Design, Setup, and Operation of the Third-Generation TeleEngineering Communications Equipment-Deployable (TCE-D) System

Jeffrey L. Williamson, Larry N. Lynch, Jeff Powell, and Bryan Register

September 2002
Design, Setup, and Operation of the Third-Generation TeleEngineering Communications Equipment-Deployable (TCE-D) System

by Jeffrey L. Williamson, Larry N. Lynch
Geotechnical and Structures Laboratory
U.S. Army Engineer Research and Development Center
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Jeff Powell, Bryan Register
Information Technology Laboratory
U.S. Army Engineer Research and Development Center
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Final report
Approved for public release; distribution is unlimited

Prepared for U.S. Army Corps of Engineers
Washington, DC 20314-1000
# Contents

Preface .................................................................................................................. ..v  

1—Introduction ........................................................................................................ 1  

2—Components of the Third-Generation TCE-D ..................................................... 3  
  Overview ................................................................................................................. 3  
  Roll-Around Case ................................................................................................. 4  
  KIV-7HS ................................................................................................................. 4  
  VTC/data selector switch ..................................................................................... 5  
  Cable patch panel ................................................................................................. 5  
  Polycom ViewStation .......................................................................................... 5  
  ADTRAN IMUX ..................................................................................................... 5  
  INMARSAT M4 Satellite Terminal Case ............................................................... 5  
  Laptop and Accessories Case ............................................................................. 6  

3—Setup .................................................................................................................... 10  
  Overview ................................................................................................................. 10  
  Setting up the M4 ................................................................................................. 10  
  Setting Up the Roll-Around Case ..................................................................... 18  

4—Operation of the System .................................................................................... 27  
  Powering Up System ............................................................................................ 27  
  Conducting a Voice Call ...................................................................................... 30  
  Conducting a VTC ............................................................................................... 30  
  Transferring Data ............................................................................................... 33  

5—Additional Topics ............................................................................................... 38  
  Using a Hand-held Camera .................................................................................. 38  
  Vehicle Power ....................................................................................................... 41  
  Connecting to the Internet .................................................................................. 43  
  Displaying Computer Images ........................................................................... 43  

6—Preparing the System for Shipment .................................................................. 45
Appendix A: Quick Reference VTC Instructions ............................................. A1
Appendix B: Quick Reference for Data Transfers ........................................ B1
Appendix C: Data Transfers Using the Klashopper Card and KlasPeer2Peer Software ......................................................... C1
Preface

The work reported herein was funded under the TeleEngineering Operations Technology Demonstration Program at the U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS. Mr. Jeff Williamson and Dr. Larry Lynch, Geotechnical and Structures Laboratory (GSL), and Messrs. Jeff Powell and Bryan Register, Information Technology Laboratory (ITL), prepared this report.

The work at ERDC was performed under the general supervision of Dr. Albert J. Bush, Chief, Engineering Systems and Materials Division, GSL; and Dr. David A. Pittman, Acting Director, GSL; Dr. Charles R. Welch, Chief, Instrumentation Services and Systems Division, ITL; and Dr. Jeffrey Holland, Director, ITL.

At the time of publication of the report, the Director of ERDC was Dr. James R. Houston and the Commander and Executive Director was COL John W. Morris III, EN.

The contents of this report are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or approval of the use of such commercial products.
1 Introduction

In FY97, the U.S. Army Engineer Waterways Experiment Station, currently the U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS, initiated a technology demonstration program to determine the feasibility of providing deployed troops with direct access to subject matter experts (SME). Direct access to SME would allow responses to engineering challenges beyond the in-theater capability to be provided without the time delays and costs associated with deploying the SME to the theater.

During the execution of the technology demonstration, the ERDC TeleEngineering Operations Center (TEOC) was established as the main operations center from which TeleEngineering support would be provided to the deployed force. Shortly after the establishment of the TEOC, the U.S. Army Engineer Division, North Atlantic (NAD), requested TeleEngineering support for operations in the Balkans region. In addition to engineer analysis support, the TEOC was requested to develop a method for deployed U.S. Army Corps of Engineers (USACE) personnel to communicate with the U.S. Army Engineer District, Europe (NAU), NAD, Headquarters (HQ), USACE Operations Center (UOC), and the TEOC. The requirements for the communications equipment were: (a) deployability and (b) the capability to allow secure and nonsecure data transfer, voice, and video teleconferencing (VTC). Additionally, the TEOC was requested to provide a fixed-site TeleEngineering Communications System to be used at NAU, NAD, UOC, and the TEOC, so that personnel at these locations could communicate with deployed personnel. The resulting fixed-site system is based on an Integrated Systems Digital Network (ISDN) and is described in a separate ERDC report; the deployable, satellite-based system is described herein.

