

THE EFFECTIVENESS OF THE U.S. ARMY SIGNAL CORPS IN SUPPORT
OF THE AMERICAN EXPEDITIONARY FORCE DIVISION AND BELOW
MANEUVER UNITS DURING WORLD WAR I

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by

DOUGLAS J. ORSI, MAJ, USA
B.A., Clarion University of Pennsylvania, Clarion, Pennsylvania, 1988
M.S., Old Dominion University, Norfolk, Virginia, 2000

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Name of Candidate: MAJ Douglas J. Orsi

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Approved by:

_____, Thesis Committee Chair
MAJ Curtis S. King, Ph.D.

_____, Member
LTC John M. Koivisto, M.A.

Accepted this 1st day of June 2001 by:

_____, Director, Graduate Degree Programs
Philip J. Brookes, Ph.D.

The opinions and conclusions expresses herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

THE EFFECTIVENESS OF THE U.S. ARMY SIGNAL CORPS IN SUPPORT OF THE AMERICAN EXPEDITIONARY FORCE DIVISION AND BELOW MANEUVER UNITS DURING WORLD WAR I, by MAJ Douglas J. Orsi, 137 pages.

The entry of the United States into World War I in April 1917 found the U.S. Army and Signal Corps totally unprepared for operations on the Western Front. This research effort proves conclusively that the U.S. Army Signal Corps overcame this unpreparedness and was ultimately effective in support of the American Expeditionary Force (AEF) division and below maneuver units during World War I. This conclusion was validated by studying the organization, doctrine, training, and technology used by Signal Corps division level units prior to the declaration of war through the immediate post-World War I period. The 1st and 2d Infantry Division signal units are studied during the battle of Soissons (July 1918) and the Meuse-Argonne (October 1918) in order to evaluate their effectiveness in support of division maneuver elements. The U.S. Army Signal Corps provided relatively dynamic signal support at division level by the time the Armistice ended hostilities on 11 November 1918. The progression of signal support within the 1st and 2d Infantry Divisions clearly shows the growth and development of signal organization, doctrine, training, and technology as applied to an AEF infantry division.

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TABLE OF CONTENTS

	Page
APPROVAL PAGE	ii
ABSTRACT.....	iii
ACKNOWLEDGMENTS	iv
LIST OF ILLUSTRATIONS.....	vi
CHAPTER	
1. INTRODUCTION: THE SIGNAL CORPS PRIOR TO WORLD WAR I	1
2. FROM THE DECLARATION OF WAR TO SOISSONS (JULY 1918)	15
3. SOISSONS, 18-22 JULY 1918.....	46
4. DIVISION LEVEL OPERATIONS IN THE MEUSE-ARGONNE, 26 SEPTEMBER-11 NOVEMBER 1918.....	73
5. IMMEDIATE POSTWAR CHANGES.....	105
6. CONCLUSION.....	124
BIBLIOGRAPHY	131
INITIAL DISTRIBUTION LIST	137

ILLUSTRATIONS

Figure	Page
1. Diagram of a Field Signal Battalion	19
2. Brigade Communications Diagram.....	23
3. Normal Main System of Communications in an Area liable to heavy shelling.....	27
4. Map of Soissons and vicinity	48
5. Schematic Communications Diagram.....	51
6. Sketch of the 1st Division Axis of Liaison	56
7. Sketch of the 2d Division Axis of Liaison.....	58
8. Map of the Meuse-Argonne	75
9. Schematic Communications Diagram.....	82
10. Sketch of the 1st Division Axis of Liaison	85
11. Sketch of the 2d Division Axis of Liaison.....	89
12. Signal Company Organization in an Infantry Division	106
13. Infantry Brigade, Regiment and Battalion Communications Platoon Organization.....	109
14. Infantry Division Wire Diagram in the Offense	115
15. Radio Net, Infantry Division (Peace Time Strength).....	117

CHAPTER 1

INTRODUCTION: THE SIGNAL CORPS PRIOR TO WORLD WAR I

I am tempted indeed to declare dogmatically that whatever doctrine the Armed Forces are working on now, they have got it wrong. I am also tempted to declare that it does not matter that they have got it wrong. What does matter is their capacity to get it right quickly when the moment arrives.¹

Sir Michael Howard, "Military Science in the Age of Peace"

Introduction

The lethality of the World War I battlefield required all commanders to effectively communicate with their higher, lower, and adjacent units to maintain control and accomplish their mission. Communications support between posts of command (the World War I term for command post) was critical to the successful execution of command and control in battle during the First World War. General John J. Pershing, commander of the American Expeditionary Force (AEF) in World War I, showed his concern for this when he wrote in September 1918; "The three things, which give me most concern, are the roads and circulation, the building of light railways, and communication between corps and division headquarters."² For the Americans in World War I, communications was also a very large concern below the division level as well. This thesis clearly demonstrates the United States Army Signal Corps effectiveness in support of division and below maneuver units on the Western Front during World War I.

The uniqueness of America's effort in communications in this war is significant. Within 19 months, the U.S. Army grew from 107,641 Regular Army and 132,000 National Guard soldiers to nearly four million.³ The Signal Corps, like all branches of

the Army, rose to meet the challenge of training and equipping these soldiers to deploy to France in support of the AEF.

A good way to examine this issue is to look at six parts, each a chapter, taking the reader chronologically from pre-World War I through the immediate post war years. The first consists of exposing the reader to the thesis and providing the outline used to separate this paper into chapters. Chapter 1 also covers a literary review of major sources, which discuss the Signal Corps' role in World War I, as well as background information on the Signal Corps prior to the declaration of war in April 1917. This will cover the Signal Corps' organization, doctrine, training, and technology.

Chapter 2 describes the Signal Corps from the U.S. entry into the war, through the creation of the AEF in France in July 1917, up to the summer of 1918. This chapter describes changes made by the Signal Corps in organization, doctrine, training, and technology in support of division and below maneuver units while training in the United States and on the Western Front while in France. Specifically it documents changes that were implemented by divisional signal units in France due to lessons learned on the battlefield from Allies and U.S. units.

Chapter 3 covers the role of communications in Aisne-Marne campaign, specifically focusing on the battle of Soissons from 18 to 22 July 1918. This battle was selected due to the offensive actions of the AEF, and geographic size, composition (1st and 2d Infantry Divisions), and background material available. The chapter first describes the battlefield and division objectives. This sets the stage for an analysis of the communications support within the 1st and 2d Divisions, broken down by organization, doctrine, signal planning, and execution.

Chapter 4 describes the role that tactical communications played in the Meuse-Argonne offensive, again focusing on selected operations of the 1st and 2d Infantry Divisions. The chapter first describes the battlefield and its main objectives. It then describes the organization, doctrine, signal planning, and execution of the U.S. division's signal assets during the offensive. This campaign is important because it was the culminating offensive on the Western Front that sealed the fate of Germany and led to the 11 November Armistice and conclusion of combat operations in World War I.

Chapter 5 describes organizational, doctrinal, training, and technological changes made in the immediate postwar years as a direct result of lessons learned on the Western Front. A review of the published U.S. Army regulations and field manuals that pertain to communications support in the immediate years following the war is made.

Chapter 6 is the conclusion of the paper. Again, the chapter is organized into sections dealing with organization, doctrine, training, and technology. It presents conclusive evidence on the effectiveness of the Signal Corps in supporting division and below operations.

Review of Literature

There are a myriad of fine works on World War I and America's military involvement in the war. A large number of these mention the role of communications in shaping and dictating the outcome of battles. Additionally, there are a lesser number that specifically highlight the U.S. Army Signal Corps role as part of the AEF.

Edward Coffman's *The War to End All Wars* is a detailed account of American's overall effort in the Great War. This work takes the reader through both the political and

military aspects of the war. *The War to End All Wars* provides a detailed military account of our mobilization, buildup of the AEF, and its subsequent battles. It broadly describes the Signal Corps' massive expansion and major undertakings throughout the war. *The War to End All Wars* is very objective in its portrayal of the U.S. Army Signal Corps' roles and effort in supporting the AEF and concludes that communications support was not effective enough in supporting units at division and below.⁴

A Concise History of the U.S. Army Signal Corps by Kathy R. Coker and Carol E. Stokes dedicates a section on the Signal Corps during World War I. The authors briefly cover all the areas of Signal Corps' responsibility during the war, to include aviation, ground communications, photography, and meteorological services. The authors put the actions and leadership of the Signal Corps in a very positive light throughout the World War I chapter. This positive slant may be due to the fact that the authors were part of the Office of the Command Historian, U.S. Army Signal Center and Fort Gordon.⁵

Rebecca R. Raines' *Getting the Message Through, A Branch History of the U.S. Army Signal Corps* provides a very detailed and thorough account of the problems facing the Signal Corps at America's entry into World War I. The author was very honest about both the highlights and failings of the Signal Corps in its race to mobilize and train the forces in support of the AEF.⁶

The Story of the U.S. Army Signal Corps, edited by Max L. Marshall, has three chapters dedicated to the Signal Corps' activities in World War I. The author of the chapter on ground communications, David J. Marshall of the U.S. Army Signal Center, was very positive in describing the challenges, activities, and effectiveness of the Signal Corps from mobilization through the Armistice in November 1918.⁷

Douglas Johnson II and Rolfe Hillman Jr.'s work *Soissons 1918* provides a very honest and clear account of one of the first large battles involving U.S. units and the role communications played in affecting the command and control of this particular battle. The authors, retired Army officers, were honest in their depiction of the ineffectiveness of ground communications in support of division and below commanders throughout the battle.⁸

Major Ronald W. Vandiver's 1987 Master of Military Art and Science thesis "The Waving of Flags and Torches, the Study of Tactical Communications in the Signal Corps during World War I" is a detailed account of the Signal Corps and their role in the AEF. The author focuses attention on all areas of the Signal Corps and uses accounts of signal units in the Second Battle of the Marne and the Meuse-Argonne to portray their pivotal roles in the final outcome of the war. The author draws a positive conclusion on the effectiveness and improvements made by the Signal Corps throughout the war.⁹

Background

The Signal Corps in 1917 was an extremely small and diverse organization. Its responsibilities not only included all ground communications, but also photography (ground and air), meteorology, and America's fledgling air program. The Signal Corps was also responsible for cryptology, radio intercept, and geniometry (radio direction finding). This paper will not cover the Signal Corps' role in aviation, photography, and meteorology because they were insignificant to ground communications at the division level and below. The role of cryptology in protecting communications at division level

and below is discussed, while radio intercept and geniometry are not because they were not missions of division level signal soldiers.

Organization

Prior to America's entry into World War I, the Regular Army and its Signal Corps units were not organized to fight a modern war as exemplified by Germany or France in 1914. The Signal Corps in early 1917 had only 4 telegraph and 4 field signal battalions and 6 depot companies with a total strength of 55 officers and 1,570 enlisted men.¹⁰ The National Guard had 10 field signal battalions and 16 separate signal companies, which encompassed 163 officer and 3,510 enlisted men. By November 1918, the AEF alone had 50 field signal battalions, 28 field telegraph battalions, 11 depot battalions and 19 service companies totaling 1,462 officers and 33,038 enlisted men.¹¹

Prior to America's entry in the war, the standard infantry division was organized according to the 1914 *Table of Organization*. This document authorized a division headquarters and three infantry brigades, with a total of nine regiments and twenty-seven battalions. The division also had an artillery brigade with two regiments of two battalions of field artillery. The division was rounded out with a cavalry regiment, engineer battalion, and a field signal battalion. With associated ammunition, supply, sanitary, and engineer field trains, the U.S. infantry division had a wartime authorized end strength of over twenty-two thousand soldiers.¹² This organization would change multiple times before the war ended in November 1918.

The infantry division received its communications support from a field signal battalion. The field signal battalion was an integral part of the division and was

organized according to the *Table of Organization* of 1914. The battalion had a wartime authorized strength of 171 personnel and consisted of a headquarters and supply detachment, wire company (Co A), and radio company (Co B).

The headquarters consisted of two officers and eight enlisted men while the supply detachment had five enlisted men. Together they provided the command, control, administrative, and logistical support for the two tactical signal companies.¹³

The wire company consisted of three officers and seventy-five enlisted men organized into a headquarters and company staff and two platoons of two wire sections each. It supported the division by maintaining the tactical wire communications from division headquarters to major subordinate units, such as its infantry brigades, artillery brigade, and the divisional trains.¹⁴ The main equipment of this company was a two-horse reel cart carrying five miles of field wire, field service buzzers, and some additional equipment. The primary means of communications with the infantry was wire.¹⁵

The radio company consisted of three officers and seventy-five enlisted men organized into a headquarters and company staff and two platoons of two radio sections each. The platoons moved the radios either by mule (pack radios) or by truck (wagon radios). It supported the division by maintaining communications with units when the use of wire lines was impractical. It usually connected the division headquarters with its field trains, divisional cavalry, and with higher headquarters, prior to establishment of wire line communications. The radio company also had the mission to intercept enemy messages and interfere or jam with their radio nets.¹⁶ Its main equipment was the pack radio set and wagon radio set.

During peacetime, the field signal battalion was only authorized to exist as a field company. The field company served as a cadre for the battalion and consisted of four wire sections and two radio sections for a total of ninety-six men.¹⁷ The sections would serve as the cadre for the companies when the battalion was manned at wartime authorizations.

The infantry brigades also had signal soldiers assigned in small numbers, organic to the organization, to support internal and external communications. These signalmen primarily used flags, signal pistols, and rockets to communicate with lower and higher headquarters.¹⁸

Doctrine

In 1917, the Signal Corps was organized and equipped to support U.S. Army doctrine that focused on the offense and open warfare. Although the U.S. had not had any practical experiences with this type of warfare on a large scale since the Civil War, the Army's doctrine remained focused on open warfare. *The U.S. Army Field Service Regulations*, dated May 1914, stated that information should be transmitted with four means to include wire (telegraph, buzzer, and telephone); visual signaling (flag, heliograph, and night lamp); radiotelegraph; and messenger (foot, mounted, cycle, motor car, and flying machine). It is interesting to note that the regulation mentioned that in cases where speed was essential in transmitting a message up to one-half mile, a mounted messenger (on horse) could deliver a message of ten words quicker than the same message sent over wire.¹⁹ The doctrine and equipment that supported it was about to face a challenge of unprecedented magnitude in France.

Training

The prewar Signal Corps had only one signal specific training school, located at Fort Leavenworth, Kansas. Here, soldiers learned their basic skills to become telephone and telegraph engineers, linemen, and radio engineers.²⁰ In March of that year, President Wilson mobilized over one hundred thousand National Guardsmen to train along the Mexican border. The mobilization was part of a systematic effort by the War Department to train and exercise the National Guard. This mobilization turned out to be a large training event for the Signal Corps. During a period of six months, over two thousand National Guard Signal Corps soldiers received training on flags, semaphores, heliographs, buzzer phones, and the radios. Signal Corps troops deployed to Mexico with General Pershing relied heavily on the field service buzzer, heliograph, and flags.²¹

The Signal Corps and War Department took an additional step in 1916 and offered commissions in the Signal Corps Officers' Reserve Corps to executives in commercial telephone and telegraph companies. This pool of technical experts and leaders from such companies as Bell Telephone, American Telephone and Telegraph (AT&T), and Western Electric provided the Signal Corps with future officers in the event of an emergency.²²

Technology

The U.S. Army deployed to France with the same communications equipment it deployed, tested, and used during the Punitive Expedition in Mexico in 1916. The Army primarily used wire to communicate with telephone, buzzers, and telegraph between

headquarters in the field. Other Signal Corps' methods of communications consisted of visual signals, carrier pigeons, and the new technology of wireless or radio.

The Signal Corps' standard field telephone was the type EE-5.²³ It was based on the same design as the U.S. Forest Service model made by Western Electric. It was a simple, rugged design that allowed operation with one hand. The field service buzzer, EE-3 was a dual-purpose phone that could be used as a telephone, and it could transmit Morse Code as a telegraph. It was a rugged system used heavily by the Signal Corps in the Punitive Expedition to Mexico. If the wire connecting the two stations was cut, the message could still be transmitted due to the strong current of the buzzer passing through the soil and being picked up by the grounded ends of the cut wire. Both systems required dry cell batteries to provide current to operate the equipment.²⁴

Both systems transmitted over a field wire known as twisted pair, or outpost wire. This wire, first tested in Mexico during the Punitive Expedition, consisted of two wires twisted around one another and covered with insulation. Each wire was actually made of four bronze and three steel wires. The wire was also color coded to identify its users. Red was for artillery, and yellow for regimental headquarters. The wire's insulation was relatively thin and tended to increase resistance or signal loss when wet or damp. The telephone connected via wire to a forty-line camp switchboard (completing a circuit) and allowed callers to be patched through to other circuits in the telephone network.²⁵

Visual signals consisted of flags (semaphores), night lamps, signal rockets, signal pistols, and the heliograph. These systems were used at the lower echelon of tactical units to transmit messages over short distances. Flag technology was relatively unchanged since the Civil War. Soldiers manipulated the flags back and forth,

transmitting a visual code. Night lamps were acetylene lanterns in which colored lights were turned on and off while focused through a small aperture in order to transmit (via Morse Code) messages. Signal rockets and the Very signal pistols fired colored starbursts and colored smoke shells to mark boundaries and signal precoordinated instructions. The heliograph was a line of sight system, which used the rays of sunlight to reflect off of mirrors and signal another station over long distances.²⁶

The Signal Corps had tested the use of pigeons to carry messages during the Punitive Expedition to Mexico in 1916 and found it unsatisfactory. This was primarily due to untrained Signal Corps personnel. Subsequently, upon America's entry into World War I, the Army was not organized, equipped, nor trained in the use of pigeons as a means of communication.²⁷

Messengers or runners were a common means of transporting messages on the battlefield. The U.S. Army used runners from the company through division level. Runners were either on foot, horse (mounted), bicycle, or motorcycle. Additionally, staff cars would be used in the event of an emergency.

The radio was a significantly new piece of technology in modern armies of the twentieth century. The Signal Corps had two radio systems on hand, the pack radio set, SCR-49 and the wagon radio set, SCR-50. Both radios were large, cumbersome, high-power quenched-spark transmitters with crystal receivers.²⁸ Due to the early technology of these radios, they were used as radiotelegraphs, transmitting Morse Code rather than voice.²⁹ A tactical radio capable of transmitting voice was only fielded after the war had ended in November 1918.

The pack radio consisted of the radio, cables, antenna, mast, and hand generator. It was broken down and transported using two or three mules (or horses) and unpacked and operated within two and one-half minutes. It had a range of twenty to thirty miles depending on the terrain and atmospheric conditions.³⁰ The wagon radio set consisted of the radio, cables, engine, dynamo, antenna, mast, guy ropes, and counterpoise. Due to its weight and bulky size, the wagon radio set required a truck or tractor for transportation. It had a range of 150 to 250 miles and could be unpacked and begin operation within ten minutes.³¹

Thus prior to the U.S. entry into the First World War, Signal Corps units within the infantry division were not prepared for the trenches of the Western Front. Warfare had greatly changed since August 1914, but the Signal Corps' organization, doctrine, training, and technology had not yet adapted to meet it.

32

¹Sir Michael Howard, "Military Science in the Age of Peace," *RUSI, Journal of the Royal United Services Institute for Defence Studies* 119 (March 1974): 5.

²Edward M. Coffman, *The War to End All Wars, The American Military Experience in World War I* (Madison, WI: The University of Wisconsin Press, 1968), 313.

³*Ibid.*, 372.

⁴*Ibid.*, 31-313.

⁵Kathy R. Coker and Carol E. Stokes, *A Concise History of the U.S. Army Signal Corps* (Fort Gordon, GA: U.S. Army Signal Center, 1991), 16-19.

⁶Rebecca R. Raines, *Getting the Message Through, A Branch History of the U.S. Army Signal Corps* (Washington, DC: Center of Military History, 1996), 168-188.

⁷Max L. Marshall, *The Story of the U.S. Army Signal Corps* (New York, NY: Franklin Watts, Inc., 1965), 142-166.

⁸Douglas V. Johnson II and Rolfe L. Hillman Jr., *Soissons 1918* (College Station, TX: Texas A&M University Press, 1999), 32-152.

⁹Ronald W. Vandiver, "The Waving of Flags and Torches: A Study of Tactical Communications in the Signal Corps during World War I" (Thesis, Fort Leavenworth, KS: The Command and General Staff College, 1987), 8-107.

¹⁰Raines, *Getting the Message Through*, 168.

¹¹United States Army Signal School, *Historical Sketch of the Signal Corps (1860-1928)*, Signal School Pamphlet No. 32 (Fort Monmouth, NJ: United States Army Signal School, 1929), 71.

¹²War Department, *Tables of Organization (Based on Field Service Regulations, 1914)*, *United States Army, 1914* (Washington, DC: U.S. Government Printing Office, 1914), 19.

¹³War Department, *Drill Regulations for Signal Troops, 1917* (Washington, DC: U.S. Government Printing Office, 1917), 244.

¹⁴*Ibid.*, 170.

¹⁵*Ibid.*, 190.

¹⁶*Ibid.*, 200.

¹⁷War Department, *Tables of Organization (Based on Field Service Regulations, 1914)*, *United States Army, 1914*, 62.

¹⁸Dulany Terrett, *United States Army in World War II, The Technical Services, The Signal Corps: The Emergency* (Washington, DC: Office of the Chief of Military History, Department of the Army, 1956), 16.

¹⁹War Department, *Field Service Regulations, United States Army 1914*, 22.

²⁰Office of the Chief of Signal, *Report of the Chief Signal Officer to the Secretary of War, 1919* (Washington, DC: U.S. Government Printing Office, 1919), 22.

²¹Marshall, *The Story of the U.S. Army Signal Corps*, 142.

²²Raines, *Getting the Message Through*, 170.

²³United States Army Signal School, *Historical Sketch of the Signal Corps (1860-1928)*, Signal School Pamphlet No. 32, 78.

²⁴War Department, *Drill Regulations for Signal Troops*, 1917, 329.

²⁵Raines, *Getting the Message Through*, 173.

²⁶Army War College, *Notes on Signal and Illuminating Devices and the Apparatus for Projecting Them* (Washington, DC: U.S. Government Printing Office, 1917), 4.

²⁷Marshall, *The Story of the U.S. Army Signal Corps*, 148.

²⁸Harry Newton, *Newton's Telecom Dictionary, The Official Dictionary of Telecommunications* (New York, NY: Flatiron Publishing, 1998), 584, 667. Spark-gap radios had two electrodes designed to permit spark discharges to take place across a gap. Quench-gap meant the spark was quenched quickly by a cooling effect, which allowed the spark to rapidly pass from electrode to electrode. Quench-gap radios were also quieter than spark-gap. The spark-gap radios were also known as Damped Wave due to their wave consisting of a series of oscillations or cycles of current gradually decreasing in amplitude.

²⁹Marshall, *The Story of the U.S. Army Signal Corps*, 157.

³⁰War Department, *Drill Regulations for Signal Troops*, 1917, 212.

³¹*Ibid.*

32

CHAPTER 2

FROM THE DECLARATION OF WAR TO SOISSONS (JULY 1918)

The failure of mechanical means of transmission will not excuse a commanding officer's remaining in ignorance of an important change which has occurred either in the situation of his own unit, or in that neighboring ones; neither will it be an excuse for his failure to exercise the necessary personal supervision.¹

AEF, Liaison for All Arms

Introduction

In order to support the needs of a mobilizing Army, the Signal Corps rapidly expanded its peacetime organization, doctrine, training, and technology to meet the demands of the AEF for combat divisions. This massive expansion put a strain on the Signal Corps to organize and train these soldiers and incorporate the communications doctrine and technological advances made by the Allies over three years of war. The Western Front would pose a challenging environment for which the Signal Corps was not prepared.

