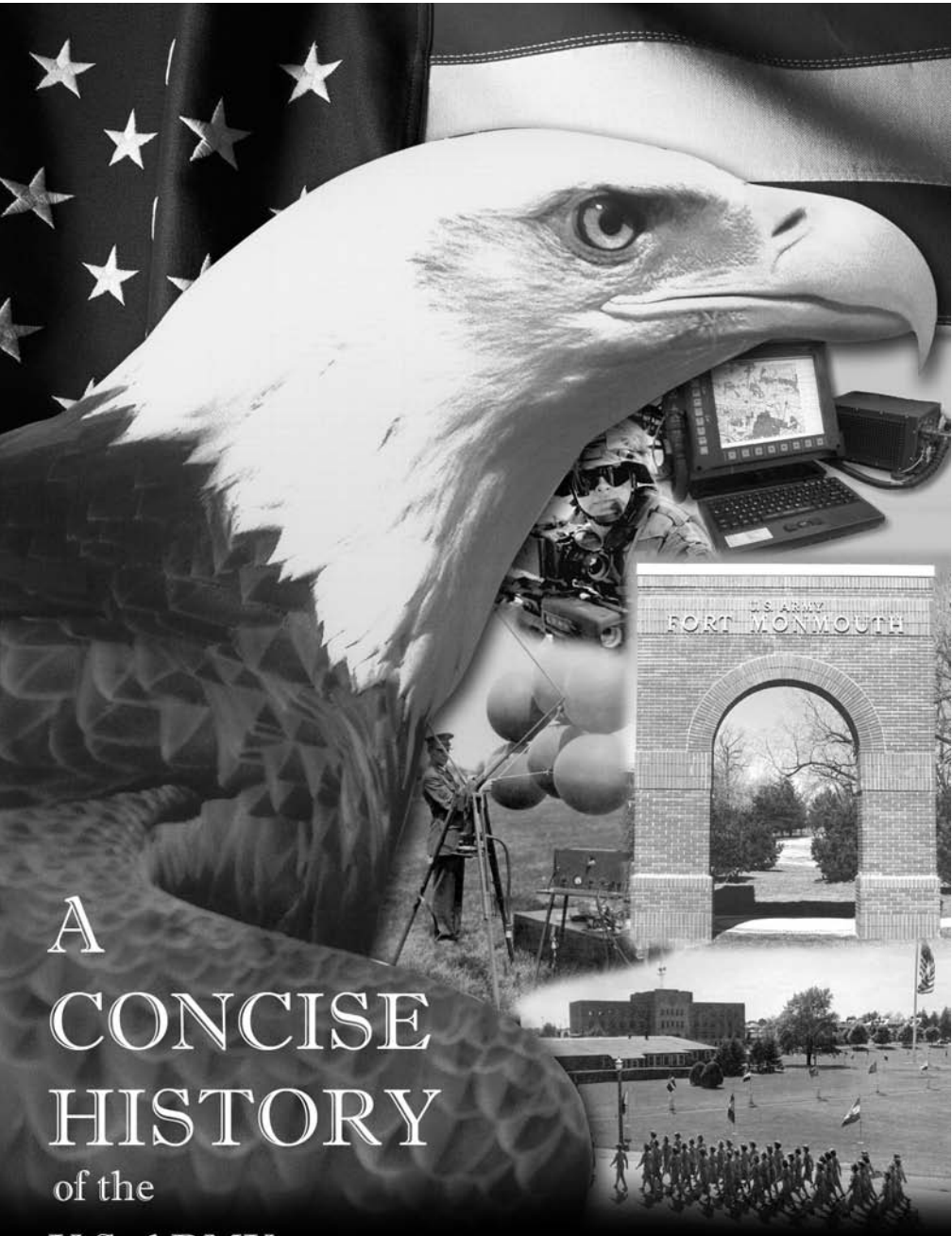
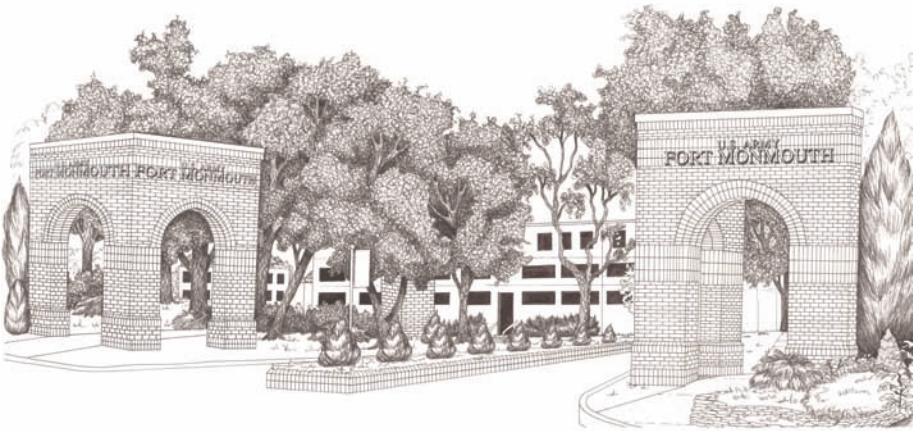


A CONCISE HISTORY

of the

U.S. ARMY
COMMUNICATIONS-ELECTRONICS
LIFE CYCLE MANAGEMENT COMMAND
and
FORT MONMOUTH, NEW JERSEY

A CONCISE HISTORY OF FORT MONMOUTH, NEW JERSEY AND THE U.S. ARMY COMMUNICATIONS-ELECTRONICS LIFE CYCLE MANAGEMENT COMMAND



Prepared by the Staff of the
C-E LCMC Historical Office
Office of the Deputy Chief of Staff for Operations and Plans
U.S. Army Communications-Electronics
Life Cycle Management Command
Fort Monmouth, New Jersey
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FOREWORD

The name "Monmouth" has been synonymous with the defense of freedom and liberty since our country's inception. The achievements of the organizations and people at Fort Monmouth have empowered our country and transformed the ways we fight from the early days of Camp Vail, through our involvement in armed conflicts over the decades, to our present-day contributions to the Global War on Terror.

This concise history represents only a cursory highlight of the achievements of the past eighty-eight years. Each and every day, we work not only to maintain the current readiness of our armed forces, but also seek new ideas and technologies designed to improve their capabilities. While the tools used to accomplish our mission today are radically different from those used in years past, the nature of our mission has changed very little from the days of wig-wag flags and carrier pigeons.

I encourage each and every one of you not only to read this brief history, but also take the opportunity to make your own history as well. If there is but one central, underlying lesson to be gained from this book, it is that each member of this organization plays a critical role in equipping our forces and defending the ideals of our nation.

To those of you who have spent a great deal of time and effort in pursuit of these noble goals I commend you; and to those who are just beginning their journey I extend my best wishes for your future success.

Sincerely,

Michael R. Mazzucchi
Major General, USA
Commanding and PEO C3T

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1
THE BEGINNING AND WORLD WAR I

The Army recognized at the outbreak of World War I that the Signal Corps's strength of less than 2,000 officers and enlisted men was incapable of providing needed communications support should the United States enter the war. This small service, with personnel obtained chiefly by the detail system, had been designed primarily for border and insular operations.

In October 1916 the Office of the Chief Signal Officer (OCSigO) asked the executives of American Telephone and Telegraph, Western Electric, Western Union, and the Postal Telegraph Company to recruit from among their trained employees personnel for a Signal Enlisted Reserve Corps. The response was more than could have been hoped for when 1,400 of the 6,000 male employees of the Bell Telephone Company of Pennsylvania applied for enlistment.

The Signal Corps needed places in which to prepare these citizen Soldiers for service in battle. The history of Fort Monmouth, then, began in 1917 when the Army established four training camps for signal troops. One was located at Little Silver, New Jersey. Fort Leavenworth, Kansas; Leon Springs, Texas; and the Presidio of Monterey, California housed the others. Government-owned land was utilized for all the camps except for Little Silver.

The Little Silver site lay in an area rich in history dating back to the American Revolution. It was near this site, in what became the Township of Freehold, that the Battle of Monmouth Courthouse occurred. There, General George Washington and his Continental Army troops engaged the British forces led by Sir Henry Clinton on 28 June 1778. The British slipped away after dark and reached the safety of the British fleet guns at Sandy Hook. Although victory was inconclusive, the battle did show that the Continental troops had learned to fight on equal terms with the British regulars in open battle thanks to the training of Baron Von Steuben.

Molly Pitcher at the Battle of Monmouth.

The Battle of Monmouth Courthouse became famous as the last major engagement of the Revolution to be fought in the North. It is perhaps best remembered for the alleged exploits of Molly Pitcher, the housewife who, while carrying water to artillerymen, reportedly saw her husband fall wounded and took his place until help could arrive.

Improvements in steamship and railroad transportation later allowed the "Jersey Shore" to become a popular summer vacation retreat for harried New Yorkers during the second half of the nineteenth century. Seven U. S. Presidents favored the seaside resort of Long Branch. Some of the city's wealthier habitués brought horse racing to the area with the construction of Monmouth Park, a one-mile track, in 1870. This park was located in what is now the southern portion of Fort Monmouth, in the vicinity of Patterson Army Health Clinic. The Entrance was located on today's Broad Street, near Park Avenue. An instant success, Monmouth Park flourished for twenty years. In season, two steamboats made daily runs from New York to Sandy Hook. There, patrons could make a connection to the park by rail.[1]

A bigger, fancier Monmouth Park opened on 4 July 1890. It featured a one and one half mile oval track, centered on what later became Greeley Field; a one-mile straight-of-way; a steel grandstand for 10,000 spectators that was reputedly the largest in the world; and a luxury hotel, fronting Parker Creek. The new park encompassed 640 acres – almost all of Fort Monmouth's "Main Post."

Monmouth Park Race Track closed three years later when the New Jersey legislature outlawed gambling. One of the feature races, the "Jersey Derby," moved to Louisville, Kentucky, home of the famous "Kentucky Derby." The deserted grandstand, track, and hotel fell into ruin. The grandstand succumbed to a nor'easter in 1899. The hotel burned to the ground in 1915.[2]

Amidst the turmoil of WWI, Colonel (retired) Carl F. Hartmann, the Signal Officer of the Eastern Department in New York City, tasked Major General (retired) Charles H. Corlett to "go out and find an officer's training camp." Corlett recalled his initial discovery of the Monmouth Park land in a 1955 letter addressed to Colonel Sidney S. Davis, Chairman of the Fort Monmouth Traditions Committee. He reported that after examining several other sites, he "finally stumbled on to the old Race Course near Eatontown. I found part of the old steel grandstand with eleven railroad sidings behind it, the old two mile straight away track and two oval race tracks, all badly overgrown with weeds and underbrush." Corlett went on to describe how he arranged a meeting with the owner of the land. "Upon inquiry, I learned that the land belonged to an old man who lived in Eatontown who was very ill (on his death bed in fact), but when he learned my business, he was anxious to see me."[3]

Corlett learned that the owner, Melvin Van Keuren, had offered to give the land to the Army free of charge during the Spanish American War. Van Keuren regretfully informed Corlett that he could no longer afford to do so. He offered instead to sell the land for $75,000.[4]

Corlett returned to his superior officers to report his findings. With authorization of the Adjutant General of the Army, then Lieutenant Colonel Hartmann leased 468 acres of the tract from Van Keuren on 16 May 1917 with an option to buy. The land, which was a potato farm at the time, was bounded on the North by the Shrewsbury River, on

the West and South by a stone road from Eatontown, and on the East by the Oceanport-Little Silver Road. Parker Creek, a tributary of the Shrewsbury, traversed the entire property near the northern limits. Notwithstanding the desolation of the site in 1917 – largely overgrown and infested with poison ivy – it afforded the Army significant advantages: six hundred feet of siding on a rail line of Hoboken (a Port of Embarkation) and proximity to the passenger terminal in Little Silver, as well as good stone roads and access by water. The Red Bank Register dated 6 June 1917 reported that the land leased by the government had been "farmed for the past four years by Charles Prothero. He will continue to work the farm south of the railroad tracks but all property north of the tracks has been leased by the government. On this property is a seventy acre field of potatoes. The government will recompense Mr. Prothero for this crop."[5]

The land would be purchased for $115,300 in 1919.[6]

CAMP LITTLE SILVER

Signal Corps Camp Little Silver, NJ (June 1917).
Encampment immediately inside East Gate.

The first thirty-two Signal Soldiers arrived at Fort Monmouth in June 1917 in two Model T Ford Trucks. This advance party under 1st Lieutenant Adolph J. Dekker brought tents, tools, and other equipment from Bedloe's Island, New York, to prepare the site on 3 June. By 14 June, they had cleared several acres on which they installed a cantonment, quartermaster facilities, and a camp hospital, all under canvas.[7]

The installation was originally named Camp Little Silver, based merely on its location. General Orders dated 17 June 1917 named LTC Hartmann the first commander. Members of the First and Second Reserve Telegraph Battalions arrived by train the following day. The War Department transferred forty-three noncommissioned officers from Fort Sam Houston, Texas, to meet the need for a cadre of experienced personnel. These men had served on the Mexican border. 451 enlisted men and twenty-five officers were stationed at Camp Little Silver by the end of the month.[8]

Construction of the "old wooden camp" proceeded at this time. Laborers worked overtime to complete a headquarters building, officers' quarters, barracks, transportation sheds, shops, and a warehouse near the railroad siding.

Corporal Carl L. Whitehurst was among the first men to arrive at Camp Little Silver. He later recalled that the site appeared to be a "jungle of weeds, poison ivy, briars, and underbrush." While remnants of the old Monmouth Park Racetrack seemed to be everywhere, only one building remained habitable. It was there, in that former ticket booth, that he and his comrades stayed while awaiting the delivery of tents.

Railroads soon brought the tents, as well as lumber with which to build barracks. Unfortunately, most of the lumber was green. According to CPL Whitehurst, "By the time the wood was dried out it was winter, and in December there were cracks you could put your finger through. The winter of 1917-1918 was a tough one, and sometimes the snow would pile up on your blankets, coming through the gaps in the boards."[9]

Colonel Hartmann was relieved of his command on 13 July 1917 by Major George E. Mitchell. Mitchell organized the Reserve Officers' Training Battalion and two tactical units, the 5th Telegraph and 10th Field Signal Battalions. Instruction of trainees began on 23 July. The curriculum included cryptography, the heliograph, semaphore, wig-wag, motor vehicle operation, physical training, dismounted drill, tent pitching, interior guard duty, map reading, tables of organization for Signal, Infantry, and Calvary units, camp sanitation, personal hygiene, first aid, and equitation. The troops spent much of their time clearing the area of undergrowth, repairing and extending roads, and digging drainage ditches. Nineteen Soldiers were hospitalized for poison ivy exposure in June; 129 in July.[10]

The Camp sent its first units (the First and Second Reserve Telegraph Battalions) to the Port of Embarkation on 7 August 1917. These units reconstituted in theater as the 406th Telegraph Battalion and the 407th Telegraph Battalion.

CAMP ALFRED VAIL

The camp achieved semi-permanent status and was re-named Camp Alfred Vail on 15 September 1917, just three months after its establishment. Vail, an associate of telegraph inventor Samuel F. B. Morse, was credited with helping him develop commercial telegraphy. Some felt that Vail's great contributions to wire communications merited commemoration of his name at a Signal Corps Camp.[11]

However, LTC Hartmann intimated in a 1955 interview conducted by Dr. Thompson, Chief of the Signal Corps Historical Division, that the Chief Signal Officer actually intended the naming of the Camp to honor his good friend, Theodore N. Vail, Chief Executive Officer of American Telephone and Telegraph. In the words of LTC Hartmann, "Recognizing the impropriety of naming the Post for Theodore N. Vail, it requires no stretch of the imagination to figure out why he (General Squier, Chief Signal Officer) came to name it 'Camp Alfred E. Vail'." The impropriety lay in the fact that Theodore Vail was living at the time and was serving as president of AT&T. According to Dr. Thompson, the Signal Corps owed nothing to Alfred Vail, who died

a year before the Corps was even established. They did, however, owe a good deal to Theodore Vail, who "helped provide the Signal Corps in World War I with communication company specialists manning the Corps' Telegraph Battalions."

Meanwhile, the Signal Corps faced an urgent need for telegraphers and radio operators in France. A six-week intensive training course on foreign codes and languages began at Camp Alfred Vail. The Army sent 223 men to the Camp for training and testing as German-speaking personnel. Additional groups of fifty or more arrived each month thereafter. The need for telegraph operators in France was so great that operators volunteering for overseas duty received bonuses.[13]

Camp Vail, NJ (1918). Blackboard reads: Non Com. Officers Class Army Paper Work. School for Enlisted Specialists, Camp Alfred Vail, NJ.

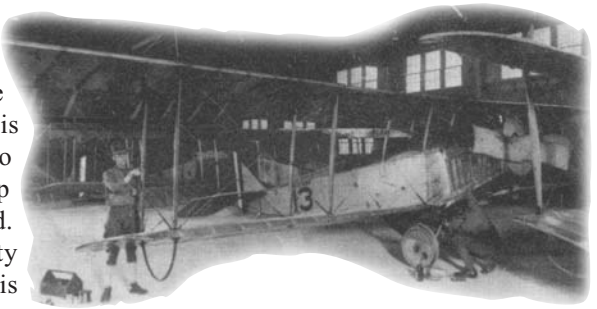
The 11th Reserve Telegraph Battalion boarded the train for Hoboken on 18 October 1917. Other units followed in rapid succession – a Radio Operator Detachment and the 408th Telegraph Battalion in November, and the 52nd Telegraph Battalion and the 1st Field Signal Battalion in December. Camp Alfred Vail trained a total of 2,416 enlisted men and 448 officers for war in 1917. The Camp trained 1,083 officers and 9,313 enlisted men in 1918. Between August 1917 and October 1918, American Expeditionary Forces in France received five telegraph battalions, two field signal battalions, one depot battalion, and an aero construction squadron from Camp Alfred Vail.

THE RADIO LABORATORY AND AERIAL TESTING

The particular demands of tank and aerial warfare in World War I necessitated a special Army laboratory devoted exclusively to developmental work. This laboratory would be entirely independent of the commercial laboratories. It would be a place where trained specialists could focus their energies on problems in wireless communication. The existing Electrical Development Division in Washington and the facilities in the Bureau of Standards were deemed insufficient for experimentation. Camp Vail was instead selected as the site.

Construction began in mid-December 1917. It was largely finished by the end of January. In addition to forty-three semi-permanent laboratory buildings in the vicinity of what is now Barker Circle, the contractor (Heddon Construction Company) drained and leveled ground for two air fields and built four hangars east of Oceanport Avenue.

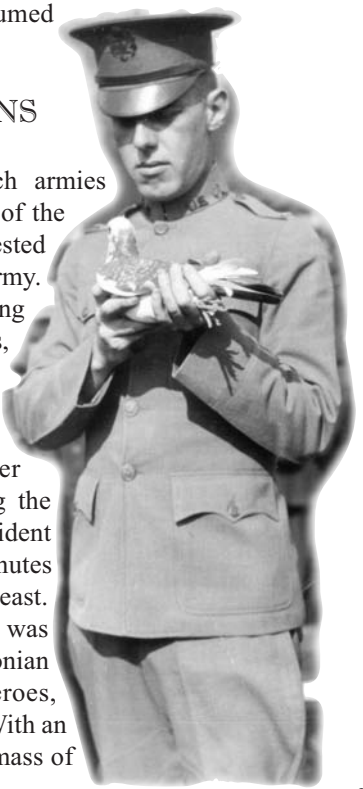
The Army charged the radio laboratory with the development of radio equipment. Research initially centered on vacuum tubes, on circuits of existing equipment, on the testing of apparatus submitted by manufacturers, and on the application of new inventions. A staff of forty-eight officers, forty-five enlisted men and twelve civilians (principally stenographers) accomplished this work.



Camp Alfred Vail, NJ (Circa 1919). Radio Laboratory personnel installing radio equipment in Curtiss JN-4 (Jennys).

Within a month, the radio equipment produced required ninety to ninety-five airplane flights a week for testing. This led area residents to mistakenly believe that Camp Vail was primarily an airfield. The camp's flying activity reached its peak during this time, with personnel of the 122nd Aero Squadron operating a total of twenty aircraft: two DeHaviland 4s, nine Curtiss JN4-Hs, six Curtiss 4-6HOs, and three Curtiss JN-4Ds. This represented the largest number of aircraft ever housed at Camp Vail.

Colonel George W. Helms, Signal Corps, assumed command of the camp on 28 June 1918.[14]



INITIAL USE OF HOMING PIGEONS

The use of pigeons by the British and French armies impressed General John J. Pershing, Commander of the American Expeditionary Force. He therefore requested such a service be established in the American Army. This was delayed due to the difficulty in acquiring the birds. The service (consisting of three officers, 118 enlisted men, and a few hundred pigeons) finally arrived in France in February 1918. 572 American birds served in the St. Mihiel offensive; 442 in the Meuse-Argonne offensive. Under murderous machine gun and artillery fire during the Meuse-Argonne offensive, the hero pigeon "President Wilson" flew twenty-five miles in as many minutes with a shattered leg and a badly wounded breast. Found dead in June 1929 at the age of eleven, he was stuffed, mounted, and donated to the Smithsonian Institution. The last of the World War heroes, "Mocker," died at Fort Monmouth in June 1937. With an eye destroyed by a shell fragment and his head a mass of

clotted blood, Mocker homed "in splendid time" from the vicinity of Beaumont, France on 12 September 1918 with a message giving the exact location of certain enemy heavy artillery batteries. American artillery silenced the enemy guns, saving countless lives.

The success of courier pigeons in war prompted the Army to perpetuate the service after the Armistice. Squier therefore established the Signal Corps Pigeon Breeding and Training Section at Camp Alfred Vail. The officer in charge of the British pigeon service supplied 150 pairs of breeders. They arrived at Camp Vail, without loss, in October 1919 and resided together with some of the retired "hero" pigeons of the World War in one fixed and fourteen mobile lofts.[15]

ARMISTICE AND DEMOBILIZATION

Inductions and draft calls stopped with the signing of the Armistice on 11 November 1918. Demobilization began for non-essential units. All flying activities at the camp ceased. The Army shipped all aeronautical property to other locations and directed Radio Laboratory personnel to complete remaining projects. The laboratory decreased in relative importance for a time.

Units assigned to Camp Vail during 1918 included three signal battalions, six telegraph and two depot battalions, two squadrons for air service, and two service companies. A total of 1,083 officers and 9,313 enlisted men served the post that year.

The Camp had been dubbed the "best equipped Signal Corps camp ever established anywhere" by the end of 1918. Just nineteen months after its acquisition by the military, 129 semi-permanent structures had been built. The radio laboratories utilized forty-seven of these exclusively. Housing was available for 2,975 Soldiers and 188 officers. Should those men fall ill, there was a hospital equipped to handle forty patients. Two temporary stables could house up to 160 horses. Hard surfaced roads facilitated transportation. One swamp was converted into parade grounds. Another was converted into four company streets, which would be lined by 200 tents.[16]

THE SIGNAL CORPS SCHOOL

In addition to being the year that the Chief Signal Officer authorized the purchase of the land comprising Camp Vail, 1919 was a time of demobilization and transition for the Signal Corps.

Though initially activated on a temporary basis, the camp survived as an Army installation because the Chief Signal Officer requested in August 1919 that the Adjutant General of the Army move all Signal Corps schools, both officer and enlisted, to Camp Vail. This move standardized signal communications throughout the Army and consolidated Signal Corps installations. The Secretary of War quickly approved the plan. The school was designated "The Signal Corps School, Camp Alfred Vail, New Jersey."[17]

The first school commandant was Colonel George W. Helms. Helms had served as the fourth Commanding Officer of Camp Vail since June 1918. He served concurrently as commandant of the Signal Corps School and as Camp Vail's Commanding Officer until December 1920.

Instruction in the new school began 2 October. The initial curriculum included an officers' division, subdivided into radio engineering, telegraph engineering, telephone engineering, signal organization, and supply. The enlisted radio specialist course consisted of radio electricity, photography, meteorology, gas engine and motor vehicle operation. Electrical students were trained as telephone and telegraph electricians. Operator and clerical courses were also offered.

The school used the hangars as workshops and classrooms since all aerial activity had ceased with the signing of the Armistice. Such use continued past World War II.

2
POST WAR AND THE 1920s

SIGNAL SCHOOL DEVELOPMENT

The Signal Corps School expanded during this period as demands for communications training grew. Training of Reserve Officer Training Corps (ROTC) personnel developed into a major function of the school in June 1920. Training began for National Guard and Reserve officers the following year.

During 1922, the Officers' Division reorganized its courses into two main sections: a Company Officers' Course for Signal Corps Officers and a Basic Course in signal subjects for officers of other arms and services and newly commissioned Signal officers. Both sections were nine months in duration.[18]

Camp Vail (1924).

