A former commander tells how his Signal battalion trained to provide divisional communications to 'win the first battle.'

'There's nothing here but communications, sir!'

by LTC Dennis C. Hall

Division Signal battalions have not suffered from a lack of training guidance in recent years. ARTEP 11-35, FM 11-50 and numerous training circulars all serve to provide direction to unit training programs, with individual training increasingly dependent on Soldier's Manuals and SQTs. This material is generally well written, clear and reflective of the skills necessary for success in combat. While the Training and Doctrine Command (TRADOC) has provided the commander many tools to assist in developing his training program, however, a great deal of latitude remains in its final design.

In the 9th Signal Battalion, 9th Infantry Division, the battalion training program flowed naturally from guidance provided by MG Richard E. Cavazos, division commander. In a series of formal briefings and informal discussions for his commanders and staff, he described his perception of the most likely scenario for the commitment of the 9th Infantry.

The 9th would deploy to Europe and, after a brief pause in assembly areas, would move to an area of operations to prepare to defend against forces significantly outnumbering it in artillery, armor and mechanized infantry vehicles. To not only survive but win against these odds, the division would have to take advantage of every possible combat multiplier. An area defense was envisioned, with decisive engagement accepted only on ground of the division's choosing. For infantry units, this meant training to extract the maximum advantage from every piece of terrain and improving their ability to fight in built-up areas. The capability to engage and defeat armor was a critical objective in all division training.

Of greatest significance to the 9th Signal Battalion, communications was identified early as a critical combat multiplier. The command and control of forces is an important part of the effective combat power of any unit -- and this means communications. Yet, providing that communications on the European battlefield would prove no simple matter. Signal units would face a significant electronic warfare (EW) threat. Enemy forces could be expected to exploit by fire intelligence collected from numerous Signal-Intelligence resources deployed well forward on the battlefield.

The objective for the 9th Signal Battalion, then, was to provide sufficient communications for command and control and the essential combat support functions and yet protect supported command posts by displaying the minimum electronic signature at each.

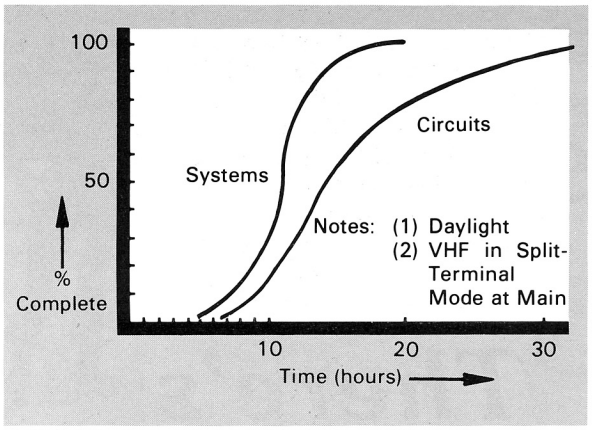

Figure 1. Estimated Installation Time

Preparation

In the fall of 1978, the 9th Signal began a training program that emphasized the techniques necessary to support the division in a high-intensity EW environment. All FM and RATT were to be remoted, with no emitters allowed within a kilometer of division main. At division main and division artillery, RATT would be remoted into comm centers. VHF would be operated in the split terminal mode at main, with all Signal centers capable of operating in this fashion. Within the limits imposed by shortages of TD-206s, emphasis was placed on the use of pulse code modulation cable. Ground and air messenger service assumed a greater role in Signal operations. And finally, night displacement was a major training objective for all elements of the battalion.

It must be stated that this emphasis on electronic counter-countermeasures (ECCM) did come at a price, however. While each Signal center trained to meet the ARTEP standard for site displacement, only in the forward area Signal center platoons and at the tactical command post was this capability for rapid movement given first priority. This seemed an acceptable trade-off for an infantry division with its limited mobility.

While excellent training material is available from TRADOC, the unit training program is still very much in the hands of the commander. An analysis of a unit's specific mission is critical to the development of that program.

