Third Infantry Division Communications

Secure, reliable, flexible, and survivable!

By Maj. Gen. R.L. Wetzel, Lt. Col. Rex F. Pierson, and Maj. John J. Keane Jr.

Since its publication, Field Manual 100-5, *Operations,* has been the subject of controversy and some criticism. In spite of disagreements, there is one critical area in the manual that commanders in NATO agree on: the need for reliable, survivable, secure command and control communications. To win the first battle and the battles that follow requires a system that allows the division commander to control and sustain his fighting forces. The division commander who cannot communicate with his subordinate commanders will not be able to concentrate his combat power to defeat the enemy. Key combat multipliers, combat support and service support elements must be included in the system to insure continued success after the first battle. Where commanders may disagree is the way to accomplish the mission of establishing a survivable reliable and responsive communication system.

The communications architecture that a division commander develops to meet the requirements of reliable, secure command and control and communications may be influenced by the sector in which the division operates, its assigned and on-call missions and the nature of the enemy threat it faces. The architecture developed by the 3d Infantry Division for force deployment is a prioritized, command-oriented system which uses multichannel radio, single-channel radio and wire communications assets of the division signal battalion and other elements of the division to provide an integrated communications architecture. It provides the user with multiple alternate means and routes for survivability and flexibility. The system is also designed to provide comprehensive communications support for the combat support and service support elements to sustain the fighting force. Flexibility and responsiveness to a changing tactical situation is provided through the allocation of additional communications assets at key locations. The electronic signatures at most command posts are reduced to increase their survivability and reduce the requirement to displace frequently. The ability of this architecture to provide requisite communications for sustained operations was demonstrated during the VII Corps Exercise Certain Rampart conducted in Central Bavaria in September 1980.

The backbone of the 3d Infantry Division Communications system is the Division Multichannel System shown in Figure 1. The system differs in some aspects from the Doctrinal System of FM 11-50, *Combat Communications within the Division* (shown in Figure 2) due to the way the 3d Infantry Division operates; however, most of the key features of the doctrinal system have been retained. The DTAC operates well forward in

3RD INFANTRY DIVISION
MULTI-CHANNEL SYSTEM

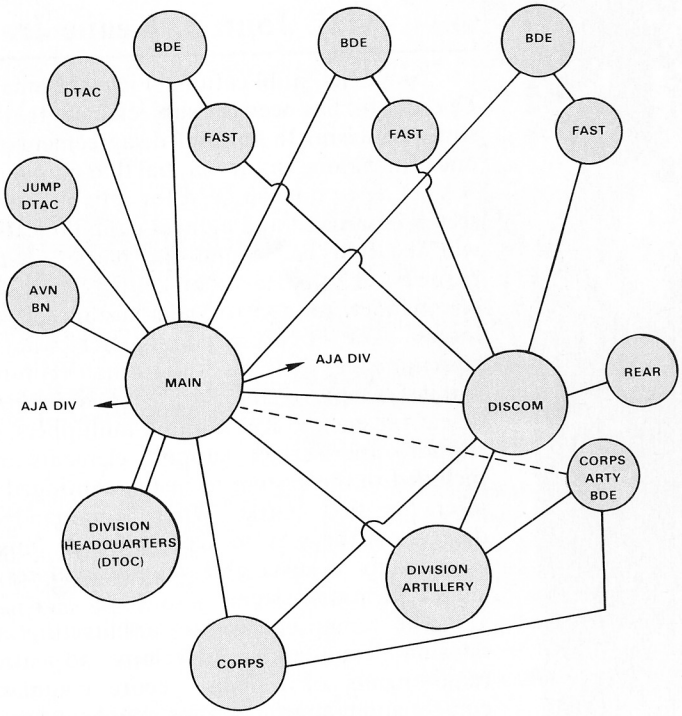

Figure 1.

