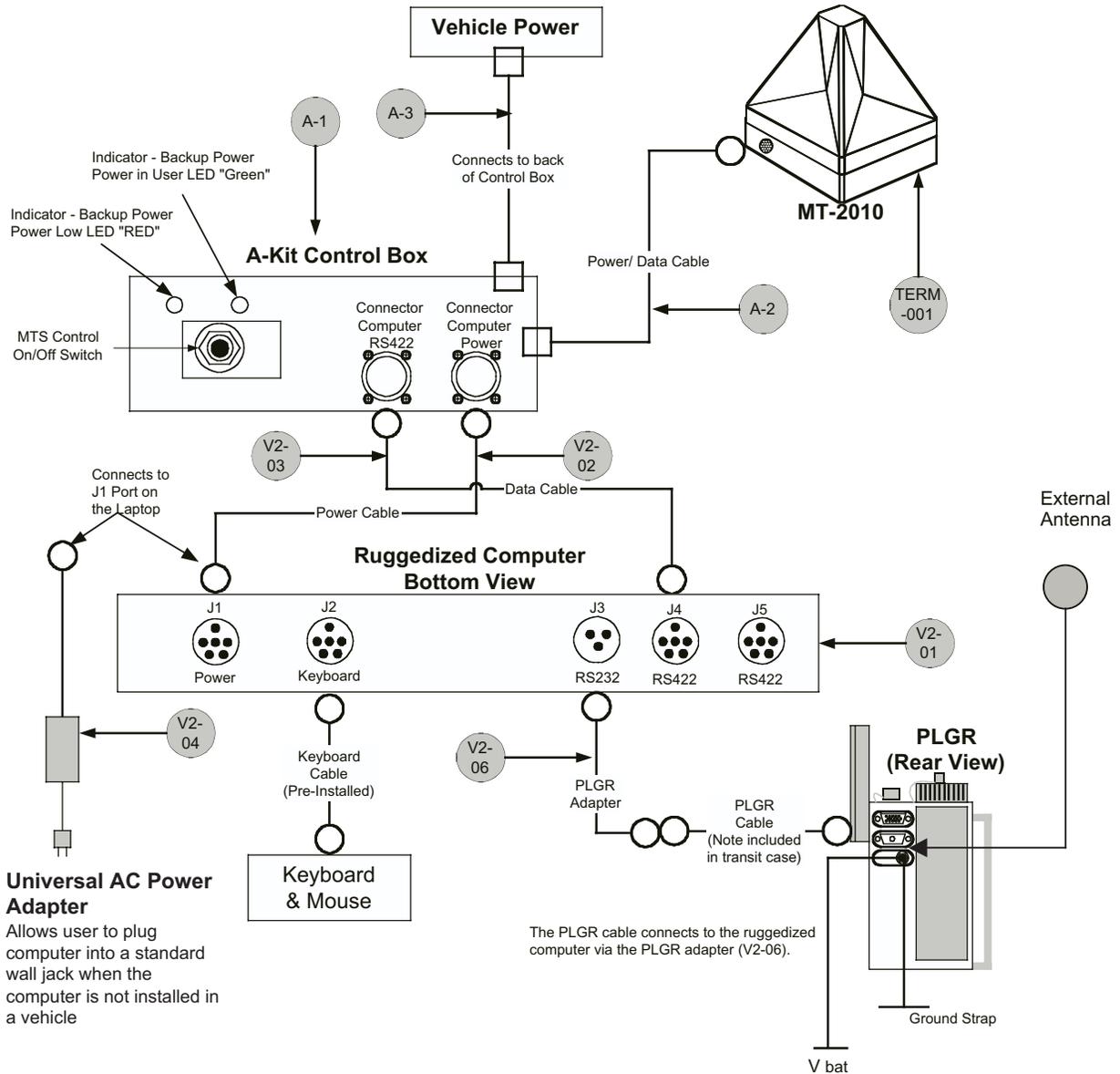


Figure 3-5 V2 Transit Case Contents

MTS Part No	Item Description	Transit Case Location
MTS-TERM-001	Transceiver (Satellite Modem)	1
MTS-MAN-01	MTS Manual	2
	PLGR	3
MTS-V2-01	Ruggedized Computer	4
MTS-V2-01A	Laptop Hard Drive	4
MTS-V2-04	Universal Power Adapter	5
MTS-V2-02	Cable, Data	6
MTS-V2-03	Cable, Power	6
MTS-V2-06	PLGR Adapter	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

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-2010 Power and Data Cable
 A-3. Vehicle Power Cable (Operators should not touch this cable).

NOTE: This diagram is not to scale.

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 [#]

CAUTION: Do not force cables into place. Doing so may cause damage to pins.

3.3.2.1 V2 Transceiver (MT 2010) installation

- (1) Attach the transceiver [TERM-001] to the A-Kit mounting bracket on the roof of the vehicle.
- (2) Attach the lanyard of 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 terminates with a connector that attaches to the transceiver. When the transceiver is not mounted on the vehicle, the power/data cable connector should be stowed on the A-Kit mounting bracket to protect the cable connector.

3.3.2.2 V2 Ruggedized computer installation to the A-Kit

- (4) Attach the ruggedized computer [V2-01] to the A-Kit mounting bracket located inside vehicle.
- (5) Connect the data cable [V2-02] to J4 (COM2) that is on the bottom side of the computer to the RS422 port on the A-Kit's Control Box [A-1].
- (6) Using the computer power cable [V2-03] connect port J1 on the computer to the power port on the A-Kit's Control Box [A-1].

3.3.2.3 V2 PLGR installation

- (7) Connect the military connector on the PLGR adapter cable [V2-06] to the ruggedized computer's [V2-01] serial port (port J3). Figure 3-10 shows the connectors on the PLGR adapter cable [V2-06].
- (8) Connect the 9 pin male connector on the PLGR adapter cable [V2-06] to the 9 pin female connector on the PLGR cable.
- (9) 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.

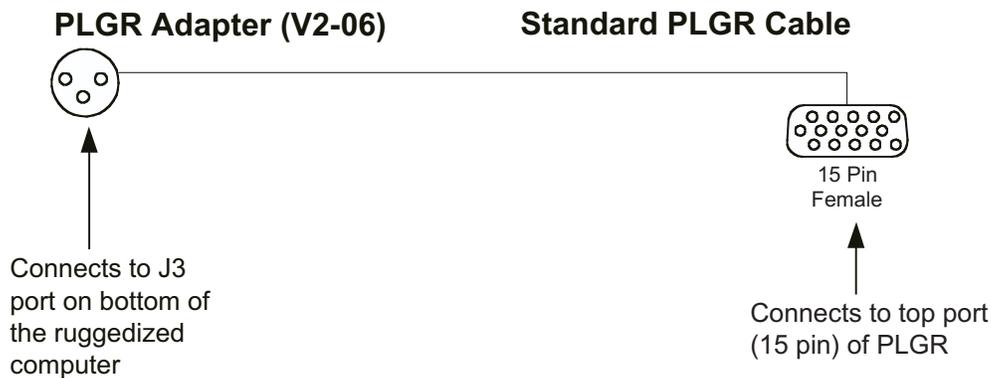


Figure 3-7 V2 PLGR Adapter connection to Standard PLGR Cable

IMPORTANT NOTE!

When turning on your satellite transceiver for the first time.

Your MT-2010 satellite transceiver has been shipped to you directly from the factory without a network identity. **Please wait 10 minutes after turning on the MT-2010 Satellite Transceiver before starting the MTS Software (MTS Messenger and TracerLink). The MTS Software will not function properly before the MT-2010 receives its network identity.**

The MT-2010 is provisioned (receives its identity) via satellite. The satellite transceiver receives its network identity the first time it is turned-on and has a lock on a satellite signal. In order for the unit to get a good lock on the satellite:

Place the MT-2010 outdoors in a spot with an unobstructed view of the southern sky.

NOTE: An error message will appear if the terminal fails to provision.

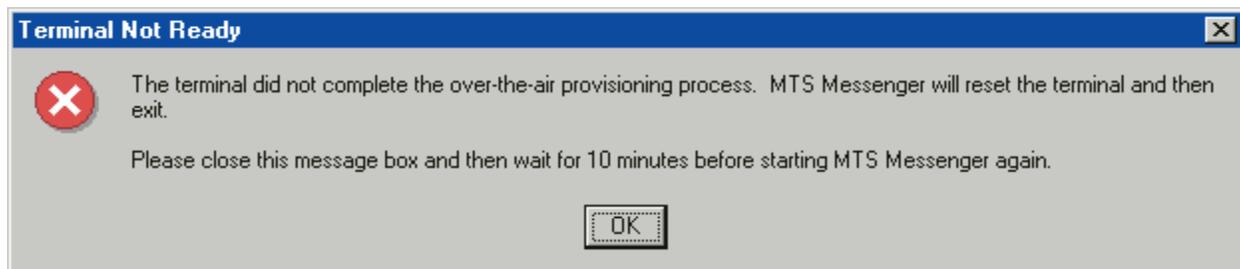


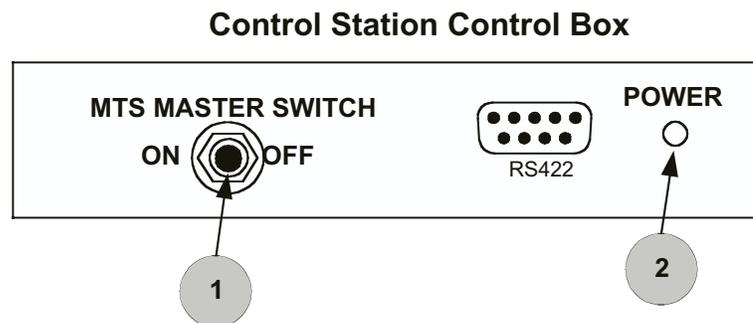
Figure 3-8 Terminal Not Ready Warning

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

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 is designed primarily to operate with AC power, but the system can work on backup or emergency power for a number of hours.



1. Control Box Power Switch
2. LED Power Indicator

Figure 4-1 Control Station Control Box

If the Unit is working on the LED will light up.

4.1.2 Control Station Control Box Power On

- (1) To turn on the Control Station Control Box, flip the **MTS MASTER SWITCH** (number 1 in Figure 4-1) to ON. If connected correctly, the LED lights on the transceiver (MT 2010) will illuminate.

4.1.3 Control Station Laptop Power On

- (2) Press the power switch on the laptop computer. Wait for the computer to load/initialize software.
- (3) Eventually you will see a security window similar to the one in Figure 4-2. Read over the text in the window, and click OK if you agree to the terms.

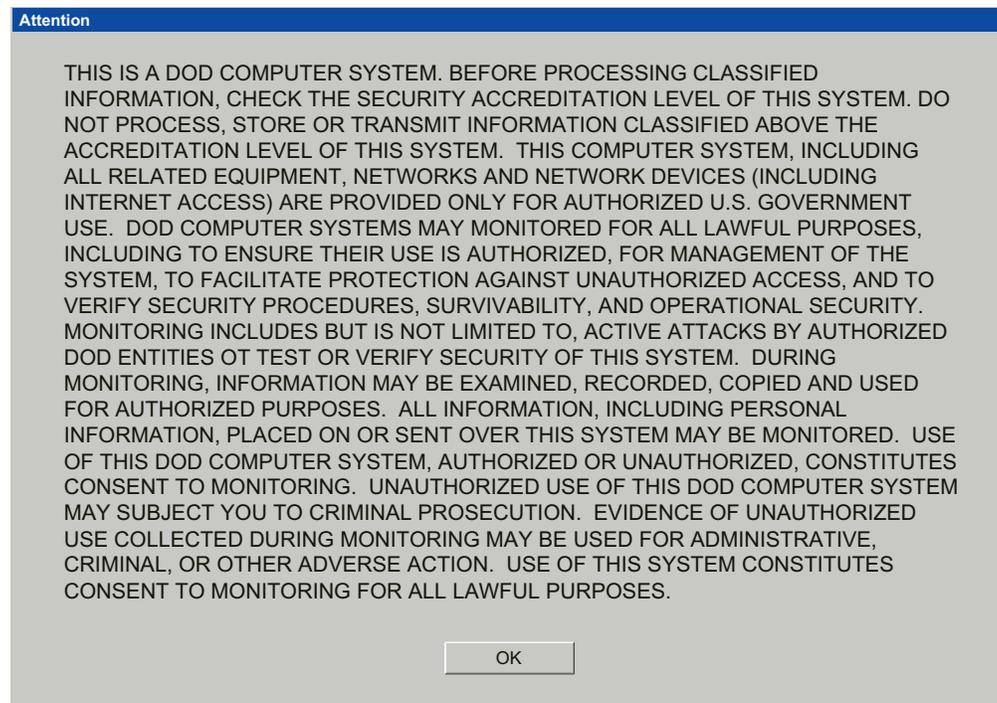


Figure 4-2 Security Warning

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

4.1.4 Control Station Printer – Power On

The Control Station Printer can draw power from two sources, an internal battery or an AC wall outlet. The power button is located on the front of the printer. It is the button on the right, of the three available buttons.

- (5) To turn the printer on, simply push the button once (see Figure 4-3). The small indicator light (above the power button) will illuminate if the printer is on. If the printer is running on battery power, the power indicator light (the furthestmost light on the left) will illuminate.

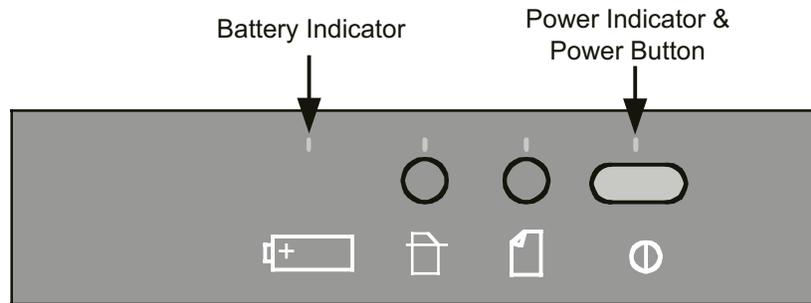


Figure 4-3 Printer Power Button & Power Indicators

4.1.5 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 4-4).

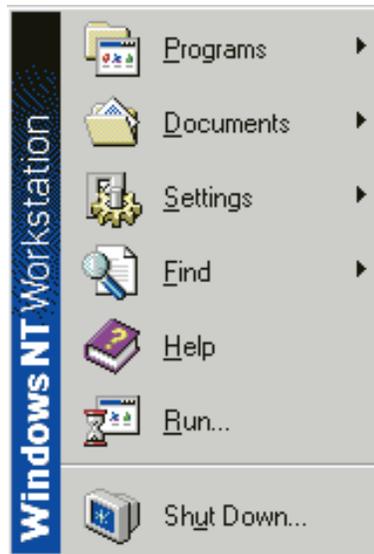


Figure 4-4 Windows Start Button

- (3) Select the **Shut Down** option. A window as in Figure 4-5 should pop-up.



Figure 4-5 Shut Down Window

- (4) Select **Shut Down** and then click the **OK** button (see Figure 4-5).
- (5) When the following window appears:

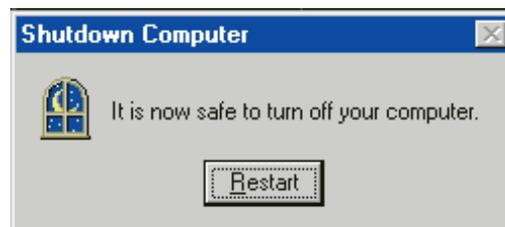


Figure 4-6 Shut Down Computer

It is now safe to turn off your computer. **Restart**

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

4.1.6 Control Station Printer – Power Off

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

4.1.7 Control Station Control Box – Power Off

- (7) Turn off the **MTS MASTER SWITCH**. Failure to turn off the MTS MASTER SWITCH will allow the terminal to continue operation and drain the emergency battery.

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 primarily to operate with vehicle power, but the system can work on backup (emergency) power for up to eight hours. The transceiver and the ruggedized computer draws power from a battery in the A-Kit.

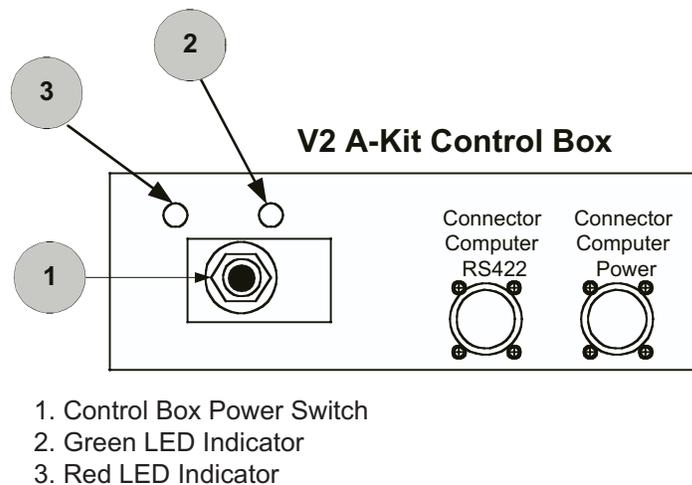


Figure 4-7 V2 A-Kit Control Box

If the vehicle is on, the V2 Configuration will draw power from the vehicle. The V2 Control Box has an internal 12-volt battery that provides power to the computer if the vehicle's power is not available. To identify which source of power MTS is using, the V2 Control Box is equipped with two LED lights. If the Unit is working on vehicle power, neither of the two LEDs will light up. If there is no vehicle power available, one of the LEDs will light up.

- The Green LED light indicates that the unit is running on auxiliary power (not vehicle) and that terminal is fully charged.
- The RED LED light indicates that the A-Kit battery is running out of auxiliary power (not vehicle). If the system is on, shutting down the ruggedized computer is recommended.

When on auxiliary power, the transceiver will operate in a 50% duty cycle mode. In other words, the transceiver will be on 50% of the time.

4.2.2 V2 Control Box – Power On

- (1) To turn on the V2 Control Box, flip the Power Switch (item 1 on Figure 4-6) to ON. If connected correctly, the LED lights on the transceiver (MT 2010) will illuminate.

4.2.3 V2 Ruggedized Computer – Power On

- (2) Follow the same procedures as in section 4.1.3 (except for step 4).

4.2.4 V2 Power Off

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

- (3) Close all open applications (MTS Messenger, Tracerlink Vehicle Server, Tracerlink Map Viewer).
- (4) Click the **Start** button in bottom left corner of the screen.
- (5) Select the **Shut Down** option.
- (6) Select **Shut Down** and then click the **OK** button.
- (7) 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.

4.2.5 Power On and configuration of the AN/PSN-11 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-11 PLGR is configured correctly for use with MTS.

4.2.6 Power off the AN/PSN-11 PLGR

- (1) 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 select the COM Port as in Figure 5-2.
 - (a) Control Station users will select COM 3 on startup.
 - (b) V2 users will select COM 3 (J4) on startup.

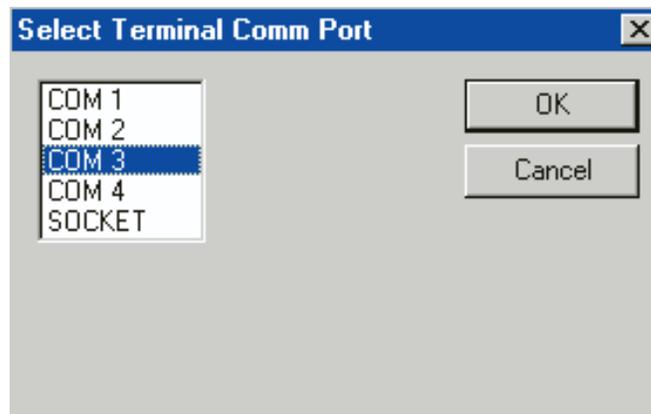


Figure 5-2 COM Port Select Window

If you receive the following error message stating: **"No response from Terminal – Check Cables"** go to section 8, Troubleshooting.

