HISTORICAL SKETCH

OF THE

UNITED STATES ARMY SIGNAL CORPS

1860-1969

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FOREWORD

Brigadier General Albert James Myer, founder and first chief of the US Army Signal Corps, observed in 1868 that "...victory or defeat sometimes hung upon the transmission of a signaled message..." Reflecting on his experiences during the Civil War and the innovations in communications developed under his aegis, General Myer wrote that the future of military signals could"...be contemplated yet in imagination only."

The explosion of communications technology during the succeeding century has more than justified that prediction. The rapid development of telegraphy after the Civil War and the introduction of the telephone adds new dimensions to military communications. Likewise, the advent of tactical radio communications in World War I followed by radar in World War II provided our forces with unprecedented command control and flexibility. The record of the Signal Corps' contribution to our nation's defense is well documented; however, its scientific achievements in peacetime are also noteworthy. The Corps tied together the expanding frontiers to the West, as well as to remote parts of the world - Alaska, the Arctic, and the farthest reaches of the Pacific.

The U.S. Weather Bureau was founded and developed by General Myer. The Corps also saw the birth and development of our present day Air Force. Cooperating with American industry in research, training and development of equipment, it added new dimensions to the nature of communications itself.

Today the development of satellite communications and automatic data

processing systems, coupled with advances in tactical and strategic communications, provides our field commanders with the most highly refined electronics network known to man.

It is believed that this brief historical sketch of the Signal Corps will be of interest to both the general and military student of history. To the military and civilian members of the Signal Corps team, this quick review of the notable achievements of the Corps should serve also as a source of pride.

Richard C. Horne III

RICHARD C. HORNE, III
Brigadier General, USA
Commanding

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SIGNAL CORPS TRADITION COMMITTEE

In 1948 Major General Francis H. Lanahan, Commanding General of the Signal Corps Center at Fort Monmouth, initiated a Signal Corps tradition program and appointed a Signal Corps Tradition Committee for the purpose of developing and implementing a coordinated plan of action to:

a. Insure a better appreciation on the part of all Signal Corps personnel of the important contributions, past and present, made by the Signal Corps to the national defense of the United States.

b. Develop the Signal Corps Center at Fort Monmouth as a permanent repository of Signal Corps tradition and memorabilia.

c. To extend proper recognition to organizations and individuals of the Signal Corps for their contributions to such accomplishments.

So successful was the committee at Fort Monmouth that in 1952 Major General George I. Back, Chief Signal Officer, expanded the program to include all other Signal Corps installations and activities. They were asked to appoint representatives to serve on a Signal Corps-wide Tradition Committee and to establish similar groups of their own to foster the Signal Corps Tradition at their posts.

The local Signal Corps Tradition Committee became the Fort Monmouth Tradition Committee by Letter Order 607, Headquarters Signal Corps Center and Fort Monmouth, 30 March 1953.

After Army reorganization, The Fort Monmouth Tradition Committee was discontinued. By Letter Orders 1012, Headquarters Fort Monmouth, 29 October 1962, a special committee known as The "Fort Monmouth Memorialization Committee" will be constituted when warranted at the direction of the Commanding General, Fort Monmouth, for the purpose of developing and implementing a coordinated plan of action intended to properly memorialize persons and/or places at Fort Monmouth.

By General Orders 18, Headquarters U. S. Army Signal Center and School, 15 July 1966, the Signal Corps Tradition Committee was re-established to continue a Corps-wide plan as originally adopted in 1948.

HISTORICAL SKETCH OF THE SIGNAL CORPS

PRO PATRIA VIGILANS

ORIGIN OF MILITARY SIGNALING IN THE UNITED STATES

Crossed flags and torch, the insignia of the Signal Corps, represent the first means of military communication employed by Brigadier General Albert James Myer, founder, organizer, and first chief of the United States Army Signal Corps.

Signals by means of torches, flags, smoke, pyrotechnics, and other symbols have been employed from time immemorial, but the systems of signaling were either difficult to learn or the equipment was cumbersome in form, complex in character, or impractical to manufacture of a scale large enough to be effective in mobile military operations. General Myer's genius lay in his ability to devise a simple visual signal system of "wig-wagging" a flag by day and a torch by night to the left or right to indicate letters that could be read by a trained soldier. His signal system met essential military requirements because it was not only militarily effective but employed light, sturdy, easily transportable, easily made equipment.

Albert James Myer was born in Newburgh, New York, 20 September 1827. He received his early education in Buffalo where he also worked as an operator in the local telegraph office. He attended Geneva College and the Medical College of the University of Buffalo. His interest in telegraphy influenced his thinking even while in medical school and, for his Doctor's degree thesis, he wrote "A New Sign Language for Deaf Mutes," (25 February 1851) which was based upon the use of a two element telegraphic alphabet that formed letters by the dot and line pressed upon the human flesh so that the touch would convey every wish and thought. For this use of the tactile sense he used Bain's alphabet. This thesis was to become the basis of his military communication system. In 1854 he was commissioned Assistant Surgeon in the Regular Army with the rank of lieutenant. While with the Army as an assistant surgeon from 1854 to 1860, he devoted much of his leisure time to devising a system of visual signals that might be effectively employed by the Army. In 1859, from Fort Hancock and Highlands, N. J., to Fort Wadsworth, Staten Island, and to Fort Hamilton, Long Island, with Lieutenant E. P. Alexander as his assistant, he officially tested his system. In 1860 the U. S. Army adopted the Myer system of signaling and appointed Assistant Surgeon Albert James Myer to be Signal Officer with the rank of major, to fill an original vacancy in a newly created Signal Department. Approved by Congress on 21 June 1860, his commission was signed by President Buchanan, 28 June, with date of rank 27 June 1860. At that time the use of signal communication of any kind in the Army -- as contrasted to mounted messenger

service -- was almost unknown. It was not known how simple signals could be made, nor at what distance they were readable. Although the telegraph had been invented by Samuel F. B. Morse in 1853, in 1860 telegraphy was still novel in armies and not provided for in tables of organization and equipment.

"SIGNALS" IN THE CIVIL WAR

At the outbreak of the Civil War in 1861, Major Myer, together with a very small group of enthusiastic officers and enlisted men, established Signal Schools to provide the rapidly expanding Union Army with signal troops. General Orders No. 1, Headquarters Signal Camp of Instruction, Georgetown, was published 31 August 1861. During the Civil War signaling assumed such an important role in military operations that Congress passed an act on 3 March 1863 establishing the Signal Corps as a separate branch of the Army with Major Myer, later to become Brigadier General, as the first Chief Signal Officer. The orange color distinguished by the historic Army Dragoons, who were redesignated Cavalry, became the branch color of the new Signal Corps. The new Corps was to serve as both a combat arm and a technical service, a dual role continued to this day. Thus the United States Army was the first to have a Signal Corps and it has since served as a model for the creation of a Signal Corps in the armies of many other nations.

Major Myer also had ideas of putting the electric telegraph into the field service of the Army. Civilian telegraphers, directly controlled by

Secretary of War Stanton and paid by the Quartermaster, were from the start of the war employed in the military effort of the North. This was the U. S. Military Telegraph, which provided command and administrative communications between major headquarters.

But Major Myer wanted tactical electric telegraph which could be moved about for free employment in the field, when visual signals could not be used. Working with civilian inventors, he brought about the development of Army's first electrical communication device, the Beardslee magneto-electric telegraph set. Hand-operated (without batteries and readily portable, it could signal over several miles of insulated field wire, which soldiers laid rapidly over the ground or strung on lance poles. They called it the "Flying Telegraph."

Assisted by officers and men detailed to him, Major Myer provided more and more military communications as the Civil War developed. Visual signals figured prominently in amphibious actions along the southern coasts; at Bull Run, Gettysburg, Allatoona; and in the assaults on Richmond, in 1862 and in 1864-65. The Beardslee magneto-electric telegraph and the "Flying Telegraph Trains" played a part in the Peninsular Campaign at Fredericksburg in 1862.

In 1863, Secretary Stanton ordered Major Myer to turn all electric telegraph operations over to the Military Telegraph organization in a disagreement which led to the temporary removal of Myer, then a colonel, to the Department of the Mississippi. A year later, the acting

Chief Signal Officer, Lieutenant Colonel W. J. L. Nicodemus, was replaced by Colonel B. F. Fisher.

