VIETNAM STUDIES

Division-Level Communications 1962—1973

DEPARTMENT OF THE ARMY

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Foreword

The United States Army met an unusually complex challenge in Southeast Asia. In conjunction with the other services, the Army fought in support of a national policy of assisting an emerging nation to develop governmental processes of its own choosing, free of outside coercion. In addition to the usual problems of waging armed conflict, the assignment in Southeast Asia required superimposing the immensely sophisticated tasks of a modern army upon an underdeveloped environment and adapting them to demands covering a wide spectrum. These involved helping to fulfill the basic needs of an agrarian population, dealing with the frustrations of antiguerrilla operations, and conducting conventional campaigns against well-trained and determined regular units.

Now that this assignment has ended, the U.S. Army must prepare for other challenges that may lie ahead. While cognizant that history never repeats itself exactly and that no army ever profited from trying to meet a new challenge in terms of the old one, the Army nevertheless stands to benefit immensely from a study of its experience, its shortcomings no less than its achievements.

Aware that some years must elapse before the official histories will provide a detailed and objective analysis of the experience in Southeast Asia, we have sought a forum whereby some of the more salient aspects of that experience can be made available now. At the request of the Chief of Staff, a representative group of senior officers who served in important posts in Vietnam and who still carry a heavy burden of day-to-day responsibilities have prepared a series of monographs. These studies should be of great value in helping the Army develop future operational concepts while at the same time contributing to the historical record and providing the American public with an interim report on the performance of men and officers who have responded, as others have through our history, to exacting and trying demands.

The reader should be reminded that most of the writing was accomplished while the war in Vietnam was at its peak, and the

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monographs frequently refer to events of the past as if they were taking place in the present.

All monographs in the series are based primarily on official records, with additional material from published and unpublished secondary works, from debriefing reports and interviews with key participants, and from the personal experience of the author. To facilitate security clearance, annotation and detailed bibliography have been omitted from the published version; a fully documented account with bibliography is filed with the U.S. Army Center of Military History.

Lieutenant General Charles Robert Myer, one of the top communicators in the United States Army, was a professional communicator during his entire career and served in a variety of assignments with nonprofessional as well as professional communicators. From 1960 to 1963 he was involved in communications combat developments as a staff officer in the Directorate of Organization and Training of the Army Office of the Deputy Chief of Staff for Military Operations. In 1964 he assumed command of the 69th Signal Battalion at Fort Eustis, Virginia. In November 1965 the battalion was deployed to Vietnam, where it remained under General Myer's command until he returned to the United States in September 1966. Following command assignments included the 11th Signal Group at Fort Huachuca, Arizona, July 1968–August 1969; the U.S. Army Strategic Communications Command, Europe, January 1970–May 1972; the 1st Signal Brigade, Vietnam, June 1972–November 1972; and the U.S. Army Signal School/Training Center and Fort Gordon, Georgia, August 1973–September 1974. On 1 October 1974 General Myer's title became Commandant, United States Army Signal School, and Commander, United States Army Signal Center and Fort Gordon. In this post General Myer served as the training and combat development proponent for communications matters within the U.S. Army Training and Doctrine Command and worked closely with the commandants of all the other Army schools to see that the communications aspects of their fields of doctrinal responsibility were integrated into future operational concepts and developments. General Myer subsequently served as Director, Telecommunications and Command and Control; Deputy Chief of Staff for Operations and Plans, September 1977–October 1978; Assistant Chief of Staff, Automation and Communications, U.S. Army, Washington, D.C., October 1978–July 1979; and Deputy Director General of NATO

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Integrated Communications Management Agency, July 1979–31 March 1981. He was promoted to lieutenant general on 1 August 1979, and he retired from service on 31 March 1981.

Washington, D.C.
20 July 1981

ROBERT M. JOYCE
Brigadier General, USA
The Adjutant General

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Preface

Concentrating on the Vietnam communications experience at division level and lower, this monograph is a companion volume to Major General Thomas M. Rienzi's comprehensive *Communications-Electronics.* Communications in Vietnam were so interrelated and interwoven that familiarity with the overall and supporting situation as portrayed by General Rienzi will promote better understanding and appreciation of the divisional communications story.

Communications is the primary mission of the Signal Corps and its members. *Division-Level Communications* is a story not only of some very fine Signal Corps units and individuals but also of many other communicators from the Infantry, Armor, Artillery, and all other branches of the Army. It is a combined arms story; on the battlefield, communications is everybody's business.

The scope of this study includes the stateside alert and readying of units for Vietnam duty and the reaction of the Army training base to supply the volume of trained specialists needed to man the equipment associated with a modern communications system. The transition from peacetime status to battlefield effectiveness is always difficult, normally made more so because of severe shortages of time, equipment, and skilled men.

The study points out examples of errors and shortfalls without losing sight of the things that went right. Vietnam unit after-action reports and senior officer end-of-tour debriefing reports were notable in their paucity of complaints about communications difficulties; things did go right in the communications field most of the time. Communications, mobility, and firepower formed the triad upon which Vietnam tactical operations were based.

Data for this monograph was drawn primarily from after-action reports and interviews, documented lessons learned, official reports, and recent interviews and letters from numerous individuals who served with the seven divisions and five separate brigades and regiments which were the heart of divisional communications. Sincere appreciation goes to the many communicators and commanders, active and retired, who shared

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their experiences, photographs, and papers so that this volume could be written. A special word of thanks is reserved for those members of the Signal School staff who assisted in researching and organizing this monograph.

20 July 1981

CHARLES R. MYER
Lieutenant General, U.S. Army

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DIVISION-LEVEL COMMUNICATIONS 1962–1973

CHAPTER 1

Early Involvements and Developments

On 24 November 1963 a large Viet Cong force attacked the Special Forces Camp at Hiep Hoa, Republic of Vietnam. Sergeant First Class Kenneth M. Roraback, working in the radio room, immediately notified higher headquarters of the situation. Heavy enemy fire damaged his gear and knocked out a portion of the radio room, but Sergeant Roraback remained at his station and attempted to repair his radio. When it became apparent that the radio was beyond repair, he destroyed what was left of the equipment, maneuvered through hostile fire, and used a light machine gun to cover withdrawal. He was taken by the Viet Cong and died in captivity. He was awarded posthumously the Silver Star for gallantry in action.

Sergeant Roraback's story points up more than his bravery. The early date, 1963, is a reminder that Army communicators were on duty in Vietnam, advising and supporting the Vietnamese Army, well before American tactical units were committed in 1965. The technical proficiency of Sergeant Roraback exemplifies the training and dedication of the American combat communicator—the very fiber of communications in Vietnam. His courageous fight once he had accomplished his technical mission says that combat communicators were fighters as well as technicians who played vital parts in operating and maintaining the links that held American combat forces together.

In most tactical operations in Vietnam, radio was the primary means of communication. Telephone, teletypewriter, data, facsimile, television, visual, and sound communications were also used. The climate and terrain of the Republic of Vietnam challenged those means of communication and the men who operated them. Vietnam is located squarely in the torrid zone. (*Map 1*) High temperatures prevail throughout the year, except in a few mountainous areas. The average annual temperature varies only a few degrees between Hue in the north (77°F) and Saigon in the south (81.5°F), with generally high humidity. The annual rainfall is heavy in all regions, torrential in some; it averages 128 inches at

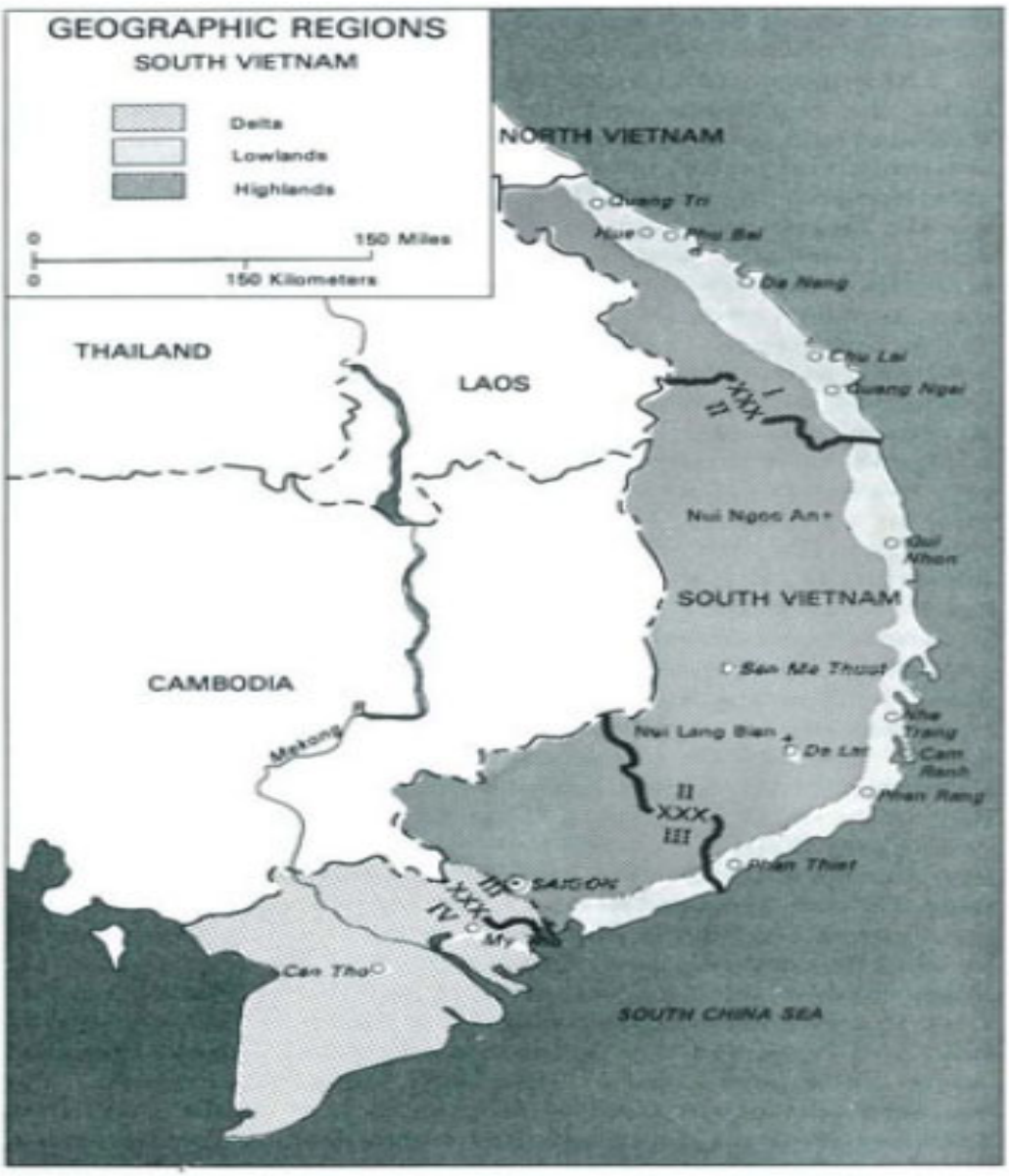
SOUTHEAST ASIA
0
500 Miles
0
500 Kilometers
CHINA
TAIWAN
NORTH VIETNAM
BURMA
LAOS
GULF OF TONKIN
LUZON
THAILAND
SOUTH CHINA SEA
CAMBODIA
GULF OF THAILAND
SOUTH VIETNAM
PHILIPPINE ISLANDS
MALAYSIA
CELEBES SEA
MALAYSIA
BORNEO
SUMATRA
CELEBES
JAVA SEA
JAVA

MAP 1

Hue and about 80 inches at Saigon. These conditions had their effects on delicate electronic equipment and temperate zone troops.

The Republic of Vietnam has three major regions: the Mekong Delta, the Highlands, and the Central Lowlands. (*Map 2*) The Mekong Delta comprises the southern two-fifths of the country. Its fertile alluvial plains, favored by heavy rainfall, make it one of the great rice-growing areas of the world to economists—and one of the world's largest mudholes to troops trying to operate there. The delta is interlaced with a series of rivers consisting of the five branches of the Mekong, which total about 300 miles in length, and three smaller rivers: the Dong Nai, the Saigon, and the Vam Co Dong. This low, level plain is seldom more than ten feet above sea level, and, during the flood season, the only dry land to be found is generally that forming the banks of the rivers and canals. These levees and dikes, built for flood control, are used extensively as village sites. Despite its shortage of solid ground, the delta region is very heavily populated, with more than 2,000 people per square mile in some areas. The water network of rivers, streams, and canals; the flat, soft terrain; and the dense population influenced the nature of military operations that were undertaken to combat enemy forces there.

The Highlands (or the Chaine Annamitique) dominate the area of Vietnam northward from the Mekong Delta to the demarcation line. The Chaine Annamitique, with its several high plateaus, is an extension of the rugged mountains that originate in Tibet and China. The Chaine forms the border between the Republic of Vietnam and the Khmer Republic (Cambodia) to a point about fifty miles north of Saigon. This natural border is irregular in height and shape with numerous spurs dividing the coastal strip into a series of compartments that make north-south communications difficult. Included in the Chaine is a plateau region known as the Central Highlands that covers approximately 20,000 square miles. The northern part extends from Ban Me Thuot about 175 miles north to the Ngoc An peak. It varies in height from 600 to 1,600 feet with a few peaks rising much higher. This 5,400-square-mile area is covered mainly with bamboo and tropical broadleaf forests interspersed with farms and rubber plantations. The southern part of the Central Highlands is generally more than 3,000 feet above sea level and features broadleaf evergreen forests at the higher elevations and bamboo on the lower slopes. Monte Lang Vian, near the mountain resort city of Da Lat, is 7,380 feet high. This sparsely populated, rugged terrain of the Central Highlands was the scene for major action as American units and their allies


GEOGRAPHIC REGIONS
SOUTH VIETNAM
Delta
Lowlands
Highlands
0
150 Miles
0
150 Kilometers
NORTH VIETNAM
Quang Tri
Hue
Phu Bai
Da Nang
Chu Lai
Quang Ngai
THAILAND
LAOS
I
XXX
II
Nui Ngoc An
Qui Nhon
SOUTH VIETNAM
CAMBODIA
Sen Ma Thuot
Nha Trang
Cam Ranh
Nui Lang Bian
Da Lat
Mekong
Phan Rang
II
XXX
III
Phan Thiet
III
SAIGON
XXX
IV
My
Can Tho
SOUTH CHINA SEA

MAP 2

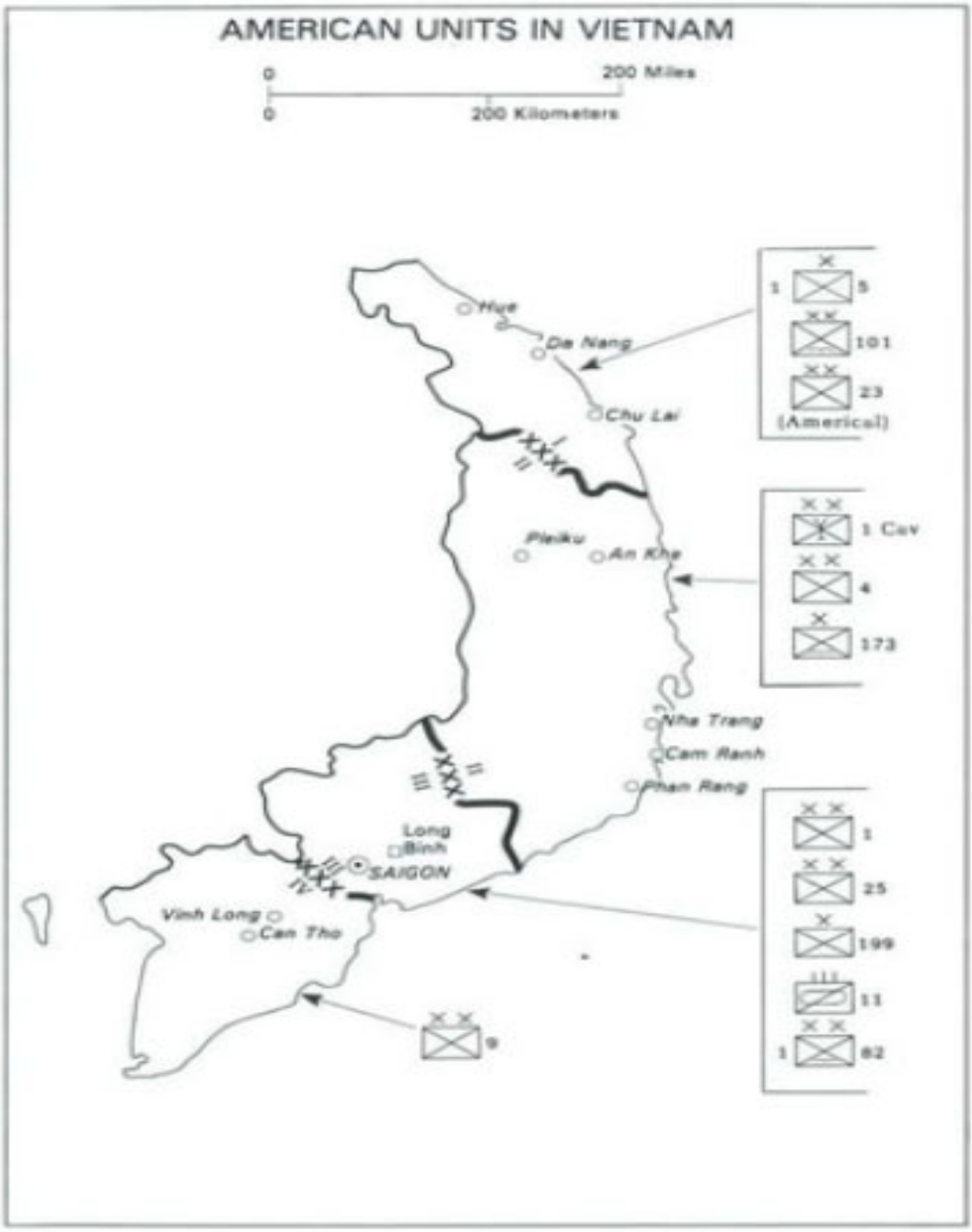
tried to keep the enemy from moving men and materiel in force toward the Central Lowlands.

The Central Lowlands consist of a narrow coastal strip wedged between the slopes of the Chaine Annamitique to its west and the South China Sea to the east. The extensive cultivation of rice and other crops in this fertile region and an active fishing fleet support the heaviest population concentration other than that of the Saigon and delta regions. Numerous ports, airfields, and military bases were developed in the Central Lowlands to support U.S. military operations both there and in the Central Highlands. Quang Tri, Hue, Phu Bai, Da Nang, Chu Lai, Quang Ngai, Phu Cat, Qui Nhon, Tuy Hoa, Ninh Hoa, Nha Trang, Cam Ranh Bay, Phan Rang, and Phan Thiet are but a few of the Central Lowlands places which became familiar to U.S. soldiers and the news media.

The land affected tactical communications in seven divisions, four separate brigades, and one armored cavalry regiment. (*Map 3*)

The commitment of major U.S. combat forces to Vietnam in 1965 followed a deepening American involvement which had begun in 1950. In 1960 Vietnamese President Ngo Dinh Diem, faced with a rapidly deteriorating situation in the countryside, declared a state of all-out war against the Viet Cong and asked for increased American aid. In late 1961 President John F. Kennedy sanctioned the operational support of Vietnamese forces by American forces. Eight company-size aviation units, two specialty aviation detachments, and two maintenance support companies were deployed to Vietnam during the following twelve months. The size of the new deployments and the new mission made an increase in communications support imperative. The first unit of the U.S. Army ground forces to arrive in Vietnam was a communications unit, the 39th Signal Battalion, commanded by Lieutenant Colonel Lotus B. Blackwell. First contingents of the battalion arrived in Vietnam in February 1962; the complete battalion was there by July.

The battalion's first job was to establish and maintain a countrywide communications system to provide command and control for the new operational support and expanded advisory missions. Code-named BACK PORCH, a tropospheric scatter radio system extended the length of the country, from the demilitarized zone in the north to the Mekong Delta in the south, and marked the first time this type of "mountain hopping" equipment was used in a combat environment. The battalion also operated telephone exchanges and communications centers throughout the country to


AMERICAN UNITS IN VIETNAM
0
200 Miles
0
200 Kilometers
Hue
Da Nang
Chu Lai
Pleiku
An Khe
Nha Trang
Cam Ranh
Phan Rang
Long Binh
SAIGON
Vinh Long
Can Tho
1
5
101
23
(Americal)
1 Cav
4
173
1
25
199
11
1
82
9

MAP 3

RADIO TELEPHONE OPERATOR

tie the Military Assistance Advisory Group headquarters to essential subordinate organizations and Vietnamese agencies. Although much of this mission involved communications well above the division level, the 39th Signal Battalion was the pioneer for many divisional operations that followed.

An early assignment of the 39th was to help install a special radio net for the village defense forces. The net tying the units together employed the amplitude modulated radio set AN/GRC-109 at several subordinate stations in each broad operational area, all controlled from a central headquarters in Saigon. Although the net control station remained open around the clock for emergency reception, normal radio contact was made only on a scheduled basis using international Morse code.

Within the operational areas, an internal communications system employed commercial amplitude modulated (AM) voice radios, TR-20's, with other interested agencies, subordinate operational bases, and selected villages. These lower nets worked twenty-four hours a day but with traffic controlled to save battery power and to permit emergency traffic. The net control station was generally either manned or monitored by American advisers; the village and other net radios were operated by trained local Vietnamese. Light manpack sets, which would have enabled roving patrols to tie into the village radio nets, were in short supply

at the time. According to one of the early advisers, Major Ron Shackleton, the old model AN/PRC-6 and AN/PRC-10 radios were tried but were too short ranging; they did see some limited use, however, by close-in observation teams and listening posts. Within operational bases, telephone wire was installed between defensive points and command posts.

Village defense radios had been installed largely as part of a special project sponsored by the United States Operations Mission, a component of the Agency for International Development. Chief Warrant Officer George R. McSparren and a team of twenty enlisted men from the 232d Signal Company, 39th Signal Battalion, worked on the project for about six months during 1962, but more help was needed. Then the 72d Signal Detachment (Provisional), consisting of seventy-two enlisted men under the command of Captain Robert A. Wiggins, was sent on temporary duty to Vietnam. It was attached to the 39th Signal Battalion during late 1962 and early 1963 to take over radio operations in the hamlets throughout the Republic of Vietnam. In five months the operation was well under way, and the unit was awarded the Meritorious Unit Citation for its efforts.

Another early communications assignment involved avionics, the application of electronics to aviation and astronautics. Much of the early operational support of the Vietnamese armed forces centered on airmobility, which placed the highest premium on good communications between aircraft, particularly helicopters, and between aircraft and ground. To ensure higher echelon avionics maintenance support for the aviation units, six signal detachments (avionics) arrived in Vietnam during 1962: the 69th, 70th, 255th, 256th, 257th, and 258th. These detachments filled a vital need in supporting the communications and electronics equipment of the aviation units already in Vietnam and of those that followed. This activity came under the signal officer of the United States Army Support Group, Vietnam, the component U.S. Army headquarters within the Military Assistance Advisory Group, who employed a qualified avionics officer to coordinate all avionics support activities. Although serious shortages of qualified personnel beset the program at the start, the problem was resolved and the avionics detachments became an invaluable part of the communications team.