- (3) Users will be prompted to select the PLGR Com Port (Figure 5-3).
 - (a) Control Stations users will select COM 1.
 - (b) V2 users will select COM 1 (J3).

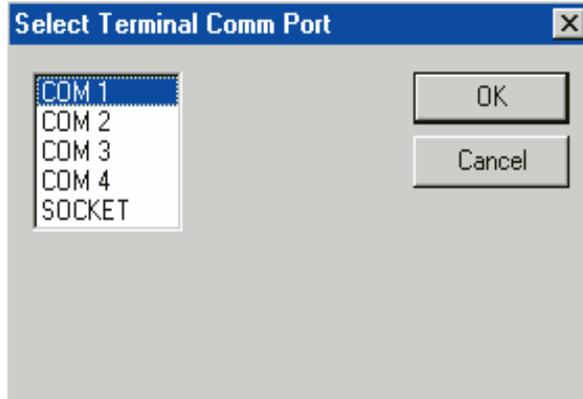


Figure 5-3 Select PLGR Com Port

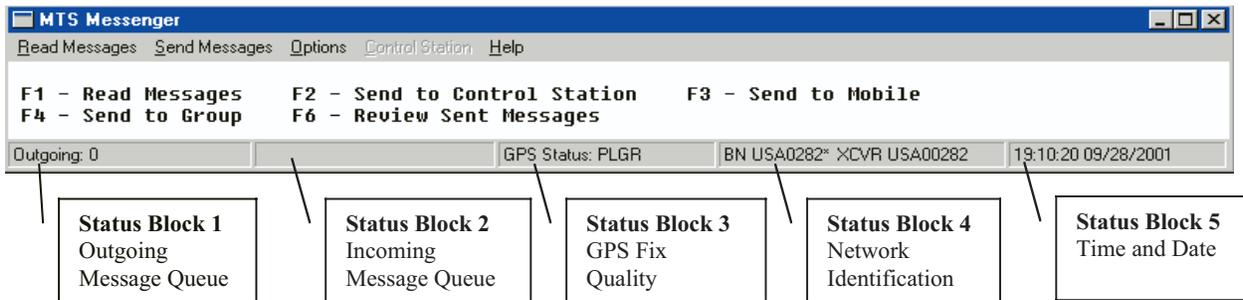


Figure 5-4 Main MTS Messenger Window (Command Reference)

After selecting the COM ports for the terminal and the PLGR, the main window will appear. See Figure 5-4. The main window consists of a menu bar, a display screen, and a status bar broken into 5 blocks.

5.1.1 Display Screen (Command Reference)

Upon successfully starting MTS Messenger, the standard display screen also known as the command reference will appear. Figure 5-4 shows the display screen. If certain help menu functions are enabled, the display screen will show diagnostics information. System administrators will only use these 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 to 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. If it stays at 1 or above for more than a few seconds, there may be a problem. Stop and restart MTS Messenger if this occurs.
- (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 units position in TracerLink. 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 transceiver once the GPS has a 3D fix.

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 5-4). 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.

5.3 Reading Messages



Figure 5-5 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 5-5) with the mouse or the function keys on the keyboard (F1 and F6).

TIP: The function keys (F1 and F6) coupled with 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 the all of the Status Blocks will be red. To read a message:

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

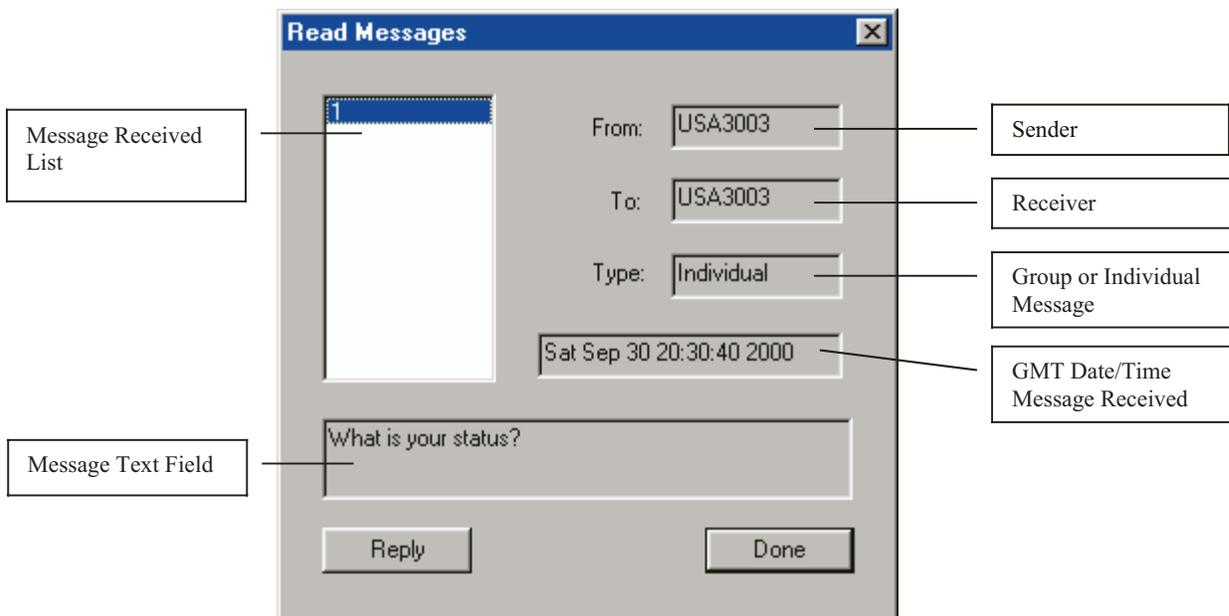


Figure 5-6 Read Current Messages

- (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 “Done” 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 5-7.



Figure 5-7 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 5-8 shows the window that will appear. The **Message Sent List** contains all messages sent.

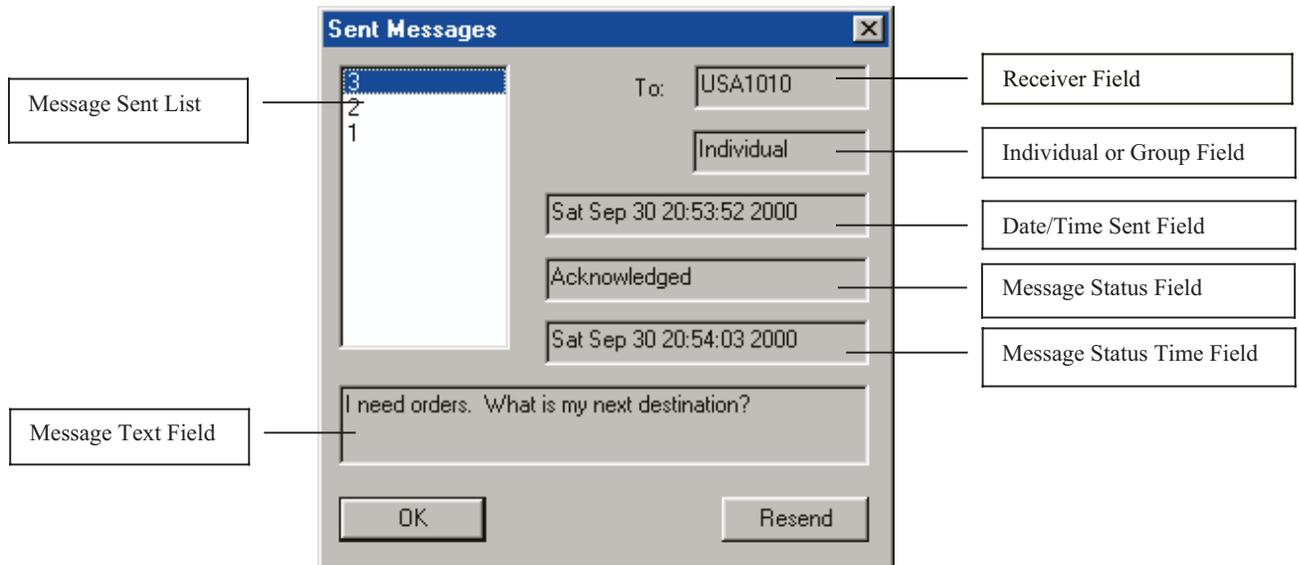


Figure 5-8 Review Sent Messages

- (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.

Sending Messages



Figure 5-9 Send Messages Pull Down Menu

5.3.3 Sending a message to an Individual Unit

To send messages to other units:

- (1) Select the **Send Messages** pull-down menu (see Figure 5-9); or use one of the function keys on the keyboard (F2, F3 and F4).

TIP: The function keys (F2, F3, and F4) coupled with 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 5-10 shows the window that will appear.

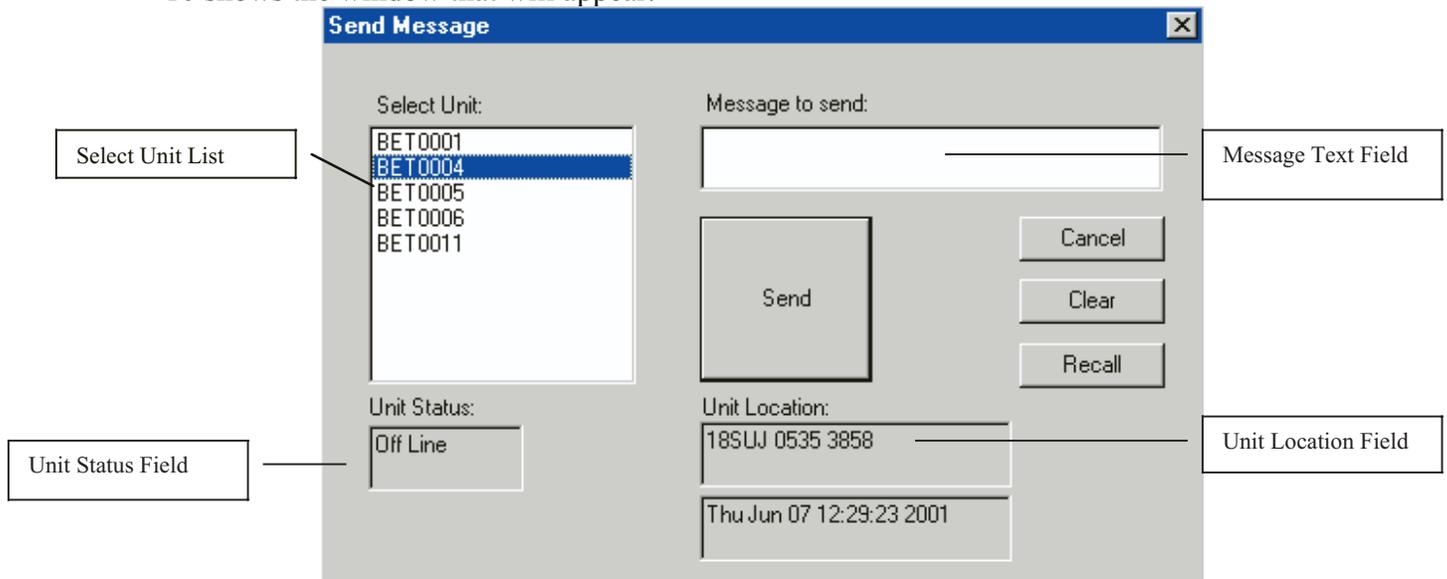


Figure 5-10 Send Message to a Control Station

- (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. Push the **Recall** button to load the last sent message into the Message Box. Press **Clear** to clear.

NOTE: Immediately after completing network registration (startup of MTS Messenger), the **Select Unit** list will not contain many MTS units. The list will grow as MTS Messenger receives position reports from all the active units in the group. Position reports are only sent once every five minutes for each unit. Therefore, it can take up to five minutes for the menu to completely populate.

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.

5.3.4 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 5-11 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 5-11 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.

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.

5.3.5 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:



Figure 5-12 No Control Station Known Message Window



Figure 5-13 No Mobile Known Message Window

5.3.6 Sending messages to the Contractor Hub

To send a message to the Contractor Hub, Select **Send Messages** from the MTS Messenger menu, select **To Contractor Hub** (see Figure 5.14)

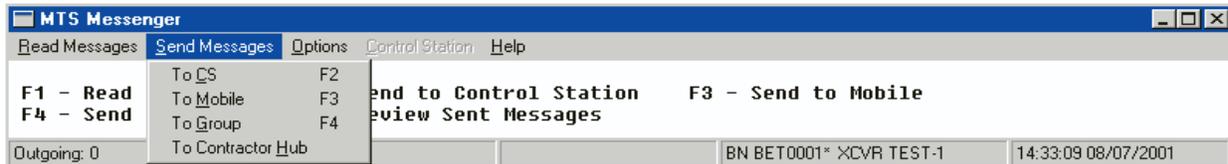


Figure 5-14 Send Message to Contractor Hub

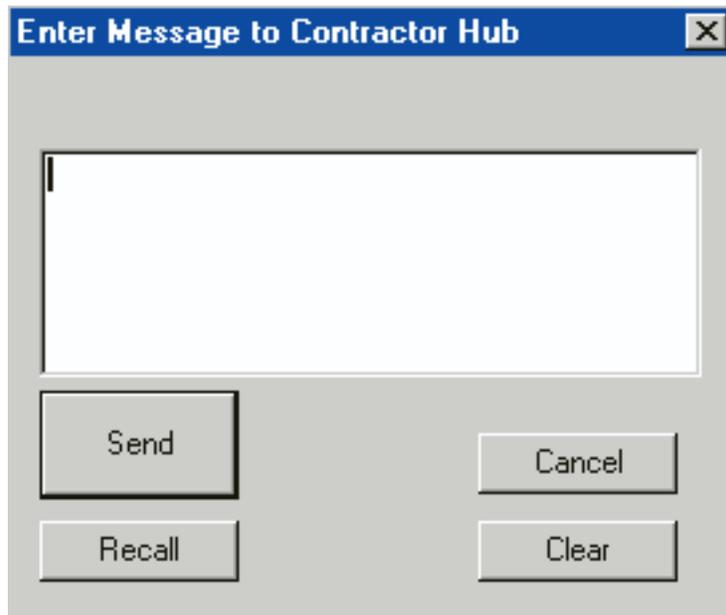


Figure 5-15 Enter Message to Contractor Hub

5.3.7 Sending a Message to o 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 5-16)

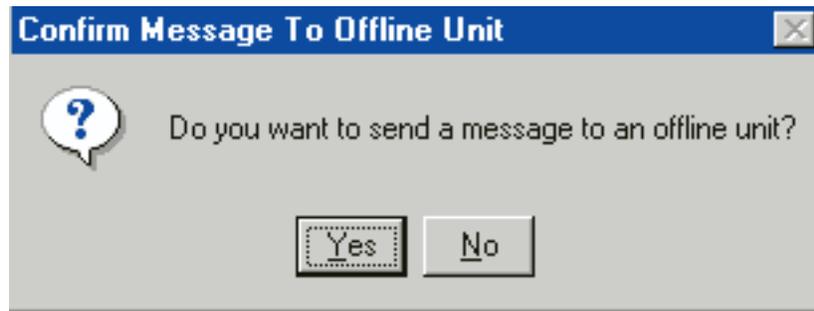


Figure 5-16 Confirm Message to Offline Unit dialog box

5.4 The Options Menu



Figure 5-17 Options Menu

5.4.1 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 to Mobile** or **Send Message to Control** Windows. When Lat-Long is not selected, the **Unit Location Field** shows the data in MILGRID format. 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.

NOTE: The display does not change immediately; it only changes after the next position refresh cycle.

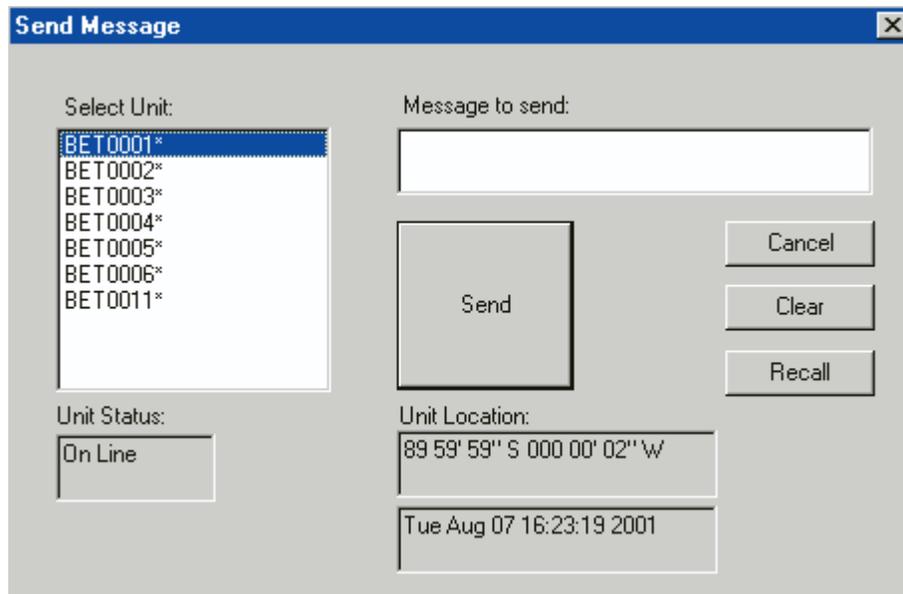


Figure 5-18 Lat-Long Display

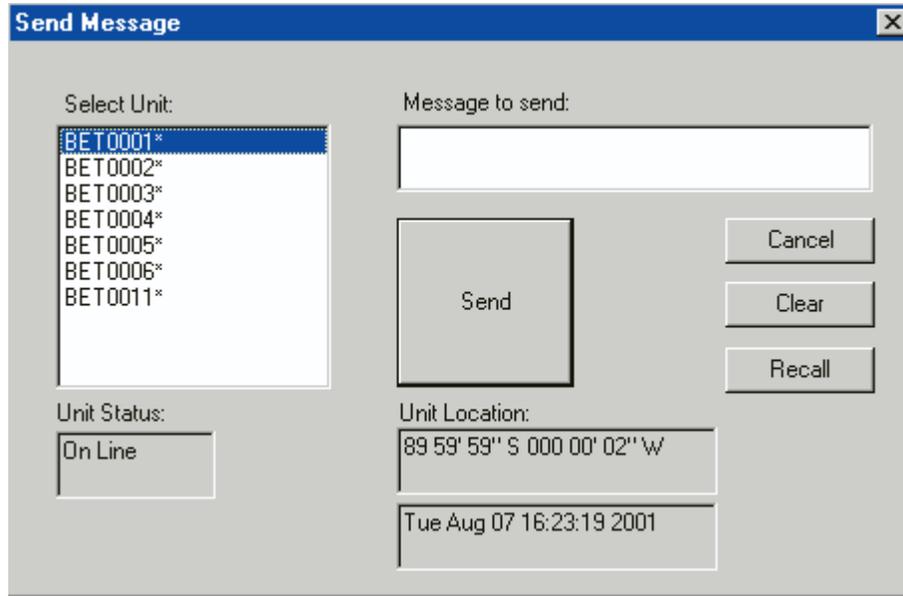


Figure 5-19 MILGRID Display

5.4.2 Options → Set GPS Rate

Set GPS Rate allows the user to increase or decrease the GPS reporting that the terminal sends back to the Control Station. The default rate for MTS is two minutes. Increasing the rate (setting the rate to less than two minutes) increases the message traffic through the satellite, **so this function should be used sparingly.**

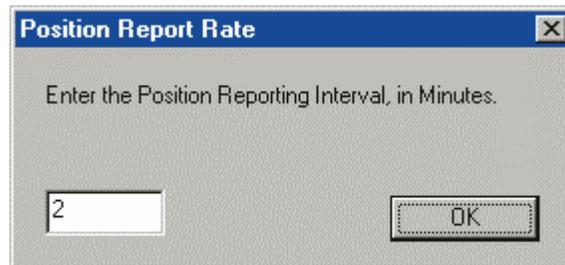


Figure 5-20 Position Report Rate

Setting the Position report rate to “0” turns off GPS reporting. Turning-off GPS Reporting means that the vehicle’s position will not be sent to all other vehicles in the Control Options → Print Message Log

5.4.3 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 5-21) will pop-up to confirm that the file is printing.