It was during Lieutenant Colonel Nicodemus' year as Acting Chief Signal Officer that badges for the designation of the officers and enlisted men of the Signal Corps, U. S. Army, having been approved by the War Department, were substituted for those formerly worn. General Orders 36, War Department, Bureau of the Signal Corps, August 22, 1864, provided a badge for Officers and another for Enlisted Men.

"Description of Badge for Officers.

Hat and Cap: Same as for other officers, with the following ornament: a gold embroidered wreath in front, on black velvet ground, encircling crossed signal flags, with lighted torch, and supported by the letters 'U. S.' in silver in old English characters. Color of Flags: one red, with white centre; the other white, with red centre. Size of flag: three-eighths of an inch square; size of centre, one-eighth of an inch square; length of staff, one and one-sixteenth inches.

"Description of Badge for Enlisted Men.

Device on Arm: Crossed signal flags, red and white, on dark blue cloth. Size of flags: Three-fourths of an inch square; centre, one-quarter of an inch square; length of staff, three inches. Sergeants will wear the designation of the corps placed in the angle of the chevron upon the left sleeve. Privates will wear the designation of the corps in the same position on the left sleeve as the chevrons of sergeants."

Captive military balloons, a logical uplifting of elevated observation and signal platforms, were not an Army Signal Corps assignment in the Civil War. In mid-1863 the Army offered its rather uncertain balloon activity to the Signal Corps, and Colonel Myer refused it on the grounds that he did not have enough men or money. So the Army dropped balloon operations altogether until 1885 when aeronautics and military ballooning were resumed -- a responsibility of the Army Signal Corps.

The valiant and heroic services of the Signal Corps throughout the Civil War contributed greatly to the success of the Union Army and Major Myer was instrumental in establishing Signal studies in the United States Military and Naval Academies. During the Civil War, 146 officers were commissioned in the Signal Corps, and, in addition, there were 297 acting Signal officers. The total number of enlisted men numbered about 2,500. The Act of 1863 establishing the Signal Corps was effective only during the Civil War and upon termination of hostilities the Signal Corps was demobilized and then re-established and reorganized in 1866 with 6 officers and 100 enlisted men.

The highest military award for bravery that can be given to any individual in the United States of America -- the Medal of Honor, was awarded Private Morgan D. Lane, Signal Corps, whose birthplace was at Monroe, New York. On the morning of 6 April 1865, while in advance of the 5th Corps, near Jetersville, Virginia, Private Lane captured a Confederate from whom he took the flag of the rebel gunboat Nansemond, for

which action he was awarded the Medal of Honor -- the first Signal Corps man to be so distinguished.

PEACETIME ACTIVITIES (1866 - 1897)

After the Civil War and Secretary Stanton's departure, the War Department restored Colonel Myer as the Chief Signal Officer. In 1867 he gained control over the command and operation of all Army telegraph lines -- including lines linking isolated camps and posts. The Corps built and maintained increasingly longer wire lines operated by key and sounder using battery-powered current, and the Corps also provided "Flying Telegraph Trains" to each Army Corps.

General Myer was also responsible for the adoption of electrical means of communication by the Army after much political difficulty. In his preface to his "Manual of Signals" for 1868, General Myer wrote: "The actions of the late war, in which victory or defeat has sometimes hung upon the transmission of a signaled message, have rendered it certain that military signals will be used in the future military and naval operations of our arms - - - The perfection to which these duties can be brought, by careful study, experiment and practice, can be contemplated yet in imagination only." "Careful study" -- "experiment and practice" -- "contemplated yet in imagination only" -- are basic thoughts that have always been and continue to be incorporated in the underlying philosophy of the Signal Corps.

In its role as communicator for the Army, and in its zeal to provide our troops with the most rapid and effective means of communication, the Signal Corps has always been quick to adopt, modify, and whenever necessary, to directly contribute to such inventions as the telegraph, telephone, radio, and radar. In between the progress of military communication from the flag, torch, and crude telegraphic equipment of the Civil War to the latest development in radar and radio relay, the Signal Corps was responsible for two other outstanding scientific achievements.

During the period 1870 - 1890 the Signal Corps organized, established, and developed every phase of a weather reporting service for the benefit of our nation's present day Weather Bureau. General Myer established 66 stations where storms were studied, and using data already being recorded by the Army Medical Department, as well as anemometric readings, he was able to give the country its first storm signals. By means of announcements in the newspapers, Farmers' Bulletins displayed in post offices, signal flags, etc., the public was warned of coming bad weather. His predictions of early and late frosts were of value to physicians as well as agriculturalists. In 1872 he began to require reports relative to the stages of water in the rivers and by bulletins was able to warn the public against floods.

In 1873, at the Meteorological Congress of Vienna, General Myer introduced the idea of worldwide simultaneous meteorological observations which won unanimous acceptance. Two years later, at their exhibition in

Paris, the International Congress of Geographical Science awarded him a letter of "Distinction" for his contributions to their exhibition. Then at the Second International Meteorological Congress in Rome, April 1879, General Myer and M. Buys Ballot, of France, reported on the results given by the worldwide simultaneous observations introduced by Myer in 1873, and on how they might contribute to further development of those observations.

During the same period, the Signal Corps installed, maintained, and operated about 4,000 miles of telegraph lines in Oklahoma, Texas, New Mexico, Arizona, California, Washington, Idaho, Montana, Wyoming and the Dakotas. These lines not only transmitted important meteorological data but were authorized by Congress for the express purpose "of connecting military posts and stations, and for the protection of the populations from Indian and other depredations." The weather service of the Corps grew rapidly. By 1875 the service was so advanced that it comprised hundreds of reporting stations from the Atlantic to the Pacific and in adjoining areas of Canada and the Caribbean. It attracted the attention of meteorologists from all over the globe and our War Department through the Signal Corps was influential in establishing the first international cooperation in the development of a worldwide meteorological service. Regular weather reports and storm warnings became a popular and demanded routine, and included exchange of weather data with foreign nations and the beginning of international cooperation in large-scale

scientific efforts. This was one of the great 19th century achievements in science as well as in international cooperation.

After the death of General Myer in 1880, the Army Signal Corps under Brigadier General William B. Hazen participated in the First Polar Year, an international effort to learn more about the Arctic. This cooperative endeavor constituted what was in fact the first geophysical year.

Nine months after General Hazen took office, a second Signal Corps enlisted man brought distinction to the Corps. Private First Class William C. Barnes, who was born in San Francisco, California, and entered service at Washington, D. C., was awarded the Medal of Honor for bravery in action at Fort Apache, Arizona, 11 September 1881. The medal was issued to him 8 November 1882.

In 1881 Hazen sent out two expeditions, one to Point Barrow, Alaska, the other to Lady Franklin Bay on Ellesmere Island, opposite northern Greenland. The ten men of the Point Barrow party returned safely in 1883 with a complete set of scientific observations during the Polar Year.

The 25 men of the Ellesmere Island team under Lieutenant A. W. Greely likewise maintained regular records of weather and polar phenomena and explored hitherto unknown areas in the vicinity. A party under Lieutenant J. B. Lockwood in 1882 reached the point furthest north attained by white men to that date. But the southward return of Greely's group met tragedy. Navy ships intended to pick them up were blocked by ice packs in the Greenland channel for two successive summers. Not

until 1884 did a rescue ship get through, to find only seven survivors, the others having starved to death. All the scientific records were saved.

On the afternoon on 19 January 1885, the first balloon ascent ever made in the United States solely in the interest of meteorology took place at Philadelphia. General Hazen, Chief Signal Officer, recognizing the importance and value of a more complete knowledge of the upper atmosphere, entered into a contract some time before with the well-known aeronaut, Mr. S. A. King, for a number of "trips to the clouds," an ascent to be made at any time on eight hours' notice. The United States Signal Service had had this subject under consideration for several years. Professor Abbe began in 1871 to collect meteorological records made in balloons. In 1872 the records of fifty ascents had been tabulated, studied, and valuable results obtained. In 1876, 1,000 small balloons were sent with the POLARIS expedition, to be used in determining the height of the clouds; but, owing to an unfortunate accident, they could not be utilized. At various times the Chief Signal Officer had sent observers on balloon excursions, which were made for purposes other than scientific. The considerable certainty with which the movement of a storm could be predicted rendered it possible and desirable to make systematic use of the balloon in the study of unusual atmospheric conditions, and the series of ascents then in progress was planned with that end in view. Among other things, it was desired to determine the difference in the temperature gradient in well-defined "high" and well-defined "low" pressures. For this purpose it was

necessary to foretell the arrival of a particular atmospheric condition at Philadelphia, from which place the ascents were made. This could readily be done so as to give the aeronaut eight hours' notice for the preparation of his balloon, and the observers who accompanied him sufficient time to reach Philadelphia from Washington.