As aviation support expanded and the enemy began to adjust his operations and tactics to counter the helicopter threat, heavier and more frequent ground fire was encountered both in the air and on landing zones, causing a marked increase in damaged and

destroyed aircraft. Aircraft and avionics mechanics and other available ground crewmen took turns riding "shotgun" at helicopter doorway positions to suppress the hostile fire. The practice had an inevitable ill effect on avionics and helicopter maintenance, and, in the fall of 1962, when the Military Assistance Advisory Group asked for help, a program was started to train men for specific duty as aerial door gunners. The 25th Infantry Division in Hawaii lent early assistance by providing specially trained volunteers on temporary duty as door gunners; they permitted avionics maintenance personnel to return to their specialties.

As the scope and complexity of American involvement increased, a need arose for an organization that could apply, test, and evaluate new methods and techniques (including communications) called for in the combat environment of counterinsurgency warfare. This led, in late 1962, to the establishment of the Army Concept Team in Vietnam under Brigadier General Edward L. Rowny. One of the team's earliest projects was generated by pleas from U.S. advisers for a better way to control and coordinate the communications means available to the South Vietnamese commanders they were assisting.

With the role of airmobility vastly expanding, command and control had assumed a new importance. Because the usual reaction to the hit-and-run tactics of the Viet Cong was a quick airmobile response, it demanded a helicopter command post from which the Vietnamese commander, together with his adviser and a limited staff, could get quickly to an area under attack, develop a plan of action, and commit reaction forces rapidly. That procedure often meant briefing the reaction forces en route to the objective, coordinating with other friendly forces, and husbanding additional support as needed; in short, using several radios at the same time. Trying to do that within the confines of a helicopter passenger compartment, where space, weight, and power were at a premium, was no small task. The commander and his staff had to compete with the high noise level in the cabin to talk to each other and to the crew members. They also needed some sort of work surface for map layouts and overlays.

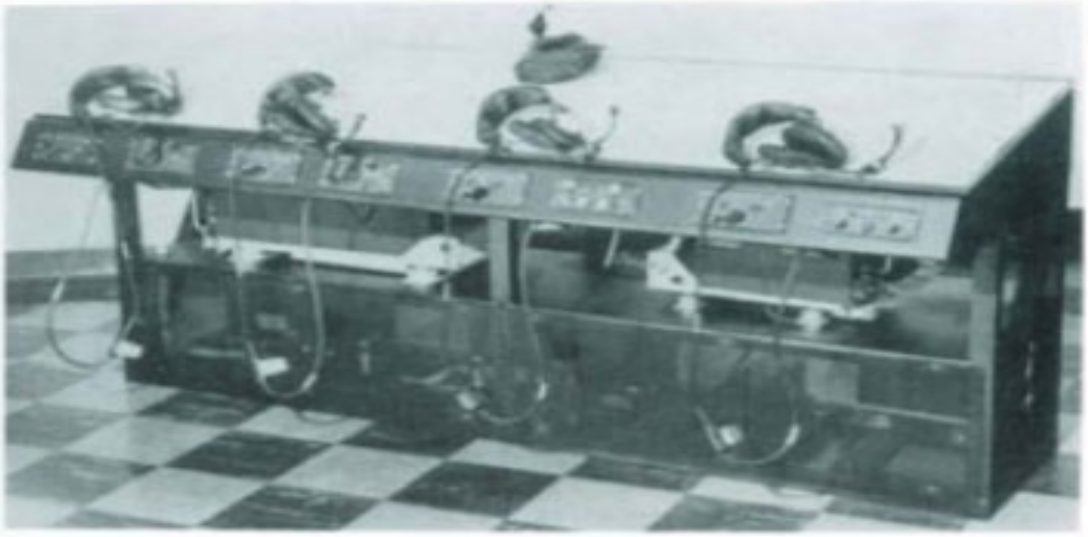
An early attempt to meet these needs was made by lashing down three FM (frequency modulated) radios (AN/PRC-10) together in the passenger compartment and mounting the antennas at 45-degree angles on the skids. Although such a "lash up" was used with some success, it was cumbersome and provided only FM channels when very high frequency and high frequency single sideband were also needed because of the extensive range and

variety of activities involved. The expedient also failed to provide for communications within the helicopter.

In early 1963, the Army Concept Team defined the requirements for an aerial command post for command control of ground and air operations and submitted a proposed evaluation plan. The plan was approved by the Commanding General of the U.S. Army Combat Developments Command and the U.S. Army Electronics Research and Development Agency at Fort Monmouth, New Jersey, which dispatched a two-man team to Vietnam in August to determine how the Electronics Laboratory might assist. In the end, four command post communications system consoles for UH-1B helicopters were fabricated. Each included an operations table and a compact five-position interphone system independent of the aircraft interphone but capable of entry into that system. Each console also provided equipment for two different frequency modulated radio channels, an independent very high frequency amplitude modulated radio circuit, a high frequency single sideband circuit, and access to the aircraft's ultra frequency amplitude modulated command radio—certainly a full spectrum of radio coverage to meet almost any contingency.

The first consoles arrived in Vietnam in December 1963 and were issued to the 145th Aviation Battalion and the Delta Aviation Battalion (Provisional) for evaluation. The battalions found the original design to be too ambitious. Because of the size and weight of the console, two single seats normally occupied by the aerial door gunners had to be removed, and the additional weight upset the helicopter's center of gravity. Nevertheless, when the map board and table were eliminated and the single sideband radio relocated, the console performed so well that in July 1964 the U.S. Military Assistance Command stated an urgent requirement for a heliborne command post (HCP) for each Vietnamese division and one each for the Vietnamese II, III, and IV Corps.

The console was ultimately designated the AN/ASC-6. The thirteen required, along with two for backup, were fabricated at the Lexington-Bluegrass Army Depot in Kentucky and rushed to Vietnam. They were tested from late 1964 to early 1965 and were successfully used in all sections of Vietnam from Da Nang in the north to Pleiku in the Central Highlands and the Mekong Delta in the south. Headed by Lieutenant Colonel Clarence H. Ellis, Jr., a five-man team conducting the evaluation included two communicators, Major Cecil E. Wroten and Captain Wilmer L. Preston. The test report commended the assistance of another communicator, Captain James A. Weatherman, and the Avionics Office of the U.S.



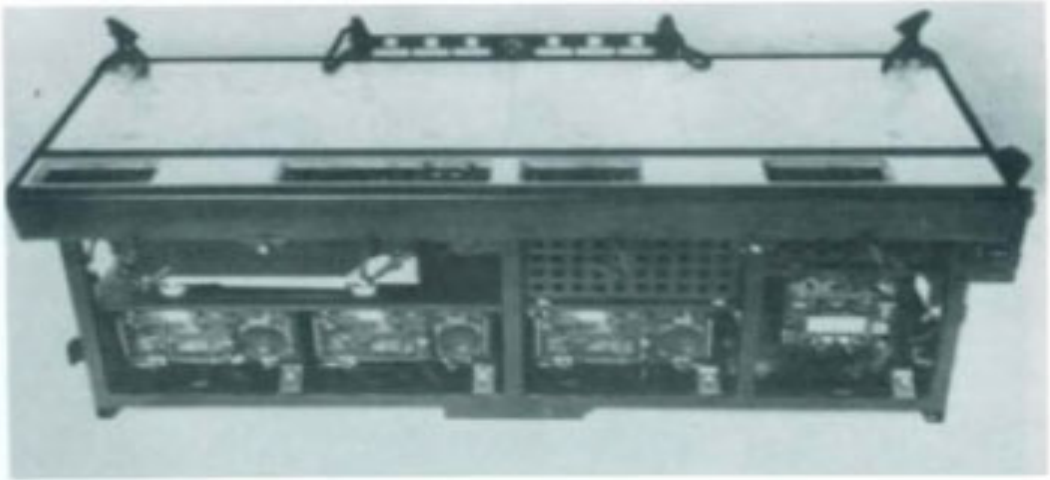
EARLY COMMAND COMMUNICATIONS CONSOLE *with aircraft radios.*

Army Support Command, Vietnam. Eighty-five more consoles of the AN/ASC-6 model would be obtained and deployed to Vietnam over the next four years.

Among conclusions noted in the test report was that standard aircraft radios and antennas were better suited for installation in the heliborne command post than were ground radios and antennas, a controversial conclusion that would arise again later. The report also noted that the command post functioned most effectively at altitudes between 1,500 and 2,500 feet, a compromise between observing activity on the ground and avoiding ground fire and other aircraft. In response to another conclusion that the command post had to be capable of longer flight time than troop transports or armed helicopters, a fifty-gallon auxiliary gas tank was placed in the space under the passenger seats.

The utility of the heliborne command post was so apparent that even as the test was going on, fifteen more were procured and placed in routine use. The heliborne command post, wrote Brigadier General John K. Boles, Jr., in forwarding the test report, " . . . is the single piece of new materiel which should have the most influence on improving the conduct of the war in Vietnam."

While those steps to improve airmobility operations were being taken in Vietnam, parallel efforts were under way at Fort Benning, Georgia. The 11th Air Assault Division was activated at Fort Benning on 15 February 1963 following recommendations made by a special board studying tactical mobility requirements, known as



EARLY COMMAND COMMUNICATIONS CONSOLE *with VRC-12 series radios.*

the Howze Board (its chief was Lieutenant General Hamilton H. Howze). This extraordinary division was given a high priority on personnel and equipment; it was tasked to develop new and radical airmobile concepts and operational procedures.

As an action officer working in combat development on the Department of Army staff, I had the good fortune to serve on a team that visited the 11th Air Assault Division during this time. The division commander, Major General Harry W. O. Kinnard, invited our team to a Saturday morning "think tank" session, a weekly practice within the division. At these sessions commanders and staff kicked around ideas, no matter how far-fetched, that pertained to airmobile operations and improved command and control. Our team was deeply impressed to see an entire division dedicated to talking through and then trying out bold tactical airmobile concepts that were no more than vague ideas a few years before. From those sessions emerged much of the embryonic doctrine that later guided the redesignated 1st Cavalry Division (Airmobile) to its dramatic combat successes in Vietnam.

Communications in airmobile operations received considerable thought and attention. In early 1964, the division signal officer, Lieutenant Colonel Tom M. Nicholson, asked the U.S. Army Electronics Command for assistance in designing and fabricating an airborne tactical operations center to be installed in the UH-1 helicopter. In the process, when the question of air versus ground radios arose, the 11th Assault Division chose ground radios primarily for supply and maintenance reasons. Using the same

type of radios as used by ground maneuver units in the heliborne command consoles would permit rapid replacement of a damaged or inoperative radio at almost any supply point or battalion maintenance facility within the division area. It would also ease the problem of obtaining spare parts. There were also operational advantages over the aircraft radios in that ground radios were compatible and had a greater range because of their higher average power output.

The Communications Department of the U.S. Army Electronics Research and Development Laboratories at Fort Monmouth, New Jersey, directed by Robert S. Boykin, received the project. Built to 11th Air Assault Division specifications, a model was delivered in March 1964 and installed with the assistance of a laboratory team. Following limited operational testing at Fort Benning, the model unit was returned to the laboratories in May with a list of proposed modifications. The unit was finally designated the Airborne Communications Control AN/ASC-5, and fifteen more were built for the division by Lexington-Bluegrass Army Depot. The AN/ASC-5 served its purpose well at that time but was later modified and redesignated the AN/ARC-122.

CHAPTER II

Commitment of American Ground Combat Forces

Continued enemy buildup and the likelihood of South Vietnamese defeat, in the spring of 1965, led to a decision by President Lyndon B. Johnson to commit American ground combat troops. A need quickly arose for a major communications buildup, and, because of contingency planning, a quick response was possible.

To facilitate the buildup, a liaison team from headquarters of U.S. Army, Vietnam, met with Department of the Army representatives in Washington and with members of the 2d Signal Group. In detailed planning sessions, the conferees forecast the need for signal resources in Vietnam and drew up a timetable for their commitment. For communications purposes the country was split in two. The newly arriving 41st Signal Battalion took responsibility for the northern sector and the veteran 39th Signal Battalion controlled the southern zone. A countrywide twelve-channel VHF (very high frequency) system was installed which extended tactical tails to key operational areas from the more fixed tropospheric system extending north and south along a main communications axis.

In early June 1965, at the direction of Brigadier General William E. DePuy, Military Assistance Command J-3, Lieutenant Colonel Kenneth G. Ring, then serving as the U.S. Army, Vietnam, signal officer, met with the J-3 staff for crucial guidance on upgrading communications support to the advisory mission. During these discussions, the requirements for FM and single sideband radio equipment, FM airborne relays, and additional tactical multichannel links were reviewed. The Military Assistance Command needed a reliable 24-hour-a-day voice communications net to each of the forty-five province headquarters, to each of the 135 district headquarters, to Special Forces camps, to Vietnamese Army training centers, and to numerous other strategic locations. The expanded communications plan, as finally approved, involved some 4,000 additional spaces and some $20 million worth

of equipment, most of which went toward improved communications at the local (district and province) level. It was this basic network that the large combat units tied into for their communications support as they began arriving in Vietnam.

The deployment of major combat units to Vietnam spanned the period August 1965–July 1968. The first units to arrive were those that stood highest in priority for resources and, therefore, highest in combat readiness. One such unit was the newly organized 1st Cavalry Division, commanded by Major General Harry W.O. Kinnard. The 13th Signal Battalion supporting the 1st Cavalry Division enjoyed those rare advantages of high priority on personnel fill, reasonable personnel stability, new equipment, and an exceptional esprit de corps stemming from the challenging new mission of airmobility that had prompted the initial organization of the unit. It stood in marked contrast to the last combat organization to enter Vietnam, the 1st Brigade of the 5th Infantry Division (Mechanized). The brigade, hard pressed to get enough men because of the severe drain by combat units already committed in Vietnam, was uprooted from its parent division, kept an inordinately long time in its staging phase at Fort Carson, and placed under the operational control of the 3d Marine Division when it arrived.

Generally speaking, the combat units that deployed to Vietnam fell into three groups. The first group included those units from high on the existing readiness list and included, in addition to the 173d Airborne Brigade, the 1st Cavalry Division and the 1st and 25th Infantry Divisions. The second group, arriving during July 1966–July 1967, included the 4th Infantry Division, the 196th Light Infantry Brigade, the 199th Light Infantry Brigade, the 11th Armored Cavalry Regiment, and the 9th Infantry Division. Among this second group, which had not enjoyed the higher priority of the earlier deployed units, the 9th Infantry Division faced, perhaps, the most difficult task of preparation. The final buildup phase, spanning the period June 1967–July 1968, involved the remainder of the 101st Airborne Division, the 3d Brigade of the 82d Airborne Division, the 11th Light Infantry Brigade, the 198th Light Infantry Brigade, and, finally, the 1st Brigade of the 5th Infantry Division.

A review of the histories of these units during their deployment phase depicts every conceivable circumstance regarding training, personnel, and equipment. By and large, however, they followed the same general patterns. The acquisition and management of personnel and equipment was understandably paramount in all their planning. The earlier deployed units fared reasonably well.

The 511th Signal Battalion of the 1st Cavalry Division (later redesignated the 13th Signal Battalion), for example, was a group that had been largely stable for two years during air assault training. Lieutenant Colonel Tom Nicholson, the battalion commander, cited his good fortune at having had the opportunity to organize, form, and train the unit from the start—certainly an exception to the general rule for units deploying to Vietnam. The division commander had also given Colonel Nicholson full responsibility to assign or replace all signal officers in the division, including those at brigade and combat arms battalion levels. This exceptional control of important personnel spaces by the signal battalion commander was, in his opinion, a major contributing factor in the cohesiveness of the communications structure within the division when it arrived in Vietnam. Lieutenant Colonel "Swede" Nelson, commanding the 501st Signal Battalion of the 101st Airborne Division, held the same view. He received, from the division chief of staff and the G-1, full responsibility for signal officer assignments within the division, and he selected the most qualified people with previous experience in infantry communications as the communications officers for the brigades and battalions. He also required that officers spend some time in the division signal battalion before assuming their duties with the combat unit.

Personnel stability is also cited in the records of the division signal battalion of the 25th Infantry Division. Lieutenant Colonel Tom Ferguson, then the battalion commander, states that nearly 75 percent of the officers and men who accompanied the battalion to Vietnam had the opportunity to train with the division for nearly eighteen months before their deployment. The 25th, like many other combat units, also received many young soldiers straight from basic combat training with the understanding that the unit would provide the advanced individual training from its own resources. The signal battalion received close to a hundred of these soldiers and proceeded to provide on-the-job training in radio and wire specialties. The battalion commander felt that these soldiers were as well qualified when they arrived in Vietnam as were those from the formal schools. I observed, in a small way, the results of this effort when the 1st Brigade of the 25th Infantry Division staged through the university staging area between Saigon and Long Binh on its arrival in Vietnam. The 69th Signal Battalion, which I commanded, was tasked with establishing base communications for the division while they were in the staging area so that the organic division signal battalion could devote its full time to

preparations for its commitment in the initial division base camp at Cu Chi. The efficiency with which the division, including its signal units, moved in and through this staging area was nothing short of remarkable. In my view it was probably the best planned transition into combat by a major combat unit to occur during the entire conflict.

The personnel experience of the 9th Infantry Division, which came in during the second phase of the buildup, was in marked contrast to the earlier units. Forecasts of future requirements in Vietnam called for more infantry divisions than were available on the troop list, and the decision was made to activate the 9th Infantry Division at Fort Riley, Kansas, on 1 February 1966, under the command of Major General George S. Eckhardt. Initial replacements came from many sources, but most arrived directly from civilian life through the reception stations and remained with the division from its activation through its training cycle and into combat—a process that not too many soldiers had experienced since World War II. In the division signal battalion, the battalion commander, Lieutenant Colonel John H. Reeder, found himself with a functioning signal battalion in which he was the only officer and in which the total strength was about 150 enlisted men. First sergeants were used as company commanders, and noncommissioned officers filled all the key battalion staff officer positions. With this skeleton crew, however, Colonel Reeder created a complete training program and laid the groundwork for the eventual fill of the battalion. Officer assignments to the battalion were slow, and officers that were assigned had, for the most part, no tactical communications experience. It was necessary to establish both officer and senior noncommissioned officer schools within the battalion to make up for this lack of experience. The same was also true of many of the enlisted men assigned to the battalion. Many of them thought of themselves as fixed plant communicators and were apprehensive about the prospect of working with tactical communications equipment in combat. The battalion commander, however, made the reluctant ones "stick it out," and they proved, in the long run, to be as competent as their more experienced, tactically trained contemporaries.

Major combat units of smaller size, such as the 196th Light Infantry Brigade, faced similar rapid fills of untrained personnel. The 196th received 2,000 recruits that had to be given basic combat training as well as advanced individual training with the brigade. This was a demanding mission for a separate brigade to assume while readying for combat deployment overseas. The 199th Light

Infantry Brigade was not filled out with untrained men until thirty days before its scheduled deployment. The 199th was fortunate, however, in being at Fort Benning, Georgia; it could draw on the Communications Department of the Infantry School and train communications personnel more easily than some other units.

A later deploying unit, the 11th Infantry Brigade, formed at Schofield Barracks, Hawaii, during 1966, experienced a similar problem. In its case, the majority of the initial filler personnel were Vietnam veterans who could not return to Vietnam with their new unit. The time before deployment was too short to obtain men from the advanced individual training schools, and again this training was conducted in the unit. The brigade communications platoon established a training program for the C-E specialties. All courses were conducted on a one-time, six-week schedule followed by a brigade command post exercise. According to the brigade signal officer, Major Frederick R. Dart, the results were not so good as those of formal advanced individual training but did provide the brigade with an adequate communications capability.

As with personnel and training, a variety of equipment problems faced tactical signal units as they prepared for deployment. Perhaps the most extensive and common problem was converting from the old radios (AN/GRC-3 through -8 series) to the new AN/VRC-12 series. Since the old and new series were not compatible, the conversion had to be made unit by unit, with the attendant problems of training operators and modifying signal operation instructions. Other equipment conversions also were required at crucial points in the planning. Many units had to accept and become familiar with the new 10-kilowatt generators which were replacing water-cooled generators. These air-cooled generators were unusual in many respects and required considerable cross-training even for operators who were already qualified in that military occupational specialty. The same was true of the new multifuel vehicles which were replacing the older 2½-ton trucks throughout the divisions. Often these new vehicles were in such short supply that they were shipped directly from the manufacturer to the unit as they came off the assembly line. The support system for the new trucks during this initial period was marginal at best and further complicated the units' problems at a crucial point in their deployment planning. In many instances signal units had to deploy with the older 5-kilowatt water-cooled generator that had been in the inventory so long that it was considered obsolete. One such unit was the 69th Signal Battalion during its first six months inVietnam. Although the 10-kilowatt

replacement certainly provided much-needed additional power, the battalion found the older PU-286 superior in some respects. It was far quieter; it could be dug in and would run cool on water; once it had been stabilized in a particular location and routine, it could be kept running with less daily attention than the air-cooled replacement. Furthermore, the parts replacement system in Vietnam was more than adequate to meet the needs of the water-cooled generators until they were phased out.

Air conditioning posed another problem during the deployment phase, particularly in the later units which had picked up feedback from combat units already in Vietnam concerning the importance of air conditioning to keeping communications shelters in continuous operation. The 125th Signal Battalion of the 25th Infantry Division partially solved the problem by obtaining enough standard 16-inch electric fans to provide two fans for each major piece of sheltered communications equipment. This air circulation expedient was not ideal but did provide some relief. U.S. units were not really prepared to operate communications equipment shelters in the hot, humid climate prevailing throughout most of Vietnam, but the ingenuity of the American soldier compensated for this shortcoming in a large way.

Another equipment problem some units faced was that of picking up pre-positioned equipment en route to the combat theater. In the case of the 25th Infantry Division Signal Battalion, approximately one-third of the unit's equipment was afloat off Okinawa and another one-third was at Korat, Thailand. It is a tribute to the logistical system that the battalion found the majority of this equipment to be in excellent working order when it arrived in Vietnam.

As the later combat elements began to deploy to Vietnam, equipment problems shifted from replacing one type with another to the more serious problem of having little or no equipment at all with which to train the filler personnel arriving shortly before the unit was scheduled to deploy. This was particularly true of the newly activated units and of those units of less than division size that would possibly function as separate brigades when committed. In many instances the table of organization and equipment signal support was not adequate for this function and additional equipment was not authorized before the units deployed. Perhaps the most serious example of this problem was the deployment of the 1st Brigade of the 5th Infantry Division. The brigade was placed under the operational control of the 3d Marine Division and committed to combat operations very soon

after its arrival in Vietnam. Because of a lack of tactical communications augmentation, initial operations were haphazard to say the least. The brigade signal detachment was fragmented and suffered severe equipment shortages. In addition, the assets of the organic marine division unit were not adequate to support the brigade. After a period of considerable frustration U.S. Army, Vietnam, activated an additional signal company in Vietnam, the 298th, to support the brigade. The company was commanded by Captain Leland Hewitt and was formed from the brigade signal platoon and elements of Company B, 5th Signal Battalion, which had accompanied the brigade to Vietnam. Because, in part, of some personal efforts by Major Edward F. Jansen, the brigade signal officer, personnel and equipment to round out the unit were soon provided. Trying to get a signal unit trained and organized in a combat theater under these conditions was, at best, a touchy business.

In addition to the other problems every unit experienced the agonies of working out a signal operation instruction that was easy to use. The 25th Infantry Division Signal Battalion S-3 developed a pocket-sized format which became widely accepted throughout the division.

CHAPTER III

Blunting the Enemy Drive

As major combat units deployed to Vietnam, they encountered a tactical environment that was alien to their training and experience. Traditional large-scale exercises, such as REFORGER in Europe and the Strike Command series throughout the continental United States and in the Caribbean, provided neither the climatic conditions nor a tactical scenario approximating operations in Vietnam. The 25th Infantry Division had trained in jungle operations in a climate that approached that of Vietnam, but the similarities were marginal. The war in Vietnam was a different kind of war, in a different place, and would tax the stamina and ingenuity of the American soldier to the limit.