Figure 5-21 Print Messages Window

If there is no printer attached to the computer, the following two messages will be displayed:



Figure 5-22 Print Error



Figure 5-23 Print Error Message Window

5.4.4 Review Groups

To Review the vehicles assigned to various groups, select **Review Groups** from the **Options Menu** of MTS Messenger (see Figure 5-24)



Figure 5-24 Review Groups

The **Review Control Groups** window will appear. Select a group from the **Select Control Group**. The vehicles assigned within the selected group will be displayed in the Vehicles in Group box.

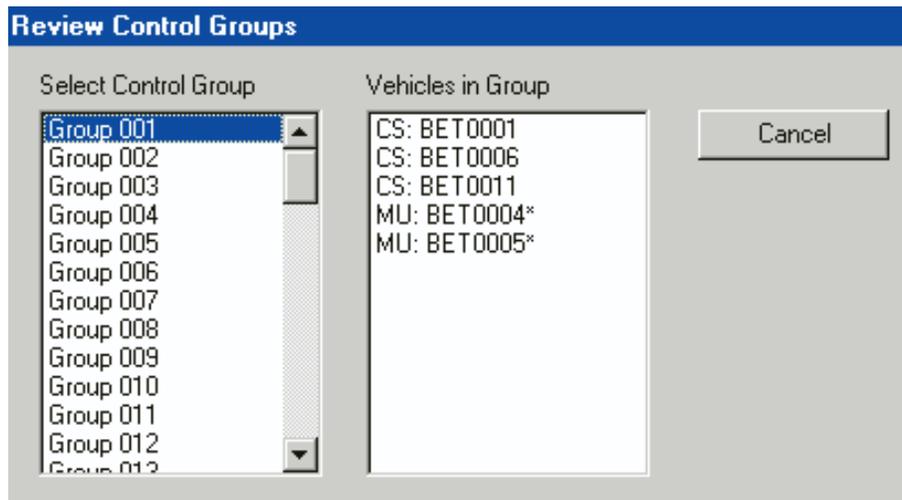


Figure 5-25 Review Control Groups

5.4.5 Modify Groups

To Modify Existing Groups, Select **Control Station** from the MTS Messenger menu.
(see figure 5-26)

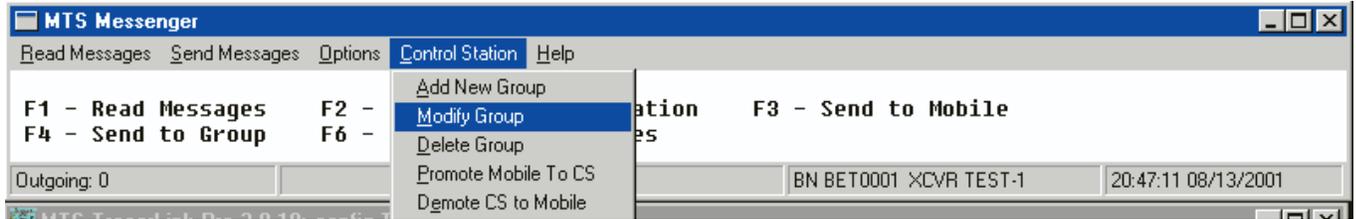


Figure 5-26 Modify Control Groups

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 group to suit the mission. After selecting Modify Group, (see figure 5-26), the Modify Control Group dialog box will appear. (see figure 5-27). Select the control group to be modified. From here, select their modification needed, eg: add vehicle or remove vehicle

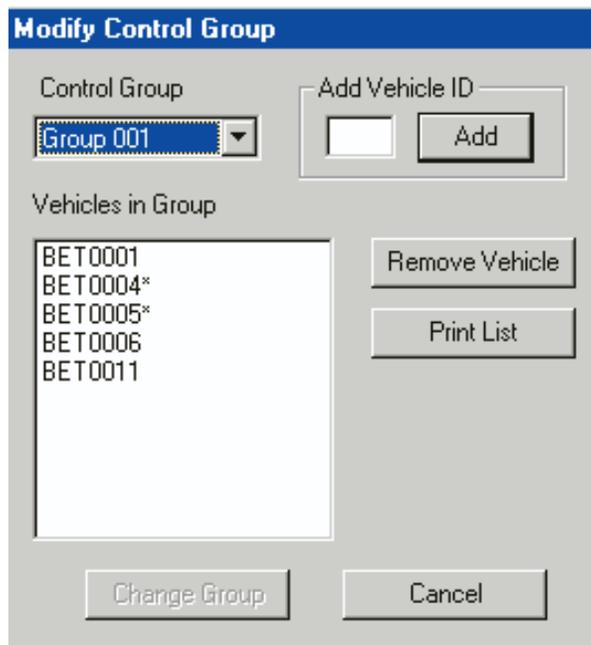


Figure 5-27 Modify Control Group Dialog Box

6. TracerLink Mapping, Version 2.0 (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.

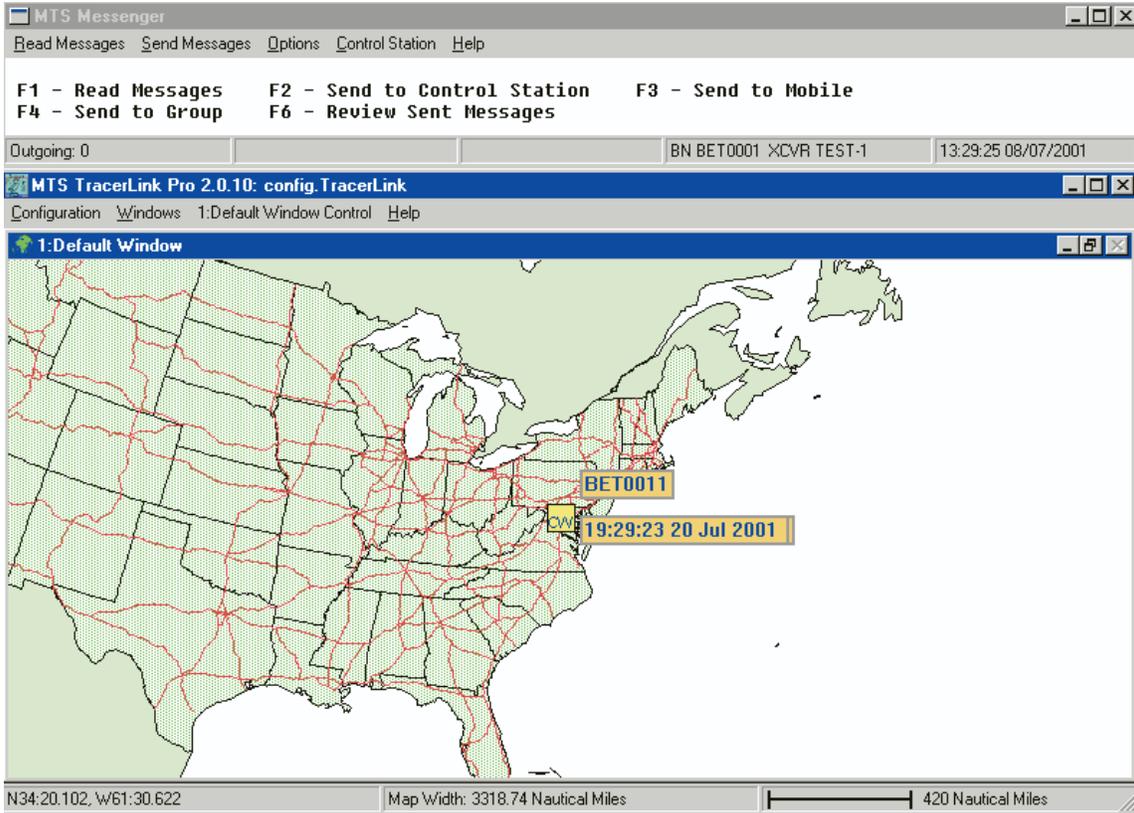


Figure 6-1 MTS Messenger and Tracerlink Startup

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 the MTS Messenger process. 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.

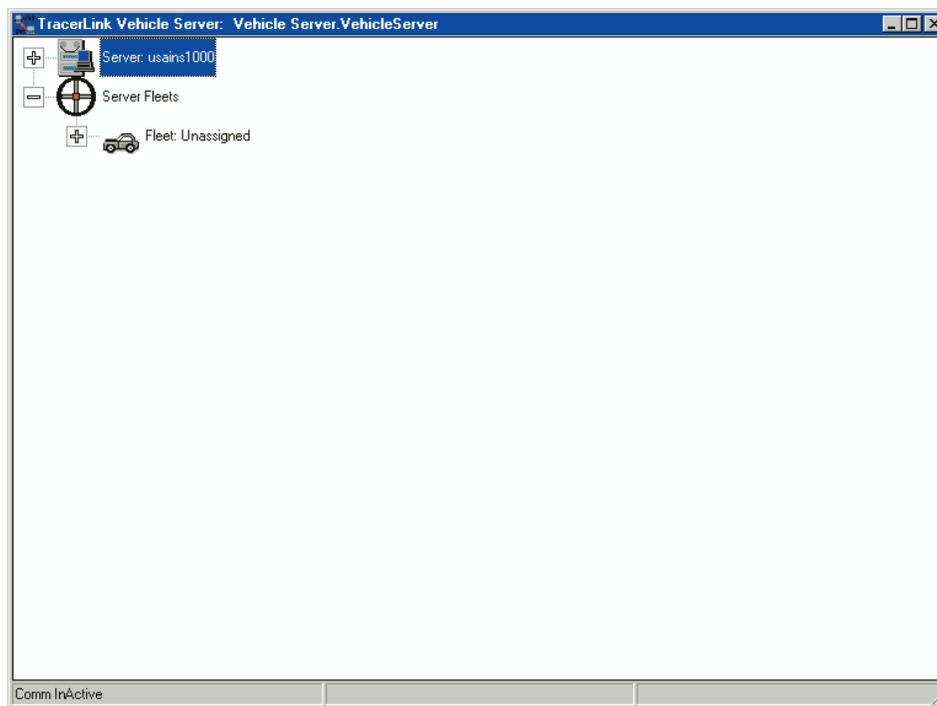


Figure 6-5 Tracerlink Vehicle Server Window

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

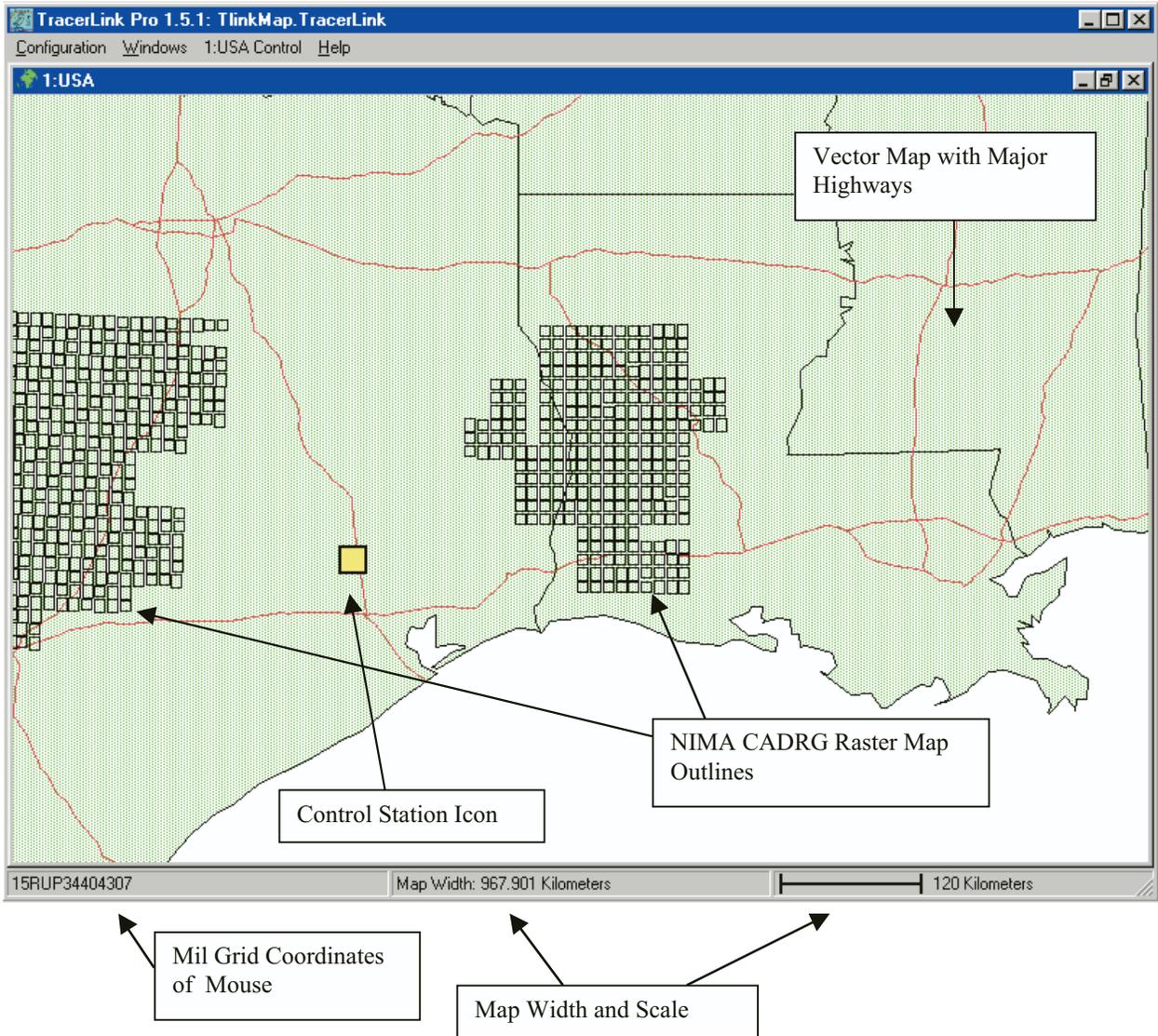


Figure 6-6 Tracerlink Map Viewer

6.3 The Maps

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

Tracerlink also supports reading NIMA CADRГ 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 two 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 five 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.

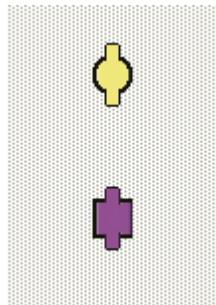


Figure 6-7 Symbols Representing Mobile Units and Control Stations

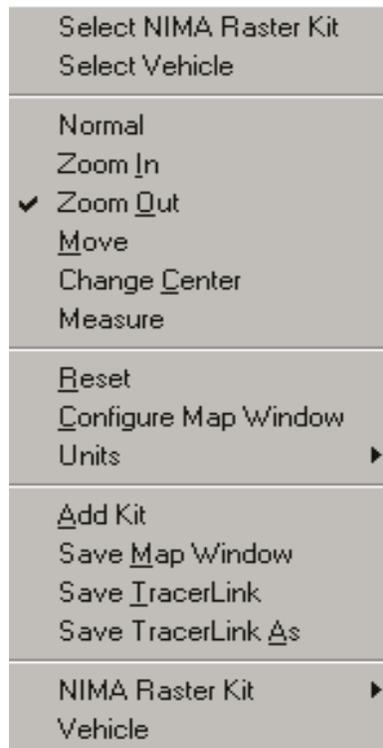


Figure 6-8 Right Click Pop Up Menu

6.5 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** (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 **7.8 Select NIMA Raster Kit Window** for more details on this function.

6.5.2 Select Vehicle

Go to Section **7.6 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 geographical 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.

NOTE: 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 (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. It displays the distance in kilometers, nautical miles, or statute miles. Once you release the mouse, the distance measurement will disappear.

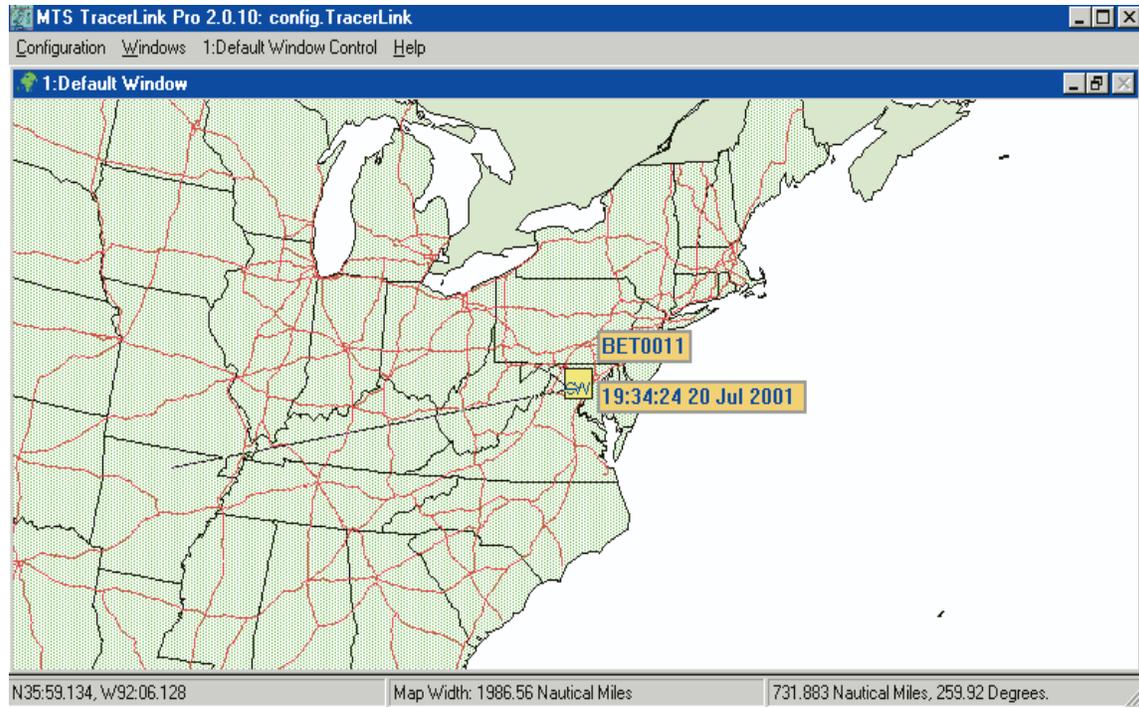


Figure 6-9 Map Showing Measure Distances Function

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.