DOCTRINAL MULTI-CHANNEL SYSTEM

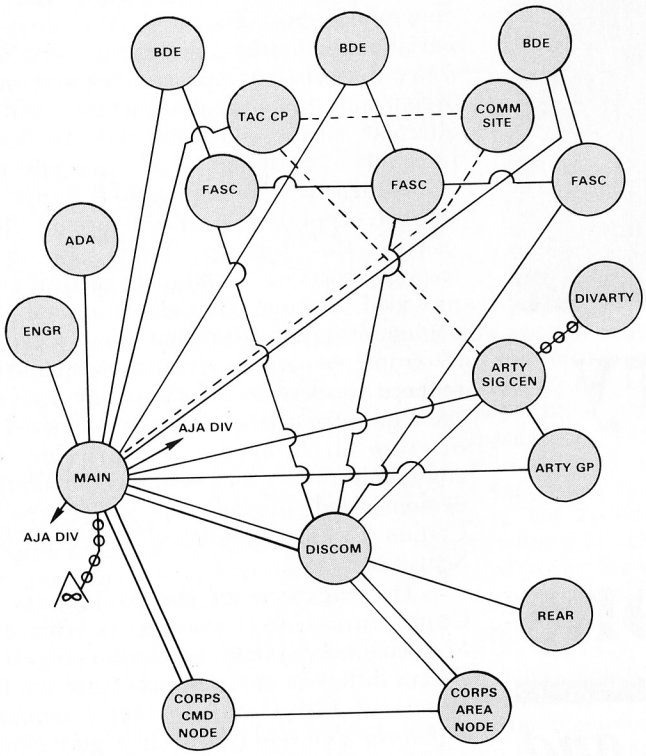

Figure 2.

a position where it can effectively fight the immediate battle. Additional assets, to include multichannel, RATT, switchboard and circuit termination assets, are located to permit operation of two simultaneous signal centers. The Division Support Command is tied into the Forward Area Support Teams (FASTs) and through the FASTs into the brigade headquarters. This not only provides access for the fighting force into the Combat Service Support subsystem, it also serves as an alternate route of command oriented communications. The Division Artillery Command Post is tied into both the Command and Combat Service Support systems. This allows the division artillery to assume control of the division in the event of the loss of both the DTAC and the division headquarters without substantial redesign of the employed communications.

The architecture differs from a strict doctrinal system due to adjustments that were made to take advantage of certain characteristics of the NATO battlefield. To increase the survivability of the division headquarters and permit it to fulfill its mission as the division's sustaining command post, the division headquarters takes every opportunity to set up in towns taking advantage of the protection offered by the hardened facilities. The major problem with locating in towns is that most towns in Europe are located in low-lying areas which inhibit line-of-sight communications. The division signal battalion does not have enough multichannel relays available to locate the doctrinal main signal centers in a town and establish all required multichannel systems. As a result, the solution to allow the division headquarters to set up in towns is to consider it as a separate signal center and provide multichannel access to the main signal center. The main signal center is still able to locate on predominant terrain more conducive to line-of-sight communications while the division headquarters is free to set up anywhere in the sector. The advantages of splitting the doctrinal Division Headquarters-Main Signal Center in this way are many. The division headquarters enjoys greater mobility, the electronic signature of the doctrinal main signal center is reduced and the reliability of the communications system is enhanced as a result of decreased main signal center displacements.

The entire communications support package for the division headquarters has been reduced to the size of a brigade communications platoon. Displacement of the division headquarters is no longer tied to displacement of the entire main signal center. During Exercise Certain Rampart, communications were available immediately for planned moves at the displacement location through prepositioning of multichannel assets. Disruption of communications due to moves

necessitated by hostile action was minimized due to the smaller support package accompanying the division headquarters.

The reduction of the doctrinal main signal center electronic signature as well as the jump signal center capability led to a more survivable system. The entire electronic signature of this site has been reduced to a single FM emitter and several highly-directional multichannel emitters. By carefully choosing the location of the main signal center, the signal of the multichannel emitters can be oriented to avoid enemy detection and insure sustained operations. Although the division headquarters retains a substantial electronic signature, AM and FM emitters, the reduced size of the signal center makes it easier to displace or locate in a town that provides terrain masking against enemy detection and direction-finding elements.

