by 2nd Lt. Michael Coffman

If one were to trace the historical developments leading to the establishment of the U.S. Army Signal Corps, he would discover that every step in the growth of combat operations has been preceded by an invention which spread the voice of command and extended its range. By giving greater speed, range, and volume to his voice of command, the field commander has been able to control a larger army. In many ways, armies have grown as fast as the signal service has permitted them to grow.

Signaling devices which supplement the human voice have always extended the range of command. The Roman historians Plutarch and Livy both make reference to "telegraphs" from the Greek *tele*, meaning "at a distance" and *grapho* meaning "to write." Visual signals such as flags, streamers, fires and lights as well as auditory ones such as trumpets and other instruments were all familiar to ancient generals. During most ancient wars, there were special corps of signalists or "telegraphers" within their armies who controlled the beacon fires.

The Egyptian Pharoahs announced the arrival of important visitors by releasing pigeons from incoming ships. By 2000 B.C., the Chinese were using pigeons to send the names of provincial election winners to the electorate. During the 10th century B.C., King Solomon supposedly used carrier pigeons. Also, pigeons carried the results of the Greek Olympic Games, beginning in 776 B.C.

But Greek contributions to signaling didn't end with sporting events. A profound innovation in signaling history occurred when Polybius described a signaling system based on waving torches to spell letters of the Greek alphabet. The inherent difficulty of using this system in daylight (especially without optical instruments) and the simplicity of the heliograph caused Polybius to be ignored for nearly two thousand years until the development of the telegraph, semaphore, and flaghoist.

In 1856, Dr. Albert J. Myer, a 28-year-old Army surgeon with an interest in the Comanche system of signaling, was quick to grasp the potential of such a relatively simple system of relaying messages. The rapid mobility of the Indian Wars demanded signaling that could match the Comanche's uncanny ability to transmit the exact whereabouts of the enemy. Dr. Myer's proposal, forwarded to Secretary of War Jefferson Davis, sat idle for three years before a board of officers was convened. The Army's reluctance to seriously consider the idea was understandable in an age when attention was limited to the rapid developments in electrical engineering and communications technology. Electric telegraphy, in fact, was older than Myer! In the early 1820's, several "needle" telegraphs had been invented by a galaxy of famous men: Ampere in France, Steinheil in Germany, and Schilling in Russia. To suggest a primitive system of flag-waving seemed anachronistic to the mid-19th-century mind.

There seems little doubt the idea would have been abandoned had it not been for the foresight and wisdom of a cavalry officer on the board, Lt. Col. Robert E. Lee. A veteran of the Indian Wars, Lee saw the futility of deploying the cumbersome telgraphic wires in a fluid tactical mode. What impressed him was the simplicity of the equipment Myer's system required. Any man on horseback could carry a flag or two, a pole that separated into four-foot sections, and a torch. If he lost his equipment, he could still signal with his neckerchief by day or a burning stick by night.

Though he convinced the War Department through a series of tests, Dr. Myer was unable to impress upon the Senate Military Affairs Committee the urgency of creating a special branch of the Army, headed by a colonel. Ultimately, the 32-year-old Myer settled for the rank of major and joined the Army staff as Chief Signal Officer. The U.S. Army Signal Corps dates its birth from his appointment on June 21, 1860.

The appointment of a signal officer to the Army staff was of little immediate benefit to the Union Army. The Myer flag code was not tactically employed until 1862, when it was used during the combined land and sea attack on Port Royal Ferry, South Carolina. The Confederates, however, lost little time in using the Myer code. A West Point graduate from Georgia and once Myer's assistant, Lt. E. Porter Alexander headed a team of signal soldiers who were able to alter the course of Bull Run by warning the Confederate commander of Gen. McDowell's intentions. Alexander continued with signal training, establishing a Confederate Signal Service and a signal manual in 1862. By the end of the war, he was a brigadier general.

Meanwhile, the War Department limited Myer's activities to providing signal training for soldiers who could

History of the Signal Corps

return to their respective branches. Upon his appointment, however, Myer tested the "wig-wag" system once more in the Southwest in Col. Edward Canby's campaign against the Navajo. He returned east at the outbreak of the Civil War to establish a signal school at Fort Monroe.

Myer's conviction that telegraph lines should be placed under Army control stemmed from the disastrous Union defeat at Bull Run. He concentrated on the possibility that Gen. Patterson's telegraph message warning Gen. McDowell of Gen. Johnston's reinforcement of Gen. Beauregard might have been lost between the telegraph office and McDowell's headquarters, 10 miles away. Couriers were used to run messages back and forth over those 10 miles, continually exposed to enemy fire.