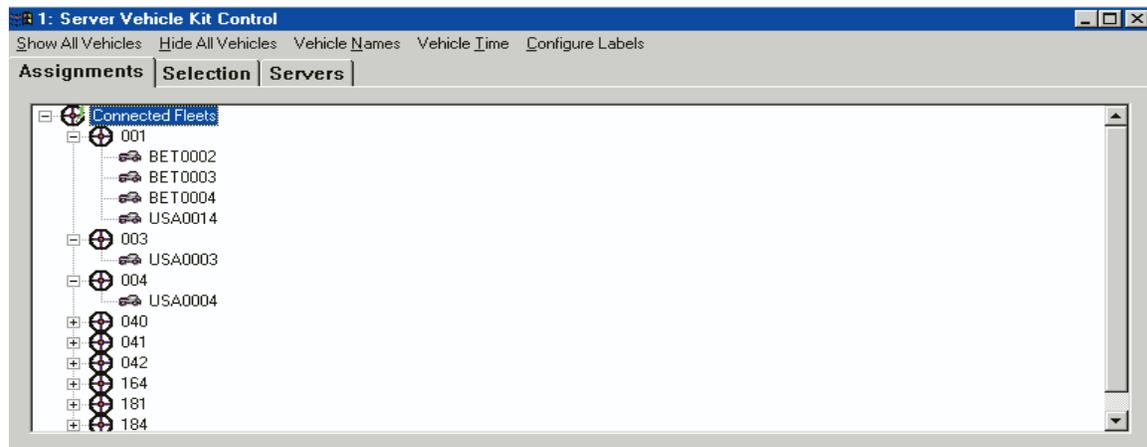


Figure 6-10 Server Vehicle Kit Control Window

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) will appear. Select the **Vehicle** image at the top.

3.33333

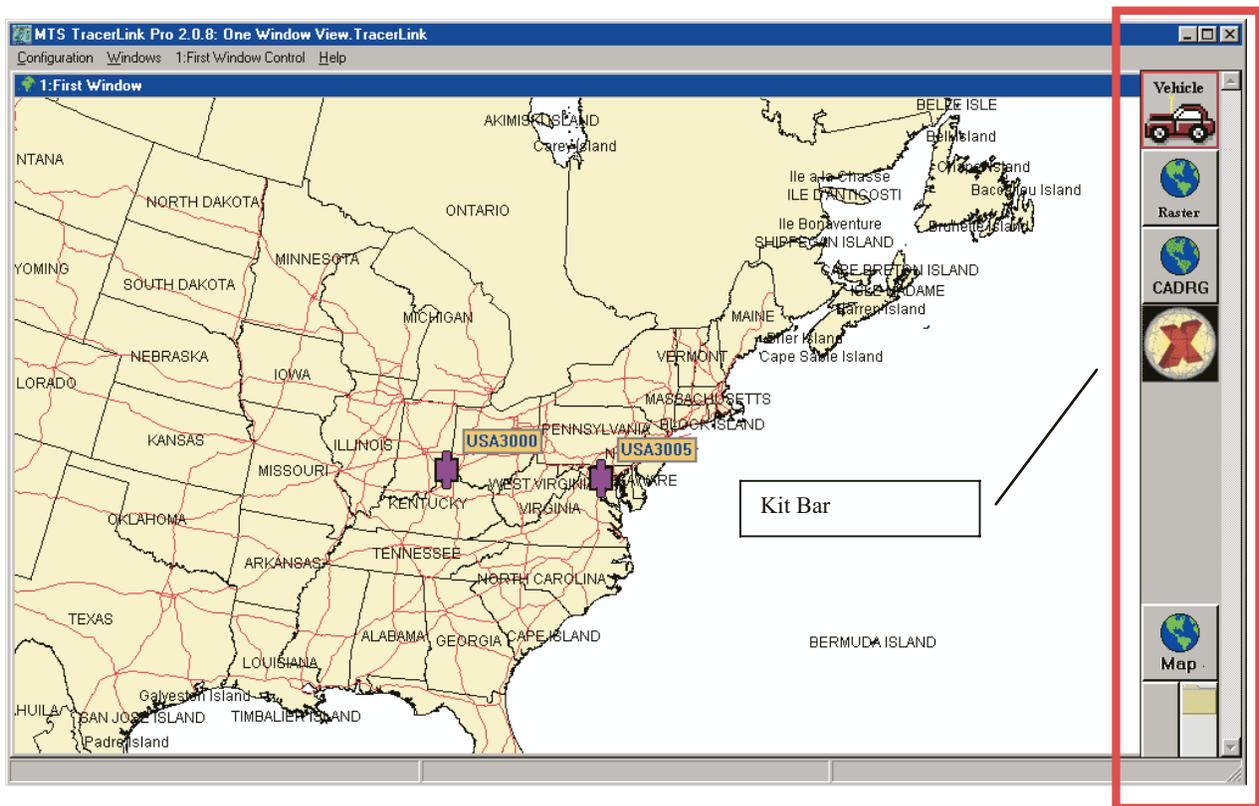


Figure 6-11 Kit Bar

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 show several more vehicles, not just the vehicle selected.

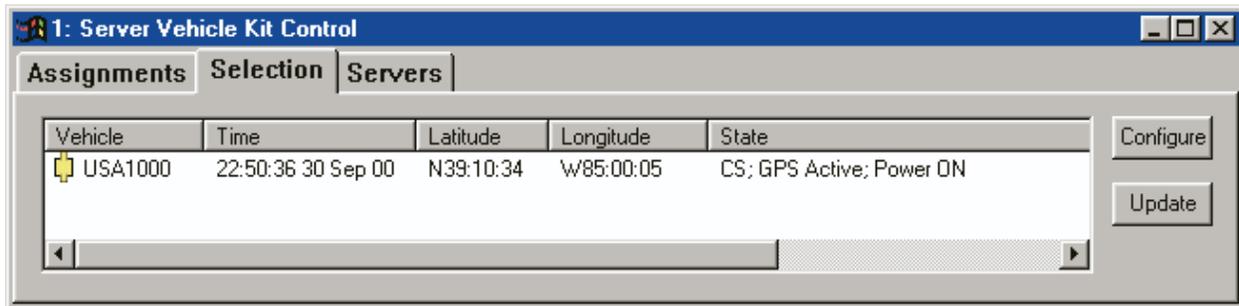


Figure 6-12 Selection Tab (Compare with Figure 6-13)

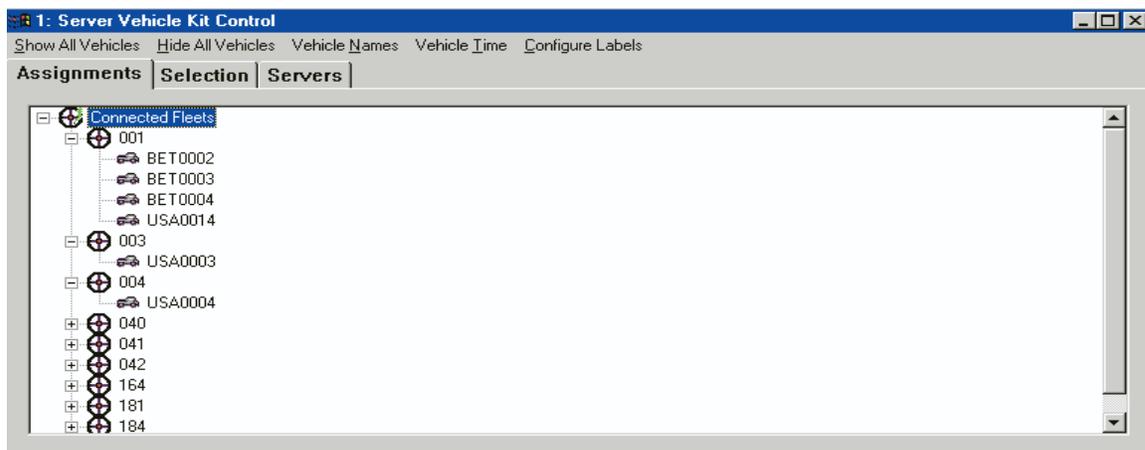


Figure 6-13 Assignments Tab (Compare with Figure 6-12)

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.

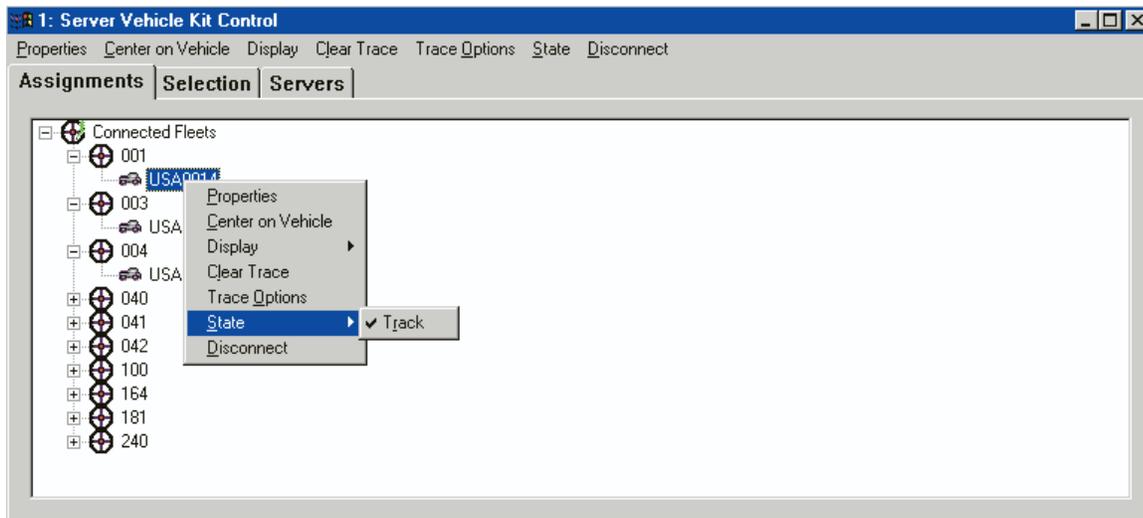


Figure 6-14 Autotrack

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).

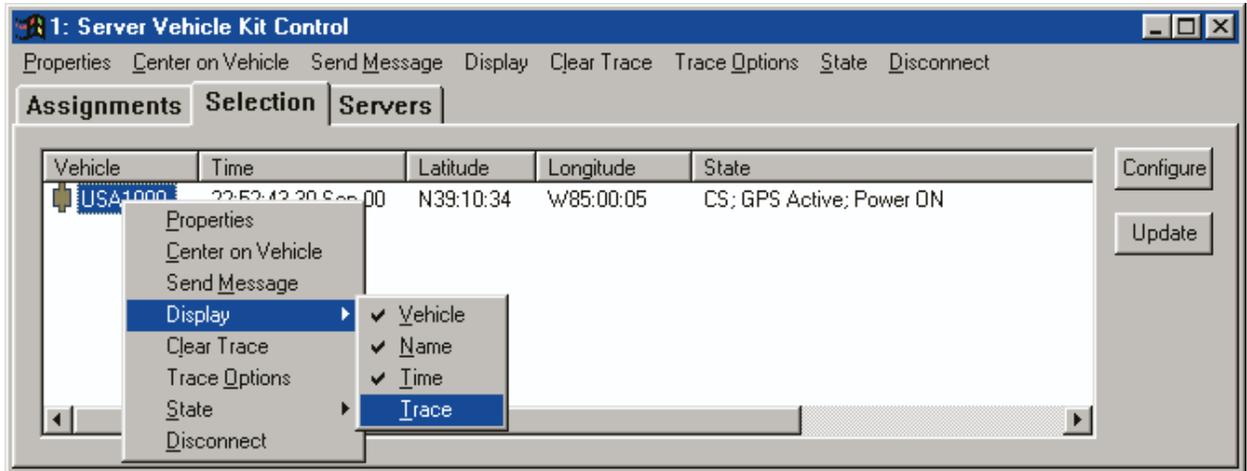


Figure 6-15 Tracing a Vehicle

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**.

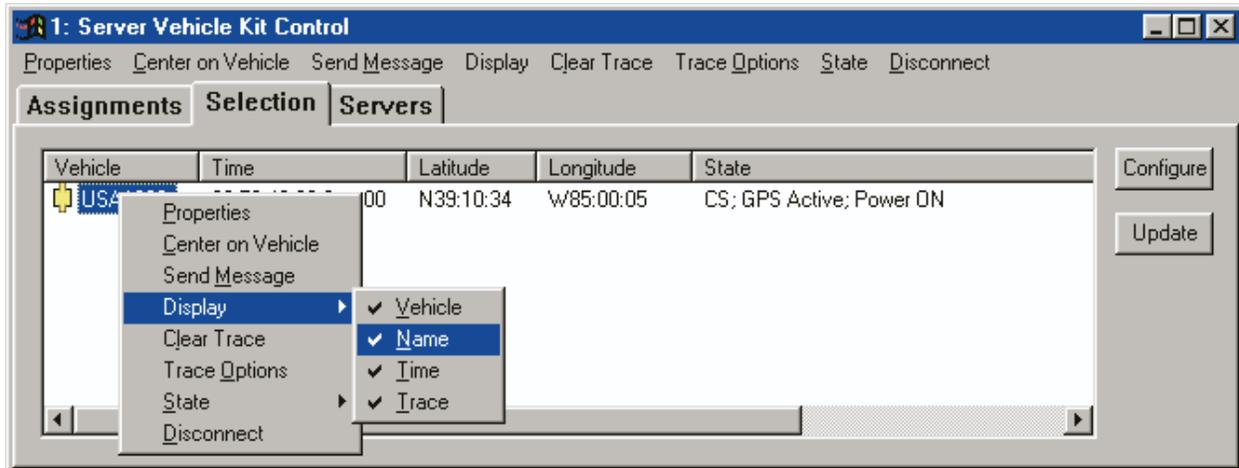


Figure 6-16 Display Vehicle's Name

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 7-8).
- (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**. If a Control Group is already hidden, to show it, simply select **All Vehicles → Show**.

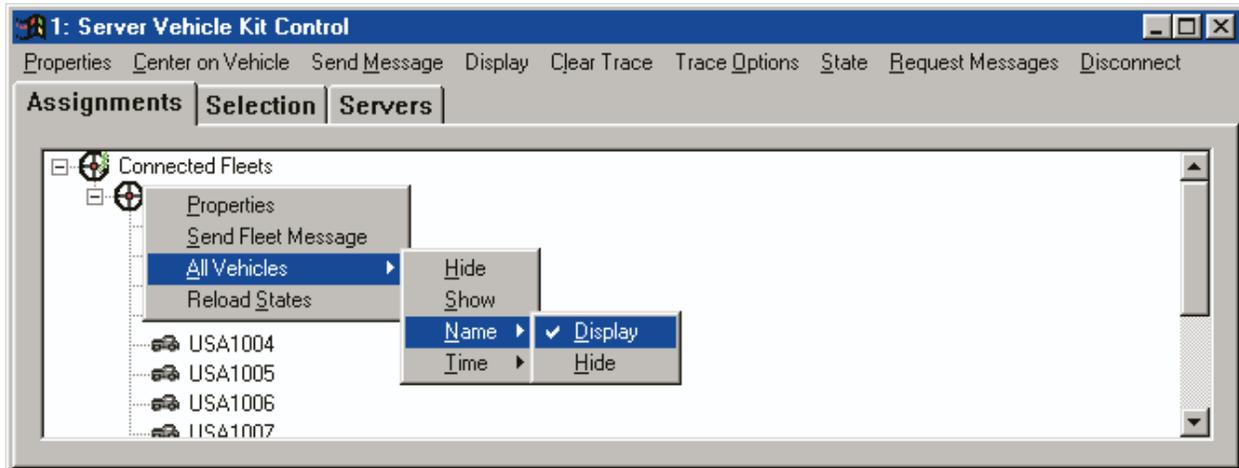


Figure 6-17 Hiding and Showing a Group of Vehicles

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.

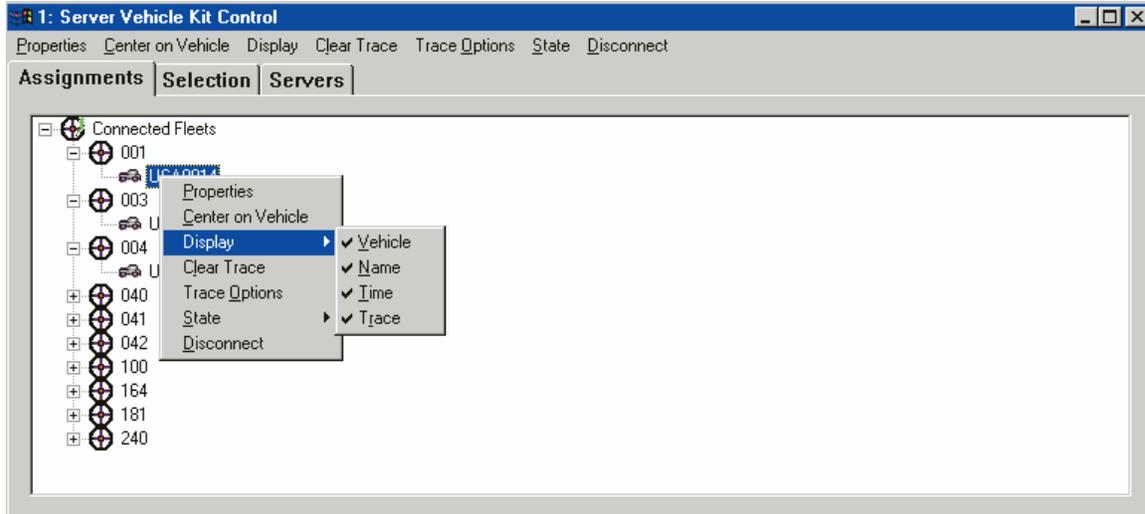


Figure 6-18 Hiding and Showing an Individual Vehicle

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**, .

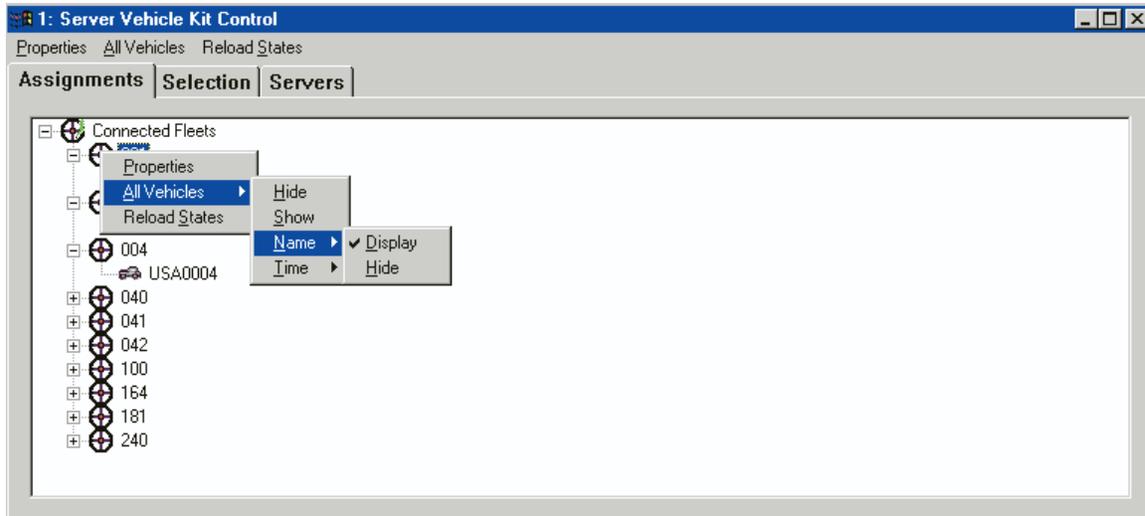


Figure 6-19 Hiding and Showing the Names of All Vehicles in a Fleet

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 6-19).
- (5) Right click on a vehicle, and select **Display → Time**, (see Figure 6-19). If the time was not previously displayed, it will be. If the time was previously displayed, it will be turned off.