Increased survivability of the entire system is provided by allowing the main signal center to operate for longer periods of time. Current doctrine envisions the main signal center displacing frequently along with the division headquarters. For the DTAC to control the battle during displacement of the main signal center requires the use of AM and FM systems that make the DTAC easier to find due to the proximity of the FEBA. The ability of the DTAC to survive and perform its mission depends on the reliability of the multichannel system which allows FM and AM systems use to be minimized. The main signal center must remain operational for extended periods of time and can only do so by eliminating as much of the electronic signature as possible. During Exercise Certain Rampart, the 3d Infantry Division opposition was unable to locate the DTAC or the main signal center due to the separation of the electronic signature and use of terrain masking techniques.

The 3d Infantry Division views the inclusion of separate battalions as a significant aspect of its system. The inclusion of the aviation battalion in the multichannel system was only possible when the signal battalion returned to the system in Figure 1 after experimenting with other types of systems. The inclusion of the aviation battalion contributed significantly to the reduction of the electronic signature at the DTAC by providing means of communication other than AM or FM systems. Effective communications with the aviation battalion allowed much more rapid response and concentration of forces against potential enemy penetrations of the FEBA. The aviation battalion is the division commander's most mobile and effective asset to seal enemy penetration, eliminate rear area threats or exploit tactical gains. It must be included in the multichannel system to provide real-time, low-signature means of communications between it

3RD INFANTRY DIVISION DEDICATED CIRCUITS

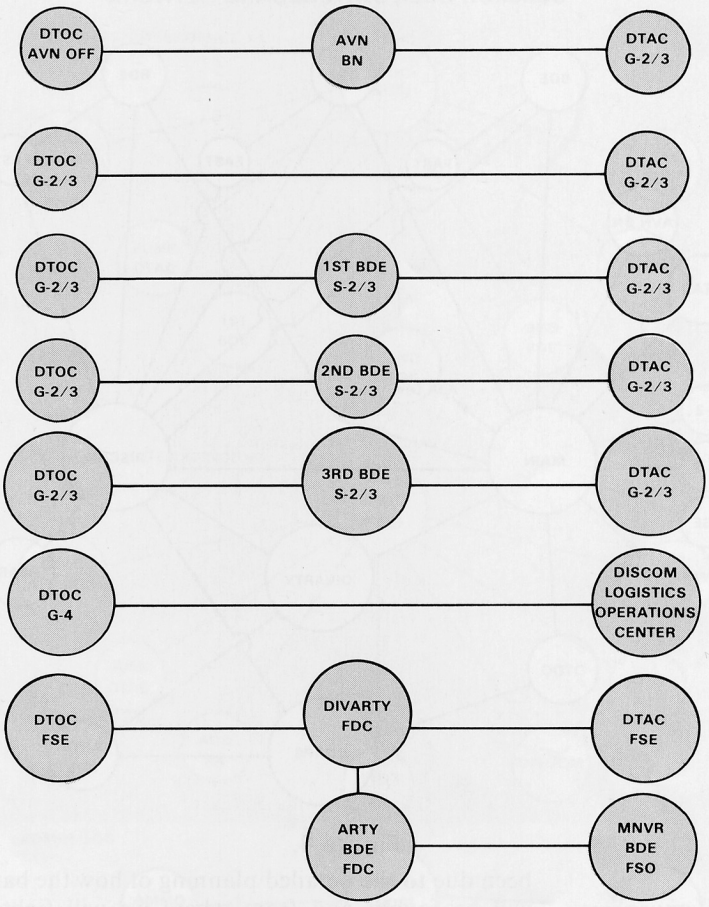

Figure 3.

and the DTAC. The exclusion of the air defense and engineer battalions is due to a difference in multichannel authorizations between a doctrinal signal battalion and the current USAREUR MTOE. When this error is rectified, both battalions will be included in the multichannel system.