Some characteristics of combat tactics and deployment contributed to this difference. During the early combat deployment, piecemeal commitment of units to the theater was the rule, not the exception. Limited port facilities, the absence of a definable battle line, and other factors dictated this approach in all four corps zones of operation. Divisional tables of organization and equipment—and particularly signal tables, were not structured to support brigades operating independently or deployed separately from a parent division.

Once ashore, these early arriving units experienced major problems in deploying to their assigned tactical areas of responsibility. Time spent in staging areas was often extended by waiting for the delivery of combat equipment through port bottlenecks and a limited number of airfields. The movement of advance parties to base camps from the staging areas resulted in tenuous and vulnerable lines of communication that often stretched the unit's organic communications capability beyond its limits. The combination of oppressive heat and stifling humidity sapped the strength of the troops and impaired the operation of sensitive electronic equipment. Even the ground itself mirrored the inhospitable nature of the country. Cultivated lowlands offered little dry ground for base camps, and the higher elevations offered a choice between powder-fine dust during the dry season and clinging red mud during the monsoons.

Major combat units were normally assigned much larger tactical areas of responsibility than those visualized in previous doctrine and training. Furthermore, their assigned areas were nothing more than large patches of ground with no discernible forward edge and, in many instances, no discernible line of communications to the rear. As a result, units tended to operate from a central base camp, extensive fire support bases, and temporary base camps established hastily in whichever direction a Viet Cong threat was developing. Extended distances, coupled with the speed of movement from one location to another, placed demanding tasks on the organic communications capability of the unit and often exceeded it.

Command and control requirements often dictated direct communications links from Military Assistance Command headquarters in Saigon to individual brigade and battalion actions conducted in the remotest regions. This requirement is difficult when battle lines are clearly drawn but often impossible under fluid combat conditions in steaming forests and rice paddies.

Security was also difficult. Friend and foe were often indistinguishable, and the secrecy of major operations was often compromised. Rapid concentration of forces in remote areas was essential but could not be accomplished under radio silence. Planning and executing major operations became a trade off between the need for concentrating quickly and the likelihood of tipping off the enemy about the operation while communicating instructions to the elements involved.

Coordination of external fire support was especially difficult. Close air support and B-52 strikes were needed where friendly and Viet Cong units were intermixed in heavy foliage or jungle cover that made identification and location difficult and limited the range of UHF (ultra high frequency) and FM radios.

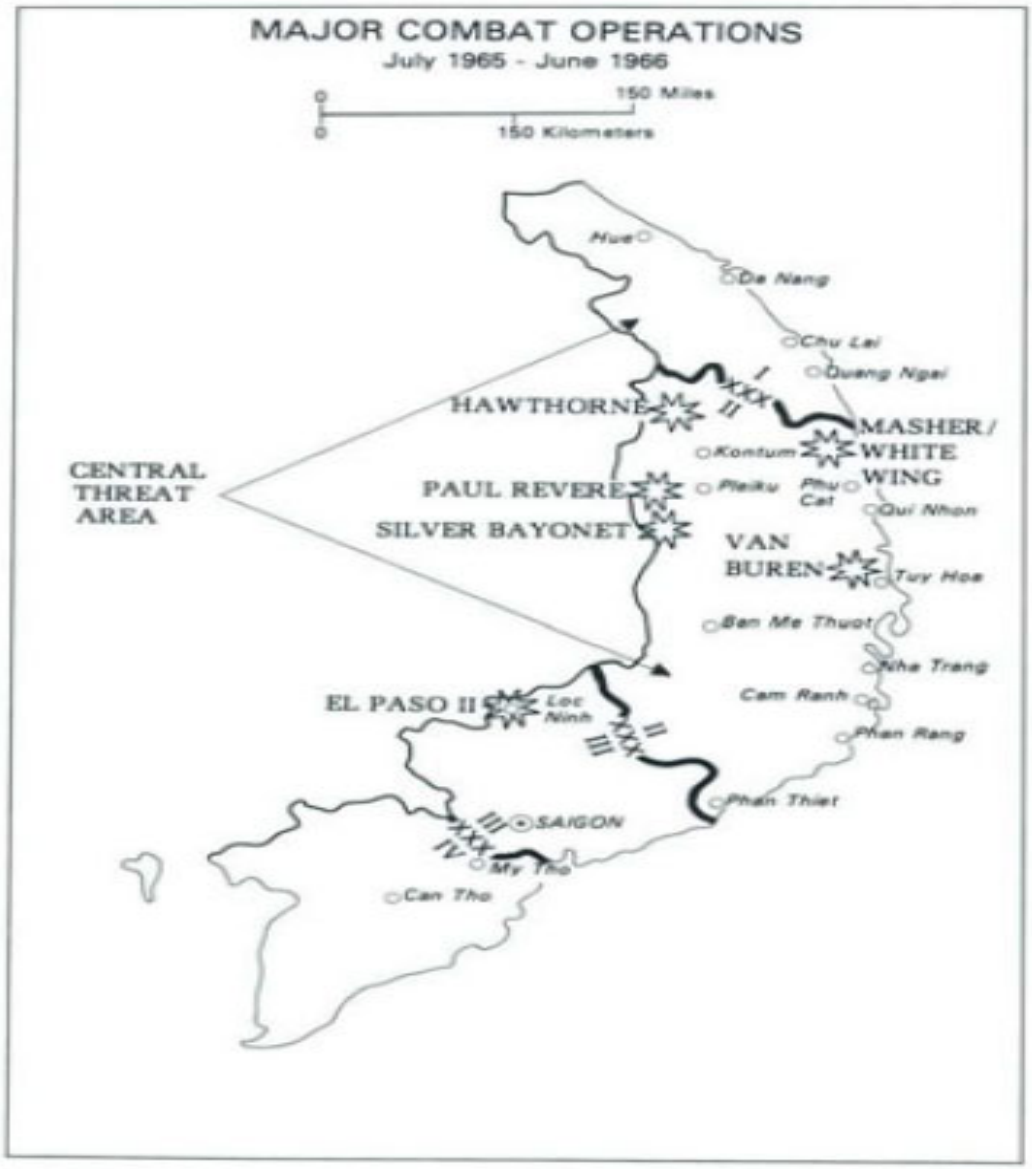
Since there were no battle lines, there were no secure areas outside base camp and fire base perimeters. Any high ground occupied as a communications site had to be totally secured, a necessity that drained combat resources sorely needed elsewhere.

The first major combat element to arrive in Vietnam, the 173d Airborne Brigade, quite early faced the problem of communicating over extended distances. The brigade's logistics base was on Okinawa, and voice communications were maintained by using organic single sideband radio equipment over a distance far beyond the planning range of this set. Early in 1965, the unit had also built an FM command and control console for mounting in the UH-ID helicopter. The use of this airborne relay in the early

days of the unit's commitment was, according to division commander Major General Ellis W. Williamson, "nothing short of fantastic." During its early deployment phase, the brigade also had to rely on the old series of FM radio equipment—a partial reason for strong dependence on the helicopter radio relay. In late 1965 this equipment was replaced with the AN/VRC-12 family and the AN/PRC-25 radios. The brigade relied heavily on high frequency radio teletypewriter between brigade and battalion; two AN/VSC-1 sets were available to each battalion. The brigade headquarters used the shelter-mounted AN/GRC-46 configuration.

The 173d was followed in rapid order by a brigade of the 101st Airborne Division, a brigade of the 1st Infantry Division, and the 25th Infantry Division. Six major combat operations involving these troops occurred during the first year of combat. Five of the six were in the central threat area. (*Map 4*)

An early communications problem which faced most of these units was that of frequency availability. Lieutenant Colonel Tom Nicholson, commander of the 13th Signal Battalion of the 1st Cavalry Division, and Lieutenant Colonel Tom Ferguson, commander of the 125th Signal Battalion of the 25th Infantry Division, both commented at length on the initial impact that the lack of adequate preplanned frequencies had on division combat operations. The 1st Cavalry Division, for example, attempted to establish and resolve frequency requirements before its departure from the United States by sending messages and telephoning to the joint headquarters in Saigon which controlled frequency assignments. Their efforts proved fruitless until the signal battalion commander personally visited the frequency control agency and joint signal officer. He resolved the problem sufficiently to begin "legal" operations in Vietnam. In the 25th Infantry Division, Colonel Ferguson felt that frequency management was nonexistent outside the division. As he saw it, U.S. Army, Vietnam, allocated frequencies to the field force headquarters, which in turn suballocated them to its major combat elements. His division, for example, was given some 8-12 discrete frequencies which supposedly were adequate to avoid any mutual interference. These same frequencies, however, were also assigned to aviation units well outside the field forces. Once helicopter or fixed-wing aircraft of these units were airborne and operating on frequencies, they saturated entire areas where the same frequencies had been assigned to ground combat units. Despite frequent pleas for an authoritative frequency management agency at the U.S. Army, Vietnam, or Military Assistance Command level, it never


MAJOR COMBAT OPERATIONS
July 1965 - June 1966
150 Miles
150 Kilometers
Hue
Da Nang
Chu Lai
Quang Ngai
HAWTHORNE
MASHER/
WHITE
WING
Kontum
CENTRAL
THREAT
AREA
PAUL REVERE
Pleiku
Phu
Cat
Qui Nhon
SILVER BAYONET
VAN
BUREN
Tuy Hoa
Ban Me Thuot
Nha Trang
Cam Ranh
EL PASO II
Loc
Ninh
Phan Rang
Phan Thiet
SAIGON
My Tho
Can Tho

MAP 4

materialized during the early days of the conflict. As a result, what generally happened was massive "bootlegging" with the ripple effect of even more mutual interference throughout the combat theater.

At the same time that the first combat units were beginning to arrive in Vietnam, the 1st Signal Brigade was activated under the command of Brigadier General Robert Terry. All signal units not organic to the field forces, divisions, or separate brigades were assigned to this brigade. Whenever a major combat unit received a mission or was assigned a tactical area of responsibility which could not be adequately supported by its organic signal means, it became common practice to augment from the 1st Signal Brigade. Views differed on how these augmentation elements should be controlled. Colonel Nicholson (13th Signal Battalion commander, 1st Cavalry Division) pointed out that these units often did not receive adequate instructions before they arrived in Vietnam and could not sustain operations. He argued strongly for the direct attachment of this augmentation to the organic signal battalion of the division and for complete control over its operations and activities by the division signal battalion commander. He stated, "Too many times it appeared as if these units were abandoned by their headquarters in that it was seldom that a senior staff officer or commander appeared to check the operations or welfare of his unit's men." Colonel Ferguson (commanding the 125th Signal Battalion, 25th Infantry Division) argued for the attachment of such augmentation to his battalion, basing his views on the fact that if this were not done there would be a split responsibility for communications in the base camp. His division comander held him totally responsible for all communications whether they were to the units within the division or to field force or U.S. Army, Vietnam, headquarters. He was dependent on augmentation from the signal brigade which, if it failed, would be considered his responsibility by the division commander. These examples of external communications support applied to nearly every division-size force in Vietnam. It seemed that all divisions needed one more fire base, one more base camp, or one more tactical headquarters to support a seemingly endless expansion of their areas of operations. They simply outgrew their signal battalions and turned for help to any other source available. The 69th Signal Battalion, which I commanded, for example, had detachments of one type or another from Hue in the north to Soc Trang in the delta. Such detachments took some of the load off the organic division signal battalions, mainly in the base camp areas. The organic battalions then could

pump more of their own resources into the immediate support of the divisions' maneuver elements, which were always in the field and always on the move. The augmentations ranged all the way from an entire company supporting the command base camp of the 1st Infantry Division at Di An to small high frequency radio detachments supporting Army and Marine elements in Da Nang and Hue. They were not division tactical communications in the strict sense, but they enabled the organic signal battalions to support more fully the combat elements of the division.

General Terry, 1st Signal Brigade commander, took an opposite view from that of Colonels Nicholson and Ferguson regarding control of these augmentations. It was his opinion that communications from the division upward to field force, U.S. Army, Vietnam, or Military Assistance Command were properly the responsibility of the 1st Signal Brigade, which had been organized specifically to provide this unquestioned control. He could not tolerate an upward communications link failure that was attributable to a 1st Signal Brigade unit at the division base camp and caused by the division signal battalion commander imposing a precedence mission or tasking on the brigade unit. As the commander responsible for these upward communications links, he had to be made aware of and approve the division's additional taskings. I shared General Terry's view. Our battalion had an entire company supporting the 121st Signal Battalion of the 1st Infantry Division in its base camp at Di An. The company worked in close and continuous harmony with the companies of the signal battalion but with the clear understanding that any tasking to that company had to come from me with the approval of the 1st Signal Brigade commander. I insisted that the company commander be fully responsive in offering assistance to the division signal battalion commander consistent with his own mission requirements, and I am convinced that this arrangement worked satisfactorily for all parties concerned.

The initial deployment of the 1st Cavalry Division to the base camp at An Khe pointed out the importance of early involvement by the division signal battalion commander in planning future command post locations. This need was well recognized by the division commander, Major General Harry W. O. Kinnard, who gave total responsibility for command post selection to the division signal officer and the G-3. Some twelve different locations within a ninety-mile radius of An Khe were physically tested for multichannel and FM radio coverage, and these sites governed subsequent command post displacements. Colonel Nicholson was

MEN OF THE 13TH SIGNAL BATTALION OPERATE AIRBORNE RELAY *to give tactical communicators more range.*

also adamant about the need for actually testing a site for communications suitability instead of drawing conclusions from a technical analysis of profiles and other paper data:

> One of the most discouraging things to me in the past was to hear some officer or noncommissioned officer say that "according to their analysis of the profile—communications were not possible"—I am a firm disbeliever of many technical charts and well designed profiles of terrain. It was a practice to actually test transmissions by transporting radio equipment to the site in question. The equipment does not have to be the entire radio relay set—in most cases a radio—of similar emission operating on the desired frequency will do the same job. There are too many variables—such as effects of tropospheric conditions, reflecting terrain features and freak conditions that make transmitting and receiving possible at places the "profile" says that it cannot be done.

The first full-scale combat commitment of the 13th Signal Battalion of the 1st Cavalry Division was in support of divisional elements during Operation SILVER BAYONET (23 October–20 November 1965) and included the battle of the Ia Drang Valley. This operation highlighted the importance of the FM airborne relay in supporting far-ranging and swiftly developing campaigns. The 13th employed a fixed-wing aircraft equipped with twelve

NUI BA DEN, JUNE 1966. *Home of Granite Romeo Tango.*

powerful FM radios. The aircraft flew in orbit at 10,000 feet over the widely dispersed combat units and retransmitted FM voice messages for most of the key command nets directing the operation.

The 1st Infantry Division faced a similar need soon after its arrival at Di An. The division adopted a more permanent variation of the relay—the mountaintop relay. The 121st Signal Battalion established a relay on Nui Ba Den, or the Black Virgin Mountain, in February 1966. The following extract from a 121st Signal Battalion news article points up the importance of the mountain and the respect it garnered from tactical communicators:

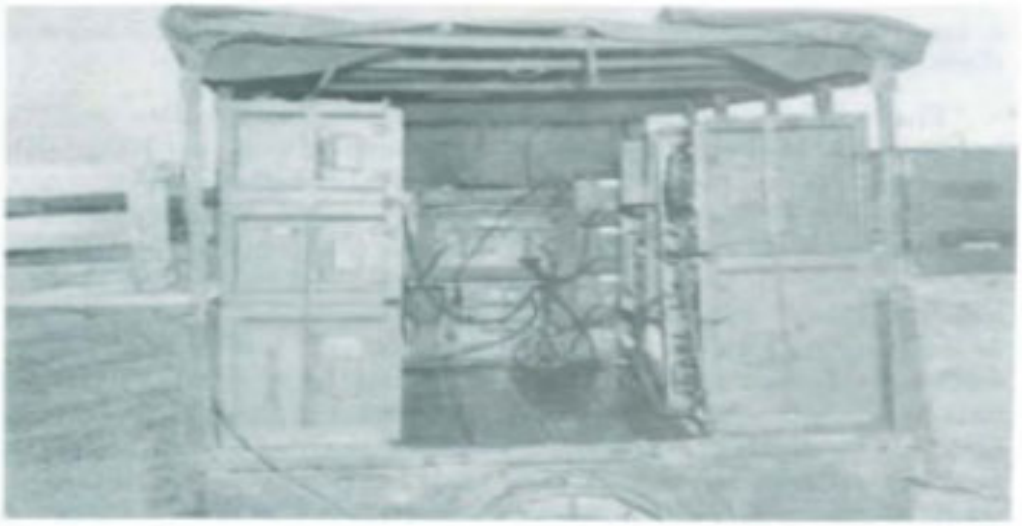
Nui Ba Den—"This is Granite Romeo Tango," has been heard by virtually every FM radio operator in the 1st Infantry Division. Granite Romeo Tango is the radio call sign of the relay site operated by Company C on Nui Ba Den mountain. Nui Ba Den, the highest point in III Corps area, has proven to be of major importance to the Big Red One for relaying VHF and FM communications. The primary mission of the eight men who run the site is to provide VHF relay for the 121st Signal Battalion and FM retransmission for the units of the division. It has also provided relay services for such units as the 25th Infantry Division, the 4th Infantry Division, the 196th Light Infantry Brigade, and Special Forces.

Although very few men in the battalion have actually set foot on Nui Ba Den, they all know of "The Mountain." Most VHF operators at one time or another have put in a shot to Nui Ba Den. When distance or terrain makes it impossible to establish communications, Nui Ba Den provides the needed boost. To many people in the division, Granite Romeo Tango

is some kind of magical FM radio station. When no one else can hear them, out of the sky comes "This is Granite Romeo Tango."

The initial combat experiences of the 1st Cavalry and 1st Infantry Divisions illustrate a communications problem that recurred in most major combat elements throughout the Vietnam conflict—the need to cover by FM voice radio a tactical area of responsibility far exceeding any encountered in previous conflicts. This expanded tactical area of responsibility, coupled with mushrooming base camps, moving fire support bases, and the need to rapidly reposition combat elements by air, burdened division-level communications. The FM command nets were the mobile backbone, and units were constantly seeking innovative ways to keep key elements "on the air." The 1st Cavalry Division solved its problem in part by an airborne relay, expensive to maintain in terms of manpower and materiel but certainly effective considering the obstacles the division faced. The 1st Infantry was fortunate in having a dominant high point such as Nui Ba Den which could be reasonably defended and which provided coverage for the division's entire zone. Later the Big Red One and other divisions erected towers to accomplish a similar purpose. Whatever the technique, the signal battalion commander had to develop something to ensure the command and control communications that the division commander needed. The signal battalion table of organization and equipment, however, was not structured to the demands of Southeast Asia. In the long run, it often boiled down to the ingenuity of the signal battalion commander in developing ways and finding means to get his all-important job done. Probably no other single thing contributed more to the success of tactical communications in Vietnam than the ability of the combat communicators to keep vital FM nets working under the near-impossible conditions that were routine throughout the war.

As the 25th Infantry Division began building its base camp at Cu Chi, it was tasked to provide communications support to the 173d Airborne Brigade during an air assault landing into Song Be. (The separate brigade-size units were frequently deployed with minimal organic communications support, and they needed augmentation if given any extensive combat missions.) The 125th Signal Battalion responded with the first helicopter lift of a 6,500-pound multichannel radio shelter and power generators to the brigade forward location. Though dropped from a height of five feet because of difficulty in determining ground level in the heavy foliage, the radio worked and provided a vital multichannel link



MRC-34½ CONFIGURATION. *125th Signal Battalion, 25th Infantry Division.*

back to brigade main at Bien Hoa Air Base. This system was relayed through Nui Ba Den by men of the 121st Signal Battalion of the 1st Infantry Division—one example of the mutual cooperation that existed among the divisional signal units throughout Vietnam. This was the first of many informal equipment-sharing arrangements between the signal troops of the 25th and the 1st Divisions.

By the end of March 1966, the 125th Signal Battalion was fully committed, supporting elements of the 2d Brigade in the Ho Bo Woods, the Plain of Reeds, and the Michelin Plantation. It became common practice to install multichannel systems down to battalion level and occasionally to an artillery battery because of the dispersion of the units and the independent nature of the missions they were assigned. This increasingly heavy reliance on multichannel radio (with no corresponding equipment augmentation to the table of organization and equipment) led to the fabrication of the highly mobile "MRC-34½'s." This terminal consisted of one twelve-channel system mounted in a ¾-ton trailer and was designed to meet the increasing airmobile demands of the division. It was far easier to move by helicopter than the cumbersome MRC-69 shelter, but once it was dropped, it remained in place except for limited repositioning by a crew of strong-backed pushers and pullers. Because of the demand for these successful fabricated airmobile multichannel terminals, the 125th had little

requirement for its high frequency radio teletypewriter equipment.

Although improvisation was commonplace during early combat for these first arriving units, much of their communications doctrine was in consonance with long-established procedures. There was little change for the sake of change alone. Colonel Ferguson's remarks on this score, which follow, generally applied to communications operations in all the units coming into Vietnam during this period:

> The communications systems installed at Cu Chi to support the division command post followed the division standing operating procedure for combat. VHF systems were installed in such a manner that the various shots could be picked up when required in an almost 360 degree fashion. Thus, when a system came in, any movement or relocation at the distant end did not require anything more than an antenna reorientation at the division command post. No further antenna erection or movement of vehicles was required. All equipment was kept mounted in the vans, ready for further movement if necessary. The HF [high frequency] radio pack was set up at a distance well away from the VHF systems to prevent radio frequency interference. The battalion MTC-3 switchboard was initially installed but this was later phased out after an MTC-1 switchboard was obtained from the 2d Signal Group. Two SB-611 patch panels were installed with all circuits wired straight through wherever possible. Circuit patching was discouraged but, unfortunately, could not be avoided. The battalion systems control tied the entire complex together by intercommunications. All in all, it was a very tightly controlled battalion-type system. The telecommunications center's MSC-29's were located close to the division command post where they could serve both the operations and intelligence sections as well as adjutant general and other interested agencies in the division headquarters.

The MSC-29 communications center terminal was one of the van-mounted items most susceptible to the high heat and humidity characteristic of the lowlands in and around Saigon where the 1st and 25th Divisions were operating. Malfunctions resulting from lack of air conditioning for this van are mentioned in numerous reports. The shelter with its teletypewriter equipment, communications security devices, and voice frequency converters was a real heat generator. In addition, the racks of equipment were very tightly packed and allowed little air circulation. The components tended to be more affected by overheating than those in other shelters. It was not unusual to find interior temperatures of 110°-120° during the day, conditions which sapped the energy and lowered the efficiency of even the most hardy and dedicated soldiers. Whenever possible, the operating signal unit dismounted

DIVISION TACTICAL OPERATIONS CENTER SWITCHBOARD, *125th Signal Battalion, 25th Infantry Division.*

the equipment and operated from tents, quonset huts, anything that would give some relief from the heat. The division base camps were relatively fixed, however, although the maneuver elements were moving constantly, so loss of mobility was not critical. Perhaps the most effective air conditioning system devised during the war, not only for the MSC-29 but for all van-mounted equipment, was the overhead grenade shelter. The sandbagged shelter, built about six-twelve inches above the roof of the communications van, provided a layer of insulating cooler air. This shelter, combined with the normal ventilating fans in the van, could reduce the interior temperature by as much as fifteen-twenty degrees—if the team chiefs kept the fan filters free of dust by daily cleaning.