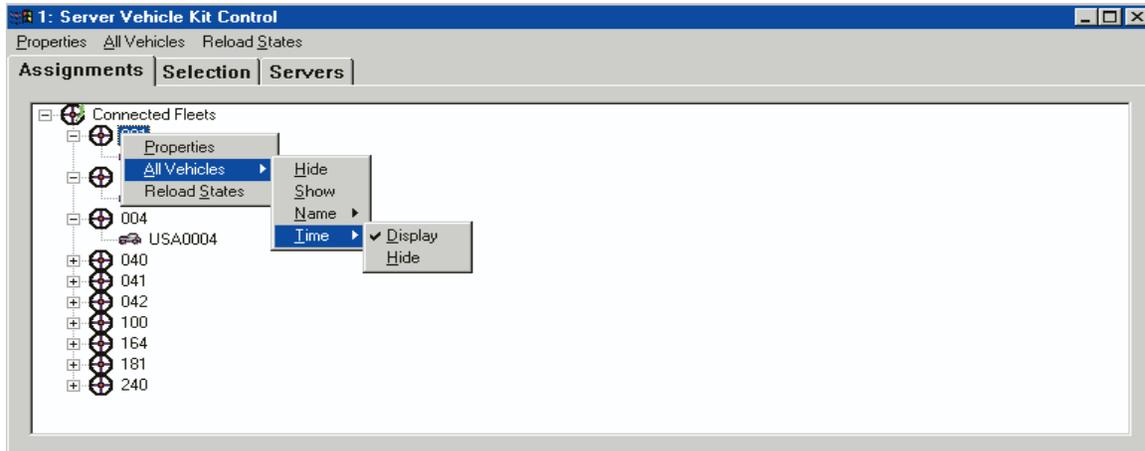


Figure 6-20 Hiding and Showing the Position Report Time for a Vehicle

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 6-20).
- (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 6-20).

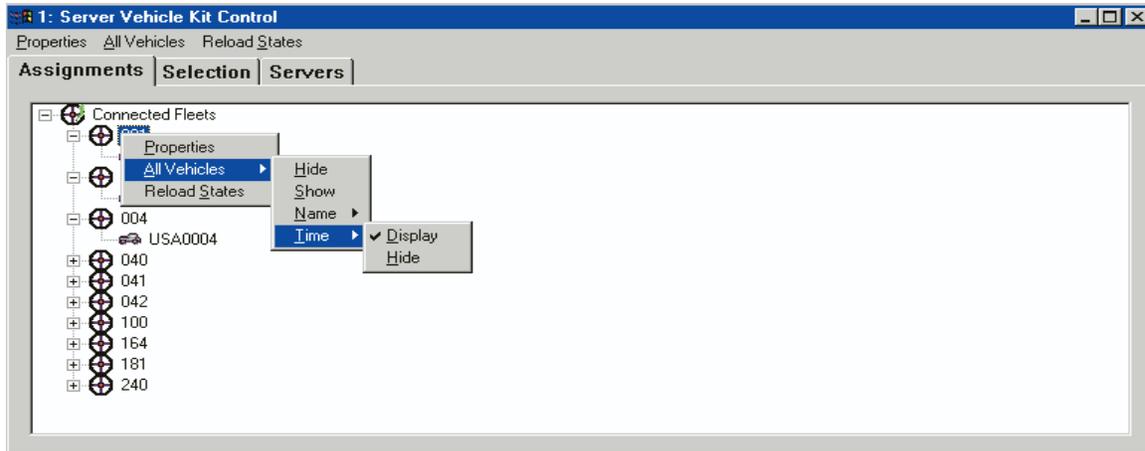


Figure 6-21 Hiding and Showing the Position Report for a Fleet of Vehicles

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).

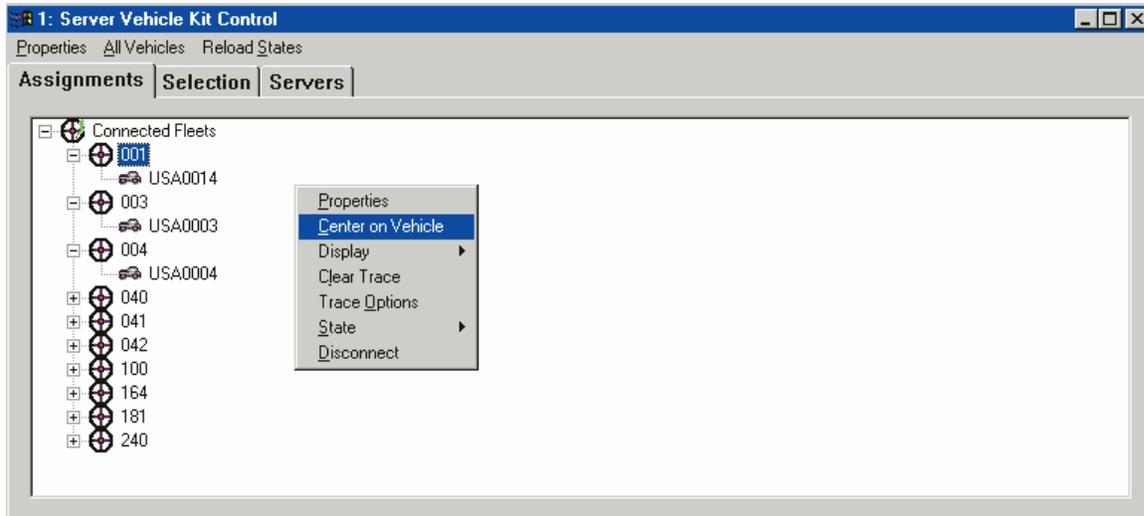


Figure 6-22 Centering the Map on a Vehicle

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.

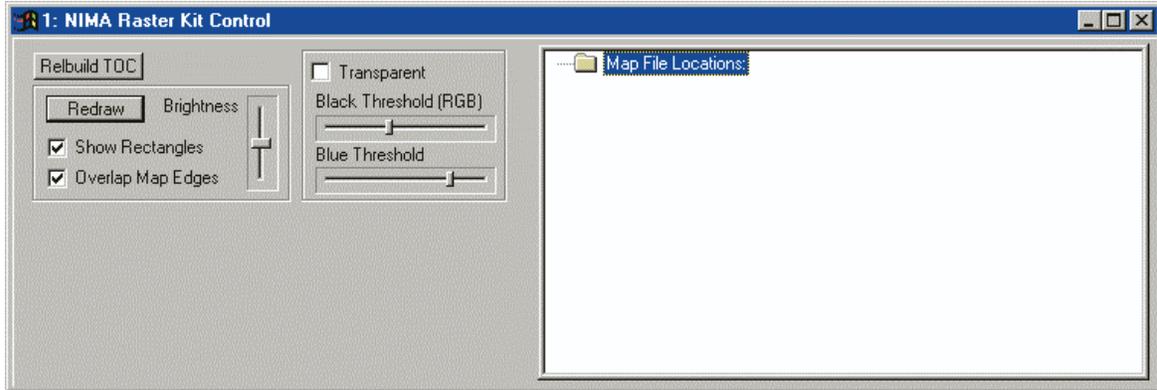


Figure 6-23 NIMA Raster Kit Control Window

- (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).

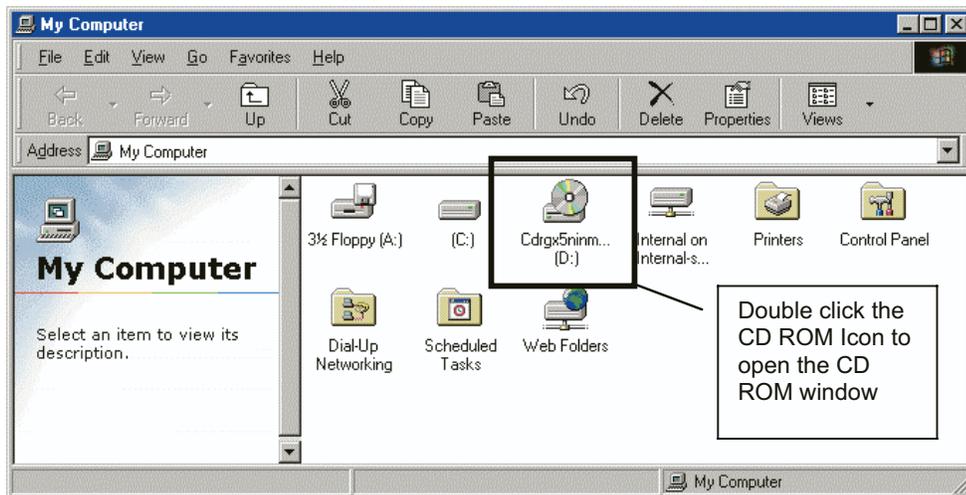


Figure 6-25 My Computer Window

- (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 “E”.
- (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.

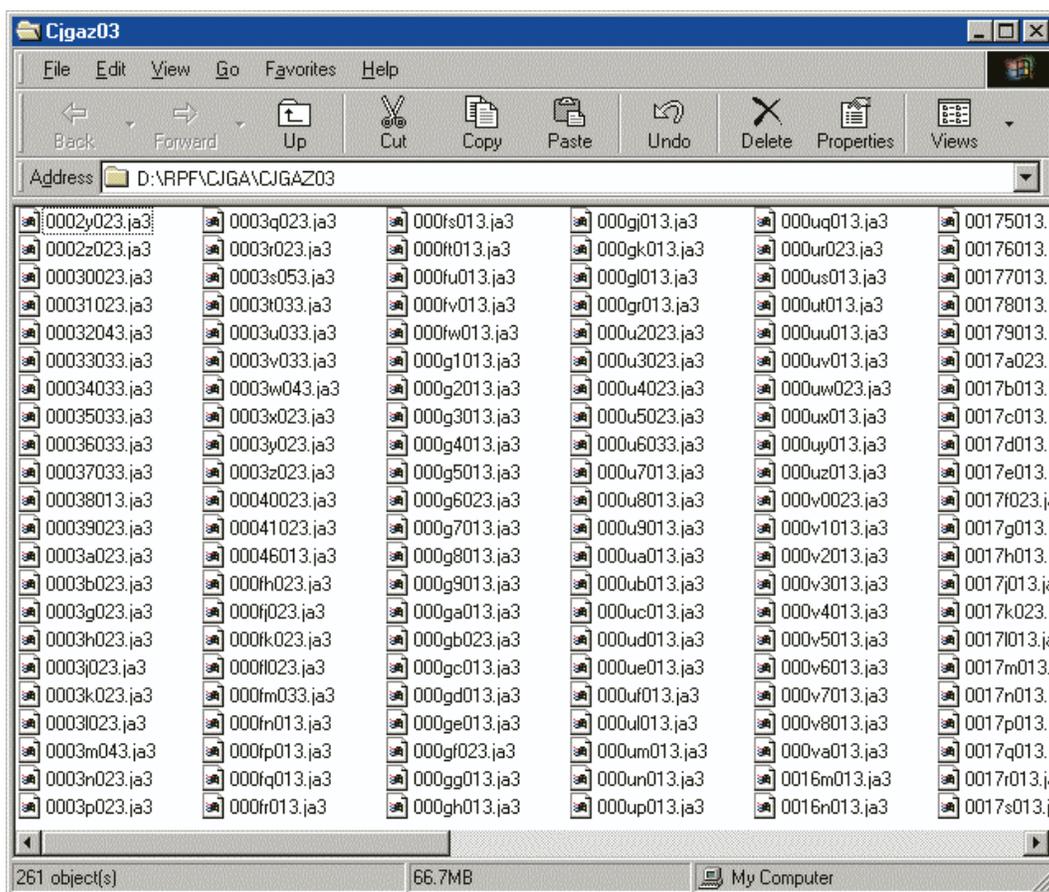


Figure 6-26 NIMA CADRg Map Files

- (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).

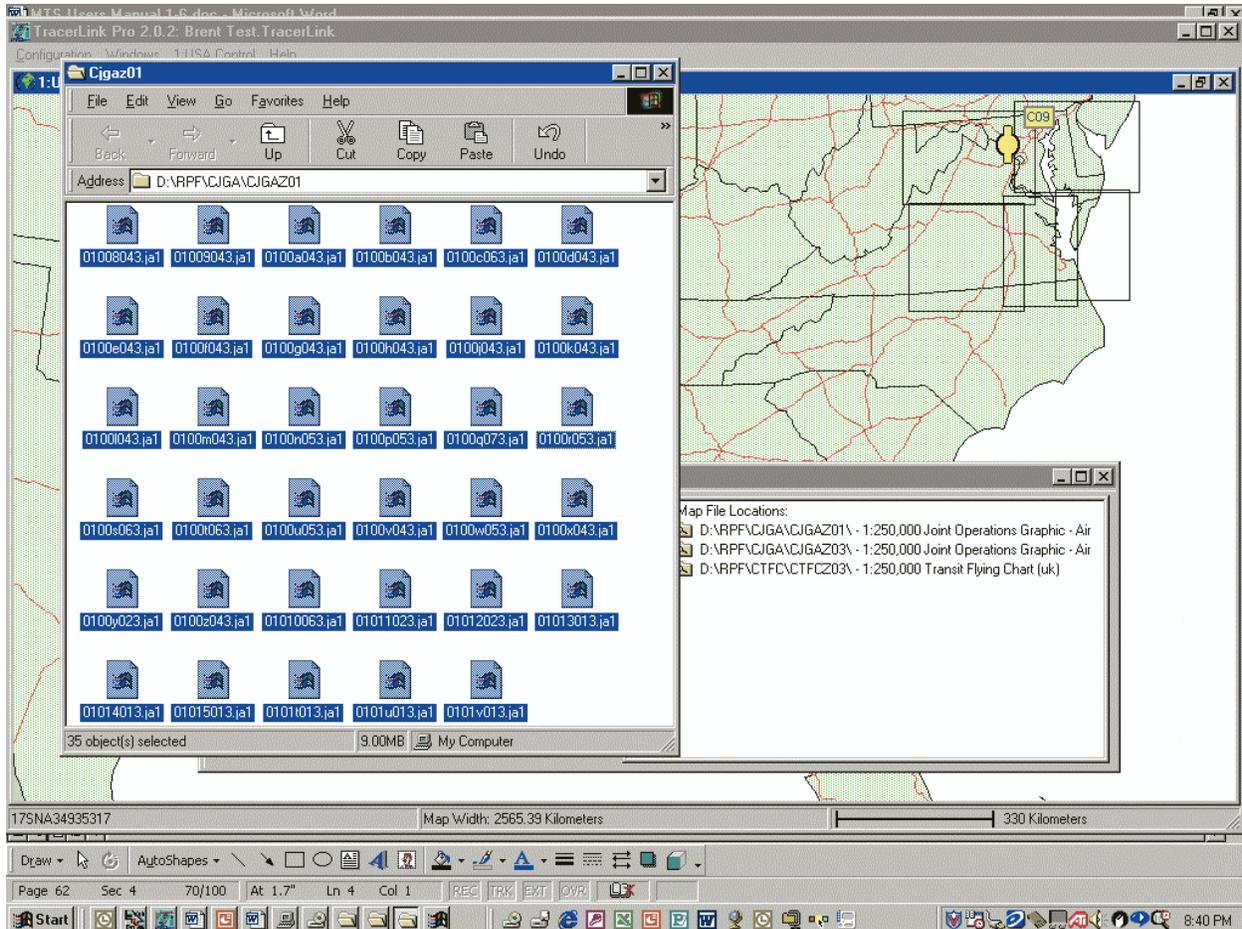


Figure 6-27 TracerLink Map Viewer open with the CADRG Map Files Folder Open

- (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.

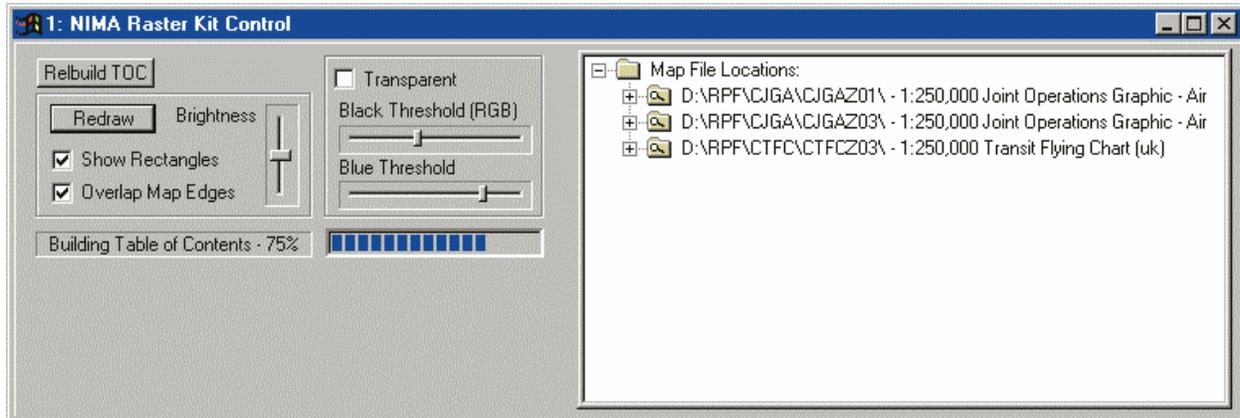


Figure 6-28 NIMA Raster Kit Control Window Showing the Maps Loading

- (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. As Figure 6-26 illustrates there can be hundreds of CADRG maps files in one folder.
- (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:

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

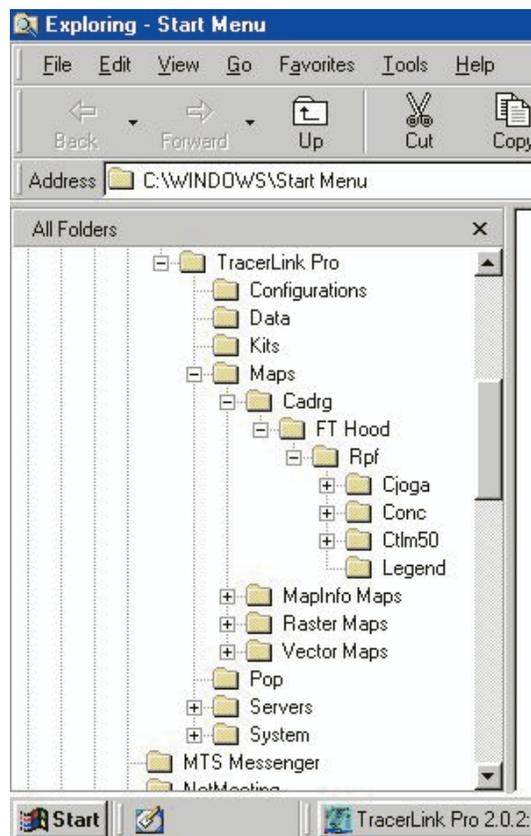


Figure 6-29 TracerLink CADRG Map Folder Location in Windows Explorer

- (5) Drag the CADRG Maps folder on the CD into the TracerLink Pro Maps CADRG folder. This will copy the maps from the CD on to 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** is a new function in **TracerLink**. 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 **TracerLink** folder icon to view contents.
 - (e) Double click on the **Maps** folder to view its contents. Your Windows Explorer should look similar to Figure 6-30.