The school, designed primarily for the training of Signal Corps personnel, found itself educating men from several branches of the Army. The name of the school was officially changed in 1921 to reflect this expanded mission. The new designation, "The Signal School" would be retained until 1935 when it would again become "The Signal Corps School."

The school was regrouped into four departments in 1922-23. These were: the Communications Engineering department, the Applied Communications department, the General Instruction course for all officers, and the Department for Enlisted Specialists.[19]

Meteorological instruction was planned and was scheduled to begin in 1919. The repair of equipment damaged in shipment from France delayed the start of classes until 5 January 1920. Photographic instruction began in 1919; however,

laboratory facilities did not become available until 1926. Instruction in motion picture production techniques was initiated in 1930. These courses reverted to the Army War College in 1932.

A training literature section was formed in 1921. It supplied the technical and field manuals needed to instruct in operations and maintenance of Signal Corps equipment. The section remained one of the major departments of the school until 1941 when the Signal Corps Publications Agency assumed its duties.

THE CAMP BECOMES A FORT

The installation was granted permanent status and renamed Fort Monmouth in 1925 in honor of the men and women who fought at the Revolutionary War Battle of Monmouth Courthouse.

Office Memorandum Number 64, Office of the Chief Signal Officer, dated 6 August 1925 stated,

> The station now known as Camp Alfred Vail, New Jersey, is being announced in War Department General orders as a permanent military post and will hereafter be designated as 'Fort Monmouth,' New Jersey. Mail to that post will be addressed to Fort Monmouth, Oceanport, New Jersey.

THE LABORATORY - LEAN YEARS TO CONSOLIDATION

Although overshadowed by the Signal School, the Radio Laboratory remained one of the most important facilities at Fort Monmouth. The Signal Corps quickly concluded after World War I that adequate research facilities for the design and development of Army communications equipment were necessary, even if at a reduced scale because of budget restrictions.

Research continued, and maximum use was made of the meager budget. The SCR-136, a ground telephone and telegraph set for artillery fire control up to thirty miles, was developed in 1926. Along with the SCR-134, mounted in observation aircraft, the SCR-136 provided air-ground liaison. Other projects included the SCR-131, a light and portable unit designed for infantry division and battalion telegraph with a five-mile range to limit possible enemy interception; the SCR-161 for artillery nets; the SCR-162 for contact between coast artillery boats and shore control points; and the SCR-132, a one hundred-mile telephone transmitter with an eighty foot portable, collapsible mast. Other experimentation was performed on items such as tube testers, crystal controller oscillators, unidirectional receivers, and non-radiating phantom antennas.

The first radio-equipped weather balloon was launched at Fort Monmouth in 1929. This represented the first major development in the application of electronics to the

study of weather and of conditions in the upper atmosphere.[20]

The function of the laboratory prior to 1929 had been primarily to design and test radio sets and some field wire equipment. Consolidation of the five separate laboratory facilities of the Signal Corps was planned that year.

The Signal Corps Electrical Laboratory, the Signal Corps Meteorological Laboratory, and the Signal Corps Laboratory at the Bureau of Standards (all in Washington, D.C.) moved to Fort Monmouth in the interest of "economy and efficiency." Conjointly, these laboratories became known as the "Signal Corps Laboratories."[21]

The Subaqueous Sound Ranging Laboratory transferred to Fort Monmouth from Fort H. G. Wright, New York, in 1930. The Signal Corps Aircraft Radio Laboratory at Wright Field in Dayton, Ohio had also been considered for consolidation, but subsequently was deleted. The Aircraft Radio Laboratory and the Photographic Laboratory at Fort Humphreys became the only research organizations not located at Fort Monmouth. These consolidations represented the first time the personnel and facilities needed to handle almost any Signal Corps problem could be found in one location.

The Signal Corps Laboratories employed five commissioned officers, twelve enlisted men, and fifty-three civilians as of 30 June 1930.[22]

ENHANCED USE OF HOMING PIGEONS

In 1925, the section had a breeding base with seventy-five pairs of breeders, two flying lofts with one hundred birds for training and maneuvers, and one stationary loft with thirty long-distance flyers. Available facilities permitted the breeding of a maximum of 300 birds per season. That number was banded and held available to fill requisitions from the eighteen lofts scattered throughout the United States and its possessions. Signal School maneuvers and ROTC courses used the birds for instruction. The Officers' Division featured twelve hours of pigeon instruction.

Pigeon with message canister attached to its leg.

Fort Monmouth's pigeon handlers successfully bred and trained birds capable of flying under the cover of darkness in 1928. By the outset of World War II, they had also perfected techniques for training two-way pigeons. The first test was conducted in May 1941. Twenty birds completed the approximately twenty-eight mile round trip from Fort Monmouth to Freehold in half an hour.

The Pigeon Center at Fort Monmouth had at that time an emergency breeding capacity of 1,000 birds a month. This represented about one fourth of the Army's maximum anticipated requirements. American pigeon fanciers supplied by "voluntary donation" 40,000 of the 54,000 birds that the Signal Corps furnished to the Armed Services during World War II.[23]

The Pigeon Breeding and Training Center briefly relocated to Camp Crowder, Missouri, in October 1943. The Center returned to Fort Monmouth on 20 June 1946, along with the long-lived "Kaiser," "G.I. Joe," "Yank," "Julius Caesar," "Pro Patria," "Scoop," and more than two dozen other heroes and heroines of World War II.

Fort Monmouth pigeons also served in Korea, where they proved particularly useful to covert operatives in enemy-controlled territory. However, Field Manual 100-11 entitled "Signal Communications Doctrine" (22 July 1948) stated, "The widespread use of radio in conjunction with the airplane to contact and supply isolated parties has rendered the use of pigeon communication nearly obsolete."

The Department of the Army finally discontinued its pigeon service in 1957. After donating the fifteen living "hero" pigeons to zoos in various parts of the country, Fort Monmouth sold the remaining birds (about a thousand of them) for $5 per pair.

While the Army's use of courier pigeons has been well publicized, little is known about the use of "fighting falcons." A press release sent to the New York Times on 8 August 1941 notified that newspaper that Fort Monmouth had begun training a falcon 'draftee' who had been caught in the Hudson River Palisades. Signal Corps Officers hoped to train the bird, named Thunderbolt, and other falcons to "blitz enemy carrier pigeons and fight parachute Soldiers by tearing into their umbrellas with some sort of secret weapon." LT Thomas MacClure, head of the falcon troops, denied reports that the falcons would have tiny knives attached to their claws. He instead cryptically informed the Times, quote, "It's something far more explosive than that." Despite such high hopes, falcons from Fort Monmouth never gained the same notoriety as the pigeons.[24]

SIGNAL CORPS BOARD

The Signal Corps Board was established at Fort Monmouth in June 1924. This followed a suggestion to the Chief Signal Officer by LTC John E. Hemphill, the fifth Commanding Officer of Camp Vail. Hemphill wrote:

> the need for a board of Signal Corps officers to be continuously assembled at a center of Signal Corps activities for the consideration of problems of organization, equipment and tactical and technical procedure has long been recognized. Preferably such a board should consist of officers of considerable rank and length of service in the Signal Corps who would be competent to pass on such equations and would also be able to devote their entire time to the duties of such a board. Due to the

> shortage of personnel it does not appear that it will be practicable to detail such a board in the near future. The best present arrangement would seem to be a board at Camp Vail consisting of the officers at this post who are immediately connected with the administration and supervision of matters relating to general Signal Corps training. Detailed studies, experimental work, or field tests could be delegated from time to time by this board, with the approval of the Commanding Officer, to the proper subordinates at Camp Vail. It is therefore recommended that a permanent Signal Corps Board be constituted at Camp Alfred Vail to act on such matters as may be referred to it by the Chief Signal Officer.[25]

Army Regulation 105-10 (2 June 1924) directed the establishment of such a board. Over the years, typical cases considered by the board included the Tables of Organization, Allowances and Equipment, Efficiency Reports, Signal Corps Organizations, and Signal Corps transportation needs.

POST ORGANIZATIONS

The 15th Signal Service Company acted as the parent organization for all new recruits, and for camp and school details. The Company possessed the longest record of any unit permanently assigned to the Fort. It was activated as Company B, Signal Corps at Camp Wikoff, New York on 27 July 1898 and came to Camp Vail on 4 March 1919. Students at the Signal School were attached to the unit for rations, quarters and administration. Periodically existing as a company, battalion and regiment, the 15th maintained its identity until late in World War II.

East Gate.

The 51st Signal Battalion and the 1st Signal Company comprised two other long-term organizations at Fort Monmouth. Garrison duties or replacement training occupied battalion personnel. Technical subjects such as radio and telegraph operation, electricity, maintenance, line construction, and meteorology consumed the training effort.

The 1st Signal Company, a permanently assigned detached unit of the 1st Division at Fort Devins, Massachusetts, carried out training required of divisional troops and participated to a limited extent in garrison details. Some instructors were furnished to the Signal School.

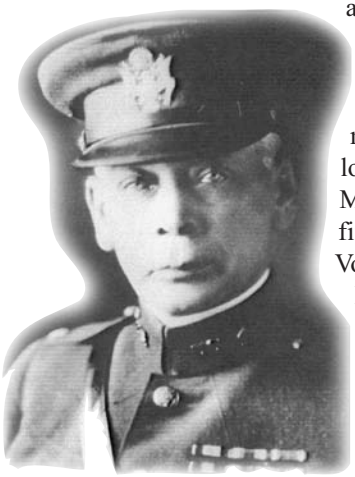
The Army, becoming increasingly conscious of the possibilities of mechanized warfare, conducted extensive maneuvers from July-October 1928 in Maryland. The

1st Signal Company conducted experiments with motorized equipment during the exercise. They concluded that radio was a prime means of communications for armored, mobile forces; that wire was useful only in rear areas; and that pigeons were impractical since they could not be trained to home to a moving loft.

The company continued in its prescribed role as a division communications unit, reportedly in a highly satisfactory state of training and morale and with equipment maintained in excellent condition.

The predecessor to the Military Affiliate Radio System (MARS) was born at Fort Monmouth in 1925 when the Signal Corps, working with the American Radio Relay League, organized the Army Amateur Radio Service (AARS). Hundreds of HAM radio operators joined the service that year. They grouped together in Corps Area Nets. Each Corps Area Net had several sectional radio nets, all coordinated by the control station located at Fort Monmouth. AARS had two objectives. The first was to provide a world-wide radio communications capability that could be used if necessary in times of emergency. The second was to provide a ready reserve of skilled radio operators that could be called into service in the event of another war.

AARS was reorganized as a joint Army - Air Force program called the Military Amateur Radio Service in 1948. Subsequently, the word "Affiliate" replaced "Amateur" (reflecting the affiliation between military and civilian radio operators) and the word "System" replaced "Service" (to better describe the global reach of the MARS networks). The system proved its value in subsequent decades in disaster relief efforts, as well as in relaying messages between service men abroad and their loved ones at home. The MARS station at Fort Monmouth, K2USA, operated around the clock with fifty-one volunteers during Operation Desert Storm. Volunteers included Fort Monmouth's commander, Major General Alfred J. Mallette. K2USA "patched" an average of seventy-five calls a day from Soldiers and airmen in Southwest Asia during this time.



Lieutenant Colonel
John E. Hemphill
Commanding Officer, Fort Monmouth
1920-1925

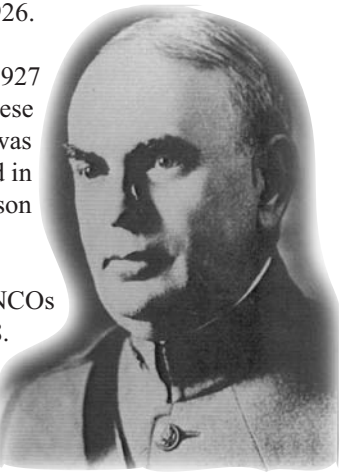
Only fourteen MARS stations existed in the United States in 1995. Though its role in the "psychological support of servicemen" had largely been supplanted by other technologies, K2USA volunteers still handled about thirty calls a week from service members in Haiti. The station continues to provide valuable service when natural disaster disrupts other means of communication.

PERMANENT CONSTRUCTION BEGINS

COL James B. Allison succeeded LTC John E. Hemphill in August 1925 as the sixth Commanding Officer of Fort Monmouth. While he served only one year in the assignment, Allison initiated plans for construction of permanent barracks and a hospital building.

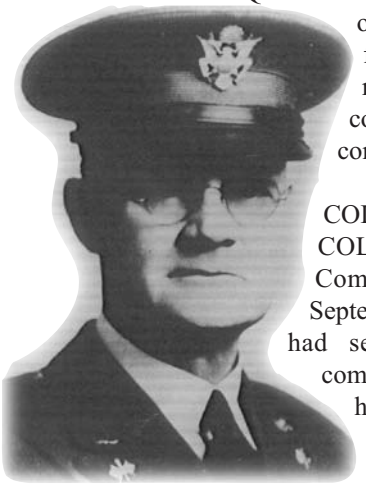
Actual construction did not begin until 1927, during the command of COL George E. Kumpe. Kumpe succeeded COL Allison in August 1926.

Four red brick barracks were completed in August 1927 around what is now known as Barker Circle. These housed approximately 200 men each. The hospital was completed in 1928, with an additional wing completed in 1934. The building, number 209, was known as Allison Hall.[26]



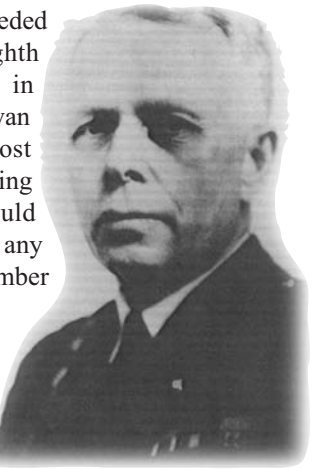
Colonel
James B. Allison
Commanding Officer, Fort Monmouth
1925-1926

Quarters for field officers, company officers and NCOs were completed and accepted on 15 August 1928. These constituted the second and third increments of permanent construction. Five four-family apartment houses and one BOQ were completed and accepted on 6 August of the following year. The remaining permanent construction would be completed in the 1930s.[27]



Colonel
George E. Kumpe
Commanding Officer, Fort Monmouth
1926-1929

COL Arthur S. Cowan succeeded COL Kumpe as the eighth Commanding Officer in September 1929. COL Cowan had served previously as post commander in 1917-18. During his second term he would serve the longest time of any commander, from September 1929 to April 1937.



Colonel
Arthur S. Cowan
Commanding Officer, Fort Monmouth
1929-1937

3
PEACETIME TRAINING--1930s

POST UNITS--MANEUVERS AND MARCHES

The two tactical units at Fort Monmouth (the 51st Signal Battalion and the 1st Signal Company) were well trained and equipped for field service with the outbreak of war in Europe in 1939. The 51st Signal Battalion had been reorganized in 1933 to prepare for field training on a large scale. Its new missions included providing enlisted instructors and overhead for the Signal Corps School; organizing a provisional radio intelligence detachment; and forming the nucleus of a General Headquarters (GHQ) signal service, to include a meteorological, photographic, and radio intelligence company.

Fort Monmouth (January 1933). Construction underway on Field Grade and SNCO Quarters. Note the remnants of racetrack.

A series of maneuvers kept the tactical units of the Signal Corps in the field much of each summer during the 1930s. In 1934, General Douglas McArthur, Army Chief of Staff, conducted a GHQ Command Post Exercise centered in the Fort Monmouth -- Camp Dix -- Raritan Arsenal triangle. The 51st Signal Battalion, with the 1st Signal Company attached, provided signal services for the exercise, staffing message centers, handling radio intelligence, and performing radio, wire, and meteorological functions.

The 51st Signal Battalion installed all communications for the most extensive Army maneuvers held since World War I in 1935. The unit installed the Army corps and umpire nets in the Pine Camp area of New York, using 177 miles of bare copper wire, 126 miles of twisted pair field wire, and 8,260 feet of lead-covered, multiple pair overhead cable.

The 1st Signal Company journeyed to Camp Ripley, Minnesota, to install, operate and maintain signal communications for a phase of Fourth Army maneuvers in the summer of 1937.

Also in 1937, the 51st Signal Battalion was assigned to maneuvers of newly "streamlined" combat divisions in the area near Fort Sam Houston, Texas. As part of its participation, the 51st engaged in a road march from Fort Monmouth to San Antonio, Texas. This represented the longest motor convoy trip of its size in the

Army's history. War conditions were simulated as closely as possible. The thirteen officers and 350 enlisted men, along with fifty-five vehicles, departed Fort Monmouth on 21 July 1937 and arrived at their destination on 2 August.

The following year, the 51st journeyed to Biloxi, Mississippi for maneuvers and took part in the Fort Bragg-Air Corps Anti-Aircraft Exercises. The 1st Signal Company participated in the Army War College command post exercise at Washington.

SIGNAL CORPS SCHOOL

The Signal Corps School, the name of which had changed to "the Signal School" in 1921 to reflect its mission at that time, reverted to its original name as part of a reorganization in 1935.

The Signal Corps experienced an acute shortage of trained personnel, particularly instructors, during the Depression years. As a result, advanced courses were offered for selected students in order to qualify them for the more responsible positions in the Signal Corps. The courses included Tactics and Techniques in Signal Communications; Auxiliary Signal Services in the Theater of Operations; Signal Operating Instructions and Orders; Equipment Studies; Staff Relations; Training Management; War Plans; Expeditionary Forces; Signal Supply; Duties of Corps Area Signal Officers; Historical Studies; and Field Exercises.

As a part of its reorganization, the Departments of Communications Engineering and Applied Communications combined into the Officers' Department.

The Enlisted Department adopted new techniques in teaching by converting to individual instruction instead of the classroom method. Courses in the Enlisted Department subdivided in the following year, becoming more highly specialized. They remained basically the same from then until World War II.

As World War II approached, the Signal Corps School functioned with three distinct divisions: The Officers' Department, Enlisted Department, and the Department of Training Literature. Seventy-eight persons comprised the faculty, eleven of whom were officers.

4,618 enlisted men graduated from the school in the decades following WWII. Signal Corps personnel comprised 2,486 of these graduates. The remainder represented sixteen other branches or services, as well as foreign nations.[28]

CORPS LABORATORIES AND RADAR

The newly named "Signal Corps Laboratories," consolidated at Fort Monmouth in 1929, received a new director in 1930. Major William R. Blair, distinguished in scientific and military fields, was appointed and served in this position until illness forced his retirement in 1938.[29]

Nine crowded wooden buildings constructed in 1918 continued to house the facilities. As a result of constant pressure by Major Blair a $220,000 appropriation was received for construction of a permanent, fireproof laboratory building and shops in 1934. This structure was built under contract. It was scheduled for completion 11 November 1934, but was not actually completed and accepted until 1 March 1935. It was named Squier Laboratory in honor of Major General George O. Squier, the Army's Chief Signal Officer from 1917-1923.

Much of the communications equipment used by American forces during World War II was designed and developed at Fort Monmouth during the 1930s. The laboratories completed six field radio sets; readied several artillery pack sets for tests; and fielded the SCR-197, a new Air Corps mobile transmitter. The SCR-300 (the "Walkie-Talkie" radio set) was perhaps the best-known development of the period. In addition, switchboards, field wire, and radio receivers were developed.[30]

One of the most important pieces of equipment developed during this time was RADAR (Radio Detection and Ranging). The term RADAR was first coined by the Navy in 1941. It was accepted by the Army in 1942. According to the first Signal Corps Field Manual on the Aircraft Warning Service, "RADAR is a term used to designate radio sets SCR (Signal Corps Radio)-268 and SCR-270 and similar equipment." The SCR-268 and 270 were not in actuality radios at all, but were designated as such for top security reasons.[31]

Radar emerged from the defensive need to counter the possibility of massive aerial bombardment. Sound detectors suffered from inherent limitations. Experiments with electromagnetic waves during World War I produced interesting experimental results, but no operational equipment was produced.

Numerous tests had been conducted with heat emitted from airplane motors or reflected by airplane surfaces in the 1920s. This work was accomplished by the Army Ordnance Corps from 1926 to 1930. The project was transferred to the Signal Corps in 1930. The research was duplicated by the Army Corps of Engineers for several years due to a misunderstanding. All Army detection development was officially assigned to the Signal Corps by 1936.

Active development on radio detection began that year. The radio interference or "beat" method gave strong indications from passing planes but lacked directivity. Efforts shifted to the radio pulse-echo method. Planes were successfully detected on an oscilloscope by these means before the end of 1936.

A combined system of heat and radio pulse-echo detection against aircraft was successfully demonstrated before the Secretary of War in May 1937. Shortly thereafter, substantial funds became available for the first time. The Signal Corps embarked on definite projects for development of a searchlight control and gun laying detector, a surface vessel detector, and a long-range aircraft detector. The average

personnel strength of the laboratories between 30 June 1930 and 30 June 1935 was twelve officers, thirty-six enlisted men, and 119 civilians. Civilian personnel strength continued to grow slowly through 1940 with 234 civilians assigned as of 30 June. Officer and enlisted strength dropped slightly to eight officers and fifteen enlisted. The strength increased dramatically, however, within the following year. Civilian manning was 1,227 as of 30 June 1941. Military strength rose to twenty-eight officers, with an additional twenty-nine officers from the Coast Artillery Corps and seven officers from the armored force.[32]

Fort Monmouth (October1936). Second phase of permenant construction including Kaplan Hall, Russel Hall and CG's Quarters. At the time, the Post did not extend south of Oceanport Creek.

COMPLETION OF PRE-WORLD WAR II CONSTRUCTION

The post's permanent red brick construction, which had undergone its first phase during 1927-29, entered its second phase in 1930 when construction began on three four-family apartments, one Bachelor Officer's Quarters, six double sets of quarters for non-commissioned Officers, and one set of quarters for field officers. These projects were completed in October 1931. Completion of eight double sets of Company Officers' Quarters, seven double sets of NCO Quarters, and one four-family apartment complex followed in June 1932.[33]

The Army's Adjutant General also authorized construction of a post theater. Construction was financed by Army Motion Picture funds. The 574-seat theater opened 15 December 1933 with a showing of "Dr. Bull," starring Will Rogers. The theater (Building 275) was called War Department Theater Number 1. Twenty years later, in December 1953, the building was officially dedicated as Kaplan Hall in memory of Major Benjamin Kaplan, an engineer who served in both military and civilian positions at Fort Monmouth for twenty-five years and was associated closely with the permanent construction program of the 1920s and 1930s. Kaplan Hall eventually became home to the Communications-Electronics Museum.[34]

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The final phase of the pre-war permanent construction program was completed between 1934 and 1936 under the Works Projects Administration (WPA). Eleven double sets of NCO Quarters were completed, along with the West Wing and an addition to the North end of the Hospital, in 1934. A blacksmith shop, incinerator, bakery, warehouses, band barracks and utility shops were also completed that year. 1935 saw the completion of the fire station, guardhouse, Signal Corps Laboratory

(Squier Hall), three sets of quarters for field officers, and three sets for company grade officers.[35]

The quarters of the Commanding Officer (Building 230) were the last to be completed. Colonel Arthur S. Cowan, then the 8th Commanding Officer, first occupied the quarters. The last of the permanent pre-war construction to be completed was the headquarters building, known as Russel Hall. Construction ended in 1936.[36]

FORT MONMOUTH SIGNAL CORPS PUBLICATIONS AGENCY

The growing need for printed training, operational, and maintenance materials gave rise to a Signal School "training literature section" whose mission was to write and publish training manuals, regulations, school texts, and other technical materials. The Joint Congressional Committee on Printing authorized a print plant for the school in 1927. Over the next fifteen years, this requirement evolved into the Fort Monmouth Signal Corps Publications Agency, activated in November 1943. This agency, organized and operated by the Fort Monmouth Training Center, consisted of the School's Department of Training Literature, the Instruction Literature Section of the Fort Monmouth Signal Laboratories, and the Technical Publications Section of the Evans Signal Laboratories. By 15 January 1944, this organization, which occupied sixteen buildings on Main Post, had five hundred products pending.

389th ARMY BAND

The 389th Army Band traces its history back to its 1901 organization at Fort Meade, Maryland as the 13th Cavalry Band. The 389th came to Fort Monmouth in August 1930 as the Signal Corps Band. It was designated the 389th Army Band in 1944, the name it bears to this day. It is the official band of the Army Materiel Command (AMC) and, in that capacity, serves all of AMC's subordinate commands when musical support is required for military and official functions. It also supports Army recruiting and participates regularly in community events.

389th Army band at Fort Monmouth, circa 1930

4
BUILD UP AND TRAINING

LIMITED EMERGENCY

President Roosevelt proclaimed a state of "limited emergency" on 8 September 1939, following the outbreak of war in Europe. This action immediately impacted Fort Monmouth.

