WITHOUT IT YOU HAVE NO DAY...

Editor's Note: *This article is based on a research paper prepared by Class Number 4, Communications Group, at the Sergeants Major Academy (Fort Bliss, Texas). For whatever political failure it may have been, Vietnam was not a military failure. It produced new examples of the value of the American Soldier and demonstrated new plateaus of mission accomplishment. But, it is from this story, as our last and most recent combat experience, that we must learn. It is imperative that we not only correct the short-comings noted in our Vietnam operations but also our successes must be the basis for developing and projecting future signal operations in a combat environment.*

The study from which this survey stems is based on the experiences and knowledge of a group of recognized C-E experts; the men who were there and helped make the communications work in that frustrating war.

The "Lessons Learned" are significant. They should not be allowed to mildew in a drawer full of studies. Thus, we present it here.

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The general opinion of communications in Vietnam, as perceived by the man to whom it was a life and death matter, was that it was good. But, as with anything else, in some areas it could have been better.

During the Vienam era, an RVN Infantryman was asked to cite instances where effective communications "saved the day." With one short phrase he established the relative importance of effective communications when he said, "Without it you have no day."

In March 1973, the last United States units left Vietnam. With this, an era of US Army Combat Operations in Southeast Asia came to an end. One of the more important facets of combat operations in RVN was the role of communications in the conduct of field operations. The Vietnam conflict had provided the US Army, particularly the Signal Corps, with a great challenge in the field of communications. We had proven that we had the telecommunication technology to permit the President of the United States to talk directly to a rifle squad leader through satellite and conventional links. The challenge was how to apply this technology to a "real-world" environment.

The Vienam era is ended and, although a complete history of the conflict is yet to be written, the role of communications during this period is well documented by technical and historical reports. These records, while providing a chronological sequence of events and assessment of technical and equipment parameters, do not examine the impact and effectiveness of communications from the user viewpoint.

In the study upon which this analysis is based, we went directly to those men who used and maintained the communications equipment. From their "tell it like it was" attitudes, we can view signal operations in four broad categories: equipment, maintenance, operations, and signal security. Areas of special interest and emphasis are quality, reliability, quantity, and effective usage of equipment.

For the most part, those interviewed expressed a positive attitude toward communications provided during their tour(s) in Vitenam. This is based on a general assessment of the entire field of communications with no distinction between organic and supporting systems or as to the various means employed to provide those communications. In this assessment of communications, a general response ranged from "lousy" to "outstanding." It was good when equipment was properly used. Dry weather affected it and many could not recall a single incident where a unit was without communications. At least one user, obviously comparing the US telephone system in Vietnam against a stateside system said, "It was considerably more efficient than the mid-Texas Telephone Company." However, when questioned on the quantity of communication in Vietnam, there was considerably less unanimity. When asked to rate the sufficiency or excess of communications provided, users were given a hypothetical situation; e.g., division commander directing a squad leader as a possible excess capability.

Using this as a situation, many combat arms NCOs and officers hedged on their answers. Many mentioned the nuisance of multiple commanders entering the lower level radio nets. Some felt it was reassuring to have support available when required. In general, no one objected to higher echelon monitoring actions while underway and assisting as required. However, the practice of "command at 10,000 feet" and constant requests for information definitely hindered and, in some cases, jeopardized actions on the ground.

> *"As Battalion Commander, I was receiving 'guidance,' 'orders,' 'suggestions,' and 'general harassment' from a LTG (CTZ CDR), a MG (DIV CDR), two BGs (ADCs), a Colonel (BDE CDR), a LTC (Div G3), and a Major (Bde S3). Believe it or not, all were in separate helicopters and all with operable radios. Unfortunately, air traffic control worked too well that day. I was praying for a midair collision."*

On the other side of the coin, another officer commented:

> *"There were instances when I was personally happy to have them (Brigade Commanders and Division CG) on my net. It enabled required support to be provided in a rapid and effective manner."*

Yet, actual examples of operations being hindered by lack of communications were rare. These cases were related to "extended distance," "lack of retrans capability at platoon level," and "lack of communications" such as squad radio, etc.