An additional key aspect of the multichannel system not shown in Figure 1 is the provision of an entire jump main signal center. Assets from this signal center can be used to provide additional multichannel terminals at the original site or to provide a stand-by signal center that can be used to reroute systems if the main signal center displaces or is lost due to enemy action. Passage of control from the original main to the displacement main can be accomplished rapidly without loss of vital command and control circuits. However, in spite of the best planning by the signal battalion and the most careful engineering of the communications system, the ability of the multichannel system to provide the division commander an effective means of controlling his forces is heavily dependent on the advance planning of command post locations by all units provided multichannel communications support. A large part of the success that the 3d Infantry Division has achieved on exercises has

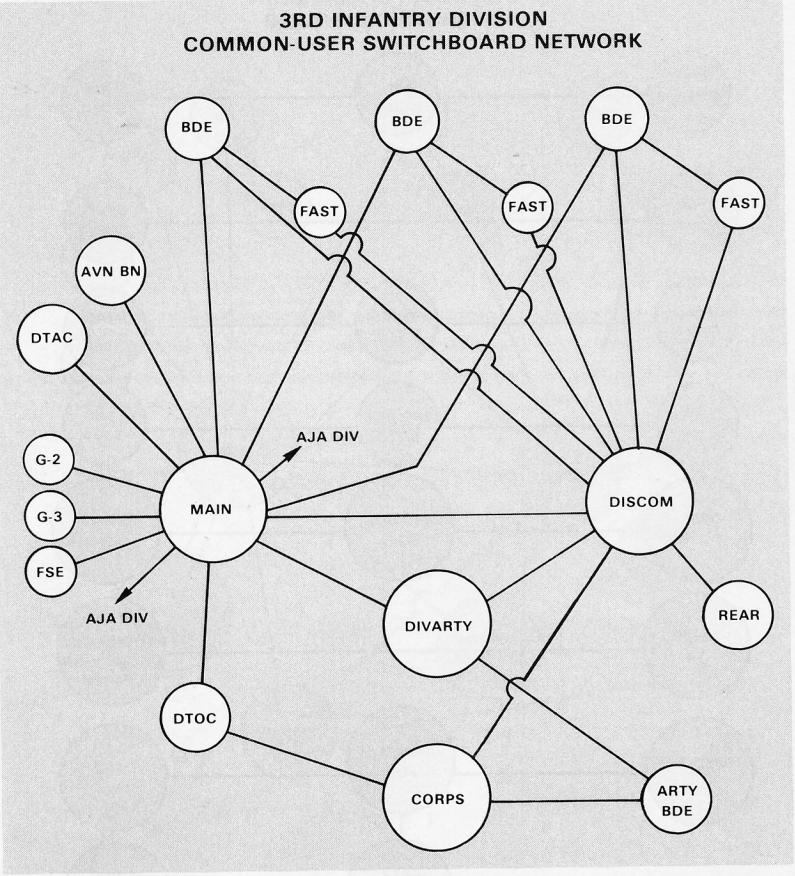

Figure 4.

been due to the detailed planning of how the battle will be fought and from where we will fight it. Commanders have discovered that planning of command post locations in advance and in conjunction with the division signal officer guarantees the most efficient continuity of communications during command post displacements. Effective communications cannot always be established only from higher to lower. A substantial effort must also be made by the lower unit to make the system work.

The type of service provided over the division multichannel system is also a key to our success. A few key point-to-point circuits tying together the key decision makers of the division, a rapid automatic dial telephone network and a hard-copy message traffic system are all provided over the multichannel system. Figure 3 shows the few key point-to-points that connect the DTAC and division headquarters to decision makers at other command posts in the division. These few circuits have proven to be what is necessary to effectively control the battle and sustain the fighting force. Figure 4 shows the division common-user switchboard system which is based on the new automatic switchboard, the SB-3614. All key staff sections are included in the system and every subscriber is provided at least two different means over separate radio paths to reach a distant command post. The common-user system is the basic voice communications for all division elements not provided point-to-point service and serves as an alternate means of communications for the decision makers shown in Figure 3.