The Army was immediately authorized additional personnel, increasing from 210,000 to 227,000 officers and men. The Signal Corps School curriculum, both officer and enlisted courses, changed to accommodate the increased enrollment. The Commandant, Colonel Dawson Olmstead, was advised that the school would probably be called upon to train 224 officers and 2,455 enlisted men to fill vacancies in newly organized units. Seventy-five officers and 1,300 men would be required annually as replacement. Events would soon prove that these estimates were extremely conservative.

One year following the "limited emergency" proclamation, Congress passed the Selective Training and Service Act providing for one year compulsory military training. The President simultaneously called the National Guard into Federal service, and the Army increased in size to 1,400,000.

The influx of personnel during World War II (the number assigned to Fort Monmouth peaked at about 35,000 military and 15,000 civilians) produced a severe shortage of housing. To alleviate this problem, the Army, in cooperation with the Federal Public Housing Authority, constructed 265 homes, known as "Vail Homes" in Shrewsbury Township, eighty-two units in Long Branch (the Grant Court Project), and fifty-nine units in Asbury Park (Washington Village), in addition to several dozen residences at Camp Evans.[37]

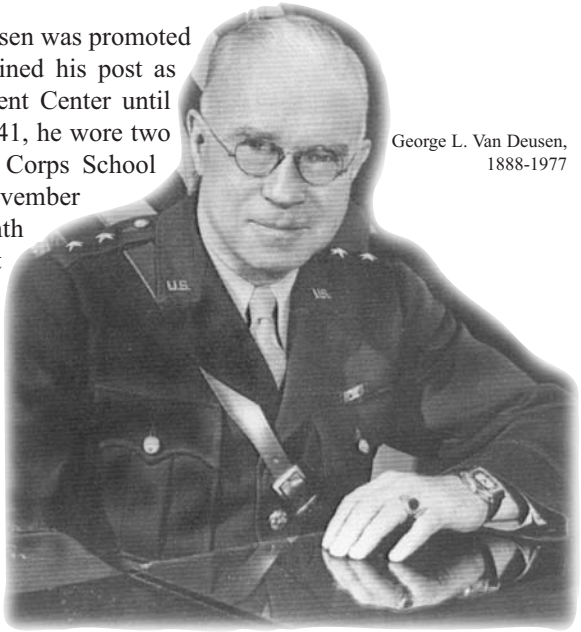
Colonel Olmstead was promoted to Brigadier General on October 1940, thus becoming the first General Officer to serve as post commander.[38]

SIGNAL CORPS REPLACEMENT CENTER

With the passage of the Selective Service Act, General Olmstead was advised by the Chief Signal Officer to develop a Replacement Training Center at Fort Monmouth where enlisted personnel would receive one year of training. The Signal Corps Replacement Center opened in January 1941. Capacity was fixed at 5,000 men. By December, however, it was necessary to increase the capacity to 7,000 and to reduce the one-year training period to thirteen weeks.

The first Commanding Officer of the Replacement Center was Colonel George L. Van Deusen. He assumed command 14 January 1941.[39]

In April 1941, Colonel Van Deusen was promoted to Brigadier General. He retained his post as Commandant of the Replacement Center until November 1941. By August 1941, he wore two additional hats: that of Signal Corps School Commandant (July 1941 - November 1942) and that of the eleventh Commanding Officer of Fort Monmouth (August 1941 - September 1942).



George L. Van Deusen, 1888-1977

General Van Deusen initiated the purchase of additional land in view of the increasing expansion of Fort Monmouth. The land, now the Charles Wood area, was considered ideal for replacement training activities for as many as 7,000 men. Adequate space was available for all necessary buildings and a maneuver area.[40]

At Camp Charles Wood, as the area was called in 1942, construction was completed within ninety days on sixty barracks, eight mess halls, nineteen school buildings, ten administration buildings, a recreation hall, post exchange, infirmary, and chapel. The camp was officially dedicated 14 July 1942.[41]

Along with the purchase of the Camp Charles Wood Area, negotiations began for leasing the New Jersey State National Guard Encampment at Sea Girt. The 1st Signal Training Battalion moved from the main post to the new camp at Sea Girt by April 1942. The land was designated Camp Edison in honor of Charles Edison, governor of New Jersey and son of the famed inventor.

The Replacement Training Center was in operation at three locations by mid-1942: Fort Monmouth, Camp Charles Wood, and Camp Edison. The Army acquired two noncontiguous field training areas near the communities of Allaire and Hamilton. Field bivouac and maneuvers utilized these wooded tracts extensively.

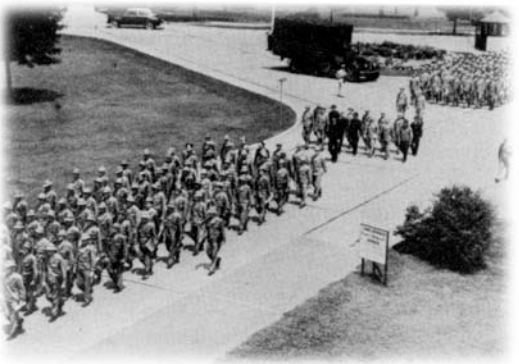
By the spring of 1943, the recruit underwent a program that began with three weeks of basic training at Camp Edison, continued with four days of field operations at Allaire or Hamilton, and culminated in an overnight march to Camp Wood for final specialist training.

The unit-training center was finally deactivated in November 1943. The center produced more than 60,000 Signal Corps specialists during the thirty months of its

existence. The enlisted cadre peak was 1,157, with 250 officers and civilians also assigned.[42]

THE OFFICER CANDIDATES

Fort Monmouth's other wartime training focused on officer candidates. The Officer Candidate Department activated within the Signal Corps School on 2 June 1941. The first class commenced 3 July 1941. That first class, with an input of 490, graduated 335 newly commissioned second lieutenants after three months' training. Subsequent classes averaged about 250 men, but gradually grew to 1,000 men per class.



Eastern Signal Corps Training Center, Fort Monmouth, NJ (1942). Officer Candidates marching from barracks to classroom.

The Signal Corps School was re-designated the Eastern Signal Corps School (ESCS) on 20 June 1942. As such, its department for Officer Candidate Training was renamed the Officer Candidate School (OCS). The training added field exercises, allowing the candidates to gain practical experience they might otherwise be lacking. The school initiated a sixteen-hour exercise simulating signal company support of an infantry division and offered training in message center and messenger procedures, wire construction, and radio and wire communication. Command posts were established for the forward and rear echelons of a division headquarters and three combat teams. The officer candidates moved from one to another, alternating duties among the four phases of communications.

All training functions at Fort Monmouth consolidated into the Eastern Signal Corps Training Center (ESCTC) in October 1942.[43] The Officer Candidate School extended from three months to four. This provided one month of field work in addition to the academic instruction. Thirty-six officers of the Women's Army Corps enrolled in the School's message center course in December 1943, becoming the first women to be accepted for training at Fort Monmouth. More than 21,000 officers completed the Officer Candidate Course during its Fort Monmouth tenure.

WARTIME LABORATORIES

The Signal Corps established three field laboratories during 1940 and 1941. Field Laboratory Number One, later designated the Camp Coles Signal Laboratory, stood at Newman Springs and Half Mile Roads west of Red Bank, New Jersey. There, 46.22 acres of land allowed for observing and measuring pilot balloon ascensions. Right-of-way for the land was obtained in April 1941, with subsequent purchase by the government in June 1942 for $18,400. The Chief Signal Officer earmarked more than

$700,000 for building construction at the site.[44]

Field Laboratory Number Two, later designated the Eatontown Signal Laboratory, required an experimental area on which to construct antenna shelters. The laboratory received 26.5 acres of a 200-acre tract west of Eatontown, which had been leased as part of the expansion of training activities (part of Charles Wood Area).[45]

Administration Building of Camp Evans Signal Laboratory, Belmar, NJ (April 1943). Signal Corps ground radar development activities were moved here from the Fort Hancock Field Laboratory in 1942. The building itself was completed and dedicated by the Marconi Wireless Telegraph Company in 1914. It was originally built as a 45- room hotel for unmarried employees of that company.

Field Laboratory Number Three originated in the Radio Position Finding section of the Signal Corps Laboratories and resided temporarily at Fort Hancock, New Jersey. It later became the Evans Signal Laboratory located south of Fort Monmouth on land which the Army began purchasing in November 1941. The purchase included land and buildings originally owned and developed by the Marconi Wireless Telegraph Company of America. A three-story brick building, dedicated in 1914 as the Marconi Hotel and meant to house the firm's unmarried employees, served as the main administration building of the Evans Signal Laboratory. Two one-story brick cottages also constructed by the Marconi Company and located directly across the street from the hotel served as quarters for military officers.

A number of brick buildings were constructed at the Evans Signal Laboratory from 1941-1942. Four long, rectangular, one-story buildings connected by enclosed wooden walkways were the first to be completed. These comprised a large laboratory complex. Two brick boiler houses with oil-fired boilers were also constructed.

A group of three research and development laboratories with an office; two smaller laboratories, each with a separate boiler house; another laboratory and boiler house; and a shop facility were also constructed in 1941-1942. All one-story brick structures

housed a research center for the Signal Corps radar program.

A large number of wood buildings were also constructed at the Evans Laboratory site during World War II. This included two groups of radio antenna shelters designed to house radar units. They resembled tall, one-story structures with exterior wood post buttresses. Several remained intact for years although most of these structures were later altered to accommodate other functions.

Aerial photo of Fort Monmouth, NJ (1943). To the middle left of photo one can see BOQ quarters adjacent to Parker's Creek and North of Field Grade and CG's Quarters.

The Army also organized Squier Laboratory on post into the Signal Corps General Development Laboratories (SCGDL).

The laboratories at Fort Monmouth developed the SCR-510 in 1941. This was the first FM backpack radio. This early pioneer in frequency modulation circuits provided front line troops with reliable, static free communications. Multichannel FM radio relay sets (such as the AN/TRC-1) were also fielded in the European Theater of Operations as early as 1943. FM radio relay and RADAR, both products of the Labs at Fort Monmouth, are typically rated among the four of five "weapon systems" that made a difference in World War II.[46]

In December 1942, the War Department directed the Signal Corps General Development Laboratories and the Camp Evans Signal Lab to combine into the Signal Corps Ground Service (SCGS) with headquarters at Bradley Beach, New Jersey (Hotel Grossman).

The laboratories had personnel strength of 14,518 military and civilian personnel in December 1942. The War Department, however, directed the Signal Corps Ground Service to cut the total military and civilian personnel to 8,879 by August 1943.[47]

INVENTIONS OF THE LATE 1940s

The first Weather Radar was developed at Fort Monmouth in 1948. It observed, for the first time, a rainstorm that was at a distance of 185 miles and was able to track the storm as it passed over the Fort.[48]

That same year, researchers at Fort Monmouth grew the first synthetically produced large quartz crystals. The manufacture of electronic components then used these crystals, making the U.S. largely independent of foreign imports for this critical mineral.[49]

The first auto-assembly of printed circuits occurred in 1949. A technique for assembling electronic parts on a printed circuit board, developed by Fort Monmouth engineers, pioneered the development and fabrication of miniature circuits for both military and civilian use. Although they did not invent the transistor, Fort Monmouth scientists were among the first to recognize its importance (particularly in military applications). They did pioneer significant improvements in its composition and production.[50]

END OF THE WAR

Wartime training quickly subsided. Reductions began in May 1943 with orders to inactivate the Replacement Training Center. This was later partially revoked. The capacity of the Officer Candidate School was set at 150 in August 1943. Classes entered at seventeen-week intervals. Enrollments fluctuated thereafter.

Former Italian prisoners of war called “Signees” arrived at Fort Monmouth in June 1944 to perform housekeeping duties. A Lieutenant Colonel and 500 enlisted men became hospital, mess, and repair shop attendants, relieving American Soldiers from these duties.

Brigadier General Stephen H. Sherrill became Commanding Officer of the Eastern Signal Corps Training Center on 3 January 1945. He served only until the end of that year, when he was succeeded by Brigadier General Jerry V. Matejka.

Most of the functions of the Enlisted Department of the Signal School transferred to Camp Crowder, Missouri with the decline in requirements for trained replacements within the Signal Corps.

The Eatontown Signal Laboratory transferred from the authority of the Chief Signal Officer to that of the Commanding General, Army Air Forces, on 1 February 1945. It

was renamed Watson Laboratories and moved to Rome, New York in 1951.

A Redeployment Branch was established as a separate function of the Unit Training Center with the end of the war in Europe on 8 May 1945. A redeployment program was carefully established to retrain personnel before deployment to the Pacific. However, with the war against Japan ending shortly thereafter, the redeployment initiatives changed to meet the challenge of speeding Army discharges in the New York, New Jersey and Delaware areas. A Separation Center was established at Fort Monmouth in September 1945. The Center separated more than one thousand men from the Army every day until 31 January 1946.

Camps Edison and Wood deactivated and were almost abandoned after the War. The Eastern Signal Corps Training Center, too, deactivated, in April 1946. Brigadier General Jerry V. Matejka, the Center commander since the end of 1945, became the fourteenth commander of Fort Monmouth. He succeeded Colonel Leon E. Ryder, who had served in the assignment since November 1944.[51]

PROJECT DIANA

Research in radar technology continued at the Evans Signal Laboratory despite the end of World War II. The Belmar (later, Wall Township) site witnessed a milestone in scientific history on 10 January 1946. Signal Corps scientists, under the direction of LTC John J. DeWitt, used a specially designed radar antenna (called the Diana Tower) to successfully reflect electronic signals off the moon. A beam of high frequency energy traveling at the speed of light (186,000 miles per second) was directed at the moon and was recorded 2.5 seconds later on the radar screen. Continuous recordings were made at regular 2.5 second intervals.[52]

Project Diana
Army Radar contacts the Moon for the first time (1946).

5
KOREA AND THE 1950s

Although overall military strength decreased rapidly following the end of World War II, the need for trained signal personnel continued throughout the post-war period. Fort Monmouth remained intact as the "Home of the Signal Corps." Personnel strength, however, had dropped to a total of 11,419 by January 1948. This included 700 officers, 3,221 enlisted men, 3,867 students, and 3,631 civilian personnel.[53]

Things soon changed as world tensions increased with the Cold War and the Berlin Airlift. Enlarging the capacity of every activity on Post again became necessary to sustain the Army's worldwide commitments. Camp Charles Wood, which had been placed in temporary caretaker status in 1945, was rehabilitated to facilitate an increase in personnel for the Signal School. Post strength climbed to 15,296 by mid-November 1948, representing an increase of nearly 4,000 in less than a year.

SIGNAL CORPS CENTER

The Signal Corps Center was established at Fort Monmouth in August 1949 as a Class II activity under jurisdiction of the Chief Signal Officer. The Center consisted of the Signal Corps Engineering Laboratories, the Signal Corps Board, the Signal School, the Signal Corps Publications Agency, the Signal Corps Intelligence Unit, the Pigeon Breeding and Training Center, the Army portion of the Armed Services Electro Standards Agency, and all Signal Corps troop units stationed at Fort Monmouth. Fort Monmouth was re-designated "the Signal Corps Center and Fort Monmouth" concurrently with this 23 August 1949 action.[54]

The Communiations Electronics Research and Development Engineering Center, better known as the Albert J. Myer Center, or simply, the Hexagon.

The President quickly received the necessary authorization to call the National Guard and organized reserves to twenty-one months of active duty with the onset of hostilities in Korea in June 1950. He also signed a bill extending the Selective Service Act until 9 July 1951.

The Officer Candidate School was reestablished at Fort Monmouth. Its first class began 24 September 1951. The school continued until 27 April 1953, graduating twenty-four classes for a total of 1,232 second lieutenants. The number of military

personnel at Fort Monmouth nearly doubled in the period from 1947 to 1953, increasing from 9,705 to 17,358.[55]

The fighting in Korea highlighted the need for new techniques in modern warfare. The use of mortars by the enemy and the resultant need to quickly locate and destroy the mortar sites resulted in development of the Mortar-Radar Locator AN/MPQ-3 and AN/MPQ-10.

The development of new equipment, however, required the Signal Corps to provide increased numbers of trained electronics personnel to work in the fire control and guided missiles firing battery systems. The Army therefore established Signal Corps Training Units (the 9614th and 9615th) at Aberdeen, Maryland and Redstone Arsenal, Alabama. These units provided instruction on electronics equipment used in the Anti-Aircraft Artillery and Guided Missile firing systems.[56]

Student loads increased in all classes of the Signal School at Fort Monmouth. Night classes were established for some of the enlisted courses, particularly Radar, as a result.

The Signal Corps Laboratories and sub-installations employed approximately 4,500 scientists and supporting personnel between 1951 and 1953. Responsibilities included production engineering of equipment designed since World War II. 250 of the 274 pieces of major signal equipment moving to the field were improved over their predecessors by 1952. Detection equipment was among those improved upon. Significant advances were made on smaller and lighter forward-area equipment, wire communications, meteorological and photographic equipment, nucleonics, radar, and thermionics.

A new research and development engineering laboratory was constructed at Camp Charles Wood in order to centralize work formerly conducted at Evans, Coles and Squier Laboratories, and the Watson Area. This was Building 2700, later dubbed the Hexagon. The first increment of the building was completed in September 1954. Dedication ceremonies occurred 30 September 1954.

At the end of the War in Korea, Fort Monmouth was for a time the object of congressional opprobrium and public notoriety. Julius Rosenberg, executed with his wife for spying in June 1953, had worked for the Signal Corps Labs during the Second World War. He was dismissed early in 1945 when it was learned that he had formerly been a member of the Communist Party, but not before he reportedly gave the Soviet Union the secret of the proximity fuse. Having received word of possible subversive activities from Fort Monmouth's Commanding General, Kirke B. Lawton, Senator Joseph McCarthy (the Chairman of the Senate Committee on Government Operations) launched an inquiry on 31 August 1953 designed to prove that Rosenberg had created a spy ring that still existed in the Signal Corps labs. McCarthy initially conducted his hearings behind closed doors, but opened them to the public on 24 November 1953. He ultimately failed to prove the existence of a Communist

conspiracy at Fort Monmouth. His actions nonetheless brought notoriety to the Signal Corps Labs and grief to the employees who were dismissed from their jobs on mere suspicion. Charges against suspended employees included attending a benefit rally for Russian children and belonging to a C.I.O. local thought to be subversive. Ultimately, forty-two employees, mostly engineers, would be suspended for posing security risks. Forty were reinstated, two resigned. All of the reinstated received back pay. The last six to get their jobs back rejoined the workforce in 1958.[57]

CONTINUED CONSTRUCTION

Fort Monmouth welcomed its sixteenth commander, Major General Kirke B. Lawton, on 20 December 1951. At this time, plans had been drawn and contracts would soon be let on $25,000,000 in new construction.

Six new permanent, 500-man barracks were completed for the Signal School by 1953. This included buildings 1200 through 1205, located north and south of Hemphill Parade Ground (Abbey-Whitsell Avenues). The 1200 area was located on previously undeveloped land in the western end of the post. A new Administration Building for the Signal School (Building 1207) housed the school library, reading and reference rooms, classrooms, theater, cafeteria, a post exchange, book store, barber shop, cleaning concession and a laundry (Buildings 1208-1210). Also constructed in this area was Building 1206, an auditorium with an outdoor amphitheater.[58]

Demolition of World War II buildings began in 1954 to dispose of wooden structures that had fallen into disrepair. The work removed ten structures from the area of Squier Hall and nine from the area of Russel Hall. Three buildings in the 500 area along Allen Avenue came down to make room for a new three-story barracks building. This barracks building (Building 360), completed in 1956, was built to house sixty bachelor non-commissioned officers.

Construction completed two major warehouse buildings (Buildings 975-976) in 1954 and replaced World War II troop housing in the 900 area. Approximately fifty World War II buildings in the 1000 area, located in the southern part of the post, were demolished to make way for a new hospital (Building 1075). The new hospital was completed in 1961.[59]

Two permanent barracks buildings replaced the remaining World War II structures located in the 200 area around Allison Hall in 1965. These three-story brick structures served as Bachelor Officer Quarters (BOQs). Two other BOQs, both similar in design, were built in this area between 1968 and 1971.

Many of the World War II buildings in the 800 area were demolished in 1970 to make way for the present Post Exchange, cafeteria, post office, and bank complex.

Several major development programs were completed in the Charles Wood area in the years following World War II and the Korean War. The housing program was initiated

in 1949 with the construction of eleven officers' family housing units. These two-family houses were constructed west of the Officers' Club, along Megill Drive. Ten additional units were constructed in 1951 on a circular drive with access to Megill Drive. An additional eleven housing units were constructed in 1955 west of Hope Road on Hemphill Road.

Fifty-two Wherry Housing units were constructed in the Pine Brook area of Camp Charles Wood to provide additional quarters in 1953. This housing project, named Eatontown Gardens, was built in three funding increments with a total cost of $6,000,000. It was completed in December 1954.

A program of housing construction financed by the Capehart Housing Act began in 1955. World War II cantonment camps around Colin Kelly Field and Frawley Field in Camp Charles Wood were demolished to make room for the new housing. Actual construction, however, did not begin until 1958. Thirty-six housing units were completed between 1958 and 1959. Each structure contained either four or eight two-story apartment units. The final group of Capehart housing units to be built on the World War II cantonment area was completed in 1960. Ten years later, in 1970, seventeen additional units were constructed along Tinton Avenue in the Charles Wood area.

Very few buildings were constructed at the Evans Signal Laboratory post- World War II. The Signal Corps did construct several warehouses, storage buildings, and small test structures.[60]

UNIT MOVEMENTS

1954 witnessed an exodus of almost 1,300 military and civilian personnel as two organizations transferred to Fort Huachuca, Arizona which, in February of that year, was redesignated a Class II installation under jurisdiction of the Chief Signal Officer and placed in an active status.

The Signal Corps Electronic Warfare Center, activated at Fort Monmouth in 1950, was the larger of the two organizations to make the westward trek. The other was the 9460th Technical Service Unit, Signal Corps Army Aviation Center, activated at Fort Monmouth in 1952 to evolve and test aviation support to Signal Corps activities near Fort Monmouth and to meet the growing needs of Army aircraft in modern military communications, electronics, and photography. Originally based at Red Bank Airport, the Signal Corps Army Aviation Center later moved its operations to Monmouth County Airport. It subsequently moved to Fort Huachuca.

Two smaller units transferred to Fort Monmouth from Maryland as these organizations departed. The 9463rd Technical Service Unit, Radio Propagation Unit transferred from Baltimore and was re-designated the Signal Corps Radio Propagation Agency on 8 January 1954. Seventeen instructor personnel from the Signal Supply School (which had been discontinued at Fort Holabird, Maryland on 31 January 1954)

also arrived. Most of this group was assigned to the Officers' Department of the Signal School to form a Supply and Maintenance Division.

SIGNAL CORPS ENGINEERING LABORATORIES

A new era of accelerated progress began at the Signal Corps Engineering Laboratories following the Korean conflict. Personnel concentrated their efforts on solving electronics problems. This paved the way for future developments.

Important work in radar, countermeasures, physical sciences, and electron devices proceeded at Evans Signal Laboratory. 300 of 349 major signal items in production existed of modern vintage, improved for the most part in speed, integration and flexibility, by 1954.

Developments of the laboratories included a lightweight field television camera with a back-pack transmitter; a personal atomic radiation dosimeter that clipped in the pocket like a fountain pen; an ultrasonic quartz saw; a high accuracy mortar locator; and super-small experimental field radios.

The laboratories formed new equipment training teams to train units in the installation, maintenance and operation of the new equipment. Some 200 Soldier specialists conducted training in the United States, Alaska, and Japan.

The Signal Corps Engineering Laboratories also played an important role in the International Geophysical Year (IGY) in 1957-58, cooperating in research efforts by ninety-six member countries. The laboratories' involvement concerned upper air research and measurement of winds and temperatures by means of rockets. Support was also provided in the earth satellite program. Scientists developed instrumentation for meteorological measurements. They also developed instruments for "Cloud Cover," a satellite launched on 17 February 1959 to survey the earth's global cloud paths.

Fort Monmouth scientists developed a method for measuring polar ice by using radar in 1957. This technique greatly aided the study of the Polar Regions.[61]

Personnel strength at Fort Monmouth totaled 15,859 as of December 1957. This reflected overall growth since the Korean War and included 1,156 officers and warrant officers, 7,503 enlisted personnel and 7,200 civilian employees.