One of the demands of communications units during the early days of the troop buildup was responding to the demands of rapid reliable voice circuits for the tactical operations centers. As a rule, the urgency of voice traffic generated in the center was such that the division signal battalion commander isolated it from the normal division switchboard and routed it on "hot lines" through a special switchboard. In the 25th Infantry Division, for example, two SB-22 switchboards were installed initially to handle the sole-user circuits that were needed. These switchboards soon proved inadequate, however, and a stacked SB-86 replaced them and also served the fire support coordination center adjacent to the center. By this means there was an operator to intervene immediately and render assistance if any of the hot lines developed troubles. The tactical operations centers were also a collecting point for an endless array of FM, UHF, and VHF antennas, and signal units were constantly improvising ways to consolidate antennas without reducing their radiating efficiency. The signal battalion of the 25th Infantry Division erected a sixty-foot self-supporting mast near the division center constructed from 175-mm. powder containers. Four

HIGH FREQUENCY RADIO BUNKER *at 25th Infantry Division headquarters in Cu Chi. Antenna mast was made from artillery power canisters.*

antennas were mounted on it and used simultaneously without interference. In addition to the ongoing major combat operations, there were many smaller but important actions. In these small unit operations, communications played a vital role in reporting information to higher headquarters and in securing required support. The radiotelephone operators in small combat teams not only provided vital communications but also performed their share of valorous acts. One of the most notable was the action of Private First Class Stephen Laier of Fort Wayne, Indiana, on 4 February 1966 near Lai Khe. His 1st Infantry Division citation for valor reads, in part, as follows:

> Private First Class Laier was serving as radiotelephone operator on a platoon ambush patrol. . . . The patrol encountered claymore mines and intense small arms fire. Private First Class Laier lost both legs due to a blast from a claymore mine and his radio was knocked off frequency.
>
> Although suffering intense pain, he was able to maintain consciousness and to recalibrate his radio. . . .
>
> Realizing that dustoff (medical) helicopters could not land due to small arms fire, he directed reinforcements to his location by continuous radio contact.
>
> Continuing to fight off unconsciousness, Private First Class Laier continued his heroic actions by directing dustoff pilots to the proper landing zone and called them in one at a time . . . so his wounded comrades could be evacuated.

Having saved the remaining patrol members, Private Laier was evacuated to a field hospital where doctors worked night and day to

save his life. He told doctors that during the combat action he had kept going because he knew that he was the only man still alive in the patrol who was trained to use the radio. Private Laier died fifteen days after the fight. The division commander, Major General Jonathan O. Seaman, reportedly wrote a friend, "This is one of the bravest soldiers I have seen in thirty years as a soldier."

A veteran war correspondent wrote of the incident, "A young infantryman named Stephen Laier has shown in fifteen pain-filled days that in some men the only limit to courage is death. The courage of Laier . . . almost defies comprehension by men who have never been wounded in battle."

CHAPTER IV

Shift to the Offensive

The arrival in Vietnam of five more major combat elements in a six-month period beginning in August 1966 enabled the allied forces to shift to the offensive. As this second year of combat for U.S. Army forces began, the 1st Infantry Division under its new commander, Major General William E. DePuy, was winding up Operation EL PASO II. Planning for this operation had started long before 2 June 1966—the day the operation began—and much of it hinged on the resolution of some knotty communications problems. To begin with, the 121st Signal Battalion could not start to handle the extensive deployment planned for EL PASO II because large quantities of its equipment were tied up supporting the large base camp complex at Di An. To take this base camp load off the organic signal battalion (the 121st), the 595th Signal Support Company, attached to the 69th Signal Battalion, was directed to deploy to Di An and assume most of the base camp communications mission, but it remained under the command of the 69th.

The arrival of the company at Di An was a tragic one. On the first evening, before the men had completed the sandbag revetments around their tents, a 155-mm. artillery round from a fire mission directed against the outer perimeter of the camp fell short and burst in the company street between the 595th and Company A of the 121st. Several men of one platoon were wounded severely and one was killed. One man was left unhurt but in a state of shock when a two-inch shell fragment went through his pillow. As the commander of the 69th, I visited the company early the following morning. The general purpose medium tent close to the burst was totally shredded, and the platoon that suffered the casualties was understandably depressed. The burst had been a rude shock for a unit going to its first real communications assignment.

Despite this initial adversity, the 595th went systematically about its business of working with the 121st to take over the base camp communications. Multichannel links to replace those of the 121st were installed to Saigon and to the neighboring Korean division. Cable systems and wire frames were installed and

maintained to replace the 121st systems. The base camp switchboard and patch panel were installed and operated by the 595th, leaving only the tactical operations center communications to be operated by the 121st. The 121st was thus able to devote all its energy and resources to planning for EL PASO II. In this and other instances where the 69th was providing support to division or brigade base camps, it was standard practice to off-load all shelters and dig them in quickly. These base camps were permanent, and the trucks on which the shelters were mounted were more of a liability than an asset. There were many side benefits of off-loading besides the obvious one of protection. The trucks could be used for general purpose hauling and were easier to maintain. Access to the shelter was easier and safer. The unairconditioned shelters were cooled by mounting a heat shield above the shelter roof.

The assistance of the 595th freed the necessary communications equipment to support EL PASO II, but it didn't solve the pressing problem of packaging and mobility. The battalion adopted the same technique that the 25th Infantry Division had employed successfully. The VHF multichannel AN/MRC-69 vans were modified. One stack of AN/TRC-24 radio equipment and one stack of AN/TCC-7 carrier equipment (one-half the capability of the AN/MRC-69) were removed from the 2½-ton truck shelter and installed in a ¾-ton trailer. The modified set, termed the MRC-34½, proved highly effective in providing VHF systems from forward areas back to base camp areas. Also, because it was lighter and less bulky than the AN/MRC-69, it could readily be airlifted into any forward area.

EL PASO II deployed all the division and brigade command elements to the field over an immense tactical area of operation and for an extended time. Ten separate command post locations (forward and rear for each of the three brigades, plus division artillery and the division headquarters) were supported simultaneously. Many of these were inaccessible by road; but the light, helicopter-transportable MRC-34½ was airlifted in, and EL PASO II was well supported.

As the scope of the 1st Infantry Division's operations expanded, more and more communications innovations appeared as the tactical signalmen labored to keep pace with General DePuy's aggressive leadership and penchant for establishing tactical command posts and fire bases wherever action was heaviest. Nui Ba Den, the only mountain of any size in the division's tactical area of responsibility, provided relay for many long multichannel shots to forward command post locations. But one elevated point was not

enough to accommodate the relatively flat and heavily forested terrain throughout the area. Although not normally found on the signal battalion table of organization and equipment, a number of fixed towers began to appear at critical points. The towers were generally two standard issue items—the 45- to 65-foot AB-577 and the AB-216 which could be erected to over two hundred feet. Seldom did anyone ask where these unauthorized towers came from, but for the 1st Infantry Division and other major combat units they were the answer to the communicator's prayer for keeping VHF and FM systems on the air.

On occasion, the towers did double duty. A 121st Signal Battalion yearbook carried a story of the largest Christmas tree in South Vietnam. To celebrate the battalion's second Christmas, the men of Company A decorated the 120-foot tower at Di An base camp with countless strings of colored lights and placed a huge star on the top. With the Big Red One communicators gathered about the tower, the commanding general of the division commended them for their outstanding work as communicators and, at the conclusion of his remarks, officially lit the "tree."

By using a combination of towers and ground or air-transportable shelter configurations, the 121st Signal Battalion installed, operated, and maintained a backbone multichannel trunking and switching system. The system interconnected the division main command post at Di An with the brigade main command post at Phuoc Vinh. It also interconnected the brigade command post and the division's forward command post at Lai Khe. It tied in the division support command and the brigade headquarters located at Di An and maintained a jump capability to tie in division and brigade tactical command posts when deployed, which was rather frequently. To gain worldwide access over this system, the 1st Signal Brigade brought in twenty-four channels of communications to Di An and Phuoc Vinh. They were terminated by the 595th Signal Company and tied the division into the entire 1st Signal Brigade system and the Defense Communication System (DCS). For switching, an MTC-1 was used at division headquarters and SB-86's were used at the division forward and the brigade command posts. Primary users of the system were the chief of staff and other staff members. The system was not very dependable because of the manual switching and because division headquarters was sometimes split three ways, between its division main, forward, and tactical command posts. The division commander, the assistant division commanders, and the brigade commanders seldom used the multichannel system other than the

dedicated trunks to the tactical operations centers. This multichannel trunking and switching system worked, but operations were marginal at best. Getting through the manual switchboard was a chore. Switchboard operators were rotated frequently: after a month or two their efficiency and ability to cope declined considerably.

That the division and brigade commanders were frequently airborne, moving by helicopter from area to area, placed the main burden of command communications on the FM radio nets. Each of the commanders had a helicopter equipped with two AN/VRC-12 series radios, and the division commander kept his on the division and brigade nets. He also needed to monitor the various maneuver battalion nets, so a further innovation was required. The command helicopter console was modified to take a third AN/VRC-12 with push-button tuning for preselected channels. Thus the commander's aide could very quickly give him a brigade net on the second radio or a maneuver battalion net on the third radio, or both.

Because of the extensive maneuver area of the 1st Division, a highly dependable FM command net was essential. This net, however, required an automatic retransmission station, which was also placed on top of Nui Ba Den. The position was fortified because the enemy held all but the summit where the station was located. But he seemed satisfied to leave the position alone, and even shared a waterhole on the mountain with station personnel.

General DePuy fully recognized the need for good communications to support the division's concept of highly mobile operations and his need to be near the critical action. Whenever intelligence indicated as enemy buildup, the commanding general would call a conference—at any hour—of key staff officers, and he always included the division signal officer. The choice of the command post location was made by the G-3 and the signal officer together, with the commander giving his approval only after he had been assured that it would accommodate the required communications to support the operations. He would then ensure that sufficient helicopter support was available to move the essential communications equipment into the location. With this high priority given by the division commander, the signal battalion was always able to get the communications in when and where the commanding general wanted them.

A peculiar facet of tactical communications in South Vietnam was the slow acceptance and, in many instances, the limited use of radio wire integration (RWI), a system that interconnects an FM

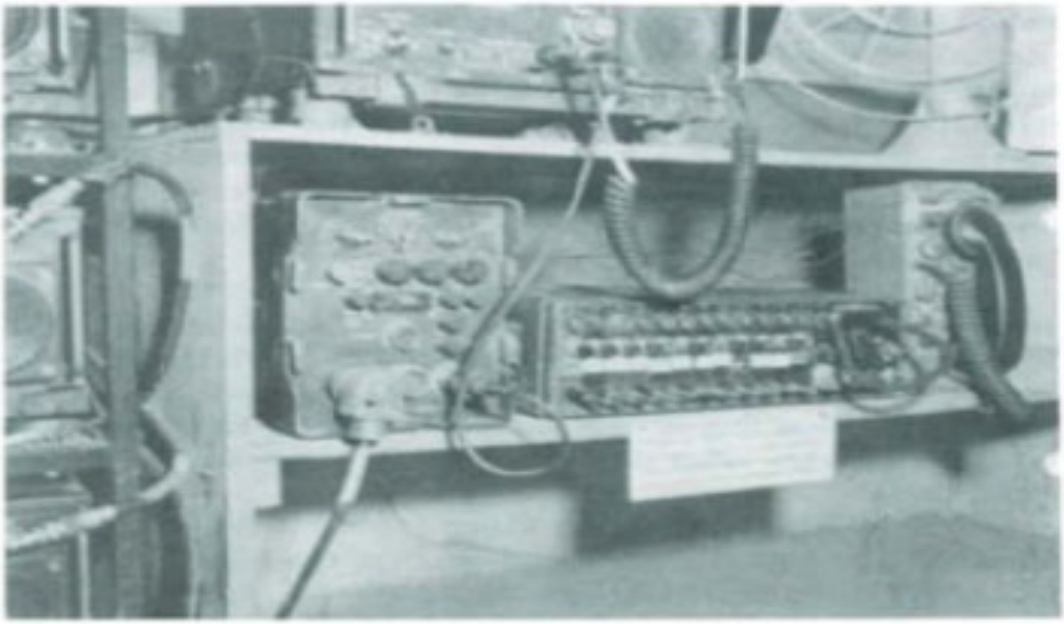
radio subscriber with a telephone subscriber through one or more manual switchboards. Every tactical signal unit was authorized radio wire integration equipment, but there seemed to be an initial reluctance to put it to general use. As the scope of tactical operations expanded, however, and direction of ground operations by division, brigade, and battalion commanders from helicopters became the norm, the need for a system became paramount in many combat units.

The Big Red One was no exception; when Lieutenant Colonel James M. Rockwell assumed command of the signal battalion in September 1966, he found no meaningful radio wire integration system. It was fortunate both for Colonel Rockwell and the 1st Infantry Division that he was experienced in tactical integration systems and knew what they could offer an aggressive airmobile commander.

Before he went to Vietnam, Major Rockwell, as the executive officer of the 69th Signal Battalion, was involved in exercise GOLDFIRE with the U.S. Strike Command at Fort Leonard Wood, Missouri. The battalion provided exercise communications for Brigadier General Bob Paulson, the U.S. Strike Command J-6, over an area even larger than the tactical area of responsibility of the Big Red One. A key requirement for the exercise was an extensive radio wire integration network spanning the whole area via a series of some eight 200-foot towers, all erected by the battalion. Radio wire integration calls throughout the area peaked at close to ten thousand per day at the climax of the exercise. It was, therefore, relatively easy for Colonel Rockwell to spot the need for such a system, knowing the personality and modus operandi of the 1st Division commander, and to start developing it. It was easier said than done, however, as he related:

> Naturally, I was not about to announce to the division that we had an RWI system until I was certain it had been installed and was fully operational, so we had several weeks of tests....Finally I was convinced that we had a good operational system and was prepared to announce it at one of the evening briefings when the following incident occurred: I was aloft with General DePuy . . . and a call came in on the FM command net from the division TOC stating that General DePuy was to call the II Field Force commander by telephone ASAP.

The system was explained to General DePuy and he attempted to put the call through from his helicopter, but there was no response. They then had to fly back to division forward to put the call through. That evening, after some friendly chiding at the staff



RADIO WIRE INTEGRATION STATION. *125th Signal Battalion, 25th Infantry Division.*

meeting about the excellence of the system, Colonel Rockwell went immediately to the base camp to determine the problem, which was

> . . . the operator who, when he found that General DePuy himself was placing the call, got panicked and just clammed up and was afraid to respond. Well that was easily fixed and about a week later we were again aloft and again had to make a telephone call. This time *he* [General DePuy] suggested that RWI system. We initiated the call and it went through beautifully.

This instance sold the division commander on the system, and soon the assistant division commanders, brigade commanders, and staff were introduced to it and became frequent users. It was even made available to maneuver battalion commanders, who became prime users. They soon learned that when isolated in the middle of the jungle they could go through their AN/PRC-25 radios to communicate with their staffs. The G-4 found it especially valuable in communicating with his people, who might even be back in Saigon on the docks, to improve resupply operations.

A never-ending source of further improvisation by the tactical signalmen was antennas for the FM radios. As demands for FM coverage broadened, ingenuity often bordered on the fantastic. The

4th Infantry Division, arriving in the Central Highlands in late 1966, contributed its bit to Vietnam FM folklore. Shortly before arriving in Vietnam, the division received the new AN/VRC-12 series and the AN/PRC-25 radios. After arriving the division received the new KY-8 voice security equipment for use with the VRC-12 series. The AN/PRC-25 was a big improvement over the AN/PRC-10, providing increased range and eliminating calibration problems. The KY-8, on the other hand, although it provided complete voice security, also reduced the transmission range of the radios. Whenever a battalion of the division was deployed a great distance from the command post, an RC-292 antenna was usually erected. This antenna in conjunction with the AN/VRC-12 series and the KY-8 combination provided good, secure communications over all distances the division covered in its operations.

The short antenna (AT-892/PRC-25) was the most commonly used and reliable for units moving in the jungle and dense terrain. Communications within a company presented no problem when it was used. The antenna, however, even though quite short, drew fire, and the radio operator became a target for snipers. To counter this activity, units simply reversed the radios on the backpacks so the antenna pointed down. This procedure didn't seem to affect the range of the radio. The long antenna ((AT-271) provided more than adequate capability for the company to communicate with the battalion when operating within a 105-mm. artillery fire fan from the battalion fire base. When operating beyond this range or when high ground separated the company and battalion fire base, the company used an RC-292 antenna. In the mountains of the II Corps area, using this antenna was a simple matter because only the head of the RC-292 was required. A soldier could climb a tree and secure the head to the treetop, and the RC-292 would provide more than adequate radio communications range. Field expedient antennas were also successful. The best was the vertical half-rhombic, which was easy to assemble and install on the mountains. On several occasions, companies were able to transmit and receive over distances of twenty-five miles using this antenna.

Perhaps one of the best examples of individual courage coupled with effective use of FM in a combat operation occurred within the 27th Infantry (Wolfhounds) of the 25th Infantry Division during Operation ATTLEBORO in late 1966 in War Zone C. This major operation saw some hectic fighting as the 9th Viet Cong Division, in a rare change of tactics, stood and fought. The commander of the 1st Battalion, 27th Infantry, commanded eleven rifle companies deployed around a rough landing zone in the dense jungle near the

Michelin Plantation. The commander, Major Guy S. Meloy, was using an AN/PRC-25 radio with the short antenna. He could talk with his units, but initially he had difficulty relaying information to supporting elements through his radio-equipped (AN/VRC-12) vehicle which he had left near the artillery position at Dau Tieng. Heavy enemy fire had pinned down his command group and most of his initial force. Sergeant First Class Ray Burdette, the battalion operations sergeant, assembled an RC-292 antenna while prone under fire. With the help of another soldier, he muscled it up to the vertical and leaned it against a tree. Using this propped-up antenna, the AN/PRC-25 radio could reach the AN/VRC-12 radio location. With this relay and the temporary help of the forward air controller overhead, external support was obtained as needed.

Major Meloy received his additional units, controlled his oversized force, secured artillery and air support, and arranged medical evacuation and resupply through the radio nets. For two and a half days the two forces slugged it out in the heavy overgrowth. Radio transmission remained good throughout the rest of the fight and assisted in the coordination of the linkup as other American forces moved in. Radio had been the only link between Major Meloy and many of the unit commanders who fought this battle under his control.

The 1st Infantry Division also counts as one of its top heroes a communicator who helped turn the tide of battle for his unit during this same operation. The citation which accompanied the posthumous award of the Medal of Honor to Captain Euripides Rubio, Jr., for conspicuous gallantry and intrepidity at the risk of life above and beyond the call of duty, reads in part as follows:

On 8 November 1966, Captain Rubio was serving as Communications Officer, 1st Battalion, 28th Infantry, 1st Infantry Division, in Tay Ninh Province, Republic of Vietnam, when a numerically superior enemy force launched a massive attack against the battalion defense position. Intense enemy machine gun fire raked the area while mortar round and rifle grenades exploded within the perimeter. Leaving the relative safety of his post, Captain Rubio received two serious wounds as he braved the withering fire to go to the area of most intense action where he distributed ammunition, reestablished positions and rendered aid to the wounded. Disregarding the painful wounds, he unhesitatingly assumed command when a rifle company commander was medically evacuated. Captain Rubio was wounded a third time as he selflessly exposed himself to the devastating enemy fire to move among his men to encourage them to fight with renewed effort. While aiding the evacuation of wounded personnel, he noted that a smoke grenade which was intended to mark the Viet Cong position for air strikes had fallen dangerously close to the friendly lines. Captain Rubio scooped up the grenade, ran through the deadly hail of fire

to within 20 meters of the enemy position and hurled the already smoking grenade into the midst of the enemy before he fell for the final time. Using the repositioned grenade as a marker, friendly air strikes were directed to destroy the hostile positions. . . .

Throughout all major combat units and in nearly every major operation the ingenuity and courage of the FM radio operator counted again and again. The FM command net was the life line, often one that had to be sustained despite the staggering obstacles of extended distances, excessive net congestion, and near-impenetrable vegetation. Many of the "jury-rig" antenna lash-ups would defy technical logic or explanation, but they enjoyed one common overriding characteristic: they worked, and battles were won.

Like all wars, the Vietnam conflict had its moments of humor. Major General John Norton, commander of the 1st Air Cavalry, initiated a small communications experiment to revive the ancient technique of carrier pigeons. He directed his signal officer, Lieutenant Colonel Walter J. Bodman, to carry it out; and two pigeons, Ralph and Suzy, were obtained. The designated pigeoneer was Chief Warrant Officer James S. Steven, Jr., probably the last of a vanishing breed.

During Operations PAUL REVERE IV and THAYER II in the Binh Dinh and Pleiku provinces, an intelligence officer from the 2d Brigade spied Suzy, with a capsule attached to her leg, sitting on a wire. Not knowing of the commanding general's experiment, he summoned a trooper who shot the supposed Viet Cong messenger pigeon. The intelligence officer rushed eagerly to the fallen bird and unfolded the thin paper rolled up in the capsule. It began, "To the Commanding General, 1st Cavalry Division. . . ." About the same time, Ralph was reported as either AWOL or missing in action, and the short-lived experiment ingloriously ended.

During 1966–early 1967 occurred the only activation of a major combat unit in Vietnam—the Americal Division. This division would operate in the I Corps zone and relieve the III Marine Amphibious Force and other marines in the Chu Lai area. The 1st Signal Brigade provided troops and equipment to form the provisional signal battalion to support this new division. Men and signal rigs of all types were pulled from four separate battalions and two separate companies; they went by road to Tan Son Nhut, Bien Hoa, Pleiku, and Nha Trang air bases for air movement to Chu Lai, where the battalion formed. The battalion was committed immediately, with no opportunity to pull these diverse personnel together as a cohesive unit. The situation was

compounded by the delayed departure of Marine Corps ground units in and around Chu Lai, a delay which resulted in shared communications facilities and joint operations of switchboards and communications centers during the transition. The organizational and training problems encountered by this signal battalion during its formative period were probably without equal during the war. That the battalion was able to provide good communications support to the newly formed Americal Division is a tribute to Lieutenant Colonel Edward A. Ford, the first commander, and to the diverse signal personnel who rapidly learned to work together as a unit. The signal battalion and the communications platoons of the infantry brigades found themselves overequipped and overmanned—a far cry from early experiences of units who were often required to deploy to Vietnam with acute shortages of equipment and personnel.

In the early spring of 1967, the first combat parachute drop since the Korean War took place, and it was not without its communications problems. Operation JUNCTION CITY was a major encirclement operation of War Zone C, and one of nine infantry battalions placed in blocking positions was dropped by parachute. A security cover plan had been devised to conceal the identity of the drop zone until the last possible moment. Planning was based on another location with somewhat similar characteristics. The signal officer involved did not learn of the true location until two days before the jump.

Visual communication devices played an important part in the assembly of the paratroopers after the jump. Initially smoke was thrown to give direction to those soldiers who had become disoriented during descent. During assembly both smoke and small gas-filled colored balloons were used to aid jumpers in quickly finding the assembly area of their units.

A heavy drop of equipment and supplies began at 0925 and continued into the afternoon. Various types of supplies were identified by differently colored cargo chutes attached to the containers. The brigade communications equipment was included in the heavy drop.

Initial communication at the drop zone was by AN/PRC-25. By using the RC-292 antenna, FM communications were established to the 1st Infantry Division forward at Minh Thanh. Three heavy drop loads of communications equipment arrived on the drop zone intact. Each load could establish austere communications for a tactical brigade command post. The

condition of the ground in the drop zone, however, precluded the use of this equipment. As soon as the vehicles were de-rigged and driven away, they became hopelessly mired. They remained in the drop zone until late in the afternoon, when armored personnel carriers from Company D, 16th Armor, became available to pull them out. Early in the afternoon on D-day, CH-47 helicopter sorties delivered VHF radio equipment, high frequency radio teletypewriter, secure teletypewriter, and FM radio shelters. Shortly after the arrival of this equipment, VHF communications were established to the 1st Infantry Division forward and provided telephone circuits from the brigade forward command post to task headquarters and telephone circuits to Bien Hoa. Wire was laid to all units in the objective area before nightfall. This was the first time it had been possible to establish wire communications to all subordinate units, and it was possible because all units were deployed within three kilometers of the brigade command post.