This training program and the ECCM techniques it encompassed came to be known as training to win the first battle. The program was accomplished through courses conducted by training teams made up of the best qualified NCOs in each company and under the overall supervision of the battalion S-3. One-week courses were conducted for soldiers holding 31M, 36C, 05B, 05C and 72E MOSs; the courses concentrated on familiarizing soldiers with first battle communications. The instruction included both classroom training and limited field exercises and was repeated quarterly. The majority of training was "hands on" and was well received by the troops as a welcome change from normal garrison duties. Several battalion exercises, numerous support missions to other units and Joint Readiness Exercise JACK FROST 79 offered the opportunity to hone these first battle skills.

Anticipating Problems

In February 1979, the commander announced a shift in the emphasis of a division CPX, GRAND SLAM II, scheduled for May. He directed that each major tactical command post down to battalion level would participate and displace once during the exercise. The division Signal battalion would deploy with the division headquarters and establish communications as the tactical operations center (TOC). Other staff elements were setting up in their field locations and preparing for the CPX. For a Signal battalion accustomed to deploying from 48 to 72 hours ahead of any major exercise, this was a heady challenge indeed. GRAND SLAM II would also provide the opportunity to test first battle communications with actual "customers" available to load the system fully.

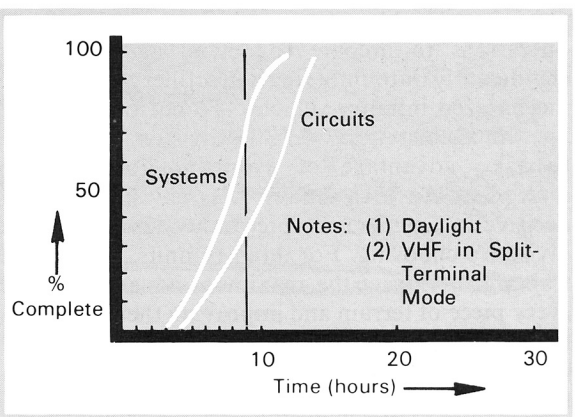

Figure 2. Estimated Displacement Time—Division Main

There was initial concern that we were attempting too much in this exercise. In particular, there was concern that the ambitious communications objectives might interfere with the CPX itself. Discussions with exercise planners and with the CG raised questions as to the "standard" time allowed to activate the division communications system. A review of ARTEP 11-35 indicates that, while displacement times are established for various elements of the system, there is little guidance as to the time required to establish initially the entire system. This question was referred to TRADOC,

which surveyed a number of division Signal officers; the range of opinion ran from four to 48 hours as the time required to establish the complete system. Opinions about the percentage of circuits and systems that had to be active to consider the system complete varied as well.

There are obviously significant differences between displacing a single element of the division C-E system and initially establishing the entire system. The time needed to establish the system is not a linear function of the number of sites nor of the number of systems involved. The relationship is far more complex than that. As the number of sites,

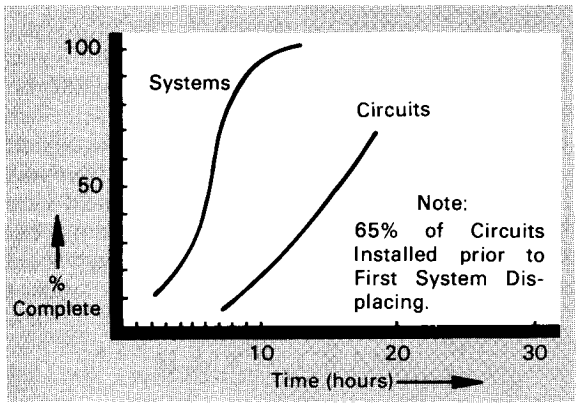

Figure 3. Installation Times—FTX

systems and circuits increases, the possibility of equipment failure increases, installation "choke-points" develop, and the difficulty of troubleshooting circuits expands in an exponential fashion. The "other end" syndrome is most pronounced during this initial activation. When only one site of a total system is displaced, at least half of each circuit is a known quantity, simplifying troubleshooting considerably.

