The new communications nodal system offers some advantages and improvements over the doctrinal divisional multichannel system and may replace all or a portion of it in the future.

Communications In The 4th Infantry Division (Mechanized)

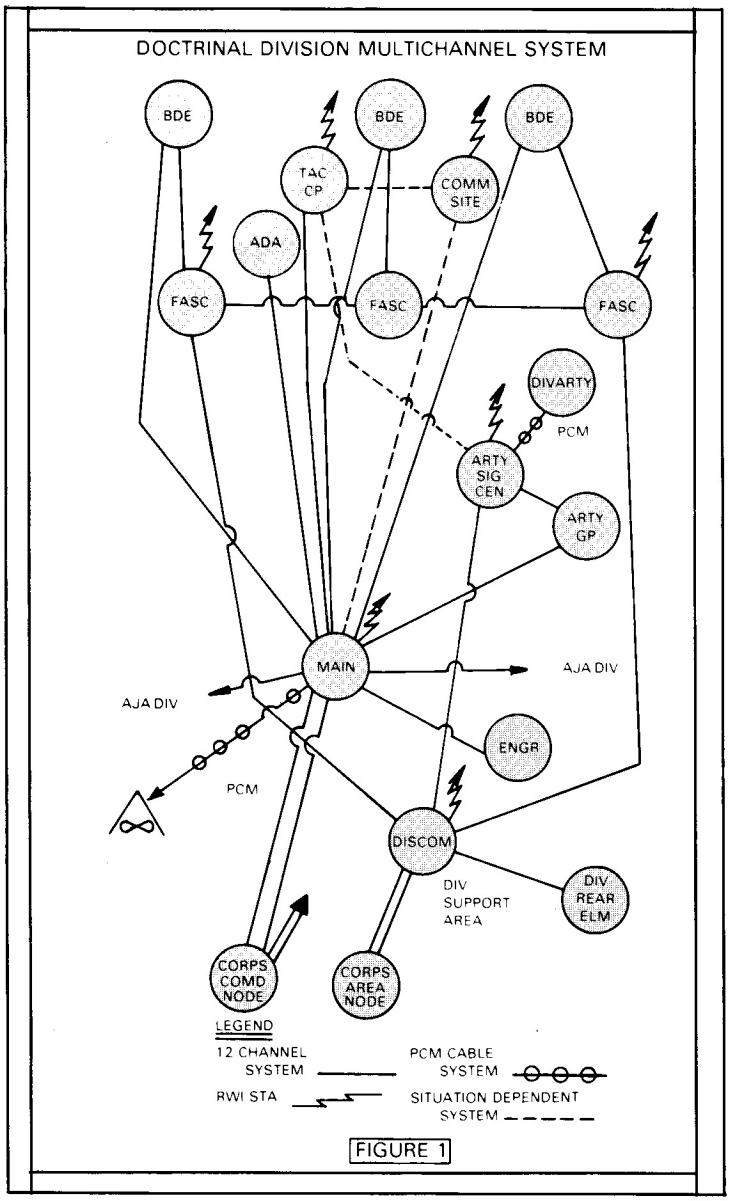


FIGURE 1

by Maj. Gen. Louis C. Menetrey and Lt. Col. A. R. McCahan

The 4th Infantry Division (Mechanized) and its assigned Signal Battalion, the 124th, have been working for over a year to develop integrated communications networks — using only assigned communications-electronics (CE) equipment — that are responsive to the tactical commander's needs. This article sets forth those initiatives across the CE spectrum of the division. The parts of this article which deal with the Division's Communications Nodal System were briefed at the CONTACCT Conference, 4 through 6 December 1979, Fort Gordon, GA.

With equipment on hand, communications support provided by an AIM Division (TOE 11-35H) Signal Battalion under the doctrine expressed in FM 11-50 is not responsive enough for the tactical commander on the highly mobile battlefield we envision in the future. Further, the electronic signature emanating from the various Command Posts (CPs) along with the number of communications personnel at each echelon of the Division mitigate against doctrinal employment. The doctrinal Division Multichannel system is shown at Figure 1. Characteristics of that system are: a command system, an area system, numerous circuits and systems, a preposition capability at TAC CP only, and a large electronic signature. In addition, the system cannot react to rapidly changing situations.