The TEOC requested that the ERDC Information Technology Laboratory (ITL) take the lead in developing the communications system. Within a 3-week period, ITL and TEOC personnel researched, designed, procured, validated, and transferred the satellite-based system to NAU for communications with the ISDN-based fixed-site system. During FY 2001, a continuing effort to reduce the size of the system, increase the transportability, and reduce the setup effort and time of the deployable system produced the second-generation deployable system, and subsequently, the third-generation deployable system.

The purpose of this report is to describe the various components of the third-generation TeleEngineering Communications Equipment-Deployable (TCE-D) System and to provide the step-by-step procedures required to set up and operate
the system. Chapter 2 presents the components that comprise the system. Chapter 3 provides details on setting up the equipment and the interconnections between the individual components. The operation of the system (i.e., making a voice call, conducting a VTC, and transferring data) is presented in Chapter 4; additional operational topics are covered in Chapter 5. Chapter 6 provides instructions for preparing the system for shipment; contact information for technical support is provided in Chapter 7. Appendices A and B provide a quick reference for operations discussed in Chapter 4. Appendix C provides instructions on using the Klashopper data communications card which may be installed in your laptop.
2 Components of the Third-Generation TCE-D

Overview

The deployable system is packed in the three cases illustrated in Figure 1. Note: These cases may vary.

Figure 1. The three cases of the system

Cables necessary for connections between the roll-around case, INMARSAT M4 Satellite Terminal, laptop, and a power source are provided with the system.

Each of the cases and its contents are described in the following three sections: Roll-Around Case, INMARSAT M4 Satellite Terminal Case, and Laptop and Accessories Case.
Roll-Around Case

The main case is a roll-around case containing the following items:

a. KIV-7HS.
b. VTC/Data selector switch.
c. Cable patch panel.
d. ADTRAN IMUX.
e. Polycom Viewstation.

Each item is identified in Figure 2 and is described in detail in the following subsections.

![Roll-around case components](image)

Figure 2. Roll-around case components

KIV-7HS

The KIV-7HS (referred to herein simply as the “KIV”) is the National Security Agency (NSA)-certified high-speed encryption device, which enables secure communications. Secure encryption keys must be electronically loaded into the
KIV for secure communications, using a separate fill device. The KIV is produced by Mykotronics and requires a 5-V DC power supply to be provided with the system.

**VTC/data selector switch**

A switch is provided to select between video teleconference mode (VTC) and data transfer mode (DATA). The switch simply determines which device, the ViewStation or the data computer, will communicate via the M4 satellite terminal.

**Cable patch panel**

Ports for connections to the laptop video, laptop data transfer, M4 satellite terminal, and the ViewStation microphone are included on a patch panel on the front of the case. More details on these connections are provided in Chapter 3.

**Polycom ViewStation**

The Polycom ViewStation (referred to hereafter as simply “ViewStation”) is a versatile video conferencing unit and is interoperable with the KIV and the ADTRAN IMUX; it uses V.35 protocol supporting secure communications. The speaker embedded into the case broadcasts the audio output of the ViewStation. Video output is displayed on the laptop screen. The case also contains a speaker and volume control knob.

**ADTRAN IMUX**

The ADTRAN IMUX (referred to hereafter simply as “ADTRAN”) serves as the system’s dialing interface and provides the network termination for the M4 satellite terminal. A front panel keypad on the ADTRAN supports configuration, test modes, test status, and manual dialing operations. See Figure 3 for a closeup illustration of an ADTRAN.

**INMARSAT M4 Satellite Terminal Case**

The M4 satellite terminal (referred to hereafter as simply the “M4”) is transported in a black, hard-sided case; it is the communications backbone for the deployable system. The M4 can operate on practically any global landmass where there is a clear line of sight (LOS) with a satellite. An indoor/phone unit,
antenna (outdoor unit), and an antenna cable are included in the M4 case. Figure 4 provides an illustration of the M4.