The Army re-designated the U.S. Army Signal Corps Engineering Laboratories as the U.S. Army Signal Corps Research and Development Laboratory (USASCRDL) in April 1958.[62]

The laboratory placed increased emphasis on internal research and created an Institute for Exploratory Research in the Office of Research Operations in fiscal year 1958. Exploratory Research Divisions were also created in each of the three operating

departments. The consolidation of internal research efforts was completed when the Institute for Exploratory Research achieved department status and the three Exploratory Research Divisions transferred from departments to the Institute. This was the final step in fostering a research organization free from the pressures that characterized development activities. A Computational Analysis Division was also established within the institute to provide a mathematical and computational service.[63]

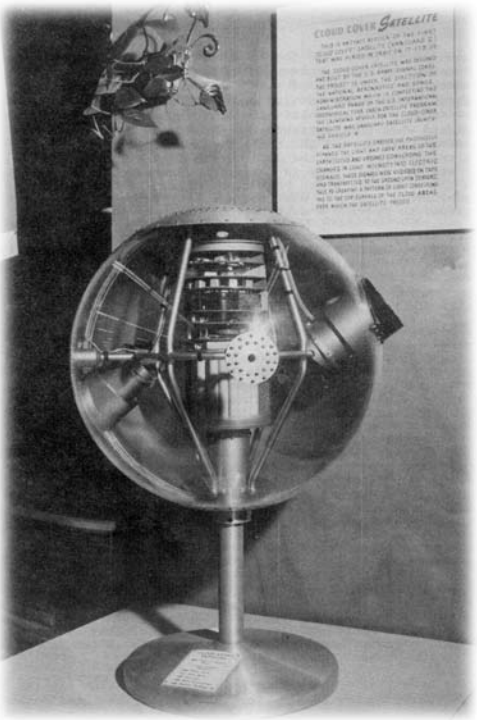
An Astro-Electronics Division was established in the Communications Department to give proper recognition and priority to astro-electronics projects. The division embraced Astro-Instrumentation, Astro-Observation and Analysis, and Astro-Communications Branches.[64]

SATELLITES

The Signal Research and Development Laboratory accomplished a major satellite payload contribution with the launch of Vanguard I on 17 March 1958. This project demonstrated the feasibility of solar converters for satellites. The laboratory developed solar-powered devices, consisting of six cell clusters, to power one of the two radio transmitters in the 3-1/4 lb, 6.4 inch sphere.

The Deal Test Station of the laboratory picked up the Vanguard I's signals three minutes after its launch from Cape Canaveral in Florida. Vanguard I traveled 409,257,000 miles in 11,786 orbits in the first three years of its existence. Its radio voice never failed, and the satellite proved itself invaluable in scientific computations. Vanguard I had a predicted life of 200 to 1,000 years and its solar cells, and perhaps its radio, were expected to operate as long as it circled the globe.

The second major satellite payload contribution was the complete electronics package for Vanguard II, launched on 17 February 1959. This satellite, with infrared scanning devices to provide crude mapping of the earth's cloud cover and a tape recorder to store the information, operated perfectly during the entire twenty-day life of the battery power source.



Vanguard II Satellite

The first communications satellite, Project SCORE (Signal Communications via Orbiting Relay Experiment), successfully launched on 18 December 1958. It broadcast a Christmas message from President Dwight D. Eisenhower to people around the world. The experiment effectively demonstrated the practical real-time feasibility of worldwide communications in delayed and real-time mode by means of relatively simple active satellite relays. SCORE was a project of the Advanced Research Project Agency (ARPA) conducted by the Signal Corps. The Air Force provided the Atlas launching vehicle.

In addition to its work with satellites, the laboratory developed and tested equipment to fit into the new concept of rapid and flexible communications.

Scientists at Fort Monmouth participated in Project WOSAC, or the World Wide Synchronization of Atomic Clocks, from 1959 to 1960. The project, carried out with the aid of the U.S. Navy, U.S. Air Force, Harvard University, and the British Post Office, established a global standard for time measurement.[65]

Fort Monmouth scientists produced MOBIDIC, the world's first mobile, van-mounted computer, in 1960. MOBIDIC would be the prototype of the computers the Army used in Vietnam to automate combat support functions in artillery, surveillance, logistics, and battlefield administration.

The laboratories developed portable, hand-held radar in early 1962 using the latest micro-miniaturization technology. This radar became the prototype of the radar gun used by police forces throughout the world to detect speeding motorists.

6
AMC/ECOM AND VIETNAM

REORGANIZATION

A reorganization of the Army in 1962 resulted in some significant changes for Fort Monmouth.

In response to a study directed by the Secretary of Defense, the Army reviewed its managerial practices in order to achieve more efficient and economical operation and eliminate unnecessary overlap and duplication of effort.

One segment of the Army study analyzed the Technical Services, one of which was the Signal Corps. As a result, the Signal Corps and the other Technical Services ceased to exist. Their functions transferred to new commands. Signal Corps functions, for instance, would no longer fall under the purview of the Chief Signal Officer. Management of Signal Corps personnel was assigned to the Office of Personnel Operations (OPO); signal training was transferred to the Continental Army Command (CONARC); signal doctrine and combat development to the Combat Development Command (CDC); and signal materiel development and procurement to the Army Materiel Command (AMC).[66]

AMC stood up 1 August 1962 as the first centralized logistics command to exist in peacetime. A subordinate element of AMC, the U.S. Army Electronics Command (USAECOM), was established at Fort Monmouth that same day.[67]

The USAECOM exercised integrated commodity management of assigned materiel within the concept of cradle-to-grave management.

The command was responsible for research, design, development, product and maintenance engineering, industrial mobilization planning, new equipment training, wholesale inventory management, supply control, and technical assistance to users in the commodity areas of communications, electronic warfare, combat surveillance, automatic data processing, radar, and meteorological materiel.

Major General Stuart Hoff was appointed the first Commanding General of ECOM, effective 1 August 1962. He simultaneously became the 22nd Commanding Officer of Fort Monmouth.

The initial effort at reorganizing Army electronics materiel management carried with it a major organizational deficiency. Field agencies previously reported to the Office of the Chief Signal Officer, the only staff interposed between them and the Department of the Army (DA). The reorganization aggravated this situation by creating two levels between the units and DA: ECOM and Headquarters, AMC.

A study was initiated almost immediately to design a better organization for ECOM.

A restructuring of the command was implemented in July 1964. It was a logical continuation of the U.S. Army reorganization of 1962 that made ECOM a cohesive operating command of AMC. The objectives of the restructuring were to consolidate missions and eliminate command and staff layering; to collocate principal mission and operating functions of research and development, procurement and production, and materiel readiness; and to establish ECOM as the primary authoritative point within the Department of Defense for integrated life-cycle management of assigned commodities.[68]

The ECOM reorganization essentially established a directorate-type organization that combined the former headquarters staff with the operating elements of corresponding functional areas.

Major organizational changes within ECOM's research and development operations were accomplished in 1964 and 1965. Initially, a supervisory research and development staff was eliminated and staff supervision within the U.S. Army Electronics Laboratories was streamlined. The laboratories were designated the U.S. Army Electronics Laboratories in July 1964 and authorized a personnel strength of ninety-four officers, 143 enlisted personnel, and 2,725 civilian employees.[69]

Fort Monmouth, NJ (early 1960's). Signal Corps Center and School 1200 Area.

A laboratory for Combat Surveillance and Target Acquisition was organized as an element of the Electronics Laboratories in January 1965. The following month an Avionics Laboratory was organized, also as an element within the Electronics Laboratories.[70]

As a result of an ECOM study, other major areas of research and development were organized into laboratory-type organizations within a few months. This included communications, electronic warfare, and atmospheric sciences.

The Electronic Laboratories were then discontinued on 1 June 1965. Six separate laboratories emerged: the Electronic Components Laboratory, Communications/ADP Laboratory, Atmospheric Sciences Laboratory, Electronic

Warfare Laboratory, Avionics Laboratory, and Combat Surveillance and Target Acquisition Laboratory. A Directorate of Research and Development (R&D) and an Institute for Exploratory Research were also organized.[71]

The new organization was designed to provide greater efficiency and responsiveness in meeting the ECOM R&D mission. The new Directorate of R&D was authorized eleven officers, eighty-seven enlisted personnel, and 1,102 civilian employees.[72]

VIETNAM

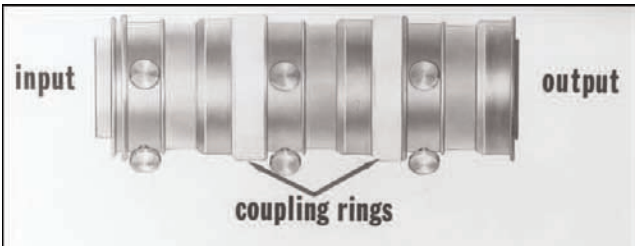
The new command responded quickly to the exigencies of war in Southeast Asia during the Vietnam conflict, supplying and supporting the most advanced radios, switches, teletypewriters, and telephones any Army had ever seen.

With the UNICOM/STARCOM program, ECOM bought the equipment and services needed to build an infrastructure in Southeast Asia and the Pacific for efficient, reliable telephone and data communications. That effort culminated in the 1965 award to Page Communications Engineers of what was then the largest contract ever negotiated by ECOM or any of its Signal Corps predecessors. This was a contract to install, maintain, and operate the Integrated Wideband Communications System. This system and associated switching centers provided the backbone for what was the first conscious attempt to create an Army area telecommunications networking tactical arena. Mobile satellite terminals supplemented the network's troposcatter and cable links across the Pacific. The two channel link from Tan Son Nhut to Hawaii, established in August 1964, was the world's first operational satellite communications system.

General Moorman ordered the new, transistorized FM radios of the AN/VRC-12/PRC-25 families shipped to Vietnam in July 1965 in response to General Westmoreland's complaints about the AN/PRC-10. The new, transistorized FM radios of the AN/VRC-12/PRC-25 families soon became the mainstay of tactical communications in Southeast Asia. ECOM awarded competing production contracts to sustain the flow. ECOM's commander, General Latta, personally browbeat contractors to ensure timely delivery of a dependable product. The Command delivered 20,000 VRC-12 and 33,000 PRC-25 radios to Southeast Asia in three and a half years. The PRC-25 was, according to General Creighton Abrams, who commanded military operations in the Vietnam War from 1968-72, "the single most important tactical item in Vietnam."[73]

Squad Radio Receiver AN/PRR-9 & Transmitter AN/PRT-4 in Tactical Operation Mode

The first AN/GRC-163 arrived in Vietnam in January 1968. ECOM developed this trailer-mounted four-channel multiplexed radio to support communications in airmobile operations. It replaced the AN/MRC-69, which was too heavy to fly even in the downsized "34-and-a-half" version.



Three-Stage Cascade Image Intensifier Tube with Stages Coupled.

ECOM delivered a new squad radio to replace the AN/PRC-6 "walkie talkie" in 1967. Troops in Vietnam had found the AN/PRC-6 too awkward for use in combat. The new radio consisted of a helmet-mounted receiver, the AN/PRR-9; and a shirt-pocket transmitter, the AN/PRT-4. The contractor, Delco, produced sets for 47,000 infantrymen through 1971.

During Vietnam, transistors and integrated circuits replaced tubes. Communications equipment became smaller, lighter, more dependable, and more versatile. It reached lower into the ranks and accommodated a much larger volume than ever before, providing more information to more people more of the time.

ECOM supplied combat troops a number of other high- technology commodities during the war. These included night vision devices, mortar locators, aerial reconnaissance equipment, surveillance systems, sensors, and air traffic control systems.

Second generation night vision devices (image intensification technology) replaced the first generation "sniper scope" (near infrared technology) of World War II. The Small Starlight Scope AN/PVS-2, the Crew Served Weapons Sight AN/TVS-2, and the medium range Night Observation Device AN/TVS-4 all saw service in Vietnam. The Night Vision Laboratory, which was attached to ECOM in 1965, began development of these products in 1961. Production of the AN/PVS-2 began in 1964.

The war provided the first test of the improved counter-mortar radar AN/MPQ-4 in a tactical environment. The AN/MPQ-4, which had existed in the Army inventory since 1960, was deployed to Vietnam in 1965 and proved particularly useful in the defense of fixed installations. During the war, ECOM scientists devised operational schemes that permitted effective scanning over 360 degrees.

ECOM developed the AN/PPS-5 man-portable surveillance radar to replace the AN/PPS-4 and AN/TPS-33. The ninety-five pound set had a 360 degree scan capability. It could detect personnel within five kilometers and vehicles within ten. ECOM awarded the production contract in April 1966, following evaluation of

Engineering Development models in Southeast Asia. There were more than 350 sets in the theater by the end of 1970. Though often deadlined for lack of repair parts, the set was popular with the troops because it reduced the need for hazardous surveillance patrols. According to one commander, "One AN/PPS-5 in operating condition is worth 500 men."

ECOM scientists in the SEACORE project developed a number of electronic sensing devices originally intended for use in the McNamara Line. These included sensors that could be emplaced by artillery, listening devices, and seismic detectors. Some sensors were cleverly disguised as dog feces. While the McNamara Line concept was impractical, the sensors proved useful in the perimeter defense of Army compounds.

ECOM supplied, managed, and supported nearly half the line items in the Army's materiel inventory during the 1960s. The items ranged in size (from a transistor to a sixty-foot parabolic antenna), complexity (from two-strand twisted wire to airborne surveillance systems), and technologies. The range exceeded that of any other AMC commodity command. Supporting this materiel in the theater involved unique problems and solutions. For example, ECOM was hard pressed to find producers who could deliver quality batteries in sufficient quantity. The command additionally had to worry about how the batteries were stored in the torrid climate of Southeast Asia.

ECOM addressed problems of supply and support through a variety of means. Commodity Management Offices (Avionics/Navigation Aids, Electronic Systems, Combat Surveillance/Night Vision/Target Acquisition, Communications/Automatic Data Processing, Intelligence Materiel, Electronic Warfare/Meteorology, and Test Equipment/Power Sources) provided intensive management of critical items. Established when the Command was organized in 1962 and staffed by some of ECOM's best people, the Commodity Management Offices survived in one form or another until 1971.

General Latta established the twenty-seven man Operational Readiness Office in 1965. Its sole mission was to monitor the progress and detect the problems of every ECOM project or activity relating to Southeast Asia. ECOM established and staffed the Aviation Electronics Agency and the Avionics Configuration Control Facility in 1966-1967 to address the unique problems associated with installation of ECOM equipment in Army helicopters.

ECOM instituted a Direct Exchange/Repair and Return program for nineteen critical items, mostly avionics equipment, in August 1965. Under this program, spares were exchanged for damaged equipment in the theater. Defective components were then returned to the U.S., usually to the Sacramento Army Depot, for repair and eventual return to the field. As repair requirements changed during the war, so, too, did the number and kind of items on the repair and return list. Defective modules were arriving at Sacramento Army Depot at the rate of 5,000 a

month by 1969. Noting that many modules were damaged or misplaced in shipment, General Latta had the labs design and issue padded, pre-addressed envelopes called "jiffy bags."

The RED BALL Express, instituted by the Army in December 1965, provided emergency supply of critical repair parts and air delivery to Vietnam. ECOM handled 27,000 RED BALL requisitions in 1967, filling 99.2 percent within thirty days (the AMC average during the same period was 97.8 percent). The National Inventory Control Point at ECOM established a permanent office in South Vietnam in January 1968. Civilian supply technicians replaced military expediters to locate equipment in the depots.

ECOM instituted a Technical Assistance Program in Vietnam in 1965 to solve the most troublesome maintenance and support problems on site and also to provide feedback information for correcting design and support deficiencies. One civil servant and thirty-three manufacturer representatives worked the Technical Assistance Program. Latta then organized a formal ECOM Area Office in Vietnam in February 1966. Three years later, the office had a staff of 141 civilian engineers and technicians. Most of the staff was assigned to support MACV Headquarters, the 1st Signal Brigade, the 1st Logistical Command, and the 34th General Support Group.

ECOM deployed the R&D Technical Liaison Team to Vietnam in January 1967 at the request of the 1st Signal Brigade. The team typically consisted of six or seven people: a team leader and representatives of the R&D Technical Support Activity and the various ECOM laboratories (Avionics, Electronic Components, Combat Surveillance/Target Acquisition, Night Vision, and Communications/Automatic Data Processing). Team members typically served three-month tours in theater (leaders, six months) to observe the operation of ECOM equipment, identify deficiencies in design or performance, provide quick-fix solutions, and acquire first-hand knowledge of field conditions. More than eighty ECOM scientists and engineers served on the team between 1967 and 1972. Several served more than once. The team also supported AMC's Vietnam Laboratories Assistance Program.

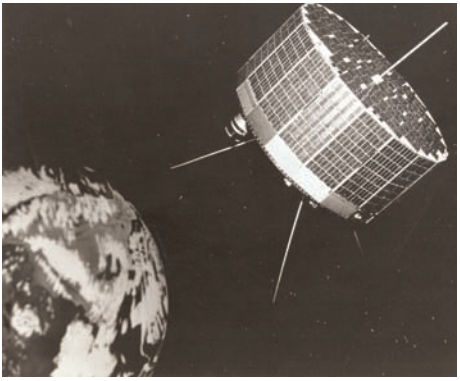
Military and civilian personnel of the ECOM New Equipment Training teams conducted more than eighty missions in direct support of the war in Southeast Asia from 1965 through 1968, including fifty-one missions in theater. More than half of all the missions supported avionics equipment.

The Vietnam War was tapering off and priorities had shifted by the time ECOM observed its 10th anniversary in 1972. Research and Development received increased emphasis for the design and development of the next generation of the military's electronic needs.

ECOM accomplished its assigned mission in its sixteen years of constant change and reorganization. During this time, the laboratories produced some famous "firsts." These included the following:

First televised weather satellite

The Tiros-1 satellite, developed under the technical supervision of the Fort Monmouth Laboratories, sent to the giant 60 foot "Space Sentry" antenna at Fort Monmouth the first televised weather photographs of the earth's cloud cover and weather patterns. (1960)



Tiros-1 satellite

Courier Satellite

First Large Scale Mobile Computer

MOBIDIC, the Mobile Digital Computer, developed at Fort Monmouth, was the first computer developed for use at Field Army and theater levels. This van-mounted computer was the first experiment in automating combat support function in artillery, surveillance, logistics and battlefield administration. (1960)

First High Capacity Communication Satellite

The Courier Satellite, developed and built under the supervision of the Fort Monmouth Laboratories, was the experimental communications satellite that proved high-volume communications, up to 100,000 words per minute, could be relayed through space. (1960)

Hand-held Radar

A 10-pound experimental unit that could spot moving targets a mile away. (1962)

Morse Code Readout

This device, developed at Fort Monmouth, plugs into any Army radio and transforms the dots and dashes of Morse Code into letters formed by a light-emitting diode (LED). This device allows a Soldier with no knowledge of Morse Code to be able to receive coded messages. (1964)

Multi-Channel Laser Relay

A single pencil-size laser beam that acted as a relay of many television and radio channels. (1965)

Microelectronics

Circuitry that was more reliable, used less power, and was less costly. Primary usage was for computers. (1966)

Night Vision

Development and deployment to Vietnam of a passive night vision device that, by using image intensifier tubes, made targets almost as visible at night as in daylight. (1968)

Radio Ground Beacon

The Electronics Command fielded a small omni directional radio ground beacon, the AN/TRN-30, for Army aircraft. The beacon is for use at remote airstrips and landing facilities.

Defibrillator Pacemaker

Developed in cooperation with doctors from Patterson Army Hospital, the device regulated the heartbeat but, in addition, could detect the start of fibrillation (wild tremors of the heart's muscle) and briefly stop the heart to allow normal beat to resume. (1972)

Carbon Dioxide Communications Laser

An air-cooled dioxide laser communications system with a range of five miles. (1973)

Lithium Battery

Testing of lithium batteries that potentially have four times the life of carbon-zinc and twice the life of magnesium batteries. (1974)

Mortar and Artillery Locating Radars

AN/TPQ-36 and AN/TPQ-37. (1975)

Automatic Telephone Central Office

The solid state AN/TTC-38 is smaller and lighter than manual switch systems, is faster and more easily maintained. It gives the user touch-dialing to anywhere in the worldwide military telephone system.

Laser Mini-Rangefinder

Small rangefinder weighing less than one pound that can be mounted on small arms and is accurate up to distances of one kilometer. (1974)

ECOM's personnel strength reached over 1,350 military and 10,250 civilians as it entered its second decade. The majority of the personnel (approximately 7,200 civilian and 900 military) worked at Fort Monmouth, with the remainder dispersed amongst ECOM Philadelphia and Fort Belvoir, Virginia; among other smaller contingents.[74]

THE SIGNAL SCHOOL TRANSFER

The war in Vietnam, like the Korean War fifteen years before, brought to Fort Monmouth a dramatic increase in its number of students. As late as 19 April 1965, the Signal School planned to enroll 4,290 students in enlisted courses during the coming fiscal year. CONARC increased the required enrollment to 8,806 in increments by the end of November 1965. The required and anticipated officer enrollment at that time was 1,185.

Congress authorized construction of three new, permanent classroom buildings to make room for the influx of students: Building 292 for the Officer School's Department of Command Communications (Tactical Division), Building 814 for the Photographic Laboratory, and Building 918 for the Radar Laboratory. In breaking ground for these buildings on 19 August 1966, Congressman James J. Howard declared, "This ceremony is symbolic as a reassurance to the people of Monmouth County that the Signal School is here to stay."

On 25 November 1966, the Commandant of the Signal School, Brigadier General Thomas D. Rienzi, presented a special diploma to the 200,000th graduate of the School's Enlisted Department. PFC Lloyd B. Hansen of Minot, ND, had completed the twenty-eight week microwave radio repair course.

At that time, the School anticipated fiscal year 1967 enrollments of 18,194 enlisted personnel and 2,124 officers. Many of the courses operated with three shifts a day to accommodate these students. As the war in Vietnam wound down, so, too, did Signal School enrollments. The School admitted 14,139 students, enlisted and officer, in 1970.

These numbers notwithstanding, the majority of the Signal Corps' enlisted personnel trained during the war at Fort Gordon, not at Fort Monmouth. Fort Gordon also hosted the Officer Candidate School. The Army placed its branch schools under the jurisdiction of the newly-created Training and Doctrine Command (TRADOC) in July 1973. The following year, TRADOC began consolidating Signal Corps training at the Southeastern Signal School, Fort Gordon. TRADOC re-designated this school "The U. S. Army Signal School" on 1 July 1974. The Signal School at Fort Monmouth continued to operate as "The U. S. Army Communications-Electronics School" while equipment and personnel transferred.[75] The movement of the school involved the transfer of only eighty-nine civilians. More than 700 others received reassignment to other agencies on post or retired. Fort Monmouth's last class in signal communication graduated on 17 June 1976.

7
ECOM TO CERCOM/CORADCOM TO CECOM

The Communications-Electronics Command inadvertently traces its roots to the December 1973 establishment of the Army Materiel Acquisition Review Committee (AMARC). This committee was charged by the Secretary of the Army with finding ways to improve "current Army organization and procedures for materiel acquisition," and to do so within one hundred days.

The Committee's report, released 1 April 1974, concluded that the Army's standard commodity command structure, with its emphasis on "readiness," limited flexibility and impeded the acquisition process. It recommended that research and development (R&D) functions be separated from readiness functions within the Army Materiel Command (AMC) and that the disparate and scattered R&D activities of AMC be consolidated in six development centers.

This meant a simple two-for-one split for most of the major subordinate commands within AMC. The picture was more complicated, however, for ECOM. AMARC concluded that the breadth of ECOM's responsibilities "tended to defocus the organization's responsiveness to modern mission-oriented needs." A splintering, not a split, was proposed. This transferred the Avionics, the Combat Surveillance, and the Electronic Warfare R&D missions to Development Centers not headquartered at Fort Monmouth.

The recommendation proved unpopular. Within days, community leaders joined Fort Monmouth personnel in a vigorous "Save the Fort" campaign. Campaigners sent more than 50,000 letters to the Secretary of the Army. These letters attracted White House attention and twice obliged the Army to reassess its reorganization plans. The letter writing campaign had some effect. The Army's initial plan, announced 1 April 1976, would have cost the Fort 780 jobs. The final plan, announced 13 July 1977, left the Electronic Warfare mission at Fort Monmouth and resulted in the elimination or transfer of only 418 personnel.

As of that date, much of AMARC was already implemented. The Aviation Systems Command, soon to become the Aviation Research and Development Command, had assumed operational control of the Avionics Laboratory and PM Navigation Control Systems (NAVCON).

The Electronics Research and Development Command (ERADCOM), established provisionally 30 March 1977, assumed operational control of its assigned elements on 15 July, as did the Communications Research and Development Command (CORADCOM). CORADCOM was established provisionally under Brigadier General William J. Hillsman, who was the Project Manager for Army Tactical Data

Systems (ARTADS). He led the task force that planned the organization of the new command.

The Army Materiel Command (AMC) was re-designated the U.S. Army Materiel Development and Readiness Command (DARCOM), with no change in mission.

Activation of the new commands--CERCOM (Communications-Electronics Readiness Command), CORADCOM and ERADCOM--was initially planned for 1 October 1977. The date moved to 1 January 1978, partly to permit review of revisions imposed on the CERCOM organization concept by Major General John K. Stoner, the ECOM Commander; and partially to accommodate additional planning necessitated by a DA-imposed reduction of 500 spaces in the Headquarters Installation Support Activity (HISA), along with a reduction in average grade and a reduction in the number of high-grade positions permitted in the two new commands.