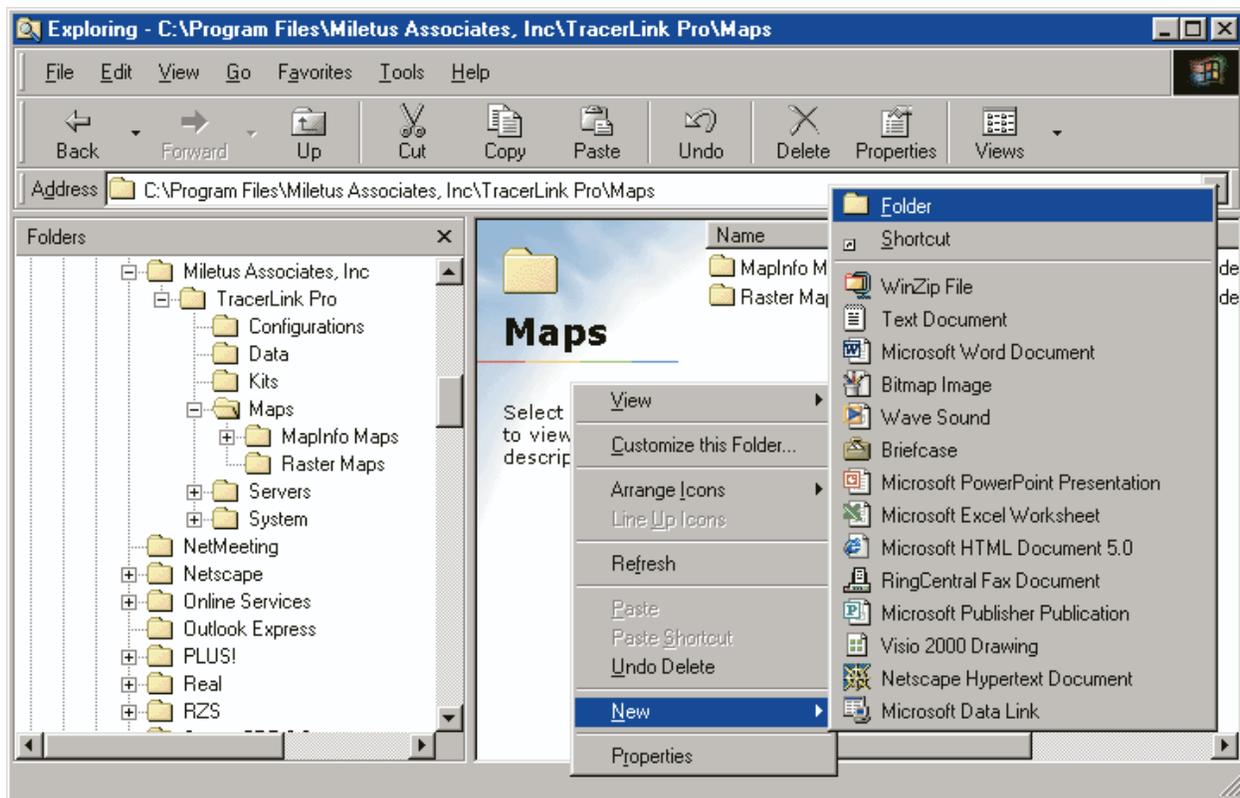


Figure 6-30 Creating a Destination Folder

- (f) Right click your mouse on the right pane of Windows Explorer.

- (g) Select New, then Folder. A New Folder will be created. Type a name for the new folder.
- (3) Choose **Select NIMA Raster Kit** option from Right Click 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 G above.
- (8) Remove map file group from the NIMA Raster Kit Control window. See **Figure 6-31 Removing Map files** window below. 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.**

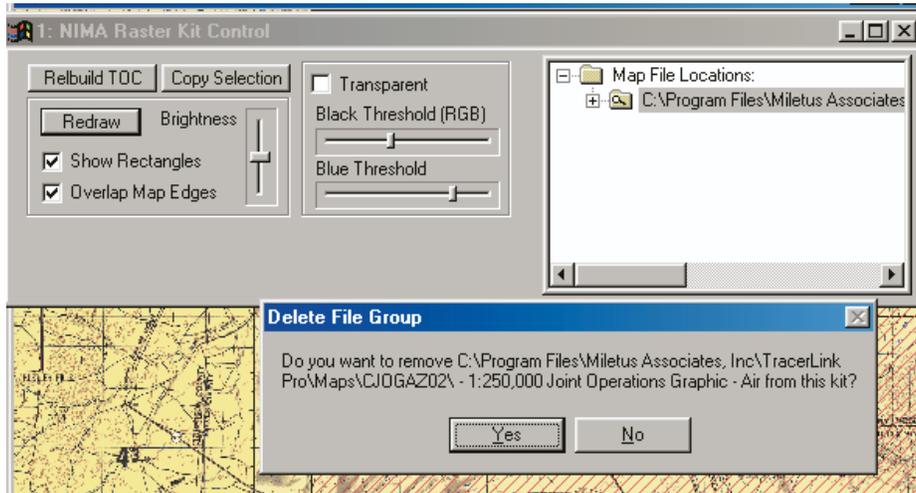


Figure 6-31 Remove Map Files

- (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 Control Station Menu

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

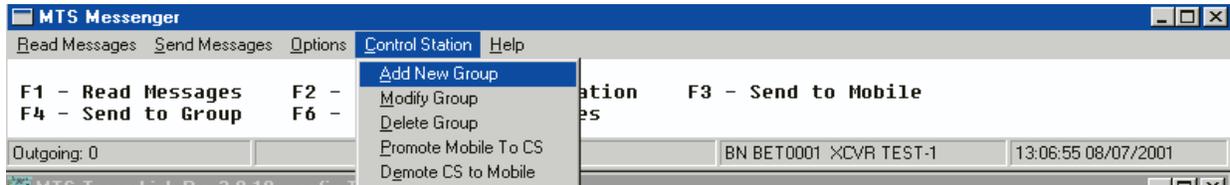


Figure 7-1 Control Station Menu

7.1.1 Creating a Control Group

The Add Control Group dialog box (see Figure 7-2) facilitates the definition of a new group.

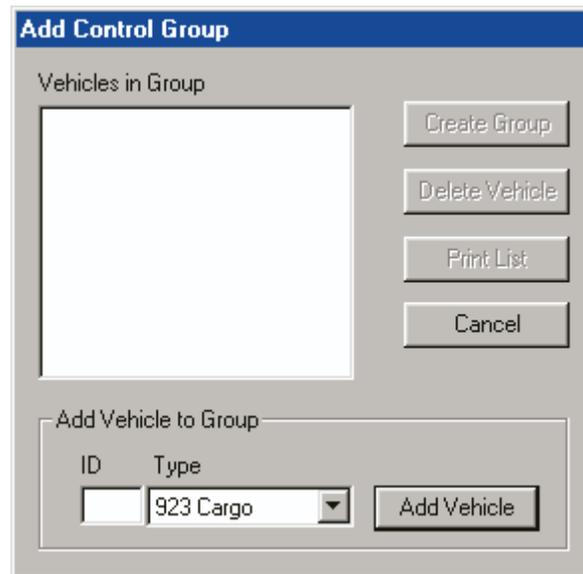


Figure 7-2 Add Control Group Dialog Box

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

- (2) To add a vehicle, the Control Station operator should type in the numeric identifier of each vehicle in the **ID** field. For example, if the Control Station operator was adding vehicle USA0123, the operator would simply type 0123.
- (3) Once a number is entered, the user can then select a vehicle type from the pull-down list. The vehicle type simply serves as a memory aid to the operator as vehicles are added to the group.

NOTE: When creating a group, the user should always assign a known Control Station. Otherwise the group will have no Control Station. A Control Station user may create a group that is assigned to another Control Station.

- (4) The user can then press the **Add Vehicle** button to put in the Pending Group List. In Figure 8-3 below, the user entered in the following vehicles; 0001, 0002, and 0302. These three vehicles are in the Pending Group List. To review the list of vehicles in an existing group (assigned to the user's Control Station), the **Delete Group** dialog box must be used.



Figure 7-3 Add Vehicles in Group List Box

- (5) If the user wishes to remove one or more vehicles from the pending group, simply select one or more lines in the list box and then press the **Delete Vehicle** button.
- (6) Before creating the Control Group, the Control Station operator can print the pending Control Group, pressing the **Print List** button.
- (7) 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.

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



Figure 7-4 Sent Add Group Request Dialog Box

When a unit is added to a group the user will receive the following message.

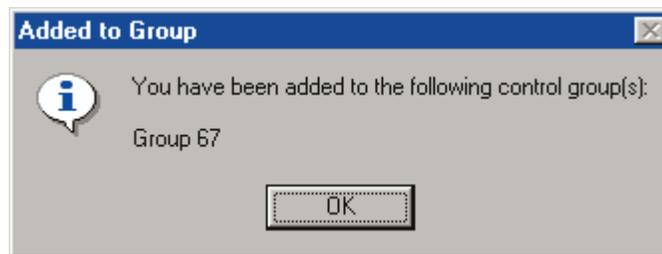


Figure 7-5 Added to Group Dialog Box

If MTS Messenger is unable to create a group because one or more vehicles do not exist, the following message box (Figure 7-6) will be displayed and the user can begin the process of creating the group again.



Figure 7-6 Group Not Created Dialog Box

NOTE: MTS Messenger learns of vehicles, their positions, and any new groups through the various messages. Because of this, there will be a lag 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. Typically, new vehicles will appear in the **Send to CS** and **Send to Mobile** dialog boxes as they are received. 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 one or more groups.

7.1.2 Deleting a Control Group

The Delete Control Group dialog box (see Figure 7-7) actually serves two purposes.

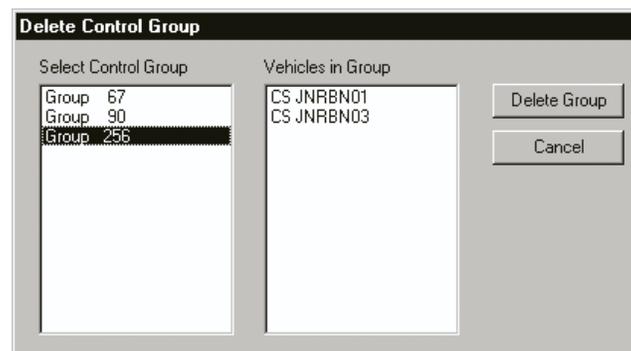


Figure 7-7 Delete Control Group

- Allows a Control Station user to view the vehicles that are in the same groups as the Control Station.
- Allows the CS user to delete a group that is no longer needed.

The **Select Control Group** list box shows all of the groups to which the Control Station belongs. In Figure 7-7, the Control Station belongs to three groups, 67, 90 and 256. For a selected Control Group, the **Vehicles in Group** list box identifies all the vehicles in a selected group. Again, this list may not be complete because not all vehicles in the group have sent position reports or a sufficient amount of time hasn't transpired for the messages to identify every unit in the Control Group.

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

7.1.3 Promoting a Mobile Unit to a Control Station

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

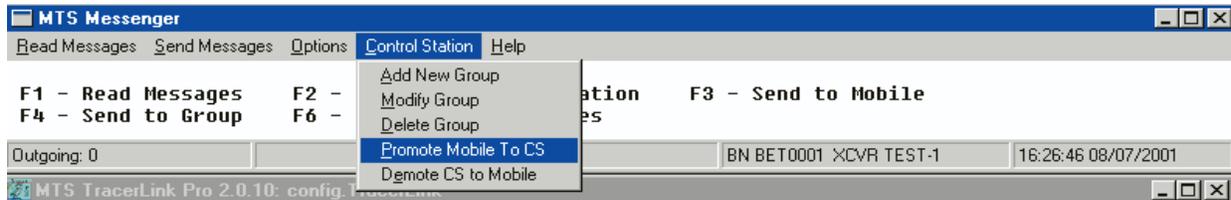


Figure 7-8 Promote Mobile to CS

- (1) Select **Control Station** → **Promote Mobile to CS** on the MTS Messenger menu bar (see Figure 7-8).

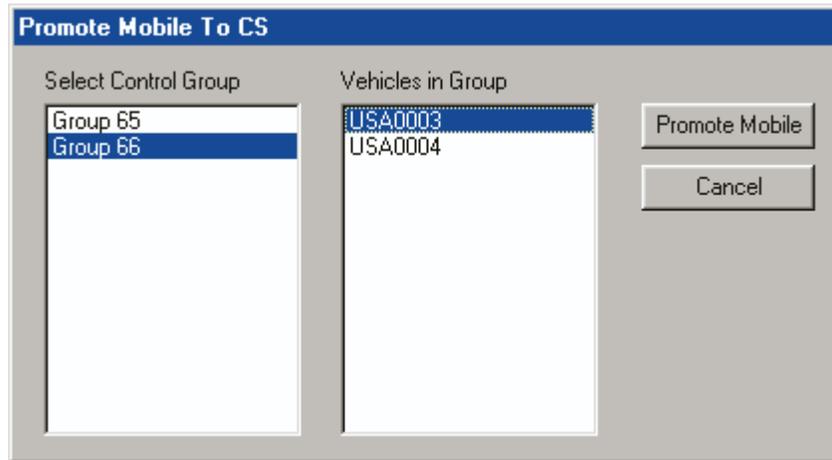


Figure 7-9 Promote Mobile to CS Dialog Box

- (2) Select a Control Group.
- (3) Identify and select the unit within the Control Group that should be promoted. Press the **Promote Mobile** button (Figure 7-9).

7.1.4 Demoting a Control Station to a Mobile

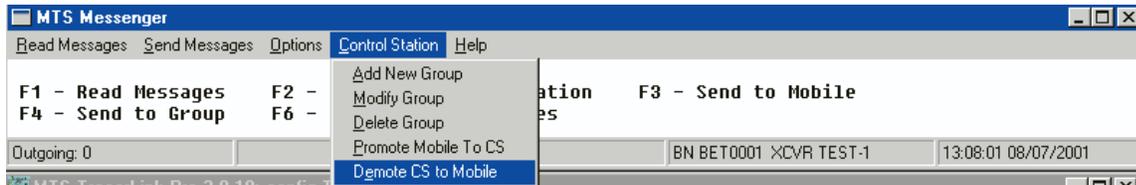


Figure 7-10 Demoting Control Station to a Mobile

- (1) Select Control Station → **Demote CS to Mobile** on the MTS Messenger menu bar.
(see Figure 7-10)

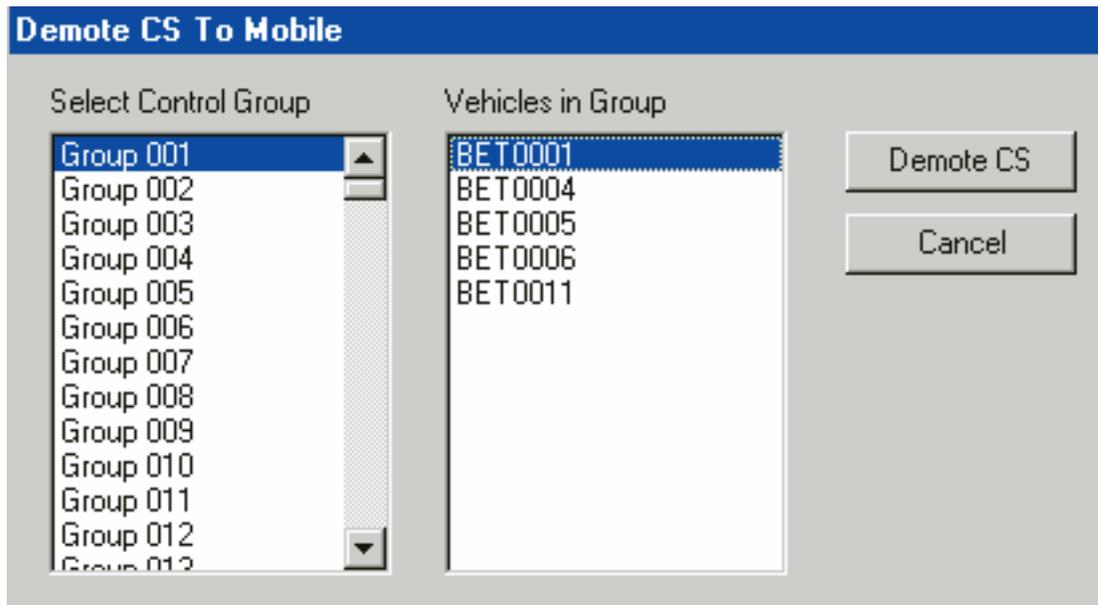


Figure 7-11 Demote CS to Mobile Dialog Box

- (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 7-10)

NOTE: If the Control Station is assigned to more than 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.

7.1.5 About MTS Messenger

(1) To determine the MTS version loaded on your computer, select **Help** from the MTS Messenger menu. Select **About this program** (see **Figure 7-12**)

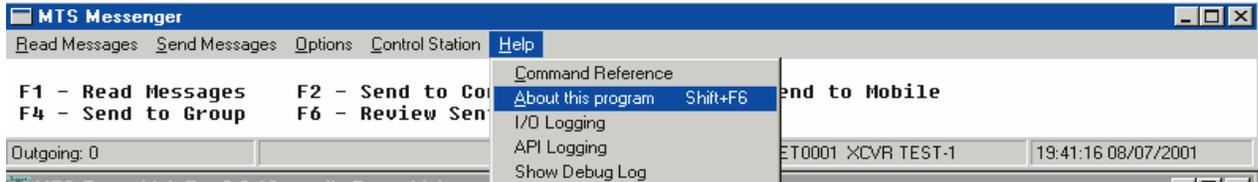


Figure 7-12 About MTS Messenger



Figure 7-13 About MTS Messenger

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.

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.

9. System Administrator Tasks

9.1 Using MTS Messenger Help

Select the **Help** menu from the menu bar. Figure 9-1 shows the menu that will appear.

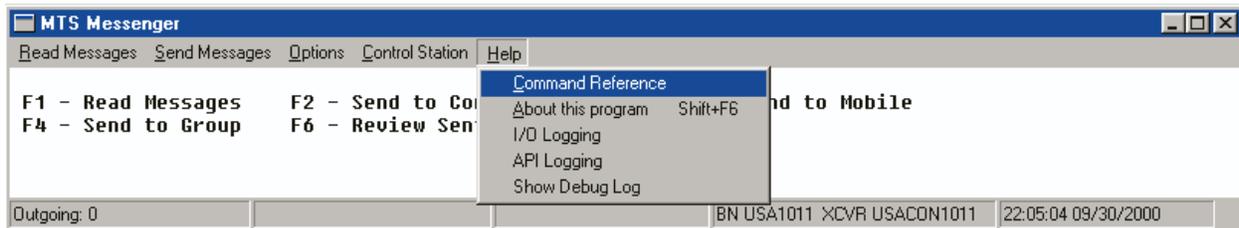


Figure 9-1 Help Menu

Command Reference will display the function key command reference in the display screen.

About this Program will display the version number of the MTS Messenger program.

I/O Logging, **API Logging**, and **Show Debug Log** all show protocol traffic to and from the satellite transceiver. The Debug Log is the only log that will be used by the System Administrator.

9.1.1 Debug Log

MTS Messenger has a built-in diagnostic function, the **Debug Log** that may help in the event of trouble. Although this function was created for Comtech Mobile Datacom's development engineers, a trained Army System Administrator working in conjunction with Comtech Mobile Datacom's Support Personnel can determine some basic status information from the **Debug Log**.

The diagnostic function displays data between the terminal and MTS Messenger and between MTS Messenger and Tracerlink. The steps below outline how to activate the **Debug Log** and how to interpret some of the data in the log. Again however, it is recommended that the system administrator not try to interpret this log without support from Comtech Mobile Datacom.