Organization

The declaration of war in April 1917 brought about rapid organizational changes within the U.S. Army and Signal Corps. On 3 May 1917, the Army adapted *Table of Organization, Series A* for its standard infantry division. This new structure was similar to the prior table of organization of three infantry brigades, with three regiments per brigade and a cavalry regiment. The artillery brigade added an additional regiment (for a total of three) and the division engineers grew into a regiment. The division was also

authorized a newly formed aero squadron. The division also made changes to the field signal battalion, which will be covered later in the chapter. With associated field trains, the infantry division had an end strength of over twenty-five thousand soldiers.² In addition to the field signal battalion, the division had a staff section dedicated to providing communications support to the division commander.

One change in the 3 May 1917 *Table of Organization* authorized a Division Signal Officer who served on the division staff. He was responsible for all “lines of information,” or methods of communications, within the division sector. He prepared the communications support for operations, provided information for the field orders, and supervised execution of the support. The Division Signal Officer was also responsible to ensure that signal supplies were on hand for current and future operations. He was the divisional instructor and inspector of all signal units within the division.³ This organization is different from the modern structure in which the Division Signal Officer commands the signal battalion and a separate field grade officer is permanently assigned to support the division staff.

The field signal battalion was authorized 252 personnel and consisted of a headquarters and supply detachment, wire company (Co A), radio company (Co B) and a newly formed outpost company (Co C). The headquarters and supply detachment, wire, and radio companies were organized as the previous *Table of Organization* dated 1914.⁴

The new outpost company consisted of five officers and seventy-five men, organized into a company headquarters and three platoons. Each platoon had five sections, consisting of a headquarters section, one switchboard section, and three telephone sections. Their mission was to extend the lines of information between the

brigade and regimental headquarters during trench warfare. This company also served as a reserve pool of personnel for the field signal battalion during open warfare.⁵ The platoon equipment consisted of telephones, wire, and switchboards. Each platoon had three pack mules in support of three telephone sections. The headquarters section and switchboard section normally collocated at the brigade headquarters. Each telephone section supported a unit headquarters and operated one telephone station.⁶ In May 1917 the Army ordered the activation of the outpost companies of the standing field signal battalions according to the 3 May 1917 *Table of Organization*.⁷ The addition of the outpost company was a new concept for the Signal Corps and provided the infantry regiments a robust support team to aid in the command and control of maneuver units. This support, from higher to lower, was a signal principle which is still followed in the modern infantry division.

This organization changed again in the summer of 1917 once the AEF formed in France. General Pershing decided that the American infantry company was too small for the amount of casualties taken in combat on the Western Front. His new organization for the infantry division, known as the “square division,” authorized only two infantry brigades with two regiments each.⁸ The infantry regiment had three battalions with three rifle companies each. Each rifle company now had 250 men as opposed to 150. Additionally, the division was authorized a machine-gun battalion. This table of organization was authorized by the War Department and published by the AEF on 15 July 1917. It became official as *Table of Organization, Series A*, on 8 August 1917.⁹

This new divisional organization also caused changes within the outpost company of the field signal battalion. The events behind the changes require some explanation.

On 12 August 1917, the AEF sent a cablegram to the War Department requesting the strength of the outpost company of the field signal battalion be authorized for 5 officers and 280 enlisted men, an increase of 205 men. This was required to support communications from the infantry regiment to brigade and down to the three maneuver battalions. The use of the telephone as primary means of communications below the infantry brigade was the reason for the increase in manning. Because of the nature of trench warfare, large numbers of signal soldiers were required to keep communication lines operational. This was due primarily to the nature of the artillery, which was in very high concentration on the Western Front and destroyed extensive amounts of wire lines. Also, artillery caused high-casualty rates among signalmen assigned below the infantry brigade level.¹⁰

The outpost company was now divided into a headquarters section and four regimental sections. The captain in command had an additional duty of assistant to the Division Signal Officer.¹¹ Each regimental section had a second lieutenant and sixty-five men, who were attached to the infantry signal platoon within the headquarters of the infantry regiment. Each section was organized into four, thirteen man, telephone details. This broke down to one regimental detail and three battalion details. The telephone detail consisted of a detail chief (sergeant first class), an assistant (sergeant), one switchboard operator (corporal), five linemen (one corporal and four privates), and five operators (one corporal and four privates). There was also an eleven-man cable-laying detail consisting of one corporal, seven privates first class, and three privates.¹² Additionally, the lieutenant in command of the regimental section served as the liaison officer for communications and technical inspector within the infantry regimental staff.¹³ These

changes became official when the War Department published *Table of Organization, Series A*, dated 14 January 1918. These changes were necessitated by the increased manpower needed to operate the field telephone network at the regiment and below (see figure 1).

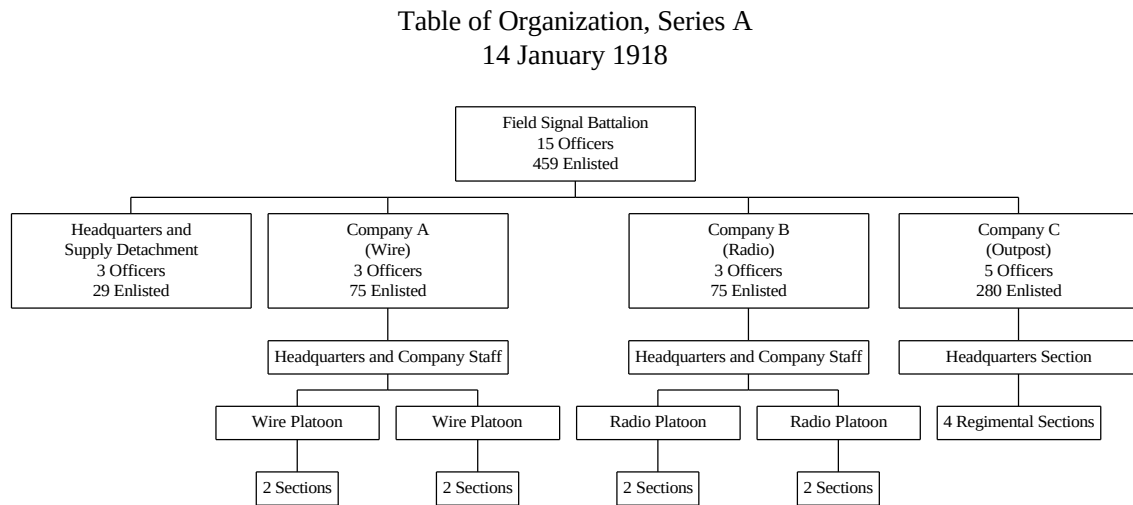


Figure 1. Based on the *Table of Organization, Series A*, dated 14 January 1918, Table 23.

This new table of organization also authorized additional Signal Corps soldiers at the infantry brigade level. The brigade was now authorized one corporal and three privates as motorcyclists. Four privates served as telephone men and five privates as mounted orderlies.¹⁴ The motorcyclists and horse-mounted orderlies served a crucial role of passing information from one headquarters to the next when wire communications were interrupted. The role of the motorcycle and automobile were slowly creeping into the territory once held solidly by the horse.

A signal section and a regimental signal platoon supported the infantry regiment. The signal section was organized within the headquarters platoon of the regimental

headquarters. This second section consisted of five mounted (horse) orderlies and three bicycle orderlies. The infantry regiment's regimental signal platoon consisted of one officer and seventy-six enlisted men. It was organized into three sections. First section (telephone) consisted of fifty-one enlisted men. The second section had ten enlisted men and served within the regimental headquarters. The third section contained fifteen enlisted men and supported the three infantry battalions.¹⁵ The regimental signal platoon's primary mission was to operate the regimental telephone system. Alternate means were used if the telephone system was not operational. The regimental signal platoon had to be prepared to run the telephone system by itself because the regimental detail section (from the outpost company) was likely to be used in divisional support during open warfare.¹⁶

The infantry battalion headquarters signal support came from the above-mentioned infantry regiment. The infantry regimental signal platoon's third section provided a corporal and four privates as signalmen while the headquarters platoon, second section provided a corporal and a private as mounted orderlies and three privates as bicycle orderlies.¹⁷ The infantry rifle companies had four privates as signalmen within the company headquarters and four runners within each platoon headquarters (four platoons per company). Runners were the primary means of communications at the company level. Once the company went over the top, it was these men who would be the primary means to relay messages between platoons, companies, and up to the battalion.

Doctrine

Upon America's entry into the war in April 1917, the Signal Corps realized its current doctrine was wholly inadequate for the static, trench warfare of the Western Front. In 1917, the War Department began adopting both the British and French field manuals on battlefield communications. The first in a long series of manuals adopted from the Allies was the British *Forward Intercommunication in Battle*, dated March 1917. The U.S. Army's manual *Forward Intercommunication in Battle*, dated May 1917, was virtually identical to the British version. This manual provided doctrinal signal support guidance for brigades and battalions in the attack (in both entrenched and open warfare types of combat), as well as means of communications with aircraft, tanks, observation posts, and patrols. The manual also covered all means of communications, from visual signals, telephones, and telegraphs to runners and carrier pigeons.¹⁸ In one swift move, the Army attempted to adopt the lessons learned in France by the British in the bloody years since August 1914. The AEF deployed to France in 1917 and began training its divisions with *Intercommunication in Battle* as the doctrinal source for communications support.

In the attack, *Forward Intercommunication in Battle* directed the establishment of a "forward station" to the front of each infantry brigade. The forward station was not a post of command (P.C.); rather it was a forward communications hub, pushed toward the direction of attack to aid in command and control once soldiers moved out of the trenches. Its purpose was to, "concentrate the communications in the area attacked by each Infantry brigade in one main artery, consisting of various alternative means of transmission, and thus join the original advanced brigade headquarters with the brigade

forward station.”¹⁹ The brigade forward party, made up of the brigade signal section, runners from the battalions, and artillery personnel manned the forward station.

Communication support at the forward station was organized into the following teams: telephone (telephones, buzzers, and earth telegraphy set); aeroplane signal; visual; runner; and pigeon.²⁰

The key point of this concept was to establish and maintain one primary telephone route from the advanced brigade headquarters to the forward station, where the telephone exchange would be located. Both the infantry and artillery would have a dedicated metallic or wire circuit. The brigade signal section laid and maintained this route, with assistance from the division artillery signal personnel. They also laid a metallic circuit to the forward P.C.s of the attacking battalions and to artillery forward observers (FO). The brigade signal officer would also supervise the establishment of communications between the brigade forward station and battalion forward P.C.s. The brigade signal section was responsible for maintaining telephone and buzzer circuits between the advanced infantry brigade headquarters and the battalion P.C.s. The manual also directed that battalions would first consult the brigade signal officer prior to the establishment of communication circuits (see figure 2 for a schematic layout).²¹

According to *Forward Intercommunication in Battle*, as the attack continued, the advanced brigade headquarters was to move forward and locate at the former brigade forward station. The brigade forward station was then to move forward and again position itself near the battalion forward P.C.s. The battalion headquarters would also move forward and take over the battalion forward P.C.s in the same manner.

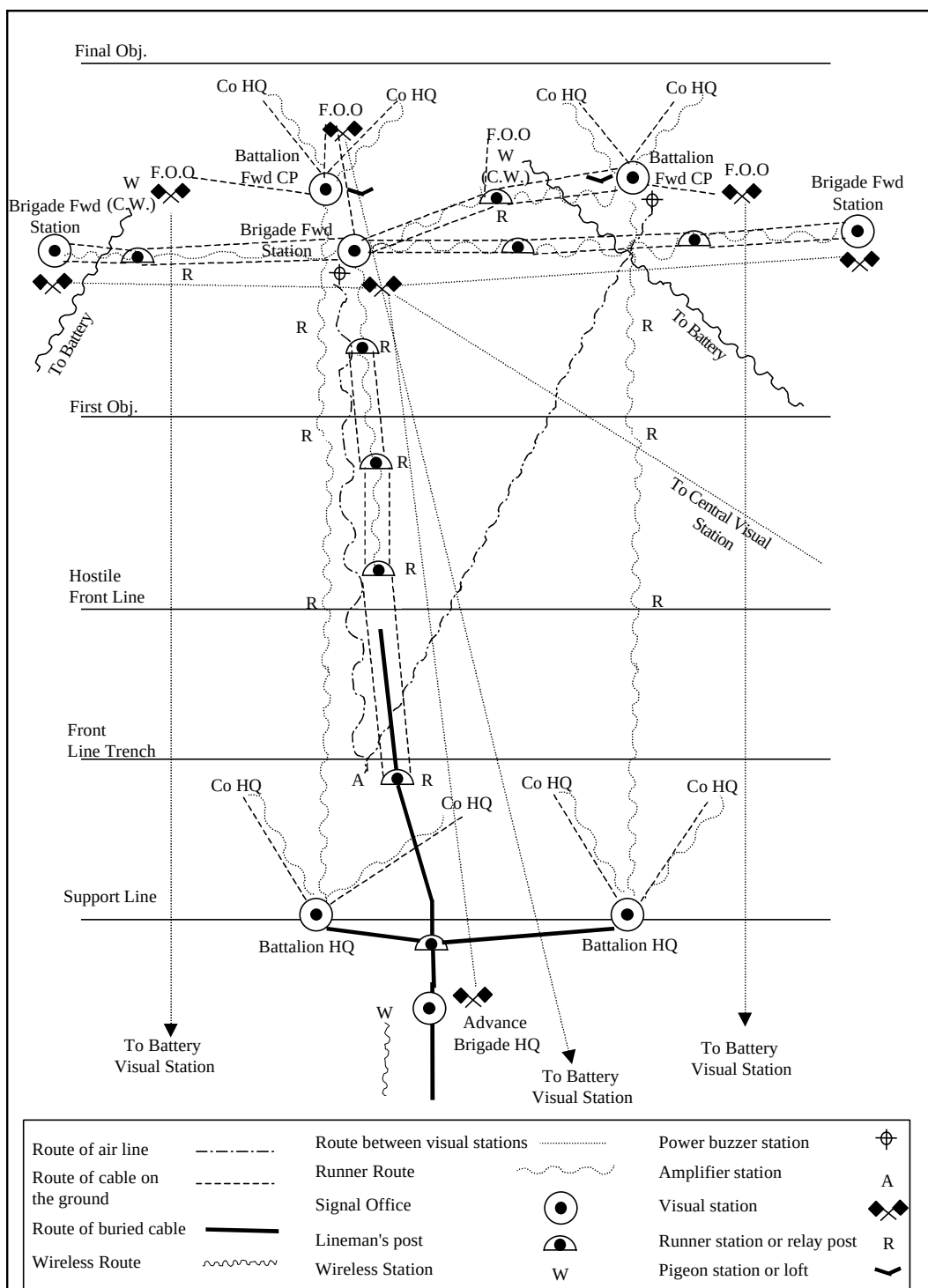


Figure 2. Brigade Communications diagram. Source: *Forward Intercommunication in Battle*, May 1917, Plate 2.

Forward Intercommunication in Battle specified that all messages sent forward of the advanced brigade headquarters were to be encoded or enciphered. Additionally, a buried phone line must be extended from the advanced brigade headquarters to the battalions. If this could not be accomplished, then signalmen were to be posted along the route of the exposed phone line to make repairs as necessary. This reason is why the outpost company of the field signal battalion needed so many men to augment the regimental signal platoons to maintain telephone communications.

Signal support at the infantry battalion was similar to that of the brigade. The battalion in the attack was to keep in communication with its forward companies, adjacent units, artillery FOs, and its brigade P.C. through the establishment of a battalion forward P.C. The battalion signal sections were responsible to run communications from their own forward P.C. to the brigade forward station.

The makeup of the signal support at the battalion forward P.C. was similar to the brigades. Once the P.C. was established, runners were dispatched to lower, higher, and adjacent units. The battalion kept 33 percent of their signalers and runners in reserve once the attack began. Communications between the battalion forward P.C. and brigade were either by a chain of runner relay posts to the original battalion P.C. and on to the advanced infantry brigade headquarters by telephone or runner. The other method was by runner or telephone from the battalion forward P.C. to the brigade forward station and then by runner, telephone, or other means available to the forward brigade headquarters. Additionally, visuals and pigeons were used to connect the battalion and the forward brigade headquarters. Connectivity between the company and the battalion was by runner, visual, and pigeon while runners were used between platoon and company.²²

The manual directed that orders would always detail the location of the brigade forward station, the number and type of infantry and artillery circuits at the forward station, and reinforcements required by the brigade signal section to maintain communications. Additionally, the order gave the visual signal scheme, runner, mounted orderly, and dispatch rider routes, as well as the location of future command posts, methods for transmitting information, special signals, and the steps to be taken to improve communications once the objectives were captured.²³

It is interesting to note that *Forward Intercommunication in Battle* was a literal copy of the British manual of the same name, never modified or changed to reflect U.S. terminology or organization. The manual did not take into account that the current table of organization divisional signal units and sections did not have pigeons, earth induction, or trench wireless sets in their inventory. Earth induction sets were used by the European Allies and passed telegraph signals through the ground from one point to the next. It was very useful at the front, where artillery caused havoc on wire communication lines. Trench wireless sets were lighter radio sets that were portable enough to be moved by a few men and taken on the attack. The lack of this equipment is also important because it reinforces the point that the divisional signal units could not train to their doctrine until they arrived in France and received and trained on Allied signal equipment.

In July 1917, the Army War College translated and adopted the French manual *Liaison Instructions for All Arms*.²⁴ This manual was similar to the British manuals on battlefield communications. The French used similar equipment and systems as the British, although terminology was different. As it turned out, many AEF signal units relied more heavily on the French than British manuals.

In May 1918, the Army adopted the British manual *Inter-Communication in the Field* as a doctrinal source of communications support at division and below. This manual replaced the previous *Forward Intercommunication in Battle*. Covering much of the same information as its predecessor, *Inter-Communication in the Field* went into greater depth in communications support of combined arms operations from the division down to platoon. It divided communications support into three categories: Attack from our own Trench System, Attack from Captured Trenches, and Open Warfare. Once again, this copy of a British manual was not updated nor changed in any manner by the War Department. It reflected organizations that were not organic to the AEF, such as the Royal Artillery and Royal Flying Corps. A few hours of editing would have made this manual much more applicable to the U.S. soldiers who were to read it.

Inter-Communication in the Field described one of the objects to be obtained in organizing a system of forward communications was, “to ensure the co-operation of all arms and units, especially between the Artillery and the Infantry.”²⁵ It directed that the means to transmit information were telegraph, telephone, wireless, power buzzer, visual signaling, and message-carrying agencies (runners, mounted orderlies, dispatch riders, pigeons, message carrying rockets, projectiles, or dogs).²⁶

The manual directed that the primary means of communication within the division in battle was the telephone. The division main communications centers were a Forward Center, an Artillery Observation Center, an Artillery Brigade and Group Center, and a Division Center (see figure 3). These points were as far forward as reliable telephone

communications could be ensured within the division. Up to these points, which were normally twelve hundred yards from the enemy front line, telephone or signal wire was buried to a depth of six feet. At this point, heavy trench mortars would cut wire regardless of its depth. Wire lines were normally run forward from this point in a *carniveaux*, the French term for a shallow communications trench.²⁷

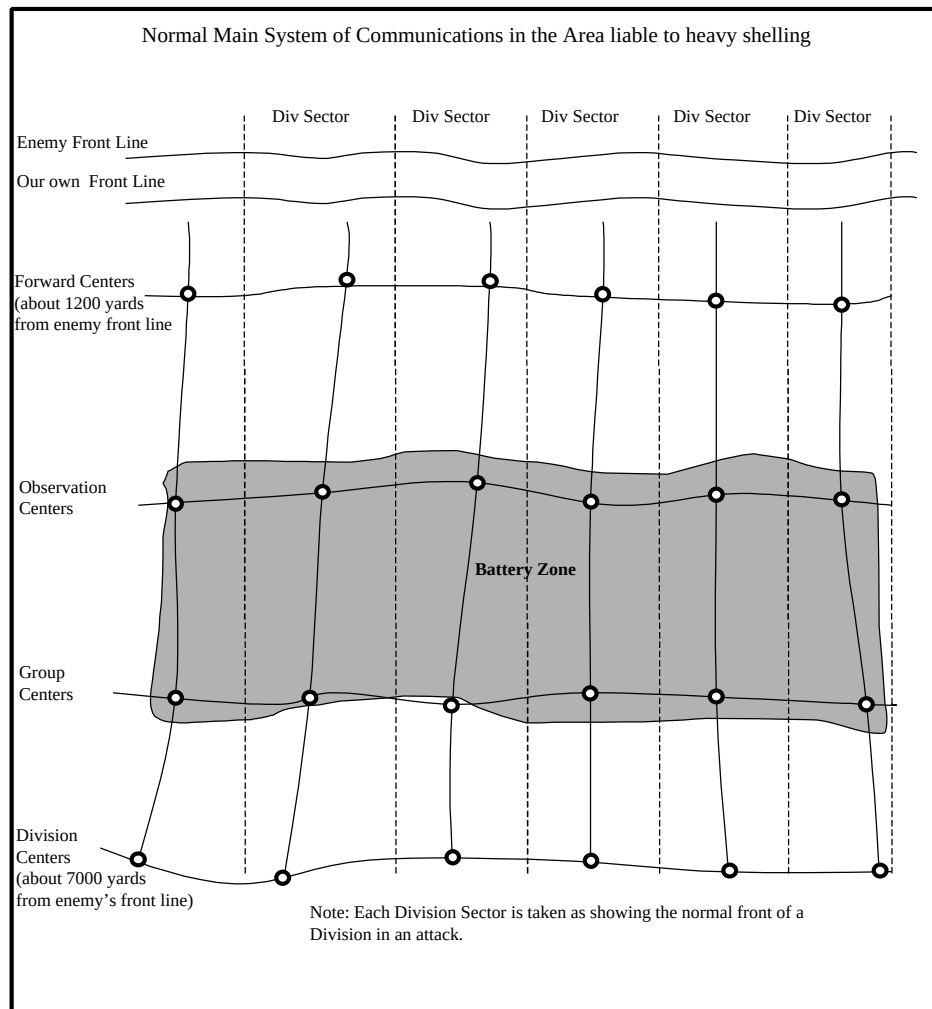


Figure 3. Source: *Inter-Communication in the Field*, May 1918, Plate I.

Inter-Communication in the Field dictated similar communications support during an attack from a friendly or captured trench as the previous manual. It directed each infantry brigade establish a forward communications center called a Forward Station with connectivity to the battalion forward command posts, artillery liaison officers, and machine-gun units.²⁸

Inter-Communication in the Field did not go into as much depth when discussing open warfare. The manual described open warfare as a situation where, “The enemy is gradually pushed back, objectives will become more distant and less definite by degrees, until finally a stage may be reached when the Division is marching in pursuit of the retreating enemy covered by an Advanced Guard.”²⁹ Communications support in open warfare was primarily through visual signaling, runners, and mounted orderlies at brigade and below. Wireless and message carrying rockets were also available for use.