Activation ceremonies for the new commands occurred 3 January 1978 in the Field House. DARCOM Commander General John R. Guthrie officiated, handing the CERCOM flag to Major General John K. Stoner and the CORADCOM flag to Major General Hillman Dickinson.

The two commands made significant contributions in the ensuing three years and four months of their operation. They also encountered problems.

The separation of acquisition from readiness gave the research and development community the visibility AMARC thought the communities needed. However, it was costly. Separation meant duplication. Each command required an administrative staff, which, at that time of constrained resources, meant the diversion of personnel from mission activities. There also was a duplication of effort in the mission activities, and overlapping areas of responsibility that used manpower simply to ensure a coordination of effort. Such duplication affected performance most severely in integrated logistics support, in initial fielding, and in long-term field support. It was also apparent in production engineering and product assurance.

AMARC was an experiment, not a solution. The AMARC committee itself insisted on periodic review, updating and revitalization of the measures it proposed to improve materiel acquisition. It was only natural to "revisit AMARC" when, in February 1979, DARCOM Commander General Guthrie voiced concern about the impact of continued manpower reductions on the mission performance of DARCOM commands.

Review of the Army electronics community began in August 1980. A marked improvement was noted in the electronics R&D capability, but the review committee found the readiness capability weakened. They attributed this to diverging workload and fixed resources. The review team, addressing this imbalance, decided there was a need for greater economy and greater flexibility in the use of existing manpower resources. This could be achieved by pooling the resources of the two commands

headquartered at Fort Monmouth, a move which would eliminate duplication. Control could be assigned to one commander with the authority to move personnel as required to meet the most pressing needs. A decision was announced in December 1980 that CERCOM and CORADCOM would merge and become the Communications-Electronics Command (CECOM) effective in May 1981.

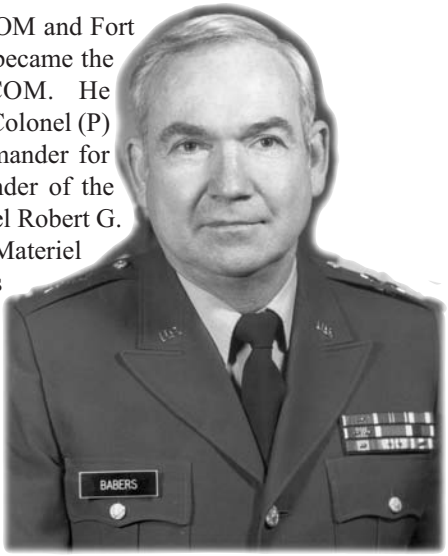
CECOM was to be structured to assure that materiel acquisition was not totally submerged in the new command as it had been in the pre-AMARC commodity command. The Development Center of the new command would have a General Officer in charge, also serving as Deputy Commander for Research and Development, to assure that R&D at CECOM retained the visibility obtained under AMARC.

OFFICIAL CECOM COMBAT FOR LEADERS CREST

8
FORT MONMOUTH IN THE 1980s

CECOM

Major General Donald M. Babers, CERCOM and Fort Monmouth commander since June 1980, became the first Commanding General of CECOM. He continued in his role of post commander. Colonel (P) Robert D. Morgan became Deputy Commander for Research and Development and Commander of the Research and Development Center. Colonel Robert G. Lynn (P) became Deputy Commander for Materiel Readiness. Both men received promotions to Brigadier General on 31 July 1981.[76]



Major General Donald M. Babers, the first Commanding General, CECOM, Fort Monmouth.

Essentially, CECOM was charged with the research, development, engineering and acquisition of assigned communications and electronic systems and management of all materiel readiness functions associated with these systems and related equipment.

Research facilities of the command included the Center for Tactical Computer Systems (CENTACS), which conducted research and development in computer science and systems, including hardware and software for diverse applications; the Center for Communications Systems (CENCOMS), which researched programs to produce advanced communications technology, equipment and systems; and the Center for Systems Engineering and Integration (CENSEI), the Army's system engineer for Tactical Command, Control and Communications. CENSEI aimed to produce a well-engineered, affordable and evolutionary system design.

A Program Manager (PM) directed the Test, Measurement and Diagnostic Equipment (TMDE) modernization effort. Two product managers reported to this PM; one, for Test, Measurement and Diagnostic Systems; and one, for Army Test, Measurement and Diagnostic Equipment Modernization.

In addition, eight project managers (PMs) existed within CECOM. These included Army Tactical Communications System (ATACS)/Mobile Subscriber Equipment (MSE); Position Location Reporting System/Tactical Information Distribution System (PLRS/TIDS); Satellite Communications (SATCOM/SATCOMA); Field Artillery Tactical Data Systems (FATDS); Single Channel Ground and Airborne Radio Systems (SINCGARS); Operations Tactical Data Systems (OPTADS); Multi-Service

Communications Systems (MSCS); and Firefinder Remotely Monitored Battlefield Sensor System (REMBASS), which was transferred to CECOM from the Electronics Research and Development Command (ERADCOM) on 30 March 1984.

The Army established a series of Program Executive Offices (PEOs) in 1987 in order to consolidate and better manage the vast array of Program Managers responsible for major acquisition programs in the inventory. The Army created PEOs for Communications Systems, Command and Control Systems, and Intelligence/Electronic Warfare and Sensors to manage all of the electronics programs. A PEO/CECOM association existed due to the nature of their missions. The PEOs received significant technical, logistical and program management support from CECOM, but reported directly to the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA ALT).

SEC CREST

The command added a Software Development and Support Center in October 1984. Located in Building 1210, a former Signal School classroom building, the center conducted software development and life cycle software support activities associated with the Army communications equipment.[77]

Field offices in various parts of the United States and Europe supported CECOM's research and development efforts and procurement and readiness functions. TASA, CECOM's Television-Audio Support Activity at Sacramento, California, was the Army life-cycle manager for non-tactical, commercial broadcasting and television equipment for the Army forces. This subsequently transferred to the U.S. Army Information Systems Command.

A number of separate agencies within CECOM were responsible for supporting all the systems in CECOM's inventory during the 1980s. CECOM's National Inventory Control Point (NICP) played a key role in keeping fielded communications and electronics equipment in a high state of readiness. This task included worldwide materiel management of communications-electronics systems and support items. Complimenting the NICP was the command's National Maintenance Point (NMP), which provided maintenance and engineering expertise on maintainability of communications-electronics materiel from conception to obsolescence.

Certain CECOM activities were managed at locations aside from Fort Monmouth. The Communications Security Logistics Agency (CSLA), based at Fort Huachuca, Arizona provided commodity management of communications security equipment, aids, and accountable spare parts.

The Electronics Materiel Readiness Activity (EMRA) at Vint Hill Farms Station, Warrenton, Virginia, furnished commodity management and depot-level management for signal intelligence/electronic warfare equipment and systems. EMRA supported the Army Intelligence and Security Command (INSCOM) and other Signal intelligence and electronic warfare units and activities worldwide.

The CECOM Logistics and Readiness Center (LRC) stood up on 10 November 1987 to act as an overseer to all communications-electronics logistics functions within CECOM. Its mission was to support the U.S. Army by providing integrated, timely, cost-effective, and high quality worldwide logistics support to include fielding, new equipment training, operations, maintenance, and sustainment. In addition, the LRC was responsible for all Foreign Military Sales (FMS) and communications security programs and management of Level II and Level III programs, having completed their initial development and fielding.

LRC CREST

POST IMPROVEMENTS

The physical area of Fort Monmouth during the 1980s encompassed the main post area, the Charles Wood Area, and the Evans Area nine miles to the south. All of the other sub-installations had been closed or were released to the General Services Administration for disposal. The last large area identified for disposal was the Coles Area on Newman Springs Road west of Red Bank. It was declared excess in March 1974 and officially closed 1 January 1975.

The post continued to grow with the construction of new facilities through the years. An interdenominational Chapel was dedicated in July 1962; a Bowling Center opened in December 1965; dedication of the Post Exchange complex took place in February 1970; the Commissary opened in April 1971; Green Acres, the CECOM Office Building, officially opened in November 1973; the Credit Union Building and the Post

CECOM Office Building.

Exchange Service Station and Convenience Store in the Charles Wood Area opened in March 1975; and the post library opened in June 1974. The library was dedicated as the Van Deusen Library in 1977 in honor of the 1941-42 post commander and Signal School Commandant.

Multi-million dollar projects in the 1980s upgraded and modernized the Myer Hall complex and barracks in the 1200 area; the Communications Center (Vail Hall); Russel Hall, and Squier Hall. A modernization program began at the Hexagon (Building 2700) in July 1982. Major objectives of a three-phase Hexagon modernization program included the installation of air conditioning; installation of energy-saving wall and window insulation; accommodations for the handicapped; installation of additional elevators; replacement of existing communications equipment; and alteration of building elements to conform to health safety and fire codes.

A new NCO/Enlisted Club opened 10 November 1983. The first phase of construction for the club, built in the area between the post service station and Husky Brook Pond, provided a facility with fast food service and a bar. Subsequent construction added a kitchen and dining room.

TENANT ORGANIZATIONS

JOINT TACTICAL COMMAND, CONTROL AND COMMUNICATIONS AGENCY

The Joint Tactical Command, Control and Communications Agency stood up at Fort Monmouth on 10 September 1984 with Major General Norman E. Archibald as Director. The DoD chartered this agency to ensure interoperability among tactical command, control and communications systems used by U.S. Armed Forces and to develop and maintain a joint architecture, systems standards and interface definitions for tactical/mobile command, control and communications systems.

The agency, headquartered in Russel Hall, united four former defense elements under the leadership of a single director: the Joint Tactical Communications Office and the Joint Interface Test Force, both at Fort Monmouth; the Joint Test Element, Fort Huachuca, Arizona; and the Joint Interoperability of Tactical Command and Control Systems Program, Washington. This office was later reorganized into the JIEO (Joint Information Engineering Organization) and was separated into various other organizations over the next fifteen years.[78]

U.S. ARMY CHAPLAIN CENTER AND SCHOOL (USACHCS) AND CHAPLAIN BOARD

The Army's Chaplain Center and School, the Army's only training center for the clergy, moved to Fort Monmouth in 1979 from Fort Wadsworth, N.Y. It conducted resident training for over 1,000 students per year, including 700 enlisted chaplain activity specialists and 300 chaplains in both the officer basic and advanced courses.

The school, which transferred to Fort Jackson, South Carolina during the 1990s, was headquartered in Watters Hall (Building 1207, formerly Myer Hall and later Mallette Hall). The building was renamed 30 July 1984 in commemoration of the 109th anniversary of the Army Chaplaincy. Chaplain (Major) Charles J. Watters, a Catholic Priest of Jersey City, N.J., was killed in action in Vietnam and posthumously awarded the Medal of Honor by President Nixon in 1969.[79]

The Chaplain Board, a field operating agency of the Chief of Chaplains, moved to Fort Monmouth in September 1979. It executed programs in support of various religious and moral activities of the Army and focused on meeting the changing needs of the Soldier. The board also assisted the Chief of Chaplains in developing concepts of ministry and professional guidelines for chaplains and religious activities.

U.S. ARMY INFORMATION SYSTEMS MANAGEMENT ACTIVITY (ISMA)/ PROJECT MANAGER, DEFENSE COMMUNICATIONS SYSTEMS-ARMY

ISMA, located in Squier Hall (Building 283), was formerly the Communications Systems Agency (CSA) and was later assigned to the Army Information Systems Command (previously the Army Communications Command at Fort Huachuca, Arizona). The changes resulted in the establishment by the Army in mid-1984 of a staff agency and a major command to coordinate the modernization of the Army's information management, communications-command and control systems. Thus, the Army Communications Command at Fort Huachuca, the Army Computer Command at Fort Belvoir, and their associated agencies merged to form the new Information Systems Command (USAISC).

The Information Systems Management Activity (ISMA) at Fort Monmouth was a subordinate command of USAISC and a project management office of the Army Materiel Command. The activity handled the acquisition and fielding of a wide variety of information and telecommunications systems in support of the worldwide Defense Communications System. In addition to undertaking projects for the Army, Navy and Air Force, the activity supported the State and Commerce Departments, the National Security Agency, the Federal Aviation Administration, and foreign allied governments in improving the modernizing their communications systems.[80]

513th MILITARY INTELLIGENCE GROUP

The 513th Military Intelligence Group activated at Fort Monmouth in September 1982, along with three subordinate units: the 201st, 202nd and 203rd Military Intelligence Battalions. All resided at Fort Monmouth except the 203rd, which was headquartered at Aberdeen Proving Ground, Maryland.[81]

Activation of the units (all assigned to the U.S. Army Intelligence and Security Command) resulted in an additional 375 military personnel at Fort Monmouth. Fully

staffed, the 513th was expected to result in an increase of about $7 million in the post's annual military payroll.

Increasing military requirements to provide rapid and accurate intelligence support to military commanders responsible for planning and executing peacetime, contingency, and wartime operations influenced the activation of these units.

MODERNIZING THE FORCE

The phrase "Force Modernization" characterized the 1980s based on technologies developed largely in the 1970s. The introduction of tactical ADP (Automated Data Processing) systems gave the American Soldier new battlefield capabilities no other Army possessed. CECOM also introduced new secure communications systems, including Single Channel Ground and Air Radio System (SINCGARS) and Mobile Subscriber Equipment (MSE). CECOM assumed the lead in finding ways to shorten the acquisition cycle through procurement of non-developmental items and in standardizing tactical computers and software.

Concurrently, CECOM embarked upon an extensive internal reorganization. The continuing budget challenge within the Federal Government acted as one motivating factor for this change. Budget challenges dictated reduced spending and a renewed search for more efficient ways of doing business. The changes included the creation of a C3I Logistics and Readiness Center and the establishment of the U.S. Army Garrison Fort Monmouth. CECOM also assumed responsibility for Vint Hill Farms Station, Virginia, and its Garrison (which previously belonged to the Intelligence and Security Command).

Major General Lawrence P. Skibbie, the second Commanding General of CECOM, Fort Monmouth from 10/82-6/84.

CECOM COMMANDERS DURING THE 1980s

Major General Donald M. Babers, CECOM's first commander, was selected for promotion to Lieutenant General and reassignment in October 1982. He transferred to Headquarters, U.S. Army Materiel Development and Readiness Command (DARCOM) as Deputy Commanding General for Readiness.

Major General Lawrence P. Skibbie replaced Babers as the CECOM Commander and became the 30th commander of Fort Monmouth. General Skibbie commanded until June 1984 when he, too, was promoted to Lieutenant General and transferred to Headquarters DARCOM.

Major General Robert D. Morgan,
Commanding General,
CECOM, Fort Monmouth
from 6/84-5/87.

Major General Billy M. Thomas,
Commanding General, CECOM,
Fort Monmouth from 5/87-7/90.

Brigadier General Robert D. Morgan, who had served CECOM both as Deputy Commander for Research and Development and Deputy Commander for Readiness, succeeded General Skibbie. He thus became the 31st Commanding Officer of Fort Monmouth. He was promoted to Major General in September 1984.

CECOM's parent command, the U.S. Army Materiel Development and Readiness Command (DARCOM) was re-designated the U.S. Army Materiel Command (AMC) on 1 August 1984. This had been its original designation from 1962 to 1976.

Following Major General Morgan's departure on 15 May 1987, Major General Billy M. Thomas became the 32nd and final Commanding General of CECOM in the 1980s. He occupied the position until July of 1990.

9
CECOM AND THE GULF WAR

The United States launched air strikes against Iraq on 17 January 1991 in an attempt to liberate Kuwait. CECOM was responsible with equipping and sustaining the force with the communications and electronics equipment it needed to fight. This was not an easy task. Units arrived in theater with only the equipment they owned. While some units possessed newer equipment, most units had at least some incomplete or damaged systems. The Army, and CECOM in particular, had to fill these gaps either through accelerated fieldings of new equipment or by reissuing items in theater before the ground offensive.

CECOM's Emergency Operations Center (EOC) began operating twenty-four hours a day, seven days a week on 7 August 1990 to address the situation. Although several organizations within CECOM set up their own crisis management centers, the EOC served as CECOM's focal point for all actions relating to the crisis in the Middle East. Employees worked around the clock in order to equip Soldiers with everything from radios and jammers to night vision and intelligence systems. From day one, CECOM worked to sustain the equipment out in the field and ensure any follow-on items arrived in theater mission-ready.

LAR antenna installation in Saudi Arabia

The CECOM Readiness Directorate completed 1,318 fieldings between July 1990 and February 1991, many accelerated specifically to meet the requirements for Desert Shield/Desert Storm. For example, CECOM managed to issue the SINCGARS system to an entire brigade within one week in order to equip the 1st Cavalry Division with SINCGARS radios before its deployment. This included not only the radios themselves, but also the operator and maintenance support training needed to sustain them. CECOM would repeat this same accomplishment in theater three more times before it was all over.

CECOM also supported the war effort through the purchase of commodities: the consumables, repair parts, and replacement items that kept forces viable wherever they operated. This complex, time consuming process ordinarily involved item managers, contracting officers and other employees across several organizations and functional areas. Many of these administrative processes were temporarily suspended due to the immediate needs of forces deployed overseas. By the end of the crisis, CECOM processed close to 180,000 requisitions, shipped six million pieces of equipment worth over $1.1 billion (including four million batteries), initiated 456 urgent procurement work directives valued at $113 million, and procured a total of 10.8 million pieces of equipment worth $326 million.

CECOM also established a Communications Security (COMSEC) Management Office in Saudi Arabia that opened 15 November 1990. While most theaters traditionally had a communications command responsible for managing COMSEC issues, one had not been set up for Operation Desert Shield. The reserve unit ordinarily assigned to Central Command, or CENTCOM, was not deployed due to obsolete equipment. Consequently, the Army Theater COMSEC Management Office (TCMO) was a significant development. CECOM, recognizing the need for dedicated COMSEC support in Saudi Arabia, acquired the necessary authorizations, resources and space to set up at the Royal Saudi Air Force Base in Riyadh. TCMO came under the direct control of CENTCOM shortly after operations commenced and remained operational until May 1991.

CECOM made extensive use of Logistics Assistance Representatives (LAR) during Desert Shield/Storm. LAR were civilian employees (GS-11 through GS-13) from the Readiness Directorate of the Logistics and Readiness Center (LRC) who provided hands-on technical assistance when needed. These LAR deployed to Saudi Arabia along with the divisions. This made them among the first civilians to arrive in the war zone. CECOM had forty-eight LAR ready to deploy within seventy-two hours of receiving the full deployment alert for Operation Desert Shield. CECOM LAR proved invaluable in providing assistance whenever Soldiers in the field asked for help regarding their equipment.

Contractors also played a vital role in the Gulf War. Technical assistance from contractors became necessary in cases involving very recently developed systems on which the effects of the desert (such as the intense heat) were not yet fully understood. CECOM in many cases planned on developing a support capability within the organization but could not do so before the system was sent to the Gulf. In other cases, especially with older items, CECOM no longer had the ability to maintain them. Contractors provided the necessary support.

Batteries represented a huge challenge for CECOM during operations. Wartime demands surpassed peacetime stocks. Batteries quickly died, due largely to the intense desert heat. Unfortunately, nearly every item in CECOM's inventory required numerous batteries. Battery producers were instructed to work around the clock by the time the Air Campaign started in January 1991. This continued until the conclusion of the ground war in early March. Different pieces of equipment, such as radios and night vision devices, demanded different types of batteries. Maintaining stock and ensuring that the right equipment received the right battery became a logistical concern for CECOM. CECOM decided to push shipments into the theater to a single control point for distribution, rather than filling individual requisitions as they were received.

The DoD, the Army, and CECOM learned many lessons during Operations Desert Shield and Desert Storm. Although the Gulf War was viewed as an overwhelming success for the nation, the experience demonstrated the undeniable need for enhanced communications and more integration on the battlefield, along with a better logistics infrastructure. These lessons became the impetus that shifted military strategy towards one that emphasized information dominance over brute force.[82]

10
A DECADE OF REALIGNMENT AND DIGITIZATION--1990s

The missions of CECOM and related Fort Monmouth organizations acquired enhanced significance in the 1990s when the Army Chief of Staff defined the Army's role in the new world order and identified requirements for decisive victory: to own the spectrum, to own the night, to know the enemy, and to digitize the battlefield.

Despite the important role it played in supporting these requirements, CECOM's worldwide civilian workforce fell from 7,375 to 6,501, while its military strength dropped from 1,035 to 555 during the 30 September 1990 to 30 September 1995 period. During the same time, the number of civilians assigned to all organizations at Fort Monmouth, including CECOM, fell from 7,732 to 6,385; the number of military fell from 1,826 to 761.

The Defense Management Review recommended consolidation of four AMC organizations that performed missions associated with Test, Measurement, and Diagnostic Equipment (TMDE). Implementation of this recommendation entailed the movement of the TMDE Product Manager and associated support personnel from Fort Monmouth to Huntsville, Alabama (Redstone Arsenal). In addition to the three military and twenty civilian positions of the PM Office, eighty-four civilian resident matrix support spaces transferred from CECOM to the new Army TMDE Activity and fifteen civilian non-resident matrix support spaces reassigned to the U.S. Army Missile Command (MICOM), for a total loss to Fort Monmouth of three military and 119 civilian personnel. The Department of the Army approved the transfer in February 1991, with an effective date of 14 June 1991. On that date, the three military personnel and two civilian technical personnel of PM TMDE transferred to the Army TMDE Activity at Huntsville. The remaining civilians of the TMDE core, who did not wish to transfer with their functions, found other jobs in CECOM, as did all collocated and non-collocated matrix support personnel. AMC formally established the Army TMDE Activity by Permanent Orders 41-2, dated 16 May 1991.[83]

Although the size of the force it supported decreased during this time, CECOM experienced little if any reduction in its workload. This situation challenged leadership first to find ways of reducing the civilian workforce without resorting to involuntary separations and then to accomplish its mission with the remaining personnel without sacrificing quality or service to the customer.

CECOM's leadership met the first of these challenges by imposing strict hiring freezes, offering incentives for voluntary early retirement or separation, and reassigning employees from eliminated positions to vacant positions of higher priority. It addressed the second challenge, initially, through a large-scale reorganization that focused on vertical integration (the development of multi-

functional mechanisms for the management of weapon systems from cradle to grave) and through the development of a workforce committed to the principles of Total Quality Management. Subsequently, the command focused its work on the objectives of the total force, as defined by Department of the Army, and on the "core competencies" of the Army Materiel Command, namely technology generation and application, acquisition excellence, and logistics power projection.[84]

BASE REALIGNMENT AND CLOSURE (BRAC)

During the Cold War, the Soviet Union posed the primary threat to America's national security. U.S. military equipment, doctrine and training centered on effectively dealing with that threat. While the conclusion of the Cold War meant the threat was diminished, the infrastructure had not adjusted accordingly. This imbalance of forces and threats led many to believe that more bases existed than necessary. The first round of Base Realignment and Closure (BRAC) consequently occurred in 1988. Fort Monmouth was impacted by 1991 with the decision to move the Electronics Technology and Devices Lab (ETDL) of the Army Research Lab out of Fort Monmouth to Adelphi, Maryland.

The most significant changes for CECOM occurred during BRAC 93. The Chaplain Center transferred from Fort Monmouth to Fort Jackson, South Carolina. The Belvoir Research, Development and Engineering Center (BRDEC) realigned in place at Fort Belvoir, with some BRDEC positions realigned to CECOM (those pertaining to physical security, battlefield deception, electric power, remote mine detection/neutralization, environmental controls, and low cost/low observables business areas). The CECOM Office Building in Tinton Falls was vacated and 2,300 employees moved onto Fort Monmouth. The Evans Area was closed and 500 employees relocated to main post and the Charles Wood Area. BRAC 93 also saw the closing of Vint Hill Farms Station in Virginia, and the research and development as well as the logistics functions for intelligence, electronic warfare and sensors, along with 712 spaces coming to Fort Monmouth. The Army was additionally required to dispose of 264 excess housing units in the Charles Wood Area, which it turned over to the Navy.

BRAC 95 involved moving additional tenant personnel from Fort Dix and Bayonne to Fort Monmouth. Another BRAC 95 decision closed the Aviation and Troop Command in Saint Louis and reassigned nearly 180 of its procurement and materiel management personnel to CECOM and Fort Monmouth. The disposal of additional excess housing in the Howard Commons area of Fort Monmouth was also ordered.

CECOM Headquarters - Building 1207. Renamed Mallette Hall in memory of LTG Alfred J. Mallette in 1996.