The second ascent was made on 13 March 1885, from the grounds of Girard College. The balloon was the "Eagle Eyrie," holding 25,000 cubic feet when filled, and having a lifting power of about 1,000 pounds. The occupants of the car were Mr. King and Private W. H. Hammond, a skillful observer, detailed for the purpose from the Office of the Chief Signal Officer. Mr. Hammond carried with him a complete outfit for making barometric, thermometric, and hygrometric observations, and the results were very satisfactory. A safe and quiet landing was made at Birdsboro, some forty miles from the place of ascension. Frank Leslie's Illustrated Newspaper, of 28 March 1885, stated that "The danger incident to a balloon ascent is greatly over-estimated by many. In the company of an experienced and skillful aeronaut the risk to life and limb is scarcely greater than on a railway train or a steamboat. Volunteers for this service are by no means wanting among those connected with the Signal Service."

Upon the death of General Hazen in 1887, Adolphus Washington Greely, then a captain, world renowned for his Arctic service, was promoted to Brigadier General and Chief Signal Officer. With his scientific

bent of mind and vigorous support of military communications and innovations, he kept the Army Signal Corps intact during a decade of effort to disband the Corps, especially after Congress decided that the weather service was too civilian in character to remain in the Army. The Department of Agriculture took over this service as the Weather Bureau in 1891.

Meanwhile new modes of communication had come to the Army -- the heliograph and the telephone. Immediately after the loss of the weather function, the Army resumed interest in military balloons. In 1892, General Greely won War Department consent for the assignment of this responsibility to the Signal Corps.

Greely also promoted military uses of photography, having taken Army's first photographer, Sergeant George W. Rice, to the Arctic in 1881-84. His photographs, though he himself was among those who starved to death early in 1884, were all preserved.

THE SIGNAL CORPS IN THE SPANISH WAR

Just before the outbreak of the Spanish-American War in 1898, the Signal Corps found itself with only 8 officers and 52 men, and $800 available for war expenses. Under General Greely's leadership, the Signal Corps was reorganized and augmented with a volunteer Corps in order to provide the rapidly expanding Army with communications. To a greater extent than any other corps in the Army, the Signal Corps' operations and sphere of usefulness was expanded by the Spanish-American War. While the Army had increased tenfold, the Signal Corps had increased more

than twentyfold -- from 60 officers and men to 1300. In the Spanish-American War, the Signal Corps quickly established a network of communication in the islands of Puerto Rico and Cuba. In Cuba, the entire telegraph system was reconstructed and was extended throughout the island. This Cuban telegraph system was transformed into a highly efficient service and was of great value to the newly established Cuban Government.

On 5 February 1899, First Lieutenant Charles E. Kilbourne, United States Volunteer Signal Corps, became the first Signal Corps officer to win a Medal of Honor. Lieutenant Kilbourne was born at Fort Myer, Virginia, and entered service at Portland, Oregon. During the Philippine Insurrection, at Paco Bridge, Philippine Islands, within a range of 250 yards of the enemy and in the face of a rapid fire, he climbed a telegraph pole at the east end of the bridge and in full view of the enemy coolly and carefully repaired a broken telegraph wire, thereby reestablishing telegraphic communication to the front. The medal was issued to him on 6 May 1905. In 1936, Kilbourne was made a Major General and assumed command of the Second Division at Fort Sam Houston, Texas. He was 6th Corps Area Commander, Chicago, from June, 1936, until his retirement. On 2 May 1963, when President Kennedy saluted and entertained 240 Medal of Honor holders at The White House, General Kilbourne, aged 90, was the oldest man present. He died 12 November 1963.

THE SIGNAL CORPS DURING 1899 - 1916

At the end of the Spanish-American War, the United States faced an insurrection in the Philippines and the Signal Corps was given the hazardous mission of constructing, maintaining, and operating a communication system that would connect the many islands of the Philippine Archipelago. The communication system established by the Signal Corps started from nothing and, by 1901, the Philippine Islands were connected with 5,000 miles of landlines and 1,300 miles of submarine cable. General Arthur MacArthur, the Philippines' Commander, wrote that without the services of the Signal Corps, "it would be impossible to hold this Archipelago with less than 150,000 men, which is now well and efficiently performed by 60,000."

At the turn of the 20th century, the gold rush in Alaska focused attention on the fact that there wasn't a foot of telegraph, telephone, or cable line in that great and strategic territory which we had purchased from Russia in 1867.

In 1900 Congress assigned to the Army Signal Corps responsibility for communications to and in Alaska -- cable and wire lines serving not only military garrisons there but all civilian needs as well, to the benefit of mining and fishing interests and other settlements scattered throughout the Territory. Radio, or wireless telegraphy, was introduced in 1898 into the Army by the Signal Corps. One of the first military circuits employing this new technology was a 100-mile link across Norton Sound to Nome,

Alaska, obviating a difficult land line or underwater cable route to that outlying settlement. By 1904, the Signal Corps communication system in Alaska was spread over a network of more than 3,600 miles. Alaska was connected with our Pacific northwest by the first long-distance cable ever to be manufactured, laid, and operated in our history. This communication system not only included telegraph and telephone lines but, by 1904, it also incorporated "the only wireless telegraph circuit in the world regularly operated as part of a commercial telegraph system, handling point-to-point business." This communication system has been an integral part of the defense and development of Alaska.

While the Signal Corps, because of its peculiar capabilities, has from time to time been called upon to foster and develop other types of services, its primary concern is, and always will be, communications. Nearly all else that the Corps does is aimed at accomplishing the mission expressed in the slogan, "Get the Message Through."

In 1906, General Greely concluded his long service, nearly 19 years as Chief Signal Officer. Many years later, by Act of Congress, 21 March 1935, he was awarded the Medal of Honor for his life of splendid public service, begun on 27 March 1844, having enlisted as a private in the United States Army on 26 July 1861, and by successive promotions was commissioned as Major General 10 February 1906, and retired by operation of law on his sixty-fourth birthday. There fell to his successor, Brigadier General James Allen, the task of introducing airplanes to the Army.

Three weeks after General Allen became Chief Signal Officer, First Lieutenant Gordon Johnston, United States Signal Corps, became the fourth Signal winner of the Medal of Honor. He was born at Charlotte, North Carolina, and entered service at Birmingham, Alabama. At Mount Bud-Dajo, Jolo, Philippine Islands, on 7 March 1906, he voluntarily took part in and was dangerously wounded during an assault on the enemy's works.

The success of the Wright airplane in 1903 led to the formation of the Aeronautical Division in the Signal Corps. In 1906, the attention of officers was "invited to paragraph 38, G. O. 128, W. D. series 1906, Item 7 which prescribes 'Military Ballooning' as one of the subjects in which officers of the Signal Corps will be examined for promotion." On 14 December 1907, the Signal Corps published Specification 483 for purchasing the first Army dirigible. In 1907 the War Department recognized the value of airplanes and issued specifications for the construction of the Army's first military plane -- Signal Corps Specification No. 486, dated 23 December 1907. The contract was awarded to the Wright Brothers who had made the first successful airplane flight. Acceptance of the Wright Brothers' first military airplane marked the beginning of our present day Air Force. The plane made its initial flight at Fort Myer, Virginia, on 3 September 1908. Two weeks later, in the course of subsequent flight tests, this airplane crashed on 17 September, severely hurting the pilot, Orville Wright, and fatally injuring his passenger, 1st Lieutenant Thomas E. Selfridge, a Field Artillery officer on duty with the Army Signal Corps

for aviation service -- the first man ever to die in heavier-than-air powered aircraft. The next plane which the Wrights built to meet their Army contract was delivered in 1909.

By 1910, the only aeronautical equipment that our nation possessed consisted of the Signal Corps' dirigible balloon, one Wright airplane, and three small captive balloons. Chief Signal Officer Brigadier General James Allen in his annual report for 1910 wrote that, "Aerial navigation has taken hold of the entire civilized world as no other subject in recent times, and represents a movement that no forces can possibly check. In its military aspects it is a subject which we must seriously consider whether we wish to or not, and the sooner this fact is acknowledged and measures taken to put us abreast with other nations the better it will be for our national defense." The Signal Corps operated the Air Service until it became a separate branch of the Army in May 1918. At the outbreak of World War I, the Air Service personnel numbered 52 officers and 1,100 enlisted men.