Each brigade headquarters was to establish a Communications Center as it moved forward. At each location, a Reports Center was established within the Communications Center. The Communications Centers were normally three miles apart, with each succeeding brigade falling in and occupying the Communications Center to their front in the line of march. The division would also establish a Division Report Center. Wireless was used to connect the division to its brigades, higher headquarters, and adjacent divisions.³⁰

Telephone communications played an important, but ultimately limited role in supporting open warfare. Due to the logistical support needed to move large amounts of wire, each division was only expected to lay one main telephone route along its axis of advance, which was extended forward to the Advance Reports Centers of the infantry

brigades.³¹ It is important to remember that the U.S. had not practiced in open warfare on a large scale, and its only recent experience was the limited excursion into Mexico in 1916.

In June 1918, the General Headquarters, AEF, published *Liaison for All Arms*, a translated version of a French manual dated 28 December 1917.³² This manual was very similar to *Inter-Communication in the Field*. Both *Inter-Communication in the Field* and *Liaison for All Arms* were used simultaneously by the AEF due to a lack of U.S. Army signal doctrine. Two points from *Liaison for All Arms* need explanation to fully understand the doctrinal changes, which were facing the ever-expanding U.S. Army Signal Corps. The first point is that although both the French and British manuals were similar, the terminology was different. While the British called the main communication line an “artery,” the French called it an “axis of liaison.” The British “forward station” was known as the “advanced center of information.” The British switchboard location was called a “signal office”; the French term was “centrals.” Again, they were similar in function, just the terminology was different. The second point was that *Liaison for All Arms* directed units to have a plan of liaison, which was what is now called the signal annex, to accompany a field order. The plan of liaison explained all methods of communications used for the upcoming operation, such as telephone, radio, semaphores, codes, ciphers, and projectors.³³ Both the terminology and the plan of liaison were to play a vital role in the expansion and growth of signal doctrine when American divisions entered combat on the Western Front.

Training

The massive expansion of the peacetime Army via volunteers and the draft caused the Signal Corps to expand its training camps to meet the demand. The Fort Leavenworth Signal School was incapable of handling the number of incoming soldiers, and thus in May 1917, the War Department created three new signal training centers at Camp Samuel F. B. Morse, Leon Springs, Texas; the Presidio, Monterey, California; and Camp Alfred Vail in Little Silver, New Jersey. The latter camp would later become the permanent home of the Signal Corps as Fort Monmouth. In December 1917, the Signal Corps also opened a radio school at Franklin Cantonment, Camp Meade, Maryland.³⁴

One of the major challenges facing the Signal Corps was the technical training needed for the newly inducted officers and enlisted in the areas of telephony, telegraphy, and radio. The War Department activated those officers in the Signal Corps Officers' Reserve Corps. These men were crucial in providing a core body of business leaders and managers who were experts in the fields of radio, telephony, and telegraphy and who could actively recruit similar personnel from the communications industry.³⁵

This active recruitment from the private sector to fill vacancies in the new signal units being formed was very beneficial. Bell Telephone and American Telephone and Telegraph provided specialists, such as telephone and telegraph operators, linemen, and radio operators. These companies provided enough personnel to field over twelve telegraph battalions and two radio companies (B Co) in field signal battalions.³⁶

In addition, the Signal Corps began coordination with America's institutions of higher learning to harness academia's knowledge of electronics and telephony. Some forty-five colleges and universities conducted special courses of instruction in telephone,

radio engineering, meteorology, and photography.³⁷ In July and August 1917, courses lasting thirteen weeks were offered at the University of Vermont, College of the City of New York, and the Agricultural and Mechanical College of Texas.³⁸

Upon arrival in France, the men of the AEF, from division commander down to signal wireman, were untrained and unprepared for the warfare they faced on the Western Front. General Pershing realized this and instituted mandatory training, to include battlefield communications, for all units in France prior to moving into the trenches of active sectors.³⁹ In 1917, the AEF organized and approved three levels of training schools in France for the specific purpose of teaching soldiers about doctrine, equipment, tactics, and techniques needed to succeed on the Western Front. The three levels of training schools were division, corps and army level.

The U.S. 1st Division was the first American unit to arrive in France in June and July 1917. The division was comprised of many recruits untrained for trench warfare currently being fought on the Western Front. With guidance from General Pershing, the AEF General Staff, G-5 Section (Training), devised a three-phased, three-month training plan for each division prior to moving to an active sector of the front. The G-5 Staff based their plan on observations of British and French training and schools. The Division Signal Officer was responsible for supervising signal training and ensuring the units met the standards in order to support the division.

The cadre of the French 47th Division Chasseurs Alpin, known as the “Blue Devils” trained the 1st Division at Gondrecourt, France. The 1st Division signal soldiers trained eight hours a day, five days a week, and had classes on Saturday mornings. They had a French officer and noncommissioned officers from the French 8th Engineers (a

regiment assigned to signal communications) instruct them on French signal methods, while a British officer taught them techniques used by the British.⁴⁰ The division learned primarily French signal techniques and procedures, to include doctrine and equipment.⁴¹ This will become evident with the prolific use of French signal terminology in the 2d Field Signal Battalion, 1st Division.

Throughout the war, American signal units had both French and British cadre assistance during the trainup period. These signal instructors were veterans of forward British and French signal units who taught their equipment and signaling methods to the green American soldiers. Later on, selected American signal officers, noncommissioned officers, and men were attached to British divisional and brigade signal units for experience at the front.⁴² Thus the Signal Corps was actively trying to gain combat signal experience from its Allies before going into action at the front.

A critical point in regards to the Allied instructors was their reluctance to accept the AEF concept of training on open warfare. From the perspective of the Allies, who were ingrained with over three years of trench warfare on the Western Front, the AEF's focus on open warfare was not realistic. General Pershing was aware of this resistance and fought to keep the Allies from diminishing the AEF reliance on open warfare.⁴³

The previously described three-phased, three-month training plan for each division did not last long. By early 1918, this period was reduced to one month for most units with a few actually having no training in France and going straight to the front due to enemy pressures during the German spring offensives of 1918. An example of this shortened training cycle is the 6th Field Signal Battalion, which supported the 6th Infantry Division. While in France, the Wire, Radio and Outpost Companies each had a

two-week period to train on specific signal equipment and tactics. The Wire Company trained on visual signals (lamps, panels, and fireworks), line construction and operation, telephones and switchboards, and the British Fullerphones. The Radio Company trained on earth telegraphy, radiotelegraphy, visual signals (same as Wire Company), buzzer practice, codes, and ciphers. The Outpost Company trained on visual signals (same as above), trench line construction, aerial and cable, telephones, switchboards, and Fullerphones.⁴⁴ Much of the training between the companies was similar, especially the Outpost Company. The latter two weeks consisted of battalion instruction on operating a division system of communications, handling messages, and locating and repairing faults. Additionally, the school conducted officers and noncommissioned officers training three hours a week, focusing on liaison for all arms, offense, and defensive operations as well as new equipment.⁴⁵

The first corps level signal school to open was for I Corps, on 15 October 1917. This school sprung from what had been the 1st Division School in Gondrecourt. Second Corps Signal School opened a school at Chatillon sur Seine (Cote d'Or), France, in January 1918. These corps schools were opened when the divisions arriving in France began to be organized into corps. Initially the corps ran the schools, but the AEF took over control of the schools, which were actually run by and directed by the AEF General Staff, G-5 (Training). This was done to ease the burden on the corps as they trained soldiers and actively took part in combat operations.

The I Corps' Signal School taught courses one month in duration with the mission of familiarizing officers and noncommissioned officers with all signal equipment found in the divisions, of which much of it was recently acquired from the French and British.

The schools were designed to “train the trainer” so that graduates, being subject matter experts on equipment and doctrine, would go back to their units and train their own soldiers.⁴⁶

The I Corps Signal School was designed to train Signal Corps officers and noncommissioned officers and was organized into three sections. Section A was for leaders in signal units. They were trained on telephone, radio, visual signaling, pigeons, fireworks, aeroplane liaison, and storage batteries (for radios). Section B was for leaders in infantry signal platoons. They were trained on all methods of communications within the infantry regiment and supporting units. They trained on the same type of equipment as the Section A, minus the use of storage batteries. Section C was for leaders in artillery signal units. They were trained on lines of information and fire control within the artillery brigade and other units. They trained on the same type of equipment as the Section A, without the use of storage batteries and pigeons.⁴⁷

The II Corps Signal School was run in a similar fashion as I Corps with courses on radio, wire, telephone, and pigeons. One unique point of II Corps’ School was that all training courses ended with a capstone exercise, which incorporated all the services within the corps school. The maneuvers were intended to have the branches (infantry, artillery, signal, chemical, etc.) understand each other’s mission and function on the battlefield. Signal soldiers conducted practical exercises with newly acquired French and British equipment, to include the fourteen and twenty-four centimeter projectors, the British Lucas lamp, and two types of German signal lamps. Additionally, the signal instructors taught the students send all messages using codes and encryption equipment.⁴⁸

The school also taught the critical skill of telegraph code. Although many soldiers who joined the Signal Corps had experience in this field, many assigned to infantry signal units did not. Soldiers were taught to send Morse Code via visual signaling, earth telegraphy, and trench radio telegraphy. The school also exposed officers in order to teach them how long it took an operator to send code and gain an appreciation for it during field exercises.⁴⁹

Fieldcraft, or the ability of the soldier to survive on the battlefield, was also taught to every signal soldier in II Corps' School. During the field exercise, signal soldiers were taught map reading and terrain association. Signal officers and noncommissioned officers needed to understand the use of terrain to protect communications wire, site visual and radio stations, and to recommend P.C. locations.

A unique aspect of II Corps' Signal School was its course for field grade officers. This course focused on the scope and limitations of tactical signal equipment. When possible, each officer was required to install and operate this equipment. They were also taught, "The use of liaison agents during warfare of position and warfare of movement [open warfare]; liaison plans; liaison annexes; range and limitations of apparatus; codes and ciphers; the duties and responsibilities of the Signal officer; the relation of the Signal officer to the tactical commander; the use of signal troops in the field."⁵⁰

Lessons learned through American experiences did make their way back to the corps schools. The II Corps Signal School's Wire Department made changes to their course of instruction on wire communication lines when events on the Western Front dictated the need for change. The first course taught wire line construction through aerial, trench, or buried lines. Later courses taught the importance of field lines (run

along the ground) by hand and by use of the wire cart when conditions on the Western Front changed from trench warfare to open warfare.⁵¹

In order to improve signal skills, the AEF organized the Army School Center at Langres, Haute Marne, France, in December 1917. Their signal school taught five different courses, lasting one month in duration. The purpose of the school was similar to the corps level schools. Courses included the School for Personnel of Mobile Units, primarily focused toward signal soldiers in field signal battalions, telegraph battalions, and infantry and artillery regiments. The Radio Section Operators' School taught radio intercept and direction finding.⁵² The Candidates School trained selected enlisted signalmen to receive commissions as signal second lieutenants. This course taught signal theory, instruction on all signal equipment, and field skillcraft. This course also provided "practical knowledge of the use of Infantry, for whom, as Signal officers, they would be required to furnish means of communications."⁵³ Additionally, there was a special course for engineer radio specialists and squadron radio officers.⁵⁴

Technology

When the U.S. Army began expanding and training the Army in 1917, they came to the realization that they were not equipped for the challenges of the Western Front. The Signal Corps took measures to procure equipment from the Allies and to begin the process of research, development, and procurement of signal equipment. The Signal Corps relied upon French and British equipment which had been battle tested in the trenches of the Western Front.

Visual equipment procured from the French included the battery powered fourteen, twenty-four, and thirty-five centimeter projector lamps used in infantry, artillery, and signal units. The fourteen-centimeter projector had a short range and was used at the infantry company level. The thirty-five centimeter projector had a ten-mile range under optimal conditions and was used at battalion through brigade level.⁵⁵ The field signal battalions were also equipped with the British Lucas lamps, another form of battery powered projector.⁵⁶ The Signal Corps also realized early on that the use of visual signals was very limited due to proximity of the enemy and friendly lines. On the Western front, the Germans possessed the high ground, allowing observation of Allied visual signals.

The Signal Corps procured French earth telegraphy equipment known as T.P.S., from the French word *telegraphie par sol* (the British used the term earth induction). This system worked by each station laying insulated wire (up to seventy-five meters) along the ground, parallel to one another and grounding each end of the wire with iron spikes driven into the ground. The transmitting station connected in the center of the wire a battery-powered telegraph induction set, which sent a powerful buzzer signal over the wire. The receiving station had a similar length of wire with a telephone receiver attached to pick up the transmissions. The system worked up to three kilometers apart. This system was excellent near the front lines because it had less wire to be torn by artillery and mortar fire. The system had three drawbacks. The first was that the enemy could easily pick up its emissions or jam the system; therefore, messages were only sent in code. The second problem was the sending station could only transmit and not receive any messages. The same was true for the receiving station, which had no means to

transmit back.⁵⁷ The third drawback was the system could not be easily moved, therefore it lost its effectiveness in open warfare.

Another problem was found early on with the use of the field service buzzer, on which the Signal Corps had relied heavily during previous operations in Mexico. On the Western Front the field service buzzer was found to interfere with telephone, telegraph, and radio system in the nearby vicinity due to its high-power output. These systems were in greater use and closer proximity than had been during in Mexico. It was also discovered that the Germans could easily pick up the transmissions of the field service buzzer using a crystal-set radio receiver. The insulation on the outpost wire used by the Signal Corps was too thin, and the buzzer was bleeding over into the earth. The British had this same problem and had outlawed the use of a ground return circuit, requiring two wires for every telephone and telegraph line.⁵⁸ Later, the U.S. Signal Corps solved this problem by developing heavier insulated outpost wire. The British Army solved the problem by using a field telegraph device called the Fullerphone, invented by a Royal Artillery Lieutenant named Algernon C. Fuller. Similar to a field service buzzer, the Fullerphone was impervious to being picked up by enemy listening posts.⁵⁹

Another type of communication device was the buzzer phone, which was an improvement over the Fullerphone. The buzzer phone was both a telephone and a telegraph device (similar to the field service buzzer). The buzzer phone had less power output, which equated to transmission over shorter distances and could not only be intercepted by directly tapping into the line.⁶⁰

The U.S. Signal Corps was far behind other nations in radio or wireless technology in the current war in France. The Allies had been using radios in combat

since 1914 and were in the process of replacing their quenched-spark radios with more reliable and rugged systems incorporating triode tubes.⁶¹ These newer radios also transmitted Morse Code in a more efficient manner using continuous wave (CW).⁶² The Signal Corps pack and wagon type radios were not rugged, and too heavy and easily jammed by friendly radios in the area due to their crystal receivers picking up any transmission.

The Signal Corps relied primarily on French radio equipment due to the U.S. Army's slow development in radio technology.⁶³ The field signal battalion used the French receiving sets, type A-1, transmitting sets, portable, type 3, radio sets, type E-3 (CW), mounted in Ford trucks and amplifiers, type 3 ter.⁶⁴ The field artillery also used the receiving sets, type A-1, transmitting sets, portable, type 3, and radio sets, type E-3 (CW). An important point to note is that some units were only authorized a receiving radio or a transmitting radio, not both. As discussed in the next chapter, although the infantry could transmit a message to the artillery, the receiving unit had no way to transmit a message back.

The British Army also fielded radio equipment used by American soldiers: the Trench set, Spark, 50 watts (also known as the B.F. set), the Wilson set, and the Loop set. All three were spark transmitters, and the B.F. set and Wilson set had a range from four thousand to ten thousand yards, depending on the antenna height. The radios were large and cumbersome, requiring three to six men to transport them. The Loop set was more survivable and transportable, due to the antenna being laid just above the ground. It had a range of two thousand yards. The British began issuing CW sets in 1917. Their antennas

were only three-feet high and thirty feet long, with a range of six thousand yards. They still required three men to move them (two in an emergency).⁶⁵

When General Pershing arrived in France, he saw first hand how the French and British were effectively using pigeons to transmit messages at the front. Messages were written by hand and strapped to the bird's leg via a small case. Encouraged by the Allies use of this technology, Pershing requested the War Department procure pigeon units for the AEF. In the United States, a search went out for trained personnel and birds. In November 1917, the Signal Corps Pigeon Service was authorized and a table of organization for a Pigeon Company at Army level evolved. The company provided pigeon groups to corps and divisions during combat operations.⁶⁶ Pigeons were used effectively in combat at certain times and under certain conditions.

To ensure the enemy did not understand friendly transmissions, the Signal Corps encoded or enciphered all messages close to the front. The River and Lake codes were used for all wire and radio communications (telephone, buzzer phone, field service buzzer, T.P.S., and radio) at division and below. A code was simply a collection of arbitrary words or groups of letters representing a word or a phrase.⁶⁷ The Signal Corps also devised a field cipher device that replaced an older cipher disk. This new device used twenty-six rotating disks.⁶⁸ Each disk had the letters of the alphabet written on them. A letter in conjunction with a word was the key to the device and set all the disks in alignment. A written message was then enciphered by using the letters that lined up with the wheels of the device. The philosophy behind this device was simple. If the enemy intercepted a message, it would take so long to break the ciphered key that the

contents of the message would no longer be of tactical value.⁶⁹ These new devices proved much better than the previous one for operations at the front.

Summary

Thus the Signal Corps entered the war unprepared for the rigors of combat on the Western Front. The Army and Signal Corps were trying to catchup in the areas of organization, doctrine, training, and technology. The test of the Signal Corps preparations and effectiveness would come in the spring and summer of 1918 when the bulk of American divisions began arriving in France and occupying sectors of the Western Front.

70

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⁴War Department, *Drill Regulations for Signal Troops, 1917* (Washington, DC: U.S. Government Printing Office, 1917), 244.

⁵Rebecca R. Raines, *Getting the Message Through, A Branch History of the U.S. Army Signal Corps* (Washington, DC: Center of Military History, 1996), 178.

⁶War Department, *Drill Regulations for Signal Troops, 1917*, 214.

⁷United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919* (Washington, DC: U.S. Government Printing Office, 1919), 25.

⁸Raines, *Getting the Message Through*, 169.

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¹¹*Ibid.*, 362.

¹²Henry L. King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons" (Individual Report, Fort Leavenworth, KS: Command and General Staff School, 1933), 7.

¹³War Plans Division, Training Circular No. 6, *Organization and Duties of Signal Units*, 7.

¹⁴King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons," 7.

¹⁵*Ibid.*, 8.

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¹⁷King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons," 8.

¹⁸Army War College, *Forward Intercommunication in Battle* (Washington, DC: U.S. Government Printing Office), May 1917, 5-6.

¹⁹*Ibid.*, 8-9.

²⁰*Ibid.*, 15.

²¹*Ibid.*, 9.

²²*Ibid.*, 22.

²³*Ibid.*, 10.

²⁴Army War College, *Liaison Instructions for All Arms* (Washington, DC: U.S. Government Printing Office), July 1917.

²⁵War Plans Division, General Staff, *Inter-Communication in the Field* (Washington, DC: U.S. Government Printing Office), May 1918, 5-7.

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- ²⁶Ibid., 27.
- ²⁷Raines, *Getting the Message Through*, 180.
- ²⁸War Plans Division, General Staff, *Inter-Communication in the Field*, 29.
- ²⁹Ibid., 53.
- ³⁰Ibid., 54.
- ³¹Ibid.
- ³²GHQ, AEF, *Liaison for All Arms*.
- ³³Ibid., 10, 51-52.
- ³⁴Raines, *Getting the Message Through*, 169.
- ³⁵Ibid.
- ³⁶Ibid., 170.
- ³⁷Dulany Terrett, *United States Army in World War II, The Technical Services, The Signal Corps: The Emergency* (Washington, DC: Office of the Chief of Military History, Department of the Army, 1956), 21.
- ³⁸United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 66.
- ³⁹Raines, *Getting the Message Through*, 179.
- ⁴⁰John L. Autrey, "Communication in the 1st Division," *Signal Corps Bulletin* (May-June 1937): 5.
- ⁴¹Edward M. Coffman, *The War to End All Wars, The American Military Experience in World War I* (Madison, WI: The University of Wisconsin Press, 1968), 136-137.
- ⁴²R. E. Priestley, *The Signal Service in the European War, 1914-1918 (France)* (Chatam, England: W. & J. Mackey & Company., Limited, 1921), 301.

⁴³Paul F. Braim, *The Test of Battle: The American Expeditionary Forces in the Meuse-Argonne Campaign, 26 September–11 November 1918* (Ann Arbor, MI: University Microfilms, 1983), 53-54.

⁴⁴United States Army Signal Corps. *Report of the Chief Signal Officer to the Secretary of War, 1919*, 103.

⁴⁵*Ibid.*, 102-103.

⁴⁶*Ibid.*, 82.

⁴⁷*Ibid.*, 89.

⁴⁸*Ibid.*, 93.

⁴⁹*Ibid.*, 92.

⁵⁰*Ibid.*, 98.

⁵¹*Ibid.*, 94.

⁵²*Ibid.*, 82.

⁵³*Ibid.*, 83.

⁵⁴*Ibid.*, 87.

⁵⁵War Department, Manual No. 6, *Visual Signaling, U.S. Army Signal Corps* (Washington, DC: U.S. Government Printing Office, 1910), 51.

⁵⁶United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 93.

⁵⁷Robert M. Yerkes, ed., *The New World of Science, its Development During the War* (New York, NY: The Century Company, 1920), 243.

⁵⁸Marshall, *The Story of the U.S. Army Signal Corps* (New York, NY: Franklin Watts, Inc., 1965), 149.

⁵⁹David L. Woods, *A History of Tactical Communication Techniques* (New York, NY: Arno Press, 1974), 127. The main idea of the Fullerphone was that a small direct current was sent out in the line and broken up in the receiving instrument so as to be audible. The direct current in the line caused no induction and the danger of being overheard was negligible.

⁶⁰George I. Back, "The Telephone: Commercial v. Military History and Development," *The Signal Corps Bulletin* 42 (March 1928): 14.

⁶¹Kathy R. Coker and Carol E. Stokes, *A Concise History of the U.S. Army* (Fort Gordon, GA: U.S. Army Signal Center, 1991), 17.

⁶²William M. Arkin, Joshua M. Handler, Julia A. Morrissey, and Jacquelyn M. Walsh, *Encyclopedia of the U.S. Military* (New York, NY: Harper & Row, Publishers, 1990), 191. Continuous wave (CW) technology consisted of High Frequency (HF) communications mode, or Morse Code. With CW, the transmitter is keyed on and off by a hand-operated telegraph key. Maximum efficiency depends on the operator. CW is very simple equipment and reliable.

⁶³Raines, *Getting the Message Through*, 172.

⁶⁴War Department, *Tables of Organization, Series A, Jan 14, 1918* (Washington, DC: U.S. Government Printing Office, 1918), Field Signal Battalion equipment listing.

⁶⁵Woods, *A History of Tactical Communication Techniques*, 225-226.

⁶⁶Raines, *Getting the Message Through*, 188.

⁶⁷War Department, Manual No. 6, *Visual Signaling, U.S. Army Signal Corps*, 84.

⁶⁸Raines, *Getting the Message Through*, 187.