CECOM expended a tremendous amount of effort during each round of BRAC in order to stay competitive while complying with the decisions reached by the commission. Unlike many other installations, the 93 and 95 BRAC rounds resulted in gains for Fort Monmouth, which meant additional work. Sixty million dollars in military construction money for renovations and new construction were awarded to accommodate the influx of employees to Fort Monmouth. The command met the logistical challenge to physically relocate so many employees while avoiding any interruption to its mission.[85]

TEAM C4IEWS FORMS

Amidst the BRAC realignments directed by higher headquarters, CECOM began a strategic alignment of its own in 1993 when it formed TEAM C4IEWS (Command, Control, Communications, Computers, Intelligence, Electronic Warfare and Sensors). Several organizations comprised this partnership: CECOM, PEO C3S (Command, Control and Communications Systems), PEO EIS (Enterprise Information Systems), PEO IEW&S (Intelligence, Electronic Warfare and Sensors), ARL (Army Research Laboratory), and DISA (Defense Information Systems Agency). Although the names of some of these organizations have changed through the years, their commitment to the partnership has not. The overarching goal of the partnership was best represented by its mission statement, which read: "We, the leaders of the above C4IEWS member organizations, commit to work together to support the vision of Fort Monmouth as a premier global Center of Excellence in developing and supporting superior C4IEWS systems and equipment as well as new architecture for strategic communications, automation and defense information infrastructure."

Official logo of TEAM C4IEWS.

In essence, the signatory organizations agreed to look beyond organizational boundaries and work together to develop innovative integrated solutions for the Warfighter. The partnership managed to overcome organizational differences and better support the Soldier by formalizing their cooperation.

Two examples of this alliance were the Digitization of the Heavy Forces at Fort Hood, TX, a PEO C3T-led project supported by the rest of the partnership; and the creation of the Stryker Brigade Combat Team (SBCT) at Fort Lewis.[86]

Team C4IEWS would eventually be transformed and renamed Team C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillances, and Reconnaissance).

CECOM'S RESPONSIBILITY FOR IT AND SUPPORT BROADENS

A single, integrated engineering organization was considered critical for coherent progress leading to the force of the future as information age technology began to blur the distinction among tactical, strategic, and sustaining base capabilities. To address the requirement, a SOMA (Signal Organization and Mission Alignment) study was conducted in order to determine the most efficient way to organize the Signal Corps' information management capabilities. All of the information management, acquisition, engineering, and procurement operations of the former Army Information Systems Command (ISC) were consequently assigned to CECOM. Through this reorganization, effective 1 October 1996, CECOM gained the Information Systems Engineering Command (USA ISEC) at Fort Huachuca, AZ. This added a total of nearly 1,600 civilian and 400 military personnel without relocation. Also as part of this reorganization, the Information Systems Management Agency (ISMA), already located at Fort Monmouth, was realigned in place. ISMA began reporting to CECOM/AMC and not to ISC at Fort Huachuca. A year later, ISMA became part of the Systems Management Agency at Fort Monmouth (which would later be absorbed into PEO EIS).

In addition to these Army-directed organizational changes, the Army Materiel Command directed CECOM to take operational control and management oversight of the Army Missile Command's Logistics Systems Support Center (LSSC), St. Louis, MO, and the Industrial Operation's Command's Industrial Logistics Systems Center (ILSC), located in Letterkenny Army Depot, PA and Rock Island, IL. CECOM's operational control of the LSSC and ILSC did not involve any personnel relocation. CECOM furthermore acquired Software Development Centers at Fort Lee, VA, Fort Meade, MD, and the Information Systems Software Center (ISSC) at Fort Belvoir, VA.

ISEC CREST

Beyond the increase in personnel, these realignments represented a marked increase in mission. Prior to 1997, CECOM was focused primarily on the operations/tactical domain of the spectrum and the technologies, software, sensors and products needed within the battlespace. In 1997, however, CECOM gained responsibility for the infrastructure side of the spectrum. This meant the responsibility for executing IT infrastructure improvements across all Army posts, camps and stations. The realignments of 1997 gave CECOM responsibility for information technology across the full spectrum of operations, from the sustaining base to the battlespace.

Further 1997 reorganizations within the Army Materiel Command formally placed Tobyhanna Army Depot (TYAD) under the direct control of CECOM. Located in

northeastern Pennsylvania, TYAD was the largest full-service communications-electronics maintenance facility in the Department of Defense with, at that time, more than 2,700 employees and fourteen forward operating locations located throughout the world.

Aerial view of Tobyhanna Army Depot.

Tobyhanna, the DoD's recognized leader in electronics maintenance, was responsible for a wide array of products. The depot's primary specialties included engineering, maintenance and manufacturing services, systems integration, repair, overhaul, power projection and high tech training.

TYAD was on the winning side of many BRAC realignments. In addition to its work supporting Army communications-electronics systems, TYAD gained responsibility for depot-level maintenance on the guidance and control systems for the Maverick, Sparrow, and Sidewinder missiles used by the Navy and Air Force. The 1995 closure of Sacramento Air Logistics Center shifted all Air Force ground communications equipment to TYAD. Forty percent of Tobyhanna's work supported the Air Force by 2002.[87]

TASK FORCE XXI, ADVANCED WARFIGHTING EXPERIMENT

The Task Force XXI Advanced Warfighting Experiment was the culmination of battlefield digitization efforts within the U.S. Army. A "real world" environment tested many of the systems conceived in the 1990s.

The brigade-sized task force consisted of two heavy battalions, one light infantry battalion, and a brigade support slice. Each of these exercises, held at the National Training Center at Fort Irwin, were designed not only to assess the technical aspects of these digitization efforts, but also to provide senior Army leaders with a sense of how these systems would perform in the hands of Soldiers actively engaged in combat operations.

The lessons learned from this experiment went a long way in determining the value of these systems in combat. While not every system involved met the goals of this exercise, the lessons learned from the experience proved invaluable in helping Army engineers and scientists better refine and improve these systems.[88]

CIPO: A FOCUS ON INTEROPERABILITY

Section 912 of the fiscal year 1998 Defense Authorization Act included several requirements pertaining to acquisition. In an April 1998 report to Congress responding to some of those requirements, the Secretary of Defense noted that "joint operations have been hindered by the inability of forces to share critical information at the rate and at the locations demanded by modern warfare." To attack this problem, the Secretary directed the creation of a study group to examine ways to establish a joint command, control and communication integrated system development process, advance command, control and communication integration and interoperability between the services and achieve efficiencies across the developmental process leading to reduced costs of acquisition, support and operations. The study group included CECOM, the Air Force Electronic Systems Center (ESC) and the Navy's Space and Naval Warfare Systems Command (SPAWAR). The study group established a Joint Command and Control Integration/Interoperability Group consisting of the commanders of CECOM, ESC and SPAWAR, as well as three CINC (Commander in Chief) Interoperability Program Offices (CIPO), each comprised of CECOM, ESC and SPAWAR personnel. One CIPO was located at Fort Monmouth, one with ESC at Hanscom Air Force Base, and one with SPAWAR in San Diego, CA. The CIPOs were to assist in making old technologies/systems more interoperable, to ensure new technologies were "born joint," and to enhance the capabilities of the CINC of the Nine Unified Commands Priorities for the CIPOs included increasing situational awareness to fight as a coalition force, and reducing fratricide. (Recently, the CINCs have undergone a name change, and are now referred to as Combatant Commanders). The CIPO at Fort Monmouth was disbanded in June 2006.[89]

REVOLUTIONIZING MILITARY LOGISTICS

The CECOM Logistics and Readiness Center (LRC) provided the logistical support for virtually all electronics-related items in the U.S. Army inventory. By the late 1990s, this organization, and every other tasked with a similar mission for other commodities, relied on a computer system that was over thirty years old. In response, the Army Materiel Command, in conjunction with CECOM and private industry, established the Wholesale Logistics Modernization Program (WLMP). The program would later become simply known as LMP.

LMP sought to modernize the Army's logistics system and use the same computer-based tools as private industry in order to create a better supply system. LMP addressed requests in an almost real-time environment instead of running batches of

requisitions. This dramatically improved the LRC's responsiveness to customer needs.
This modern, enterprise-based program additionally allowed logisticians to obtain information and insight far beyond that indicated by traditional printed reports. This meant improved analysis of different types of data and resulted in enhanced decisions on the part of the logistician. This meant decreased time for field units to order and receive the items they required and decreased CECOM time and money in providing this service to the Army.

While LMP represented a revolutionary improvement over the previous system, one of the most interesting aspects of this project was the innovative nature of the contract with CSC (Computer Sciences Corporation). AMC created a strategic alliance with private industry and purchased ten years worth of the service instead of buying the system outright. Additionally, all of the data existing in the old system was successfully transferred into LMP. Each government employee whose job was negatively affected received a "soft landing" that offered a $15,000 signing bonus and a three-year contract with CSC, among other benefits.

Another Army process-reengineering initiative, known as Single Stock Fund, targeted the purchase of Secondary Items (replacement assemblies, repair parts and consumables). Before SSF, there was a distinct separation between the wholesale and retail level, and a very complicated purchasing and procurement arrangement. With few exceptions, items that left the wholesale area would subsequently "disappear" into the retail system. Field units would be given all the parts they wanted free of charge. This created little incentive to limit inventory. An "iron mountain" of spare parts was stockpiled throughout the Army.

Under SSF, the distinctions between the wholesale and retail level logistics structures greatly diminished. AMC obtained visibility into the assets of the Directorate of Logistics at every post, camp, and station, and paid for the repairs on every item. This simplified the management and funding processes and increased the visibility of assets, since the wholesale level could see what the retail level had in stock. Consequently, logisticians could not transfer items from the wholesale to the retail unit, but from unit to unit if necessary. This created additional flexibility and improved efficiency.

SSF ultimately enabled the Command to see more of its inventories, manage them more intelligently, and capture costs with greater clarity.[90]

STREAMLINING THE ACQUISITION PROCESS

CECOM and the Army recognized the need to speed the process by which they acquired and delivered the best technology available to its Soldiers. CECOM's efforts in acquisition reform successfully allowed the Command to use commercially available products and software and adapt them where necessary to meet the needs of the Soldiers. In instances where products and software were not available off-the-

shelf, CECOM developed the new technologies needed to enhance overall capability.

The Interagency Interactive Business Opportunities Page (IBOP) launched on 14 May 1999. Supporting all U.S. Commands, Army leaders saw the IBOP as an innovative and easy way to expedite the process of passing Solicitation and Contract information to and from potential bidders.

IBOP was a significant step towards implementing a totally paperless and more efficient environment. Designed to capture the entire solicitation process from posting draft documents to electronic signature of contracts, IBOP revolutionized the Acquisition business and provided a main point of information dissemination regarding solicitations for DoD. Furthermore, IBOP was successfully exported to other federal agencies. The Department of Energy, Department of State and all of its Embassies world wide, Department of Commerce, U.S. Special Operations Command, Army Forces Command, and U.S. Navy SPAWAR all used it.

IBOP was one example of the CECOM Acquisition Center's efforts to leverage technology growth and current commercial software applications to accomplish the rapid contracting solutions demanded today. Reverse auctioning, which compelled sellers to bid down through vibrant competition with other sellers, was another.[91]

COMMERCIAL ACTIVITIES (CA) STUDIES

The Commercial Activities study was a process that placed government operations in direct competition with private industry to determine which provided the best service at the lowest cost. The winner was subsequently assigned the task. Garrison operations comprised the primary functions under review at many domestic installations. The last CA study done at Fort Monmouth had been completed in 1982.

During the mid-nineties, the Army once again utilized CA studies as one of many tools available to achieve greater efficiency and effectiveness. CECOM announced three studies to Congress on 26 February 1999: the Information Mission Area (IMA) study at Fort Monmouth, the Fort Monmouth Garrison (FMG) Base Operations (BASOPS) Directorate of Logistics (cataloging) study, and the Tobyhanna BASOPS study of information technology and public works.

The final recommendations from these studies became available in 2002. The period of performance for all three areas was for one year, with four one-year options to follow. The in-house cost estimate prevailed for both the TYAD and IMA studies. The annual cost savings per year were estimated at $2.9 million and $8.9 million, respectively. The Fort Monmouth Garrison Study resulted in a win for a contractor, which would result in an approximate annual savings of $1.4 million.[92]

BALKANS DIGITIZATION INITIATIVE

The Balkan Digitization Initiative (BDI) was developed in response to the capture of

American Soldiers in Macedonia. It focused on installing a real-time vehicle tracking system designed to provide commanders with the precise location of any vehicle on patrol. The BDI, also known as "Blue Force Tracking," was a cooperative effort between U.S. Army Europe, the Program Executive Officer for Command, Control and Communications Systems (PEO C3S), the CECOM Logistics and Readiness Center, Tobyhanna Army Depot and TRW, Inc.

This program was considered critical to the entire effort in the Balkans since U.S. forces continuously patrolled areas where there was serious potential for conflict. In order to provide adequate protection and ensure mission success, complete situational awareness was critical to ensure that any problem encountered could be successfully handled. This system, along with all of the associated command and control mechanisms, was designed, built, and installed in 70 M1114 up-armored Humvees in less than seven months.[93]

Y2K

Y2K compliance became a significant issue at CECOM, just as it did at many other technology-dependent organizations. Compliance represented the single largest IT project ever undertaken for the Army Materiel Command in general, and for CECOM in particular. An estimated $45 million was spent on project management costs alone during the four years of the project's lifecycle.

CECOM's role in this project was threefold. CECOM was not only responsible for ensuring that CECOM-managed tactical systems complied; it also supported AMC Headquarters in their overall implementation efforts and ensured the IT infrastructure at every AMC installation was Y2K compliant. Items such as telephone switches, traffic lights, and even refrigeration units had to be identified, inventoried and corrected before 31 December 1999. Following the completion of a comprehensive IT inventory, organizations had to decide whether or not to reengineer, retire, or replace every item that was not compliant. Only after all that had been accomplished could programmers and software engineers begin work on addressing the specific compliance issues in each piece of software.

Over 1.3 million items were inventoried and assessed during the Y2K project. Over 986,000 were corrected for potential problems.

Compliance efforts dramatically intensified as the Millennium quickly approached. Despite the numerous technical and managerial challenges associated with this project, no significant problems were associated with Y2K. CECOM clocks switched over to the new millennium without incident.[94]

CECOM COMMANDERS DURING THE 1990s

Major General Alfred J. Mallette assumed command of CECOM on 10 July 1990. General Mallette was subsequently promoted to Lieutenant General and assigned as

the Deputy Commanding General of NATO's Office of Communications and Information Systems on 22 July 1992. Building 1207, CECOM's Headquarters Building, was renamed Mallette Hall in 1996 due to General Mallette's years of dedicated service to CECOM and the United States Army.

Brigadier General Otto J. Guenther succeeded General Mallette on 22 July 1992. He was promoted to Major General on 20 October 1992. He remained at this post until 10 January 1995.

Major General Gerald P. Brohm replaced General Guenther as the Commanding General of CECOM until 1 September 1998.

The last Commanding General of CECOM during the 1990s was Major General Robert L. Nabors, whose tenure lasted from 1 September 1998 to 20 July 2001.

Major General Otto Guenther,
Commanding General, CECOM,
Fort Monmouth
from 7/92-1/95

Major General Gerald P. Brohm,
Commanding General, CECOM,
Fort Monmouth
from 1/95-8/98

Major General Robert L. Nabors,
Commanding General, CECOM,
Fort Monmouth
from 9/98-7/01

Major General Alfred J. Mallette,
Commanding General, CECOM,
Fort Monmouth
from 7/90-7/92

Portrait Artist Nancy Gosnell- of Fairhaven, with Mrs. Nancy Mallette and Major General Gerald P. Brohm at the dedication of Mallette Hall.

11
THE 21ST CENTURY AND THE C-E LCMC

JOINT CONTINGENCY FORCE ADVANCED WARFIGHTING EXPERIMENT

One of the more significant lessons relearned from the Gulf War was the need for C4ISR interoperability between all of the armed services as well as foreign allies. The ever-increasing trend towards coalition warfare meant the U.S. Army would have to fight alongside units not just from different branches of the military, but also from different nations. Various types of communications systems were required to work in concert with one another in order to fight successfully in such an environment. CECOM participated in this effort.

A Joint Contingency Force Advanced Warfighting Experiment (JCF AWE) was held at Fort Polk, LA in September 2000 in order to establish how the digitization of light forces would increase lethality, survivability and operational tempo. These AWE initiatives played a vital role in Army transformation since they allowed leaders to more accurately determine just how well these systems worked. This endeavor heavily involved CECOM and Team C4IEWS because many of the new systems relied extensively on advanced communications and electronic components.

The En-route Mission Planning and Rehearsal System (EMPRS) was one of the most interesting and significant systems developed by CECOM and tested during this exercise. This new system, installed on a modified cargo aircraft, allowed Soldiers to maintain situational awareness while in the air. Based primarily on a suite of enhanced communications equipment and onboard computers, EMPRS allowed embarked Soldiers to remain in constant contact with joint forces. It also provided a template for airborne Soldiers not just to change any aspect of their upcoming operation but to "rehearse it" and determine how likely these alterations affect the success of the mission. This capability was especially critical on the modern battlefield due to the constantly changing nature of warfare. EMPRS was praised as the "crown jewel" of the exercise.

On 20 July 2001, Major General William H. Russ succeeded Major General Nabors as the Commanding General of CECOM.[95]

SEPTEMBER 11, 2001

At 0800 on 11 September 2001 a group of volunteers assembled at the Fort Monmouth Expo Theater to participate in a three-day force protection exercise involving law enforcement agencies and emergency personnel at all levels, from Fort Monmouth firefighters to the NJ State Police. The exercise included simulating a biochemical terrorist attack at Fort Monmouth and studying the emergency response

that would take place after such an attack.

The group pretended to be horrified and upset when, just after 0900, the director of the exercise informed them that a plane believed to have been hijacked by terrorists had crashed into one of World Trade Center towers. The volunteers assumed this was part of the simulation. They quickly realized, however, that this was not so. The three-day exercise that took months to plan was cancelled in a matter of minutes. Volunteers were instructed to return to their offices and stay there.

Employees assembled wherever they could find a TV or a radio. They listened in horror along with the rest of the world as first direct attack on American soil since Pearl Harbor occurred.

The Emergency Operations Center sprang into operation twenty-four hours a day, seven days a week. Fort Monmouth quickly realized it did not have enough manpower to monitor access to the base as required by the new threat level. Gates closed and access was limited to a few main roads. Employees volunteered, even on weekends and after duty hours, to help check identification cards at the gates. A Visitor Control Center was initiated to process visitors. Reserve Soldiers were activated to augment security on post.

Rescue personnel use the infrared camera to search for signs of life at the World Trade Center

While Force Protection measures were being upgraded and put in place, CECOM was tapped to help with the World Trade Center (WTC) site rescue effort. Team C4IEWS technologies helped rescue and recovery workers in a variety of ways. The world's smallest infrared camera, developed by CECOM and attached to PVC pipe, was used for finding and searching through voids in the rubble. A laser doppler vibrometer was also used to judge the structural integrity of the buildings. Electronic listening devices detected distress calls to 911 made from cellular phones. Additionally, hyperspectral flyovers monitored and controlled recovery operations from the air.

CECOM deployed a quick reaction task force to the Pentagon to install a communications infrastructure for 4,500 displaced workers. CECOM teamed with the Pentagon renovation office to provide engineering and integration support to renovate the Pentagon's command and control infrastructure in support of the Pentagon rebuild (Phoenix Project).[96]

CECOM had responded to national rescue efforts in the past. When Hurricane Andrew hit Florida in 1992, CECOM personnel deployed for about one month in order to help set up a humanitarian depot that facilitated the distribution of rescue

supplies and to restore communications in the area. CECOM also assisted with the North Ridge Earthquake relief effort in Los Angeles in 1994.

HOMELAND SECURITY

The nation placed an unprecedented emphasis on Homeland Security (HLS) as a result of the 9/11 attacks. CECOM experienced first-hand the need for better communications, more integrated response plans and quicker response times. Given the nature of CECOM's mission and its close proximity to New York City, CECOM was in a unique position to help with future HLS efforts. HLS was one of CECOM's top initiatives in the months after 9/11.

CECOM AND OPERATION NOBLE EAGLE

President George W. Bush announced the mobilization of reserves for homeland defense on 15 September 2001 in response to the terrorist attacks of September 11. The initial call up of reserve forces was for homeland defense only. It was later expanded to include reserve forces for Operation Enduring Freedom. Operation Noble Eagle began in October 2001 for Fort Monmouth with the arrival of Bravo Company, First Battalion, 181st Infantry Regiment from Boston. The company's mission was to protect the Fort Monmouth community, its facilities, and personnel stationed on post. Bravo Company performed ID checking at the gates twenty-four hours a day, seven days a week; randomly searched vehicles; and conducted building and perimeter security. The 181st returned home in September 2002 and was replaced by Bravo Company, 104th Infantry Regiment, a National Guard Unit from Greenville, Massachusetts. The 50th Combat Support Battalion, Detachment One from West Orange New Jersey, replaced Bravo Company in June 2003. In addition to their regular duties, the Reserve forces became integrally involved with Fort Monmouth and the surrounding communities, paying visits to local veterans homes and schools and explaining life in the military and life as a Soldier.[97] Access control was then contracted to the Wackenhut-Alutiiq Corporation in early 2004.

CECOM AND OPERATION ENDURING FREEDOM

One of the United States' initial responses to the attacks of September 11th was seizure of financial assets and disruption of the fundraising network of terrorist groups. Initial deployments then began to Southwest Asia and Afghanistan. On 20 September President Bush announced the start of the War on Terror and demanded that the Taliban in Afghanistan hand over all Al Qaida terrorists living in their country or share their fate.

Operation Enduring Freedom commenced on 7 October 2001. B-1, B-2 and B-52 bombers, F-14 and F/A 18 fighters enacted air and land strikes. Tomahawk cruise missiles launched from U.S. and British ships and submarines. Fort Monmouth's preparations for Operation Enduring Freedom began in the weeks following September 11th as all centers prepared to supply equipment and fulfill emergency

requisitions. CECOM deployed a total of 875 military, civilians and contractors during OEF. The highest demand items initially requisitioned included Lithium batteries, Firefinder, and night vision equipment. Batteries remained in short supply during Operation Enduring Freedom (particularly the BA 5590), as they had in the Vietnam and Gulf Wars.

One of the most important CECOM systems used in Afghanistan was the phraselator. Developed in conjunction with DARPA, this system translated the English voice into Dari, Pashto, Arabic and other languages using fixed phrases from force protection and medical domains. This system was critical in OEF because there were not enough trained linguists on the ground. CECOM continued to assist DARPA in providing new domain vocabularies and developing a two-way phraselator capability.

Well Sensor System

CECOM developed a prototype demo unit for "down well" viewing in Afghanistan. The system was an immense success with the troops and was first deployed to Afghanistan in March 2003. CECOM engineers deployed to Afghanistan in October 2002 to support the Combat Service Support Automated Information System Interface (CAISI), a set of deployable wireless LAN equipment. CECOM civilians supported this system in a brigade support area near Kandahar. Eventually, the success of the equipment and the increase in Soldier morale led to it being installed in fifteen additional remote locations in Afghanistan. This system was named one of the top 10 Army inventions of 2003.

CECOM sent a team to SWA to control crisis action planning, resolve financial and appropriations issues, establish a contracting office in a high threat environment, and provide administration of war contingency contracts. This team was responsible for successfully equipping joint forces in the region, standing up the Afghan Army logistics system and institutions, and accelerating the local production of supplies to help increase self reliance and build the local economy.

One of Fort Monmouth's tenant activities, the 754th Explosive Ordnance Disposal Detachment, was deployed to Afghanistan in support of Operation Enduring Freedom in November of 2002. The Detachment returned in June 2003. Their mission in Afghanistan was to dispose, render safe and advise about explosive hazards and ordnance. Based out of Kandahar, their main customers included Special Forces groups, the Air Force and teams from the 82nd Airborne Division. During their deployment, the 754th disposed of 652,000 pounds of explosive ordnance and responded to twenty-six incidents.

Problems and lessons learned during OEF were similar to those to be encountered in Kuwait and Iraq the following year. Some of these problems were attributed to extreme weather conditions. Preparations for deployment turned arduous because engineers and administrative personnel were responsible for completing all documentation and orders for not only government personnel but also all the contractors sent to Afghanistan. Depending on military transport to get to Kandahar Airport was often a problem and caused lengthy delays. It regularly took personnel well over a week to get to the theater. Problems also arose in protecting CECOM equipment from excessive heat. This problem was addressed in part with Hex solar shades and Modular Ammunition solar shades (MASS). However, this equipment could only be requested through the Soldier and Biological Chemical Command (SBCCOM) and approved by HQDA. Demand far exceeded supply.[98]

TRANSFORMATIONS AND REALIGNMENTS IN 2002

CECOM again found itself in the midst of an Army reorganization effort in 2002. TIM (Transformation of Installation Management) looked at the way the Army managed its posts, camps and stations and sought to centralize management. For CECOM, this meant that the garrison commander would report to a regional office rather than to the Commanding General of CECOM. The Army believed that centralizing installation management into regions would provide for more streamlined funding, a tighter focus on similar installation issues within a defined geographic region, and establishment of better standards for installations. DA also intended to improve support to the Army Transformation and the readiness of Soldiers through TIM.