In 1913, Brigadier General G. P. Scriven, Allen's successor, inherited an expanding variety of Army Signal Corps activities. These included field radios, aircraft radios, increasingly elaborate long-range wire, cable and radio circuits, and fire control systems for directing the fire of large guns on targets visible only to remote observers. A month before the United States entered World War I in 1917, Brigadier General G. O. Squier became the Chief Signal Officer.

"SIGNALS" IN WORLD WAR I

Just before our nation entered the first World War, the active Signal Corps strength consisted of 55 officers and 1,570 enlisted men. Squier built up the Corps tremendously, from fewer than 2,000 officers and men to over 50,000 by the close of 1918. A permanent Army Signal Corps post at Fort Monmouth, New Jersey, was begun as Camp Little Silver, then became Camp Alfred Vail, centered on a nucleus of signal schools and laboratories. (Earlier signal schools had been located at Fort Leavenworth and at Fort Myer, named in honor of the Corps' founder soon after his death in 1880 and which bears his name today.)

Squier induced the world-renowned physicist, Dr. Robert A. Millikan, to come from the University of Chicago to head up Army Signal Corps research and development activity. Many new kinds of equipment, particularly vacuum tube radios, were designed and produced by industry.

In France the outpost companies of field signal battalions provided all telephone, telegraph and radio service down to the barbed wire, while signal telegraph battalions built heavy-duty communication lines across the country. In Paris the Signal Corps maintained a laboratory in which worked such scientists as Major Edwin H. Armstrong, who developed the superheterodyne circuit during his overseas service, and who later invented frequency modulated radio. One of the scientist-officers whom General Squier brought into the Corps was Major William R. Blair who was placed in charge of the considerable meteorological activity

maintained by the Army Signal Corps in France to serve the needs of fire control and aviation.

U. S. Army aircraft continued as a Corps responsibility until the War Department took aviation out of the Signal Corps in May, 1918, setting it up as the Air Service -- which later became the Army Air Corps.

Army photography became an increasingly important Army Signal Corps function during World War I, expanding to include motion pictures and training films so necessary to train quickly large numbers of recruits.

The following are some of the missions the Signal Corps had to accomplish in World War I:

1. Inaugurate a training program to increase the active Signal Corps strength to 2,712 officers and 53,277 enlisted men in order to provide communication troops for an army of about 4 million.

2. Establish a large-scale Signal Corps research and development program.

3. Establish and provide an urgently needed meteorological service for the entire Army.

4. Establish and provide a photographic service for the entire Army.

5. Establish and provide a pigeon service.

6. Expand the Army Aviation Service from 52 officers and 1,100 enlisted men to 16,084 officers and 147,932 enlisted men.

The Signal Corps crisscrossed all France with fixed stations. It strung 10,000 lines of wire, built 2,000 miles of polelines, operated

282 telephone exchanges and 133 complete telegraph stations in addition to stations in the Combat Zone. Radio as a means of communication in war was used for the first time, but only to a limited extent.

In summarizing the achievements of the Signal Corps in World War I, the late Brigadier General John J. Carty, Chief Engineer of the American Telephone and Telegraph Company, wrote that "When the war broke it was not possible for any of the European nations to provide a communication system adequate for the conduct of the war. It remained for the Signal Corps of the United States Army in nine months to construct a long-distance telephone and telegraph system which the governments of Europe had failed to do in forty years. The system extended from Marseilles on the south to LeHavre on the North; across the channel to London, and Liverpool; on the west their lines went as far as Brest; and on the east as far as Germany. We were able to talk all over the Continent."

Though the Signal Corps constituted about 4 percent of the total troop strength in World War I, its casualties by percentage were second only to the Infantry. General Pershing wrote: "Each Army corps and division has had its full quota of field signal battalions which in spite of serious losses in battle accomplished their work, and it is not too much to say that without their faithful and brilliant efforts and the communications which they installed, operated, and maintained the successes of our armies would not have been achieved."

At the time of the signing of the Armistice the strength of the Signal Corps was 2,712 officers and 53,277 men, divided between the American Expeditionary Forces and the forces in the United States.

POST-WAR OPERATIONS (1919 - 1939)

During the decade of inevitable military shrinkage after World War I and the ensuing decade of the depression, one Chief Signal Officer after another, Major Generals C. M. Saltzman, G. S. Gibbs, I. J. Carr, J. B. Allison, and J. O. Mauborgne, struggled to maintain, against oppressive shortages of money and men, a skeletal Signal Corps. They promoted new developments in wire and radio, and brought out a steadily improving series of SCR (Signal Corps Radio) numbered sets of ground and airborne radios. They improved the War Department Radio Net and Army communication links within the continent and beyond -- to such outlying posts as Hawaii and Panama.

General Mauborgne, a research-minded chief, especially supported the highly secret beginnings of Army radar, which Colonel Blair, Director of the Army Signal Corps Laboratories at Fort Monmouth since 1930, had initiated. Colonel William R. Blair holds the fundamental and basic patent for American radar. From the Signal Corps' pioneering in the development of our country's radar have evolved the many radars used in the military and those employed in numerous civilian applications such as navigation, storm tracking and air lines flight direction and control.

In the years immediately before America plunged into World War II, the Signal Corps promoted Dr. Armstrong's newest contribution to radio, frequency modulation, which soon revolutionized mobile communications in Army combat.

Major General D. Olmstead succeeded Mauborgne a few months before the attack on Pearl Harbor, an occasion when the Army Signal Corps radar SCR-270 on the north shore of Oahu performed properly, detected the Japanese airplanes 130 miles away, and gave the warning which men would not believe.

At once Olmstead received a superhuman task of expansion which paled the rapid growth of the Corps in the previous World War, not so much in manpower as in research, development, and production. While the Corps leaped from 27,000 to 350,000 officers and men in four years, enormous and increasingly intricate growth occurred in the research, development, and supply of equipment, in the training of men in the applications of new electronic devices and weapons previously unheard of: complex radios in every tank and command car (push-button FM radio), mobile long-range radio, radio relay, carrier communications, radioteletype employed in the new world-wide system of ACAN (Army Command and Administrative Net), and radar.

WORLD WAR II

At the outbreak of World War II, the active strength of the Army Signal Corps was less than 300 officers and 4,000 enlisted men. This group of

officers and men, educated in the great service schools of our military establishment and schooled in the progress, development, and research in communications since World War I, provided the initial energy, initiative, drive, and imagination which characterized the expansion of the Signal Corps in World War II. To meet the signal requirements of World War II, it was necessary for the Signal Corps to establish a global communication network and to complete a procurement program for the equipment of the Army that reached a figure of six billion dollars. This procurement program literally reoriented and expanded the entire communication industry of our nation. To provide our Air Force, Ground Force, Service Force, and our allies with vitally needed communication personnel, it was necessary for the Signal Corps to organize and develop the largest schools of communication the world has ever seen. The Signal Corps strength at the peak of World War II numbered more than 27,000 officers and 300,000 enlisted men -- a force almost twice as large as the entire U. S. Regular Army on 1 July 1939.

In addition to providing signal units for the five theaters, five commands, and one department in World War II, the Signal Corps furnished the necessary signal troops to maintain three Army groups, 11 armies, 24 corps, and 89 divisions. The Signal Corps created global, theater, and combat communication systems in order to integrate the vastly expanded communication requirements of World War II.

The extent to which radio is appreciated as a vital means of communication is well known. It is hardly necessary now to recount the many

contributions radio made to the successful prosecution of World War II. Wherever men of the Armed Forces went -- and they were deployed all over the earth -- radio went with them. Thus the world-wide radio network may be likened to the nerves of the body with Washington as the nerve center.

Thousands of words have been written about radar, the marvel which is properly credited with shortening the war. It is not so generally known, however, that the Signal Corps was responsible for the pioneer development and research of radar in our army.

Virtually all the important radar equipment actually employed in combat up to the end of the war, including the complete radar equipment of the B-29's was developed under the Signal Corps program.

Radar alone soon equaled the great variety of radio and wire items in the many forms in which this new technique developed -- radars both for ground troops and for the explosively expanding Army Air Corps. Under Major General H. C. Ingles, Chief Signal Officer, 1943 - 1947, the Army Signal Corps emerged from the four-year ordeal much larger and with far wider activities and responsibilities than ever before. This was true despite the fact that the Corps lost to the Army Air Corps late in 1944 all electronics responsibility for aviation, and lost late in 1945 all radio intelligence activity. This last, a specialized application of communication-electronics, had greatly expanded during World War II. Though these losses momentarily cut away from the Corps nearly half its men and

activity, within a few years the Signal Corps assumption of new and important missions regained and enlarged its stature in the Army.