THE EQUIPMENT

Users, when asked what means of communications they rated least reliable, provided a tremendous range of replies. These replies led to the conclusion that tactical teletype was rated least reliable by a wide margin. Many factors contributed to this low rating; e.g., equipment malfunction, poor transmission media, and overloads in traffic and precedence. The user in Vietnam felt that the teletype network, at best, was only marginally effective. However, of significance is the fact that most users rated the equipment they used as **most** reliable. This included FM for combat arms, CW for special forces, and landline telephone for support troops.

As the conflict in Vietnam increased in intensity and as the United States became more involved in combat operations, it rapidly surfaced that much of the communications-electronic equipment used in previous conflicts was not suitable for a conflict of this nature. The first equipment casualty of the Vietnam Conflict was the "Handie Talkie" (AN/PRC-6 Radio). This radio, developed during the Korean War, was heavy, bulky, fragile, and limited in range. It was hard to carry, unreliable, and was quickly discarded by both advisors and United States units.

The replacement for the AN/PRC-6 was the "squad radio," a two-part radio AN/PRR-9 Receiver and AN/PRT-4 Transmitter. It was designed to be carried in a soldier's pocket with the receiver clipped on his helmet. It was an improvement over the old PRC-6 but did not provide the capability and wide use as foreseen by the Infantry School planners. Inherent problems developed such as speaker being too loud for patrol duty. The earphone was uncomfortable and considered a health hazard and there was conflict in the basis of issue. Should everyone get a transmitter or should some squad members be able to receive only. User comments were: "unsatisfactory," "unnecessary," "too many men try to talk at once," and "squad radios on helmets get in the way."

However, while there was equipment that didn't do the job, there was also extremely reliable and effective equipment in the field. Throughout the Vietnam era, the most widely used item of communications equipment was probably the AN/PRC-25 FM Radio and its successor the AN/PRC-77. Most users rated these radios "outstanding." The AN/PRC-25/77 was used by all types of units in every conceivable environment. Its performance constantly exceeded the designed planning ranges. The fact that it was rugged, reliable, and easy to use made it an invaluable tool for command and control. Users state, "I was constantly amazed at the effectiveness and reliability of the PRC-25," ". . . the AN/PRC-77 was the most reliable in the field," . . . and "the AN/PRC-25 did the job for our battalion and regimental assistance teams . . ."

The man pack radios, and to a lesser extent the AN/VRC-12 vehicular series, were rated high by most users. However, there were significant problem areas. A principal problem was the repeated failure of handsets. Users reported failure due to water or corrosion. Field fixes were reported and handsets were wrapped using the plastic outer wrapping of the BA-386. The handset, from the user standpoint, appears to be the weak link in tactical communications at the individual soldier level. Further, the fact that the handsets would not withstand the degree of hard use and abuse they were subject to was apparently underestimated by the designers and therefore was inherently defective.

There were, of course, other problems associated with FM Radio not all of which were technically the fault of the radio equipment. These faults include the distinctive silhouette of the manpack versions. The shape of the AN/PRC-25 serves to single out radio telephone operators (RTOs) as special targets. To prevent this, some units used field expedients to "camouflage" the appearance. Similarly, while the long antenna (AT-271A) provides better range, its size not only further pinpoints the RTO but also hinders movement in jungle areas. So most units accepted the trade-off of range for safety and dependability which resulted from using the short whip antenna AT-892.

In the area of batteries, many failures resulted in the changing of batteries each time a patrol went out. Users stated, "Batteries are cheaper than lives." There were problems with performance and availability and users just simply would not rely on anything less than a new battery for a new mission. Many users felt that manufacturers were providing defective batteries and went so far as to identify particular manufacturers.

Editor's Note: The authors accurately state the problems and the results. However, the prime problem was not with defective manufacture but with inadequate storage facilities, improper storage procedures, and failure to use first-in/first-out procedures.

User comments were ". . . even when we had sufficient quantity the quality was lousy . . ." ". . . batteries didn't last long in that climate . . . ," and ". . . batteries were old and inoperative when received . . . ."

Finally, part of the FM series radio was the ground plane antenna RC-292. This antenna, while greatly extending the range and coverage, was not suitable for employment in a mobile environment. It was employed extensively by base camps and fire support bases but was impractical for small tactical units. Some units often used only the RC-292 radiating portion without the ground plane elements. These were placed in trees, on buildings, or any acceptable location that would provide the necessary height and ease of erection. Most users expressed a need for a more easily erected antenna oriented for use at semifixed locations.