The division RATT nets are depicted in Figure 5. They are structured much like the doctrinal configuration of FM 11-50. The major difference is that the 3d Infantry Division activates two operations/intelligence nets as opposed to the doctrinal separate operations and intelligence nets. The number of stations in each net has been reduced to a total that permits better net management by the net control station and more rapid service for all units in the net. It also reflects the reality of maintaining the communications equipment which performs the RATT mission. By eliminating the activation of one RATT station at each brigade CP, the signal battalion has not only reduced the electronic signature at the brigade, it has provided a displacement RATT capability and reduced its maintenance requirements in the brigade sector. The elimination of the requirement to activate all three RATT sets of each forward area signal center platoon also allowed the signal battalion to perform a non-doctrinal mission. The 3d Infantry Division's administrative/logistics net includes the division ammunition officer who is now left out of existing communications systems. A serious deficiency was noted in several exercises that pointed out the inability of MSC's to keep track of ammunition deliveries. The expected location of ammunition supply points in Europe will probably not have access to multichannel communication sites. The ammunition officer was provided a RATT station that allowed direct access to the brigade S-4 located at the FAST. The activation of the RATT station has proven to be an effective means of keeping unit commanders informed of ammunition resupply. The potential problem of the large electronic signature associated with a RATT emitter is a matter of concern. Until alternate solutions are made available to provide a secure means of communications for the ammunition officer that extends across the battlefield, entry into the division RATT system provides the only means to perform the mission.

A criticism that could be made of the division RATT net structure is that it fails to provide multiple access for all units. The division comm center network in Figure 6 shows that the brigades and FASTs are tied-in to the message traffic network provided over the multichannel system. By comparing the division RATT net structure with the comm center network, it can be seen that the units omitted from dual-access are provided entry into the multichannel system. The only change that the division makes is to reverse the requirements for providing comm centers at the brigades and FASTs. The signal battalion provides its vehicular

mounted comm center at the brigade CP location. This reversal arose from the difficulties experienced at the brigade CP with providing an adequate power source for the components of the brigade commo platoon comm center. The non-van mounted configuration authorized to the MSCs has proved unreliable enough to require the change in missions. Contingency plans have been developed to bypass the FAST location and route a circuit directly from DISCOM to the brigade where the signal battalion courier can deliver the message to the FAST.

The true flexibility of the system can best be seen when it comes to training. The signal battalion has developed a simple and cost-effective means to train the entire system that solves the fundamental problem of installing a division tactical communications system. As a result of numerous exercises, the signal battalion found that 90% of the problem with division multichannel communications systems is terminating circuits from the multichannel equipment to the subscriber. Most training, however, was devoted to establishing multichannel systems at great distances between sites which inhibited circuit termination training. Before the division's participation in Exercise Certain Rampart, the signal battalion activated the entire division multichannel system in an area the size of two football fields. Due to the proximity of all emitters, systems could only be activated selectively but important training goals were accomplished. The first step was to establish all signal centers to include MSC CPs and FASTs along with all associated terminal equipment. Circuits were verified for internal wiring, multichannel systems were selectively activated and all circuits and equipment were validated from subscriber to subscriber. If a problem arose, the soldiers responsible for each link were able to walk to the distant site to resolve the difficulty. As a result, circuit routing problems were resolved rapidly due to close cooperation by everyone involved. In addition, the soldiers who usually only dealt with each other at the end of a multichannel system that connected two sites separated by a considerable distance were able to work face-to-face and gain an appreciation of what the soldier at the other end had to do to make the circuit work. When problems could not be resolved, the technical expertise of the battalion was available due to the close proximity of sites to find a solution or repair equipment if needed. Throughout the exercise, soldiers from the signal battalion's Direct Support Communications Maintenance and COMSEC Maintenance Agencies inspected all communications systems and repaired equipment on site where possible. The savings in time and POL realized as a result of locating all sites so close to each other were appreciable. The understanding that each soldier obtained on how his or her job helped make the entire system work resulted in the best communications support the division has received in some time.