The paramount importance of superior signal communications in modern warfare was unanimously acknowledged by our military leaders during World War II. Commanders in every theater repeatedly emphasized that success in battle depended on the prompt transmittal of orders and the immediate translation of those orders into coordinated action.

Development of multichannel and single channel radio teletypewriter systems made it possible to transmit great volumes of military messages throughout the world and led to the installation of a global communication system in which messages could be instantly relayed over radio, land-line, and submarine cable facilities by the simple process of extracting a piece of tape from a receiver and inserting it in a transmitter.

Before World War II, the Signal Corps operated a domestic radio network extending to Honolulu, San Juan, Panama, Seattle (for Alaska), and Manila. Only about 5,000 messages were handled daily. By the time the atomic bombs were dropped ending the conflict, this comparatively small military communication system had been expanded enormously into a gigantic around-the-world belt line of multichannel circuits, with a traffic handling capacity of 100,000,000 words per day.

This belt line, extending from Washington to Asmara in Eritrea, to New Dehli (India), to Brisbane (Australia), to San Francisco, and back to Washington, and operated by the Signal Corps Army Communications Service, formed the greatest unified military communication system ever

developed. Because of the flexibility of this system, all phases of America's mighty war effort were perfectly coordinated -- mobilization, production, training, transportation, feeding, equipping, and actual fighting. Commanders separated by oceans and continents could exchange questions and answers instantaneously and therefore decide major problems in a matter of minutes.

Many new types of wire and cable were developed. Assault wire, weighing only one-fourth as much as field wire, was so light that one man could easily carry a mile of it. To facilitate the laying of assault wire, special dispensers were developed to replace the bulky reels previously used. With the aid of these dispensers, coiled wire could be paid out without a twist or snag from the packboard of a soldier on foot, from the rear of a jeep, from a light airplane flying at two miles a minute over an impregnable jungle, or even from a bazooka shell or rifle grenade in flight.

Accurate weather predictions played important parts in our battlefield successes throughout World War II. The Signal Corps was in the forefront in the development of modern weather equipment which enabled our airmen to support ground troops and supply our armored columns. One of the finest pieces of meteorological equipment developed by the Signal Corps was a radio direction finding receiver by which the direction and velocity of the wind could be plotted at elevations up to 60,000 feet. The set receives continuous signals from transmitters which are carried aloft on meteorological balloons.

The increasing importance of Alaska and northern approaches in plans for the National Defense is of particular interest to the Signal Corps. A noteworthy development was the opening of the Alaska Highway Telephone and Telegraph Lines for commercial service between Alaska and Canada and the United States.

PERIOD OF EXPANSION IN COMMUNICATIONS TECHNIQUES

With the demobilization of the wartime Army, the Signal Corps lost a large percentage of its highly skilled men and was confronted with a training problem similar to that which was faced during the war. Hundreds of specialists were being trained at Fort Monmouth, which stood out as one of the finest technical institutions in the country.

For a while after World War II the personnel of the Corps declined, reaching a low of about 50,000 in early 1950. Its schooling tasks which had mushroomed during the war to include Camp Murphy in Florida and Camp Kohler in California were reduced to the basic schools at Monmouth. But the communications-electronics sciences could not be permitted to lapse. These fields were increasing dramatically in importance. The several laboratories which had spread out in the Monmouth area since the 1940's began by 1954 to consolidate in one huge truncated triangular building, the present headquarters of the U. S. Army Electronics Command at Fort Monmouth.

The fact that significant research and development did not greatly decline was exemplified by man's first contact with the moon, accomplished

by Army radar at the Signal Corps Radar Laboratory, Camp Evans, Belmar, N. J., 10 January 1946. This first contact with the moon marked the beginning of space communications in which the Signal Corps has since continued to pioneer.

Under Major General S. B. Akin, Chief Signal Officer, 1947 - 1951, the special skills and technologies of the Signal Corps were maintained. The world-wide communications of the Army Command and Administrative Network (ACAN) continued to improve the services required by Army and government personnel in many overseas locations. Radio-relay techniques were improved and the equipment received ever wider use. It was radio-relay teams of the Signal Corps on occupation duty in Japan that suddenly found themselves in June, 1950, called upon to support a conflict in a new sort of war in a new setting, supporting the United Nations in Korea. The first Army troops and the first casualties in that land included Signal Corpsmen flown in from Japan.

KOREAN COMBAT

Korean combat placed new requirements on the Signal Corps. The renewed use of aircraft in the Army, including helicopters, demanded special communications and navigation equipment. Ground forces demanded new and better ground radar -- mortar locators and troop detectors particularly. Again the Corps underwent wartime expansion under Major General G. I. Back, 1951 - 1955.

New schools were required at Camp San Luis Obispo, California, and at Camp Gordon, Georgia. Camp San Luis Obispo, placed in an active status by Department of the Army General Orders 44, effective 4 June 1951, became the home of the Southwestern Signal Training Group established as a class II activity under the jurisdiction of the Chief Signal Officer, effective 1 November 1951. Effective 15 December 1951, the Southwestern Signal Replacement Training Center and the Southwestern Signal School were established by Department of the Army General Orders 99, dated 16 November 1951. At Camp Gordon, Georgia, by Department of the Army General Orders 31, dated 26 September 1950, a Signal Corps Replacement Training Center was established at the Signal Corps Training Center there, both class II activities under the jurisdiction of the Chief Signal Officer. The Fort Gordon School continues today as an essential Signal training installation, the U. S. Army Southeastern Signal School.

In the years since the Korean War and especially under Lieutenant General J. D. O'Connell, 1955 - 1959 -- the first Chief Signal Officer to hold the rank of lieutenant general -- there was a tremendous rise in communications-electronics.

Electronic support for guided missiles began in 1949 at the Army's White Sands Missile Range in New Mexico and soon grew into the large U. S. Army Signal Missile Support Agency. The experience gained through early participation in this phase of communications-electronics work enabled the Signal Corps later on to provide major science and electronics support to subsequent missile and space programs.

Electronic warfare and countermeasures efforts, which began modestly at Fort Monmouth in 1950, expanded quickly; and by 1954 this had led to significant developments at Fort Huachuca, Arizona, where the Signal Corps operated the U. S. Army Electronic Proving Ground. Here important test and evaluation work was carried out on newly developed Signal Corps equipment and systems under simulated and actual field conditions.

THE MISSILE AND SPACE ERA

Phenomenal growth in recent years -- accelerated by the missile and space era -- has characterized numbers of other major Signal Corps efforts. For the nation's air defense the Missile Master, an electronic control and coordination system for use with Nike and Hawk missile batteries, was developed by the Corps, jointly with private industry. The first operational Missile Master was put in action at Fort Meade, Maryland, in December 1957. Additional systems to perform this vital electronic air defense mission were installed at key complexes throughout the United States.

The advent and rapid development of Army missiles brought forth a relatively new and expanding electronics mission area for the Signal Corps. This covers the field of combat surveillance and target acquisition -- essentially the gathering by day and by night, in all kinds of weather, of information about the enemy for use in the employment of weapon systems against him.

The U. S. Army Combat Surveillance Agency was established to provide direction for this major systems area. The Corps developed and introduced on an expedited basis a number of surveillance equipments. A few of these were modified versions of existing off-the-shelf items. Among the new items were first-generation pilotless surveillance drones; the manpacked TELESCOUT television system; mobile and portable surveillance radars that weigh only 80 pounds; and sensors such as airborne radars, infrared and photographic cameras. Development continues toward improved systems involving a variety of means -- radar, photography, infrared, TV, seismic, and acoustic -- some to be carried in advance surveillance drone vehicles and some in manned Army aircraft.

Significant advances were made in avionics, involving electronic devices and communication for Army aircraft. Besides communication sets, a mobile control tower was developed. The Corps developed, in a joint program with the Navy, an instrumented flight system for helicopters and fixed-wing aircraft, with real picture presentation to the pilot. Also developed were navigational systems employing visual map presentation to show the pilot the in-flight location of his plane.

Actually, the Signal Corps opened up the space age electronically by bouncing radio signals off the moon from its Diana I radar at Evans Signal Laboratory on 10 January 1946. Next came the Signal Corps' first contributions to satellite technology made within the framework of the IGY program.