The best synopsis of what these years of communications innovation and experience meant to the major combat elements is perhaps given in the remarks of Major General Frederick C. Weyand as he reflected on the accomplishments of the 25th Infantry Division:

> During the past year of combat in Vietnam, the 25th Infantry Division has constantly sought to improve its effectiveness in the fundamental capability to move, shoot, and *communicate*. Our operational planning gives specific attention to the command locations that will provide the most effective control. We are on guard to insure that communications, the means by which comand control is achieved, is not shunted aside or neglected at the expense of a portion of the tactical plan. My communicator [signal officer] is included in the planning cycle but that, of course, is not the whole story. The communicator during an operation must possess the capability to modify the plan to meet the unforeseen. He must continually keep abreast of the tactical situation to install or re-route VHF systems, follow up to reduce message backlogs, monitor circuits to insure topnotch quality, and all the other numerous tasks connected with "getting the message through."
>
> The modern communications systems employed in support of our operations extend, as never before, the voice of the commander on the battlefield. Appreciation of this vast network is perhaps never greater than when a beleaguered tactical commander is able to call for and have artillery fire and airstrikes on target within a few minutes. The responsive Signal Corps systems that save valuable seconds have doubtlessly saved lives also.
>
> To be without reliable communications at critical moments could easily afford the enemy the momentary advantage he seeks. I congratulate

all of the communications personnel in Vietnam for their unceasing efforts to provide our tactical commanders an unfailing means of exercising command and control.

CHAPTER V

Riverine Operations and the Cambodian Incursion

General Creighton Abrams's assumption of command of the U.S. forces in Vietnam in July 1968 presaged major changes in the direction of American efforts there. These changes came in no small part from President Johnson's decision in March not to enter the presidential race and a resulting push toward a negotiated peace and American withdrawal.

By and large this push posed no problems in division-level communications that had not appeared in earlier tactical operations. Two exceptions were riverine operations in the rice-rich delta region south of Saigon and incursion into Cambodia. Both called for exceptional ingenuity and perseverance from tactical communicators.

Riverine Operations

The Mobile Riverine Force was conducting Operation CORONADO I in the delta region as the third year of combat began. The 2d Brigade of the 9th Infantry Division, commanded by Colonel William B. Fulton, combined with the U.S. Navy's River Assault Flotilla One, made up the force. The 9th Division established an advance command post at Dong Tam from which the assistant division commander normally operated. A 204-foot AB-216 radio antenna tower enabled him to receive radioed instructions from the division commander and to pass on instructions to the Army element of the Mobile Riverine Force and other units operating in the region. Swamps and heavy jungle of the delta region forced the tactical units to rely on small craft as primary transportation for conducting operations. It was the 2d Brigade's responsibility to patrol waterways, searching out and destroying the enemy.

The brigade soon learned that transportation was not its only problem. Because of the relatively flat terrain and a large operational area that was predominately swamp and heavy foliage, line of site communications were difficult at best. Few areas existed

in the delta which could support radio relay and retransmission stations. The joint riverine operations were relatively new, so there was no communications experience from which to draw. Communications facilities seemed plagued from the outset, and innovation became the order of the day.

ROTATABLE ANTENNA. *9th Signal Battalion, 9th Infantry Division.*

The USS *Benewah*, which was outfitted in the Philadelphia Navy Yard, was the home of the brigade and the flagship of the flotilla. It was far from ideal for communications. Space was limited, and the compartment set aside for housing the brigade communications equipment was too small. Only one twelve-channel VHF system (TRC-24, TCC-7, TCC-20) could be installed; it linked the brigade headquarters aboard the *Benewah* to the division headquarters ashore. When the VHF system failed, FM and HF radio provided the only communications to the division.

There were also problems with installing antennas. The majority of the antennas were installed on the restricted space of the ship's superstructure. The closeness created frequency interference and in some instances complete blockage of radio communications. Operators of the VHF system found that antenna problems were further compounded by the ship's drifting at anchor, which disoriented the highly directional TRC-24 antenna. The 9th Signal Battalion obtained two UHF omnidirectional antennas that were normally used with the VRC-24 air-ground radio. Mounting and coupling one omniantenna to the TRC-24 receiver antenna and one to the transmit antenna kept signals from fading, and communications were possible regardless of the ship's position.

As the 9th Division refined its operations, a 200-foot AB-216 communications tower made tracking the *Benewah* easier, but the procedure was still cumbersome and tricky. It required two men to climb atop the tower, located at the 9th Infantry Division base camp, and rotate the AN/TRC-24 antenna in accordance with instruction received from an operator inside the VHF shelter on the

ground. The ground operator watched his receive-strength level meter and directed movement of the antenna to get a maximum signal level reading. This procedure was extremely dangerous because of the high frequency voltage on the transmitting antenna and the antenna height. During the monsoon season the problem of tracking the *Benewah* was further compounded by high winds and rain, which increased the possibility of serious injury to the men on the tower. To solve this problem, a rotatable antenna was constructed from scrap antenna mast sections, and a heavy-duty antenna rotor was obtained from the division Military Affiliate Radio System (MARS) facility. The rotor was controlled from the ground with an antenna control box. Two lengths of spiral-four cable provided the necessary rotor power. Initially a step-up transformer was used to compensate for the high line loss incurred through the use of the spiral-four cable. Experimentation showed that cable of less than two hundred fifty feet could be used with the rotor without too much voltage loss. Extensive modification eventually produced a basic antenna mount and fastener arrangement which was stable and simple to erect. The 9th Signal Battalion constructed and installed two such rotatable antennas.

Space was limited in the tactical operations center. An SB-22 switchboard cut down on the number of instruments needed, and FM radios serving the center were remoted through a patch panel to give the subscriber in the center access to multiple nets from his one remote station.

Multichannel communications between the battalions and the brigade were provided by smaller, lighter equipment. The GRC-10 radio and TCC-3 multiplex equipment provided four voice channels between the *Benewah* and the battalions. These VHF transmissions, as well as the TRC-24 transmission to division, terminated on the brigade switchboard.

The Navy normally hard-wires all its communications equipment, so reconfiguring circuits is difficult. For the brigade, with its ever changing communications requirement, this system just would not suffice. On the request of the brigade signal officer, the *Benewah* was refitted so that the operator could patch equipment temporarily where it stood. This arrangement saved time by allowing the operator to bypass faulty equipment and patch inoperable equipment as needed; communications circuits could be rerouted quickly aboard ship.

Original plans for telephone switching called for a twelve-line capacity SB-22 switchboard, which proved to be unsatisfactory. Even after the installation of a stacked (additional jack field sec-

tion) sixty-line SB-86 switchboard it was not uncommon to find all cords in use during peak traffic hours. The SB-86 provided switching for all radiotelephone circuits as well as internal telephones aboard the ship. Messengers who delivered correspondence aboard ship by foot and between ships of the flotilla by launch reduced switchboard traffic.

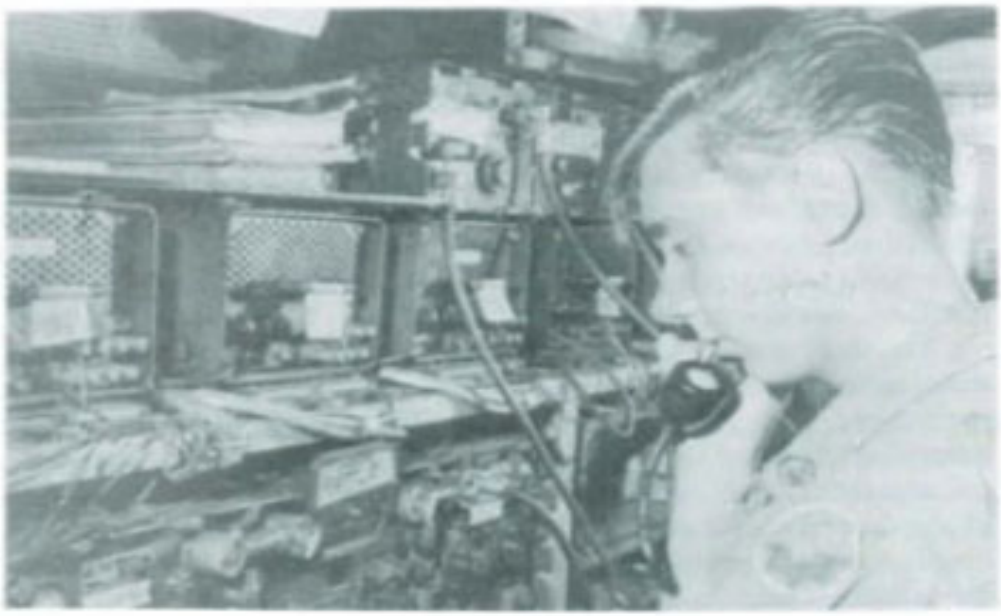
Infantry maneuver elements of the brigade relied extensively on FM and HF single sideband radios. Those conducting land operations used the manpack PRC-25 radios; those aboard barracks ships, attack boats, command and control boats, and monitors normally used the AN/GRC-106 and the VRC-12 series. FM communications were provided to the widely dispersed maneuver elements operating beyond normal radio range by VRC-49 retransmission units installed aboard command and control boats and by airborne relays. Radios installed in command and control helicopters allowed the brigade and battalion commanders to take advantage of altitude for increased line of site communications.

Communications maintenance facilities for the brigade were also afloat; an electronics maintenance team from the division maintenance team from the division maintenance battalion was located aboard the USS *Askari* to repair equipment there when needed.

It was not common practice within the division to establish a division alternate. The extra equipment was used to install a second multichannel system between division main and the brigades (excepting the 2d Brigade, located aboard the *Benewah*) as a hedge against enemy attack or other unforeseen troubles.

Division standing operating procedures called for four sole user circuits to brigade—three voice circuits, one from the division G-2 to the brigade S-2, one from the division G-3 to the brigade S-3, and one from the division artillery element in the tactical operations center to each artillery battalion; the fourth circuit was from the division communications center to the brigade communications center by teletypewriter. These circuits were split between the two parallel multichannel systems, so spare channels were available should one system fail. Circuits could be rerouted at the patch panels within one or two minutes. Since only the 9th and elements of the 1st Signal Brigade were using the TRC-24 vans in this area, U.S. Army, Vietnam, allowed the division signal officer to coordinate multichannel frequencies. Interference was as a result practically nonexistent.

The division also placed great command emphasis on using systems control and technical control to ensure greater reliability.



AN/GRC/TCC-3 MULTICHANNEL EQUIPMENT *aboard the Benewah.*

SB-22 SWITCHBOARD *aboard the Benewah.*

One technique was to tie channel 12 of the TRC-24 systems into an SB-22 switchboard at systems control for circuits terminating at division headquarters and at technical control for those terminating at the forward area signal centers.

As the division gained more experience in riverine operations, the 2d Battalion commander found that a single command post aboard the *Benewah* would not suffice. He established a forward command post with the command post of the 3d Battalion, 34th Artillery, his direct support unit, aboard a medium landing craft.

The only normal communications with that artillery battalion floating command post were FM; telephone communications to the brigade forward command post were badly needed. The signal battalion obtained a medium landing craft, installed a VHF terminal aboard it, and tracked the boat from the *Benewah* as it moved along the rivers and canals with the brigade forward command post landing craft. The forward command post was activated only when the landing craft was beached or anchored, and telephone communications were required only at those times. The VHF radio system, however, was maintained at all times; anchoring or beaching the multichannel boat alongside the brigade command post boat, passing a twenty-six pair cable across, and hooking the telephones was a simple procedure.

As the enemy modified tactics to counter the success of the riverine operations of the 9th Division, the division also modified tactics by placing one battalion ashore to conduct airmobile operations in coordination with the riverine operations being carried out by the remainder of the Riverine Brigade. Fire Support Base TIGER II, approximately seven kilometers south of Ben Tre, was the location of the shore battalion headquarters and one company. The other companies were located in small fire support bases five or six kilometers from Ben Tre, which was in the heart of the enemy infiltration area. A four-channel VHF system provided communications between battalion headquarters at Fire Support Base TIGER II and the brigade at Ben Tre. The battalion communicated with the companies in the small fire support bases by wire. Experience had shown that despite doctrine, wire could not be used because the Viet Cong would cut it as soon as it was put in. In this case, however, but for one exception the spiral-four cable proved effective even though there were larger numbers of the enemy operating in the area.

The geography of the delta region posed some special problems for the communicators of the 9th Division. One of these was grounding. Multichannel and telephone equipment routinely

produced noisy communications twice a day, at low tide. During high tide the water table was one foot below ground level; at low tide, thirteen feet. Of various methods attempted to solve the problem, one success was welding a large quantity of scrap metal together and burying it below water level at low tide. A long ground rod welded to the scrap metal and extended to above ground level provided a connecting point.

A special problem for photographers was the absence of virtually any clean water. Water provided by engineer manned water points and later the base water system left spots on film and prints from sediment. Filters used by the engineer water points were in short supply and could not be spared for photographic usage. A paper filter, found in use at the helicopter rearm and refuel points initially proved unsuccessful, but water run through the filter in the reverse direction from that specified for fuel came out clean and clear. A filter assembly was installed at the photo lab, and a new problem developed—everyone came there to get good drinking water.

At no place in Vietnam was the need for towers to gain antenna elevation and extend range more critical than the delta. The extremely flat terrain afforded no natural elevation where FM and VHF radio antennas could be installed to increase their range. Towers were the solution, but steel towers were in short supply. Eventually U.S. Army, Vietnam, located a few 300-foot towers installed at navigational aid sites. These were offered to the 9th Division for the dismantling and transportation. Two towers were dismantled and moved to division headquarters with the assistance of a Navy large landing craft to transport heavy items. The basic plan was to install 78-foot towers at selected battalion base camps to raise FM and VHF radio antennas. Battalion commanders resisted; they felt that the required red aircraft warning light would provide a perfect aiming stake for enemy mortarmen. After considerable persuasion, one battalion commander agreed to let the signal battalion build a tower at his base camp. He broke the ice, and the towers cropped up at other locations throughout the division to give the communicators a much needed boost in getting some of their very demanding VHF links.

Cambodian Incursion

As American withdrawal continued through 1969 and early 1970 the enemy buildup of supplies just across the Cambodian border posed a distinct threat to U.S. forces and to Saigon. This

threat coupled with governmental upheaval in Cambodia prompted the U.S. incursion into that country.

The 1st Air Cavalry Division's Operation SHOEMAKER was the ultimate test of the division's ability to communicate. On 24 April 1970, the division was instructed by II Field Force headquarters to begin planning for a possible combined U.S.-Vietnamese operation into the "Fishhook," that section of Cambodia which juts between War Zone C and Binh Long Province of South Vietnam. The division was ordered to be ready to move within seventy-two hours with the mission of neutralizing the Central Office of South Vietnam (COSVN), the Communist high command for all activity in the South Vietnam base area. The task force was under the command of Brigadier General Robert Shoemaker, the assistant division commander for maneuver. General Shoemaker elected to locate his task force headquarters with the 3d Brigade at Quon Loi to reduce the personnel and equipment support requirement. The plan was simple in concept but difficult in execution. The rapid growth of the task force outstripped the communicator's ability to respond. Initially the force consisted of the 3d Brigade, 1st Cavalry Division; the 3d Airborne Brigade of the Army of the Republic of Vietnam; and the 11th Armored Cavalry Regiment plus normal support including artillery and one assault helicopter company. This organization was reinforced on 30 April by one mechanized infantry battalion from the 9th Infantry Division; one tank battalion from the 25th Infantry Division; one battalion (the 5th Battalion, 12th Infantry) from the 199th Light Infantry Brigade; and two battalions from the 2d Brigade, 1st Cavalry Division.

On 1 May Operation SHOEMAKER began. The 3d Brigade struck north across the border. To the east, in the deep finger of the Fishhook, the 11th Armored Cavalry Regiment advanced to the northwest into the objective area while simultaneously three battalions of the Vietnamese 3d Airborne Brigade were combat assaulting by helicopter into three objectives north of the Central Office. Subsequently they were to move south, in a large pincer movement, to cut off enemy routes of escape.

Communications at Quon Loi became more and more difficult as the burgeoning task force deployed. Frequency modulated radio was a major problem because of the size and diversity of the force but was still the primary means of communication for every major and minor unit in the operation. Interference was commonplace up and down the frequency spectrum as a result in part of the secrecy required by the operation and in part the commonality and overlap of frequencies used throughout the III Corps zone. Dupli-

cation of frequency assignment mushroomed further as units from other divisions and separate brigades joined the task force. The congestion of radios and associated antennas at Quon Loi was extreme, with at least a hundred FM radio nets in the immediate area of the joint task force headquarters and many (if not most) antennas using the same AB-216 tower. At one time nine VHF, one UHF, seven log periodic, and thirty-six 292 antennas could be counted on one tower belonging to the 3d Brigade. This number was in addition to antennas mounted on the towers of the 11th Armored Cavalry Regiment and 595th Signal Company (36th Signal Battalion) which were located less than three quarters of a mile away. The signalmen solved the FM problems by adjusting the receiver transmitters for peak power output, utilizing airborne and ground relays on Nui Ba Den and Nui Ba Ra, switching frequencies, reconfiguring antennas, and checking and rechecking the avionics equipment.

Very high frequency radio relay was initially installed between Quon Loi and Camp Gorvad (Phuoc Vinh) by a four-channel AN/GRC-163 system. After D-day multichannel communications were increased by additional channels provided by the II Field Force and 36th Signal Battalion (Area) communication systems. The communications support concept of Operation SHOEMAKER called for telephone service off the 3d Brigade's SB-86 switchboard. With the rapid buildup of communications this board was soon saturated even though it had been expanded to ninety lines. By the third day of operations the signalmen were forced to establish a separate switchboard geared to the requirements of the task force using personnel from the 13th Signal Battalion. Lieutenant Colonel Norman E. Archibald said, "To put it bluntly—it was a hand to mouth operation. We always kept our fingers crossed hoping that nothing would happen to the division wire system while we diverted personnel and material assets to the nodal head at Quon Loi."

Coordinating and controlling the signal activities of all the units involved in SHOEMAKER was a difficult task for the signal staff. They were hindered, albeit unintentionally, by the secrecy which surrounded the operation. For example, coordinating the signal operation instructions, cipher keylists, operation code material, and frequencies with elements of the 9th Infantry Division, 25th Infantry Division, and 199th Light Infantry Brigade was a real nightmare.

The rapid growth in the number of units assigned to Operation SHOEMAKER also complicated coordination and control. As each

of the units was assigned to the task force, it became increasingly difficult to meet individual communication needs. This problem was evidenced by the increase of cable and wire systems, installation of additional VHF circuits, and abundance of RC-292 antennas with their requirement for frequencies from the already crowded spectrum. By the fifth day, the task force had increased to a size equivalent to nearly two divisions. At this point, command and control reverted back to the division at Phuoc Vinh and the operation was reoriented toward the northeast, north and northwest of the Cambodian border.

The 1st Cavalry Division continued to shift its forces, and on 13 May the 3d Brigade moved from the Fishhook in an air assault northwest of Bu Dop. The void left in the western portion of the Fishhook was filled by the U.S. 25th Infantry Division, while the Vietnamese Airborne Division had its own area of operation in the southern Fishhook. The 1st Brigade and the 11th Armored Cavalry Regiment remained in the northern Fishhook adjacent to the "Flatiron," but a final realignment on 19-20 May placed the 1st Brigade with two battalions in Cambodia near the town of O Rang, north of Bu Gia Map. The first team now had eleven battalions, three armored cavalry squadrons, and the 1st Brigade Tactical Command Post, located at Fire Support Base DAVID in Cambodia.

The tactical implications of O Rang were interesting primarily because of the uncertainties involved. The division did not know if the enemy force was still in the vicinity and was not completely sure if communications could be established between O Rang and the division because of the distance (140 kilometers), the mountainous terrain, and the lack of previous reconnaissance. On 20 May 1970, the 1st Brigade air assaulted into O Rang, and personnel from the 13th Signal Battalion were among the first to touch the ground. Their equipment included an AN/GRC-163 four-channel radio, two 1.5-kilowatt generators, and several batteries. The communications issue remained in doubt until approximately four hours after touchdown. Fire Support Base DAVID was at the 3,000-foot level; this elevation plus the angle of elevation from O Rang to Nui Ba Ra (where the VHF channels were rerouted to Phuoc Vinh) was sufficient to overcome any terrain obstacles, and the system was brought in.

The 13th Signal Battalion continued to provide backup to the 1st Brigade communications platoon while it was in Cambodia. Early in the morning of 14 June the North Vietnamese assaulted Fire Support Base DAVID from three sides. The attackers were driven off after a bitter fight. The brigade signal officer and several

other communicators were severely injured, and considerable equipment was destroyed. Acting Sergeant Goldsworthy, who was in charge of the VHF element, not only maintained communications throughout the firefight but earned the Silver Star for gallantry in action.

Lieutenant Colonel William R. Rogers, the division signal officer for the 25th Infantry Division and commander of the 125th Signal Battalion, noted that planning was so tightly held that the commanders, including the signal officer, did not know what was really happening until it happened and that the division did not move its headquarters closer to the area of operation, so the signal officer had to hold communications assets, vitally needed in other sectors, in reserve for a possible forward displacement that never materialized. These problems highlighted two recurring frustrations of the division signal officer throughout the conflict in Vietnam.

CHAPTER VI

Phase-Out

As the Nixon administration sought to move the conflict in Vietnam from the battlefield to the conference table, the first major U.S. Army combat elements began to withdraw. The withdrawal began in July 1969 with the 9th Infantry Division, followed closely by the 3d Brigade of the 82d Airborne Division, and ended with the 196th Light Infantry Brigade in June 1972. *(Table 1)*

TABLE 1—PHASE-OUT OF REMAINING U.S. ARMY TACTICAL UNITS
OCTOBER 1970–JUNE 1972

Unit	Date
3d Brigade, 9th Infantry Division	October 1970
199 Infantry Brigade	October 1970
1st & 2d Brigade, 4th Infantry Division	December 1970
25th Infantry Division (-2d Brigade)	December 1970
11th Armored Cavalry Regiment	March 1971
2d Brigade, 25th Infantry Division	April 1971
1st Cavalry Division (-3d Brigade)	May 1971
1st Brigade, 5th Infantry Division (Mechanized)	August 1971
173d Airborne Brigade	August 1971
23d Infantry Division (-196th Infantry Brigade)	November 1971
3d Brigade, 101st Airborne Division	December 1971
1st Brigade, 101st Airborne Division	January 1972
2d Brigade, 101st Airborne Division	February 1972
3d Brigade, 1st Cavalry Division	June 1972
196th Infantry Brigade	June 1972

Historical records reveal little that was unusual about division level communications as units withdrew. As a general rule, units and their signal support elements collapsed into some central staging area and their communications mission was gradually transferred to units of the First Signal Brigade. This procedure permitted organic signal units to leave with the major combat elements they were supporting. The experience of the 3d Brigade of the 82d Airborne Division is typical. The 36th Signal Battalion of the First Signal Brigade moved into the 82d's area during the phase-out period and established a residual communications

network that permitted the organic signal units to be withdrawn. Most of the combat units that phased out in this manner mentioned three problems in their after-action reports.