**Laptop and Accessories Case**

A third case provided with the system contains the laptop and accessory items such as hand-held camera, camera tripod, longer antenna cable(s), power inverter, vehicle battery jumper cables, power extension cord, tool kit, power strips/surge protectors, etc. Contents and size of this case will vary, depending on specific mission requirements.

The laptop computer provided with each system facilitates data communications and provides a display for the VTC. An example of a laptop provided with the system is illustrated in Figure 5.

The laptop is delivered with two hard disk drives. One drive should be used for classified information; the other used for unclassified, only. The laptop hard drives should be carried as carry-on baggage to protect from damage.
Figure 4. M4 satellite terminal

Figure 5. Laptop

Chapter 2 Components of the Third-Generation TCE-D
The laptop is equipped with a Comspec ffastests digital data communications card (referred to hereafter as the “Comspec card”).\textsuperscript{1} It is installed in a PCMCIA slot and is operational upon delivery; no further user setup is required. Figure 6 provides an illustration of the Comspec card installed with the cable attached.

![Figure 6. Comspec card installed](image)

Figure 7 provides an illustration of some items which may be included in this case.

\textsuperscript{1} Some versions of the TCE-D are delivered with a Klashopper card. The cable is identical to that shown in Figure 6.
Figure 7. Accessory items
3 Setup

Overview

The system's compact design simplifies setup effort by reducing the number of steps required to make the system operational. Ports and cables are labeled to easily identify proper connections. Interconnections between major components within the roll-around are permanent to ensure proper connections and simplification of the setup process.

The following sections, "Setting up the M4" and "Setting up the Roll-Around Case," describe the steps necessary to make the system operational. In all instances, always set up the M4 first. This serves two purposes: (1) to determine if satellite service can be established at your location, and (2) to establish a "READY" mode on the M4 before the roll-around case is powered.

Instructions for setting up the accessories (for example, power inverter for 12-V DC power conversion and the hand-held camera) are provided in Chapter 5.

Setting up the M4

The M4 case contains the satellite terminal indoor unit (IDU), the antenna outdoor unit (ODU), antenna cable, power cable, and M4 documentation. Figure 8 provides an illustration of the M4 case and its contents.

Remove the antenna cable, power cable, and documentation from the case and set aside. Next, remove the ODU (also referred to herein as "antenna") from the case and open the support leg bracket as illustrated in Figure 9.

Next, remove the IDU and disconnect the short antenna cable as illustrated in Figure 10.

Use the knobs to tighten or loosen the antenna base. See Figure 11.

---

1 A longer cable (20 m+) is provided with each system in the Laptop and Accessories case.
Figure 8. M4 case and contents

Figure 9. Folding down the leg bracket on the ODU
Figure 10. Unfolding the antenna panels

Figure 11. Tightening/loosening the antenna base
Place the antenna in a location where the unit will not be in the path of personnel. It is a microwave radiation hazard and should be handled accordingly. See the front panel of the antenna for safe operating distance.

Aim the antenna in the general direction where a clear LOS can be obtained with a satellite. To obtain a general direction and angle for the ODU, refer to the M4 documentation for the “Antenna Azimuth Elevation Map.” See Figure 12. When the IDU is powered on, the satellite located in the general view of the ODU will be selected.

![Figure 12. Antenna azimuth and elevation map](image)

The M4 can operate on battery power, which can be used during the initial M4 setup steps or plug the unit into AC power as illustrated in Figure 13. When the unit is connected to AC power and the system powered, the M4 will operate on AC power, and the M4 battery will be recharged. Adapters are provided so that the terminal may be powered with 220 V and 110 V. The unit itself automatically senses the input voltage and switches accordingly.

Plug the other end of the power adapter into the phone unit or IDU as shown in Figure 14.

Next, connect the IDU and ODU via the antenna cable. Exercise caution when handling this cable; ensure the cable doesn’t “kink,” causing a break. Various lengths of these cables are available. The basic cable is 10 in. long. The ends of the cable are identical. Figure 15 illustrates the connection of the cable to the IDU; Figure 16 illustrates the ODU connection.
Figure 13. Connecting M4 power supply to AC power

Figure 14. IDU antenna cable connection
Figure 15. Connecting the M4 power supply to the M4 IDU

Figure 16. ODU cable connection
Next, turn the terminal on by pressing the power button. See Figure 17.

The system will require a few moments to initialize. While initializing, the display will read “INITIALISING”; then, the unit will be ready for alignment. Simply hold the antenna, and slowly “sweep” the antenna left to right as demonstrated in Figure 18.