Figures 1 and 2 represent an early estimate of activation and displacement times made in an effort to analyze the factors affecting each. They represent experience gained at Fort Lewis on battalion field exercises, generally conducted without users, but modified by an estimate of the impact of the customers' presence. The basic shape of each curve represents a consideration of what occurs at each site during initial activation and subsequent displacement. The position of the curve along the time axis is based largely on the state of training of the unit.

A number of problems existed in the 9th Signal that could be expected to affect installation times during the CPX. Additionally, there were known bottlenecks in battalion operations that would undoubtedly delay installation. The division tactical operations center had been cabled for a CPX the previous August and during JACK FROST, but neither of these was in the standard configuration intended for GRAND SLAM II. No senior NCOs in the battalion had experience in cabling the TOC as it would be set up for the coming exercise. At the same time, few members of the division staff had experience operating from the TOC, and this could be expected to affect cabling times as last minute changes occurred.

The patch panel at division main was historically a choke point — well over a hundred circuits would be activated with, at most, two patch panel operators available at any one time to handle their activation. Relatively low priority local circuits, requiring little effort for installation, often waited hours for completion of the higher priority trunks before they were released to traffic.

Frequency interference is a significant problem at Fort Lewis because of the presence of Gray Army Airfield and the proximity to McChord AFB, SEA-TAC International Airport and the Canadian border. Multichannel equipment failures are particularly frustrating during initial installation, as a failure of any one of literally dozens of separate components can prevent the activation of a given circuit or system. Undoubtedly, significant portions of these failures occur because equipment that is bad prior to deployment is not discovered until the systems are activated. Finally, serious personnel shortages existed in key MOSs. The battalion could anticipate deploying for the CPX with approximately 50 per cent strength in comm center operators.

Finding Solutions

Each of these problems was addressed in turn. The Electromagnetic Compatibility Analysis Command (ECAC) was approached for assistance in resolving the problem of frequency interference. ECAC conducted a compatibility analysis of the frequency environment at Fort Lewis and selected frequencies for each site for both initial installation and for each displacement. While not all frequency problems were eliminated, the number of systems that experienced interference was significantly reduced.

Two patch panels were installed at division main, with one handling multichannel circuits and one locals. Additionally, troubleshooting responsibilities were handed over to the distant

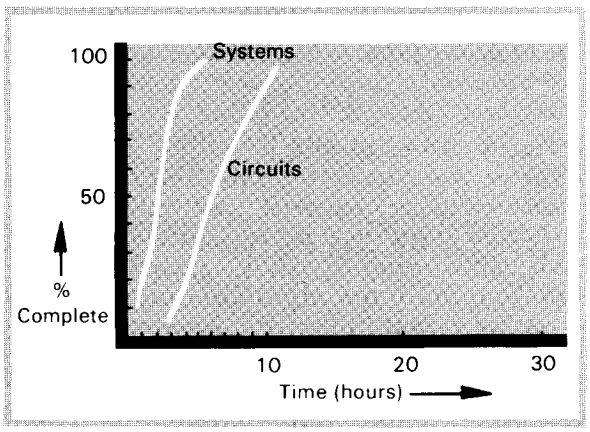

Figure 4. Displacement Times—Division Main—FTX

patch panels, and the patch panel at main concentrated only on those problems which had been identified at that location. Cable teams were attached from C to A Company to lay all pulse code modulation links supporting split terminal systems and all remote keying lines. A Company wiremen were able to concentrate on the TOC and all local cabling. Brigade and forward area comm centers were collocated for the CPX to minimize the impact of some of the personnel shortages.

Considerable effort was devoted to a battalion maintenance program to certify each stack of PCM prior to the CPX. PCM equipment was transferred to the electronic maintenance section and a complete test station established. Each TRC-145 in the battalion was tested on a channel-to-channel basis with this electronic maintenance equipment. All TCC-65s were tested back-to-back under electronic maintenance supervision. Two to four