While the performance of AN/PRC-25/77 and the AN/VRC-12 series radios was rated outstanding, it again appears that we failed to go the "extra mile" and provide the user with full range capability by providing ancillary items of the same quality. In this failure, we not only reduced our capabilities but also created nightmarish situations for the logistician trying to resupply batteries and handsets at rates far exceeding normal usage factors.

THE MAINTENANCE STORY

As always, maintenance support was a problem. It was adequate but could have been better. Users seemed to feel that additional "float" or "running spares" would help. Many thought ". . . radio operators, specifically voice FM radio operators, should receive some training in minor repair and adjustment . . . ." Although opinions on maintenance were not unanimous, those units authorized trained maintenance personnel at small unit levels (e.g., Special Forces and Artillery) reported a predictable increase in equipment reliability. Many users stated, "Operators should in all cases be repairmen," because "signs can be detected by the operator that would prevent major breakdowns." Other users had dissenting opinions. They proclaimed, "Only qualified radio personnel should be allowed to repair radio equipment" and "radio operators do not need to be able to repair."

OPERATIONAL CONSIDERATIONS

"Big Picture" communications support was another aspect. Many factors and unique situations did not lend themselves to the installation of the normal communications network. The hierarchy of communications at the succeeding echelons of Division, Corps, etc., simply did not apply in Vietnam. The lack of suitable secure relay sites, wide dispersion of units, and the so-called base camp concept blurred the distinction of interconnected, independent, but echelon-oriented communications networks. Communications support became the question of who could do the job and how fast; it was no longer a matter of doctrine but depended on capability. Brigades and battalions were sometimes tied into the division nets by the long-line, fixed-station system when this support was beyond the capability of the organic division signal battalion. Therefore, in Vietnam we saw some dramatic changes in communications support. Significant changes that affected the signal support at higher levels in RVN were: the introduction of tropospheric scatter equipment; integration of fixed or "strategic" communications with tactical or "field" systems; adaptations of existing equipment to a new environment and associated problems; and, the development of new items of equipment.

Vietnam saw the first combat employment of over-the-horizon tropospheric scatter (TROPO) radio equipment. Essentially, we progressed from the so-called "backbone/back porch" system installed in 1962 (using AN/MRC-85 sets and fixed "billboard antennas") to the transportable AN/TRC-90 series radio terminal sets which provided communications to such places as Ke Sahn outpost. TROPO played a significant part in the United States

Trailer-mounted configuration of the AN/MRC-34½.

communications support effort. Had we been limited to line-of-sight equipment, as in previous wars, it would have required untold effort and lives in securing hilltop sites for relay stations.

Communications support in Vietnam was strictly mission-oriented. This deviation from the echelon-oriented concept presented some problems in control and technical interface. Nevertheless, it worked and made efficient use of available resources at every level. With the exception of TROPO systems, the majority of communications equipment employed in RVN was post-Korea vintage. This gear was mounted primarily in 2½-ton or ¾-ton size shelters and lacked air-conditioning. Although air-conditioning requirements were easily remedied, the bulky weight and power requirements of the shelters made them unsuitable for airmobile operations. These defects were eventually alleviated. Units used adaptation, ingenuity, and "make do" procedures. Equipment was mounted on smaller vehicles or pallets. Basic configurations were changed. In one case, the AN/MRC-34½ appeared. This device, consisting of half the equipment of an AN/MRC-69, was housed in an ambulance-type vehicle, or in most cases a ¾-ton trailer.

During this period, the 1st Air Cavalry Division (earlier known as the 11th Air Assault Division) designed totally new assemblages using existing components. The results were: the AN/MRC-111, AN/MRC-112, and the AN/MRC-34½. At the same time, signal units providing support at the tactical level were experiencing various problems such as the unreliability of small generators in a 7-day-a-week situation. Additionally, tactical switchboards (SB-22 and SB-86) often proved fragile due to their vulnerability to moisture.

As the Vietnam conflict wore on, most of the problems were overcome and the system functioned—perhaps not as efficiently as it should, but nonetheless, it did function.

The 1st Cavalry Division's 13th Signal Battalion with its lightweight equipment was able to support airmobile operations in the field. However, at base camp, an entire signal support battalion was required to provide the support normally internal to the division. Shortcomings were met by designing new equipment, accelerating or modifying items already underway, and/or by procuring commercial off-the-shelf items. The AN/TCC-70 "mini-mux" was procured and fielded. This gave us 4 channels of carrier over the AN/VRC-12 Series Radios. Further, additional versions of the AN/TRC-129 and the AN/TRC-132 provided greater power and channel capacities. However, there was little advantage gained in the areas of weight and size for either the antennas or the shelters.