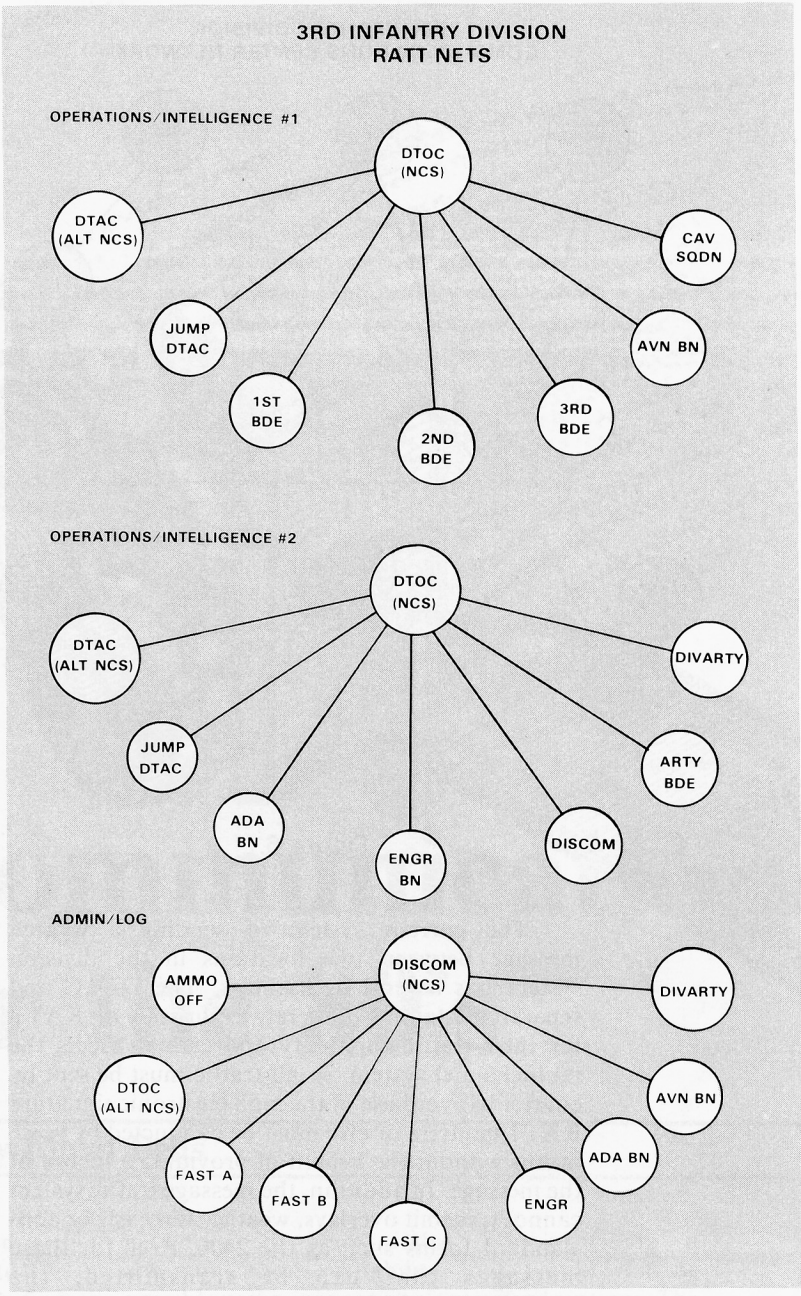

Figure 5.

In spite of the success achieved by the 3d Infantry Division communications system, there are two problems with current and proposed systems that must be resolved if we are to provide the most responsive communications system possible for the division commander. The administrative procedures required to send a message must be reduced and a new system developed on the assumption that the division headquarters is located at the main signal center must be reevaluated to see if they can support the 3d Infantry Division concept of operations.

