Chapter 4

Near-Term Digital Radio in the TI

This chapter discusses the functional description, employment, operational software, operational procedures, and tactics and techniques of the NTDR in the TI.

FUNCTIONAL DESCRIPTION

4-1. The NTDR is a state-of-the-art, technology-based digital radio. It operates in the UHF band (225-450 MHz) in discrete tuning steps of 0.625 MHz. Transmitted data is encrypted, protected with forward error correction and detection codes, and modulated onto a radio frequency (RF) carrier. Received data is recovered following the same process, but in reverse. Direct sequence spreading at a chip rate of 8 MHz enhances performance with respect to multipath, jamming, and enemy interception. Nominal digital throughput is 200 kilobits per second (kbps). The NTDR supports LAN (Ethernet) and serial (RS-423 asynchronous and RS-422 synchronous and asynchronous) interfaces. It has a range of 10-20 kilometers (6-12 miles). It incorporates a Global Positioning System (GPS)-receive capability that provides the MGRS position for the radio.

EMPLOYMENT

4-2. The NTDR is the primary data communications transmission system linking the ABCS at the brigade and battalion echelons. The NTDR net provides a wireless WAN for warfighters using their ABCS host terminals located in TOCs. The NTDR WAN allows warfighters to transmit information at high data rates between TOCs to support C2 data and imagery information flow. The NTDR net transceivers are typically employed in the following C2 platforms:

- BCV.
- C2V.
- Selected M1068 TOC and TAC platforms.
- UH-60 helicopter equipped with the A2C2S.

OPERATIONAL SOFTWARE

4-3. The protocol processor software for the NTDR is downloaded from a personal computer (PC) using PROCOMM software. The software is accessed using the function switch and display on the front panel of the NTDR. The display provides visual feedback about the radio's status. It has three message areas:

- MGRS — displays the latest MGRS position of the radio.
- RT STATUS — displays messages about the status of the RT.

- HUB LOW — provides an indication when the hold up battery (HUB) is low and needs replacing. The display is blank when the HUB power is adequate.

4-4. Table 4-1 lists the NTDR function switches.

Table 4-1. NTDR Function Switches

Switch	Function
OFF[1]	Removes operating power from the radio but saves fill data, providing a good HUB is installed.
Communicate (COM)	Is used for normal radio operation.
FILL	Is used for loading fill data into the radio.
BIT	Starts the radio self-test.
Zeroize (Z)[1]	Clears all fill data from the radio's memory.
Store (STO)[1]	Removes all operating power from the radio. Used to extend the life of the HUB.

[1] OFF, Z, and STO are pull-to-turn positions.

4-5. As the operator sets up the NTDR operation and selects the appropriate function, the software automatically executes the function and displays the result in the display area.

SECURE OPERATION

4-6. The NTDR requires fill data for normal operation. The fill data is loaded into the radio using the automated net control device (ANCD) and NTDR interim fill device (NIFD). The ANCD loads the COMSEC data and the NIFD loads the transmission security (TRANSEC) and GPS data. To load the NTDR, the operator–

- Ensures fill data is available.
- Sets the function switch to FILL; the operator verifies by viewing the display.
- Connects the NIFD to the radio fill connector.
- Turns the NIFD on and sets it to the appropriate fill setting; the operator verifies by viewing the display.
- Disconnects the NIFD, connects the ANCD, and turns it to the appropriate fill setting; the operator verifies by viewing the display.

OPERATIONAL PROCEDURES

4-7. The brigade S6 establishes NTDR networks to support the brigade OPLAN or OPORD. The NTDR structure ensures successful network operation. This requires establishing separate cluster nets and a backbone net to connect the clusters. Cluster heads form within the clusters to link the backbone and to maintain connectivity. The NTDR has a self-organizing

networking capability that provides highly mobile operations. End-to-end routing within the NTDR net structure is based on Internet protocol (IP). A cluster may be formed by linking elements of a maneuver battalion together with the backbone that links the battalion clusters with the brigade TOC. Figure 4-1 shows an example of an NTDR network.