Using lessons learned from various exercises and the experience of other units, the 4th Inf Div (M) developed and tested the viability of a Communications Nodal System (CNS) as an alternative to the doctrinal system. The CNS has several advantages: it has a preposition (jump)

Three Ivy Division signalers, Sgt. Wayne Harris, Sgt. David Stranz, and Sp4 Charles Dyer of Company C, 124th Signal Battalion, attach RF Cable and guy lines to the antenna of their AN/TRC-145 multichannel terminal set. (U.S. Army Photo)

Sgt. Roger W. Womack of Company C, 124th Signal Battalion, punches out perforated tape on a teletypewriter. (U.S. Army Photo)

capability at Division Main, Division TAC, each Brigade, and DivArty plus minimum disruption during jumps; it features decreased electronic signature at CP locations; it has enhanced Radio Wire Intregration (RWI) capability throughout the Division area; and it has a flexible, totally secure voice switching system.

The basic components of the CNS are three or four NODES located on high ground throughout the division area of operations and interconnected by 24 channels of communications provided by two AN/TRC-145 multichannel terminal sets. The Nodes are moved to preplanned locations based on changes to the division's situation or mission. There is single link connectivity from a Node to each major sub-element of the Division as shown in Figure 2. The command posts in Figure 2 must locate within line of sight of a Node. This normally gives a wide choice of covered and concealed positions. The Node locations — occupied, alternate, and planned — are listed in the division operations order. Separate battalions are not provided direct access into the system with their own multichannel equipment but are provided entry depending on their physical location and proximity to those units which do have direct connectivity. To an extent, the locations of command posts of separate battalions are dictated by this requirement. Characteristics of the CNS are: a total common user system, with priority service to selected users; reduced electronic signature, especially at Main and Support Command; a total secure voice switching system; a torn tape teletype relay system; and an integrated RWI network. Further, the CNS has preposition capability for the Main CP, each Brigade CP and the DivArty CP. Finally, the system can react to quickly changing situations.

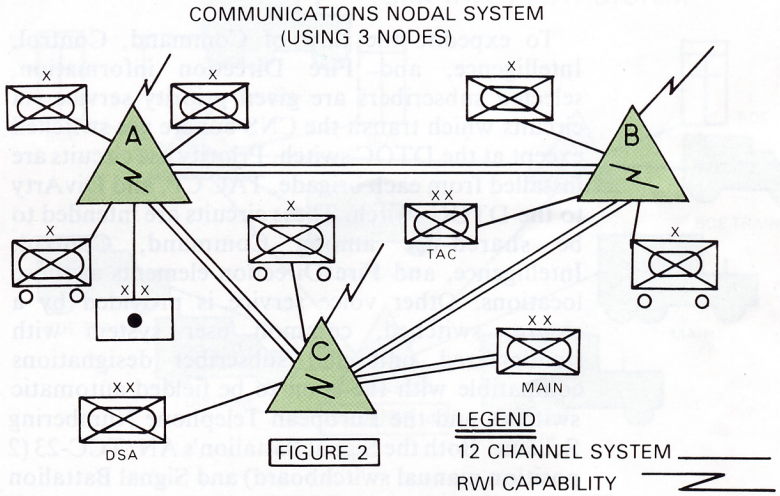


FIGURE 2

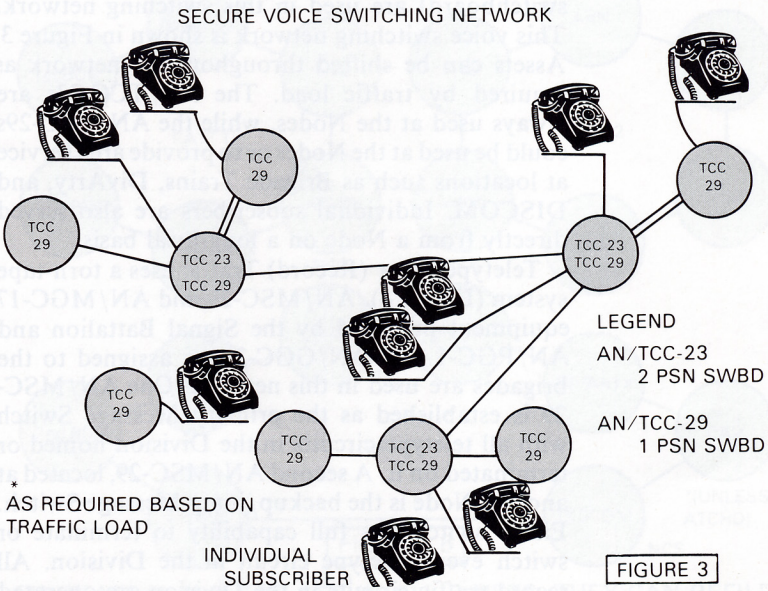
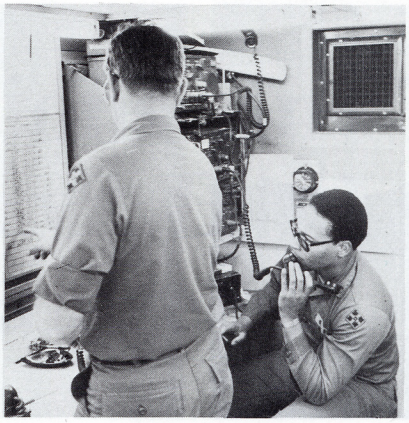