Turn on the tone indicator by pressing the “2nd” button followed by the 9 button. Once the M4 detects a satellite, the tone emitted by the ODU will beep faster. A faster beep indicates a better signal. The display on the IDU indicates the signal to noise (S/N) ratio in decibels (db); a value of 55 db or higher is desired. Adjust the angle and bearing until the fastest beeping and highest S/N ratio can be achieved. Once you are satisfied with the signal strength, place the antenna on a sturdy surface, maintaining the antenna’s angle and bearing. Press the OK button (Figure 19) on the handset. The tone indicator by may be turned off by pressing the “2nd” button followed by the 9 button. Signal strength bars continue to be displayed: better signals produce more bars.

After the system “locks” onto a satellite, the system will register itself with the satellite. Verify a “READY” indication on the IDU display. Note: The “AORW:FRANCE” message may or may not appear on your handset. To test the connection, place a nonsecure voice call. Refer to Chapter 4 for instructions. Use sandbags or other materials to firmly secure the antenna in place by securing the base. Keep the cable and antenna out of pedestrian’s way.
Figure 18. Adjusting the ODU

Figure 19. OK button on handset
Setting Up the Roll-Around Case

Place the roll-around case on a flat, level, sturdy surface with the lid side facing up. Open the case. Turn the case so that the ViewStation is facing toward you. Remove the orange Velcro® strap, lens cover, and foam collar from the Viewstation as illustrated in Figure 20.

If you will be communicating in the secure mode, you must install the KIV. Open the KIV holder by loosening the spring-loaded buckles on both sides as shown in Figure 21.

Raise the holder and insert the KIV into place, as shown in Figure 22.

Close the holder and secure the buckles. Connect the KIV data cables and the KIV power supply cable as shown in Figure 23.

If you will be operating in the nonsecure mode, connect the KIV data cables together as shown in Figure 24, thus, bypassing the KIV.

Connect the M4 port (Figure 25) on the roll-around case to the ISDN Port on the IDU on the M4 phone (Figure 26).

Figure 27 provides an illustration of the cable for this connection.
Figure 21. Loosening the spring-loaded buckles on the KIV holder

Figure 22. KIV holder opened and KIV inserted
Figure 23. KIV data cables and power supply cable connected

Figure 24. KIV data cables bypassed
Figure 25. M4 port and laptop port on roll-around case

Figure 26. Connecting to the ISDN port on the M4
Figure 27. Cable for M4 port to ISDN port connection

Connect the Comspec card (or Klashopper card) in the laptop to the roll-around case laptop port shown in Figure 25.

Figure 28 provides an illustration of the cable connected to the Comspec card.

Connect one end of the cable in Figure 29 to the universal serial bus (USB) video port on the roll-around case (Figure 30).

Connect the other end of the cable to the USB port on the rear of the laptop, as illustrated in Figure 31.

Connect the end of the cable in Figure 32 to the microphone in (MIC IN) port on the roll-around case (Figure 30).

Connect the other end to the ViewStation microphone, as shown in Figure 33.

Connect the female end of the roll-around case power cord to the connector on the case as shown in Figure 34. Ensure the power switch is in the “off” ("0") position.

Connect the other end of the cable to an AC power source. The system can accept 90 to 240 V AC for input power. Finalize the laptop setup by connecting the laptop to an AC power source and boot the laptop.
Figure 28. Cable connected to Comspec card

Figure 29. USB video cable
Figure 30. USB Video port, MIC IN port, and volume control on roll-around case

Figure 31. USB port on the rear of the laptop
Figure 32. MIC cable

Figure 33. Connection of microphone cable to the ViewStation microphone
Figure 34. Roll-around case power connection and switch
4 Operation of the System

The following sections provide instructions on the operation of the system. First, basic operations necessary for initializing the system will be presented. Instructions on powering up the system will be presented followed by instructions for making a nonsecure voice call. Then, steps for conducting VTCs and transferring data will be presented. Appendices A and B provide quick reference guides for these operations.

Powering Up System

Always ensure that the M4 unit is fully operational and is “READY” before powering up the roll-around case. Ensure the Viewstation, ADTRAN, and KIV (if the KIV is connected) are in the off position. Then, turn the power switch to on position (Figure 34) on the roll-around case. Allow 5 sec for the power to stabilize. Turn the ADTRAN to the on position with the switch shown in Figure 35.