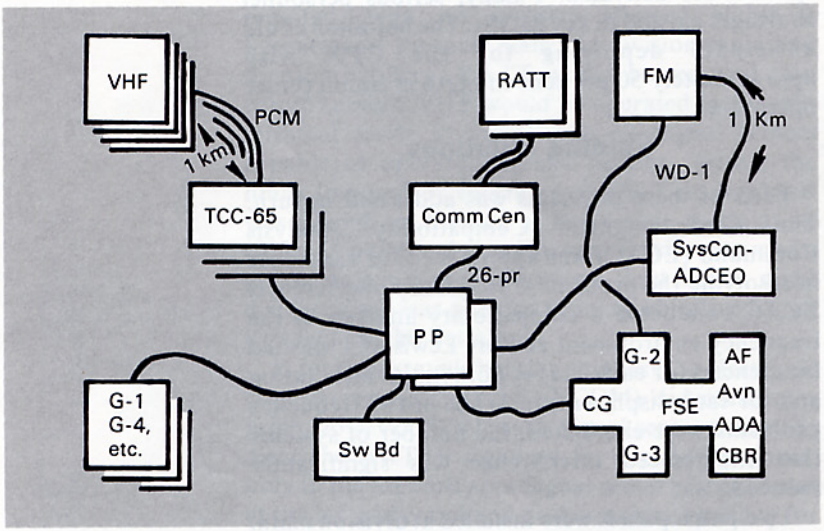

Figure 5. Division Main

stacks of PCM were completed each day, and only the equipment that was certified operable went to the field.

Dry Run

Finally, it was decided to conduct a battalion FTX two weeks prior to GRAND SLAM II as a communications rehearsal for the exercise. Activation times could be recorded and compared with earlier estimates. If it appeared that the battalion could not meet the activation times necessary to support the CPX, adjustments to the exercise schedule would have to be made. Fortunately, this was not the case. Figures 3 and 4 provide circuit and system activation times achieved during the FTX.

Virtually no PCM maintenance problems were experienced during the exercise, a tribute to the successful certification program carried out by electronic maintenance section. The only serious problem encountered was in the cabling of the tactical operations center, and this was due solely to the lack of experience of the wire teams at main.

After the FTX, the Signal battalion requested and received permanent responsibility for the maintenance and installation of the G-2 and G-3 TOC tables from the division headquarters company. This allowed pre-wiring of these critical facilities, reducing significantly their installation time. Further, owning these tables assured that they would be available for training in future battalion FTXs.

One very significant advantage the 9th Signal enjoyed during the CPX was that the 58th Signal Battalion was available to assume responsibility for vitually all controller communications. This allowed the 9th to concentrate fully on the tactical systems supporting the exercise. Without the 58th's fine work, it's doubtful that the CPX could have been successfully supported. Certainly, not all of the communications objectives would have been met, nor would it have been possible to conduct a Signal FTX prior to the CPX.

GRAND SLAM II

CPX GRAND SLAM II was held from 21 to 24 May. The final configuration of division main is shown in Figure 5. After the weeks of preparation, the exercise itself was almost anti-climactic. Installation and displacement times surpassed the most optimistic predictions (Figures 6 and 7). Thirteen VHF systems and approximately 110 multichannel trunks were installed. Seven systems and almost 80 circuits were involved in the displacement of division main. In addition to division main, the tactical command post, division artillery and each brigade displaced and easily bettered the ARTEP standard for displacement.

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The only significant outage was the loss of the FM radios remoted into the TOC for an hour-and-a-half due to a bad power supply. Notwithstanding this problem, first battle communications were considered validated and adopted for use in the 9th Infantry Division.

Installation times were exceptional and the best yet achieved by the 9th Signal, but caution must be exercised in interpreting the results of GRAND SLAM II. All times shown in Figures 6 and 7 were

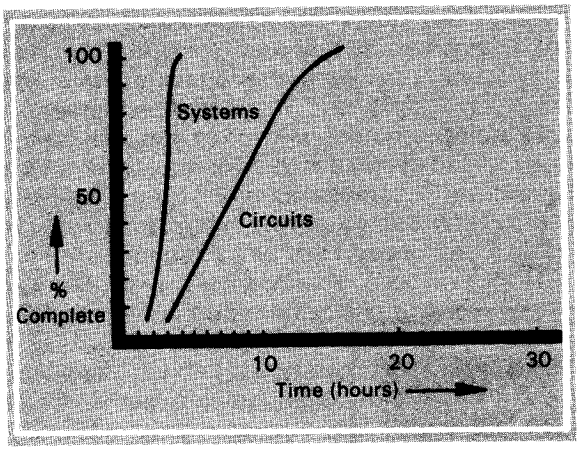

Figure 6. Installation Time—GRAND SLAM II

based on the arrival on site of the main body. An advanced party, consisting of the main platoon leader and several wire and PCM teams, was dispatched about one hour prior to the main body. All moves were conducted in full daylight. Of course, the battalion had the benefit of a very recent exercise in essentially the same locations used for the CPX; troops were fresh and "up" for an exercise that was the culmination of several months of training.