With the increased capability for communication support to combat units, only two major areas remained that needed improvement. These areas were tactical switching and the teletypewriter. Although bady needed, improvement was never accomplished during the Vietnam conflict.

THE SECURITY HEADACHE

Another major problem during the Vietnam era was signal security or SigSec. At this particular point in time the gap between what was required, who was responsible, and who was actually doing it was immense. In Vietnam it often seemed to be an insurmountable problem. During the early stages of conflict, the senior Army component headquarters in-country, the US Army Support Command Vietnam (later redesignated USARV), published signal operating instructions (SOIs) and standing signal instructions (SSIs) for use by all advisors and US support units. The SOIs contained manually-generated National Security Agency (NSA) authentication and numeral codes. These codes were cumbersome to produce and, at best, were almost useless in a combat or airmobile situation. Designed for an office environment and routine situations, they simply did not adapt to field use.

Equally useless was a system that used "secure word designators." This system assigned code words to key peronnel operating under the COMUSMACV and were changed "only as required" or "when compromised." In many cases this constituted a daily change of "secure word designators." As a result, the use of "homemade codes" and "shackles" became prevalent. This practice, which persisted throughout the conflict, gave users a false sense of security and was probably more dangerous than transmitting traffic in the clear. Amazingly, this idea held throughout the Vietnam era. When surveyed, NCOs stated: "Codes are useless . . . leaders recognize the voice of the Commander or his operators," and "the old unit code is sufficient, especially in Vietnam."

However, as major US units arrived in the theater, distribution and usage of USARV and MACV code items soon exceeded the prescribed security limits. Incoming US units were also bringing their own code systems which were often superior to those being used in RVN. The 25th Infantry Division (Tropic Lightning) arrived from Hawaii bringing with it NSA-produced KAC operations, authentication, and numeral codes. As the influx of units continued, the need for compartmentalization of code systems increased.

USARV, using NSA preprinted codes, began the process of supplying the code requirements to the rapidly expanding US Forces. The KAC Codes, while not perfect, provided a major breakthrough in employment and distribution. Still there were shortfalls that were unresolved. The Infantryman on the ground and the helicopter pilot supporting him usually dispensed with the codes. However, other users had this to say: ". . . slow and time consuming . . . ," ". . . served the purpose . . . ," and ". . . wouldn't be without them . . . ." Even so, there were holdouts and, while some NCOs showed a misplaced confidence in locally fabricated codes, they seriously questioned the security of **authorized** codes. Rationale is reflected in these comments: ". . . they [authorized codes] were so simple the enemy could decode them in a matter of minutes . . . ," and, ". . . they were useless due to being easily broken by the NVA . . . ." During the ensuing period there were many problems and many complaints. NCOs recalled reverting to one-time pads used in special forces operations.

Radio operators complained that codes were "too cryptic." Security requirements frequently necessitated the changing of radios authorized in present day tactical units and the increased range of sets, particularly Airborne, greatly complicated frequency assignment.

Finally, rapid deployment of units between areas of operation and the assignment of proper call signs further aggravated the situation. "Legal" call signs (ACP-119) were long and difficult to pronounce. Aviation units absolutely refused to use their assigned call signs and reverted to call signs such as Snoopy, Playboy, and Razorback. This, combined with frequency compromises, created tremendous problems in publication and distributions of SOIs and SSIs, particularily at lower levels. Sometimes it took several days to produce a single edition and SOIs were often compromised while being distributed.

This situation established requirements for a more reliable means of passing classified traffic and led to two major developments in the latter stages of the conflict: the introduction of voice encryption devices for voice FM series radios and the KAL-55B authentication wheel or "whiz-wheel." It was a circular authentication table designed to simplify and speed up operation at a level acceptable to most users. Users stated, "The circular authentication table, to me, was the most efficient and easy to employ," and, ". . . 'whiz wheel,' far superior to pocket type SOI/Codes . . . ."