Wait for the ADTRAN to display a ready message as shown in Figure 36.

If the KIV is connected, insert the crypto ignition key (CIK) and rotate the CIK clockwise one-quarter turn to the “on” position as shown in Figure 37.

The KIV will “beep” and messages will appear on the KIV display; messages appearing are as follows: “Testing,” “Batt Good,” “Key Good,” and finally, “FDX.” After the FDX message appears and remains in the display, the Online button will flash, indicating the system is ready for a secure call. If the call is nonsecure, the KIV must be completely removed from the system (bypassed) by disconnecting the two cables from the RED and BLACK ports of the KIV, and connecting the two cables. Now, turn on the ViewStation. The ViewStation switch is located on the left rear of the ViewStation and is illustrated in Figure 38.

The system is now ready for operation.
Figure 35. ADTRAN power switch

Figure 36. ADTRAN displaying ready message
Figure 37. CIK inserted and rotated one-quarter turn clockwise to on position

Figure 38. ViewStation power switch
Conducting a Voice Call

To test the connection, place a nonsecure voice call as follows:

Lift the handset and simply dial 00 + country code + area code + number and press OK. The following is an example for dialing the United States.

00 1 601 634 3485 OK  (USA)

Conducting a VTC

To initiate a VTC, ensure the selector knob is positioned to VTC. The laptop screen will be used as the video monitor. Start the WinTV32 software on the laptop by double clicking on the WinTV32 icon (Figure 39).

![Figure 39. WinTV32 icon](image)

Press the TV mode icon (Figure 40) to change the monitor to full screen display.

Ensure the ViewStation is powered up. A start screen similar to the one in Figure 41 should appear on the display.
Figure 40. Changing the monitor to full screen mode

Figure 41. Start screen
Various functions of the ViewStation can be controlled with the remote control (Figure 42).

![ViewStation remote control](image)

Figure 42. ViewStation remote control

Some of the more commonly used keys on the remote control are:

a. *Volume key.* Located on the right side, increases or decreases the audio output of the ViewStation.

b. *Green key.* Located at the top of the remote control, selects from a start screen to a full screen and vice versa. Prior to conducting a VTC conference call, this key can be used to select a full screen, which activates the ViewStation to display the view from the ViewStation’s camera.

c. *Red arrow keys.* Located near the top of the remote control after a full screen has been activated, the keys can be used to rotate the ViewStation camera to obtain a desired view.

d. *Zoom key.* Located on the left side and is used to “zoom” the ViewStation camera.

For a secure VTC, ensure that the KIV is connected properly.

On the ADTRAN panel, press “#” to display the dialing screen. Press Enter to select DTE #1, “2” to dial number, then, Enter to bring up the display “Dial Number.” Enter the ISDN number; for example, to connect to the TEOC bridge,
enter "0016016302904" and press Enter. The ADTRAN display will read "Dialing," "Connecting," "Bonding Setup," followed by "Clear Channel 64000."

When the display reads "Clear Channel 64000" for 10 sec, press the green button near the top of the Viewstation remote control. The ADTRAN’s transmit data (TD) and receive data (RD) lights should flash. The KIV will beep twice and the online light will turn solid; the display will read "FDX TR." The VTC will finalize its connection.

To terminate communications, press the "#" key to bring up the dialing screen. Press Enter twice to "hang up" the call. The display will present a ready message when the call is terminated. Always ensure that the satellite phone returns to the READY mode after a VTC to avoid unnecessary airtime charges.

**Transferring Data**

The following paragraphs provide instructions on transferring and receiving files to/from other sites.

Ensure the ADTRAN display presents a ready message. Ensure the laptop is disconnected from all other networks. If classified material will be exchanged, ensure the secure hard drive is installed. Hard drives may be swapped only when the laptop is "off."

Ensure the selector switch is set to "DATA." For secure communications up to the SECRET level, insert the CIK into the KIV and turn clockwise one-quarter turn until the unit powers up. The display should read "FDX," and the online indicator should be flashing.

For nonsecure communications, the KIV is not needed. Simply remove the two 37-pin connectors attached to the rear of the KIV and plug them together. Ensure the unclassified hard drive is installed.

Place files to be transferred into the C: \XMIT\SEND directory by using Windows® Explorer and the "copy" and "paste" techniques.