The first was maintaining high morale when the future of the unit was uncertain. In many instances units did not know where they would end up; some, in fact, were inactivated soon after they left Vietnam.

The second problem was turning in equipment, which often had to be split three ways: one part was transferred where it stood to Vietnamese forces; another part was turned in at a depot; and the third part was retained. Instructions often came at the last minute. Frequently the "pack rat" syndrome produced much more equipment on hand than unit records showed. Central distribution points had to be established so that a unit could turn in all of its equipment by a scheduled departure date. Many soldiers keep anything which their experience tells them might be useful later. Since some of the major combat units had been in Vietnam a long time, there were some large hoards of "auxiliary" equipment.

The third problem was excessive personnel turbulence. Trying to identify the troops who were to remain behind and those who were to leave was cumbersome in light of the various personnel policies then in effect. This and other problems frustrated both the administrators and the affected soldiers during the phase-out. It is to each unit's credit that, by and large, the debarkations went smoothly and remained fairly close to the established schedule.

The withdrawal of the major U.S. combat elements did not presage the end of hostilities. The fight was to be carried on by units of the South Vietnamese Army with logistics and air support provided by the United States from outside Vietnam. Channels for this assistance had to be maintained in the four military regions where the fighting was continuing, and communications support was a vital factor during the final months of combat.

To ensure adequate support to the South Vietnamese forces after the withdrawal of the American combat troops, a regional assistance command headquarters was set up in each of the four military regions. Its commander, normally a major general, worked closely with the senior South Vietnamese military commander in the region on coordinating close air strikes, logistics support, and other combat support which the United States was obligated to provide. Since all of the signal units organic to the major combat elements had been withdrawn, communications support to these four U.S. regional assistance commanders had to be provided by residual signal units of the First Signal Brigade.

This communications network, austere by comparison with that provided for American combat units, was vital because it was the only link between the U.S. commanders in the four districts and the residual headquarters elements in Saigon, which could coordinate to direct air strikes and logistics support where they were needed. A signal unit, roughly of company size and commanded by a captain, provided signal support in each of the four military regions. The unit generally provided a switchboard to serve the regional U.S. commander and his staff, a simple communications center through which messages could be handled, and, perhaps most important, a narrow-band secure voice terminal to permit the U.S. commander to call in air strikes through the Joint Operations Center in Saigon. The telephone and communications center functions were relatively clear-cut and caused few problems. The circuits went to the closest entry point in the fixed backbone system that spanned Vietnam and which was at that time being run under contract by the Federal Electric Corporation. From there the circuits rode the system to the residual headquarters in Saigon.

The requirement for secure voice communications was, however, another matter. If the Vietnamese commander was working from his main headquarters, the U.S. commander could track him without much difficulty and call in the close air support missions as needed. The system was set up so that the commanding general had to place the call and request the mission himself. The narrow-band voice equipment traversed the fixed backbone network to the close air support center in Saigon, which called for missions from either Thailand or Guam as circumstances dictated. When a Vietnamese commander moved to the field, however, the process became more complicated. Then the U.S. commander had to stay with him and, from whatever his location, place an immediate secure voice call all the way to the operation center in Saigon. He often had to use tactical FM radio equipment and rely on retransmitting because of long distances and terrain obstacles.

Some of the most demanding secure voice communications missions were placed on the system after the majority of U.S. tactical communications units and equipment were gone. To meet this demand, FM retransmission aircraft began flying almost continuous missions, in the first and second military regions where the mountainous terrain and enemy activity were heavily taxing the Vietnamese forces. These U-21 aircraft stayed in continuous orbit on station until they had to refuel. This technique gave the commanders in all four regions a secure way to call in close air strikes from almost any location.

At this time the First Signal Brigade, which had once boasted over 25,000 troops, consisted mainly of a management office that monitored the contractor's waning operation and his maintenance of the backbone communications system. It also monitored the 39th Signal Battalion in Saigon, which provided minimal communications support to the remaining Military Assistance Command headquarters and to the signal units in each of the four military regions.

The final phase withdrawal was the departure of the regional assistance commands themselves; the four signal units that supported them were the last elements to go. About the same time, the colors of the First Signal Brigade were officially retired and transferred to Korea.

CHAPTER VII

Communications Security Threat

Few communications subjects can arouse more controversy among professional soldiers than that of security. The argument centers on security versus responsiveness. The points under debate usually involve the techniques used to try to gain some degree of communications security, such as changing call signs and frequencies and using codes for the coordinates of locations and other critical data. To many people, the ideal solution to all but the frequency problem would probably be a small, lightweight, durable, unclassified black box which would automatically scramble and unscramble transmissions so that only those people with a similar black box could understand the transmission. The black box was not available when U.S. troops were committed in Vietnam.

The security measure of changing call signs was very controversial on two points. One was the confusion created by changes. Colonel Sid Berry, the commander of the 1st Brigade, 1st Infantry Division, from June 1966 to February 1967, spoke for many commanders when he said, "It simplifies communications for units and individuals to keep the same frequencies and particularly call signs. Frequent changing of call signs confuses friends more effectively than enemies." The other point was that new call signs frequently cast a poor image or were too long. Although there were many complaints about the denigrating image reflected by call signs, one of the most vivid was provided by Lieutenant Colonel Norman E. Archibald when he recalled his 1970 experiences as division signal officer of the 1st Cavalry Division: "The signal battalion still had a difficult time selling call signs like 'Supreme Capon' (. . . the commander said, 'What? You want everyone to call my troops castrated chickens?') . . ." Brigadier General William S. Coleman, in 1967–68 assistant commander of the 1st Infantry Division, expressed both objections: "Another change that I hated to see was the fancy call signs that the division was ordered to adopt. Imagine being on the radio and saying, 'Sailing Gerta Delta One One Juliet, this is Mister Taboo Four Four.' Why, by the time

you get the call signs out, you've forgotten what you wanted to say."

Although these and other complaints were understandable, a communications security problem did exist in Vietnam and had to be dealt with. Early in the war, many people apparently had assumed that the enemy was unsophisticated and that communications security did not warrant much concern. That may have been true when American troops first arrived, but the enemy quickly adjusted.

It soon became evident that he was using poor communications security to good advantage: U.S. troops found their own radio equipment when they swept enemy positions; the enemy might disappear from a location just before a planned U.S. attack; B-52 bomber strikes did not produce expected results because the enemy apparently anticipated them. Some plans probably leaked to enemy agents operating within the Vietnamese political structure at the province and district levels, where Americans had to get political clearance for operational areas to ensure that there was no conflict with local defense forces. But even these suspected leaks could not explain the problems in established free fire zones and already authorized areas of temporary operations. There had to be another source from which the enemy was obtaining critical information.

There was. On 20 December 1969 elements of the 2d Battalion, 2d Infantry, and of the 2d Battalion, 28th Infantry, both from the 1st Brigade, 1st Infantry Division, overran an enemy installation about four kilometers north of Ben Suc in the II Corps zone and captured twelve enemy soldiers. They also seized an assortment of documents and communications equipment, including three U.S. Army FM radios of the AN/PRC-25/77 variety; one Chinese Communist AM receiver, compatible with the U.S. AM radios of the AN/GRC series; seven Sony transistor radios; one Panasonic receiver; one homemade receiver; and one homemade transmitter. All the equipment was in excellent operating condition, and the homemade receiver and transmitter reflected a very high quality of workmanship. With this equipment, this Viet Cong and North Vietnamese Army radio intercept unit could monitor and exploit virtually all nonsecure voice and manual Morse code communications among U.S. and allied tactical units within receiving range. Interrogated prisoners indicated that, along with building up equipment, the enemy had instituted a large number of English linguists. These linguists became an integral part of many Viet Cong and North Vietnamese units such as the intercept unit.

Among the captured documents were several booklets containing extensive instructions on proper intercept techniques and detailed analyses of the communications procedures and exploitable weaknesses of U.S. and allied units. Specific comments were included on the communications procedures of the 1st Infantry Division, 1st Cavalry Division, 4th Infantry Division, 25th Infantry Division, 11th Armored Cavalry Regiment, 5th Vietnamese Division, and the various Military Assistance Command advisory teams. These booklets were current, lengthy, and very detailed. On point of origin codes the instruction was, ". . . they usually use landmarks or a PO (point of origin) from which they use LEFT, RIGHT, UP and DOWN to designate a position." In one journal entry a 1st Infantry Division unit message had been copied: "Presently my one six element is at CPT Coutine (actually Checkpoint Canteen) R.6 U 2.2." The actual coordinates were written above the entry. That decoding points of origin and shackle codes appeared frequently throughout the journal indicated that deciphering such codes apparently posed no major problem.

The unit also noted the importance of obtaining information from warning nets. By monitoring these nets the enemy could get data on artillery and air attacks and transport of wounded. He could extract all intelligence concerning the units engaged, fire bases, landing zones, and air reconnaissance. He could also get information that would help analyze the traffic intercepted from U.S. infantry communications. The journal identified U.S. advisory and South Vietnamese unit nets as very productive for intelligence data. It further noted that the South Vietnamese made monitoring easy because they never changed call signs or encrypted messages. The journal gave examples of B-52 warning messages. It instructed the monitors to be sure to get the coordinates because they represented the box, or target area, which had to be reported for the security of their own troops.

The captured radio intercept unit was one small team targeted on several American and Republic of Vietnamese units. A logical assumption is that by 1969, when this unit was captured, the enemy could field a number of such teams. This attribute of the enemy in Vietnam must be accorded any future enemy; that is, his ability to adjust to American operational techniques and to improve his capacities. The enemy in 1969 was not what he had been. As the situation changed, he changed.

These examples are but a few of how the enemy used U.S. communications means and procedures to gather intelligence and to assist his operations. There are numerous instances on record of the

enemy jamming radio frequencies and sending false messages. These bogus transmissions used imitation to try to turn fires or forces to an area chosen by the enemy. In one case the enemy tapped the internal telephone lines of a defensive base and diverted reserve forces from the area where he attacked.

General Abrams, then head of the Military Assistance Command, after examining the captured documents and being briefed on the radio intercept team incident, summed up his reaction: "This work is really rather startling; the attention to detail, complete accuracy, and thorough professionalism is amazing. These guys are reading our mail, and everyone will be informed that they are."

CHAPTER VIII

Security Response

In the history of strategic military operations, it has long been public knowledge that Allied operations in the Pacific during World War II were indebted to the breaking of the Japanese operational communications codes. More recently it has been revealed that the British were able to break the strategic communications code by which Hitler received information and issued directives to his senior commanders. High command levels should have and did get top priority in American attempts to safeguard communications against similar breaches. With the men at the tactical level not really wanting signal security gear, there was a relatively modest attempt in the U.S. Army to develop new equipment for that level until the need became more evident.

Signal security equals a combination of people, equipment, and systems. People participating in tactical operations have a natural dislike for signal security measures; they prefer to conduct business in the simplest, most direct manner possible. Early in Vietnam, *possible* in most cases meant whatever superiors would permit in the tactical situation involved. The people part of the equation did not improve until the chain of command became convinced of the need for strict communications discipline. The conviction grew in proportion to information about the threat, and interest and participation grew as equipment and systems improved. The signal security problem was never fully resolved during the Vietnam era despite many improvements and much hard work. It was, and still is, one of the most difficult problems facing tactical communicators.

Along with the need to communicate as rapidly and directly as possible during combat, another factor worked against effective communications security: a soldier in the thick of battle feels the need for friendly assurance. This assurance can come from talking—to anyone else who has a radio. When this happens, chances are that little thought is given to what information is actually being transmitted.

Before secure voice equipment was in general use, oral communications requiring any secrecy had to be painstakingly coded

and decoded manually. All too often coding was circumvented in favor of simplicity, speed, and assurance. The tactical communicator needed some type of voice encryption device.

In 1965, when he was the U.S. Army, Vietnam, signal officer, Colonel Kenneth Ring recalled that there were some eight hundred KY-8 security devices in a stateside depot. These devices had no mounting brackets or connecting cables because their application had not been settled. Colonel Ring requested, on behalf of U.S. Army, Vietnam, that a new equipment training team be sent to Vietnam to demonstrate the devices and discuss their tactical uses; the team arrived in August 1965. From this start, the security device applications and improvements progressed through some tortuous evolutions.

Voice security devices were issued to the field units in Vietnam beginning in 1965 with the KY-8 for stationary or vehicular use; the KY-8 was fully distributed by the third quarter of fiscal year 1968. The KY-28 was issued for use in aircraft beginning in 1967 and ending a year later. The KY-38, for manpack or mobile use, also was issued initially in 1967 and was fully distributed in 1968.

The voice security gear, like most newly developed equipment, had its problems. The main cause of failure was heat. The KY-8 had to be kept in well ventilated surroundings and away from direct sunlight. During a 1969 presidential visit, an overheated KY-8 temporarily stopped secure voice communications between II Field Force headquarters and Tan Son Nhut.

The 199th Light Infantry Brigade station at Xuan Loc, in the II Field Force commanding general's secure FM voice net, continually broke down. Many pieces of equipment were generating heat in a poorly ventilated bunker and causing the KY-8 to fail. When it was moved to a cooler location, the KY-8 operated normally. Commanders and communicators became aware that, for reliable communications, the security equipment had to operate in the coolest possible environment.

In at least one case the ingenuity of a well intentioned communicator backfired. First, he placed a filled Lyster (water) bag over the KY-8 to cool it, but the device still overheated. Next, he removed the cover of the KY-8 to increase ventilation. That improved the operation of the KY-8 but violated security by exposing the equipment to view and giving the enemy an opportunity to intercept intelligible signals.

In a successful innovation, the 125th Signal Battalion engineered and installed a secure land line to expedite spot reports be-

tween the 372d Radio Relay Company and the 25th Infantry Division G-2. The battalion, operating two KY-8's in essentially a back-to-back test mode, replaced the short back-to-back cable with spiral-four cable of the required length. This system worked with almost no trouble and with very high quality.

During September 1968, the PRC-77 and KY-38 combination was issued down to the infantry battalion level, providing for the first time secure voice communications to infantry companies and in the battalion command nets. At the company level plans and operations could be discussed rapidly, safely, and explicitly without fear of enemy detection. Field units used two methods to offset the weight disadvantage (over 50 pounds) of the PRC-77/KY-38 package. One was to use the equipment fully by having one man carry the PRC-77 radio and another the KY-38. The second was to move the field unit as normal, then have supporting aircraft fly in the equipment for use in static or night defensive positions.

In the fall of 1969, reports on NESTOR (code name given narrowband secure voice equipment) utilization were revealing. Many units under the operational control of the II Field Force were not using their KY-38's as much as desired. The PRC-77/KY-38 when carried by one man, as intended, was just too heavy. Other units reported that they needed VRC-12/KY-38 interconnecting cables. They wanted to use the smaller KY-38 in lieu of the KY-8. The KY-8 was prone to overheat and ran on generated power. Power was limited at fire support bases, and the field troops thought it unwise to run the noisy generators at night. The KY-38, on the other hand, was battery powered. Acting on this feedback, Electronics Command Laboratories went into an emergency production of interconnecting cables for the VRC-12 and the KY-38 and by late 1969 had produced three hundred. A substitution of the KY-38 for the KY-8 in vehicles was also agreed upon.

One of the most serious equipment problems in the field was the lack of kits and special cables for installing NESTOR gear in aircraft and vehicles. The installation kits and most of the cables was a supply responsibility of the Electronics Command. There was a variety of kits which adapted NESTOR equipment to the tactical series radios used in vehicles and aircraft. The initial supply of kits, once they had been developed, was adequate early in fiscal year 1969. As the use and uses of the equipment increased, however, kits and cable components became increasingly hard to find. The so-called X-mode cable for the KY-8 was also in short supply. Another aspect of the kit shortage came to light during the U.S. withdrawal from Vietnam. Although retrieving the NESTOR

equipment from vehicles was no problem redistributing it was often haphazard. A similar situation existed with KY-28's in aircraft, principally helicopters. Losses and evacuations of aircraft which had been fitted for the equipment made the shortage worse, since most of the replacement aircraft did not come with the kits installed.

The number of KY-28 keying devices for the NESTOR family of equipment was adequate when units were operating in one locale; when divisional units were dispersed (the normal practice), more keying devices were needed. The 101st Airborne Division recommended that keying devices for the KY-28 and KY-38 be supplied as required. In July 1969, II Field Force established a common NESTOR key list for all units operating in the III Corps zone. To maintain compatibility, key changes had to occur simultaneously in all units. The time chosen for this change was midnight, tactically the worst possible time because the greatest number of enemy contacts occurred from 2200 to 0200. Moreover, where several units shared the same keying device, having to move at night to change key settings was inconvenient and dangerous and added to the reasons for not using the equipment. Later the time of the daily NESTOR key change was moved to 0600.

As the use of communications security equipment increased in Vietnam, so did the need for logistical support. A reorganization was approved by the commanding general of U.S. Army, Vietnam, in mid-1967. The revised structure consisted of the Communications Security Logistics Support Center, Vietnam, which functioned as a general support facility serving U.S. Army, Vietnam, with six subordinate units strategically located in the four corps areas. The center was also assigned the mission of organizing, training, and deploying seven contact detachments to augment direct support to the combat divisions. Support began to improve.

Security codes were another problem. The early units had not been very conscious of communications security, and the unauthorized practice of using homemade communications security codes and shackles eventually became widespread. This dangerous practice, which persisted throughout the conflict and which gave users a false sense of security, was probably more dangerous than communicating in the clear. As the number of units burgeoned and the need for compartmenting code systems grew, U.S. Army, Vietnam, requested and received from the National Security Agency a whole series of preprinted codes to cover the expansion. These codes, while not perfect, were a great improvement in both the employment and distribution of such systems. Getting the infan-

tryman under fire, or the helicopter pilot supporting him, to employ the codes was another matter.

The continuing need for easier authentication and more reliable means for passing limited classified traffic led to a new development in the later stages of the conflict: the KAL-55B authentication wheel, or "whiz wheel," a circular authentication table in a plastic covered disc. This innovation simplified communications security measures to a level acceptable to most users.

Signal security, particularly in voice radio transmissions, was a major problem area throughout the period of combat operations in Vietnam. Army Regulation 380-40, *Department of the Army Policy for Safeguarding Communications Security Information*, assigns responsibility for this type of security to both the commander and the individual. All users of communications facilities were more or less aware of their vulnerability to enemy intercept, analysis, and decoding, and of the need for authentication and encoding. The gap between this knowledge and actual practice was immense, and in Vietnam it seemed at times an insurmountable problem.

CHAPTER IX

The Art and Process of Communicating

Communicating derives from a Latin word which carries dual meanings of transmitting and sharing. Merely sending a message and receiving an acknowledgment is not communicating. Communication is a vital part of combat and combat is a team job. If the combat operation goes awry, the entire unit can suffer. The more each individual knows and understands about other individuals' jobs, the better will be the chances for success. The combat communicator must do his share.

During a Vietnam era training exercise, a staff officer wrote a long messge which contained one short top secret paragraph. The rest of the message was of a lower classification. Since the classification of the message had to be the same as its highest element, the entire message had to be encoded by hand, transmitted, and then decoded by hand. The message reached its recipient some forty-eight hours after it left the hands of its originator. Had the staff officer been familiar with the communications system supporting his particular headquarters, he could have gotten his message through in a small fraction of that time by splitting it. The longer part of the message could have been transmitted quickly over on-line teletypewriter circuits designed to handle secret traffic while the shorter, top secret, part was being encoded by hand as a separate transmission. The headquarters failed to achieve one of its objectives; because it was a training exercise no lives were lost, nor were actual tactical operations endangered.

Communicating even face to face with another individual can be difficult. Sharing an understanding of the thought being transmitted depends upon the language being used, the cultural experience of both individuals, and the expectations of the recipient. Misunderstanding often comes from misinterpretation because the parties involved are thinking of different subjects. This can happen in combat in a very messy way. One example was cited by an adviser who was on a combat operation with a battalion of the 7th Regiment, 5th Vietnamese Division, near Trung Lap in January 1965. During a firefight with an enemy unit, the senior

American adviser was killed and a young lieutenant had to take his place. American gunships were called in by radio to provide fire support. The inexperienced adviser managed to describe the enemy location to the pilots well enough to bring the first run in close to the target, then he discussed with the pilots the adjustments necessary to make the second run more effective. The adviser then abruptly switched subjects and indicated that his column was moving out in a certain direction. The pilots, anticipating information about enemy activity, apparently did not comprehend the shift in subject and shot up the battalion column. Seven soldiers were wounded before the gunships could be called off.

Not all transmission mix-ups occur over the radio. Messengers are a vital part of the communications system, and their use does not always preclude misunderstanding. On 14 November 1965 during the Ia Drang Valley operations of the 1st Cavalry Division near the Cambodian border, Company A, 7th Cavalry, commanded by Captain Ramón A. Nadal II, took part in an air assault into Landing Zone X-Ray. During the fighting that followed, Second Lieutenant Walter J. Marm of the 1st Platoon had his hands full conducting his first big firefight as a platoon leader, when a company runner came up to him with the message, "The CO's hit. You're in command." The young officer was stunned. For a few hectic minutes he was under the impression that he was commanding Company A. Then he heard Captain Nadal's voice on the radio. The runner, in his haste to dodge enemy bullets and to get the message to Marm, had neglected to pass on the captain's full message beginning with the simple word *if*.[1]

In August 1966 a long-range patrol from the 2d Brigade, 1st Cavalry Division, was operating near the Cambodian border and had not had any enemy contact when Company A, 1st Battalion, 5th Cavalry, air assaulted in on their location. Apparently a radio transmission from an aerial observer indicating large groups of people a few kilometers away from the patrol's location had come through garbled. Brigade headquarters understood that the patrol was being attacked by large groups of people. The two units were unscrambled, and Company A was airlifted out to execute its original mission for the day, several hours later than intended.

Cultural differences can interfere with the proper transmission

[1]The platoon attack to clear the area was stalled by deadly fire from a machine gun bunker among the trees. Lieutenant Marm charged and silenced the enemy position; he was seriously wounded in the attempt. For his heroic actions, Lieutenant Marm was later awarded the Medal of Honor.

of an idea from one mind to another. Brigadier General William A. Knowlton, assistant division commander of the 9th Infantry Division, made the point while discussing operations in the delta region and Vietnamese-American relationships:

> . . . just to give you an example of differences between American customs and Vietnamese customs that can lead to all kinds of problems. The blowing of the horn in an automobile. In Vietnamese, that means, "Don't sweat. I see you up ahead and I know where you are." In American, it means, "I'm going; get out of my way because I want to get by you." If a Vietnamese is riding down the middle of the road on his bicycle and he hears a horn behind him, he says, "How wonderful. He knows I'm here in the middle of the road," and he relaxes. The American, in turn, says, "He doesn't understand my message. I told him to get over because I want to go by." There had been a total lack of communication in blowing the horn. Due to this lack of communication, the results are that the American runs the Vietnamese into the ditch, the bicycle gets smashed up, and the old man says, "The Americans are idiots; they are barbarians; they're crude and very impolite to the Vietnamese. . . ."

A cultural difference need not mean a difference in nationality or education. One noteworthy case occurred during the Vietnam era at Fort Leonard Wood, Missouri, in screening people nominated for the Army officer candidate program. Pressure was strong to get every qualified candidate into the program. The screening process consisted of an aptitude test, a unit commander's evaluation, and a board of officers' evaluation. When a number of likely candidates did not score high enough to qualify, a detailed inquiry revealed that the scoring key to the evaluation form used by the board members was faulty for about 20 percent of the questions. The key and the form had been prepared by civilian consultants who apparently were not familiar with Army word usage and attitudes. One inconsistency, for example, involved the personal appearance of the candidates. The term clean-cut, which most board members had used in describing the appearance of outstanding male candidates, earned the candidate no points, but the term attractive would have scored a point. The board and the candidates, all of whom were male, just did not think in those terms. The use of the scoring key and evaluation form had to be adjusted.