The U.S. Army Installation Management Agency (USAIMA) would direct overall Army installation operations. Regional offices would manage all Army installations and garrisons within a geographical area. There would be seven regional offices under TIM, with Fort Monmouth's Garrison belonging to the Northeast Regional Office at Fort Monroe, Virginia. The new installation management and realignment was implemented on 1 October 2002. Formal realignment of employees did not occur until October of 2003.

NETCOM (the Network Enterprise Technology Command), established in October of 2002, was another Army-wide realignment effort that affected CECOM. In the same way TIM centralized garrison management, NETCOM centralized the management of the Army's information technology and networks. NETCOM was aligned in several geographic regions, each with a Regional Chief Information Officer (RCIO). CECOM would receive its support from the Northeast Region, located at Fort Monroe, VA. The Directorate of Information Management (DOIM) came under the operational control of IMA while technical control resided with NETCOM .[99]

2002 also saw the creation of the Research, Development and Engineering Command (RDECOM). This new subordinate command of AMC was established under the direction of AMC Commander General Paul J. Kern and stood up, provisionally, on 1 October 2002. MG Doesburg, former Commander of the Soldier and Biological

Chemical Command (SBCCOM), assumed responsibility for the development and implementation of RDECOM. The mission of this new Command was to field technologies that sustained America's Army as the premier land forces in the world.

Operational control of the MSC R&D activities also transferred to RDECOM, effective 1 May 2003. This included the Tank-Automotive and Armaments Command Research, Development and Engineering Center (RDEC), the Edgewood and Natick RDEC, the Aviation and Missile RDEC and the CECOM RDEC (renamed the CERDEC). Portions of the CECOM LRC (sustainment engineering) and the CECOM Software Engineering Center (software engineering) were also affected. The Combatant Commander Interoperability Program Office (CIPO) and specific DCSRM positions supporting the RDE financial program additionally transferred to RDECOM.
Today, the CERDEC is the Army's information technologies and integrated systems center. Its Command and Control Directorate; Intelligence and Information Warfare Directorate; Night Vision and Electronic Sensors Directorate; and Space and Terrestrial Communications Directorate work together to develop and integrate Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) technologies that enable information dominance and decisive lethality for the networked Warfighter.[100]

KNOWLEDGE MANAGEMENT

CECOM was truly a global organization by 2002, with only forty-seven percent of employees residing at Fort Monmouth. The CECOM Knowledge Center was unveiled in May 2002 to address this phenomenon. The "KC" was an internal knowledge-sharing portal intended to connect the global CECOM workforce.

The Knowledge Center stored information papers, trip papers, policies, and other documents in an easily searchable document library. It also offered collaborative workspaces and virtual meeting tools to facilitate project management.[101] With more than half of the workforce eligible to retire in five to ten years, knowledge management initiatives that targeted the preservation of tacit knowledge were enacted at both CECOM and at the Army level. On 4 October 2004, the CECOM/CERDEC/PEO C3T/PEO IEW&S Knowledge Centers combined into a single portal now known as the Team C4ISR Knowledge Center.

ENTERPRISE SYSTEMS ENGINEERING

Enterprise Systems Engineering (ESE) was another initiative pursued in 2002. It quickly morphed into a concept and eventually became one of CECOM's top priorities. ESE was a single systems engineering effort that would tie all discrete integration initiatives together into an enterprise architecture solution. CECOM perceived this need and set up a Systems Engineering Team that compiled a "systems engineering handbook" and prototyped a system to address questions with enterprise implications.[102]

C4ISR ON-THE-MOVE

Another initiative pursued in 2002 was the C4ISR On-the-Move Demonstration. An integrated Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) system–of–systems to increase the lethality and survivability of the lighter platforms of the Future Combat System (FCS) would be pivotal to the success of Army Transformation.

The two-week demonstration took place at Fort Dix, NJ, conveniently located forty miles from Fort Monmouth. Fort Dix provided ample space to showcase the system's capabilities. A number of VIPs attended the demonstrations, and the exercises were considered an overall success by those who participated and observed.[103]

CECOM AND OPERATION IRAQI FREEDOM IN 2003

Electronics Sustainment Support Center -Southwest Asia

Operations in Iraq began on 19 March 2003 with joint strikes by the U.S. and Great Britain designed to disarm Iraq of its weapons of mass destruction and remove the regime from power. CECOM began preparing for strikes against Iraq in early October by forming an Anticipatory Logistics Cell (ALC) to identify potential spare and repair part shortfalls. The ALC developed a list of CECOM systems expected to be deployed by the Army, Special Operations and Marines. Supply supportability assessments were conducted, enabling CECOM to identify potential spare and repair part shortfalls. During the war, the ALC investigated high priority spare requests from Iraq and accelerated deliveries.

CECOM and Team C4IEWS acquired, developed, fielded, and supported an array of technological systems during OIF, including frequency hopping tactical radios, satellite linked computers inside vehicles, sophisticated sensors, and electronic jamming systems. CECOM deployed more than 391 military, civilians and contractors and 152 Logistics Assistance Representatives (LAR). Thirty-two LAR embedded with the 3ID, 101st and 82nd Airborne Divisions during combat operations. LAR provided technical and logistical assistance for CECOM Systems.

CECOM deployed two Electronic Sustainment Support Centers (ESSC) to Kuwait. The two ESSC consisted of sixty-five logistics and maintenance personnel. Both centers became operational 1 March 2003 at Camp Arifjan, Kuwait. ESSC provided a robust embedded and regional logistics and maintenance support capability for TEAM C4IEWS systems. CECOM also established a forward repair activity in Qatar. The forward repair activity was designed to halve turn around time for the repair of STAMIS/TIER III (computer hardware) used in SWA. The activity moved to Kuwait prior to the start of OIF.

CECOM continued operating its Emergency Operations Center (the name was subsequently shortened to Operations Center) 24 hours a day, 7 days a week with three shift rotations briefings to the Commanding General and senior leaders. CECOM expedited over 131,984 OEF/OIF requisitions, of which 3,585 were major items. Of the 85,431 requisitions, 45,000 were high priority items for which extraordinary measures were taken to ship and track the items. CECOM accelerated the production and delivery of critical weapon systems and met surging demands for items such as lithium batteries, night vision, mobile subscriber equipment, tactical satellite, SINCGARS, aviation and communication security. CECOM responded to 4,713 materiel release orders. These materiel release orders were mostly emergency call-ins to support Joint Chiefs of Staff special projects.

CECOM expedited contract awards and modifications to satisfy urgent war needs. Twenty-seven awards totaling over $63 million were made, including urgent requirements for FBCB2, lithium batteries, antennas, transceivers, secure enroute communications packages, near term digital radios, laser detecting sets, shortstop electronic protection systems, single channel ground and airborne radio systems, joint tactical terminals, and Coalition joint forces land component command rotational units.

The Public Affairs Office provided casualty assistance services for northern and central New Jersey service members' families. These services were provided for families of Soldiers who were either killed in action or in non-combat accidents while deployed.

CECOM CSLA Cryptographic Key Materiel Inventory Managers responded to over one hundred flash and immediate priority messages concerning compromise, emergency replacement and additional requirements for cryptographic key material. They also assisted NETCOM and the local DOIM in transmitting message traffic to the theater and expediting the shipment of Iridium secure telephones to units in Iraq.

CECOM teamed with NETCOM to upgrade the Central Command (CENTCOM) command center in Qatar and to make the infrastructure operational. The CENTCOM Command center was routinely seen on CNN and other news networks. CECOM developed, acquired and performed quality control for this center.

CECOM designed and installed an Initial Operational Capability (IOC) enterprise management infrastructure in October 2002 to support the SWA theater at Camp Doha, Kuwait. This system managed the signal and data networks in the theater. CECOM also installed and tested the Al Udeid Air Base Earth Terminal Complex. The earth terminal complex provided a new dynamic intra-theater STEP capability during OIF.

CECOM completed twelve new software releases throughout 2003 operations in SWA. CECOM made software changes to a variety of systems to include COMSEC equipment, ASAS, Guardrail, and the artillery fire control codes. CECOM also

developed six mission data sets for the radar signal detection set. One was requested by the Air Force for use on their search and rescue platform. CECOM also supported Secretary of State Colin Powell for his address to the UN on 5 February 2003, replicating 1,000 copies of a CD for his multi media presentation to the Security Council entitled "IRAQ-Failing to Disarm."

Friendly fire incidents were virtually eliminated in OIF through the use of Blue Force Tracking and the Force XXI Battle Command Brigade and Below Command Control System (FBCB2). Developed, fielded and supported by Team C4IEWS and PEO C3T, these systems gave commanders unprecedented sight on the battlefield and allowed them to synchronize their forces. Combat and thermal identification panels, Phoenix Infrared lights, and GLO tape infrared reflective material- all Team C4IEWS fielded items- also reduced incidents of fratricide during OIF.

FBCB2 Screen Capture

The Firefinder radar system proved instrumental in OIF. Firefinder detects and locates enemy mortar and artillery weapon firing positions. This forced the insurgents, in many cases, to hold their mortar and artillery fire in self-defense rather than fire on allied troop positions. Team C4IEWS developed, fielded and supported Firefinder. A Team C4IEWS piece of equipment called the AN/ALQ-144 Infrared Jammer made U.S. Aviators, helicopters, and aircraft safer than ever during OIF. Team C4IEWS mounted these jammers on the fuselage of helicopters. The jammers emitted signals to decoy heat-seeking missiles and caused them to detonate in the air and miss their targets.

The SEC provided critical support on the Guardrail intelligence system that allowed it to locate threats and keep coalition forces safe during OIF. Guardrail is an airborne intelligence collection system that provides support to early entry forces, forward deployed forces and military intelligence. Guardrail is called a "common sensor" because it can intercept both classes of signal: Communications Intelligence (COMINT), which is low frequency radio transmissions and cell phone calls; as well as Electronics Intelligence (ELINT), radar transmissions. The SEC resolved a significant software problem during OIF that was causing the ELINT precision location subsystem of the Guardrail to crash and therefore not be able to locate electronic emitters. The software that supports the Guardrail system is designed to support a particular way of flying. In Iraq, the Guardrail could not fly the way it was designed to due to various geopolitical boundaries and restrictions in the region. It consequently could not identify targets that were being reported by Special Forces

on the ground. The SEC team was able to reprogram the software in just forty-eight hours to enable the Guardrail to identify, accurately, targets once again while operating within geopolitical restrictions.

CECOM developed and implemented an automated accountability system, Roll Call, for deployed personnel. The command implemented roll call to track and record command deployments and ensure total command personnel accountability on a daily basis.

Among OIF problems were complications with several CECOM and Team C4IEWS systems due to environment, equipment age, and lack of trained personnel. PM representatives eventually deployed in theater to support systems in an attempt to rectify this problem. They fully inspected equipment before shipping, strictly followed technical manual guidelines in sand environments, and kept parts and risk kits in theater. A shortage of repair parts also occurred during OIF due to problems with transportation. Items took a long time to get to the CONUS departure sites. They arrived palletized at the theater distribution center, which further increased the amount of time it took to get the part to the recipient. LAR reported significant shortages of communication and transportation equipment. A communication and transportation package was recommended for future LAR as part of an initial deployment package.[104]

Radar Operator Sights A Firefinder

BATTERY MISSION

In the lead up to strikes against Iraq, the foresight of some senior command leaders at CECOM avoided the critical shortage of batteries experienced during Desert Storm. In anticipation of increased demands for lithium batteries, CECOM initiated actions to ensure a continued supply of batteries during deployment and actual operations. In November 2002, CECOM identified that the funding required in order to ramp up production prior to the OIF conflict would amount to $56.3 million. The Command received this funding in December 2003 and immediately put it on contract. As a result, overall BA-5590 production increased from 60,000 batteries per month to nearly 125,000 batteries per month by April 2003. Production was to continue increasing to 300,000 batteries per month to fill shortfalls while continuing to meet CENTCOM AOR requirements. In order to expedite the delivery of batteries from the factory to the foxhole, CECOM arranged for direct shipments to Kuwait from its major lithium producer, Saft, as well as its rechargeable producer, Bren-Tronics. Shipments went directly to Charleston AFB for airlift to Kuwait, bypassing the supply depot and saving

several days of ship time. The use of rechargeable batteries was promoted for non-deployed forces and for selected missions in the U.S. Central Command Area of Responsibility (CENTCOM AOR). In order to facilitate the CENTCOM use of rechargeables, an existing battery charging van was shipped from Fort Benning along with battery chargers and batteries to allow centralized, high-volume charging in the AOR. This charging van remained in place to help reduce the consumption of non-rechargeable lithium batteries.

Despite these accomplishments, the Acting Principal Assistant for the Deputy Under Secretary of Defense for Logistics and Materiel Readiness, Bradley Berkson, issued a memorandum on 30 January 2004 that stripped CECOM of its lithium battery mission and transferred it to the Defense Logistics Agency (DLA). The decision was based upon the fact that stocks of the BA5X90 lithium battery ran extremely low during Operation Iraqi Freedom. Berkson believed the transfer would improve battery availability as the DLA Defense Supply Center Richmond (DSCR) was the integrated materiel manager for all batteries and the DLA funded critical consumables. The effective date for the transfer was no later than 30 September 2004. According to the MOA, the Army would continue to be the technical face to the user for technical issues and would be responsible for battery policy, standardization, and design integrity and stability. DLA would take over inventory management and oversee the contracts. The transition would be handled by forming a joint team with representatives from both sides. The former Vice Chief of Staff, General John Keane, had opposed the move citing several years of funding shortfalls for the shortage. The Army also feared the move would pose a risk to troop readiness.

C-E LCMC

On 2 August 2004 Claude M. Bolton, Jr., Assistant Secretary of the Army for Acquisition, Logistics and Technology (AL&T), and General Paul J. Kern, Commanding General of AMC, signed a memorandum of agreement to formalize the Life Cycle Management Initiative. That initiative established life cycle management commands by aligning the AMC systems-oriented major subordinate commands such as CECOM with the Program Executive Offices (PEOs) with which they worked. The result of the initiative at Fort Monmouth would eventually be the formation of the Communications-Electronics Life Cycle Management Command (C-E LCMC). This would link more closely than ever before CECOM, the PEO for Command, Control and Communications-Tactical and the PEO for Intelligence, Electronic Warfare and Sensors. The Communications-Electronics Research, Development and Engineering Center (CERDEC) also would link with the C-E LCMC to create a unified vision across the acquisition, research, development and sustainment communities as a single face to the Warfighter was provided throughout the total life cycle of systems and equipment. The C-E LCMC stood up on 2 February 2005.

In the words of Major General Michael R. Mazzucchi, “A Life Cycle Management

Command is completely and totally dedicated to providing Warfighters the best equipment and services in the shortest possible time, and provides the most sustainable equipment, effectively and efficiently, by being the best stewards of the resources the Nation has entrusted to us."[105]

BRAC 2005

The National Defense Authorization Act for fiscal year 2002 authorized the Department of Defense (DoD) to pursue a Base Realignment and Closure (BRAC) round in 2005, a complex analysis and decision process that involved virtually all levels of DoD management, from installation through major command and component/agency headquarters to OSD. All bases, posts and installations were considered. On 13 May 2005, the Department of Defense recommended the closure of Fort Monmouth and the realignment of C-E LCMC elements at Fort Monmouth to Aberdeen Proving Ground in Maryland. The recommendation affected 4,653 civilians and 620 military personnel at Fort Monmouth. Despite aggressive state and local lobbying, the Base Realignment and Closure (BRAC) Commission approved the DoD's recommendation on 24 August 2005. The BRAC recommendations to close Fort Monmouth and realign C-E LCMC elements at Fort Monmouth to Aberdeen Proving Ground, Maryland became law on 9 November 2005. The transition of the workforce to Maryland is expected to take place by 2011.

The BRAC recommendations affected not only C-E LCMC elements but also other tenants at Fort Monmouth. The Commission approved relocating the U.S. Army Military Academy Preparatory School to West Point, NY; the Joint Network Management System Program Office to Fort Meade, MD; and the budget/funding, contracting, cataloging, requisition processing, customer services, item management, stock control, weapon system secondary item support, requirements determination, integrated materiel management technical support inventory control point functions for consumable items to the Defense Supply Center Columbus, OH. Further, it recommended relocating the procurement management and related support functions for depot level reparables to Aberdeen Proving Ground, MD, and designating them as Inventory Control Point functions, detachment of Defense Supply Center Columbus, OH, and relocating the remaining integrated materiel management, user, and related support functions to Aberdeen Proving Ground, MD. Information Systems, Sensors, Electronic Warfare, and Electronics Research and Development and Acquisition (RDA) were recommended for relocation to Aberdeen Proving Ground, MD. Elements of the Program Executive Office for Enterprise Information Systems would be consolidated with existing elements at Fort Belvoir, VA.

The 13 May 2005 DoD recommendations resulted in a net gain of 275 positions at TYAD. TYAD would become the DoD Center of Industrial and Technical Excellence for communications and electronics equipment. New workload would be received from each of the Armed Services. The recommendations included:

Lackland Air Force Base in Texas relocating work on computer maintenance, cryptographic equipment, electronic components and radios; the Naval Weapons Station, Seal Beach, California relocating work on the maintenance of electronic components, fire control systems and components, radar and radios; the Marine Corps Logistics Base in Barstow, California relocating work on the maintenance of electronics components, electro-optics/night vision/ forward looking infrared systems, fire control systems and components, generators, ground support equipment, radar and radios; and Red River Army Depot, Texas relocating the maintenance of tactical vehicles.

With regard to the Supply, Storage, and Distribution Management Reconfiguration, the DoD recommended realigning "Tobyhanna Army Depot, PA, by consolidating the supply, storage, and distribution functions and associated inventories of the Defense Distribution Depot Tobyhanna, PA, with all other supply, storage, and distribution functions and inventories that exist at Tobyhanna Army Depot to support depot operations, maintenance, and production. Retain the minimum necessary supply, storage, and distribution functions and inventories required to support Tobyhanna Army Depot, and to serve as a wholesale Forward Distribution Point. Relocate all other wholesale storage and distribution functions and associated inventories to the Susquehanna Strategic Distribution Platform." The BRAC Commission found the DoD recommendation for TYAD consistent with the final selection criteria and the Force Structure Plan and approved the recommendation.

ON-GOING SUPPORT TO THE GLOBAL WAR ON TERROR

The C-E LCMC has hundred of civilians, contractor and military personnel deployed to the SWA theater at any given time as well as an authorized LAR strength of 247. Between 11 September 2001 and 18 August 2006 there were over 538 deployment events conducted collectively by all C-E LCMC LAR in support of contingency operations in Kuwait, Afghanistan, and Iraq. Many of these LAR have deployed more than three times with seven LARs deploying as many as five times.[106]

The C-E LCMC has chartered a group of leaders on the ground to ensure that the fielding of its C4ISR platforms to the various units is both successful and consistent with objectives and timelines in the Army Campaign Plan. These leaders are known as Trail Bosses. According to MG Michael R. Mazzucchi, Commander, C-E LCMC and PEO C3T, "The mission and objective of the trail boss is to serve as a centralized coordination point for all Team C4ISR fieldings and training actions."[107]

At any given time, two to three managers from the CONUS and OCONUS Electronic Sustainment Support Centers (ESSC), together with assigned government and contractor Field Service Representatives (FSR), are deployed to

one of the eleven ESSC and service provider operating locations in Afghanistan, Iraq, and Kuwait.[108] ESSC provide a robust embedded and regional logistics and maintenance support capability for TEAM C4ISR systems.

The use of Forward Repair Activities (FRA) to provide on-site support of C-E LCMC systems continues to expand, bringing the total to 25 permanent and 11 long-term temporary FRA providing support worldwide, with eight in Southwest Asia. They can also provide warranty processing, spares management, and upgrade services. In addition, all FRA have reach-back capability to Tobyhanna Army Depot (TYAD). TYAD backs its customers with the ability to deploy with the Logistics Support Element (LSE) and provide support for them in a theater of operations.[109]

The C-E LCMC's Reset mission mandates the reconstitution of equipment from units returning from Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) in a very short timeframe prior to redeployment for the next possible contingency. The requirement is to bring all committed force structure equipment back to a desired level of combat effectiveness. The Reset Team was established in July 2003 to coordinate C4ISR requirements and provide overall management for coordinating the induction of systems requiring depot level repairs.[110] As of 19 September 2006, the Command has supported 86 Weapons Systems and Reset 25,647 Weapons Systems and 55,178 COMSEC items for a total of 80,825 items Reset. These Reset efforts supported over 600 battalion level units.[111]

The C-E LCMC has fielded and maintained a wide variety of equipment during the GWOT. In fact, the Command manages half of the nationally stock numbered items in the Army inventory: 55,874.[112] These include items like frequency hopping tactical radios, satellite-linked computers inside vehicles, sophisticated sensors, and electronic jamming systems.[113]

In all, 903,687 requisitions were processed between 11 September 2001 and 19 September 2006 against 13,439 Different Stock Numbers. The majority of these requisitions, 590,891, were high priority. Significant shipments included Tactical Satellite, Mobile Subscriber Equipment, SINCGARS, Night Vision, Global Positioning Systems, Firefinder, Aircraft Navigation System, Batteries, and Aircraft Survivability Equipment.[114]

The Command additionally intensively managed the AN/TPQ-36 Firefinder Mortar Locating Radar, the AN/TPQ-37 Firefinder Artillery Locating Radar, the Lightweight Counter Mortar Radar, the Counter Remote Control Improvised Explosive Device Electronic Warfare, and Intelligence and Security Command Focused Systems. This "intense management" included tracking operational status by serial number, tracking deliveries and fielding, and reporting weekly at the Four-Star level.[115]

PEO IEW&S designed, built, tested, shipped, installed, and integrated a situational

awareness system known as the Persistent Surveillance and Dissemination System of Systems (PSDS2). This system linked many different sensors, such as Infrared, radar, commercial security cameras, and unmanned aerial vehicles, and allowed control of many of these sensors from within division headquarters. It provided the combatant commander and staff unprecedented situational awareness and the ability not only to respond to hostile actions, but also to enact better-coordinated responses to hostile and suspicious activity through the coordination and control of many varied sensors.

PEO IEW&S also aggressively maintained the Prophet program in order to continue to field Prophet Systems per HQDA mandated timelines. They sustained and supported fielded and deployed systems, applied quick reaction technical insertion capabilities to address theater specific requirements, and continued the system design and development of the next generation Prophet systems. The PEO continued to field Prophet Block I systems to every unit deploying in support of Operations Enduring and Iraqi Freedom, beating Army mandated modularity transformation timelines and enabling the Army to transform while simultaneously prosecuting the Global War on Terrorism. The Prophet will provide the Division, Brigade Combat Team (BCT), Stryker Brigade Combat Team (SBCT), and Armored Cavalry Regiment (ACR) Commanders with Near-Real-Time (NRT) Force Protection (FP), Situational Awareness, and Electronic Attack (EA) capabilities to support the Army Vision, current, and future force requirements. It is mounted on the heavy High Mobility Multi-purpose Wheeled Vehicle (HMMWV). It can also operate in a dismounted mode (e.g. uses a SIGINT man-pack) for airborne insertion and early entry operations. The Prophet's primary mission is Force Protection (FP), by performing Electronic Sensing (ES), and using Direction Finding (DF) to provide emitter Lines-of-Bearing (LOB).

PEO IEW&S' Forward-Looking Infrared (FLIR) programs were among the most technically and programmatically complex in the Army, providing state of the art, second generation FLIR sensor, night vision capability to the Warfighter. In brief, FLIR refers to "an airborne, electro-optical thermal imaging device that detects far-infrared energy, converts the energy into an electronic signal, and provides a visible image for day or night viewing." These sensors are hailed as life saving, allowing Warfighters to see clearly at long ranges during varied atmospheric and battlefield conditions and provide battlefield dominance to Abrams, Bradley and Stryker platforms. During the period 2003-2005, PEO IEW&S fielded hundreds of different FLIRs to Army and USMC units. All fieldings occurred on time, or ahead of schedule, including many short notice HQDA directed fieldings to units in Iraq and Afghanistan.

The Lightweight Counter Mortar Radar-Army (LCMR-A), also managed by PEO IEW&S, provides 360 degrees of azimuth coverage and is used to detect, locate, and report hostile locations of enemy indirect firing systems. The LCMR-A is a digitally connected, day/night mortar, cannon, and rocket locating system. It can be broken down, installed in man-packable carry cases, and shipped worldwide without damage by ground, rail, water, and air.