3RD INFANTRY DIVISION
COMMUNICATIONS CENTER NETWORK

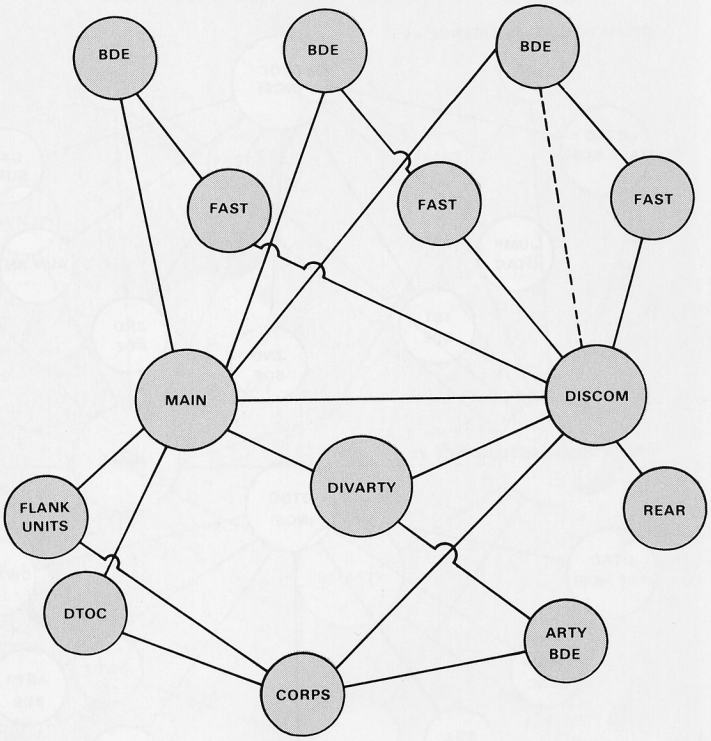

Figure 6.

The current system of sending a written message between two locations in the division system has several deficiencies. The DTAC and separate battalions must rely exclusively on RATT for their traffic capability and cannot access the multichannel system, so all traffic must be sent by courier to avoid use of the high electronic signature RATT emitters or else must be conducted by voice means without the benefit of providing a record of the message. In addition, the message traffic system cannot transmit overlays, weather forecasts or non-standard forms such as the 2406. Even for those messages that can be transmitted, the administrative procedures of message preparation and handling plus the requirement to convert a message to tape result in such inherent delays that messages are often received too late to be effective. The division must be equipped with a system that allows direct subscriber to subscriber secure transmission of messages. Tactical facsimile systems or other means of passing messages, overlays and non-standard formats must replace the existing system. The DTAC and other units excluded from the current system must be given the same capability as other elements of the division. The replacement system should be simple enough to allow operation by the subscriber so all administrative processing requirements can be eliminated.

The division is also faced with the prospect of being issued new systems that envision a series of dedicated communications links extending from the doctrinal division headquarters at the main signal center out to all major subordinate commanders. A simple system such as TCT/TCS requires dedicated circuits to each brigade and the division artillery. Due to commitment of the channels on the two multichannel systems supporting the 3d Infantry Division Headquarters, a third multichannel system would have to be activated to support the TCT/TCS requirement. This would require commitment of assets now used for preposition capability and would reduce the mobility of the headquarters. Two solutions are possible. The TCT/TCS system can continue to be located at the division headquarters but will be given just two circuits over the existing systems. A means of "splitting" the circuits at the main signal center for transmission to other subscribers must be provided to insure the proper circuit quality. This allows the system to be located with the division headquarters and provides direct coordination between the staff and the system operator. Another solution would be to locate the system at the main signal center and provide the division headquarters the terminal capability of a brigade. This would separate the system from the primary user but would eliminate the requirement to divert critical assets. Since the 3d Infantry Division is only one of several divisions that splits the headquarters from the main signal center, the developers of new systems must include the capability to support this concept of operations as part of the system design. The ability to change the system to meet the requirements of an evolving communications system is essential.

The key to a successful command and control communications system in the NATO or any other environment is ability of the system to respond to subscriber requirements. The 3d Infantry Division system is a responsive system that also permits more effective training of the signal soldier. The simplicity and straight-forward nature of the system is built on the basic skills each soldier is expected to know. It does not overcomplicate systems design as found in area and nodal systems nor does it demand of the soldier performance of skills beyond his/her training. Simple straight-forward and basic communications meet the subscriber's requirements and produce a better trained signal soldier.

Maj. Gen. Wetzel, Commandant of the US Army Infantry School at Ft. Benning, Ga., has served in numerous capacities during his 29 years of military service. He was commissioned at West Point in 1952. Lt. Col. Pierson, Battalion Commander of 123d Signal Bn., is an eighteen-year veteran. He graduated from West Point in 1963. Maj. Keane, a thirteen-year veteran, is assigned to Headquarters, Defense Nuclear Agency. He was commissioned at West Point in 1968.