⁶⁹War Department, Manual No. 6, *Visual Signaling, U.S. Army Signal Corps*, 88-

CHAPTER 3

SOISSONS, 18-22 JULY 1918

The attack began at the appointed hour of 4:35A.M. It was out of my hands when they went over the top, and there was nothing to do but pray for victory, and wait for news.¹

Major General James G. Harbord, *Leaves from a War Diary*

Introduction

The battle at Soissons is the first example of an American multi-division attack in open warfare by units of the AEF in 1918. Although a French corps controlled the two attacking U.S. divisions, the battle provides numerous examples of the critical roles played by American signal units and soldiers. These accounts allow us to determine the effectiveness of the Signal Corps in supporting the maneuver commander and shaping the outcome of the battle.

Even though the battle was considered successful in stopping and turning back the German offensive, major problems arose over the lack of command and control from company through division level. Part of the problem lay with the lack of experience and poor planning of the chain of command. Other problems were with the doctrine, organization, and training of communications support.

Background

From 18-22 July 1918, a large and crucial battle involving Americans took place near Soissons, France. The American 1st and 2d Infantry Divisions fought as part of the French XX Corps with the mission of seizing crucial high ground south of Soissons. The

XX Corps was under the French Tenth Army, which had five corps under its control. Soissons was part of a larger operation, known as the Aisne-Marne offensive, which sought to seal off the salient the Germans had driven into the French lines from May through July 1918.²

The XX Corps consisted of the two American divisions and a Moroccan division in the first line of attack with a Scottish and French division in reserve. The plan arrayed the 1st Infantry Division in the north (left), the 1st Moroccan Division in the center and the 2d Infantry Division in the south (right). All three divisions would attack from west to east. The mission of the corps was to sever the German lines of communications running through Soissons. Multiple rail lines and highways ran through and near Soissons, which supported forty German divisions in the Marne salient (see figure 4, map of Soissons area).³

The main objective for XX Corps was the line between the French villages of Saconin-et-Breuil, Chaudun, and Vierzy. The Soissons-Chateau-Thierry road ran northeast to southwest through this area. The secondary objective was the plateau between Charcrise and Oulchy-le-Chateau. The first objective would allow the Allies to break the initial German defense and place long-range artillery fire on the German lines of communication. The second objective would cut the lines of communications within the salient and force the Germans to withdraw.⁴ The terrain around Soissons was an open plateau, with cultivated wheat fields and waist high grains, periodically cut by deep ravines. Stone villages and rock quarries dotted the landscape.⁵ This type of terrain was kind to the defender and unforgiving to the attacker.

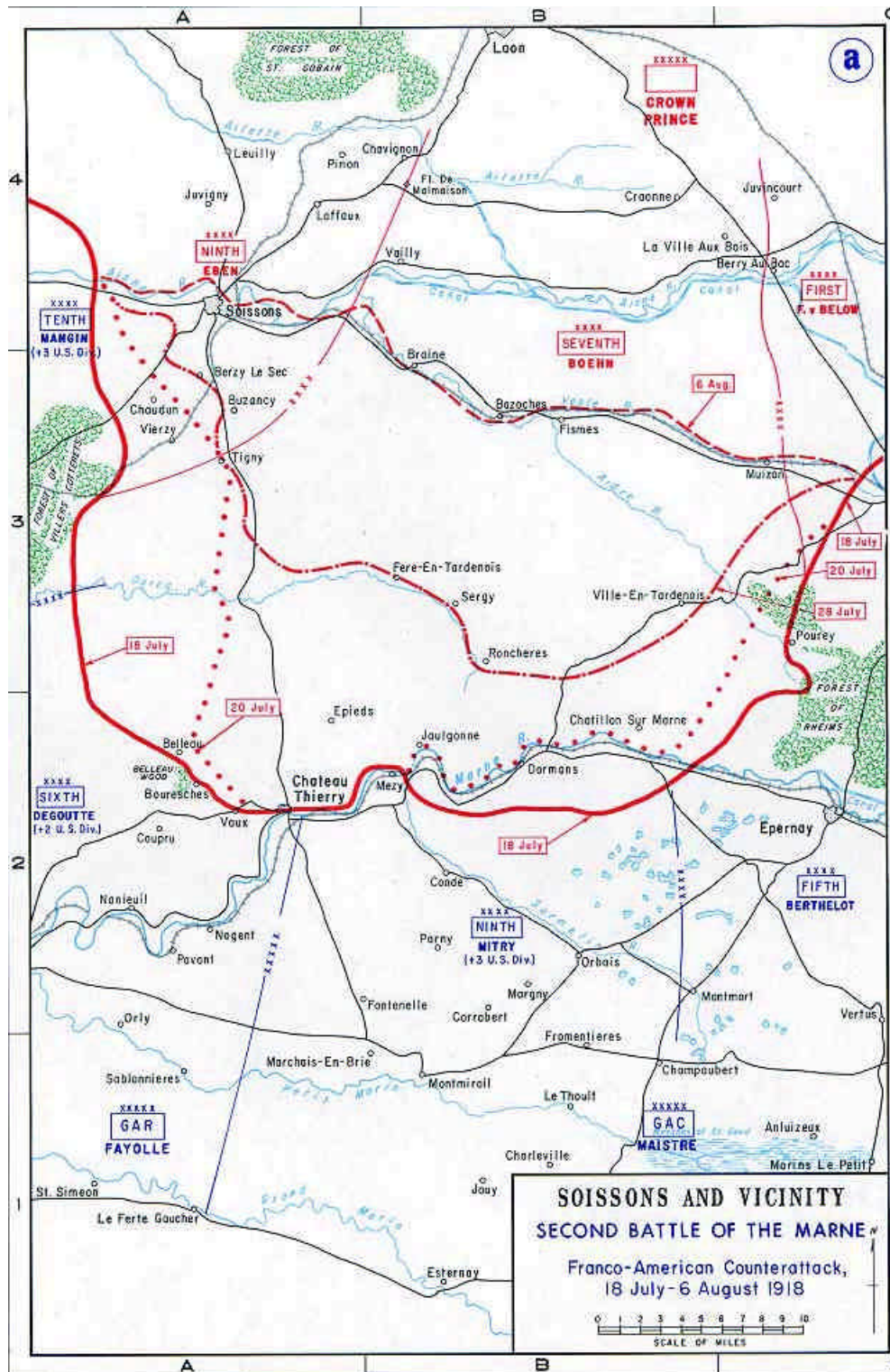


Figure 4. Source: *West Point Military History Series Atlas for the Great War*, (Wayne, NJ: Avery Publishing Group, Inc., 1986), map 21a.

Organization

The 1st Infantry Division's primary maneuver units were the 1st Infantry Brigade, consisting of the 16th, and 18th Infantry Regiments, and the 2d Infantry Brigade, consisting of the 26th, and 28th Infantry Regiments. Primary signal support for the division came from the 2d Field Signal Battalion. The 2d Infantry Division's primary maneuver units were the 3d Infantry Brigade, consisting of the 9th and 23d Infantry Regiments and the 4th Marine Brigade, consisting of the 4th and 5th Marine Regiments. The 4th Marine Brigade was fully integrated into the 2d Division and fought as regular infantry throughout World War I. Primary signal support for the division came from the 1st Field Signal Battalion. Both divisions, to include the field signal battalions, were organized and equipped according to the *Table of Organization, Series A*, dated 14 January 1918. Thus note that the 1st Division had the 2d Field Signal Battalion while the 2d Division had the 1st Field Signal Battalion.

Doctrine

Initial training with the French 47th Division Chasseurs Alpin heavily influenced the 1st Division's signal doctrine. Prior to April 1918, the 1st Division's 2d Field Signal Battalion's training and experience concentrated on trench warfare. This was in line with the French view that open warfare was not feasible on the Western Front. This ran counter to the General Pershing's guidance that all AEF units train on open warfare.⁶ Beginning on 8 April, the Division began training on open warfare, which culminated with maneuvers on 15 April 1918. During these maneuvers, the 2d Field Signal Battalion satisfactorily established and maintained communications for the Division.⁷ Therefore a

combination of French signal doctrine in trench warfare and British and ad-hoc American doctrine in open warfare influenced the 2d Field Signal Battalion.

The success of the exercises and experience led to the 1st Division G-3 memorandum “Instructions No. 7, Subject Liaison,” dated 21 April 1918, which specified a general scheme of signal support in open warfare situations.⁸ “Instructions No. 7” specified the use of messengers, wire, radio, visual, panels, pyrotechnics, and pigeons (if available) to support communications within the division during open warfare. The instructions stated that division signal support was built around a single axis of liaison. The axis of liaison had four key elements, the division headquarters, telephone central (also called a switching central), rear report center and an advance center of information (also called the advance report center). Each of the above-mentioned locations had a telephone switchboard on site (see figure 5). The 1st Division’s solution for communications in open warfare was a combination of French and British signal doctrine best suited for the U.S. infantry division.

The division headquarters served the same purpose as it does today, with its organic switchboard providing telephone communications to forward units, as well as adjacent and higher headquarters. Telephone central supported the light artillery groupings and served as a relay point between the axis and forward artillery units. The rear report center was located adjacent to the infantry brigade P.C.s, and formed a relay point from the axis to the infantry brigades. The advance center of information (ACI) was located adjacent to infantry regimental P.C.s, and formed a relay point from the axis to the infantry regiments and observation posts.⁹

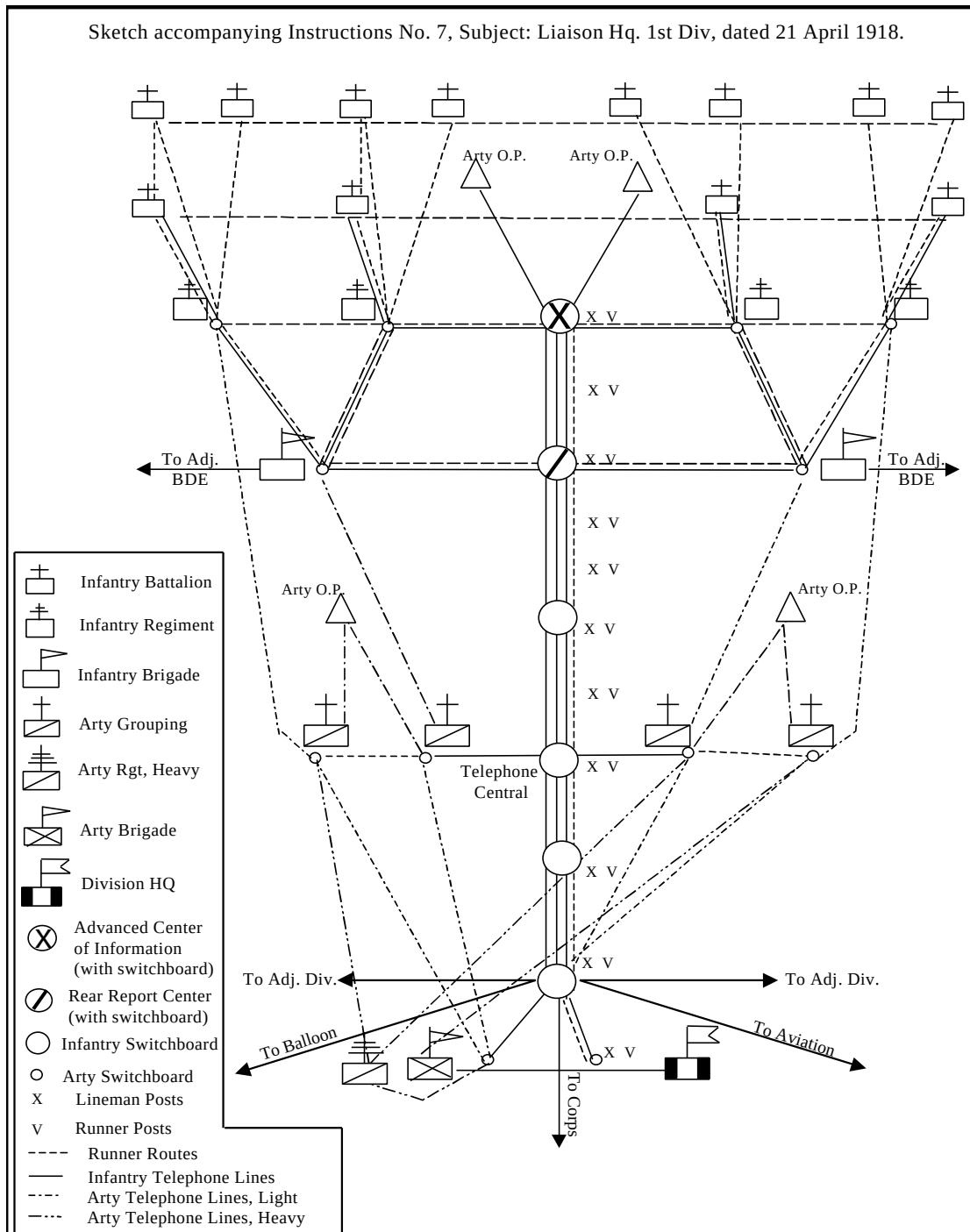


Figure 5. Source: *World War Records 1st Division A.E.F. Regular, Volume 2, Field Orders 1st Division June 1, 1918 to September 18, 1918.*

The axis of liaison was constructed of telephone lines, switchboards and a chain of messenger and relay stations, which followed the advancing infantry units as they moved forward from their original attack positions. The division headquarters, report center and ACI advanced along the axis of liaison. Artillery groups, infantry brigades, and subordinate infantry regiments connected to the axis of liaison by telephone lines, messengers, and visual signals.¹⁰

A key principle of signal support that was described in “Instructions No. 7” was that higher units established signal communications with subordinate units and supporting units established signal communications to the P.C.s of the units supported. This principle held true in all means of communications except for visual signals. Initiation of visual signals was from lower to higher due to the proximity of the enemy and the vulnerability it placed the sender.¹¹

The 2d Field Signal Battalion, 1st Division, was responsible for the installation and maintenance of signal communications down to the infantry regiments and the field artillery brigade. It was also responsible for operating infantry regimental radio sets (send and receive, spark type). The infantry brigades maintained messenger service to their regiments, the ACI, and adjacent brigades. The signalmen assigned to infantry regiments, battalions, and companies installed and operated all signal communications available at their P.C.s and to their next subordinate units.¹² An important point to note is that “Instruction No. 7” did not specify wire communications from regiment to front line infantry battalions. Only the infantry battalion in reserve was accommodated wire from their infantry regiment.

Another point in regards to signal doctrine was that the majority of the signal personnel supporting the infantry brigades and regiments were not assigned to the maneuver units. Signal soldiers who operated internal communications within the maneuver units were assigned to the field signal battalion (outpost company) rather than the brigade or regiment. This meant that the commander of the maneuver unit did not actually “own” the soldiers who supported him in battle, rather they would be cut to the unit by direction of the division G-3.

The 1st Division “Instructions No. 7” was doctrinally very similar to that which was stated in *Liaison for All Arms* and *Inter-Communication in the Field*. The memorandum showed a heavy French influence in the terminology adopted by the 1st Division. Although the terms were different than the British manual, both manuals required a main artery or axis on which all communications flowed forward and to the rear. Units closest to the axis connected to it directly, primarily with means of telephone. Units farther away would pass information through the units that were directly connected to the axis.

Although the 2d Division has much less documentation concerning its signal doctrine prior to Soissons, it seems reasonable to infer that it was similar to the 1st Division’s and as reflected in *Forward Intercommunication in Battle*, *Inter-Communication in the Field*, and *Liaison for All Arms*.

Planning

Both AEF divisions involved in the battle of Soissons left detailed records of their communication plans for the battle. Their communications planning tells only a small

picture of what was to come once the battle started and the men went over the top.

Critical to the planning for this battle was the fact that the 1st Division was able to arrive in sector and conduct limited reconnaissance, while the 2d Division had no opportunity for this preparation. This played a vital role in their respective communication planning and support.

The 1st Division published a memorandum, dated 16 July 1918, which directed that all messages would be sent in French in order to support the deception that French units were still manning the trenches west of Soissons. This aided the French Tenth Army deception plan, which masked the arrival of American units in the area. The memorandum also directed that telephones would not be used forward of brigade P.C.s until further ordered.¹³ Although this supported the Army deception plan, it hindered the maneuver units in their communication operations during a very compressed planning sequence prior to the battle.

The 1st Division signal support planning for Soissons was listed in the Plan of Liaison, Field Order No. 27, dated 17 July 1918. The plan outlined the axis of liaison, with the ACI located at Villieres Central. The axis then connected to Tr. (abbreviation for the French term “trainee”, meaning trail) De la Glaux in the vicinity of the Trois Penpliers, onto Tilleul de la Glaux. It also listed the locations of brigade P.C.s and directed liaison between artillery, infantry and aviation units. The Plan of Liaison also mentioned visual signals, to include the use of star clusters and rockets to coordinate artillery fire.¹⁴ The 1st Division plan also incorporated pigeons. Two dovecotes (houses to hold and train pigeons), T-35 and T-123, were located by the Beauville Farm. Each front line infantry battalion was assigned a post with three pigeons.¹⁵ As it turned out, the

use of pigeons by both Divisions seemed to have had little impact on the outcome of the battle. The 1st Division Plan of Liaison was detailed and thorough, showing that the division took steps to ensure communications would hold up during the battle (see figure 6 for the 1st Division axis of liaison).

The brigade level field orders for Soissons were very sparse in describing communications or the axis of liaison. The 2d Brigade, 1st Division Warning Notice, dated 16 July 1918, reiterated the Division's guidance on sending all messages using the French Carnet Reduit Napoleon Code.¹⁶ The Brigade's Field Order No. 34, dated 17 July 1918 had only one sentence in regards to the axis of liaison. It stated, "Axis of liaison of Brigade--Same as for Division."¹⁷ Thus the signal planning for the brigade was very vague in regards to where the regiments were to connect into or even find the axis during the attack. A copy of the 28th Infantry Regiments Field Order for Soissons, dated 17 July 1918 did not mention the axis of liaison or signal communications at all. The only methods of liaison mentioned are tank and aeroplane.¹⁸ A copy of the 1st Brigade Field Order for Soissons is missing from the *World War Records of the 1st Division A.E.F.*

In a separate memorandum dated 17 July 1918, the 2d Brigade, 1st Division directed its regiments to establish and maintain relay runner posts between regimental and brigade P.C.s. The posts were to be no longer than 350 meters apart.¹⁹ This distance was determined by the vulnerability of a runner on the World War I battlefield. It was not a man's endurance, but rather his ability to stay alive while moving unprotected through trenches or from shell hole to shell hole.

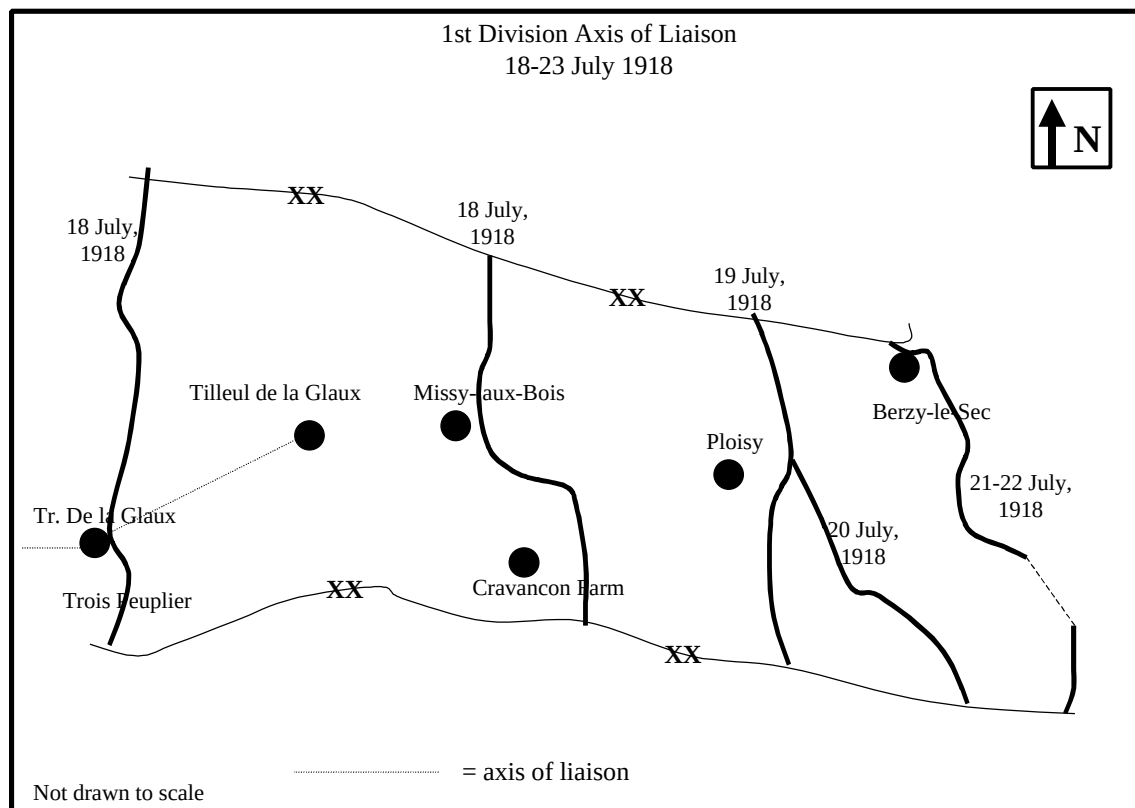


Figure 6. Sketched from the Map of Soissons accompanying American Battle Monuments Commission, *1st Division Summary of Operations in the World War*, (Washington, DC: U.S. Government Printing Office, 1944).

The 1st Division held a conference for all brigade and regimental signal officers at the Division P.C. at 3:00 P.M. on 17 July 1918. The meeting covered the tactical situation and Plan of Liaison. One problem effecting both divisions was that the XX Corps Plan of Liaison was improperly translated, making no references to radio frequencies and call signs of adjacent units. The information was finally passed down to unit signal officers a few minutes prior to the attack, but it included only a single frequency for all Division radio traffic.²⁰

The 2d Division Field Order No. 15, dated 4:30 A.M. 17 July, 1918 directed the 1st Field Signal Battalion to, “establish lines of information to the Brigades and stations of the reserves.” The field order also directed that “no communications will be sent by means of telephone, T.S.F. [*Telegraphie sans fil*, the French term for wireless or radio, used frequently by both the 1st and 2d Divisions, showing the French influence on their signal planning]²¹ or T.P.S. [earth telegraphy] by units less than a Brigade between the time of entering the sector and H hour.”²² This was to ensure success of the French Tenth Army deception plan. Second Division Annex No. 5, Plan for Liaison, was three pages long and gave the axis of liaison as Carrefour de Nemours to Carrefour de Montgobert (see figure 7 for the 2d Division axis of liaison). It also stated that the brigades’ axis of liaisons would follow the brigades’ P.C.s. The plan also provided guidance on telephones, T.P.S., T.S.F., visual signaling, carrier pigeon information, and codes.²³

The 3d Brigade Field Order did not mention the Division axis of liaison or direct a brigade axis. The Brigade Field Order stated, “1st Field Signal Battalion will establish lines of information to the Brigade and stations of the Reserve as given in the Plan of Liaison.” It also directed that the Brigade and Regimental Signal Detachments would connect up to their respective headquarters.²⁴ The only existing records available at the regimental level within the division were from the 23d Infantry Regiment. This unit’s Field Order No. 49, dated 17 July 1918 makes no mention of signal communications or the axis of liaison.²⁵ The 4th Brigade (Marine) Field Order for Soissons is missing from the *Records of the 2d Division, Regular*. The 2d Division Plan of Liaison was detailed in its plan to support the coming battle. Yet at brigade and below, the unit field orders were vague in regards to signal communications. This may

be due to the majority of signal personnel supporting the brigades and regiments being assigned to the Field Signal Battalion's C Company. The Outpost Company may have looked to the Division's Plan of Liaison for guidance and direction.