Steps for Opening and Low-Level Interpretation of the Debug Log:

- (1) Select **Help → Show Debug Log** from the Help menu. When this is done, the Command displayed in the main panel will change to display diagnostic information. The diagnostic information includes all data received from and sent to the terminal, and all data sent to the Tracerlink map. Lines of the form "Army Msg of X bytes" indicate a message was received from the satellite terminal. To verify the terminal is receiving messages from the satellite,

view this screen for several minutes to see that messages are periodically arriving. If you receive a message, go to step 2. If you do not receive the message after 10 minutes, go to step 3.

```

MTS Messenger
Read Messages Send Messages Options Help

Debug Queue: 27 (16)...
27 [16:41:37] Army Msg of 82 bytes: FE 0B 01 03 FF 41 0C 38 C9 93 1B 39 10 15 00 77 00 06 02 06 1F 41 04 38 D0 06 50
26 [16:41:31] Army Msg of 14 bytes: FE 16 01 09 FF 41 07 39 10 35 00 77 15 06
25 [16:41:26] Army Msg of 82 bytes: FE 0B 03 1F FF 42 04 38 CE 57 53 39 10 35 00 77 15 07 06 1F FF 43 0C 38 D8 E4 FD
24 [16:41:26] Made new Army unit <01 07 FF = C07>.
23 [16:41:26] Made new Army unit <09 66 FF = F66>.
22 [16:41:26] Made new Army unit <01 55 FF = C55>.
21 [16:41:26] Made new Army unit <06 1F FF = CONTROL1>.
20 [16:41:26] Made new Army unit <03 1F FF = FRG1>.
19 [16:41:19] Army Msg of 82 bytes: FE 0B 01 03 FF 41 0C 38 C9 93 1B 39 10 15 00 77 00 06 02 06 1F 41 04 38 D0 06 50
18 [16:41:19] Made new Army unit <01 66 FF = C66>.
17 [16:41:19] Made new Army unit <01 00 7F = C007>.
16 [16:41:19] Made new Army unit <02 06 9F = D069>.
15 [16:41:19] Made new Army unit <02 06 1F = D061>.
14 [16:41:13] Army Msg of 14 bytes: FE 16 01 09 FF 41 07 39 10 35 00 77 15 06
13 [16:41:13] Army Msg of 65 bytes: FE 14 01 09 FF 41 07 A0 03 23 16 41 14 00 00 43 2C 44 2C 46 52 47 2C 45 56 41 44
12 [16:41:13] Made new Army unit <01 03 FF = C03>.
11 [16:41:13] Control Station Info: CS 1 <C03>, CG 65, HW 0C
10 [16:41:13] Made new Army unit <01 09 FF = C09>.
9 [16:41:13] WHOAMI Info: I'm <C09>, CG 65, hw 07
8 [16:41:13] Prefix table: Prefix table(10,50): MDCHUB,C,D,FRG,EVADER,RESCUER,CONTROL,HOOD,HARC,F,

Outgoing: 0 C09 16:41:38 03/23/2000

```

Figure 9-2 Sample Debug Log

- (2) To revert back to the Command Reference select **Help → Command Reference**. The Command Reference screen (also referred to as the standard MTS Messenger window) should appear as in Figure 5-4.
- (3) If no messages containing the string "Army Msg of X bytes:" arrive for a 10-minute period, the terminal is not receiving messages from the satellite. Check that the LED lights are illuminated (see section 10.2). If the LED's are lit, the terminal may be blocked from satellite view by trees or buildings. Proceed to step 4. If the LED lights are not illuminated follow the procedures outlined in section 10.2.
- (4) Move the terminal into a clear area without any obstructions in the direction of the satellite. If the terminal has power and a view of the satellite, but is still not communicating, the terminal may be the problem, proceed to step 5.
- (5) At this point it will be necessary to look at the terminal directly without MTS Messenger. You will need assistance from a Comtech Mobile Datacom engineer. Please call the Comtech Mobile Datacom Support Center at 1-888-428-2101.

9.2 LEDs (Light Emitting Diodes)

The transceiver is equipped with three colored LEDs (light emitting diodes). The LEDs are colored Red, Yellow and Green. The LEDs are located on the side of the terminal.

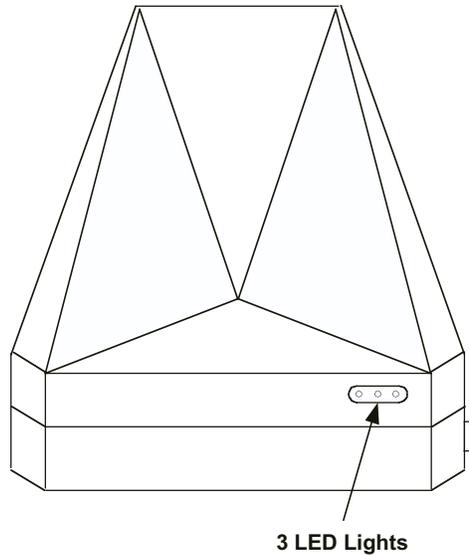


Figure 9-3 LED's on Transceiver

The LEDs provide information on:

- Whether the terminal is receiving power. If there are no lights, the terminal is not receiving power.
- The transceiver startup process. The LED lights will cycle a number of times (go from Red to Yellow to Green in what appears to be a random order) during the initial startup process. Although the lighting process appears random, it actually shows the boot-up process of the firmware in the transceiver.
- If the terminal is functioning in standard operating mode. After the startup process, the terminal will go into its standard operating mode. During this mode the green and yellow lights will illuminate in a semi-constant fashion.
- If the terminal is sending a message. The Red LED will flicker for a few milliseconds when transmitting a message.

9.2.1 No LED Lights on the Transceiver (MT 2010) & Check Cables

The most important indicator that the LEDs provide is to determine if the terminal is receiving power. If the LEDs do not turn-on when a user turns on the control box, there could be one of three problems.

- (1) The most obvious problem would that the control box isn't actually turned on. Turn on the control box. If this solves the problem skip all the subsequent steps. If the problem persists proceed to step 2.
- (2) Check to see if there are loose cables. Check that the cable to the transceiver is appropriately fastened. Ensure that the transceiver cable is not damaged at the control box. If you suspect that a cable from the control box to the transceiver has been damaged, mount the transceiver on another vehicle. **Do not touch the cable if you see exposed wire.** Plug in the transceiver to the other vehicle's control box, turn on the control box and see if the transceiver's LEDs illuminate. If the transceiver's LEDs do not illuminate go to step 3.
- (3) Check the pins on connector of the transceiver. Are the pins bent or broken? Do the pins show signs of any other damage? If the answer to either of these questions is yes, contact your System Administrator, or the unit CSSAMO. If the pins appear OK, go to step 4.
- (4) Check to see that the control boxes you have used in steps 1-3 are functioning correctly. Try powering up another transceiver on the control boxes you have been using. If you have checked the control boxes and you think that the control boxes are working correctly, contact your Control Station operator or the unit CSSAMO.

9.3 Checking and Troubleshooting TracerLink

If TracerLink Map Viewer is not showing vehicles that you believe it should be showing follow the steps outlined below. This section assumes that the user understands how to display (show) and hide vehicles and groups. It assumes that all Control Groups have been set to show, but the user is still not seeing a known unit (vehicle).

9.3.1 Checking that Vehicle Server COMM is Active

The Vehicle Server window communicates with MTS Messenger. MTS Messenger passes position data TracerLink Vehicle Server, so that the Map Viewer can display the appropriate vehicle icons. To verify that the Vehicle Server is actively communicating with MTS Messenger, perform the following steps:

- (1) Maximize the Vehicle Server window. Usually this window will be minimized, however to verify connectivity between MTS Messenger and TracerLink you will need to maximize the window.
- (2) Check that the lower left status bar says **COMM Active**. This means the Tracerlink Vehicle Server is connected to MTS Messenger. In Figure 9-4, the lower left status bar shows **COMM InActive**.

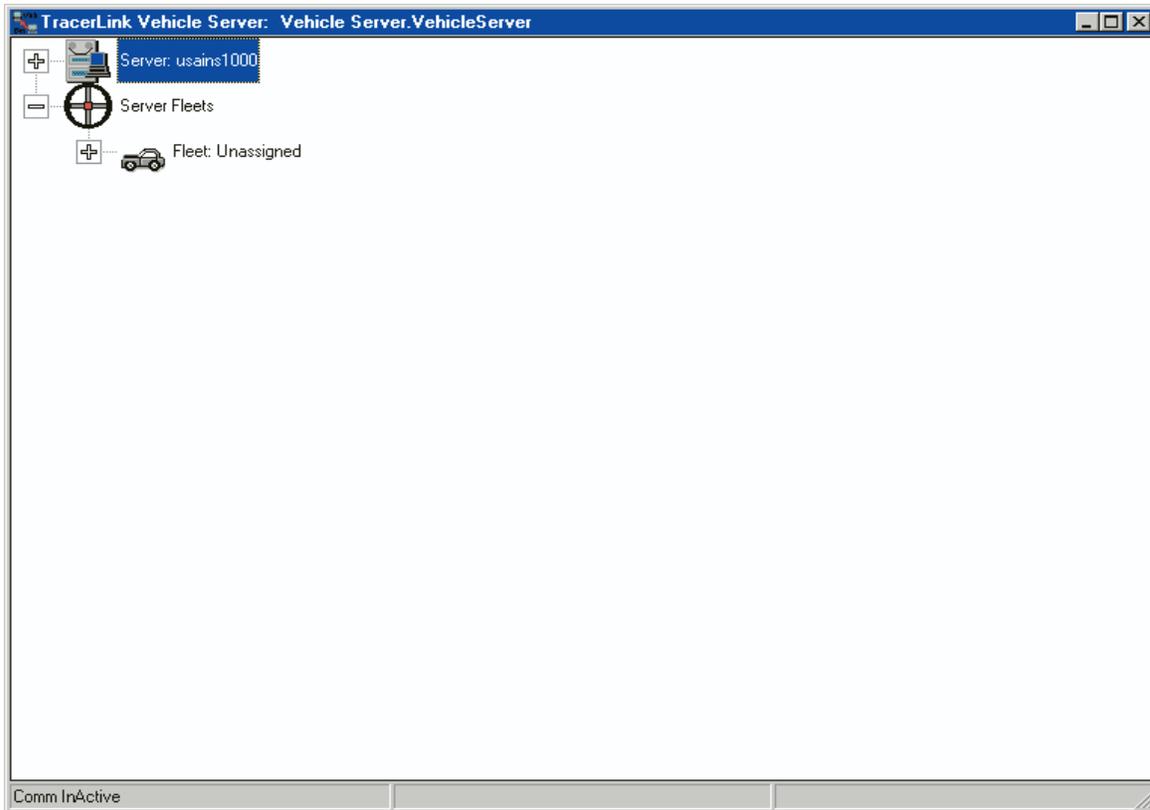


Figure 9-4 Vehicle Server Window – COMM InActive

- (3) Close the Vehicle Server and the Map Viewer. Shut down (close) MTS Messenger.

- (4) Restart MTS Messenger. Make sure MTS Messenger is functioning appropriately. If it is proceed to Step 5. Using the send function in MTS Messenger, check that the vehicle is on-line in MTS Messenger and showing its position, or that it is off-line but that its last report is available. Figure 9-5 illustrates a unit C55 that is off-line, but that its last position report was at MILGRID 18SUJ27093825. If position information is available in MTS Messenger, it should be available in TracerLink.

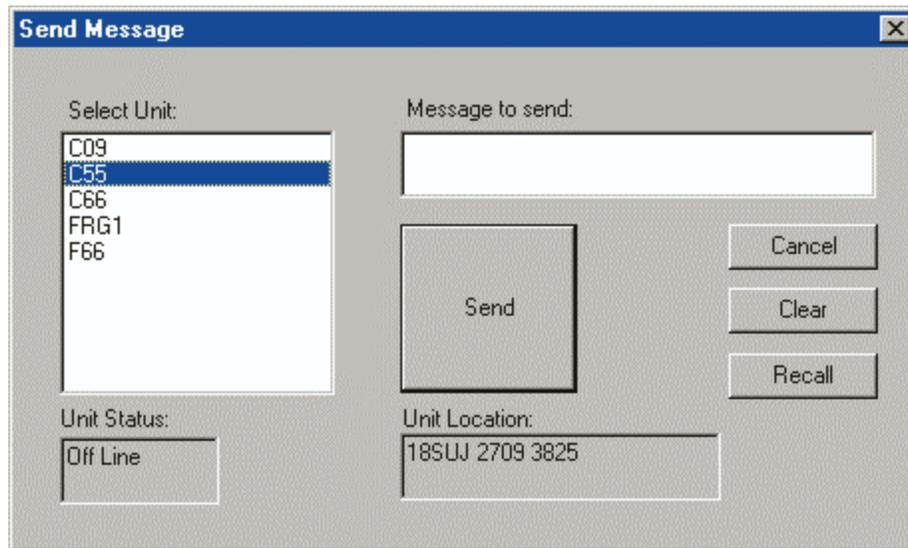


Figure 9-5 Check Status of Vehicle via MTS Messenger

- (5) Restart Vehicle Server, and then restart the Map Viewer. The map viewer is different -- it can be shut down and restarted without restarting the vehicle server or MTS Messenger. If the vehicles that previously were not seen are now in-view, you can stop troubleshooting. If the vehicles are still not in-view in the TracerLink Map Viewer you will need to check if the vehicle is **Connected** in Vehicle Server Kit Control window.

9.3.2 Deleting and Connecting Server

There are occasions when you may suspect a problem between the TracerLink Map Viewer and the vehicle server. In that case, you want to delete and reconnect the server.

NOTE: Deleting the server will shut down Tracerlink Pro. Tracerlink Pro must be re-started after deletion.

- (1) Select vehicle, The Server Vehicle Control window is displayed.

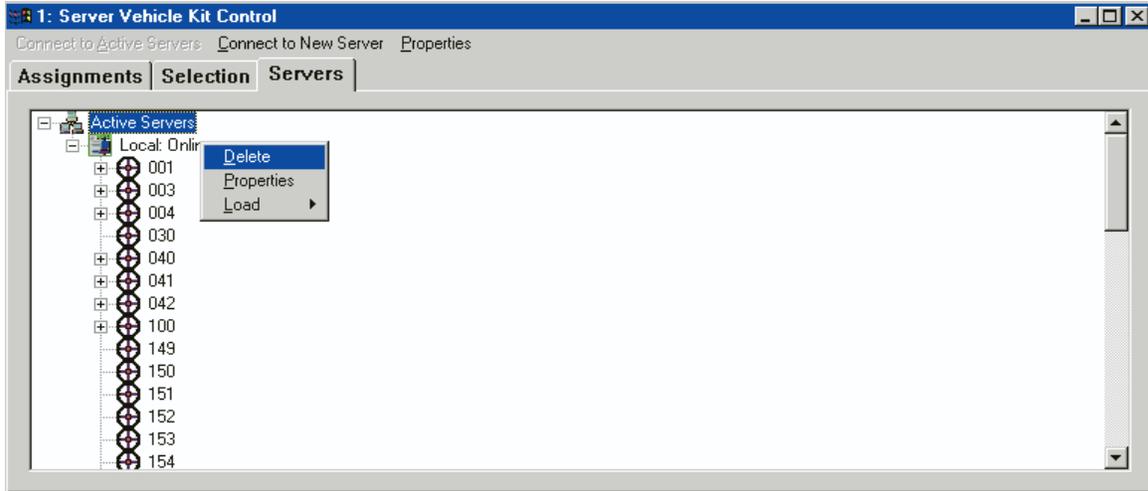


Figure 9-6 Server Vehicle Kit Control – Delete a Server

- (2) Right click on local server. Click on delete. The user will be asked to confirm whether or not the user really wants to delete the server. Click on yes.
- (3) To connect a new server, right click on the **Active Server** icon (See Figure 9-7).

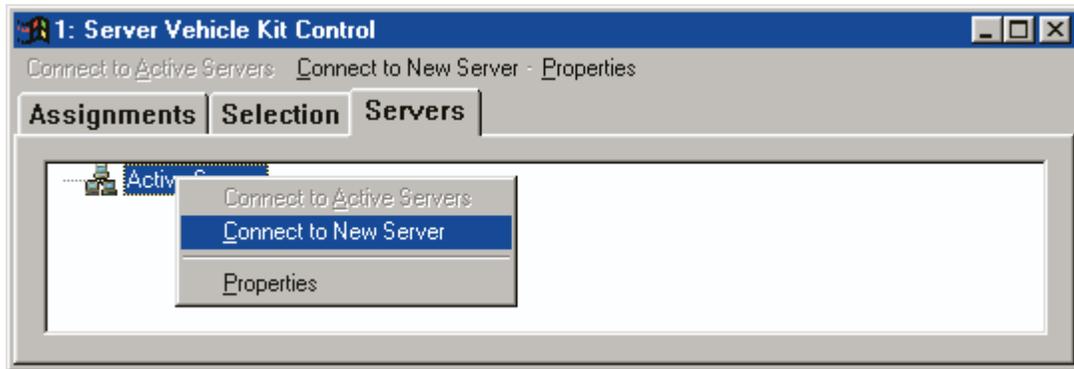


Figure 9-7 Server Vehicle Kit Control – Connect to Server

- (4) Select the **Connect to Server** option (See Figure 9-7)



Figure 9-8 Server Vehicle Kit Control –New Server Connection – Local

- (5) The **New Server Connection** window will appear. In this window are a number of check boxes. If you want the Map Viewer to see vehicles automatically as well as the vehicle's corresponding name and time of last position report, click on all of the appropriate boxes and then click **OK**.

9.3.3 Connecting & Disconnecting Vehicles / Groups in the Vehicle Server Kit Control Window

Groups and vehicles can be disconnected (Not Connected) in TracerLink so that a user can no longer display (show) or hide the group and units. The system administrator may want to disconnect an entire group for a user or a group of users so that the user or group does not see the position (icons) of another group, (this assumes the user is a Control Station and that has been assigned to several groups). For example, Group 001 users may not want to see Group 002 positions. Group 001's TracerLink configurations could be set with Group 002 as **Not Connected**. Conversely, if Group 001 wanted to see Group 002 (in other words **Connect** Group 002), after it was **Not Connected**, the configuration would need to be changed again.

A potential problem may occur when user has inadvertently disconnected a vehicle or a group of vehicles. The System Administrator will need to re-connect the vehicle or group. The steps needed to re-connect a disconnected group are as follows:

- (1) Check to see if the vehicle you want to see has been truly been **Not Connected** using the **Server Vehicle Kit Control Window**.
- (2) Once the **Server Vehicle Kit Control Window** is open, select the **Servers** tab .

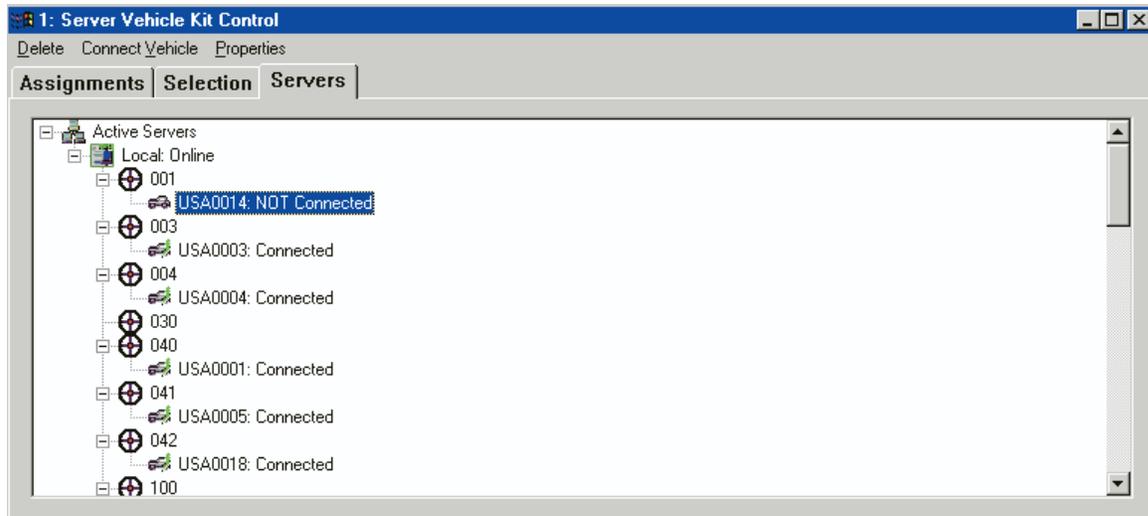


Figure 9-9 Server Vehicle Kit Control Window → Server Tab

- (3) To change a unit which is **Not Connected** simply select the **Not Connected** vehicle, then right click, and finally choose **Connect Vehicle** as in Figure 9-10. Once you choose **Connect** the vehicle will appear as **Connected**. You can follow the same procedure to **Connect** the entire group (fleet). Select the group, then right click, and finally choose **Connect**. To disconnect a vehicle or group follows the same procedures, except instead of choosing a **Not Connected** vehicle or group, you choose one that is **Connected**.
- (4) Now you will need to ensure that the connection changes are saved for the next time the user launches TracerLink Vehicle Server and TracerLink Map Viewer. Therefore, close the Server Vehicle Kit Control window. Right click on the Map Viewer 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 the configuration as a different filename.