Myer proposed to build a field telegraph train, including two horsedrawn vans, each equipped as a telegraph terminal office. In addition to instruments and batteries, each train would carry wire, a supply of lancepoles and insulation. Regardless of headquarters location, the team would proceed to a point midway between it and the nearest telegraph office. This suggestion, along with a proposal that the Secretary of War approve the temporary creation of a Signal Corps for the duration of the war, was further spurred by Union defeats in the latter part of 1862 and early 1863 which, as Myer quickly pointed out, were largely due to the superior Confederate Signal Service. J.E.B. Stuart, Robert E. Lee, and, of course, E. Porter Alexander were all firm advocates of a separate signal branch of the Army. Following Myer's suggestions, Congress, on March 3, 1863, created the United States Army Signal Corps as a temporary organization for the duration of the war. The branch had one Chief Signal Officer, a colonel, receiving $211 a month. Privates earned between $13 and $17 monthly.

Myer also suggested a system of selective officer appointment, based on results of competitive examinations. While earlier commissions were based largely on West Point graduation, foreign commissions, or direct commissions on the basis of civilian merit, the new legislation provided for adequate testing to determine the moral and educational fitness of candidates. Subjects included reading, writing, arithmetic, elementary chemistry, science, field telegraphs, and the deployment of signal units in the field. To Myer's

surprise, test results were very high, forcing him to discriminate on the basis of "morals."

Despite its formal christening in 1863, the Signal Corps was in no sense on firm ground. In September 1863, Myer publically accused the commercial telegraph service of subverting the Signal Corps' authority over wire lines. Myer urged signal officers to "vigorously defend their right to control the electric telegraph trains by writing to their commanding generals, insisting that no one use their lines except under the direct supervision of signal officers." Underestimating Secretary of War Stanton, Myer found himself called to account for insubordination and summarily dismissed as signal officer of the Army.

Myer's reaction was swift and determined. He waged a relentless battle through personal influence in Congress and a lavish privately printed brochure, but Stanton remained firm, refusing to even acknowledge any letter from Myer requesting reinstatement. Political support for Myer's cause had mounted by the close of the war, and the obstinate Stanton was becoming a source of irritation, so President Johnson relieved him in favor of Ulysses Grant. As a result, Myer was reinstated with the rank of brevet brigadier general.

Following the Cheyenne Indian Campaign in 1866, the Signal Corps had dwindled down to one lieutenant and two clerks. Only by congressional action was the position of Chief Signal Officer made permanent, and, ironically, the Engineer Corps was tasked with providing soldiers to be trained in Signal skills.

Realizing his Signal Corps might lose all identity with the infusion of Engineer personnel, Myer seized upon his newly assumed responsibility of operating a weather bureau as justification for an expansion of the Signal Corps. To link the weather stations in the system with long-line communications was imperative, and only an expanded Signal Corps could fill the need.

The rapid expansion of Signal Corps functions into areas beyond the scope of communications responsibilities led Congress to reorganize the Corps by providing that, "the operation of the Corps shall be confined to strictly military matters." Although tactical weather reporting was retained, all other meteorolgical functions were consolidated within the Department of Agriculture Weather Bureau. At this time, the Signal Corps was reduced to 10 officers and 50 enlisted. Gradually, the telegraph lines controlled by the Signal Corps were reduced in keeping with this policy, until by 1916 only 40 miles west of the Mississippi were retained.

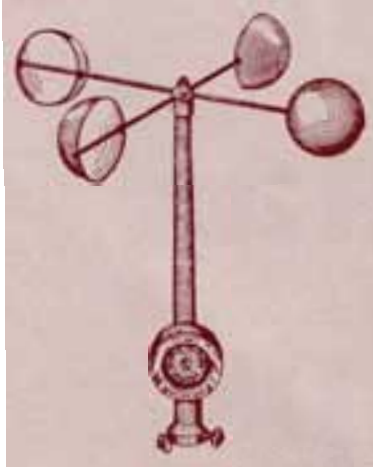
But the Corps was far from dead. For sheer determination in the face of almost unconquerable barriers, few achievements in Signal Corps history rival the building of the Alaska Communications System. Directed by Congress with an initial appropriation of $450,550 to provide both civilian and military telegraph links to the Alaska Territory, it was impossible for the new Chief Signal Officer, Adolphus Greely, to foresee the pitfalls ahead.