Activate the Comspec ffastests software by double clicking the yellow icon located on the Windows® Desktop, as illustrated in Figure 43. This icon may be titled "PC-GOV" or "ffastests PC."

Click the "Configure" menu item at the top of the screen, as Figure 44 illustrates.

Some users may have the option of choosing "PC-SEND" or "PC-RECEIVE." These are preconfigured versions of the software which will load automatically. Once started, the program can be accessed by clicking the bar

---

1 Some systems are configured with a Klashopper card installed, instead of a Comspec card. If this describes your system, refer to Appendix C for instructions.
Figure 43. Desktop screen

Figure 44. Configuring ffastestsPC software
(labeled “ffastestsPC – HSD”) at the bottom of the Windows® screen. This will maximize the status screen. If necessary, the user can go back to the Configure screen by clicking on the “Exit” button.

Click the “send” option under “TRANSFER MODE,” as illustrated in Figure 45.

Under “Auto Receive Files,” click “yes” and enter your user ID. “USERID” is the default ID, but you may want to use your assigned name (For example: TEOC, SITE1, STATION1, ALPHA, etc.). This will allow you to receive files from the far site. If you click “no,” you will receive no files the far site may have for you. The files on the far site must be stored in a directory named as your assigned name. It is recommended that the defaults be accepted for all other options.

You must place the call to the other station using the front panel keypad on your ADTRAN.

Press the “#” key, press Enter to select DTE #1, and then press “2” to activate the dial option. Select this option by pressing Enter. A blinking cursor will appear, prompting for input of the dial number. Enter the number and press Enter. Once you are connected to the other station, your ADTRAN will display “CLEAR CHANNEL 64000.” Allow the call to stabilize for 10 sec.
Click the “Establish Communications” button, as Figure 46 illustrates.

A new window will open and text will appear on the screen. The last line should read “Trying to establish link,” as illustrated in Figure 47.

The KIV should synchronize with the other station, and you will hear two beeps. The ADTRAN “TD” and “RD” lights should be flashing. Next, the screen will display “Remote link established – with FFASTESTS PC HSD.”

The file transfer exchange will begin. Upon completion of the file transfer, the software will terminate and return to the “CONFIGURE” screen. Next, you must manually terminate the call; otherwise, you will incur unnecessary air time charges for prolonged connections. To terminate the call, press the “#” key and press Enter twice on the ADTRAN.

At any time, you may click on the “Exit” button to return to the “Configure” screen. From the “Configure” screen, you may want to check the log file by clicking on the “View Logfile” menu item.

If the system loses satellite signal during transmission, only a portion of a file may be transmitted. The software is designed to complete the transmission on the next call. Simply redial the call via the ADTRAN and reestablish communications.

Figure 46. Establishing communications
Figure 47. “Trying to establish link” window
Each section in this chapter covers additional operational topics including the use of a hand-held camera, using 12-V DC vehicle power with system, connecting to the internet, and displaying computer displays (such as PowerPoint® slides) during a VTC.

**Using a Hand-held Camera**

A hand-held digital camera may be used with the system allowing the ViewStation camera to be focused on the participants, while the hand-held camera is focused on another view, such as a bridge, building, etc. Remember, the use of the hand-held camera is not required for normal operation of the system. In a later section, instructions on displaying computer images over the VTC, via a scan converter, will be presented; the camera and the scan converter cannot be connected to the system at the same time.

The camera provided with this system is the SONY MVC CDR-1000 and is illustrated in Figure 48.

The camera is capable of recording digital video images or digital “still” images. A memory “stick” provides storage for the images; the 3.5-in. floppy adapter and memory stick are illustrated in Figure 49.

The cable used to connect this camera to the rear of the Viewstation has two RCA plugs on one end and a single male connector on the other end. Figure 50 illustrates this cable.

Connect the single male connector to the A/V OUT jack on the camera. Figure 51 illustrates this port. Then, connect the RCA connection to the VCR IN jack on the rear of the ViewStation as shown in Figure 52.

For more information on using the camera, including the memory stick and floppy adapter, refer to the Sony users manuals and/or contact TeleEngineering personnel.
Figure 48. SONY MVC CDR-1000 camera

Figure 49. SONY MVC CDR-1000 with memory stick and floppy adapter
Figure 50. Cable for palmcorder connection to the tall rackmount case

Figure 51. A/V port on camera
During a VTC, the SONY camera output may be selected as the video source to the ViewStation by pressing the “NEAR” button on the remote and selecting the VCR device as shown in Figure 53. The far site will now see the output of the hand-held camera.