The first officially assigned task was the technical operation and maintenance of the prime satellite tracking stations of the IGY Minitrack

Network, and the provision of communications and data transmission between these stations. Associated with this was calibrating the tracking equipment against objects radiating from space prior to the launching of satellites. These tasks took the Signal Research and Development Laboratory personnel to the Arctic, the Antarctic, the South Pacific, Australia, Japan, Western Europe, and Canada. To produce new atmospheric data, rocket soundings were made on a global basis; electromagnetic propagation data were obtained through the fantastically pure ice formations surrounding the Nort and South Poles. At Thule, Greenland, a weasel equipment with a down-looking radar while in motion instantly measured ice thickness in minutes as compared to the weeks required by normal seismic techniques in obtaining ground contours.

The first major satellite payload contribution was a demonstration of the feasibility of solar converters for satellites. This came with the launching of the small Vanguard I, 17 March 1958. Solar power devices consisting of six cell clusters were developed by the Laboratory to power one of the two radio transmitters in the 3 1/4-pound, 6.4-inch sphere. Its initial orbit time was 135 minutes.

Three minutes after the Vanguard I was launched at Cape Canavaral, Florida, its signals were being picked up at the Deal, New Jersey, Test Station of the Laboratories. With the launching at 0716, the first signal here was received at 0719 and the signals continued to come in until 0728. Then there was a lull until 2217 to 2230 on the same day.

In its first three years Vanguard I traveled 409,257,000 miles in 11,786 orbits. It has proved itself invaluable in scientific computations. Because its orbit, with apogee 2,513 miles and perigee 407 miles, was definitely known and charted, it was used by map-makers as a true "fix" in establishing positions of Pacific islands never definitely placed before. It also enabled geophysicists to determine that the earth is slightly pear-shaped, not the oblate spheroid it had been previously thought to be. Still more important, it established solar cells as the most efficient and reliable source of electrical power for satellites. On 21 February 1965, the National Aeronautics and Space Administration reported that the tiny satellite's radio voice had weakened to the point where engineers believed it would never be heard from again after a transmission record of almost seven years.

A prototype of the first communications satellite, Project SCORE (Signal Communications via Orbiting Relay Experiment), was successfully launched 18 December 1958, carrying from outer space President Dwight D. Eisenhower's Christmas message to people around the world. This experiment effectively demonstrated the practical feasibility of world-wide communications in delayed and real time mode by means of relatively simple active satellite relays, and provided valuable information for the design of later communications satellites. Signal Corps ground stations interrogated the satellite 78 times during the thirteen days' battery life, using voice and teletype messages for the communication tests with excellent results, and

provided valuable information for the design of future communications satellites. SCORE was an Advanced Research Project Agency (ARPA) project carried out by the Signal Corps with the Air Force providing the Atlas launching vehicle.

The second major satellite payload contribution was the complete electronics payload for the IGY Vanguard Cloud Cover Satellite, 1959 Alpha, launched on 17 February 1959. This Vanguard II, 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 20 days of the life of the battery power source during which it made 211 orbits and was successfully interrogated 155 times to release the stored information.

Throughout the IGY satellite program, the Signal Corps Research and Development Laboratory also contributed special components or subsystems, such as high-frequency control crystals, special batteries, and high efficiency, low voltage to high voltage transistor power converters to the payloads developed by other organizations.

Under the eighteenth Chief Signal Officer, Major General R. T. Nelson, appointed on 1 May 1959, the Signal Corps continued to seek improved command control systems of communication, combat surveillance, electronic warfare, and avionics for the Army, and contribute to the electronic science and capability of America's space effort.

To televise cloud formations within a belt several thousand miles wide around the earth and transmit a series of pictures back to special ground

stations. TIROS (Television and Infra Red Observation Satellite), a 270-pound object, was successfully launched on 1 April 1960, by an Air Force Thor-Able vehicle. This first television-type satellite for world-wide cloud cover mapping was produced under Signal Corps technical supervision and NASA sponsorship. Its two TV cameras -- one a wide-angle lens photographing 800-mile squares of the earth's surface and the other shooting 30-mile squares, ranging between the latitudes of Montreal and New Zealand were of different resolution for direct readout and tape storage, and the most intricate control so far used in a satellite.

The first orbit pictures were rushed to Washington on a new facsimile machine developed by the Laboratory. It transmitted a high quality picture to its destination in just four minutes. As a result, the first pictures from TIROS were on the President's desk shortly after they were received from the satellite, and he personally released the information to the world. During its three months of operation, TIROS sent down more than 22,952 pictures of cloud formations, showing us the world as man had never seen it. Although it was only an experimental forerunner, TIROS I made some important discoveries and contributions to meteorological research.

TIROS II, launched 23 November 1960, an improved experimental weather observer -- followed TIROS I to provide man with new and more comprehensive views of earth's ever changing weather patterns from its vantage point some 400 miles in space. The new, more definitive pictures and data it gathered and returned to earth provided a ground work for new giant strides in meteorology and long range weather forecasts.

TIROS II satellite included all of the equipment of TIROS I -- TV cameras, tape recorders, TV transmitters, command receivers, timing mechanisms, beacons and telemetry equipment, new scanning and non-scanning infrared sensing devices, new magnetic orientation device, new noise suppressor circuits, new miniaturized RF diplexer, improved horizon scanners, and sun angle sensors.

The U. S. Army communication satellite COURIER I B was launched on 4 October 1960. It went into orbit (at apogee 658 miles above the earth, and at perigee, 501 miles) and calmly began to receive, to store, and -- on command from the earth -- to transmit to earth a stream of voice and telegraph radio messages at the rate of slightly more than 67,000 words a minute.

Each time it passed over Salinas, Puerto Rico, or Fort Monmouth, the Signal Corps loaded it with hundreds of thousands of words in teletypewriter code. In the 14 minutes it stayed within range of either station, COURIER picked up or transmitted the 773,693 words of the King James Bible -- or did both simultaneously -- and still had two minutes' time left over. COURIER's communication system broke down after seventeen days operation.

COURIER figured in the transfer of roughly six million words a day. Both on the ground and aboard the satellite, the telegraphic signals were first recorded upon, and then transmitted from, magnetic tape. The tape was moved through the transmitter, aground or aloft, at 740 times the normal transmission rate for high speed teletypewriters.

Nine days after the launching, a photograph transmitted from Fort Monmouth was retransmitted from COURIER and received at Salinas with no substantial loss in quality. This acheivement established the feasibility of satellite storage and relay of all types of facsimile messages, including letters, maps, charts, and photographs.

COURIER was a 51-inch sphere, the outer surface of which was studded with 19,200 solar cells. When the sun shone upon them, these generated 62 watts, which could be used immediately or stored up in batteries. The most important items of COURIER's equipment were 5 tape recorders, 1 for handling voice, and 4 for storing the ultra-high speed messages. All equipment, including the recorders, 4 receivers, and 4 transmitters, weighed 300 pounds. Total weight of satellite was 500 pounds.

Developed and launched as an experiment to test the feasibility of a global military communication network using delayed-repeater satellites, COURIER was replaced with a group of three satellites that followed 24-hour equatorial orbits at an elevation of 22,300 miles above the earth. In 24-hour orbits, the new satellites were to follow exactly the rotation of the earth. In effect, each hovered permanently over a particular point of the equator, and the three together were intended to supply an ever-available means of contact between points lying, roughly, between the Arctic and the Antarctic circles. These three communication relay stations were to form the Synchronous Satellite system. To explore and develop this new means of communications, the Initial Defense Communications Satellite Program, known as the IDCSP, was established. The

responsibility for carrying out the Army's portion of this Program is one of the missions assigned to the Army SATCOM Agency at Fort Monmouth.

In addition to its work with satellites, the Laboratory developed and tested all phases of work to fit its equipments into the new concept of rapidity and flexibility of communications, jamming of the enemy's electronic equipment; utilization of light, mobile rapid computing machines to assist battlefield commanders in making decisions; the use of photographic drones over the enemy's lines, and the employment of silent radar sentries, television, infrared detection and photographic devices and seismic and acoustic systems for battlefield surveillance.