As a combination submarine-cable and land-line operation, Greely ordered a section of telegraph line installed from Nome to Fort Safety for an oceanic connection. Departing over 157 miles away with a cable-laying steamer, the Corps suffered its first disastrous setback when a reef ripped out the hull. The ship was finally salvaged by a commercial shipping company.

In winter, the overland telegraph lines were delayed by temperatures which dropped to seventy below zero. In summer the sun transformed much of the route into a quagmire. Fifteen miles per day was often an optimistic estimate of progress. Completed in June 1903, the line still required Canadian wire services for communications with the States. Plans for a 1300-mile cable from Juneau and Sitka to Seattle were completed on October 3, 1904.

While ballooning was widespread as an aerial observation platform for artillery and reconnaisance since the Civil War, the Signal Corps' first entry into aviation occurred shortly after 1900. With a Congressional appropriation of $25,000, the War Department began construction of a "flying machine for war purposes." The Chief Signal Officer chose Samuel P. Langley, a personal friend and director of the Smithsonian Institute to undertake the project. Langley agreed to build a flying machine but at twice the original appropriation. His machine failed miserably in successive attempts to maintain flight. An embarassment to both Congress and the War Department, the failure was a major reason for the delayed response to certain inquiries from a couple of obscure bicycle manufacturers from Dayton.

In December 1907, however, the Signal Corps published its "Specification 486, Advertisement and Specification for a Heavier than Air Flying Machine."



Required to travel at least 40 mph, there was an additional requirement that it "be quickly and easily assembled and put in operating condition in about one year." Although forty-one bids were received, only three met all requirements, and of these, only the Wright Brothers' airplane was ever delivered and accepted.

With the purchase of the first Army airplane, flight instruction began as part of the Signal Corps' contract with the Wright Brothers. Lt. Frederic E. Humphreys soloed on October 8, 1909, to become the first Army Aviator. The Army struggled with one pilot and one plane until 1911, when Congress appropriated $125,000 for Army aviation. Chief Signal Officer, Brig. Gen. Allen, received $25,000 immediately and ordered five planes for flight training at College Park, Maryland.

Rich in military heritage, Augusta has been associated with the U.S. Army Signal Corps since 1911 when the aviation training was moved from College Park to Augusta. In addition to a favorable climate, Augusta had gained recognition through the exploits of one of the Wright Brothers' early instructors, Frank Coffyn, a native Augustan, who had established a private flight school on Monte Sano Hill. That same year, the Army's entire inventory of aircraft, numbering five fragile Wright B's and Curtisses, arrived for a training camp that lasted only a year at Barnes Farm near Sand Bar Ferry Road in Augusta, before a permanent field was built in San Antonio, Texas.

The years before WWI saw dramatic innovations in military aircraft. The observation and adjustment of artillery fire had been adequately demonstrated at Fort Riley, Kansas, and the Lewis machinegun had also been fired from the earliest biplanes.

It was inevitable that the Signal Corps would lose responsibility for the training and maintenance of an aircraft section and in August 1913, Congress called for an aeronautical branch of the Army while retaining an Aviation Section within the Signal Corps. Not until May 1918, was an Army Air Corps established.

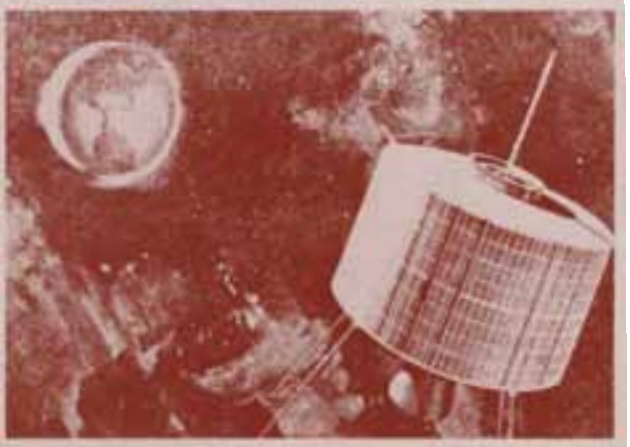
World War I marked a radical departure from the traditional concept of the Signal Corps. What had been an elite group of communicators, numbering about 2000 prior to the war suddenly became 2,712 officers and 53,277 enlisted by the end of the war.