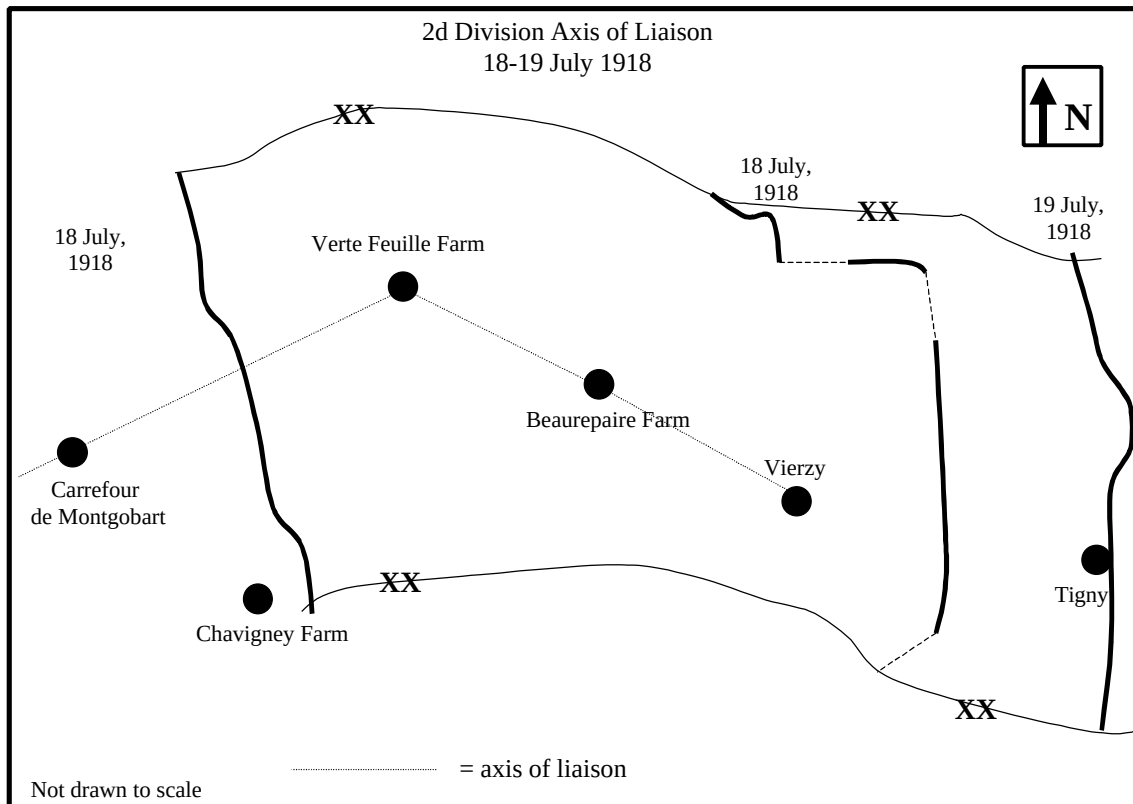


Figure 7. Sketched from the Map of Soissons accompanying American Battle Monuments Commission, *2d Division Summary of Operations in the World War*, (Washington, DC: U.S. Government Printing Office, 1944).

Like the 1st Division, the 2d Division had a well-documented plan of communications support at the division level for the coming battle. The signal planning at the brigade level seems to have been very vague and not clearly articulated in the existing documentation. Both Divisions' brigades failed to designate a brigade axis of liaison. This in turn caused the regiments to not designate an axis within their units. It

must also be pointed out that both Divisions' axis of liaison were only listed as far as the jump off point. The axis was apparently not identified into the enemy territory prior to the battle. The battle would show that the communication plans were lacking in this and other areas.

Execution

The 2d Field Signal Battalion, 1st Division arrived at Mortefontaine, below the Aisne River on 16 July 1918. The following evening, at 10:30 P.M., twenty-three members of the Outpost Company began hauling wire and signals supplies by hand and truck from the division supply dump toward the front lines, establishing advance signal supply dumps (the term used for signal supply sites). Throughout the evening and into the morning, a steady downpour made the already deteriorating roads even worse, and visibility was poor. At 4:45 A.M. on the morning of 18 July, the men of the Outpost Company jumped out of the trenches and ran wire for three kilometers ahead of the infantry. Throughout the battle, signalmen carried wire and equipment forward to advance signal dumps and units, dropped off equipment, and repaired the lines on the way back.²⁶

Company A attached radio operators to the infantry brigades and regiments in order to operate radio sets at their P.C.s. Companies B and C sent teams forward to the infantry brigades to operate telephone switchboards and install telephone and wire lines.²⁷ As the battle kicked off, the 2d Field Signal Battalion was well postured to support the division.

The 1st Field Signal Battalion, 2d Division did not have as smooth a start. The Division was further away from the sector than the 1st Division and did not arrive until the late on 17 July and early on 18 July. Some infantry units had to run to make it to the jump off positions at the start of the attack.²⁸ Maneuver and signal leaders barely received the orders to attack, let alone time to conduct a reconnaissance of the area. Additionally, only a third of the 1st Field Signal Battalion had arrived in the Soissons area, having had difficulty moving through the traffic-choked and muddy roads of the region. The Division did not have its wire trucks or outpost wire on hand and had to obtain this material from a French supply dump. By midnight prior to the attack, a telephone and radio set were operational, connecting the Division P.C. to its brigades, regiments and XX Corps.²⁹ Even so, as the battle kicked off, the 1st Field Signal Battalion was not positioned to support the 2d Division due to factors largely beyond their control.

The main factor hindering the 1st Field Signal Battalion was the deception plan implemented by the French 10th Army. The concept was to mask the arrival of fresh American units into the Soissons area. The arrival of American units into the attack position at the last moment would thus preserve the deception that French units still occupied the positions. However, the late arrival led to an inadequate reconnaissance of the area.

From the start, both divisions' communications plans began to show signs of stress. The advance was too quick for T.P.S. and projector lamps (signal lights) to be effective. German artillery fire also took its toll on telephone wire, tearing up great swaths of the lines. French tanks, supporting both divisions, also tore up wire as they

charged forward into the attack. Additionally, infantry regimental commanders changed their minds on the locations of P.C.s without advising their signal officers.³⁰

As the battle continued, the 1st Division made excellent progress, which extended the axis of liaison forward and stressed their signal systems even further. The 2d Field Signal Battalion supported the movement by running additional phone lines forward. On the morning of 18 July, the Division P.C. jumped forward to a rock quarry, shortening the lines of communication to the front. The Field Signal Battalion installed a switchboard at the P.C., but artillery continued to cut telephone lines, which kept communications with the front intermittent.³¹

Although signal support for the Division P.C. was adequate, it was falling apart at the infantry brigade and below. The signal teams assigned down to the 26th Infantry Regiment were held up due to congested roads, and then the teams got lost. The teams did not show up and establish radio communications between all three battalions until 3:00 P.M. on 18 July. The signal teams were also short of wire due to the limited amount carried on signal carts, the long distances made that first day, and wire destroyed by tanks and artillery.³²

As mentioned earlier, once the men went over the top, communications at the battalion level was primarily through runner. Second Battalion, 28th Infantry, commanded by Major Clarence Huebner, provides an example of communications support within an assault battalion of the 1st Division. When the battalion started the attack, a signal detail, consisting of a telephone and T.P.S. teams from C Company, 2d Field Signal Battalion was attached to the battalion. Shortly after the attack opened, artillery fire killed or wounded the entire team and destroyed their equipment. After this

setback, the only means of communications to and from higher headquarters was by runner. After the battle, Huebner noted that commanders never knew which signal team they were going to receive until right before the attack. The attached signalmen did not know the unit, and if they became separated, they often became lost.³³ This brings into question the habitual support relationships that the 2d Field Signal Battalion had with the maneuver units of the 1st Division and whether this was a one time event or a systemic problem.

Modern U.S. Army signal doctrine recommends that a habitual relationship form between the supporting signal team and the supported unit. This means that when a unit deploys on a mission, it gets the same team it trained or fought with previously. The high number of casualties among the signal soldiers during World War I may be the root of this problem. Although the casualty rate among the 1st and 2d Field Signal Battalions at Soissons is unknown, the casualty rate of the Signal Corps during the First World War was second only to the infantry in total numbers.³⁴

The 2d Division made great progress during the early morning attack on 18 July, which compounded their problem of command and control. Once the soldiers went over the top, runners became the primary means of communication. This caused havoc with the command and control of the maneuver units during the battle. An example of this occurred within the 3d Brigade. Colonel Laroy S. Upton, commander of the 9th Infantry Regiment (3d Brigade), made critical comments in his post battle report on the lack of communications during the fighting on 18 July. Due to the late arrival of his unit (approximately six hours prior to the start of the battle), his regiment went into the fight without flares or signal marker panels (for marking the P.C.). Due to the heavy rains, the

roads were choked with troops and equipment, not allowing phone lines to be run along them. Also thanks to the condition of the roads, the use of runners became even more problematic. These problems ultimately caused Upton to lose contact with supporting artillery throughout the attack. During 18 July, Upton's 9th Infantry received one message from Brigade and none from Division headquarters.³⁵

During the morning of 18 July, the 3d Brigade Commander, Brigadier General Hanson Ely, moved his P.C. forward to the Beaurepaire Farm in order to find out what was going on with his two regiments. Although signal wire was run through the farm, outages due to artillery and tanks had made it ineffective.³⁶ At that point in the battle, Ely's only means of communication with his subordinate and higher headquarters was runner. His staff car with runner constituted his "rapid communications" with the Division P.C.³⁷ This system of communications was unresponsive and too inflexible to meet the needs of a combat brigade trying to command and control two regiments during open warfare. As it turned out, the 3d Brigade's signal section, with telephone and wireless equipment, were still stuck in a traffic jam somewhere to the rear of the battle during the initial assault.³⁸

During the first day of the offensive, the 2d Division Headquarters moved forward to Verte Feuille Farm at 11:00 A.M. Telephone lines were already there, run up through Beaurepaire Farm, and into the town of Vierzy, which was contested by both American and German troops. That evening, a telephone switchboard was setup in the town, near where the 3d and 4th Brigades had setup their P.C.s. The Division P.C. had moved forward once again and occupied Beaurepaire Farm.³⁹ Telephone

communications from division to corps seems to have been effective, but outages due to torn wire plagued the usefulness of the field telephone throughout the day.

Despite the communication problems, signal soldiers were making enormous efforts to get the message through. These soldiers were out front throughout the first day, running wire and setting up telephones and radios, often without cover or concealment. Despite the weather, lack of equipment, and the enemy situation, they made a good showing of themselves and their branch.

All in all, the communication plan for the first day of the battle did not go as envisioned. At first, the two most reliable means of communications for both the 1st and 2d Division were runner and field telephone. Due to artillery fire in the rear area and the number of tanks used by the Allies, field telephone lines were broken faster than the signal linemen could repair. Eventually the runner thus became the most reliable means of communications at the division-level.

Three factors caused the lack of communications on the first day of the battle. The first was that both division signal plans, although adequate, did not anticipate friction, or the chaos which occurs when first contact is made. The plan did not take into account that telephone lines would be cut by artillery, tanks or vehicles. Nor did it account for signalmen and runners being cut down by fire, or equipment breaking down. The plan did not take into account the lack of food and sleep, the dark of night, and the pouring rain. The second factor was that the maneuver commanders did not properly plan their movements with signal officers. Too often, commanders or P.C.s were out of communication due to last minute changes, which were not coordinated. The third and final factor was the French Tenth Army deception plan. This plan ultimately caused both

American divisions to have very little planning time prior to the battle. This lack of time caused a lack of proper reconnaissance, and the situation was even worse for the 2d Division, which had farther to travel to reach the attack position. This trade off, between planning time and deception, was a conscious one made by General Mangin the Tenth Army commander.⁴⁰ The deception was ultimately successful, but cost the Americans in command and control.

The XX Corps ordered further attacks beginning at 4:00 A.M. on the morning of 19 July. Due to poor communications between the corps and its divisions, the attack order arrived late. Some front line units only received word to attack minutes before the proposed jump off time. The objective for the second day was to continue to move eastward, cutting the north south axis of the Soissons-Chateau Thierry road.⁴¹

Casualties among the Signal Corps troops mounted as the second day of the battle began. In the 2d Field Signal Battalion, the battalion commander and two company commanders were missing. Out of desperation and necessity, Captain Crook, commander of C Company, 2d Field Signal Battalion took the remnants of the battalion, to include cooks, clerks, and stablemen, and divided them into four-man teams with one noncommissioned officer in charge of each. Each team took two wire test sets and forty pounds of twisted pair (outpost wire) and moved forward, extending and repairing the Division's axis of liaison. Captain Crook setup relay and projector lamp stations every five hundred yards. Manpower was so short that infantrymen were used to haul the wire forward.⁴² Crook's actions were instrumental in supporting the continued attack of the 1st Division.

During 19 and 20 July, communications in the 2d Division sector actually improved with the establishment of redundant means and new locations of P.C.s. The division and artillery brigade headquarters were now located at Beaurepaire Farm. The infantry brigades P.C.s were located in and around Vierzy. Captain Fuller, commander of A Company, 1st Field Signal Battalion, maintained connectivity from division headquarters to the brigade P.C.s by running three telephone wires through the village of Vierzy and maintaining a relay of linemen to repair them. By this method, at least one line was operational through the battle. On 19 July, signalers established a radio station in Vierzy and used projector lamps and T.P.S. with limited success. Due to high casualties and exhaustion, the French 58th Division relieved the 2d Division early in the morning of 20 July. On 23 July, signalers of the 1st Field Signal Battalion finally left Vierzy, the last members of the 2d Division to leave the Soissons area.⁴³ Although the 1st Field Signal Battalion started the attack poorly, they adjusted well and performed admirably considering the circumstances that they were dealt.

On the night of 20 July, 1st Division received orders from XX Corps to continue the attack to seize Berzy le Sec at 4:00 A.M. on 21 July. The Division Field Order Annex for the Plan of Liaison contained detailed guidance on the methods of communications. The night before the attack, the Division Signal Officer gathered the remaining officers of the 2d Field Signal Battalion and explained the tactical situation and the Plan of Liaison. That night, the Division readjusted its existing wire circuits, cutting out relay stations and useless sections of wire. By constructed laterals, or parallel runs of line, the Division was able to make the telephone network more efficient for the coming battle.⁴⁴

On 21 July, the 1st Division P.C. was planning to move to a cave in the Missy Ravine. Signalmen went forward and setup a switchboard and radio, using wire found at an abandoned German dump. The installation of the switchboard improved telephone traffic for the division by relieving the strain on the primary switchboard. In the end, the division P.C. did not move forward, and the 15th Scottish Division relieved the division on the night of 22-23 July.⁴⁵

The lack of twisted pair wire, for telephone communications, was also a factor affecting both divisions as the battle wore on. As mentioned earlier, the 1st Field Signal Battalion arrived without enough wire, and the battalion had to procure wire from the French. The amount of wire used in the battle was greater than that carried by the units. The Signal Corps soldiers also resorted to using captured German wire or improvising. The lack of wire was so great across the AEF that when wire was found untagged (policy being to tag wire every fifty yards) and no one could be called on the line, the wire was taken.⁴⁶

Summary

The battle of Soissons was a success in stopping the German offensive and beginning the first in a series of attacks, which would not stop until the Armistice on 11 November 1918. From a signal perspective, the battle can be considered only partially successful. Signal planning and execution for the battle, the first that supported open warfare, seems to have been barely adequate. It followed doctrine and on paper seemed to have taken into account all factors but one, which was the fog of war (and as Clausewitz termed, friction) which drifts over the battlefield once the soldiers go over the

top and artillery turns calmness into chaos. The Signal Corps would need to take into account the loss of personnel, equipment, and wire connectivity on the modern battlefield.

Active coordination between the unit signal officer and the commander and staff in developing, implementing and changing the signal support plan needed to improve. Often changing the location of a P.C. at the last minute was a necessity, but the communication systems (especially wire) were not flexible enough to quickly react. The Tenth Army deception plan also put both divisions at a significant disadvantage due to the lack of planning time and reconnaissance given to signal personnel. The assignment of a single radio frequency by the French XX Corps also caused confusion in the divisions. One frequency meant that only one radio net could be maintained for all the division, brigades, and regiments, which was not as planned or trained.⁴⁷

The battle showed that although Signal Corps units and soldiers were at a significant disadvantage, they showed flexibility and persistence. Shortages of equipment and loss of personnel did not deter signal units from pushing forward and getting the message through. The American doughboy's spirit and tenacity shined throughout the ranks of the signal battalions and maneuver signal units.

In order to maintain wire communications forward of the division, the Signal Corps needed more redundancy and far more reliable and survivable alternate means. At this point in the war, the radio was still too unreliable to make an impact on improving command and control of the battle. Commanders still had to rely on runners as the primary means to control their units once the battle had begun, especially in open warfare.

The men of the 1st and 2d Field Signal Battalions had faced the test of battle in open warfare and would meet many other challenges in the coming months. They still participated in the battle of St. Mihiel before moving toward the final campaign of the war, the Meuse-Argonne.

¹James G. Harbord, *Leaves from a War Diary* (New York City, NY: Dodd, Mead & Company, 1925), 325.

²Douglas V. Johnson II and Rolfe L. Hillman Jr., *Soissons 1918* (College Station, TX: Texas A&M University Press, 1999), 9.

³*Ibid.*, 12.

⁴*Ibid.*, 12.

⁵Oliver L. Spaulding and John W. Wright, *The 2d Division American Expeditionary Force in France 1917-1919* (Nashville, TN: The Battery Press, 1989), 109.

⁶Paul F. Braim, *The Test of Battle: The American Expeditionary Forces in the Meuse-Argonne Campaign, 26 September-11 November 1918* (Ann Arbor, MI: University Microfilms), 1983.

⁷Henry L. King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons" (Individual Report, Fort Leavenworth, KS: Command and General Staff School, 1933), 15-16.

⁸*World War Records 1st Division A.E.F. Regular*, Volume 2, *Field Orders 1st Division June 1, 1918 to September 18 1918*, Instructions No. 7, Subject Liaison, 21 April 1918. The *World War Records 1st Division A.E.F. Regular* and the *Records of the 2d Division Regular* are postwar compilations of actual wartime documents; therefore there are no page numbers throughout the volumes. Most of the field orders and memorandum are under four pages in length.

⁹*Ibid.*

¹⁰*Ibid.*

¹¹*Ibid.*

¹²King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons," 20.

¹³*World War Records 1st Division A.E.F. Regular, Volume 2, Field Orders 1st Division June 1, 1918 to September 18 1918*, Memorandum from 1st Division Headquarters, July 16, 1918.

¹⁴*World War Records 1st Division A.E.F. Regular, Volume 2, Field Orders 1st Division June 1, 1918 to September 18 1918*, Plan of Liaison, July 17, 1918.

¹⁵King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons," 34.

¹⁶*World War Records 1st Division A.E.F. Regular, Volume 8, Field Orders, Operations Memoranda, etc., 1st & 2d Infantry Brigades*, Warning Notice, 16 July 1918.

¹⁷*World War Records 1st Division A.E.F. Regular, Volume 8, Field Orders, Operations Memoranda, etc., 1st & 2d Infantry Brigades*, Field Order No. 34, 17 July 1918.

¹⁸*World War Records 1st Division A.E.F. Regular, Volume 10, Field Orders, 16th, 18th, 26th, 28th Infantry Regiments*, 28th Infantry Regiment Field Order for Soissons, 17 July 1918.

¹⁹*World War Records 1st Division A.E.F. Regular, Volume 8, Field Orders, Operations Memoranda, Etc, 1st & 2d Brigades*, 2d Brigade Headquarters, Memorandum, 17 July 1918.

²⁰King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons," 39, 77.

²¹R. J. Dubois and L. Preux, *The Military Interpreter* (Paris, France: Charles Lavauzelle & Company, 1957), XVI.

²²*Records of the 2d Division Regular, Volume 1, Field Orders 1918 – 1919*, Field Order No. 15, 17 July 1918.

²³*Ibid.*

²⁴*Records of the 2d Division Regular, Volume 2, Field Orders 3d and 4th Brigades, 1918 – 1919*, Field Order Third Brigade, Soissons, 17 July 1918.

²⁵*Records of the 2d Division Regular, Volume 3, 9th Infantry, 23d Infantry, 5th Marines, 6th Marines, and 2d Engineers*, Field Order No. 49, 17 July 1918.

²⁶United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919* (Washington, DC: U.S. Government Printing Office, 1919), 403.

²⁷King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons," 40.

²⁸Johnson, *Soissons*, 62.

²⁹United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 404-405.

³⁰*Ibid.*, 405.

³¹King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons," 43.

³²*Ibid.*, 43.

³³*Ibid.*, 44.

³⁴Army Times Editors, *A History of the U.S. Signal Corps* (New York, NY: G. P. Putnam's Sons, 1961), 123. The casualty list of the Signal Corps totaled 2,840. Of these casualties, 179 were killed in action, 112 died of wounds received in action, 10 others died of gas received in action. Twenty-seven others were killed in accidents or died of disease. This includes all Signal Corps troops, to include the Aviation Service.

³⁵*Records of the 2d Division Regular, Volume 7, Operation Reports, War Diaries, Patrol Reports, 9th- 23d Infantry, 1918*, Report of the Battle of Beaurepaire Farm, 18 July 1918.

³⁶United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 405.

³⁷Johnson, *Soissons*, 74-75.

³⁸*Ibid.*, 74.

³⁹United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 405.

⁴⁰Johnson, *Soissons*, 16-18.

⁴¹*Ibid.*, 88.

⁴²United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 404.

⁴³*Ibid.*, 405.

⁴⁴King, “A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons,” 50.

⁴⁵*Ibid.*, 51.

⁴⁶Lincoln A. Levine, *Circuits of Victory* (Garden City, NY: Country Life Press, Doubleday, Page & Company, 1921), 507.

⁴⁷King, “A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons,” 50.

CHAPTER 4

DIVISION LEVEL OPERATIONS IN THE MEUSE-ARGONNE, 26 SEPTEMBER–11 NOVEMBER 1918

Every effort must be made to insure forward as well as lateral communications in all units and if such communications temporarily break down they must be promptly reestablished by means provided for in advance.²

1st Division G-3, “H hour, D day & Supplementary Instructions”

Introduction

The Meuse-Argonne was the culminating American offensive on the Western Front that helped seal the fate of Germany and led to the 11 November 1918 Armistice and conclusion of combat operations in World War I. This was the first major offensive in which the AEF fought as a separate army, initially under the command of General Pershing. With the vast size and scope of this offensive, which would require a full-length book in itself, this chapter will focus only on selected combat operations of the 1st and 2d Division’s during the first two phases of the offensive. The 1st and 2d Divisions were seasoned combat units and their previous participation in the battle of Soissons provides an opportunity to compare the communication performance of the same units in different battles.