FIGURE 3

PFC Albo of Company C, 124th Signal Battalion, answers a subscriber's "drop" on a SB-86 switchboard in a AN/TCC-29 switchboard shelter.

Maj. Zoelle surveys a wall chart as SSgt. Moore mans a radio set. Both are members of the 124th Signal Battalion of the Ivy Division. (U.S. Army Photo)



To expedite the flow of Command, Control, Intelligence, and Fire Direction information, selected subscribers are given priority service via circuits which transit the CNS but are not switched except at the DTOC switch. Priority use circuits are installed from each brigade, TAC CP, and DivArty to the DTOC switch. These circuits are intended to be shared-use among Command, Control, Intelligence, and Fire Direction elements at those locations. Other voice service is provided by a secure, switched, common user system with standardized unit and subscriber designations compatible with the soon to be fielded automatic switches and the European Telephone Numbering Scheme. Both the Signal Battalion's AN/TCC-23 (2 position manual switchboard) and Signal Battalion and Brigade's AN/TCC-29 (1 position manual switchboard) are used in this switching network. This voice switching network is shown in Figure 3. Assets can be shifted throughout the network as required by traffic load. The AN/TCC-23s are always used at the Nodes, while the AN/TCC-29s could be used at the Nodes or to provide area service at locations such as Brigade Trains, DivArty, and DISCOM. Individual subscribers are also served directly from a Node on a long-local basis.

Teletypewriter (Record) Traffic uses a torn-tape system (Figure 4). AN/MSC-29 and AN/MGC-17 equipment provided by the Signal Battalion and AN/PGC-1 and AN/GGC-3 sets assigned to the brigades are used in this network. One AN/MSC-29 is established as the primary Message Switch with all teletype circuits in the Division homed or terminated on it. A second AN/MSC-29, located at another Node is the backup/jump Message Switch. Either switch has full capability to terminate or switch every teletype circuit in the Division. All record traffic circuits in the Division are operated on a speech-plus basis which permits voice coordination prior to sending the message. We also use a simplified message form for Intra Division record traffic whether it is sent via this network or radio teletype (RATT). A means officer at each location determines which system will be used for the most expeditious method of delivery.

The FM and RATT radio net structures within the Division have been changed in several ways. FM 11-50 shows three RATT nets at Division level: Operations, Intelligence, and Administrative/Logistics. We have reorganized and consolidated the RATT terminals at major unit level to maximize terminal availability. Since each brigade enters only two nets, they have 100% backup for those requirements (which, we have found, is absolutely required). With the consolidation, the brigade to battalion RATT links are eliminated. If a battalion is operating beyond FM range of its parent brigade, RATT assets can be requested from the Division Signal Office to meet that commitment. Our RATT nets are shown in Figure 5.

FM Voice Nets are secure to Brigade level and Brigade Cmd/Ops Nets are secure, but not lower since we have a little less than 30% of authorized NESTOR equipment. Both the Division FM Cmd/Ops and Intel Nets are equipped with automatic, secure, retransmission stations to extend their range. All major and separate subordinate units of the Division are required to maintain these nets, but do not transmit on a routine basis. They are controlled nets.

The CNS lends itself readily to Radio Wire Integration (RWI) wherein tactical FM radio calls can be switched through the multichannel system providing a great deal of flexibility to the tactical commander. An RWI station is located at each of three Nodes with direct access to the voice switching system. Since every CP location can "see" at least one Node and tactical FM-equipped vehicles and

Sgt. Davis and PFC Pittman, Company C, 124th Signal Battalion, construct antennas for their AN/TRC-145 Radio multichannel terminal set. (U.S. Army Photo)

Sgt. Cristen Baxter, Company C, 124th Signal Battalion, sends teletype traffic at one of the division's message switches. (U.S. Army Photo)

aircraft normally operate in the same area, this RWI system is easily used.