To reduce administrative and overhead burden, to accelerate the interchange of records and operational data, and to provide timely analysis of operations, the U. S. Army Signal Corps was directed in 1956 to initiate the study and development of tactical Automatic Data Processing Systems for the field army which could be employed to advantage in areas of administration, intelligence, logistics, and combat operations. This resulted in development of MOBIle DIgital Computer (MOBIDIC), fully militarized and transistorized. The first MOBIDIC, Model A, installed in a 30-foot Army trailer, was turned over to the U. S. Army Signal Research and Development Laboratory, at Fort Monmouth, on 31 September 1959, for acceptance and evaluation testing. The first operational or production model, 7A, capable of handling all data processing aspects of running a modern field army, was shipped to the Seventh Army Stock Control Center at Zweibrucken, Germany, on 12 January 1961.

To consolidate certain related functions at Fort Monmouth and to increase capability for mobilization expansion, the United States Army Signal Training Command, Fort Monmouth, New Jersey, was activated 1 July 1960, in accordance with General Orders Number 13, Department of the Army, 3 May 1960, and General Orders Number 17, Office of the Chief Signal Officer, 23 May 1960. Major General Wm. D. Hamlin, Commanding General, directed that Headquarters Fort Monmouth be combined with United States Army Signal Training Command and the new headquarters be designated Headquarters United States Army Signal Training Command and Fort Monmouth (General Orders 1, Headquarters United States Army Signal Training Command and Fort Monmouth, 1 July 1960).

There was no material change in missions or personnel. The reorganization introduced the command concept in the assignment of training, a major mission responsibility, to a single field commander, concerned with training of personnel in the employment, operation, and maintenance of Signal equipment, and development and review of Signal Corps doctrine. Activities assigned to the new Training Command were the U. S. Army Signal School and the U. S. Army Signal Training Center, Fort Gordon, Georgia; the U. S. Army Signal Board, and the U. S. Army Signal Radio Propagation Agency.

Formerly, the Training Center at Fort Gordon was under direct supervision of the Office of the Chief Signal Officer. The commander and staff at Fort Monmouth assumed this function in addition to their former mission. Staff supervision over the training functions continued as the

responsibility of the Chief, Personnel and Training Division, Office of the Chief Signal Officer. Policy guidance was furnished by the Chief, Personnel and Training, who was program director.

The U. S. Army Signal Materiel Support Agency was a consolidation of old agencies under a revised name. This Agency absorbed the functions of the U. S. Army Signal Equipment Support Agency and of the U. S. Army Signal Publications Agency. The Fort Monmouth Procurement Office was attached for administration to this newly created Agency; however, the former working relationship of the Procurement activity and its supervision and command by the U. S. Army Signal Supply Agency in Philadelphia, Pennsylvania, remained essentially the same. The Chief, Procurement and Distribution Division, Office of the Chief Signal Officer, continued to exercise staff supervision over the U. S. Army Signal Supply Agency.

The U. S. Army Signal Research and Development Agency was also a regrouping of previous functions. This Agency included the U. S. Army Research and Development Laboratory, the U. S. Army Signal Research Activity, the U. S. Army Signal Operation Activity, and the U. S. Army Signal Patent Activity. The Chief, Research and Development Division, OCSigO, continued to exercise staff supervision.

Space communications required the U. S. Army Signal School to train personnel to keep the intricate new systems operating effectively and efficiently. With emphasis being placed on command control, firepower, and mobility in modern army concepts, as well as on the development of complicated guidance systems for missiles, rockets, and satellites, these

systems introduced wholly new ruggedized, miniaturized, transistorized, and modularized communications-electronics equipment.

The Signal School was directed in 1957 to initiate a course for staff officers to exploit the potentialities of automatic data processing systems (ADPS). Before the first fully militarized and transistorized mobile digital computer was turned over to the Laboratory in 1959, the Signal School had already started resident training of enlisted ADPS programmers, console operators, and maintenance specialists.

With earliest experimentation in 1951, use of closed-circuit educational television in the School has grown until today it is one of the largest and most advanced educational TV systems in existence anywhere. This requires training of TV operators and repairmen. Further studies for future use include a closed-circuit TV link connecting all Army service schools, centralized scheduling of selected common instruction which would originate from the responsible service school, night study rooms in barracks where students could review important lesson material recorded on video tape, use of broadcast educational TV for training certain types of reservists, and many other effective uses.

The first official flag for the U. S. Army Signal School at Fort Monmouth was received on 6 March 1956. Centered on this three by four feet flag of white background with yellow fringe is the School insignia -- crossed flags, flaming torch, strokes of lightning with the motto, Pro Patria Vigilans.

In 1959, together with the Southeastern Signal School, Fort Gordon, Georgia, the U. S. Army Signal School conducted a total of 66 separate officer and enlisted courses. To train personnel for the diversified activities, 33 separate courses for enlisted men and 22 for officers were conducted regularly at Fort Monmouth. Attendance annually was approximately 8000 enlisted men and 2,400 officers. An additional 16,500 students were then enrolled in the School's extension courses. Of these, the Department of Nonresident Instruction, USASCS, prepared and administered 84 subcourses, and in addition administered 16 courses prepared by other services.

As of 1 September 1960, The U. S. Army Signal Training Command newly designed shoulder sleeve insignia and the distinctive unit insignia became mandatory for all assigned personnel of General, Special, and Administrative and Technical Staff sections of Headquarters U. S. Army Signal Training Command and Fort Monmouth; for the staff and faculty and all students attending courses of instruction on permanent change of station orders of the U. S. Army Signal School; for assigned personnel of the U. S. Army Signal Training Center, Fort Gordon, Georgia; of the U. S. Army Signal Board, and of certain subordinate support units assigned to the U. S. Army Signal Training Command and Fort Monmouth.

With the consolidation of training functions 1 July 1960, the authorization and actual strength of Headquarters United States Army Signal Training Command and Fort Monmouth increased substantially. This increase included students, trainees, and other personnel at Fort Gordon,

Georgia and the (Fire Distribution Systems) Detachment, Fort Bliss, Texas. As of 31 March 1961, there were in the Training Command 12,464 military and 7,580 civilians, making the grand total 20,044.

On 1 July 1962, Major General Earle F. Cook succeeded General Nelson as Chief Signal Officer. Upon General Cook's retirement, 30 June 1963, Major General David Parker Gibbs took office effective 1 July 1963. General Gibbs was doubly distinguished in that he was the only son of a former Chief Signal Officer to serve in that position (his father, Major General George S. Gibbs having been Chief from 9 January 1928 to 30 June 1931) and that he was to be the last Chief Signal Officer. By General Orders 6, dated 28 February 1964, the Office of the Chief Signal Officer was redesignated the Office of the Chief of Communications-Electronics, effective 1 March 1964.

ARMY REORGANIZATION

While others at higher levels with insights into the philosophy and techniques of management had the responsibility for the events taking place, to Generals Cook and Gibbs came the task of bringing to fruition rather thoroughgoing reforms. Functions of the Technical Services were sliced in various ways. Instead of having a single Technical Service handle all Signal matters as before reorganization, the Army gave Signal personnel management to the Office of Personnel Operations, Signal training to the Continental Army Command, Signal doctrine and combat development to the Combat Developments Command, and Signal materiel development and

procurement to Army Materiel Command. Army leaders envisioned reorganization completed 18 months after the effective date of the Department of Defense Reorganization Order, that is, 16 February 1962. But as late as 1964 there were troublesome adjustments, only some of which had been predictable.

On 22 June 1962, General Herbert B. Powell, Commanding General, USCONARC, informed Brigadier General John C. Monahan, Commandant, U. S. Army Signal School, that he would inactivate the Signal Corps Training Command and establish the U. S. Army Signal Center and School. He further informed the Commandant: "I look upon you, as Commandant of the United States Army Signal School, as my principal advisor and representative for organization, doctrine, training, tactics and techniques of the Signal Corps . . . . The current reorganization of the Department of the Army which has transferred the responsibility for doctrine to U. S. Army Combat Development Command should in no way lessen the influence the schools have over doctrine or diminish in any way their responsiveness to requirements from the field."

General Powell continued: "I expect that the U. S. Army Signal School at Fort Monmouth will serve as a repository, within Department of the Army Regulations, for corps tradition, history, trophies, awards and other recognitions. In essence, the U. S. Army Signal School at Fort Monmouth will be the 'Home' of the Signal Corps.

"I shall rely on you as Commandant of the United States Army Signal School, for assistance and advice with respect to all matters pertaining

to your field. I am confident that through our mutual efforts the Army School System will not only retain its present stature but, through the adoption of forward thinking precepts and advanced educational methodology, grow into a system envied and copied by our foremost institutions of learning."