Background

The Meuse-Argonne offensive from 26 September to 11 November 1918 was part of the final Allied offensive of the Great War and the first campaign with an American Army under American command. Under the guidance of Marshal Foch, the overall Allied “Victory Offensive” attacked the Germans on the northern and southern parts of

the Western Front. The plan was for the British to attack in the north, and the French and Americans in the south. By putting pressure on two distant points, Foch hoped to draw German reserves to one point or the other and therefore gain success at either location. The combined American and French attack was in the area of Verdun along the Meuse valley with the objective of severing the German lines of communication.³

The American First Army was the main U.S. element of the southern attack, and it consisted of three American Corps. The plan arrayed III Corps in the east (right), V Corps in the center, and I Corps in the west (left). All three corps would attack from south to north. The First Army's mission was to attack north toward Buzancy-Stonne and mutually support the attack of the French Fourth Army. The French Fourth Army offensive was called the Meuse-Argonne (Champagne) Offensive by the American Army (see figure 8 for a map of the Meuse-Argonne offensive). The Germans had four in-depth defensive belts through the American sector, which proved difficult to breach.⁴

The initial mission of III Corps was to drive north along the west side of the Meuse River and assist V Corps' right flank. The primary effort of the American offensive fell upon V Corps, which was to seize Montfaucon (Falcon Mountain) which was key terrain that dominated the surrounding area. I Corps was to attack north along the Aire Valley and the eastern edge of the Argonne Forest and assist V Corps' other flank.⁵

Both the 1st and 2d divisions had fought at St. Mihiel Offensive from 12 -15 September 1918 and deployed to the Meuse-Argonne as soon as transportation became available. The 2d Division did not get into the fight until 1 October 1918, fighting as part of the French XXI Corps (French Fourth Army). The French Fourth Army was west of

the Argonne Forest, adjacent to the American First Army.⁶ The 2d Division joined the reserve for the French Fourth Army on 30 September 1918. On the night of September 30-1 October 1918, it relieved the French 61st Division (part of the French XXI Corps), located near Somme-Py. On the morning of 3 October 1918, the Division attacked southeast to northwest toward Mont Blanc, with the objective of seizing the Medeah Farm-Mont Blanc Road and St. Etienne. The Division attacked with the 4th Brigade (Marine) on the left and the 3d Brigade on the right. The regiments were arrayed from left to right: 6th Marines, 5th Marines, 9th Infantry, and the 23rd Infantry.⁷

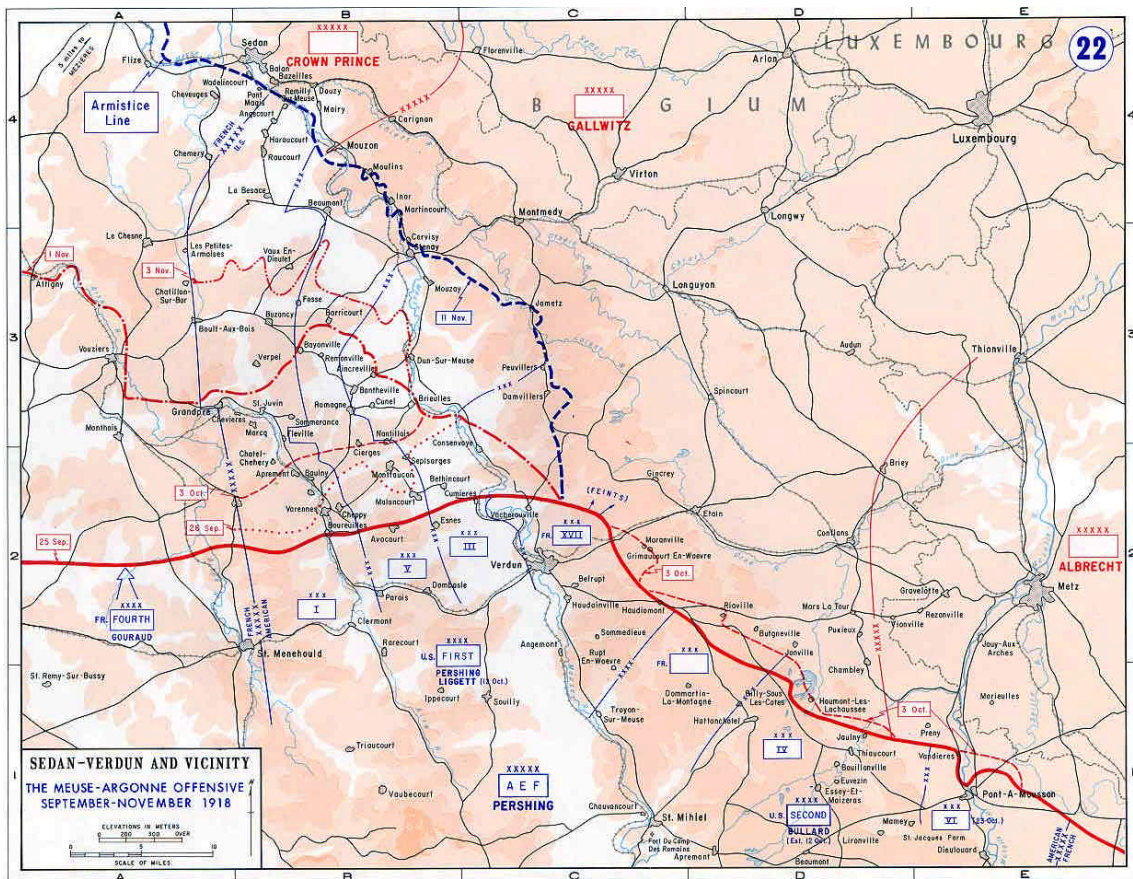


Figure 8. Source: *West Point Military History Series Atlas for the Great War*, (Wayne, NJ: Avery Publishing Group, Inc., 1986), map 22.

The 1st Division, initially in reserve for the American First Army, did not see active combat until 4 October 1918 when it was attached to I Corps.⁸ On 29 September 1918, the Division moved into I Corps' area and relieved the 35th Division, located north of Charpentry, on the night of 30 September-1 October 1918. The 1st Division settled into the defense and actively patrolled the area until 4 October 1918, when it attacked north toward Exermont. The Division attacked with the 1st Brigade on the left and the 2d Brigade on the right. The Infantry Regiments were arrayed from left to right: 16th Infantry, 18th Infantry, 28th Infantry and the 26th Infantry. This attack was part of an I Corps and V Corps combined operation directed by First Army.⁹

The terrain in the French and American sectors of the Meuse-Argonne greatly favored the defending Germans. Five main terrain features dominated the area. In the east, the Heights of the Meuse rose above the landscape on the eastern side of the unfordable Meuse River (running north to northeast in the sector). Although not in III Corps sector, the high ground affected the Corps' ability to maneuver due to German observation and direct fire. In the center (V Corps), Montfaucon rose 342 meters and provided observation throughout the entire sector. In I Corps area, the heavily wooded Argonne Forest provided a dense obstacle that had to be breached. Additionally, the Aire River, which is fordable in only a few places, ran through the valley formed by Montfaucon and the Argonne Forest. The French Fourth Army sector, adjacent to I Corps, incorporated the Argonne Forest and Aisne River running north to south near its eastern boundary. The 2d Division was located in this region.¹⁰ Thus the American First Army and French Fourth Army were going into the battle with terrain benefiting the defending enemy.

Organization

The 2d Infantry Division's maneuver units were the 3d Infantry Brigade, consisting of the 9th and 23d Infantry Regiments, and the 4th Marine Brigade, consisting of the 5th and 6th Marine Regiments. Primary signal support for the Division came from the 1st Field Signal Battalion.¹¹ The 1st Infantry Division's maneuver units were the 1st Infantry Brigade, consisting of the 16th and 18th Infantry Regiments, and the 2d Infantry Brigade, consisting of the 26th and 28th Infantry Regiments. Primary signal support for the Division came from the 2d Field Signal Battalion.¹² The table of organization governing the manning and equipment of the divisions was still the version dated 14 January 1918. On paper, the division's field signal battalions were organized and equipped in the same manner as during combat operations at Soissons in July 1918. As will be seen, the field signal battalions updated their doctrine, and changed their organizational relationships based on past experience and the support needed for maneuver units.

Doctrine

The 1st Division took the lessons learned from the combat experiences of Soissons and issued two new documents regarding communications on 2 August 1918. The first document was a memorandum from Major Karl Truesdell, the Division Signal Officer. In this memorandum titled "Liaison in the 1st Division A.E.F.," Major Truesdell outlined the duties and responsibilities of field signal battalion and liaison personnel during periods of combat. This form of liaison was called "automatic liaison." The memorandum identified the duties and responsibilities of liaison officers and liaison

agents. The former were trained in all matters of communications and devoted to full time communication issues. The latter were detailed for communication duties for a specific period of time.¹³ As far as can be determined, liaison officers and liaison agents were not members of the field signal battalion or division signal officer staff, rather they were additional personnel task organized for battle to coordinate with higher, lower and adjacent units.

This memorandum also specified the duties of the officers within the field signal battalion. Specifically mentioned were the roles that the battalion commander, A Company (Division Radio Officer), B Company (Division Wire Officer), and C Company (Outpost Company) commanders performed in training, supervising, inspecting signal soldiers in their units and those who served at the division headquarters and in maneuver units. For example, the C Company commander, who also served as the Infantry Signal Inspector, had duties that included:

Inspection and coordination of all means of infantry communication within the infantry brigades and regiments. He furnishes replacements of personnel and material to these units. Coordinates with Artillery Communications Officer for the temporary liaison and fire control communications and with the Division Wire Officer as regards to rear centrals, routing and operations. Supervises the infantry signal training down to include the company signallers [*sic*].¹⁴

Overall, the purpose of the memorandum was to refine and specify the responsibilities for training, maintaining, and supervising liaison (communications) in field signal battalions and maneuver units.

The memorandum also broke down signal support by company (field signal battalion) in terms of personnel and equipment at the division, infantry brigade, regiment, and battalion P.C.s. The infantry brigade P.C. had a total of thirty soldiers from the field

signal battalion broken down into a message center, T.S.F (radio), telephone, and projector teams. The roster even identified the positions of a cook and teamster (the radio wagon was hauled by four horses) and a motorcycle with sidecar.¹⁵

The regimental P.C. had a total of forty soldiers from the field signal battalion broken down into message center, T.S.F (radio), T.P.S. (earth telegraphy), telephone, projectors, and pigeon teams. The same type of support personnel (cook and teamster) also came from the field signal battalion to support the signalmen. Additionally, the infantry regimental supply company provided a four-mule wagon for the specific purpose of transporting regimental signal equipment.¹⁶ This shows that maneuver commanders felt signal support was critical and supplemented the soldiers to support in the movement of their specialized equipment.

The infantry battalion now had a permanent twenty soldier signal detail assigned consisting of a noncommissioned officer in charge of four teams (T.P.S., telephone, projector, and buzzer phone). All equipment was man portable with no existing transportation assets identified other than a recommendation to use available space on ammunition carts for long moves (at the discretion of the battalion commander).¹⁷

This memorandum was critical in two main areas. First, it provided permanent attachment of signal specialists at the brigade, regiment and battalion level. This was a change from the earlier practice of waiting to attach soldiers to the unit on the eve of battle. The 1st Division was thus solving a problem that the table of organization had not foreseen. Second, the signal specialists within the division (Division Signal Officer, A, B and C Company commanders from the 2d Field Signal Battalion) received further guidance to inspect and ensure the proper conduct of training.

On the same day that the Division Signal Officer published his memorandum on Liaison, the G-3 published a memorandum titled "Liaison in semi-open warfare--in offensive or defensive actions." The latter memorandum broke down liaison responsibilities and methods from the division headquarters through battalion level. In regards to the field signal battalion, the memorandum specified that the axis of liaison was the backbone of the liaison system and was to consist of a number of telephone lines (both command and artillery) from the division P.C. forward to the ACI. Brigade, regimental and artillery grouping P.C.s would connect into the axis in order to transmit all information.¹⁸ The key change from the April and July memorandums was that the Division axis of liaison would be kept separate from the regimental wire system; the infantry brigade would be connected to its regiments on a separate wire system that only connected to the axis at the infantry brigade P.C. This was a change to current doctrine (all subordinate units connecting to the division axis) because axis of liaisons had become too unwieldy. Specifically, unnecessary and redundant lateral runs were using too much wire, which was becoming a premium in the AEF.¹⁹ Even with this change, the lack of wire in the AEF came to a crisis during the Meuse-Argonne. When the Armistice was declared, the AEF had less than five days worth of field wire available.²⁰

The ACI, located forward of the division P.C. on the axis of liaison, was to be situated near a well defined geographical feature (for ease of location) and organized with the purpose of becoming the future division P.C. during the advance.²¹ Although this information was more detailed than the earlier memorandums, it did not change the basic purpose of the ACI or the division axis of liaison.

The memorandum specified new guidance for the infantry regiments and brigades as well as the field signal battalion. Each combat element's signal teams, from regiment through division, would assume the forward unit's wire lines during the advance and rebuild them and provide laterals as directed by the Division Signal Officer. It also directed that centrals (switchboards) and test points be situated along the axis of liaison (to speed up the testing and repair of telephone lines).

Another change was that message centers were now organized at the P.C. of the division, brigades and infantry regiments, and they maintained all means of communications with higher headquarters. The message center's mission was to receive and transmit all information and orders.²²

The final change in this memorandum was that it placed responsibility for communications within the unit on the unit commander. This was critical because it placed the burden on the commander to keep in touch with both his higher headquarters and subordinate units. Soissons had taught the division staff that some commanders were out of touch for up to a day due to communication failures or their own attitudes on keeping higher headquarters informed and the memorandum sought to correct this problem. This principle of commanders being responsible for maintaining communications with higher headquarters remains in effect today.

The diagram entitled *Schematic diagram to accompany Principles of Communication in Semi-Open Warfare* is shown in figure 9. This diagram, although somewhat vague due to an incomplete legend, does show the basic wire diagram for the axis of liaison in semi-open warfare and was attached to the G-3 memorandum.

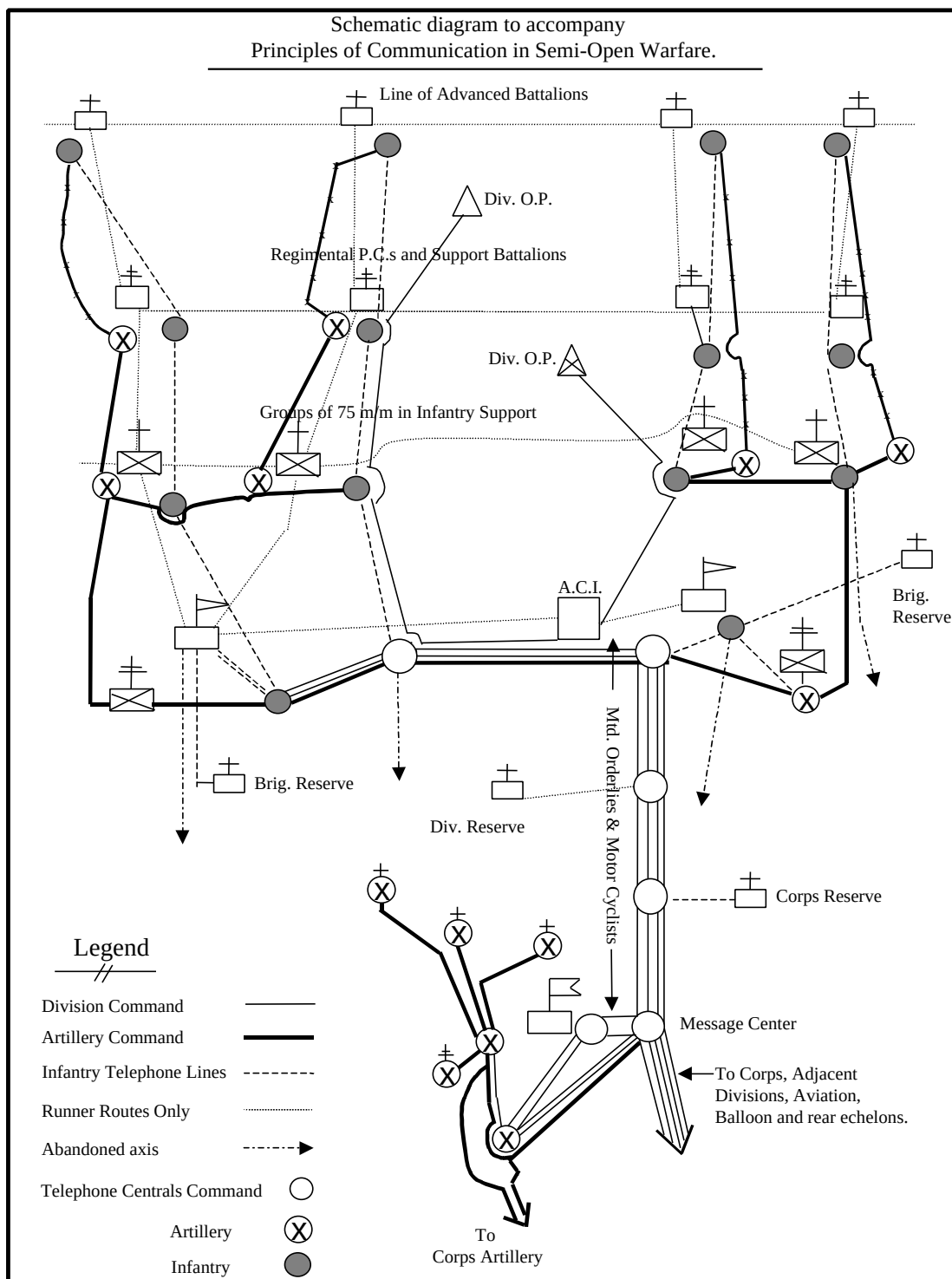


Figure 9. Diagram attached to the 1st Division memorandum "Liaison in semi-open warfare--in offensive or defensive actions," dated 2 August 1918. Source: *World War Records 1st Division A.E.F. Regular, Volume 2, Field Orders 1st Division June 1, 1918 to September 18, 1918.*

The 1st Field Signal Battalion, 2d Division had also learned lessons from their previous combat experience. After St. Mihiel, the battalion attempted to determine every possible contingency to lay wire prior to entering combat. During the battalion's four days of rest at Toul, three methods were devised and refined to aid in running wire forward during combat. The first was the use of a truck, with an iron bar run through spools of wire and placed on the tailgate of the truck. The second method was the use of the horse or mule drawn reel cart. Both methods relied heavily on roads, which were likely to be unusable or packed with troops, supplies, and trucks (as Soissons proved). The final method was to lay wire by hand. The shoulder coil was the preferred method. The shoulder coil was a quarter-mile of wire, tightly coiled to prevent it from snagging objects, and which was carried over the shoulder (this method of carrying wire is still used today in the MX-306, .25 mile reel of wire in a canvas bag).²³ This proved to be the best method to run wire through the battle scarred and torn terrain of the Meuse-Argonne. Thus the 1st Field Signal Battalion was actively attempting to improve its ability to provide effective communications support to the division during the upcoming battle.

Planning

Both the 1st and 2d Divisions left detailed records of their signal planning during operations in the Meuse-Argonne. On the morning of 30 September, the 2d Field Signal Battalion, 1st Division sent a detachment (advance party and reconnaissance) to the town of Cheppy to look at the wire network of the 35th Division, which was the unit to be relieved by the 1st Division. It was decided that the 1st Division would build a new telephone network. The Division used horses and mules (due to poor road conditions) to

bring forward signal supplies. On 1 October, the 2d Field Signal Battalion took over the 35th Division's net and began to build their new one. This early reconnaissance put the 2d Field Signal Battalion in a good position to support the upcoming Division movement and relief.

The 1st Division G-3 published a memorandum on 1 October 1918 directing the brigade P.C.s to maintain a courier at the Division Message Center at all times. It also directed the brigades to ensure when they moved to send another courier to the Division Message Center who knew the new location of the brigade P.C.²⁴

The 1st Division Field Order No. 47, dated 2 October 1918, listed the axis of liaison as Cheppy–Charpentry–Chaudron Farm–Exermont–Sommerance–Alliepont. The Plan of Liaison was listed under Appendix 1 to the field order, and was dated 30 September 1918. In addition to describing the axis of liaison, it also listed the number and type of circuits the field signal battalion installed along each leg of the axis. From Cheppy to Charpentry, three circuits were run along the Buanthe River. From Cheppy to Very, two circuits ran along a branch of the Buanthe River. Two circuits were run from Very to Charpentry. From Charpentry forward, five circuits were laid along the Min de Baulny–Cimetiere, Chaudron Farm–Exermont line. Of these five circuits, two were for command and one each for observation, artillery, and service (see figure 10 for the 1st Division axis of liaison).²⁵ An interesting note is that the plan of liaison was written two days prior to the publication of the field order. This possibly means that the communications scheme was made prior to the maneuver plan being finalized. This early publication was probably necessary to allow the signalmen time to install the wire network and move equipment forward.

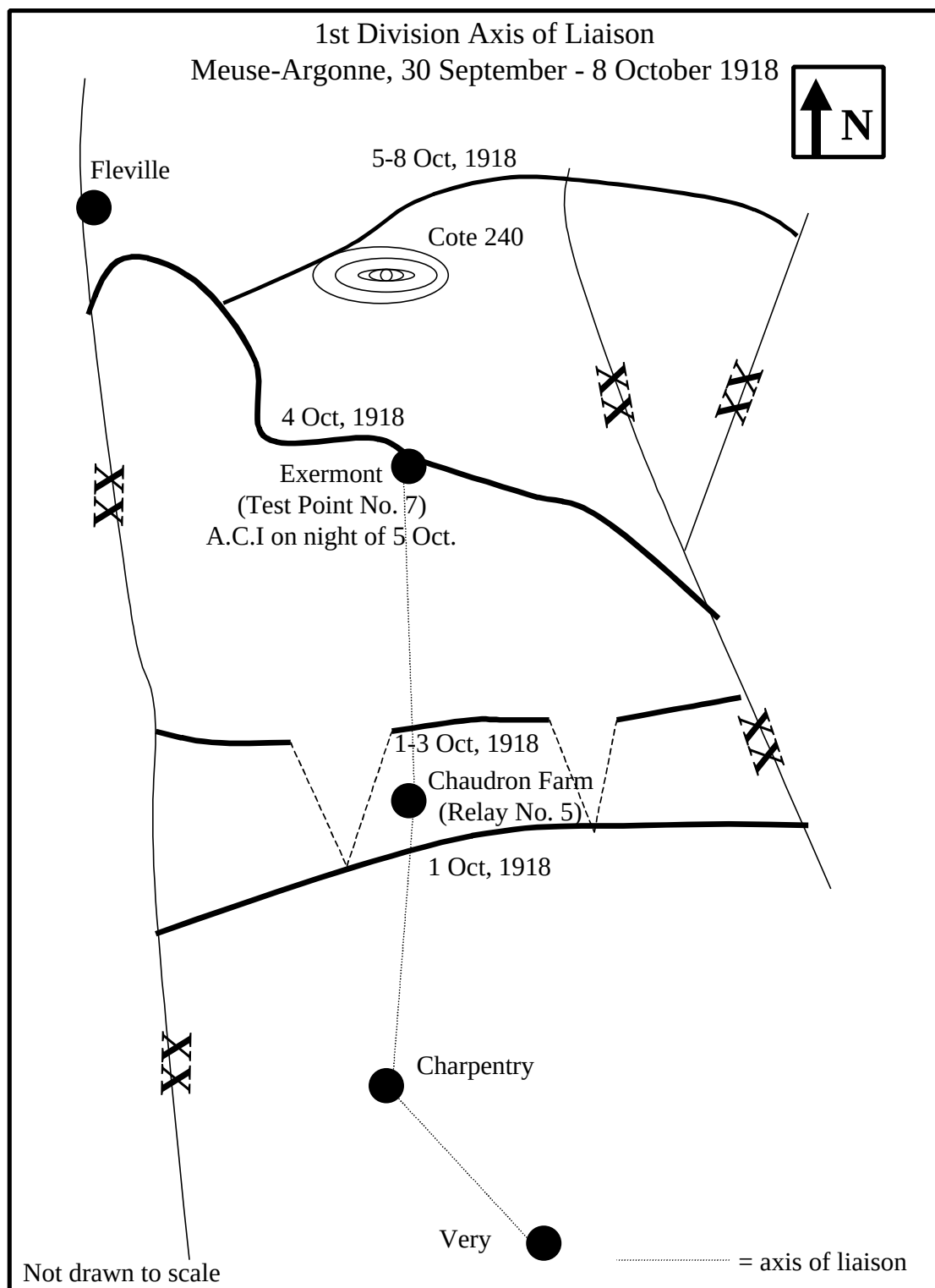


Figure 10. Sketched from the Map of the Meuse-Argonne accompanying American Battle Monument Commission, *1st Division Summary of Operations in the World War*, (Washington, DC: U.S. Government Printing Office, 1944).