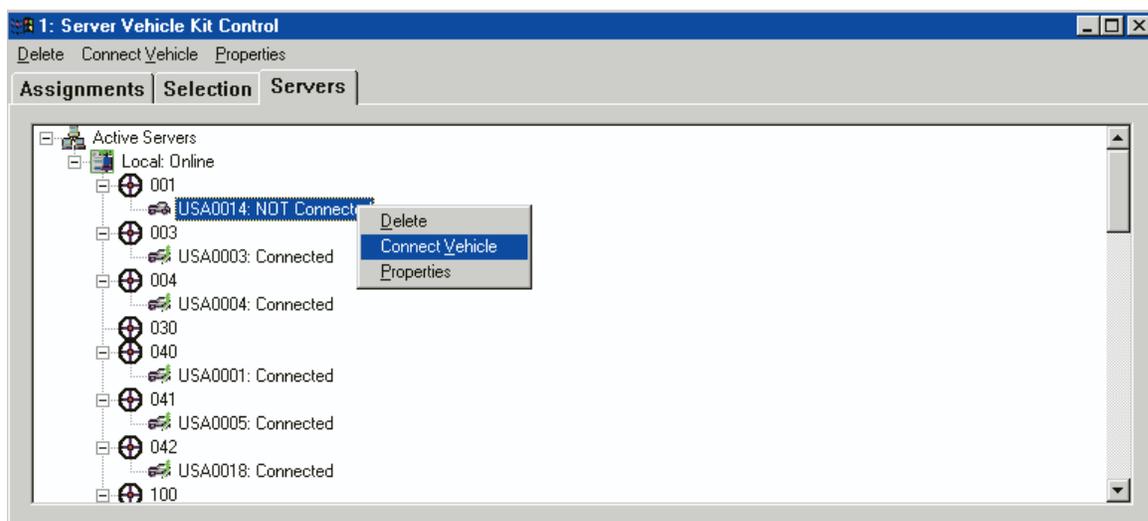


Figure 9-10 Connecting A Vehicle or Group

10. Warranty

Comtech Mobile Datacom Corporation is obligated, under the provisions of the Warranty for items delivered pursuant to this contract, to repair or replace or otherwise provide a remedy for warranted items only if damage or loss results from or is caused by the warranted item. Comtech is not obligated to provide repair, replacement or other remedies in the event that damage or loss is the result of or is caused by actions or events other than the warranted item, to include such causes as (1) misuse or abuse of the item beyond the use contemplated in the Specification; (2) accidental damage. To include aircraft crashes; (3) combat damage; (4) natural disasters, to include flood, earthquake, hurricane, tornado; and (5) fires or explosions not originating on or within the warranted item.

Comtech will provide a thirty-six month warranty including parts and labor for all equipment delivered under the MTS contract. The warranty may include on-site procedures or mail-in or a combination of both. Comtech will provide no-cost repair for MTS equipment delivered to Comtech by mail or commercial carrier. Comtech will bear all shipping and packaging costs both from and to Government sites, and will be responsible for equipment from time of shipment to safe return to the Government site.

Equipment located in CONUS, Alaska, Hawaii, Germany, Korea and Southwest Asia (including but not limited to Kuwait, Saudi Arabia, Bahrain, and Qatar), will be returned to a fully operational status or replaced with a fully operational unit within seventy-two (72) hours of a bona fide attempt to report the problem to Comtech using the customer assistance services provided under this contract. Equipment located in all other locations will be returned to a fully operational status or replaced with a fully operational unit within two hundred forty (240) hours of a bona fide attempt to report the problem to Comtech using the customer assistance services provided under this contract. A bona fide attempt is established once the user has established contact with the staffed telephone support service or after a user leaves an answering service machine message or receives a delivery receipt notice to an e-mail, World-Wide Web or satellite message request for service.

The Precision Lightweight GPS Receiver, PLGR, is not covered under Comtech Mobile Datacom Corporations warranty for MTS

PLGR's requiring warranty replacement will be returned to Rockwell Collins INC.

To return a PLGR to the manufacturer:

1. Remove the main power battery (if installed).
2. Do not remove the 3.6 volt memory battery
3. Package the PLGR to protect from in-transit damage.
4. Use DD Form 1149, include the fault code or written explanation of the fault.
5. Ship to Rockwell Collins INC
ATTN: Service Center MS 134-141
855 35th Street NE
Cedar Rapids, IA 52402-3613

Mark for: AN/PSN-11 Warranty

11. Spare parts

When Comtech replaces a defective part during the warranty period, the newly installed part will become Government property. The defective part will become Comtech property. The effective warranty for all replacement parts installed during the initial warranty period will be equal to the remaining warranty period on the original item or 90 calendar days, whichever is greater.

The Precision Lightweight GPS Receiver, PLGR, is provided with the MTS. If replacements parts are required for a defective PLGR, alert your unit supply. Replacement accessory parts will be ordered IAW your unit supply SOP. The PLGR is not covered under the Comtech warranty clause.

12. Required Tools

There are no required tools necessary for the two MTS configurations.

13. Frequently Asked Questions

13.1 What group am I in?

Mobile (V2) users can only be in one group. Control Station (CS) users can be in one or many groups. To check which group you are a member of, invoke the group message window (F4) in MTS Messenger.

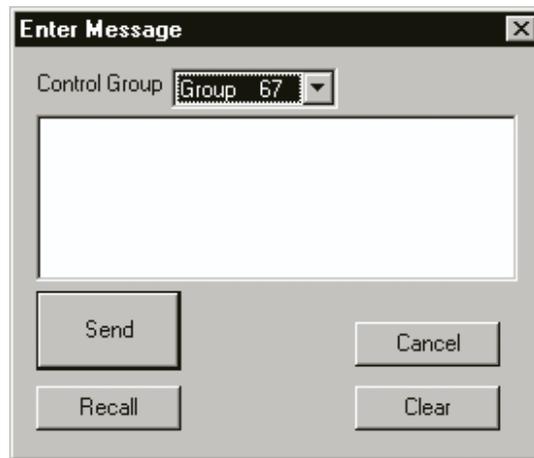


Figure 13-1 Enter Group Message Dialog Box

Notice that in this window, the user is a member of Group 67. If the user was a Control Station, the user could use the pull down window to see what other groups the user was currently a member of.

Note: Groups are assigned numbers in MTS Messenger and letters in TracerLink. See FAQ 2 for an explanation.

13.2 Why can't I see myself on the map?

If your unit is not appearing on the map, first check to see if you are looking in the right area of the map. If you still do not see yourself check the following:

- (1) Is your transceiver assigned to a group? If you are not assigned to any group, you will not be able send, receive to any other transceiver. You will also not be able to see your unit on the map, (see Section 5.3.3).
- (2) Is the **Vehicle Server** window open, and does it show COMM ACTIVE .
- (3) The TracerLink map viewer has been disconnected from the Vehicle Server.

13.3 Why can't I see other members of my group?

There are two reasons why you might not see any other units in your group.

- (1) If you are not assigned to any group, you will not be able to send, receive to any other transceiver. You will also not be able to see your unit on the map.
- (2) It can take several minutes to see your group members appear after starting MTS Messenger.

13.4 Can I print my maps in TracerLink?

There is no direct printing function in TracerLink. However, a user may perform a screen capture, then paste the screen capture in WordPad, or MS Paint. A screen capture, literally takes a picture of what is on your screen.

- (1) To perform a screen capture press the **PrtSc** button. This button can be found on the top row of the Control Station laptop keyboard.
- (2) Open Word Pad. To open word go to the Start button, select Program Files, then select Accessories, and finally select WordPad. (**Start**→**Program Files** → **Accessories** → **WordPad**).
- (3) Paste the screen capture. To paste the screen capture, choose the Edit menu option, then select Paste. (**Edit** → **Paste**). A quicker way to do this would be to press the **Ctrl** key and the “**V**” key simultaneously.

Note: Only Control Station users have printers, mobile (V2) users have no printing capability.

13.5 Can I send messages via TracerLink?

No, although there is a message option in TracerLink this option has been disabled for MTS.

13.6 I cannot open my MTS transit case, what am I doing wrong?

If the case does not open easily, verify that the four butterfly clips are indeed 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.

13.7 I changed the position display in MTS Messenger to Lat Long but it still appears as MILGRID. What did I do wrong?

You did not do anything wrong. The Lat Long / MIL GRID position display in MTS Messenger can take many minutes to change. The display does not change immediately; it only changes after the next position refresh cycle. Positions are refreshed in MTS Messenger every five minutes.

13.8 I can't see messages I sent yesterday. Can I save my messages in MTS Messenger?

No. For security reasons the Army has required that messages never be saved on any of the MTS computers. Once you close out of MTS Messengers all of your messages will be erased. Control Stations may print a message log, but that log will not be saved on the Control Station computer.

13.9 Why can't I see my vehicle/control station icons?

The unit must be able to see both GPS and Communication Satellites. It must receive good PLGR information to work properly. First, ensure the Transceiver and PLGRF antenna have a clear view of the sky. Ensure the antenna is not under camouflage nets or other wised blocked. The PLGR must be properly configured. The PLGR setup should be set for continuous reporting, viewing mixed satellites, and the timer must be off.

14. Appendix

14.1 A-Kits – Vehicle Interior

14.1.1 FMTV



V2 computer mount (with V2 Computer installed) inside FMTV cab.

14.1.2 FMTV Control Panel



V2 Control Box mounted inside FMTV cab.

14.1.3 HEMTT



V2 computer mount (without V2 Computer) inside HEMTT cab.

14.1.4 HET



V2 computer mount (without V2 Computer installed) inside HET cab.

14.1.5 HET Control Box



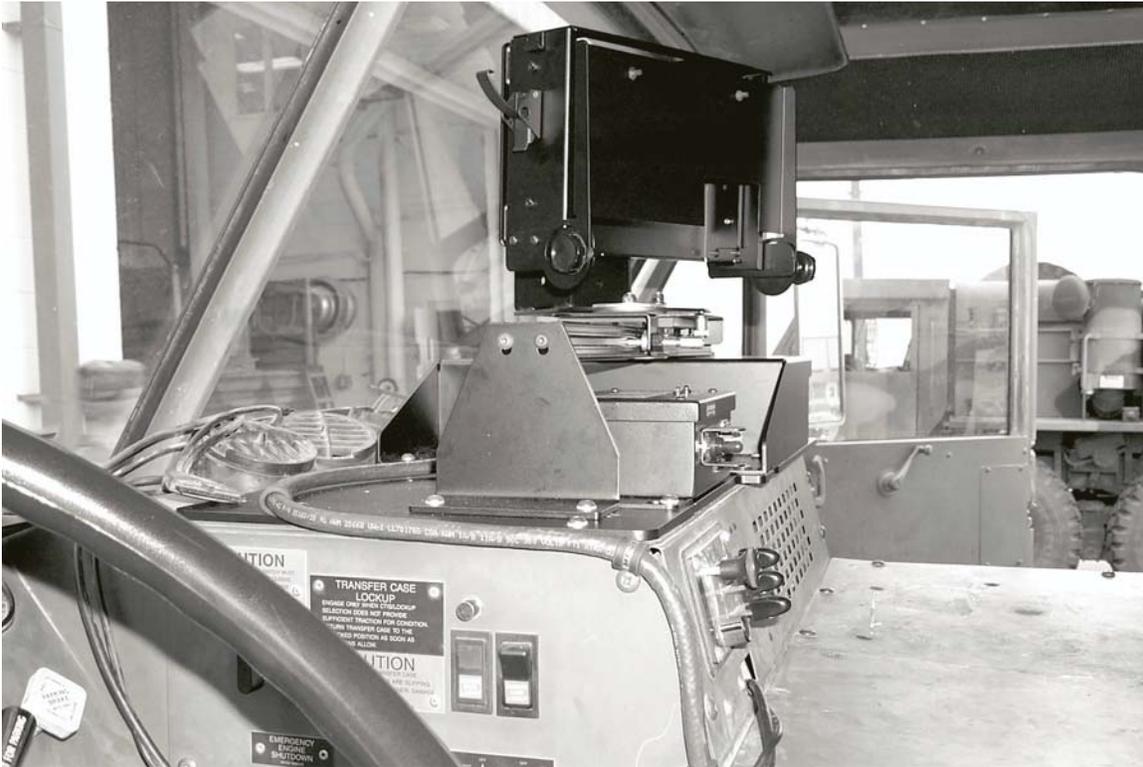
V2 control box for the HET. Notice the control box under the V2 computer mount in the picture above.

14.1.6 HMMWV



V2 computer mount (without V2 Computer installed) inside HMMWV. Notice Control Box in the center of the cab.

14.1.7 PLS



V2 computer mount (without V2 Computer installed) inside PLS.
Notice the control panel under the sliding computer mount.

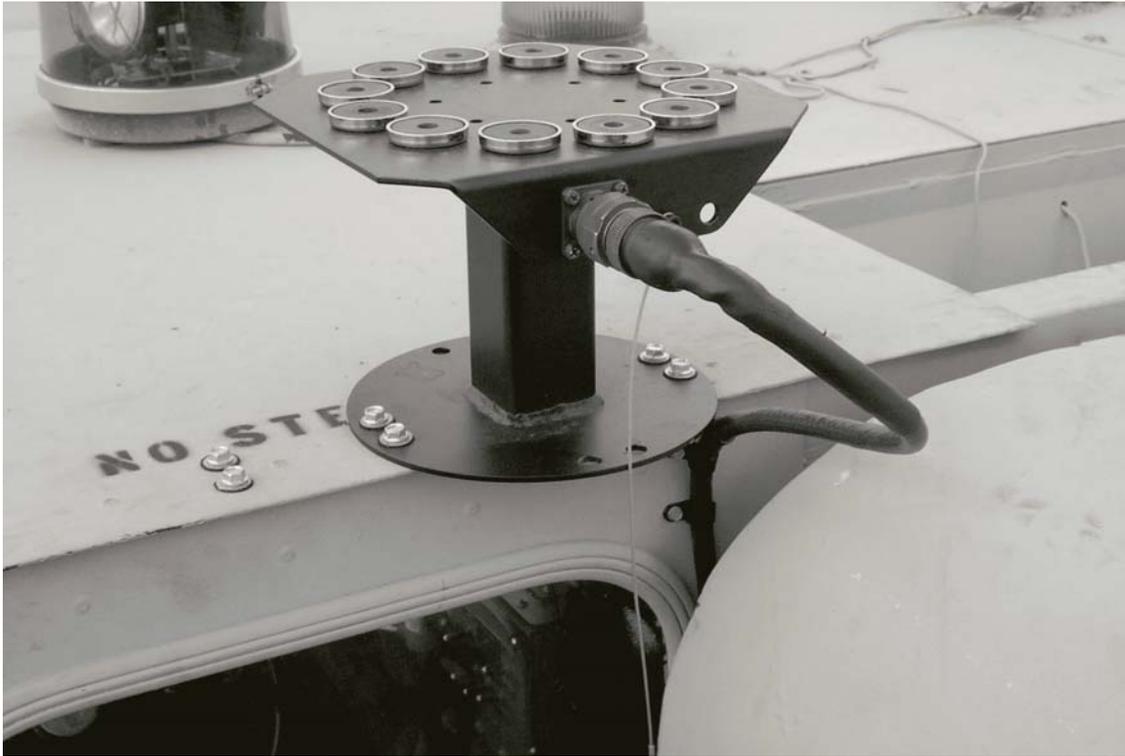
14.2 Transceiver Mounts

14.2.1 FMTV Transceiver Mount



Transceiver mount (without MT 2010 transceiver installed) on top of the FMTV cab. Notice the lanyard and stowage of the data cable when the transceiver is not installed.

14.2.2 HEMTT Transceiver Mount



Transceiver mount (without MT 2010 transceiver installed) on top of the HEMTT cab.
Notice the stowage of the data cable when the transceiver is not installed.
The lanyard in this photo is hanging down (not clipped) out of the picture.

14.2.3 HET Transceiver Mount



Transceiver mount (without MT 2010 transceiver installed) on top of the HET cab.
Notice the lanyard and stowage of the data cable when the transceiver is not installed.

14.2.4 HMMWV Transceiver Mount



Transceiver mount (with MT 2010 transceiver installed) on the front of the HMMWV cab.

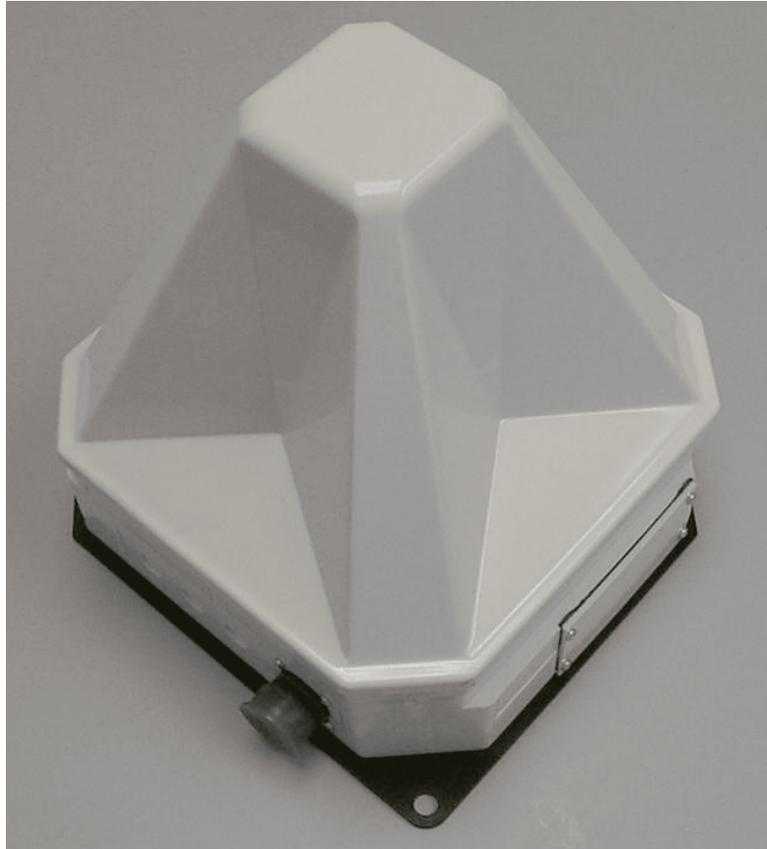
14.2.5 PLS Transceiver Mount



Transceiver mount (with MT 2010 transceiver installed) on top of the PLS cab.
Notice that the lanyard is clipped to the transceiver.
Also notice that the data cable is attached to the transceiver (not stowed).

14.3 MTS Components

14.3.1 MT 2010 Satellite Transceiver



14.3.2 Control Station Laptop and Port Expander



14.3.3 Printer



14.3.4 Control Station Control Box



14.3.5 V2 Computer (Screen and Keyboard)



14.3.6 V2 MIL Ports



14.3.7 V2 Power and Data Cables



Left to Right -- Power Cable, Data Cable

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