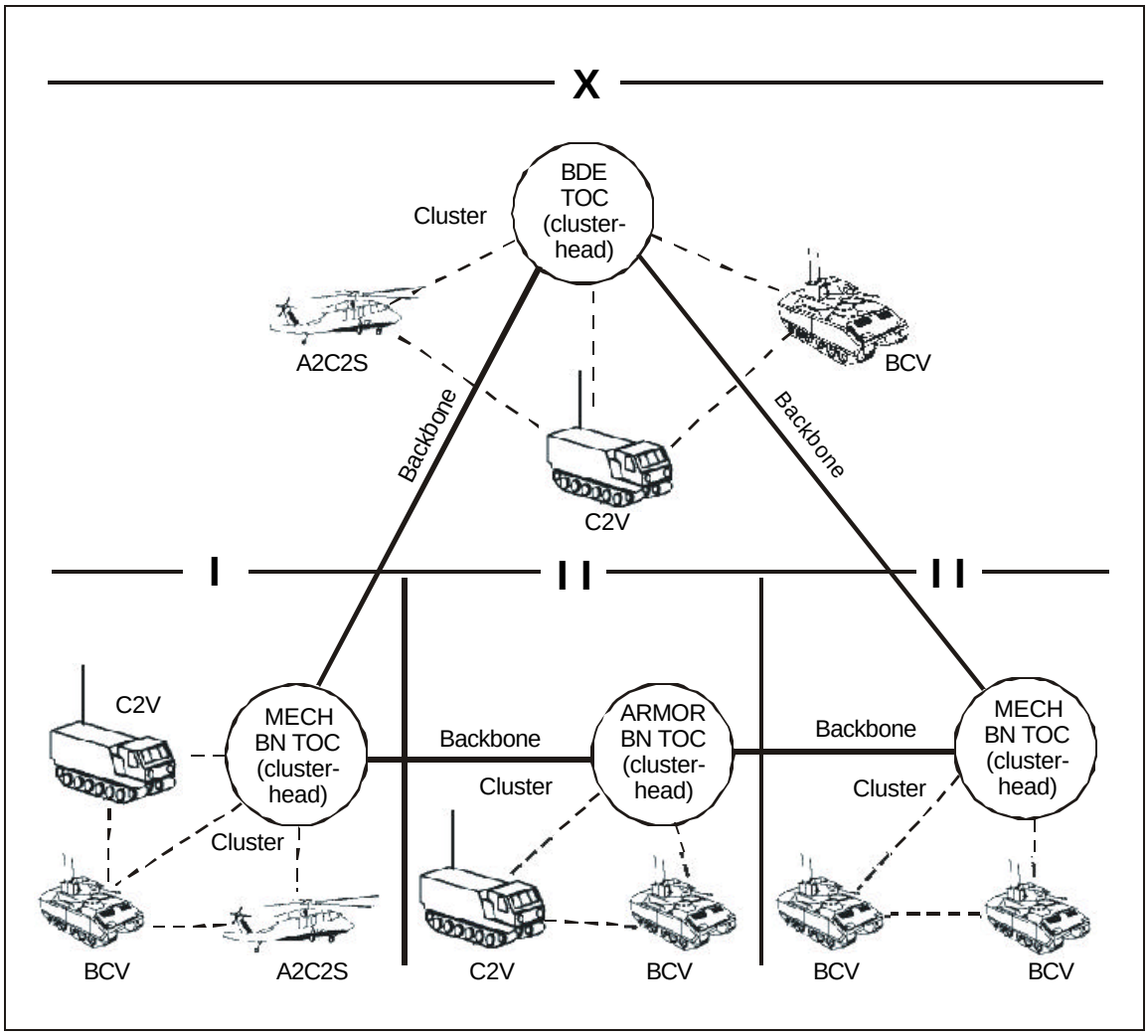

Figure 4-1. Example of a NTDR Network

TACTICS AND TECHNIQUES

4-8. The following tactics and techniques help ensure successful NTDR network operation:

- Antenna and all cables are installed properly.
- Proper NTDR sight location is consistent with LOS RF propagation.
- Brigade S6 plans and manages the NTDR communications network but relies on the battalion S6s to control the NTDRs supporting the battalions.