In early 1965, the introduction of the KY-8 and KY-38 provided a measure of increased security and convenience. This, however, cost the communicator by increasing complexity, decreasing range, and, perhaps most important to the Infantryman, increased weight. Although most users liked the system, a significant number had misgiving as to its reliability. Major problems were keying, weight, and lack of confidence. Users, when questioned, stated: "Much fade out . . . problems changing codes"; "I received the wrong key list constantly"; ". . . Damn heavy . . . it is definitely not a one-man load"; and, ". . . It's an excellent system **unless** you have to carry it . . . ."

GENERAL OBSERVATIONS

When Vietnam drew to a close, we had encountered many problems and supposedly learned and profited from our mistakes as well as our accomplishments. As a result of Vietnam, we now know that the Army must be fully ready to meet future engagements regardless of climate, terrain, type of warfare, and size or composition of the forces committed and engaged. The recommendations that follow are based primarily on contact with actual users of the C-E System; the people whose life-line literally was Communications. An additional consideration is that combat elements depend almost exclusively on radio, thus raising serious questions concerning their "life-line" in an electronic warfare (EW) environment.

In effect, we have learned that radios must be reliable in all aspects, to include accessories. They must be able to perform in all climates and terrain without degradation of performance. The manpack radio must be lightweight and compact without a distinctive silhouette in its operating configurations.

Antennas must be durable, efficient, and simple to employ, especially in a fluid situation. Consideration should be given to plug-in range extender modules (amplifiers) for operation in difficult terrain or at extreme distances.

Battery power source must be physically small, lightweight, long-life, insensitive to moisture/temperature, and, above all, reliable.

Field switchboards are overdue for modernization. Mechanical components which are prone to malfunction and failure should be examined.

The mechanism of the tactical teletypewriter sets should be simplified to reduce the number of moving parts; this would reduce the lubrication and adjustment problems and the susceptibility to dust, dirt, and corrosion. All parts should be hardened and the use of brass and other soft metals avoided.

Maintenance, maintenance training, and operator training are areas that need improvement. As maintenance support in Vietnam ranged from outstanding to totally unsatisfactory, it appears that a major factor is the degree of urgency that drives the maintenance activity. The best system from combat units' point of view would, of course, be direct exchange.

Since conflicting views are presented, training must be based on equipment types, technology required, availability of spare parts, float stock, and logistical supply lines. Operator training must be examined, particularly in the areas of radio and signal security. Since anyone may be required to operate in a radio-telephone system, operation and SigSec procedures should receive strong emphasis in both officer and enlisted basic training. Further, periodic refresher training should be provided. As we approach other conflicts, we should remember what was learned in Vietnam. The enemy, regardless of his economic and social background, in all probability has the same capabilities as we.

It appears that communications discipline is the key to successful radio operations. Access to various nets must be limited to absolutely necessary users. Traffic must be limited to that which is strictly essential. Messages must be short and concise. Transmission time must be reduced to a minimum level and effective SigSec procedures must be constantly employed. Further, there is a need for complete interface throughout the division area which must include access to the Corps area communications system.

A number of units were highly successful in employing aerial radio relay means by using fixed or rotary wing aircraft. This method effectively extended the range of ground based radio. Further development of aerial platforms should be pursued.

With the near total reliance on radio communications by the combat elements, effective EW will play havoc with these units. To combat this situation, maneuver battalions should periodically conduct training exercises where absolutely no radio communications are permitted. This would force those units to develop and practice the use of alternate communications. Additionally, combat exercises should employ both active and passive electronic countermeasures (ECM) for the duration of exercises; and, since the maneuver elements will be most susceptible to EW, the battalion commander should be assigned EW advisors.

CONCLUSION

The overview of communications in RVN as seen by the Senior NCO reflects an accurate and professional opinion from those actively engaged in the use and management of C-E systems.

During the early involvement in Vietnam, communications assets were generally insufficient at company and battalion level; but this was not the case in the latter stages of the conflict as surplus equipment became commonplace.

This article is based on those who fought and lived with these communications experiences and is summed up in the words of an anonymous RVN Infantryman who stated that without adequate communication, ". . . you have no day."

In future conflicts, we must be able to "win first battles" and to fight effectively when outnumbered "five to one." This means not only "adequate" but also "best" communications. Precise command and control is the key.

If we accomplish this and provide the fighting man with all he needs, we will have "made his day."

The SB-86 switchboard often proved fragile due to their vulnerability to moisture.