Other understanding gaps come from using colloquial language, service jargon, and technical verbiage. All such gaps are a potential danger to effective communication. Add to this danger mechanical communications devices, distance, static, stress, confusion, conflicting requirements, and the loss of visual contact. The chances for error rapidly multiply.

Many of the military operations conducted in Vietnam were combined operations with troops of other countries and joint operations with the U.S. Navy and Air Force. Under these conditions, great care had to be taken to ensure that established procedures and terms were used by operations and communications personnel to avoid unnecessary misunderstandings. For example, trained communicators know that the term repeat has long been outlawed from normal military radio usage. The reason is that in both British and American artillery procedures, the term is used to order repetition of an associated fire mission. Requests for repetition of radio messages or parts of them must be made with *say again*.

The efficiency and professionalism of a tactical unit can be judged accurately by monitoring its command net. The command net reflects the personality and character of the unit. A frantic, nervous unit has a frantic, nervous command net. A good unit's command net is quiet, uncluttered, calm, and quick to respond. The base station exercises firm control over the net, polices the net, requires legitimate users to use correct and efficient procedures, and commands trespassers to get off the net. Operating a command net professionally requires operators who are military professionals. Garbled communications were the exception, not the rule, in Vietnam.

CHAPTER X

Logistics

The supply of repair parts has long been recognized as one of the major problems in the maintenance program of the U.S. Army. The volume of equipment furnished a modern army is tremendous and the slight differences between "identical" parts which come from being produced by different manufacturers add to the problem. Ordering and receiving the right part becomes a precision task. Updated manuals are needed for parts identification, and an error in one digit on a stock number from an outdated reference can result in the wrong part or no parts at all. The volume and complexity of the task is mind boggling.

Many units in Vietnam listed acquiring spare parts as one of their main logistical headaches. They tried different approaches to resolve the problem. Some units tried to beat the supply system by having their men scour the depots to locate parts and major items of equipment and requisition them on the spot. Other units, such as the 25th Infantry Division, tried to make the system work. Colonel Tom Ferguson in reflecting on his experience as the division signal officer, stated, "We faithfully followed the Technical Manual 38-750 concept at all times, and with excellent support from the division support command and somewhat tenuous faith in the Army supply system we were able to maintain our equipment." Some used the system and some used modifications of the system, and both were made to work satisfactorily. The conscientious and traditionally ingenious American soldier would make the system work—even if, at times, he had to bend it slightly. Higher echelons soon attacked the problem from their levels and instituted a number of improvements.

The closed loop support system was established to control the flow of critical components or assemblies to and from respective commands in hope of supporting prescribed levels of equipment readiness. Supply, retrograde, overhaul, and resupply were given special attention to ensure that critical items were quickly overhauled and rebuilt and then quickly returned to the supply system. This system allowed units to exchange critical items directly. The

system was generally successful with radar and teletypewriter equipment but less so with radio equipment because replacement items were not available for direct exchange. One innovation that made the system more efficient was the "jiffy bag," a cushioned paper bag in which small modules and components could be shipped for repair and returned safely and quickly.

Problems in the receipt, issue, and distribution of communications-electronics equipment and repair parts grew from the lack of signal expertise at logistics depots. Most people who worked these were not versed in the increasing sophistication and technical makeup of equipment and components and the volume of communications-electronics supply.

At the division level, the primary logistical organization was the division support command (DISCOM). With its supply and service, transportation, maintenance, and medical battalions, plus its administration company and its headquarters company and band, the support command was both a customer of the communications system and a major supporter. The supply and service, transportation, and the maintenance battalions played a major role in keeping the communications equipment operating. They supplied repair parts and replacement items and maintained and repaired equipment when the units could not.

The division signal officer had to maintain a close relationship with the commander of the support command. The success of the communications system depended, to some extent, on the effectiveness of support the command provided. The support commands were vital not only in division communications but also in combat. A number of division commanders considered the support commands so important that they assigned some of their most experienced officers to head them. The division commander or command section did not always realize that the support command was ultimately responsible for supply and repair parts for signal equipment within the division. The division signal officer frequently had to resolve supply problems which were beyond his scope.

Most of the units in Vietnam centralized their maintenance systems. Time and distance and the immediate tactical situation, however, often dictated something between complete centralization or decentralization.

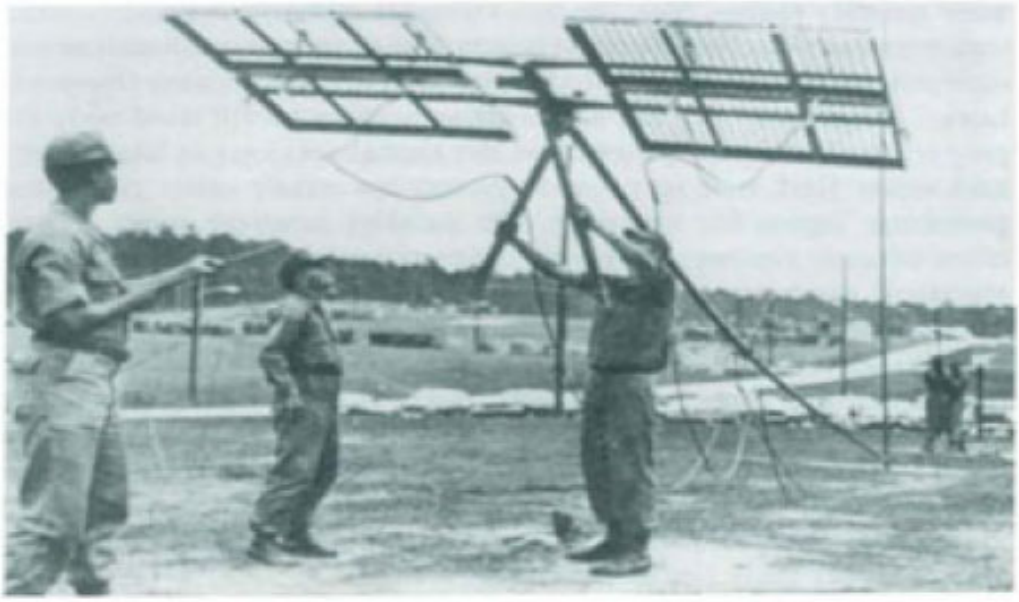
Tactical units operating in Vietnam received power for their communications equipment from fixed plant generators, portable generators, and batteries. Civilian contractors operated fixed generators in some of the base camps. Portable generators were used extensively and were important in division communications. They

were usually three-, five-, or ten-kilowatt. When air conditioning was necessary for the efficient operation of some communications equipment, the ten-kilowatt air-cooled generator became the workhorse. Originally the ten-kilowatt generators were used only for powering signal equipment but the signal sections at base camps and other sites had to provide power for many other purposes, perimeter lights for example. On smaller landing zones, *signal* often became synonymous with the responsibility for providing all electrical power at the location.

Commands had to emphasize maintenance if the generators were to survive under heavy use. Heat, wind, and sand were constant enemies, and inadequately trained and improperly supervised operators often compounded the maintenance problem. Operators frequently were trained in the operation and maintenance of the motor but not the generator or trained to operate the system but not to maintain it. As a result, most units placed generators high on their list of problems.

Batteries were used in every vehicle, every generator of five kilowatts and above every telephone switchboard, every tactical telephone, and most tactical radios. The Vietnam climate was the biggest enemy of batteries, both wet- and dry-cell. In the heat and humidity, the wet-cell battery reached its boiling point quickly and stopped working. Operators had to service cables, battery boxes, electrolytes, and connectors more frequently than normal to prolong battery life. Dry-cell batteries also were not immune from the Vietnam temperatures. They had to be kept in a cool, dry place. The recommendation that batteries be stored under refrigeration until issued to the troops was not commonly followed at the lower levels, where any refrigerated space normally was reserved for perishable foods and medical supplies. Dry-cell batteries were often stored in any available container, for example a steel Conex container which changed temperature drastically from day to night. This storage method gave many units batteries that operated for only a fraction of the normal time.

One of the heaviest users of the dry, zinc and carbon oxide batteries (BA-386) was the AN/PRC-25/77 manpack radio employed by most tactical units. As voice secure transmission became more common, the usage requirements of these batteries, which had to be used in both the radio and security device, increased significantly. To increase dry-cell battery life, the magnesium battery (BA-4386) was developed and first used in early 1968. The magnesium battery lasted almost twice as long as the zinc and carbon oxide battery and it did not have to be refrigerated. The mag-



STUDENTS ERECT ANTENNA *at Willard Training area, Fort Gordon, Georgia.*

nesium batteries, however, generated a hydrogen gas which in a closed container built up and caused the batteries to explode and burn. Storing the magnesium batteries in a well ventilated area solved this problem.

Batteries in storage were not always rotated to ensure that older stock was used first, and some became useless. Though the magnesium battery was a distinct improvement and means were developed to reduce or eliminate problems, batteries as well as generators were high on the problem lists of most units.

From 1965 to the final redeployment of tactical units, numerous communications-electronics assemblages were introduced in Vietnam to upgrade the quality and quantity of tactical communications. In many cases, these assemblages consisted of whole families of equipment designed to replace obsolete gear. The AN/PRT-4 and PRR-9 squad radios replaced the AN/PRC-6. The AN/PRC-25 and 77 short-range FM radios replaced the AN/PRC-8-10. The AN/VRC-12 series FM radios replaced the RT-66-67-68/GRC (including AN/GRC 3-8, VRC 7-10, VRC 20-22, and VRQ 1-3 sets). And the AN/GRC-106 AM radios and teletypewriter replaced the AN/GRC-19. These four basic systems provided communications at specific levels or filled distinct needs.

The new two-piece, lightweight squad radio greatly increased

the capacity of squad communications. It consisted of a two-channel hand-held transmitter, the AN/PRT-4, and an ultraminiature helmet-mounted receiver, the AN/PRR-9. Designed to provide short-range (500-1,600 meters) tactical communications in the combat areas, it replaced the hand-held receiver and transmitter which was used for communications between squad and platoon. The new radio was considerably smaller, lighter, and more efficient than the older PRC-6 and could communicate with the VRC-12 and PRC-25/77 radios as well as with the PRC-6. It was used primarily within and between squads but could be used by larger units for other kinds of tactical missions. The squad radio was issued in early 1967 and by late that year was available to all tactical maneuver units. Units using the new radio varied in their opinion of it. Most would trade it for the AN/PRC-25/77 whenever possible for greater range and reliability. They considered the squad radio most effective in relatively static situations such as perimeter defense.

The AN/PRC-25, a short-range FM radio, was modular and was transistorized except for a power amplifier tube. The radio was used in three basic configurations, manpack (PRC-25), vehicular (VRC-53), and manpack or vehicular (GRC-125). The first PRC-25's in Southeast Asia (mid-1965) were intended for advisers. With their initial distribution came the first new equipment training (NET) team from the Electronics Command to begin instruction on the operation and maintenance of the VRC-12 and the PRC-25.

The AN/PRC-77 set was an improved version of the PRC-25. Completely solid state design made it more reliable. It also needed less power and could be used for secure voice communications. The PRC-77 was basically a manpack radio but also could be used in the three basic configurations, manpack (PRC-77), manpack or vehicular (GRC-160), and vehicular (VRC-64). The PRC-77 was compatible with the VRC-12 and PRC-25 families, with the ARC-54 aircraft radio set and with the PRT-4 and PRR-9 squad radio. The PRC-77 was organic to battalion-size units and was issued through platoon level.

The radio sets AN/VRC-12 and VRC-43 through VRC-49, commonly referred to as the AN/VRC-12 series, were the new vehicular radio communications equipment used extensively by combat units. These FM radio sets replaced the AN/GRC-3 through GRC-8 series. The new sets consisted of various combinations of two basic components, a receiver-transmitter and an auxiliary receiver. The receiver-transmitter came in two versions, the RT-246 and the RT-524. The RT-246 could select one of ten frequen-

cies preset by the operator. The operator had to select each frequency manually on the RT-542, which had a built-in loudspeaker in the space occupied by push buttons on the RT-246. The RT-524 was developed primarily for use in vehicles where the operator could reach the control panel easily; the RT-246 was designed for use in tracked vehicles where the operator could not reach the control panel. In Vietnam this equipment was often removed from vehicles for use in bases such as forward tactical command posts. In most cases, major tactical units were issued the VRC-12 family of radios just before or shortly after their deployment to Vietnam during 1965 and 1966.

The high frequency communications system within a divisional area of operations were used almost entirely for radio teletypewriter operation. The AN/GRC-46 or the AN/VSC-1 AM radio teletypewriter sets gave the maneuver battalions their only means of secure printed communications. At brigade and division levels, radio teletypewriter for the most part provided only a backup for the multichannel secure teletypewriter circuits. The GRC-19 was replaced in 1966-67 by the newer high frequency single sideband radio set AN/GRC-106 with its radio teletypewriter configurations, the half duplex AN/GRC-142 (AN/VSC-2) and the full duplex AN/GRC-122.

The AN/MRC-69 was a frequency division multiplex radio relay carrier terminal set which could provide twenty-four telephone channels and twelve teletypewriter channels. It was normally used at division and brigade levels as a dual radio carrier terminal providing two twelve-channel systems. The set was the backbone for the divisions' multichannel systems. It was available in numerous equipment combinations (in addition to the basic MRC-69) such as the single terminal MRC-73, the telegraph-telephone terminal MCC-6, and the radio repeater MRC-54.

The airmobile and airborne divisions needed a lighter, more mobile system. With the organization of the 1st Air Cavalry Division, a trend toward lighter systems began and resulted in the MRC-111 and MRC-112. Although they could be transported by helicopter easily, they provided only four channels. These were followed by the AN/GRC-163, a lightweight, four-channel, single terminal radio consisting of the VRC-47 and a multiplexer (TCC-70). The GRC-163 had a communications planning range of fifty miles and provided multichannel communications between brigade and battalion where wire lines were not tactically feasible. The GRC-163 was designed for use in airmobile operations and was compatible with the VRC-12 and PRC-25 series of

radios. Unlike the larger, heavier MRC-69 and MRC-112, the set was small enough to be airlifted in assault helicopters. Kits were also available for installing it in a quarter-ton truck or trailer. GRC-163's were first shipped to Vietnam in January 1968 and were accompanied by a two-man training team from the Electronics Command. Another four-man team was sent to Vietnam in August 1968 to train personnel of the 1st, 4th, and 9th Divisions to install, operate, and maintain the set.

CHAPTER XI

Administration

Administration at the division level in Vietnam included a wide range of activities in the area of combat service support. Finance, personnel, casualty reporting, information, postal, legal, chaplain, special services, inspector general, and adjutant general administrative elements were customers of the communications system.

Few things can lower a soldier's morale faster than errors in his pay. Accurate pay in Vietnam depended on accurate data and rapid notification of adjustments. For soldiers assigned to lonely radio relay stations or to maneuver battalions and their supporting elements, getting to the finance office to check out a pay discrepancy or to make a change was not easy. Administrative personnel had to rely on the communications system to assist the soldier with his pay problems. The radio, teletypewriter, and telephone provided the means for them to initiate and monitor the field soldier's paper work.

Divisional finance organizations included a main office at the division headquarters and branch offices with major subordinate units at different locations. The main office had to stay in close contact with these dispersed branches to safeguard funds, maintain efficient service, and keep accurate records. Finance offices provided forward service teams to maneuver units on paydays or at processing points. Their functions ranged from receiving pay inquiries to providing payrolls to authorized (class A) agents. The responsibilities involved in distributing millions of dollars in military payment certificates each month and in accurately maintaining from ten thousand to thirty thousand pay records made effective coordination a must. Communications, primarily by telephone and teletypewriter, were vital in the coordination and efficient operation of the divisional and separate brigade finance offices.

Some customers of the communications system had sporadic massive calls for coordination. One of these was the finance office on "C-day," or conversion day, when one color-coded military payment certificate series changed to another, a measure

to help control counterfeiting and black-marketing. Such conversions were well planned and were detailed in standing operating procedures, but the plans did not adequately provide for the large increase in communications support required to carry them out efficiently.

During 1971, the joint uniform military pay system (JUMPS) was implemented throughout Vietnam. This system for paying military personnel was centralized and completely automated. The heart of the operation was at the U.S. Army Finance and Accounting Center at Fort Benjamin Harrison, Indiana. Pay-related data from units all over the world, including Vietnam, were fed into the center over high quality circuits of the automatic digital network (AUTODIN). In Vietnam, however, network terminals were not located near all the finance offices. Where no such terminal was nearby, the finance office had to get its data to a terminal by messenger. The tactical communications system could not provide the high quality circuits needed to extend the network into the divisional areas.

A flood of questions from field units and clarifications from higher headquarters came inevitably as the new comprehensive pay system started. During the early stages of implementation in Vietnam, most of the finance offices there telephoned the Finance and Accounting Center in Indiana daily, asking questions about implementing and coordinating the new system and receiving answers to the preceding day's questions. Considering the ever present possibility of a telephone preemption, this approach worked remarkably well. The first payday under the system had produced a considerable number of disgruntled soldiers. The story went the rounds in Vietnam that General Abrams called in the Military Assistance Command finance officer for a report on the situation. Brushing aside some optimistic forecasts, General Abrams reportedly said, "I want every effort made to see that the troops get paid. . . . and then see if you can get me paid too." Hard work and busy phone lines got rid of the bugs.

By the time of the Vietnam war, the American public had become accustomed to rapid worldwide communications. The people back home expected to hear within a matter of hours if a relative or loved one had become a battle casualty. Procedures and communications support had to be established to meet that expectation. The situation was complicated by air evacuation of wounded and dead. A casualty could be evacuated by helicopter in minutes from the battlefield to a hospital and then, in some cases, by plane in hours back to the States. The additional distress and

shock to parents if the body of their son should arrive in the United States before they were notified had to be avoided. Some units established separate circuits reserved solely for casualty reporting. It was and will remain a top priority administrative requirement upon the communications system, especially during periods of heavy combat.

Another major customer of the communications system was the division G–1 or adjutant general, who carried out personnel and administrative functions. His calls to coordinate matters with higher and lower headquarters made up a major portion of the telephone traffic load, although he also used messengers, couriers, and the radio teletypewriter. The personnel work load in Vietnam was greater than the normal, both because of awards, decorations, casualty reporting, and rest and recuperation leaves attributable to combat and because of deliberate cross-transfers to avoid mass rotational losses that would cripple a specific unit. Such transfers were necessitated by the fixed tour and by the group arrivals of members of incoming units.

The phase-down created more personnel and communications work. Not only did men from units being closed out have to be shifted to other units, but most units tried to assign each individual to the major unit of his choice. The telephone service, the local lines and the long lines, received both praise and criticism during the buildup and phase-down in Vietnam. In spite of some shortcomings, it more than adequately responded to the needs of the divisions.

One development in management practices was beginning to have some influence on the communications system during the Vietnam war but did not reach the impact that it will have on a future conflict if the trend continues. That development was the increased use of business machines and computers to assist in the support of combat operations. In Vietnam, business machines such as the National Cash Register Model 500 were used for stock and inventory work in logistics, and the Univac Model 1005 was used in personnel and finance. The divisional communications system was not able to extend the high quality circuits needed for the joint uniform military pay system, but future use of speedy data processors or their replacements may mean that the division will have to provide the circuits.

CHAPTER XII

The Training Base

If the military organizations are to survive for long on the field of battle, they must be constantly strengthened by trained men to replace those lost through rotation, promotion, sickness, or battle. Both in quantity and quality, the U.S. Army training establishment measured up to the Vietnam war expansion and the demand for trained replacements. To this end, many training courses had to be run on three shifts, around the clock. Skilled military instructors were assigned first to the classroom, then to Vietnam, then to the classroom again. Many worked not only their full duty shifts but also added hours repairing equipment and doing other work which helped ensure that the training program would go on. At a number of communications training installations, civilian staff members and civilian instructors also played a crucial part in the herculean task of meeting the demands for trained technicians. Their corresponding stability, expertise, and dedication often made the difference between success and failure when the military staff was riddled by overseas levies. Together, the civilian and military teams got the job done.

Before the Vietnam war, training in the technical services such as the Signal Corps had been the responsibility of the chief of the service concerned. The chief signal officer had under his command the Signal Training Command at Fort Monmouth, New Jersey, which directed all Signal Corps field training activities, including the Signal School at Fort Monmouth, the Signal Training Center at Fort Gordon, Georgia, and the Training Command Detachment at Fort Bliss, Texas. He also held responsibilities for signal research and development and for signal supply and procurement.

Shortly after assuming his duties in 1961, Secretary of Defense Robert S. McNamara directed a number of special studies aimed at improving management practices within the Department of Defense. One of these special studies was Project 80, "Study of the Functions, Organization and Procedures of the Department of the Army." The study was made by a hand-picked task force of military

men and civilians headed by deputy comptroller of the Army Leonard W. Hoelscher. The study began on 17 February 1961 upon the approval of the study plan by Army Chief of Staff General George H. Decker. As the Hoelscher committee neared completion of its report, representatives of the deputy chief of staff for logistics raised strong objections to some features. Brigadier General James M. Illig and Dr. Wilfred J. Garvin took particular exception to the technical service chiefs' losing their responsibilities for the technical training and career management of their personnel. They expressed the view that combat arms agencies such as the Continental Army Command and the Office of Personnel Operations could not produce the kind of skilled technicians required in an era of rapid technological change for service throughout the Army and Department of Defense.

The Hoelscher committee submitted its report in October 1961 and was disbanded except for a small residual staff. General Decker appointed a general staff committee under Lieutenant General David W. Traub, Comptroller of the Army, to study the Hoelscher committee report and recommend what actions the Army should take. The Traub committee supported the recommendation that technical training be transferred to the Continental Army Command.

Secretary McNamara pushed for action. At an 8 December 1961 meeting with the Army technical services chief, he asked for their views on the broad aspects of the reorganization plan. Chief Signal Officer Major General Ralph T. Nelson concurred in the recommended changes.

On 16 January 1962, President Kennedy sent the reorganization recommendations of Secretary McNamara to Congress. Under the provisions of the McCormick-Curtis amendment to the Defense Reorganization Act of 1958, the proposals went into effect on 17 February 1962 when Congress failed to exercise its right to object within thirty days. Secretary McNamara pushed implementation. On 1 August 1962 the chief signal officer was placed under the general staff supervision of the deputy chief of staff for operations. The Signal Corps part of the reorganization was completed on 28 February 1964 when the chief signal officer was divested of his remaining field activities and was integrated into the staff of the deputy chief of staff for operations as Chief, Communications-Electronics, under the provisions of Department of the Army General Order 28.

The U.S. combat support phase of the Vietnam war began in late 1961 and the combat phase in mid-1965. Between these two

crucial dates, direct responsibility for the training of Signal Corps technicians was transferred from the chief signal officer to the commander of the Continental Army Command; the procurement and distribution of Signal Corps equipment was transferred from the chief signal officer to the commander of the new Army Materiel Command; and the responsibilities for training publications and technical publications were transferred to the new Combat Developments Command and Army Materiel Command, respectively.

Among the many schools run by the Continental Army Command were schools representing most of the branches of the Army with the exception of those schools in the medical, legal, and intelligence fields which were the responsibilities of the appropriate Department of the Army staff members. The schools most closely associated with divisional communications were the Southeastern Signal School at Fort Gordon, Georgia; the Signal School at Fort Monmouth, New Jersey; the Field Artillery School at Fort Sill, Oklahoma; the Armor School at Fort Knox, Kentucky; and the Infantry School at Fort Benning, Georgia. All others, including the higher level staff colleges and senior service schools, had an interest in the quality and utilization of the product but little part in its development.