The 1st Division Plan of Liaison also listed P.C. locations, types of panel markers, codes and ciphers, location of the signal dumps, and signaling methods for tanks and airplanes. The plan also gave the call signs and frequency to the adjacent division and brigades. Distribution of the Plan of Liaison was made to the adjacent divisions, I Corps, and the brigade and regimental signal officers.²⁶

On 3 October 1918, the G-3 published a memorandum entitled, “Subject: H hour, D day & Supplementary Instructions,” which provided further communications guidance. This document also explained communication with aircraft along with detailed guidance on maintaining forward and lateral communications during the advance.²⁷

Within the Division’s two infantry Brigades, signal planning was almost non-existent. The 1st Brigade Operations Instruction No. 71, dated 3 October 1918 references the Division’s Plan of Liaison under the section titled “Means of Liaison.” It directed each regiment to provide runners to serve as “Liaison Agents for the Brigade Headquarters.” This section also called for the regiments to exchange two runners with their adjacent regiments. Typically, machine gun platoons and rifle platoons were used to conduct combat liaison with adjacent units and divisions. The records do not reveal that any other signal equipment was used for this type of liaison other than runners.²⁸

Although Operations Instruction No. 71 did not list a Brigade axis of liaison, it did provide an “Axis of Move of Brigade P.C.” This axis was the general route along which the Brigade P.C. would move forward during the operation. This may also represent the path used by signalers to run the wire forward to the regiments and battalions.²⁹

The 1st Division's signal planning was thorough and complete. The Plan of Liaison and the Division field orders covered all areas of communications. The listing of the axis of liaison in the field order is noteworthy because it provided Division units key locations on the battlefield for message traffic.

The 2d Division Plan of Liaison, dated 30 September 1918 was an extremely detailed seven page memorandum, broken down into nine chapters, covering the axis of liaison, radio and T.P.S., panels, pyrotechnics, aeroplane, and balloon liaison, codes, visual signaling, pigeons, couriers and runners, and infantry-tank signaling. The first two chapters, axis of liaison, and radio and T.P.S. liaison were left blank and marked, "To be published later."³⁰ Similar to the 1st Division Plan of Liaison, the 2d Division's also referenced specific pages in *Liaison for All Arms*. This indicates that this manual was read and used by both Divisions.

The following day, 1 October 1918, the Division published Field Order No. 34, which directed the relief of the French 61st Division. The order directed the Division Signal Officer to confer with the 61st Division prior to the relief. On that same day, Annex I, to the Plan of Liaison, containing chapter II (Radio and T.P.S. Liaison) was published. It gave both CW and spark radio call signs and panel markings for the Division.³¹

On 2 October 1918 at 11:00 P.M. the Division published Field Order No. 35, which directed the attack toward Medeah Farm and Blanc Mont. The field order, in the section titled Combat Liaison, directed units to maintain contact with the French divisions on their flanks. The order mentioned the Plan of Liaison, as published on 30

September, with a change to Chapter VI, Codes. The changes were in the four letter designators of selected code words for the Division.³²

As stated earlier, the Plan of Liaison did not describe the axis of liaison (which was labeled as “to be published at a later date”). Field Order No. 34 and 35 did not mention the axis of liaison either. The lack of the axis of liaison in either the body of the field order (as 1st Division) or in the plan of liaison is critical. This could have led to maneuver unit signal units and liaison officers and agents being unaware of key locations throughout the battlefield. This was a failure on the maneuver commander for not incorporating the axis into the field order. An addition to the field order publishing the axis of liaison probably occurred (more on this below) and for any number of reasons was omitted from the *Records of the 2d Division Regular, Field Orders 1918–1919*, Volume 1. Another omission from the field order was the future locations of the Division P.C.

Although Field Order No. 35 and the Plan of Liaison failed to identify the axis of liaison, the Operation Report of B Company, 1st Field Signal Battalion confirmed the existence of an axis. The Operation Report, written by Captain John A. Hart, B Company commander, described the wire lines run from division through the brigades down to the regimental P.C.s, which confirms that the axis existed. The construction of the axis began on 30 September. The axis of liaison ran from the Division P.C. in Wagram up to Somme-Py, where the ACI was located. From this location, B Company wired in the brigade P.C.s.³³ The main route of the axis of liaison was made with heavy twisted pair, while light twisted pair was used for the regiments and below (see figure 11 for the 2d Division axis of liaison).³⁴ As far as can be determined, both Divisions’ axis of

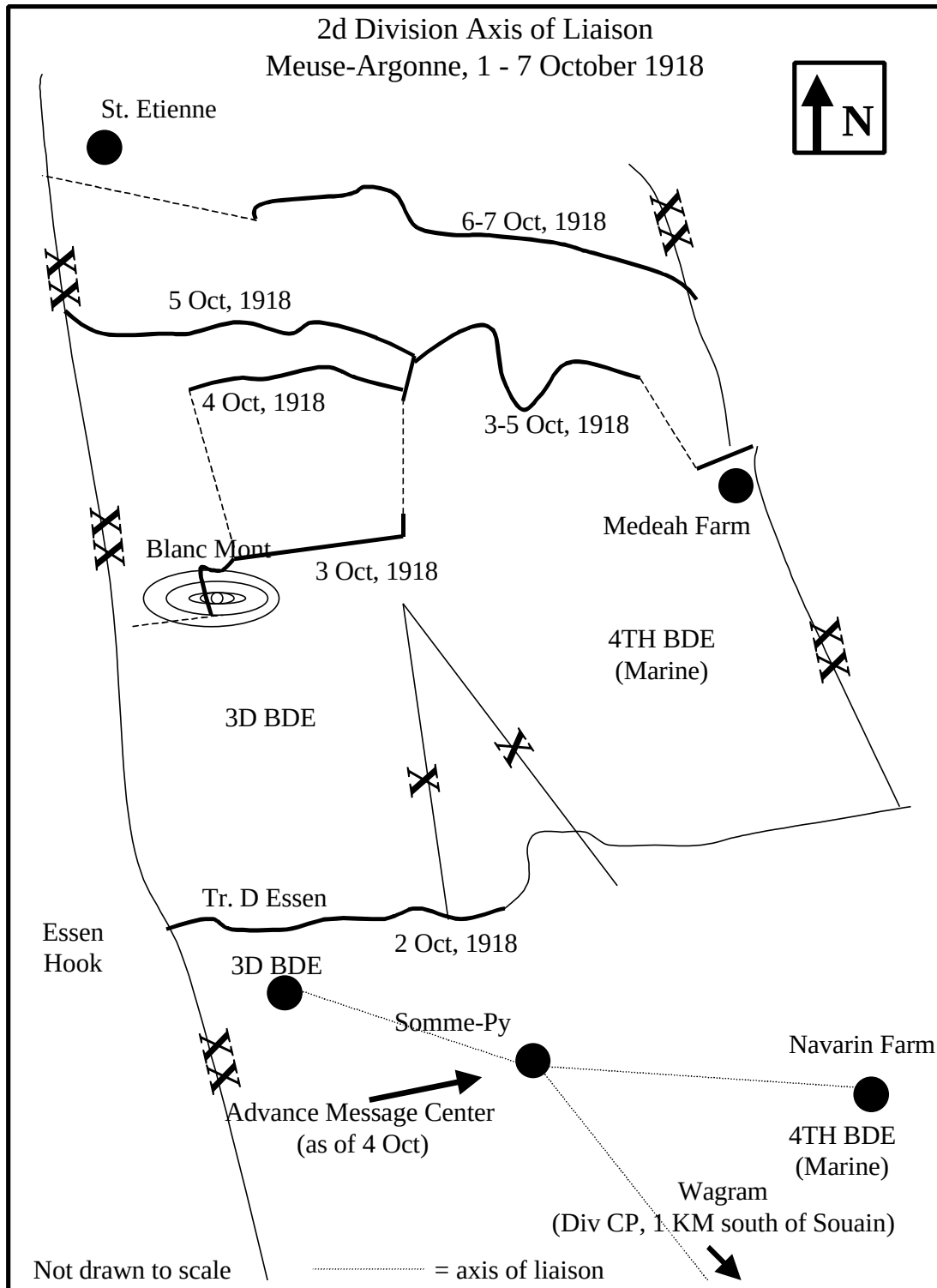


Figure 11. Sketched from the Map of the Meuse-Argonne accompanying American Battle Monument Commission, *2d Division Summary of Operations in the World War*, (Washington, DC: U.S. Government Printing Office, 1944).

liaison were only planned as far forward as the jump off line on the first day of the attack. This may have occurred for a number of reasons. Depending on the tactical situation, the maneuver units might not make progress forward, or could move out of sector due to an impenetrable obstacle or stiff enemy defense. The Division Signal Officer and the Field Signal Battalion may have made tentative locations for the axis of liaison, but not recorded it in the field orders or Plan of Liaison due to it only being tentative and not wanting to cause confusion.

It is interesting to note that on 2 October, the day prior to the attack, the 6th Marine Regiment provided a wire carrying detail of one lieutenant and forty-three men to the Field Signal Battalion's B Company. The Marines, along with men of B Company, carried approximately eight miles of wire to Somme Py.³⁵ This shows that the leadership within the 2d Division realized the importance of supporting the Field Signal Battalion in establishing communications. It also showed that the Field Signal Battalion did not have the adequate manning or equipment to move wire and equipment during combat operations.

Within the 2d Division's infantry Brigades, the field orders reveal almost no mention of signal planning other than referencing the Division's Plan of Liaison.³⁶ As mentioned earlier, because the majority of signal personnel supporting the Brigades came from the 1st Field Signal Battalion, the Division Plan of Liaison may have sufficed for planning purposes. If this were the case, it would necessitate the distribution of the Plan of Liaison down to the infantry battalion.

The 2d Division's signal planning was also very thorough, yet incomplete due to the omission of the axis of liaison. Beyond this omission, the Plan of Liaison and field orders were well crafted for the coming battle. Both 1st and 2d Divisions were going into the fire of battle with detailed communication plans, which sufficiently supported the initial scheme of maneuver. The signal planning showed marked improvement from that of Soissons, two months earlier.

Execution

On the night of 2-3 October, members of the 1st Field Signal Battalion, 2d Division ran the axis of liaison forward and set up a telephone switchboard and radio station in a stone culvert under a railroad embankment at Somme-Py (the ACI). Unknown to the 1st Field Signal Battalion, the 3d Brigade P.C. moved and caused an all night search by a wire detail for its new location. The wire detail found the P.C. and connected them to the Division prior to the jump off of the attack. That night, the E-10 bis radio set at the ACI, which maintained communications with the Division P.C., malfunctioned. A master signal electrician from the Field Signal Battalion moved forward through a barrage and repaired the set.³⁷

The 2d Division attack began at 5:50 A.M. on 3 October. The Division made good progress and reached their objectives, which were a line from the crest of Blanc Mont to Medeah Farm by 8:40 A.M. The axis moved forward and kept pace with the advance of the maneuver units. The Field Signal Battalion had pooled the soldiers of B Company (Wire) and C Company (Outpost) in order to leapfrog stations along the axis. Signalmen carried radio batteries forward along the axis.

After reaching their initial objectives, the Division consolidated and reorganized while a French Division moved through their rear to attack to the west (the Essen Hook). The Division published Field Order No. 36 at 2:00 P.M. on 3 October, directing a continuation of the attack to the northwest. The objective was the line from the road junction one kilometer southwest of Scay Farm to one kilometer south of St. Etienne. The Division directed patrols to reconnoiter the town of St. Etienne.³⁸ The order (what we would call a fragmentary order today) was only one page long and did not mention signal communications. This may imply that the scheme of maneuver and communications support was not coordinated as well as it could have been. The attack jumped off at 4:00 P.M., with the 3d Brigade, on the right, making greater progress than the 4th (Marine) Brigade on the left. Thus the Brigades were not adjacent to each other by the end of the day. Wire was run forward from the 4th Brigade P.C. toward Blanc Mont and St. Etienne, and was completed by 10:00 P.M. The 3d Brigade P.C., located four kilometers north of Somme-Py, was out of contact with the Division. A wire detail, using a wire cart, ran a line from the 4th Brigade P.C. to the 3d Brigade P.C. This is an example of how commanders realized the critical role of communications during battle. Maneuver commanders were so cognizant of the need to communicate with higher headquarters that they adapted their communications plan to support the dynamic needs of battle. Later that night, the 4th and 3d Brigade P.C.s had two circuits between them, connected through a station on the axis.³⁹ The maintenance of the telephone wires along the axis was difficult due to numerous artillery barrages, yet the signalmen kept the circuits operational in support of the next days' attack.

The 2d Division made over seven kilometers of progress on 3 October and the Field Signal Battalion kept the axis operational. Lieutenant Thomas Donaldson, (Company B), kept the forward telephone station (ACI), with the advancing regiments. At one point, he was a bit too eager and established the station in St. Etienne before it was clear of Germans. He withdrew with his switchboard five hundred meters and set up once again.⁴⁰

On 4 October at 6:00 A.M., the 2d Division published Field Order No. 37, directing the attack toward Machault and Cauroy. The jump off time depended on the French Divisions to the left and right. The attack was launched at 2:30 P.M. There was no change to the Plan of Liaison in the field order.⁴¹ The 1st Field Signal Battalion continued to maintain and advance the axis of liaison despite the frequent outages due to artillery fire. According to the Operation Report of B Company, 1st Field Signal Battalion, the brigade station moved forward and occupied the regimental station on 4 October. This meant the axis of liaison was moving forward and assuming the stations of the forward units.

On the morning of 4 October, Brigadier General Ely, commander of 3d Brigade, sent two field messages to the Division P.C. (the first carried by his adjutant, the second is of unknown transmission), both requesting that an Advance Message Center be established at least as close as Somme-Py. General Ely complained that it was difficult to keep in contact due to the great distance between the Brigade and Division's P.C.s. He also requested that the Division try and fix the telephone lines from their end, "as we can't keep them up."⁴² This message showed the vulnerability of wire lines in the axis of liaison due to artillery fire. The strain on the axis of liaison was being felt by 3d Brigade,

which caused their commander to almost beg for the Division to help. It should be noted that radio communications were working so well that the Division may not have realized the magnitude of the wire line problem. Also, the Division had not yet moved its P.C. or Advance Message Center forward from Wagram since the start of the attack on the previous day.

At 10:55 A.M. on the same day, Colonel J. C. Rhea, Chief of Staff of 2d Division, sent a message to General Ely, informing him of the tactical situation and the instructions for the future attack. This message provides insight into the methods and means of communication available and used by the Division. Colonel Rhea acknowledged one of General Ely's messages sent one hour earlier. The Division plan was to wireless (radio) the actual H-hour (the time the attack would commence) to Ely because the telephone connection was out. The division headquarters directed Ely to confirm receipt of this message via radio. The message also announced the intent of the Division to jump forward an Advanced Message Center, to be followed later by the Message Center and Division P.C. The holdup was that wire had not been run to that location yet.⁴³

This message confirmed that the Division knew the telephone lines were down and that the Advance Message Center would move up. General Ely had been heard! This message also reveals the use and reliability of radio between the Brigades and the division P.C. while showing the vulnerability of wire in open warfare due to artillery. The 2d Division made great use of the radio throughout the Meuse-Argonne. Finally, telephone lines were back up by 11:35 A.M., and the attack jumped off at 2:30 P.M. with a rolling barrage. Although communications were good, little progress was made that day due to stubborn enemy resistance.

On 5 October at 4:00 A.M., the 2d Division issued Field Order No. 38, which directed a continuation of the attack toward the previous day's objective. The Division was to jump off once the French divisions on its flanks came abreast of it. As it turned out, the French Division on the right flank of 2d Division made little progress, so 3d Brigade never attacked. The 4th (Marine) Brigade made limited attacks.⁴⁴ Throughout the battle, the Division received numerous field messages from the maneuver brigades and airplanes via radio. Radio was clearly an asset within the Division, judging by the number of reports being received as an alternate means to telephone (wire). A Company, 1st Field Signal Battalion reported after the battle that, "a total of 99 official messages [radio] were handled by the division system during the action." The report also mentioned that most delays from the spark-sets (brigades to regiments) were caused by jamming from other sets.⁴⁵ Radio was useful during the battle due to the damage caused by artillery to the Division's wire network. The long distances between P.C.s made the technique of burying wire (to avoid damage by artillery) impractical.

Two documents from the Division dated 5 October show the actions of the 1st Field Signal Battalion and the Division Signal Officer. The memorandums were "Rectification of Plan of Liaison, Chapter 4" and "A Rectification of the Plan of Liaison of the 2d Division, Chapter 4." The first memorandum directed changes to the pyrotechnic codes because of the earlier codes having fallen into the hands of the enemy. The changes were for signals made by the infantry and airplanes. The second memorandum changed rocket and smoke signals for the infantry.⁴⁶ These memorandums are insightful because they show that the Signal Corps was effectively adapting to the

changing operational and tactical picture during the battle, in order to support the Division in its combat mission.

The 2d Division conducted further limited attacks toward Machault–Cauroy for five more days. The U.S. 36th Division relieved the 2d Division on 10 October. The 1st Field Signal Battalion had suffered 49 casualties out of 470 men in the Meuse-Argonne (Champagne), of which 4 were killed.⁴⁷

The 2d Field Signal Battalion, 1st Division began building its axis of liaison on 1 October 1918. On that afternoon and evening, the Field Signal Battalion ran four metallic circuits of heavy stranded steel field wire along the railroad to the 1st Brigade P.C. and on through the valley to Very, the location of the 2d Brigade P.C. The axis was then run along the main road from Very to Charpentry. On the night of 2 October, the axis was run into the second valley north of Charpentry, and a test point established. Between Cheppy and the end of the axis, signal soldiers established four other test points. The Division's brigades, regiments, and battalions were hooked into the axis, and it was kept operational though continuously cut by artillery shelling.

The 1st Division attacked at 5:25 A.M. on 4 October 1918, supported with tanks. The axis of liaison was moved forward behind the rolling barrage and the first wave of infantry. Progress went well as the infantry moved forward. The Division met its objectives for the day, and in fact the 16th Infantry surpassed theirs and had to pull back in order for the Division to consolidate its positions that night.⁴⁸

The 2d Field Signal Battalion had a busy day extending the axis of liaison. The Field Signal Battalion ran wire from relay No. 5 at Chaudron Farm to relay No. 6 and on to No. 7, (south of Exermont), establishing two wire circuits by 9:30 P.M. Signalers

connected two additional lines within an hour and a half. This was in time to support the move forward of the brigade and regimental P.C.s, which were then connected into relay No. 7 (the new ACI).⁴⁹

In the 26th Infantry Regiment, the standard operating procedure was for the assault battalion to run and maintain the wire back to the supporting infantry battalion (regiments normally attacked with two battalions, leaving the third in support for follow on operations). The supporting infantry battalion maintained the wire lines back to the regimental P.C.s. The telephone section of the regimental signal detachment assisted in maintaining the entire regimental telephone system.⁵⁰

The infantry maneuver units typically ran a ladder line from one P.C. to another. Ladder lines were telephone wires; normally run ten yards apart and bridged (connected) at regular intervals. At the bridges, linemen with test sets maintained the wire. In the 3d Battalion, 26th Infantry, one man patrolled every five hundred-yard section of line, both day and night, looking for breaks.⁵¹ This constant patrolling took a great deal of manpower away from the front lines, but paid dividends throughout the battle.

On 5 October, the 1st Division continued the attack toward Fleville at 6:30 A.M., in accordance with I Corps' plan. Once again, a rolling barrage and tanks supported the infantry. The attacking forces had a tougher challenge on this day and did not make good progress. The 16th Infantry did not attack because the other units were still far behind and could not support its attack. The end of the day found the infantry regiments abreast of one another, having made little progress and facing a determined and pugnacious foe.⁵²

During that same day, signalers ran a lateral line from Chaudron Farm to Serrieux in order to connect the 2d Brigade and artillery.⁵³ No further activity seems to have

occurred on the axis of liaison except maintenance due to repeated breaks by artillery. The Division had a viable system in place to monitor and repair the lines, so that telephone communications were considered reliable.

Signal detachments of the forward units attempted T.P.S. but found it too costly. The time needed to transport the equipment and for set up, along with the casualties and damaged equipment, outweighed its value in open warfare. The use of radio within the Division was primarily to communicate with higher headquarters, adjacent divisions, and airplanes. The amount of fog and smoke on the battlefield negated the use of projectors, and pigeons were not used.⁵⁴

Down at the infantry companies, runners were the only means of communications to other companies and the battalion P.C.s. Runners, mounted messengers, and the telephone were the primary means of communications between battalions and regimental P.C.s. The use of runners in combat was the most reliable means of communications, yet also very dangerous. According to Major Lyman S. Frasier, commander of 3d Battalion, 26th Infantry, 1st Division:

An important message would be sent by at least two runners, one leaving some little time after the other. It was also found advisable to place some distinguishing mark upon runners. When no distinguishing marks were worn, it required that they carry their messages pinned on their blouses in a conspicuous place.⁵⁵

The runners must have looked upon this as a necessity and yet with ominous foreboding.

On 6 October 1918, the 1st Division consolidated and reorganized its positions, maintaining contact with the enemy through patrolling but not conducting a general attack. On 7 October, the Division was assigned to V Corps, with a mission to capture

the heights west of Romagne-sous-Montfaucon.⁵⁶ This ended the second phase of the Meuse-Argonne for the 1st Division.

After the war, Major Frasier commented on the cost of maintaining communications during the second phase of the Meuse-Argonne offensive. He stated, “It cost the 3d Battalion 74 men to maintain telephone communications, but had we not had communications at all times, the number of casualties that could have been charged to the lack of it might well have been 740 instead of 74.”⁵⁷ The cost of maintaining communications was also high in the Field Signal Battalion. The 2d Field Signal Battalion, 1st Division had seventy-two casualties, including five killed, eight missing, thirty-seven wounded and twenty-two gassed. The infantry signal detachments had 138 casualties.⁵⁸

Summary

Communications support within the 1st and 2d Divisions during combat operations in the Meuse-Argonne was generally effective. The success of the support was based upon three points. The first was the effective planning which took place prior to soldiers going on the attack. The 1st and 2d Divisions laid out detailed signal plans prior to the battle and made adjustments to the plan as the battle raged on. Throughout the battle, 2d Division passed critical messages in regards to attacks and coordination over radio because telephone lines being cut by artillery. The signal plans were flexible enough to support changes that occurred because, as the Elder Moltke said, “no plan of operations survives the first collision with the main enemy body.”⁵⁹ That the plan was changed due to the friction of war is a testament to the plan’s flexibility in open warfare.