**Vehicle Power**

The system is designed to operate on 90- to 240-V AC power source. If only DC power, like that of a 12-V DC automotive system, is available, the ProSine power inverter can be used to convert the 12-V DC to 110-V AC with sufficient current to operate all system components. Figure 54 illustrates the ProSine inverter (referred to hereafter as simply “ProSine”) and jumper cables.

To use the inverter, ensure that the ProSine’s power switch is in the “OFF” position. Using the automotive battery jumper cables, connect the positive terminal on the rear of the ProSine to the positive terminal of the vehicle’s 12-V DC battery; connect the negative terminal of the ProSine to the negative battery terminal. Crank the vehicle and turn the ProSine “ON.” Never crank the vehicle with the ProSine in the “ON” position.

With the power switch on the roll-around case in the “OFF” position, connect the power cord to the ProSine; then, turn the power switch to “ON.” Protect the ProSine and cords in damp/wet conditions to ensure safety of personnel.
Figure 53. Video source selection screen

Figure 54. Prosine inverter with jumper cables
Ensure the ProSine is kept as cool as possible. Provide adequate ventilation to the cooling fan and keep the unit shaded.

**Connecting to the Internet**

A Klashopper card may be installed in the computer for connection to the internet. Use of this feature requires a dial-up internet service. Some Government organizations provide a dial-up number for personnel to check email while personnel are away on travel. A commercial internet service provider can be used to provide the service. One of these capabilities will be required for this feature. Contact the TEOC staff for instructions.

**Displaying Computer Images**

Computer images, such as PowerPoint® slides, may be displayed over the VTC to the far sites. Simply connect the monitor jack on the laptop to the VCR IN jack on the rear of the ViewStation (as shown in Figure 55) via a scan converter.

![VCR In Jack](image)

Figure 55. VCR In jack on rear of ViewStation

The hand-held camera and laptop cannot be hooked up to the ViewStation unit simultaneously. During a VTC, the laptop output may be redirected to the
ViewStation by pressing the "NEAR" button on the remote and selecting the VCR device as shown in Figure 56. The far site will now see the output of the laptop.

Figure 56. Video source selection screen
To help ensure that the equipment survives transporting with no damage, extreme caution should be exercised when packing the system. Basically, performing the setup steps in reverse is a good suggestion. Some other useful tips are listed:

a. Ensure the ViewStation is secured with the collar, lens cover, and the strap installed.

b. Remove the KIV and keep in your possession; store the CIK separately.
7 Technical Support

If you need support, contact the TEOC at one of the following numbers:

1-877-223-8322 (toll free within U.S.)
(601) 634-3485 (Commercial)
(601) 634-2735 (Commercial)
(312) 446-3485 (DSN)
(312) 446-2735 (DSN)

TEOC personnel respond to the voice mail at these numbers 24 hr a day, 7 days a week. Every reasonable effort will be made to assist you.

Questions may be emailed to the TEOC at:

teoc@teleengineering.usace.army.mil (nonsecure)
teoc@teleengineering.army.smil.mil (secure)

You may visit our websites at:

http://teleengineering.usace.army.mil (nonsecure)
http://teleengineering.army.smil.mil (secure)
Appendix A
Quick Reference VTC
Instructions

1. Set up the system as described in Chapter 3. All components should be powered-up in the order of the satellite phone/terminal, the ADTRAN, the KIV, and lastly, the ViewStation.

2. ADTRAN display should read “ISDN-1 READY” (Integrated System Digital Network).

3. Press the “#” key on the ADTRAN to bring up the dialing menu.

4. Ensure “dte#1” is flashing and press “Enter”. (Scroll to select, if necessary.)

5. Press “2” followed by “Enter” to dial number. Then input the number to be dialed, followed by “Enter”. (For example: 0016016343981, <Enter>), or Press “3” followed by “Enter” to redial the last number dialed.

6. If call does not go through, simply disconnect, wait until the handset displays “Ready”, and redial.

7. After the ADTRAN display reads “CLEAR CHANNEL 64000” and the read data (RD) light in the ADTRAN has begun to blink, press the Green (Call/Hang Up) button at the top of the ViewStation remote control.

8. The KIV should sync up by beeping twice. You may need to press “Initiate” on the KIV to initiate the sync.

9. When finished, Press the “#” key on the ADTRAN to bring up the dialing menu again, then press “Enter”, “Enter” to select dte#1, Hang Up, and terminate the call.