Technological support for this war effort increased proportionately. Maj. Gen. George O. Squier, Chief Signal Officer, who had a Ph.D. in electrical engineering, cooperated with the communications industry, directly commissioning experts from the private sector to tackle the complex problems associated with radio tubes. Pioneers in radio research such as Dr. Robert A. Millikan of the University of Chicago, and John J. Carty, chief engineer of American Telephone and Telegraph Company, are but two examples of these experts. Also, a major signal laboratory was created at Camp Alred Vail in Little Silver, New Jersey, later to become Fort Monmouth. The development of the SCR-67's and -68's from this laboratory and the introduction of these early radiotelephones into France by the mid-1918's heralded a new age in military communications.

In addition to personnel expansion and radiotelephone development in WWI, the impact of radar on WWII cannot be underestimated. Allied superiority in radar technology permitted high accuracy target acquisition on the beachhead at Anzio, Italy, and also neutralized the effectiveness of early German V-1 rocket attacks on England. Great credit can be given to command emphasis prior to WWII by the Chief Signal Officer, Maj. Gen. Joseph Mauborgne, who encouraged accelerated development in radar technology. Col. William Blair, Director of the Army Signal Corps Laboratory at Fort Monmouth, was responsible for the first military radar in 1937.

The introduction of tactical FM radio was also an important innovation in WWII communications. Developed in the 1930's by Col. Roger Colton and Maj. Edwin H. Armstrong in Signal Corps Laboratories, the new sets eliminated the need for time-wasting tuning adjustments by using crystal-controlled frequencies. Field commanders such as Patton seized on the tactical advantage afforded by improved command and control.

By WWII, signal intelligence had evolved from the wire-tapping of Civil War days to a sophisticated means of deciphering and interpreting enemy communications. It incorporated cryptology with compiling and distributing codes and ciphers. Headquartered in Arlington, Virginia, the Signal Security Agency controlled a staff of over 7,000, only to relinquish control to the G-2 element, with the Signal Corps retaining administrative and financial support



responsibilities. By the close of the war, this led to the creation of the Army Security Agency, eventually becoming today's INSCOM.

Following WWII, the Signal Corps began experimenting with extra-terrestrial communications links as early as 1946 with "Project Diana," an effort to bounce radar signals off the moon from a station in Belmar, New Jersey. Although only seven percent of the 112 megacycle radar pulse returned, a milestone was established.

With the Soviet bloc entry into satellite technology, the Signal Corps quickly responded in December 1958, with the launch of its first test satellite, Score I, which rapidly led to a global communications network. An acronym for Signal Communication Orbit Repeater Experiment, it received signals from the earth, stored them on tape, and re-broadcast them to the earth on command to stations located in Texas, Arizona, and Georgia.

Although primitive by today's standards, Score I led to the solar-powered Courier 1B, also able to store, receive, and re-broadcast messages on demand, with increased capabilities over its predecessor. In one experiment, all 773,693 words of the Bible were transmitted to the satellite on high-speed tape in fourteen minutes. The process was reversed with a text clearly understandable, an incredible feat for its time.

The first major communications system employed in Vietnam was a response to a need for high quality telephone and message circuits between key locations. Code named "Backporch" it utilized troposopheric scatter radio trunks capable of providing numerous circuits between locations more than 200 miles apart. Funded by the Air Force and deployed by the Signal Corps, the system had vans containing troposcatter terminals capable of transmitting and receiving up to seventy-two voice channels simultaneously. Recognizable as the 60-ft tall "billboard antennas," the system was operated by the 39th Signal Battalion.

The inadequacy and unreliability of the radio circuits linking Vietnam with Hawaii and Washington led to the SYNCOM satellite communications service which provided a relay link between Hawaii and Saigon. Also, it marked the first use of satellite communications in a combat zone.

Further demands for a communications system that could meet the demands of a vastly expanded US presence in Vietnam led ultimately to a commercial fixed-station system. Known as the Integrated Wideband Communications System, all equipment was commercially procured and installed by the contractor. This was the Southeast Asian link in the global Defense Communications System.

The benefits of science and the products of our technology continue to shape our society and to influence events of worldwide significance. Today, Fort Gordon, the home of the Signal Corps, is at the forefront of educational technology in providing communication skills for the Army worldwide. It continues the proud tradition of 120 years of excellence.

Lt. Coffman has been on active duty for six years. He spent the first five in the enlisted ranks serving as an interpreter and translator in Russian and German. An OCS graduate, Coffman holds a B.A. (cum laude) from Florida Technological University.