Major General Gibbs continued laboriously to work out solutions, either on the basis of logic or on the basis of quid pro quo. On 4 February 1964, he wrote Brigadier General Monahan of the impending elimination of his position as the Chief Signal Officer, and the concurrent establishment of the Chief of Communications-Electronics. He wrote:

"In addition, I would like to have Colonel Van Harlingen discuss with you my feelings on the continuation of Signal Corps history and traditions in the Army. With the many changes brought about under the reorganization of the Army in 1962 and now the elimination of the position of the Chief Signal Officer, these functions are gradually disappearing. The change in title to Chief of Communications-Electronics was deemed necessary by the Army staff to more properly express the scope of responsibilities which are to be assigned to my new office. One result is to make it clear that I am not Branch Chief for the Signal Corps.

"I feel that the seat of Signal Corps traditions should be located at Fort Monmouth. The museum . . . would be a natural as the focal point for Signal Corps traditions. The reorganized U. S. Army Strategic Communications Command, being the largest Signal Corps unit, will be

the repository for the present flags and traditions surrounding the Chief Signal Officer's office."

With all of this, there was no change in titles for Signal Officers at lower echelons. Their primary role remains the traditional and most important one of signal communications.

Just as radar was born in a strictly military environment and represented a radical departure from known civilian techniques, and man's first contact with a celestial body was from the Diana radar tower in 1946, and just as the Signal Corps established the first communications center in outer-space from which their Commander-in-Chief broadcast his 1958 Christmas greeting to the inhabitants of the world and beyond, it is not inconceivable that Signal Corps trainees will be the first to discover intelligent life in other parts of the universe. This is not likely in the immediate future, it could nevertheless happen at any time.

Discovery of intelligent beings on other planets could lead to an all-out effort by Earth to contact them, or it could lead to sweeping changes or even the downfall of civilization. The better we can come to understand the factors involved in responding to such crises the better prepared we may be. If intelligent or semi-intelligent beings are discovered in the coming years they would probably be found by radio communications with other solar systems. This could be Signal Corps signals of a kind that would show to anyone listening on other planets that they were man-made, not the result of natural phenomena.

A world-wide communication and tracking network is essential to placing an astronaut in orbit. Orbiting a man is only a stepping stone toward orbiting a space station as a jumping off point for trips to the moon and beyond. This will be the opening of the era of interplanetary travel which may lead to the discovery of extraerrestrail forms of life. What part will the Signal Corps play in this greatest achievement of all times?

SOUTHEAST ASIA

As the security of Southeast Asia deteriorated and the Republic of Vietnam requested American aid in fighting the ever-increasing threat of communist domination, United States troops, first as advisors, and then as active combatants, became involved in the conflict.

Again the Signal Corps was faced with the difficult task of providing communications of a type and in the area far different from any experienced before. Highly mobile, yet reliable, communications were needed which could be operated in jungle terrain; equipment which could withstand both the heat of the arid months and the dampness of the monsoon season was required.

This challenge was met through a rapid deployment of signal technicians, repair personnel, and supply specialists to the combat zone to support the operating personnel already there. Control of supporting signal units and responsibility for area and strategic communications services were centralized with the establishment of the 1st Signal Brigade on 1 April 1966. The largest combat signal unit ever established, the Brigade quickly installed the most complex and reliable communications system in the history of

warfare. Additionally, during the communist Tet offensive of February - March 1968, many units of the Brigade assumed the additional roles of infantrymen in repelling determined Viet Cong - NVA assaults.

In steaming jungles and rice paddies throughout Vietnam, treacherous terrain and grueling weather conditions are providing a constant test for the Signal Corps; this challenge is being met and conquered every day by the men of the Corps.

CHIEF SIGNAL OFFICERS OF THE ARMY

Name	Grade	Appointed	Remarks
Albert J. Myer	Major	27 Jun 1860	Promoted to Colonel 3 Mar 1863. Relieved 10 Nov 1863.
Wm. J. L. Nicodemus	Lt. Col.	15 Nov 1863	Relieved 26 Dec 1864. Died 6 Jan 1879.
Benjamin F. Fisher	Col.	26 Dec 1864	Resigned 15 Nov 1866. Died 9 Dec 1915.
Albert J. Myer	Col.	28 Jul 1866	Assumed office 21 Aug 1867. Promoted to Brig. Gen. 16 Jun 1880. Died 24 Aug 1880.
Wm. B. Hazen	Brig. Gen.	15 Dec 1880	Died 16 Jan 1887.
Adolphus W. Greely	Brig. Gen.	3 Mar 1887	Appointed Maj. Gen. U. S. Army, 10 Feb 1906. Retired 27 Mar 1908. Died 20 Oct 1935.
James Allen	Brig. Gen.	10 Feb 1906	Retired 13 Feb 1913. Died 19 Feb 1933.
George P. Scriven	Brig. Gen.	5 Mar 1913	Retired 13 Feb 1917. Died 7 Mar 1940.
George O. Squier	Brig. Gen.	14 Feb 1917	Promoted to Maj. Gen. 6 Oct 1917. Retired 31 Dec 1923. Died 24 Mar 1934.
Charles McK. Saltzman	Maj. Gen.	1 Jan 1924	Retired 8 Jan 1928. Died 25 Nov 1942.

CHIEF SIGNAL OFFICERS

OF THE ARMY

Name	Grade	Appointed	Remarks
George S. Gibbs	Maj. Gen.	9 Jan 1928	Retired 30 Jun 1931. Died 8 Jan 1947.
Irving J. Carr	Maj. Gen.	1 Jul 1931	Retired 31 Dec 1934.
James B. Allison	Maj. Gen.	1 Jan 1935	Retired 30 Sep 1937. Died 13 Mar 1957.
Joseph O. Mauborgne	Maj. Gen.	1 Oct 1937	Retired 30 Sep 1941.
Dawson Olmstead	Maj. Gen.	24 Oct 1941	Retired 30 Jun 1943. Died 2 Sep 1965.
Harry C. Ingles	Maj. Gen.	1 Jul 1943	Retired 31 Mar 1947.
Spencer B. Akin	Maj. Gen.	1 Apr 1947	Retired 31 Mar 1951.
George I. Back	Maj. Gen.	2 May 1951	Retired 30 Apr 1955.
James D. O'Connell	Maj. Gen. Lt. Gen.	1 May 1955 11 Jul 1958	Retired 30 Apr 1959.
Ralph T. Nelson	Maj. Gen.	1 May 1959	Retired 30 Jun 1962.
Earle F. Cook	Maj. Gen.	1 Jul 1962	Retired 30 Jun 1963.
David Parker Gibbs	Maj. Gen.	1 Jul 1963	Effective 1 Mar 1964 redesignated Chief of Communications-Electronics by DA GO 6, 28 Feb 1964.

CHIEFS OF COMMUNICATIONS-ELECTRONICS

OF THE ARMY

Name	Grade	Appointed	Remarks
David P. Gibbs	Maj. Gen.	1 Mar 1964	Retired 30 Jun 1966.
Walter E. Lotz, Jr.	Maj. Gen.	1 Sep 1966	Effective 16 Sep 1967 redesignated the Office of Assistant Chief of Staff for Communications-Electronics, (OACSC-E).

OFFICE OF THE ASSISTANT CHIEF OF STAFF FOR

COMMUNICATIONS-ELECTRONICS

Name	Grade	Appointed	Remarks
Walter E. Lotz, Jr.	Maj. Gen.	16 Sep 1967	Reassigned to Commanding General, Army Strategic Communications Command, 28 Feb 1968.
George E. Pickett	Maj. Gen.	1 Mar 1968	

MEMBERS OF THE SIGNAL CORPS AWARDED

THE MEDAL OF HONOR

CIVIL WAR
MORGAN D. LANE, Private, Signal Corps, United States Army, 6 April 1865

INDIAN WARS
WILLIAM C. BARNES, Private First Class, Signal Corps, United States Army, 11 September 1881

PHILIPPINE INSURRECTION
CHARLES E. KILBOURNE, First Lieutenant, United States Volunteer Signal Corps, 5 February 1899

PHILIPPINE INSURRECTION
GORDON JOHNSTON, First Lieutenant, United States Signal Corps, 7 March 1906

BESTOWED IN THE NAME OF THE CONGRESS OF THE UNITED STATES
ADOLPHUS W. GREELY, Major General, United States Army, retired. Act of Congress, 21 March 1935

ESC-FM 1679-69