The LCMR-A is a spiral enhancement to the existing LCMR, which was originally designed to operate as a stand-alone capability for Special Forces. Unlike the Firefinder systems, the LCMR does not have a separate search and track beam. Instead, it performs a 'track while scan' operation. The Communications-Electronics Research, Development and Engineering Center's (CERDEC) Intelligence and Information Warfare Directorate (I2WD) originally developed it. The Army recognized the original LCMR as one of the Army's "Top Ten Greatest Inventions" of 2004. PM Radars is responsible for the sustainment of all deployed LCMR systems.

LCMR-Lightweight Counter Mortar Radar

The Army Battle Command System (ABCS) represented one of PEO C3T's top priorities. Prior to 1995, several independent projects worked to leverage the rapid growth in Internet-related technologies and develop systems that improved command and control capabilities in several battlefield functional areas. Then, in 1995, PEO C3T began working with the Training and Doctrine Command (TRADOC) and elements of the 4th Infantry Division at Fort Hood, TX, to develop the ABCS. The ABCS provides commanders with the battle command architecture necessary to gain and maintain the initiative and successfully execute missions assigned by the National Command Authority (NCA). It joins eleven communications subsystems together onto one platform, making all interoperable. These eleven systems include the Force XXI Battle Command Brigade and Below (FBCB2), Global Command and Control System-Army (GCCS-A), Maneuver Control System (MCS) and All Source Analysis System (ASAS). The biggest difference between previous ABCS versions and the ABCS 6.4 worked on in this period is that ABCS 6.4 improves and automates data sharing and horizontal interoperability among the systems. Soldiers, the requirements community, material developers, product managers, industry, software programmers, engineers, technicians, the test community, trainers, and combat systems all participated in the ABCS 6.4 testing.

The Joint Network Node (JNN) represented another PEO C3T priority. A highly transportable and mobile communications system, it supports the new transformational force structure. The JNN and associated user access cases provide enhanced video, voice, and data capabilities. The JNN Network Node connectivity is composed of the Joint Network Node, Unit HUB Node and the Battalion Command Post Node (BnCPN). JNN-N affords the Warfighter a communications network down to the Battalion level by allowing the Soldier to mimic connection capabilities used in an office and to make direct use of internet based applications. The Army started JNN in 2004 as a way to disseminate tactical communications down to the battalion level for troops in Iraq. Eventually, the program was to add additional bandwidth and an on-the-move capability and spiral into a program

called the Warfighter Information Network-Tactical.

The Counter-Remote-Controlled Improvised Explosive Device (IED) Electronic Warfare (CREW) Team, comprised of members from throughout the C-E LCMC, met an urgent need for Electronic Counter Measure (ECM) devices to defeat the enemy's use of IEDs against coalition forces. The team implemented a "near real time" counter-IED program that could neutralize new IED threats as soon as they emerged. They successfully deployed ECM devices, established and staffed logistics support fielding offices in the theater of operations, executed over 115 contractual actions valued in excess of $200 million in response to more than seven separate urgency statements, and conducted a formal source selection for the next generation ECM devices valued at $550 million. One such vitally important device was the WARLOCK ECM test set. The sets protect Army convoys in Iraq, Afghanistan and other locales in Southwest Asia by detecting and detonating IEDs planted along roadsides. The contractor of this system delivered more than 2,000 units during 2005.

In addition to providing critical C4ISR systems to the GWOT, the C-E LCMC embraced Lean initiatives that supported Army Transformation goals. Not an acronym, Lean is instead a way of thinking that leads to continuous process improvement designed to banish corporate waste and maximize profit. The concept of Lean thinking did not represent a radical new ideology. It evolved mainly from "Lean production," an approach pioneered by Toyota following World War II and later adopted by firms in a range of industries engaged in mass production; but a growing fascination with the efficiency movement had existed even in the half century prior to the war. Lean Thinking can be summarized by the following five principles: precisely define value by each product; map the value stream for each product; make value flow without interruption; let the customer pull value from the producer; and pursue perfection. Impressed by Lean's high success rate in private industry, AMC Commander General Paul Kern mandated that Lean Thinking be extended to all processes throughout his command. AMC provided Major Subordinate Commands with a Lean budget and facilitator services from the Simplex Corporation for start-up. The Command had launched thirty-six Lean Projects as of May 2006. At that time, CECOM and the PEOs possessed 100 green belts, five black belts, and two master black belt candidates. "Belts" represent levels of certification, with master black belt being the highest. An ambitious training schedule was planned for the summer of 2006. It was anticipated that by 15 September 2006 there would be 162 green belts, twenty black belts, and two master black belts.

HURRICANE KATRINA

C4ISR systems are as indispensable in natural disaster recovery as they are in the Global War on Terror. The C-E LCMC thus assumed domestic duties following Hurricanes Katrina and Rita in addition to its on-going support of the Global War on Terror.

Hurricane Katrina was a category five hurricane that hit the Gulf coast region of the United States, primarily affecting citizens in Louisiana, Alabama and Mississippi. Katrina made landfall on the Gulf Coast on 29 August 2005. Over 1,600 people died as Katrina made its way across land as a category three storm. To assist in recovery efforts, the C-E LCMC provided generators ranging from 10KW to 840 KW prime power units and communications systems. When the storm disrupted the Defense Information System Agency hub in New Orleans, C-E LCMC software engineers provided vital support to reestablish the connectivity of systems through which requisitions for Southwest Asia were processed. The Acquisition Center effectively handled contractual obligations for Hurricane Katrina Relief while LCMC personnel deployed to the region.

C-E LCMC Personnel Support Hurricane Katrina

TENANT ACTIVITIES

COMMUNICATIONS ELECTRONICS COMMAND

The mission of the Communication Electronics Command is to sustain and support superior C4ISR systems for the joint Warfighter: sustaining base, tactical and strategic battlespace systems.

PEO IEW&S

The Program Executive Office Intelligence, Electronic Warfare and Sensors (PEO IEW&S)'s mission is to field and insert state-of-the-art, interoperable sensor capabilities and products which enable the land component commander to control time, space and the environment, while enhancing survivability and lethality, through continuous technology evolution and Warfighter focus in the right place, the right time, and at the best value for the U.S. taxpayer.

PEO C3T

The mission of PEO C3T is to rapidly develop, field, and support leading edge, survivable, secure and interoperable tactical, theater and strategic command and control and communications systems through an iterative, spiral development process that results in the right systems, at the right time and at the best value to the Warfighter.

PEO EIS

The Program Executive Office Enterprise Information Systems (PEO EIS) has two Project Manager offices located at Fort Monmouth: the Project Manager, Defense Communications and Army Switched Systems (PM DCASS) and the Project Manager, Defense Communications and Army Transmission Systems (PM DCATS). They are responsible for developing, acquiring and deploying tactical and non-tactical Information Technology systems and communications, with the goal of assuring victory through information dominance. PEO EIS provides DoD and the Army with network-centric knowledge-based business and combat service support systems and technology solutions. They provide the infrastructure and information management systems that support every Soldier, every day. PEO EIS assists with the accession and training of Soldiers, tracks the Army's personnel and medical information, provides and maintains Warfighters' equipment, and plans the movement of their supplies and assets.

COMMUNICATIONS, ELECTRONICS, RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

The mission of the CERDEC is to develop and integrate Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) technologies that enable information dominance and decisive lethality for the networked Warfighter.

U.S. ARMY GARRISON FORT MONMOUTH

The mission of the U.S. Army Garrison Fort Monmouth (USAG FM) is to provide base operations support, facilities, services, and well-being for the Fort Monmouth community.

PATTERSON ARMY HEALTH CLINIC

The mission of Patterson Army Health Clinic is to provide and coordinate high quality care for all of its beneficiaries in the highest tradition of military medicine, while promoting optimal health and maintaining readiness. Patterson Clinic is now home to Monmouth County's first Veterans Affairs Health Clinic.

UNITED STATES MILITARY ACADEMY PREPARATORY SCHOOL (USMAPS)

USMAPS, established in 1945, moved to Fort Monmouth from Fort Belvoir, Virginia on 1 August 1975. The school prepares and trains selected enlisted members of the Army to qualify for admission to the United States Military Academy, and provides training that will assist them after they arrive at West Point. The school is open to enlisted members serving on active duty in the Army; to enlisted members of the Army Reserve and National Guard; and to civilians who are authorized by the Department of the Army to enlist in the Army Reserve for the purpose of attending the preparatory school. About 320 Soldiers enter USMAPS each year to compete for 170 appointments to West Point.

FEDERAL BUREAU OF INVESTIGATION (FBI)

The agency's Northeast Regional Computer Support Center, Fort Monmouth, serves the FBI's largest field office--Now York City--plus field offices in Albany, Boston, Newark, New Haven, Philadelphia and Richmond. The activity began with 25 personnel, mainly computer operators, and now currently has approximately 115 employees.

754TH ORDNANCE DETACHMENT

The 754th Explosive Ordnance Disposal Detachment's mission is to train police, fire and public officials in explosive ordnance disposal and bomb threat search techniques, as well as to reduce the hazard of domestic or foreign conventional nuclear, chemical, biological and improvised explosive ordnance that personnel or outside activities may encounter.

MILITARY INTELLIGENCE DETACHMENT, ALPHA CO. 308TH M.I.B.N, 902D M.I GROUP

The 308th Military Intelligence Battalion conducts counterintelligence (CI) operations throughout CONUS to detect, identify, neutralize, and defeat foreign intelligence services (FIS) and international (IT) threats to U.S Army and selected Department of Defense forces, technologies, information and infrastructure. On order, the 308th reinforces designated unit(s) with CI and support personnel.

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LOOKING AHEAD

When asked what he saw as the future of the C-E LCMC in the Global War on Terrorism, MG Mazzucchi remarked, “There was a time when all focus was pretty much on future combat systems, unit of action. Certainly, the folks in the research and engineering command know and remember well when the only thing we could spend dollars on was the Future Combat System. I mean that’s what the focus and direction was for a multitude of reasons. Now, we understand that the current modular force will be around for a long time and the world environment will continually change. We’re focusing a tremendous amount of energy on urban combat, very austere conditions in Southwest Asia-- that’s just one part of the spectrum of war. We have to continue to remind ourselves that we could be back to an environment of a triple canopy jungle, places similar to Vietnam. We can be in very cold places, you only have to go to the Korean War memorial and remember those terrible winters--a very different environment than the construct of Iraq today. So, what will C-E LCMC be doing? Keeping our eyes open and being in the position to do what we did two years ago, three years ago to get the Army ready to go into Iraq, plus have it ready to go wherever it has to go at any point in time. The current modular force is going to be with us. We are going to contribute and continue to work future modular force, certainly, but there is an appreciation that there is still a whole lot that has to be done to transform the Army and be a part of the Army force generation model to get to a place where the units are truly modular and we don’t have the situation again where we have a premier state of the art digital organization online with an analog organization.”

The co-location of the interdependent organizations of the C-E LCMC enables the command to provide critical capabilities to the Joint Warfighter. The C-E LCMC thus stands as an interdependent life cycle management team, providing a full range of life cycle support and indispensable Warfighting capabilities Army wide.

ENDNOTES

[1] Bingham, Richard. "Fort Monmouth, New Jersey: A Concise History." Communications-Electronics Command, December 2002; George H. Moss Jr. and Karen L. Schnitzspahn, *Victorian Summers at the Grand Hotels of Long Branch, New Jersey* (Sea Bright: Ploughshare Press, 2000), 21.

[2] *This is Fort Monmouth* (Fort Monmouth: 1950); Moss and Schnitzspahn, *Victorian Summers*, 28; Pike and Vogel, *Eatontown*, 112.

[3] Personal letter from Major General Charles H. Corlett to Colonel Sidney S. Davis dated 3 December 1955.

[4] Ibid.

[5] Bingham, Richard. "Fort Monmouth, New Jersey: A Concise History." Communications-Electronics Command, December 2002; Pike and Vogel, Eatontown, 80; PASSING OF MONMOUTH PARK.; Once Famous Race Course of Jersey Cut Up Into Building Lots. Special to The New York Times. New York Times (1857-Current file). New York, N.Y.: Apr 10, 1910. p. 6 (1 page); An Archeological Overview and Management Plan for Fort Monmouth (Main Post), Camp Charles Wood and the Evans Area, 1984; Galton and Wheelock, History of Fort Monmouth, 12; Stenographic record of interview with COL Carl F. Hartmann, Signal Corps Retired, 26 October 1955 in the Office of the Chief Signal Officer; An Archeological Overview and Management Plan for Fort Monmouth (Main Post), Camp Charles Wood and the Evans Area, 1984; Historical Properties Report, Fort Monmouth, New Jersey and Sub installations Charles Wood Area and Evans Area, July 1983.

[6] Authority of the Army Purchase Act, 25 February 1920.

[7] Stenographic record of interview with COL Carl F. Hartmann, Signal Corps Retired, 26 October 1955 in the Office of the Chief Signal Officer; Untitled man uscript, Communications Electronics Command Archives, Fort Monmouth; History of Fort Monmouth, 5.

[8] Ibid.

[9] "Shore Veteran Recalls Early Days of Post," Monmouth Message, May 18, 1967 p. 14.

[11] Order 122, Office of the Chief Signal Officer, 21 August 1917. Born at Morristown NJ, in 1807, Alfred E. Vail graduated from the University of the City of New York in 1836 and early became associated with Samuel F. B. Morse. Vail's mechanical knowledge greatly expedited the first experiments in telegra phy. He devised the Morse alphabet of dots, dashes, and spaces. His automatic roller and grooved lever embossed on paper the characters that were transmitted. Vail was the superintendent of construction of the original telegraphy line between Washington and Baltimore. Inventor of the finger key, he received the first message successfully transmitted in 1844. In view of the great contributions made by Vail to wire communications, it was proper that his name be commemo rated in a Signal Corps training camp.

[12] Stenographic record of interview with COL Carl F. Hartmann, Signal Corps Retired, 26 October 1955 in the Office of the Chief Signal Officer.

[13] Signal ROTC courses in prominent universities throughout the United States were also training radio operators and telegraphers. See Historical Sketch of the Signal Corps, Signal School Pamphlet No. 32 (Fort Monmouth, 1929).

[14] S.0. 139, War Department, 14 June 1918.

[15] Lt. Lawrence Galton and Lt. Harold J. Wheelock, A History of Fort Monmouth, New Jersey (Fort Monmouth, 1946).

[16] "Fort Monmouth Locale Steeped in American Military Tradition," Monmouth Message, May 18 1967 p. 12.

[17] Helen C. Phillips, United States Army Signal School 1919-1967, (Fort Monmouth: USA Signal Center and School, 1967).

[18] Signal Corps Bulletin, August 1926, 15.

[19] Phillips, 22.

[20] Galton and Wheelock, The History of Fort Monmouth. 1917-1953, (Fort Monmouth: Historical Branch G3, 1953).

[21] OC SIG O Letter to CO, FM, 12 August 1929.

[22] History Report of SC Engineer Labs, July 1930-December 1943.

[24] Special to the The New York Times from Fort Monmouth, the Division of Press Intelligence, 8 August 1941 (CE-LCMC archives, Fort Monmouth, NJ.).

[25] Galton and Wheelock, 30-31.

[26] PL 177, 69th Congress (Appropriations for Construction at Military Posts and for other Purposes).

[27] Ibid.

[28] Phillips, 54.

[29] COL William R. Blair entered the U.S. Army in 1917. He had many tours of duty at Fort Monmouth and became Director of the Signal Corps Laboratories in 1930. He is considered the Father of American Radar. Blair finally received a patent for the pulse echo technique in 1957. COL Blair retired in 1938 and died in 1962 at the age of 87.

[30] This was the first major development in the miniaturization of radio equipment.

[31] H. M. Davis, History of SC Dir of U.S. Army Radar Equipment. The field manu al was WD, FM 11-25, GPO Wash: 1942.

[32] Davis, Abstract.

[33] PL 806, 70th Cong 25 February 1929 and the Army Appropriation Act, PL 278, 71st Cong. (28 May 1930).

[34] PL 535, 71st Cong. (3 July 1930) and PL 718, 71 Cong (23 February 1931); TAGO Ltr, (29 September 1932); GO 221, (21 December 1953). HQ SC Center & FM.

[35] PL 302, 72nd Cong (Title III of the Emergency Relief and Construction Act of 1932, approved 21 July 1934; PL 67, 73rd Cong 16 Jun 1933 authorized all of the remaining permanent construction to 1936.

[36] National Defense Budget Estimates for FY 1984, Ofc Of Asst Sec Def (Comptroller) March 1983.

[37] At the time, Shrewsbury Township encompassed all of what is today the Borough of Tinton Falls. Incorporation of the latter (first, as New Shrewsbury) left only the Vail Homes area to constitute Shrewsbury Township.

[38] BG D. Olmstead served as the tenth Commanding Officer of Fort Monmouth until July 1941. He was subsequently promoted to Major General and became the Chief Signal Officer of the Army from October 1941 to June 1943.

[39] GO 11, HQ Fort Monmouth.

[40] Camp Charles Wood is bound on the north by Tinton Avenue, on the east by Maxwell Place, on the south by Pine Brook Road, and on the west by Pearl

Harbor Road.

41 GO 28, (3 July 1942), HQ Fort Monmouth, and War Dept GO 58, (29 October 1942). Camp Charles Wood was named in honor of LTC Charles W. Wood, SC, and redesignated the Charles Wood Area in 1958. LTC Charles Wood was assis tant executive officer of Fort Monmouth. He died suddenly on 1 Jun 1942 while on temporary duty in Washington. Wood had retired from the Army in 1937 because of illness. He was recalled to service in Oct 1940, and served as post signal property officer at Fort Monmouth and later as assistant executive officer.

42 Galton & Wheelock, 84.

43 WD SO 274, 9 October 1942.

44 SCL 394, 30 September 1941; Field Lab No. 1, was dedicated as Camp Coles, 1 October 1942, in honor of COL Ray Howard Coles, Assistant to and Executive Officer for the C Sig O, AEF, World War I. By WD, GO 24, 6 Apr 1945, Camp Coles was redesignated Coles Signal Lab. It was rededicated Coles Area 18 December 1956, when the USA Signal Equipment Support Agency occupied the site.

45 William R. Stevenson, Miniaturization and Micro Miniaturization of Army Communications- Electronics 1946-1964 (Fort Monmouth: Headquarters and U.S. Army Electronics Command, 1966). Historical monograph 1, project Number AMC 21M; Max Marshall LTC, The Story of the U.S. Army Signal Corps, (New York: Franklin Watts Inc., 1965).

46 Ibid.

47 Ibid.

48 Stevenson; Marshall.

49 The total cost of property only making up the Charles Wood Area was $143,200. The property consisted of 475.68 acres. The tracks of land making up the acreage were known as the Eatontown Area; Wire School Area; Phillips Farm; Monmouth County Country Club; and Field Lab No. 2 of the SCGDL, were combined and officially designated HQ Camp Charles Wood.

50 History Report of SCEL, July 1930 to December 1943, 6.

51 Kenneth J. Clifford, Commanding Officers of Fort Monmouth, (Fort Monmouth: Command Historian's Office, 1984).

52 David G. Buchanan and John P. Johnson, Historic Properties Report (Draft) (Building Technology and National Park Service, U.S. Department of Interior, July 1983).

53 Phillips, 204.

54 GO 35, DA, 3 August 1949; GO 67, HQ Fort Monmouth, NJ (22 August 1949), the last order of that Headquarters.

55 Phillips, 219; Ibid., 220.

56 Ibid., 241.

57 For a more detailed account of this event, see Rebecca Raines, "The Cold War Comes to Fort Monmouth, Senator Joseph R. McCarthy and the Search for Spies in the Signal Corps," Army History, no. 44 (Spring 1998), pp. 8-16. Following the arrest of the Rosenbergs in 1950, two former Fort Monmouth scientists, Joel Barr and Alfred Sarant, defected to the Soviet Union – a fact, unknown to McCarthy, that lends credence nevertheless to his suspicions.

[58] Buildings 1204, 1205, 1212, now occupied by USMAPS since August 1975; Myer Hall named in honor of the founder of the Signal Corps, Chief Signal Officer, 1860-1863, 1866-1880; Myer Hall dedicated 11 September 1953; The auditorium and Myer Hall, occupied by USA Chaplain School June 1980 and USA Chaplain Board, September 1979.

[59] Patterson Army Hospital officially opened 17 March 1958 and was dedicated 17 April 1958 in honor of MG Robert Urie Patterson, Surgeon General of the Army 1931-1935.

[60] Buchanan and Johnson, 72, 81, 84.

[61] Marshall; Stevenson; Amory H. Waite Jr., Radio Ice Depth Measurements, Papers and History Relating Thereto, (unpublished original manuscript and collection of documents). CECOM Historical Office.

[62] DA GO 47, 24 June 1954.

[63] GO 3, HQ USASRDL, 5 February 1959.

[64] GO30, HQ USASRDL, 31 December 1958.

[65] Marshall; Leonard D. Berringer, "Atomic Time standards," Instruments and Control Systems 39 (June 1966), 99.

[66] Martin Blumenson, Reorganization of the Army 1962, (OCMH Monograph 37M, July 1965).

[67] OC SIG O to CG Fort Monmouth 9 July 1962. ECOM actually activated by OC Sig O, 23 May 1961. ECOM officially organized 1 August 1962. HQ AMC G05, 26 July 1962.

[68] HQ ECOM GO46, 26 June 1964.

[69] HQ ECOM GO54, 26 June 1964.

[70] HQ ECOM GO3, 4 January 1965; HQ ECOM GO12, 25 Feb 1965.

[71] ECOM. GO28, 27 May 1965; ECOM GO39, 27 May 1965; ECOM GO40, 27 May 1965.

[72] HQ ECOM GO29, 27 May 1965.

[73] ECOM sent an improved version of the AN/PRC-25, the AN/PRC-77, to Vietnam in 1968 by way of the 6th Armored Cavalry Regiment and the 82d Airborne Division. The AN/PRC-77 had an "X" mode for use with a new security device, the TSEC/KY-38.

[74] MO Pers Auth of Strength Rpt, Form 108-1, Force Dev.

[75] Only 89 civilians elected to accompany the school to Fort Gordon; the remaining 700 retired or were reassigned to other agencies at Fort Monmouth.

[76] MG Babers came to Fort Monmouth as the twenty-ninth CO and the second CG Of CERCOM in June 1980. He thus became the first CG of CECOM, assuming command effective 1 May 1981 (Auth para 3-1a, AR 600-20).

[77] Monmouth Message, 26 October 1984.

[78] CECOM News Release #064-84, 13 September 1984.

[79] Monmouth Message, 27 July 1984.

[80] Monmouth Message, 12 October 1984.

[81] Monmouth Message, 1 October 1984.

[82] Richard Bingham, CECOM and the War for Kuwait August 1990-March 1991. Army Historical Program Monograph AMC 167 (May 1994).

[83] CECOM Annual Command History FY 90/91.

[84] Deputy Chief of Staff for Plans and Operations (DCSOPS) Business Integration Division (BID), CECOM history research conducted by BID staff (2003).

[85] Ibid.
[86] Ibid.
[87] Ibid.
[88] Ibid.
[89] Ibid.
[90] Ibid.
[91] Ibid.
[92] Ibid.
[93] Ibid.
[94] Ibid.
[95] Ibid.
[96] Information Systems Engineering Command, OEF/OIF history report, 1 June 2003.
[97] Monmouth Message, October 2001-August 2003.
[98] CECOM OEF/OIF history and lessons learned reports (2003).
[99] DCSOPS BID, CECOM history research conducted by BID staff (2003).
[100] CECOM Annual Command History FY03.
[101] Ibid.
[102] Ibid.
[103] Ibid.
[104] CECOM OEF/OIF history and lessons learned reports (2003).
[105] Michael Mazzucchi, "LCMC Announcement from Major General Mazzucchi," 2 February 2005; OPERATION ORDER 05-01 (Form the Communications Electronics Life Cycle Management Command – CE LCMC), 2005.
[106] Heather McCooey, "LARS, Reset," PPT briefing, 2 November 2006.
[107] Harrison Donnelly, "Lifecycle Manager: Bringing Together All Facets of the C4ISR Lifecycle," Military Information Technology Online Archives March 7, 2005, http://www.military-information-technology.com/article.cfm?DocID=827.
[108] LRC, "Logistics Managers Meet at Ft. Monmouth," Team C4ISR Knowledge Center, May 11, 2006.
[109] FY05 TYAD Historical Report.
[110] "Logistics and Readiness Center Logistics and Engineering Operations Division Reset Program Mission," Team C4ISR Knowledge Center, June 4, 2004.
[111] "Team C4ISR Overview," Team C4ISR Knowledge Center, October 19, 2006.
[112] "Team C4ISR Overview," Team C4ISR Knowledge Center, October 19, 2006.
[113] CECOM and the Global War on Terror.
[114] "Team C4ISR Overview," Team C4ISR Knowledge Center, October 19, 2006.
[115] Ibid.