The effectiveness of divisional communications depended heavily on the skills and dedication of the enlisted technicians who installed and manned the systems that carried the voice of command. The Southeastern Signal School at Fort Gordon generally taught most of those enlisted military occupational specialties that fell in the tactical area while the Signal School at Fort Monmouth taught the strategic and fixed stations skills. *(See Appendix A.)* Communications training also went on at a number of Army training centers. For example, training in military occupational specialty 05B, radio telephone operator, was conducted under the doctrinal monitorship or proponency of the Southeastern Signal School at Fort Dix, New Jersey; Fort Jackson, South Carolina; Fort Knox, Kentucky; Fort Huachuca, Arizona; and Fort Ord, California. Training in other heavy volume military occupational specialties was conducted under Southeastern Signal School proponency at Fort Polk, Louisiana; Fort Leonard Wood, Missouri; Fort Dix; Fort Jackson; Fort Huachuca; and Fort Ord.

When the Vietnam war began, an expanding Army increased its divisional requirements. The training load doubled. In 1962 the Southeastern Signal School graduated 16,643 tactical communicators; in 1967 it graduated 42,901. Wartime training under the

ground rules that were in effect became a mammoth task.

Some of those rules established for the Vietnam war were to have a distinct impact on the training establishment and differed from those existing in previous wars. Some of these ground rules were imposed on the Army and some were, at least partially, self-imposed.

In World War II, the draft period was "for the duration plus six months." For the Vietnam war, it was for two years. This ground rule for the Vietnam war further aggravated the training problem because the non-Regular Army personnel who developed experience in a combat tour did not have enough time left in the service to man other units or to act as instructors. Nor could a draftee be sent to a unit outside the combat area for any lengthy period of on-the-job seasoning after his school training and still have time left for a Vietnam tour. The training establishment had to train people to fill both requirements, combat and non-combat. The twelve-month Vietnam tour, coupled with the loss rate for all other causes, meant a heavy personnel turnover. This, in turn, meant a quantity requirement against the training establishment, especially when the Army was expanding rapidly to meet ever-rising strength levels in Vietnam.

Experienced communications personnel who could be used as instructors were in short supply. This understrength was further aggravated by a ground rule which authorized some instructors to be absent for half of each training day to attend civilian job training under Project Transition. This well-intentioned project was open to servicemen within six months of the expiration of their term of service and was designed to provide a more orderly transition into the civilian job market. The top priority task of training communicators for the battlefield was degraded by the loss of these experienced instructors. In 1968 the Southeastern Signal School estimated that over a hundred thousand hours had been lost to Project Transition at a time when such a loss could be ill afforded.

The presidential decision not to call up any significant number of reserve component elements or individuals posed a number of problems. The impact on the training establishment was felt primarily in the junior officer and noncommissioned officer areas. Both the instructor corps and the student support units needed more junior officers and noncommissioned officers of maturity and experience. The ground rules precluded looking to the reserve components for assistance.

Another problem was the lack of an adequate ground rule for the distribution of new equipment. For the training base to develop

operators and repairmen, it must get a proper portion of the early production of new items of equipment to use for training. All too often the training base had to fight tooth and nail for what should have been recognized as a normal requirement. Similarly, when new items of equipment come into the inventory to replace older models, the changeover frequently takes many years. Economic considerations concerning maintaining production lines, stretching out costs over a number of fiscal years, and getting the most for the dollar by using the old equipment longer in lower priority units have a degree of validity. In the training establishment, these ground rules frequently resulted in having to instruct on more than one generation of equipment at the same time or in instructing students on a generation of equipment different from that which their unit of assignment would have. In equipment changeover, the ground rules on timing were frequently governed more by fiscal considerations rather than by training and operational needs. Student deferment was another of the ground rules that affected the training base. The existence of a large college population meant that the input to the armed forces as a whole was not a true cross-section of the talent which could have been available. Subtract from the available input those volunteers accepted by the Air Force, the Navy, and the reserve components, and a quality problem starts to appear. In training technicians for the communications field, the quality of input matters.

The personnel system managers at Department of the Army level maintained a strong emphasis on limiting the number of military occupational specialties and related special skill or training identifiers. This policy led to problems, especially in the communications field. The training base would provide specialized training of individuals to meet battlefield requirements, only to have the individual end up in the wrong location. The personnel system could not identify the individuals well enough to get them to where the need existed. This difficulty was noted by the Continental Army Command Training Liaison Team which visited Vietnam in August–September 1967. Colonel Edward E. Moran, the signal representative on one of the early liaison teams, stated in his trip report that procedure was required whereby individuals who received specialized post-military occupational specialty functional training could be identified in Vietnam and be assigned to units requiring those specialized skills. Instances were noted where jobs requiring specialized training were filled by untrained personnel, while trained individuals were assigned elsewhere.

Shortly after the combat phase of the Vietnam war began, liai-

son between Continental Army Command schools and battlefield elements was established by a number of methods. One was visits by the training liaison teams. Colonel Moran's trip report stated that the purposes of his trip and its overall objectives were to establish a responsive system of feedback data from the field to responsible schools, determine the quality of and specific deficiencies found in school graduates, ascertain potential problem areas, and gather data which would be directly applicable to courses of instruction.

Liaison visits were as effective as the power of observation and analysis of the team members, the effort expended, and the cooperation of the host command. Colonel Moran's summary comments reflect the effectiveness of this early liaison visit.

Colonel Moran's team found that Continental Army Command Signal School graduates performed well in Vietnam. The speed with which they became fully effective on the job depended directly upon their training on specific equipment makes and models in use in Vietnam, the extent to which their training was systems oriented, and the length of time between completion of schooling and reporting to unit assignments in Vietnam. In the great majority of cases one week or less of on-the-job training was sufficient.

The types and items of equipment used in Vietnam in some cases had been phased out of school courses in favor of newer equipment. Colonel Moran recommended that older equipment be reinstated in pertinent courses until its use had been discontinued in Vietnam. In other instances, greater emphasis should have been placed on specific aspects of training to increase early effectiveness on the job.

Communications systems training should be emphasized, Colonel Moran found, and the requirement to fight as infantry as well as perform as technicians should be impressed upon the signal school student during training.

The team found signal units generally up to authorized personnel strength, although critical shortages existed in a number of specific military occupational specialties. In many instances, school graduates with post-military occupational specialty graduation functional training were not assigned to units requiring the training. Cable splicer, 36E, school graduates were not available on requisition. A course in Vietnam was necessary to fill this need.

In many instances, Colonel Moran found, slow supply response to emergency ("Red Ball") repair parts requisitions delayed the repair of critically needed communications equipment.

The team thought the U.S. Army, Vietnam, headquarters bimonthly publication, "Command Communications," established

in September 1966, was an effective organ for feedback on communications experience.

Certain revisions or changes in emphasis of school courses were indicated. For example, the fixed station technical controller, 32D, needed to be trained in specific facility control operations as performed in Vietnam. Particularly important were circuit standards, equipment interfacing, local operation procedures, restoring circuitry, and operation of the AN/MRQ-73. Communications center specialist, 72B, training required greater emphasis upon perforated tape reading, message transmission rather than reception, message format, and classified material accounting.

Another liaison channel was initiated on 22 August 1967 by Brigadier General William M. Van Harlingen when he wrote to Major General Walter B. Richardson, the commander of the U.S. Army Training Center and Fort Gordon. General Van Harlingen stated that since arriving in Vietnam he had felt a need for exchanging information with the Southeastern Signal Corps School, from his viewpoint both as the 1st Signal Brigade commander and as the assistant chief of staff for communications-electronics for U.S. Army, Vietnam. He had some unusual problems in training because of the environment and because of much new equipment being put to its first large-scale use. On both counts General Van Harlingen suggested an informal monthly information exchange with the school. General Richardson enthusiastically endorsed the recommendation.

As this liaison grew, detailed reports from the battle area came to the school and equally detailed replies returned. In a 13 October 1967 letter, General Van Harlingen discussed difficulties in maintaining the AN/GRC-106 radios. The deadline rate increased from 14.43 percent for the January-June period to 16.6 percent for the June-September period. A shortage of repair parts contributed to approximately 50 percent of that rate during the first period but to less than 5 percent in the second period. The shortage of qualified single sideband radio repairmen was most critical at that time. General Van Harlingen sent a technical assistance team from General Dynamics to the field to survey the training problem, give remedial operator and maintenance training, and observe repair shop procedure. The team would also give command staff orientation and evaluate the effectiveness of the new equipment training team and the utilization of repairmen trained by the team. He hoped also to receive an interim report on 1st Logistics Command repair facilities before 15 October and to include it in his next letter. In early September a member of General Van Harlingen's staff

attended a Distribution and Allocation Committee meeting at the office of the Army deputy chief of staff for logistics. At that meeting, representatives supported a recommendation to divert two hundred AN/GRC-106's plus a few AN/GRC-142's and 122's and AN/VSC-3's to Continental Army Command for immediate distribution to the schools. The hope was that this equipment would improve both operator and maintenance training.

In his reply on 26 October 1967, General Richardson indicated that the Signal School at Fort Gordon recognized the difficulty in maintaining the radio set AN/GRC-106. There was a high deadline rate for the training equipment; of the twenty-two sets on hand, only eleven were working. To compensate, Continental Army Command had allocated thirty more sets for the school from current production runs. This action supported his view that if the Signal School was to provide trained, qualified men for new equipment, it must receive its training allocation from early production runs.

In another letter on 15 May 1968, General Van Harlingen noted that a Continental Army Command liaison team had recently completed its quarterly visit to Vietnam. Colonel Theodore F. Schweitzer, the director of instruction at the U.S. Army Signal Center and School at Fort Monmouth, was the signal representative on the team. The team visited Military Assistance Command, his headquarters, each field force, five divisions, two separate infantry brigades, and the 1st Signal Brigade and several of its units throughout the command. Colonel Schweitzer met and discussed signal training with commanders, staffs, and enlisted communications specialists in all these organizations. He made the following general observations: Enlisted and officer students did not receive sufficient instruction on the Army Equipment Records System (TAERS). Students being trained on communications equipment normally mounted on a vehicle with a power generator as a part of the total package should receive training in 1st echelon maintenance of the vehicle, trailer, and power generator. Maintenance personnel in general were well trained in circuitry, in reading schematics, and in repairing equipment once the fault was found, but they should be better trained to identify and isolate trouble. There was a lag in receipt of trained operators and maintenance personnel for new equipment being introduced into Vietnam, but Southeast Asia Signal School was training selected cadre personnel from units already in the country. Carrier wave, Morse code, was not being used in any unit contacted, so continuing training in Morse code for the 05B and 05C should be studied to determine if it could

be eliminated. Communications officers (MOS 0200) were particularly well trained to perform the communications functions within the combat battalions, but they were also required in most cases to perform as duty officers in the battalion tactical operations centers and were not trained in that area.

Colonel Schweitzer found the most frequent complaint about newly arrived radio relay and carrier attendants (MOS 31M) was that their school training barely prepared them for the job in Vietnam. They were weak in knowledge of erecting and connecting the antenna; many indicated that training in antenna erection consisted of observing demonstrations. Personnel also needed training on the new AACOMS pulse code modulated (PCM) equipment and in the maintenance of the vehicles and generators associated with radio relay equipment.

Colonel Schweitzer noted several deficiencies in the training of radio teletypewriter operators (MOS 05C). Personnel arriving in Vietnam lacked knowledge in the fundamentals of HF operation. They were unfamiliar with space diversity operation, and their knowledge of antennas was generally poor. Most needed additional training on the KW-7 security equipment.

Colonel Schweitzer concluded that with these exceptions the training of communications personnel appeared to be satisfactory for operations in Vietnam. General Van Harlingen agreed with the observations and recommendations. This comprehensive report of the Continental Army Command liaison team was studied in depth at the Signal School. The school was already aware of a number of the problem areas and had made progress toward eliminating them.

Troubleshooting by maintenance personnel was considered the most important aspect of all maintenance training. The trend was toward less theory and more training with the actual equipment to be used on the job. Evaluations during training were planned to determine any deficiencies. The lag in the arrival of operators and maintenance personnel trained for new equipment continued to be a problem and was constantly addressed by the school. Training on pulse code modulated equipment appeared to be the major area of concern. The school's main problem in this area was the lack or the late receipt of sufficient quantities of new equipment to conduct adequate training. As a part of the effort to do everything possible to relieve that problem and to provide the 31M course the minimum equipment required, the school consolidated the PCM equipment available in that course.

Liaison by correspondence continued periodically for several

years. Further liaison came by way of senior members of the Signal Corps who spoke to graduating officer classes at the Southeastern Signal School. These occasions provided excellent opportunities for personal exchanges of views with the school staff on training problems related to tactical communications and frequently resulted in further discussions by correspondence.

Major General William B. Latta, commander of the U.S. Army Electronics Command, visited Fort Gordon as a graduation speaker and examined the training being conducted. He later indicated to Colonel Moran that training for the radio relay specialist, 31M, was lacking in three respects. The course was too short, even though it had been increased from twelve to fourteen weeks. Too much time was lost in the three-week training on pulse code modulated equipment and the losses from three-shift operation. The practical work was conducted on a parade ground and did not give the necessary training for field conditions. General Latta recommended a two-week period in the field. System training was a necessity for the radio relay specialist. On-the-job training was cited by General Latta as essential "to polish previously attained knowledge and skills." It was not acceptable to prepare men only as apprentices for further training in their units.

Many other means were used to make school training as relevant as possible. The rotation of enlisted instructors between combat duty and classroom duty provided realism. Incorporation of lessons learned and other operational reports from Vietnam into the training program was pushed. Exit interviews made by Vietnam veterans upon completing their tours were analyzed for their contribution. Major Clark Jonathan Bailey II, signal officer of the 11th Armored Cavalry Regiment, pointed out in his interview that he, the regimental officers, and the noncommissioned officers all felt that the military occupational specialty training was not adequate. He specifically cited the radio mechanic/radio repairman, MOS 31B, and the radio teletypewriter operator, 05C. Men in these specialties were trained to repair components but they did not understand nor could they analyze communications systems. Major Bailey also noted that they did not seem to understand the basic principles of how to overcome adverse communications conditions and made little effort to correct problems before calling for a repairman.

Within the limitations of their funds, equipment, instructors, and facilities, the schools and training centers tried to respond to the field. One limitation on their ability to respond was a 10 percent restriction on changes in course content. Any greater change

BRANT HALL, *new home of avionics maintenance courses at Fort Gordon.*

required Continental Army Command approval. The time required to process change requests and the questionable technical capability of the command to evaluate them provided difficulties for the schools. Another source of conflict in the repair field was with the Army Materiel Command over the adequacy and timeliness of technical manuals. Some of these difficulties could possibly be attributed to the newness of the responsibilities assigned by the Project 80 reorganization, but improvement in these areas remained a high priority from the viewpoint of the schools throughout the war.

On 12 September 1966, Continental Army Command issued a letter, "Policy Guidance—Electronics Training." This letter presented a training formula that applied primarily to the repair field. In this formula the available time (for enlistments and training) and the average aptitude of trainees were, for the moment, constants; the method of training was the only variable to manipulate. The letter went on to give specific Department of Defense guidance and objectives, but what it all added up to was a major challenge to the training establishments. Through the dedication of many individuals, the training establishment overcame limitations in the areas of equipment, personnel, facilities, and funds to meet and support the Vietnam war requirements.

One view of the lessons which should have been learned by the training establishment from these experiences is summed up in the

following statement made by a senior officer who served at one of the signal schools during the Vietnam war period:

From the viewpoint of a service school official, my priority list for three changes to improve on Vietnam War school experiences would be:

1. Higher Training Equipment Priority: Early and adequate issuance of equipment is essential to "hands on" equipment oriented operator and repair courses.

2. Greater Course Revision Authority: During time of war, the service school commandant must have greater responsibility for the adequacy of his instruction and greater authority to change it. I would propose 20% authority in course length and 40% authority in course content.

3. Higher Officer and Instruction Priority: In time of war, there are few stateside missions higher in real priority than that of preparing troops for combat. Upon completing their combat duty, top performers from the combat zone must be brought back to the school system where their influence can be magnified.

CHAPTER XIII

Combat Communications in Retrospect

There is much to learn from the ten years in Vietnam. The always constrained nature of the war affected tactical communications in many ways. In World War II, four years when the technological might of the United States was fully committed to the conflict, unbelievable advances were made in every field. Radar progressed from infancy to a decisive weapon. Propeller aircraft gave way to jet aircraft. Radios were rapidly designed to keep pace with the armored and mechanized divisions that ultimately won the battle in Europe. Hiroshima and Nagasaki marked the dawn of nuclear war.

In Vietnam, over a time span more than twice that of World War II, there was no matching technological progress in communications-electronics equipment. Perhaps the nature of the war itself militated against it. Perhaps the war's not being considered one of national survival stifled the motivation of the technological base. Riverine operations in the Mekong Delta and the incursion into Cambodia in 1970 taxed the ingenuity and skill of the tactical communicators to the limit and they responded admirably, with the same equipment doing the same job that it did in 1963. Some progress was made with single sideband operation of newer high frequency radios, and a degree of voice security was finally provided for FM radios. But telephone switchboards remained slow and unsecured. The promise of tactical satellite terminals that could free U.S. troops from the constrictions of terrain never materialized. Heliborne command and control consoles were still scarce, mainly "jury-rig" affairs which never achieved a standard configuration because it seemed everyone wanted something just a little bit different. Crypto keying of what few security devices there were became a logistic, maintenance, and operational nightmare. Preparation and transmission of situation and intelligence reports were so cumbersome and time consuming that messengers were often used instead of electrical means. In short, it was more a war of individual improvisation than of equipment modernization, at least for the tactical communicator. Yet, so handicapped, he did

well, getting more mileage from what he had than the designers ever thought possible and seldom if ever causing an operation to fail because of a lack of communications.

The scope of the improvisations was certainly driven by the constantly changing character of the conflict and the varied environments in which it was waged. Major combat units were organized in Vietnam. Some Army units were attached to Marine units; others found themselves committed full time to what could only be described as semiamphibious operations in the Mekong Delta. Divisions were given tactical areas of responsibility exceeding anything in their past experience. These departures from conventional ways of doing things were orchestrated over the full gamut of terrain and climatic conditions that characterized South Vietnam.

Another major factor which reflected in the individual initiative shown by the tactical communicators was the peculiar structure of the combat zone outside of the division tactical areas of responsibility. There were never any corps in the doctrinal sense of the word nor a field army that could be identified as such. When the division signal battalion looked to the rear (and the rear, itself, was sometimes pretty hard to find) it saw the multichannel systems and equipment of the First Signal Brigade. The brigade networks normally did not link the divisions to the field force headquarters, the closest thing to a corps headquarters in Vietnam, but generally to either U.S. Army, Vietnam, or Military Assistance Command headquarters in Saigon. In almost every division, in fact, elements of the First Signal Brigade were meshed with the battalions because the division signal battalion by itself was often unable to handle the large area that the division had been assigned. It is little wonder, then, that multichannel improvisations in the 9th Division in the delta varied greatly from those employed by the 1st Cavalry Division in the highlands. Each major combat unit had its own story to tell.

The workhorse of tactical communications in Vietnam was, without question, the FM radio—backpack, vehicular, and airborne. If the FM nets failed, the battle had to be fought with reduced command and control, a not impossible task but risky at best. But, because of limited security devices which were hard to key and maintain, it was hard to make everyone radio security conscious, and the North Vietnamese, as General Abrams put it, "read our mail" far too often. In the closing days of conflict, after U.S. combat forces had been withdrawn, the FM secure radios were still calling in B-52 strikes. These radios often provided the only link between the air operations center at Military Assistance Command

headquarters and the beleaguered military district where their lethal efficiency was so sorely needed.

Communications combat narratives consistently reflect the struggle between the FM radio operator and his unfriendly environment. It seemed always that the trees were too high, the ground was too flat, the frequencies were too few, or the congestion was too great. But somehow he would make the FM radio work in spite of these obstacles, it seems almost incongruous that, recognizing the importance of FM, a reliable radio wire integration system (RWI) was not developed and fielded during the long war years. The need was great enough and the technological base was sound enough. Commanders at division and brigade level probably spent more time in the air in Vietnam than they did on the ground, and signal officers were constantly agonizing over ways of keeping them in touch with subordinate units and staffs when they were airborne. It seemed every major combat unit ended up with its own way of doing this, and some did not succeed in doing it at all. Throughout the whole conflict, most radio wire integration was accomplished by an SB-22 switchboard married to a black box that linked the FM radio and the switchboard so the radio call could be extended to the appropriate telephone subscriber. The radio wire integration operator manipulated this Rube Goldberg contraption manually and not easily.

Multichannel radio ran a close second to FM in importance and varied methods of employment. If a division did not establish multichannel links to its brigades, task forces, and fire bases quickly, the FM nets become so overburdened that the crucial combat information sometimes was lost in the shuffle. On the other hand, heavy vegetation and flat terrain often inhibited multichannel even more than FM transmission. Many reports reflect the conflict between the need to erect towers for better multichannel and FM coverage and the need to conceal command posts. The units, again, improvised.

The final days that preceded the withdrawal of remaining U.S. ground forces from Vietnam seemed an ironic flashback, from a communications point of view, to 1962 and 1963. In the four military regions the small military advisory group that remained was supported by a company-size communications unit that tied the advisory headquarters at Da Nang, Pleiku, Bien Hoa, and Can Tho to the Military Assistance Command headquarters in Saigon. Tactical communications, in the context of providing command and control for U.S. combat units, had played its role and had left the stage. The durable "backbone" communications system, for years

the hallmark of the legendary First Signal Brigade, had undergone a major transition, operated first by U.S. Army signalmen, then by U.S. contractors, and finally by South Vietnamese forces. The familiar antenna-studded hilltop relays remained, but the reliability and traditional quality had eroded to a point where use of the system was a struggle, not a virtue. Nevertheless, the nontactical voice security equipment that linked these four regions to Saigon and provided the only means of vectoring in B-52 strikes "rode" this tenuous system until the waning days of our involvement.

Thus, Army communications left Vietnam in much the same way as it arrived—a single-thread umbilical supporting a small group of military advisers. But the impact of its presence and influence on combat in a remote country against an unsophisticated but resourceful and tenacious enemy was etched in a thousand narratives of this most difficult war. We may well fight again under similar conditions—somewhere. If we do, the resourcefulness and ingenuity of the American tactical communicator will surface again, as it always has.

Appendix A

Some Divisional Enlisted Military Occupational Specialties, Communications

Radio Telephone Operators	05B and 05C
Linemen	36C and 36K
Telephone Switchboard Operator	72C
Communications Center Specialist	72B
Radio Relay and Carrier Attendent	31M
Tactical Circuit Controller	31N
Power Generation Equipment Operator/Mechanic	52B
Tactical Communications Chief	31G
Area Communications Chief	31Z
Combat Photographer	84B
Aerial Sensory Devices Operator	26E
Photographic Laboratory Specialist	84G
Field Radio Mechanic/Repairman	31B and 31E
Teletypewriter Repairman	31J
Field Radio Relay Equipment Repairman	31L
Manual Central Office Repairman	36G
Surveillance Infrared Repairman	26N
Airborne Surveillance Radar Repairman	26M
Radar Maintenance Supervisor/Inspector	26W
Aviation Electronic Mechanic	35K
Aviation Electronics Communications Repairman	35L
Aviation Navigation Equipment Repairman	35M
Avionics Radar Equipment Repairman	35R
Aircraft Stabilization Repairman	35N
Aviation Equipment Maintenance Supervisor	35P
General Crypto Repairman	31K
Field General COMSEC Repairman	31S
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