Lessons Learned

The communications procedures used on GRAND SLAM II are just a first step in providing electronic protection for command posts. Currently, all VHF supporting division main is located on a single "radio hill." This concentration is, by itself, too tempting a target and must be dispersed. This will require that each VHF team be capable of independent operations, a difficult proposition given the current state of individual training.

While two secure FM retransmission stations were operated during the CPX, an increased use of secure retransmissions would allow more stations to operate with low power. Further training in secure retransmission is required. The 9th Signal cable platoon is well qualified in the installation and maintenance of PCM cable, but until sufficient TD-206s are available, only limited advantage can be taken of this vital resource.

Finally, and perhaps most difficult, the Signal battalion FM net provides invaluable intelligence to alert Signal-Intelligence teams. The ultimate challenge for a division Signal battalion may well be operations under complete radio silence. If electronic protection measures are given first priority and all ECCM techniques used, the installation of the division communications system could easily take 48 to 72 hours. Under many circumstances, this may well be an acceptable price to pay.

Aside from these considerations, several conclusions can be drawn from the experiences of the 9th Signal:

While excellent training material is available from TRADOC, the unit training program is still very much in the hands of the commander. An analysis of a unit's specific mission is critical to the development of that program.

Many effective ECCM techniques are available to the Signal battalion commander. A trade-off exists between speed of installation and certain of these techniques, but that trade-off may not be as great as commonly believed. Certainly, for an infantry division, the trade-off appears acceptable.

An ARTEP standard should be established for the time required for initial system activation. Adjustments can be made for terrain and weather conditions and for the degree of ECCM protection desired.

Once again, maintenance has proven the key to successful operations. The condition of equipment in rigs that deploy on an exercise is the single-most important factor affecting Signal operations — and installation time.

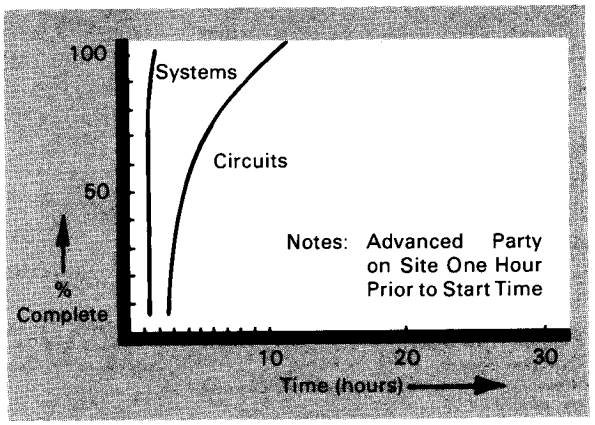

Figure 7. Displacement Time—GRAND SLAM II

Signal units can keep pace with their customers, as best illustrated by the comment of an Intelligence NCO during the CPX. His section had just arrived at the new division main location, and he was waiting for the tentage to be unloaded for the tactical operations center. One of the phones rang on the G-2 table, temporarily set up under a nearby tree. "Sorry, sir," he said into the phone. "I can't tell you yet. There's nothing here so far but communcations."

Former commander of the 9th Signal Battalion, LTC Hall is currently attending the Industrial College of the Armed Forces in Washington, DC. Previous assignments for the 16-year veteran include serving as the assistant division C-E officer of the 9th Infantry Division and as a brigade Signal officer in the 82d Airborne Division. LTC Hall earned undergraduate and graduate degrees in electrical engineering at the University of Illinois. He also holds a master's degree in information technology from George Washington University.