In furtherance of OPSEC and in consideration of the limited frequency spectrum available for use in potential deployment areas, the 4th Inf Div (M) is reducing the net structure at brigade and lower levels. The 480 frequencies now required are consolidated into a more manageable and realistic 240. Testing of this reduced frequency use continued during the EW/CAS Test6/JTX GALLANT EAGLE 80 in March 1980 at Ft Irwin, CA. Both the Artillery's FIST concept and an ADA Battalion/Group reorganization frequency requirements have been incorporated into the reduced frequency list. We feel that discipline of user requirements for nets and radios is necessary for the redundancy and simplicity imperatives of the modern battlefield.

These, then, are some of the initiatives used in the 4th Inf Div (M) to enhance the total organic communications capability. They are responsive to the tactical commander's needs and should be included in doctrinal changes for the future battlefield.

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Lt. Col. A. R. McCahan is the former commander of the 124th Signal Battalion. He is currently assigned to OJCS, Washington, DC. His previous Division assignments have been with the 2d Infantry Division and the 101st AAslt Division.

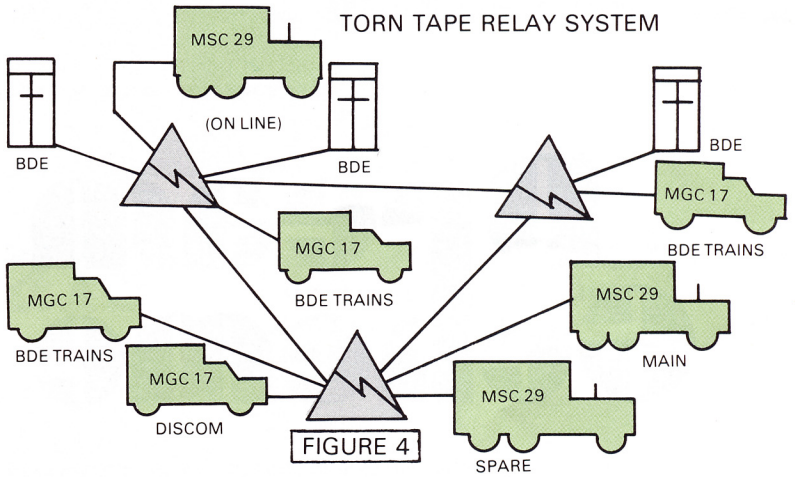

FIGURE 4

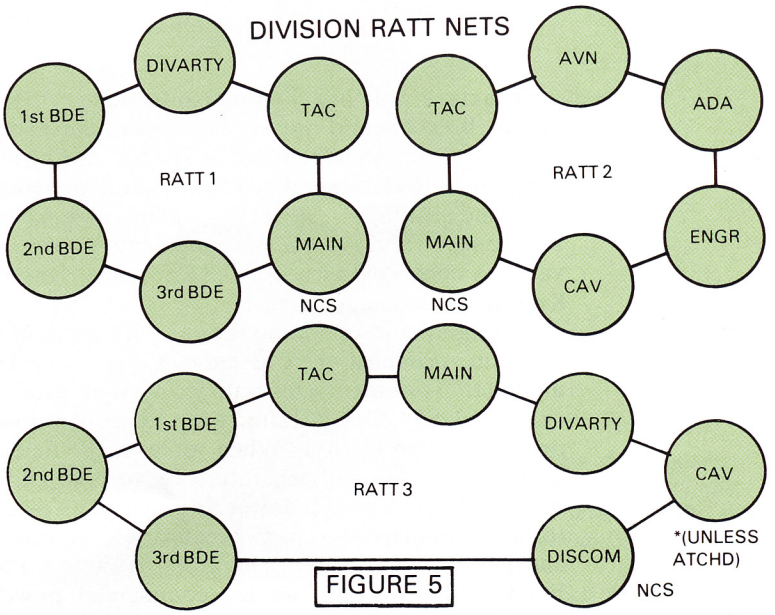

FIGURE 5

SINCE MAIN AND TAC ARE IN ALL 3 NETS, THEY CAN REFILE.