10. Turn off the ADTRAN, KIV, ViewStation, and laptop. Turn off the M4 by pressing and holding the Power (1/0) button on the M4 handset for 5 sec.
Appendix B
Quick Reference for Data Transfers

1. Set up the system as described in Chapter 3.

2. Use Windows Explorer to copy the files you want to transmit into the “C:\XMIT\SEND” folder. In most cases, it is best to zip files to be sent using WinZip. This compresses files, making them smaller and taking less time to transmit, thus saving money and preserving long filenames (the Ffastest program truncates filenames longer than eight characters to eight characters.)

3. Double click on the yellow PC-GOV icon to start the Ffastest program. Click on the Configure menu at the top to bring up your configuration screen. Ffastest is a point-to-point data transfer program, with one end in the “Send” mode, and the other end in “Receive” mode. Deployed sites will typically be in “Send” mode; fixed sites in the “Receive” mode. Enter special USERID, if necessary. (The UserID is the folder in which the far fixed site will place files for you to pick up.) Also, ensure that for AutoReceive Files, “Yes” is checked.

4. Next, dial the number using the ADTRAN. Press the “#” key, select Dte#1, and press Enter. Select “Dial Number” and press Enter, then enter the number “00+country code+area code and number” (Example: 0016016341234) and Enter. When the call has stabilized for 10 sec, click on “Establish Communications”. The window should read “Waiting for Link…” or “Trying to Establish Link…”

5. Files placed in your XMIT\SEND folder will be sent to the XMIT\RECEIVE folder on the far site’s computer; these files will be moved from your XMIT\SEND folder into your XMIT\SENT folder on your laptop. Any files the far site has placed in the folder on the far site computer’s XMIT\USERID for you to pick up, will then be transferred to the XMIT\USERID directory on your laptop (where USERID is the user ID that you specified on your Configuration screen).
6. After the file transfer(s) is complete, terminate the call by pressing #, Enter, Enter.
Appendix C
Data Transfers Using the Klashopper Card and KlasPeer2Peer Software

1. Use WinZip to compress the files to be sent. KlasPeer2Peer is a point-to-point data transfer program; one site must be in the “Connect” mode, -- the other in “Listen” mode. Deployed sites will typically be in “Connect” mode.

2. Double click on the KlasPeer2Peer icon to start the program.

3. Select the “Connect to PC” button at the top of the window.

4. Double click on the connection to be used (for example: TEOC).

5. In the “Connect to” screen enter USERID, if necessary (for example: DEP1, USER1, etc.).

6. Enter password.

7. Dial the number using the ADTRAN. Press the “#” key, select Dte#1, and press Enter.

8. Select Dial Number and press Enter.

9. Enter the number. For example: 00-601-619-7684

10. Press Enter. Once the ADTRAN displays BONDED 128K, double click on the CONNECT button in the “Connect To” screen. An info screen will display, informing you of the near and far machines. Click OK. In the next screen, double click on FILE TRANSFER and select SERVER in the WP_FTP Sites Window.

11. Highlight files to move using the → and ← keys.
12. A double screen will appear, showing your local PC and the far PC. Simply drag and drop the files you wish to transfer.

13. Once completed, terminate the call on the ADTRAN by pressing #, Enter, Enter.
Design, Setup, and Operation of the Third-Generation TeleEngineering Communications Equipment-Deployable (TCE-D) System

Jeffrey L. Williamson, Larry N. Lynch, Jeff Powell, Bryan Register

U.S. Army Engineer Research and Development Center
Geotechnical and Structures Laboratory and Information Technology Laboratory
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

U.S. Army Corps of Engineers
Washington, DC 20314-1000

Approved for public release; distribution is unlimited.

In FY97, the U.S. Army Engineer Research and Development Center (ERDC) initiated a technology demonstration program to determine the feasibility of providing deployed troops with direct access to subject matter experts (SMEs). Direct access to SMEs would allow responses to engineering challenges beyond the in-theater capability to be provided without the time delays and costs associated with deploying the SME to the theater. Shortly after being established, the TeleEngineering Operations Center (TEOC) initiated an effort to develop a secure, deployable communications package capable of video teleconferencing and data transfer. Described in this report are the components comprising the third generation of this package and steps necessary to set up and operate the system.