A second reason for the success of signal support to the divisions was the experience and training of the 1st and 2d Field Signal Battalions and the maneuver signal units. Although turnover in the signal units were high due to casualties, both the 1st and 2d Divisions were veteran outfits who had been in France for fifteen and eight months respectively. These units had experience and continuity in personnel when entering combat. They had learned their lessons from Cantigny, Belleau Wood, Soissons, and St. Mihiel. This is not a unique fact and shows the normal progression of units who are forged by combat into effective organizations.

The final point about the success of the operations was the importance that the chain of command placed upon communications before and during the battle. As evidenced by the comments of Brigadier General Ely and Major Frasier, commanders knew by this point in the war that if they failed to maintain communications with lower, higher, and adjacent units, men would die. Another example of the importance placed on communications by commanders was the infantry and Marine details provided to the 1st and 2d Field Signal Battalions to carry wire forward. Combat liaison, or the ability to communicate with other elements on the battlefield, was of high priority within both Divisions. This was especially true for the 2d Division as it was operating in a French Corps with French Divisions on its left and right.

The Meuse-Argonne offensive ended on 11 November 1918 as the guns fell silent along the Western Front. The Signal Corps had come a long way and made many changes in organization, doctrine, training and technology after April 1917. The immediate post war years would also show changes within the Signal Corps from lessons learned on the fields of France.

1

²*World War Records 1st Division A.E.F. Regular, Volume 3, Field Orders 1st Division September 19, 1918 to Conclusion*, Memorandum: H hour, D day & Supplementary Instructions, 3 October 1918.

³Larry H. Addington, *The Patterns of War Since the Eighteenth Century* (Bloomington, IN: Indiana University Press, 1994), 169.

⁴Paul F. Braim, *The Test of Battle: The American Expeditionary Forces in the Meuse-Argonne Campaign, 26 September–11 November 1918* (Ann Arbor, MI: University Microfilms, 1983), 127-8.

⁵*Ibid.*, 137.

⁶American Battle Monuments Commission, *2d Division Summary of Operations in the World War* (Washington, DC: U.S. Government Printing Office, 1944), 49-51.

⁷*Ibid.*, 52-4.

⁸American Battle Monuments Commission, *1st Division Summary of Operations in the World War* (Washington, DC: U.S. Government Printing Office, 1944), 62.

⁹*Ibid.*, 62-67.

¹⁰Braim, *The Test of Battle: The American Expeditionary Forces in the Meuse-Argonne Campaign, 26 September–11 November 1918*, 125-6.

¹¹American Battle Monuments Commission, *2d Division Summary of Operations in the World War*, 52.

¹²American Battle Monuments Commission, *1st Division Summary of Operations in the World War*, 66.

¹³Henry L. King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons" (Individual Report, Fort Leavenworth, KS: Command and General Staff School, 1933), 59.

¹⁴*Ibid.*, 60-61.

¹⁵*Ibid.*, 64-5.

¹⁶*Ibid.*, 65-6.

¹⁷Ibid., 67.

¹⁸*World War Records 1st Division A.E.F. Regular, Volume 2, Field Orders 1st Division June 1, 1918 to September 18, 1918*, Memorandum: Liaison in semi-open warfare--in offensive or defensive actions, 2 August 1918.

¹⁹King, "A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons," 77.

²⁰Frank W. Bullock, "Wire Industry Vital to Industrial War Planning," *The Signal Corps Bulletin*, 66 (May-June, 1932): 6.

²¹*World War Records 1st Division A.E.F. Regular, Volume 2, Field Orders 1st Division June 1, 1918 to September 18, 1918*, Liaison in semi-open warfare--in offensive or defensive actions, 2 August 1918.

²²Ibid.

²³United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919* (Washington, DC: U.S. Government Printing Office, 1919), 456.

²⁴*World War Records 1st Division A.E.F. Regular, Volume 3, Field Orders 1st Division September 19, 1918 to Conclusion*, Memorandum for Brigade Commanders, 1 October 1918.

²⁵*World War Records 1st Division A.E.F. Regular, Volume 3, Field Orders 1st Division September 19, 1918 to Conclusion*, Plan of Liaison, 30 September 1918.

²⁶Ibid.

²⁷*World War Records 1st Division A.E.F. Regular, Volume 3, Field Orders 1st Division September 19, 1918 to Conclusion*, Memorandum: H hour, D day & Supplementary Instructions, 3 October 1918.

²⁸*World War Records 1st Division A.E.F. Regular, Volume 8, Field Orders, Operations Memoranda, etc., 1st & 2d Infantry Brigades*, 1st Infantry Brigade Operations Instruction No. 71, 3 October 1918.

²⁹Ibid.

³⁰*Records of the 2d Division Regular, Volume 1, Field Orders 1918-1919*, Plan of Liaison, 30 September 1918.

³¹*Records of the 2d Division Regular, Volume 1, Field Orders 1918–1919, Annex I, Plan of Liaison, 1 October 1918.*

³²*Records of the 2d Division Regular, Volume 1, Field Orders 1918–1919, Field Order No. 35, 2 October 1918.*

³³*Records of the 2d Division Regular, Volume 8, Operation Reports, War Diaries, 1st Field Signal Battalion, 1918, Operation Report, B Company, 1st Field Signal Battalion, 12 October 1918.*

³⁴*United States Army Signal Corps, Report of the Chief Signal Officer to the Secretary of War, 1919, 456.*

³⁵*Ibid.*, 456.

³⁶*Records of the 2d Division Regular, Volume 2, Field Orders 3d & 4th Brigades, 1918, 3d Brigade Field Order No. 37, 2 October 1918 & 4th Brigade Field Order No. 18, 1 October 1918.*

³⁷*Ibid.*, 456-7.

³⁸*Records of the 2d Division Regular, Volume 1, Field Orders 1918–1919, Field Order No. 36, 3 October 1918.*

³⁹*United States Army Signal Corps, Report of the Chief Signal Officer to the Secretary of War, 1919, 457.*

⁴⁰*Ibid.*, 457.

⁴¹*Records of the 2d Division Regular, Volume 1, Field Orders 1918–1919, Field Order No. 37, 4 October 1918.*

⁴²*Records of the 2d Division Regular, Volume 4, Field Messages, 3d Infantry Brigade, 1918-1919, Field Message 3d Brigade, 4 October 1918.*

⁴³*Records of the 2d Division Regular, Volume 1, Field Orders 1918–1919, Memorandum to 3d Brigade Commander, 4 October 1918.*

⁴⁴*American Battle Monuments Commission, 2d Division Summary of Operations in the World War, 61.*

⁴⁵*Records of the 2d Division Regular, Volume 8, Operation Reports, War Diaries, 1st Field Signal Battalion, 1918, Operation Report, A Company, 1st Field Signal Battalion, 12 October 1918.*

⁴⁶*Records of the 2d Division Regular, Volume 1, Field Orders 1918 – 1919, Memorandums, 5 October 1918.*

⁴⁷United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 457.

⁴⁸American Battle Monuments Commission, *1st Division Summary of Operations in the World War*, 68.

⁴⁹United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 486.

⁵⁰Infantry Journal, *Infantry in Battle* (Washington, DC: The Infantry Journal Incorporated, 1939), 193.

⁵¹*Ibid.*, 193.

⁵²American Battle Monuments Commission, *1st Division Summary of Operations in the World War*, 69-70.

⁵³United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 486-7.

⁵⁴*Ibid.*, 487.

⁵⁵Infantry Journal, *Infantry in Battle*, 193.

⁵⁶American Battle Monuments Commission, *1st Division Summary of Operations in the World War*, 71.

⁵⁷Infantry Journal, *Infantry in Battle*, 193.

⁵⁸United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 487.

⁵⁹Peter Paret, *Makers of Modern Strategy from Machiavelli to the Nuclear Age* (Princeton, NJ: Princeton University Press, 1986), 300.

CHAPTER 5

IMMEDIATE POSTWAR CHANGES

The importance of intercommunication in warfare can not well be exaggerated.¹

Major General George Squier, *Report of the Chief Signal Officer to the Secretary of War, 1919*

Introduction

The Signal Corps ended the Great War having rapidly expanded and changed in order to support the efforts of the maneuver elements within AEF infantry divisions. Like the rest of the Army after the war, the Signal Corps drastically reduced in size from over 55,000 officers and men to approximately 5,300 in 1921 and down to 3,000 in 1922.² Once the war ended and demobilization occurred, the Signal Corps began to make institutional changes in its organization, doctrine, training, and technology; many of these changes were based on wartime experiences to meet the needs of the postwar Army.

Organization

The postwar infantry division maintained the same overall “square division” structure as during the war, but with a number of other changes. The infantry division received a new table of organization on 4 May 1921. This new organization scaled down the infantry division in size from over 28,000 to 19,389, primarily by rifle companies being reduced in size from 250 down to 200 men and the reduction of the artillery brigade from three regiments to two. The infantry division also dropped the machine gun battalion but added a machine gun company to every infantry battalion and howitzer

company to each infantry regiment. The infantry division also added a medical regiment and a light tank company.³ The division staff still maintained a Signal Corps lieutenant colonel as the Division Signal Officer. Major changes took place within the former field signal battalion and with communications personnel in the division maneuver units.

The infantry division's field signal battalion was reduced to a signal company, located within the special troops battalion.⁴ The signal company was now authorized 156 personnel (as opposed to 474 in the field signal battalion) and consisted of a headquarters platoon, operation platoon, and a construction platoon (see figure 12).

SIGNAL COMPANY ORGANIZATION IN AN INFANTRY DIVISION

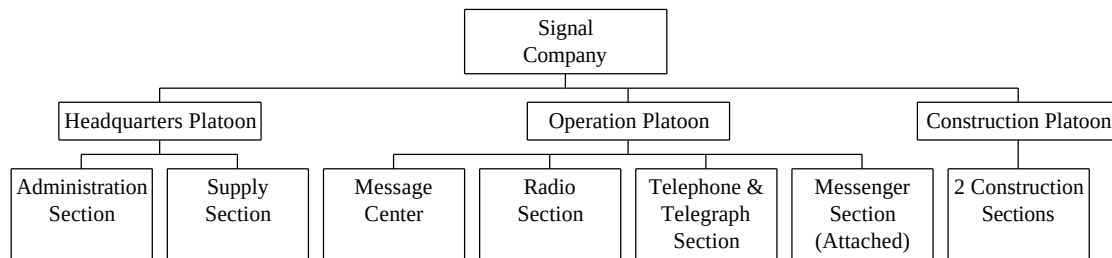


Figure 12. Based on the *Tables of Organization*, dated 4 May 1921, page 11.

The headquarters platoon was broken down into an administration and supply section with a total of thirty-six men. A captain and first sergeant were authorized for the administrative section, with a first lieutenant and staff sergeant in charge of the supply section.⁵ The headquarters platoon served the same functions as the headquarters and supply detachment of the previous field signal battalion. The commander of the signal company also served as the assistant to the Division Signal Officer.

The operation platoon consisted of two officers and sixty-eight men, organized into the message center, radio section, and telephone and telegraph section. The message center was authorized a second lieutenant and eight men, with the mission to receive, record, dispatch, and deliver all written official communications (except mail) which arrived or departed the division headquarters. The radio section was authorized a first lieutenant and twenty-eight men, with the mission to establish radio communications with corps and adjacent divisions and with division units (brigades, division air services, signal tank, and attached balloon units). This was the first time that tank units had a radio mounted in a "signal tank" for communications with higher headquarters. The telephone and telegraph section was authorized thirty-two men (a master sergeant in charge) with the mission to install, operate, and maintain telephone and telegraph systems at division headquarters. The operation platoon had an attached messenger section while in the field. The mission of the messenger section was to maintain scheduled messenger service to subordinate units and service as required to superior, adjacent, and subordinate units.⁶ The messenger section had no organic personnel assigned from the signal company. The messengers were detailed from units for specific exercises or for battle. The operation platoon served the same functions as parts of the wire and radio companies of the previous field signal battalion. The major change was that the platoon now only serviced the division headquarters, rather than reaching down into the infantry brigades. The infantry brigades had their own organic signal support.

The construction platoon consisted of two officers and forty-eight men, organized into two construction sections. Each section was identical in strength (one officer and twenty-four men) and organization, the only difference being the authorization for a first

lieutenant in one section and a second lieutenant in the other. Their mission was to construct and maintain wire line circuits between division headquarters and brigades, and division troops and activities, except the air service.⁷ This platoon served the same purpose as the wire company in the previous field signal battalion.

The major equipment in the signal company consisted of five radio sets, thirty-six telephones, eighty miles of single field wire, twenty-five miles of heavy twisted pair, eighteen miles of light twisted pair, and four two-horse wire carts. The signal company was authorized more motorcycles and trucks per person than the previous field signal battalion. The signal company, with 156 personnel, now had nine motorcycles with sidecars, and sixteen trucks, to include two that carried radios.⁸ This compares with the previous field signal battalion, with 474 personnel, which was authorized nineteen motorcycles, and only ten trucks.⁹ The new organization now had the mobility to better support the division.

The infantry brigade, regiment, and battalion organizations were now authorized communications platoons, which fell under the headquarters company of the unit. In the infantry brigade, the communications platoon consisted of one officer and fifty-nine men, organized into the platoon headquarters, message center section, messenger section, radio and panel section, wire section, and visual section (see figure 13).

**INFANTRY BRIGADE, REGIMENT AND BATTALION
COMMUNICATIONS PLATOON ORGANIZATION**

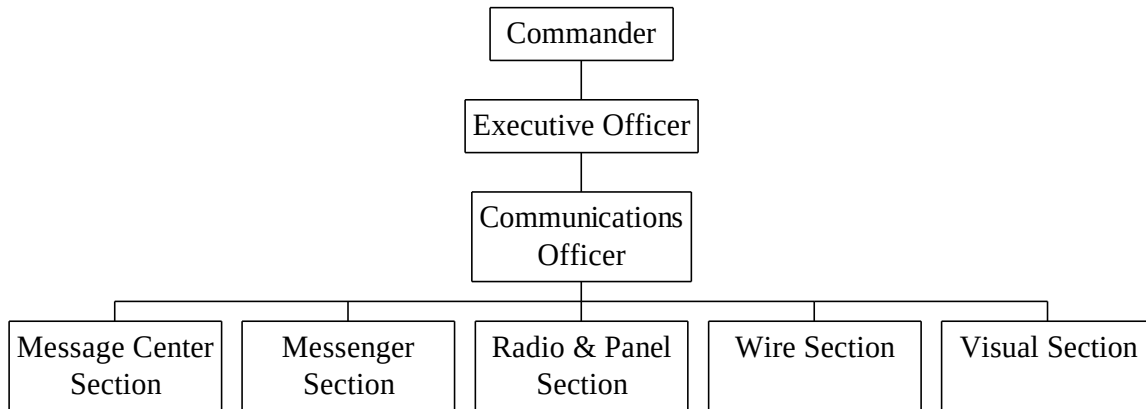


Figure 13. Based on the *Tables of Organization* dated 15 April, 1921, page 17.

The platoon headquarters consisted of one lieutenant and a master sergeant. The lieutenant served as the Communications Officer for the brigade. The message center section consisted of six men with the mission to receive, record, dispatch, and deliver all official written communications (except mail) arriving or leaving the unit. The messenger section had nineteen men with the mission to maintain a scheduled messenger service to subordinate units and operate special messengers to superior, subordinate, and adjacent units. The radio and panel section consisted of ten men with the mission to communicate with division, adjacent units, subordinate units, and supporting units (when they were equipped with radios) and display panels. The wire section consisted of sixteen men with the mission to establish and maintain telephone systems at headquarters; and to construct and maintain wire circuits to next subordinate units, to supported units and other activities in the headquarters. The visual section consisted of

seven men with the mission of providing visual signals and observation for emergency signals from the front line.¹⁰

The infantry brigade communications platoon's major equipment consisted of two radio sets (one for higher and adjacent units, one for lower units), two four-line and two twelve-line switchboards, eleven telephones, fifteen miles of field wire, eight miles of outpost wire, and two hand pack reel carts.¹¹

This new organization greatly increased the number of signal soldiers in the brigade. The previous table of organization only authorized thirteen men in communication roles within the infantry brigade headquarters. The new organization effectively took the outpost company (company C) from the field signal battalion and permanently attached its soldiers to the infantry brigade, regiment, and battalion headquarters. This change was the next logical step of what the 1st Infantry Division had tried to accomplish with their reorganization of signal personnel in August 1918 after lessons learned from the battle of Soissons. This concept of having a permanently assigned signal platoon at the maneuver brigade and battalion headquarters is still in practice today, along with the platoon leader being the Communications Officer for the unit.

The shift of signal personnel from the former field signal battalion down to the maneuver units was also seen in the infantry regiments. Whereas the previous *Table of Organization* (January 1918) had only a signal section within the headquarters platoon of the infantry regiment, the new organization provided a communications platoon. The communications platoon consisted of one officer (first lieutenant) and fifty-three men, with the same organization and mission as the infantry brigade communications platoon.

The units' major equipment was the same as the infantry brigade communications platoon's except it had only eight telephones, three hand pack reel carts, and fifteen miles of outpost wire.¹² Again, permanently assigned signal soldiers in a platoon structure were now in the positions formally held by C company of the previous field signal battalion.

The infantry battalion communications platoon consisted of one officer (first lieutenant) and thirty-six men, with the same organization and mission as the infantry brigade and regimental communications platoon. The units' equipment was the same as the infantry brigade and regimental platoon except it had only one radio set (to communicate with regiment, adjacent units, and supporting artillery), one hand pack reel cart, two four-line switchboards, four telephones, and five miles of light wire.¹³ Placing radios down at the battalion level was a significant shift from the previous practice of having radios only at the regimental and above level.

The infantry rifle company's were authorized a Signal Corps corporal and six runners in the company headquarters platoon. Each of the three rifle platoons was authorized four runners for a total of eighteen runners in the company.¹⁴

The shift in the infantry division organization to permanently assign Signal Corps soldiers in platoon strength at the brigade, regiment, and battalion levels was an important step in the evolution of signal support. This organization supported the concept of higher to lower signal support, which was utilized during World War I. The organization also formally placed Signal Corps officers on the maneuver unit staffs down to the battalion level to advise the commander on all communication matters and command the signal soldiers supporting the unit. This organization solved the problem of

signal soldiers not arriving at the jump off site on time or not knowing who the personnel in the unit were during combat operations.

Doctrine

The Signal Corps was lacking coherence in the area of doctrine during World War I. The Army had numerous doctrinal communications manuals (based on British and French originals) during the war. The problem was that the manuals were all from different sources and not standardized. This failure, which was a systemic Army wide problem, was solved within seven months of the end of the war.

In June 1919, the General Headquarters, AEF published *Signal Communications for All Arms (Provisional)*. This manual should be considered a wartime product due to the abruptness of the conflict ending and the information being gleaned so recently in the same theater of war. The intent of the manual was for production and distribution prior to war's end. *Signal Communications for All Arms (Provisional)* was a far-reaching document. Finally, the Army had a manual, which was specifically tailored to U.S. military organizations and wartime experiences. It clearly spelled out in detail how communications were to work down to the company level, as well as the duties and responsibilities of Signal Corps personnel. The manual, as the title states, was only provisional. The authors knew that the Army was gaining new equipment, which would change how it was organized and fought. An example of this is what *Signal Communications for All Arms (Provisional)* mentioned about T.P.S. (earth telegraphy). It stated:

It has been used for communication within the Infantry Regiment and in some cases from Regiment to Brigade. It has proved unsuitable and will soon be replaced by a small portable radio loop set which is being perfected by the Signal Corps for use within the Infantry Regiment.¹⁵

Signal Communications for All Arms (Provisional) was an all-encompassing work, which covered signal support for all branches of the service from corps to company/battery level.¹⁶ This manual made great gains in defining the role of the unit signal officer at all levels of command. *Signal Communications for All Arms (Provisional)* described one of the major duties of a unit signal officer as to “supervise the technical training and employment of Signal troops of his own and the subordinate units.” Another duty was to “prepare the Plan of Signal Communications [the new, standardized name for a Signal Annex] and keep it corrected to date.”¹⁷ The training issue was germane because there was no longer a field signal battalion with senior officers to assist in training of personnel at the maneuver unit level. The most senior ranking person in the signal company was a captain.

A crucial part of *Signal Communications for All Arms (Provisional)* was its standardized signal terminology and practices. As stated earlier, the name for the Signal Annex became “Plan of Signal Communications” as opposed to the French term of “Plan of Liaison.”¹⁸ *Signal Communications for All Arms (Provisional)* provided a detailed format for this annex to the field order. The format was for a base annex with four appendices. The base annex gave several general principles and references. It also covered the axes of communication of higher units, followed by a basic rundown of all means of communications (ground and air observation; marking front lines; telephones; radio; panels; visual; pyrotechnics; pigeons; couriers and runners; codes and ciphers;

time; meteorological data; and signal dumps). This was followed by an appendix for telephones, radio (earth and wireless), pyrotechnics, and codes.¹⁹

The term for the main signal route of a division, known as the “main artery” by the British or “axis of liaison” by the French, became the “axis of signal communications.” Although the term “main artery” was still used for the actual route where the predominance of wire was laid, the main communications route was called the “axis of signal communications.” The term “advanced center of information” was also changed to the term “forward communications center.”²⁰ Finally, throughout the manual, the term post of command (P.C.), was superseded by the term command post (CP), a term still used in today’s manuals.

In 1922, the General Service School at Fort Leavenworth published *Signal Communications for All Arms*. This manual, based on the earlier AEF provisional manual of the same name, was very similar in content. Yet, *Signal Communications for All Arms* was a peacetime doctrinal manual that corresponded to postwar changes in Army organization, training, and technology. This manual covered wire and radio systems, message centers, courier, and visual signals. It also described the duties and responsibilities of unit signal officers. *Signal Communications for All Arms* also refined the previous edition’s “Plan of Signal Communications” and added a format for a “Signal Unit’s Operation Order.”²¹ Two key points of this manual were the doctrinal support of wire and radio communications within the infantry division.

Signal Communications for All Arms directed that higher headquarters were responsible to run wire down to subordinate units and to establish, operate, and maintain a forward communication center (FCC). A FCC also had the duty to run lateral lines to

adjacent FCCs when the tactical situation stabilized. *Signal Communications for All Arms* does not state or show in diagrams that headquarters were connected laterally, rather only the FCCs accomplished this.²² This may simply be due to the wire sections being forward with the FCCs.

The doctrinal wire system portrayed in *Signal Communications for All Arms* was flexible for open warfare. Like earlier manuals, the FCC became the future headquarters as units advanced. If the division CP or FCC remained static while the brigades moved forward, the brigade axis from the brigade CP forward was just extended. If the situation called for the division CP to move forward, the division FCC pushed forward until it directly connected to the advanced brigade CPs. Once this occurred, the main communication route ran back through the division FCC to the division CP (see figure 14), thus providing alternate routes for messages in the event of an outage.

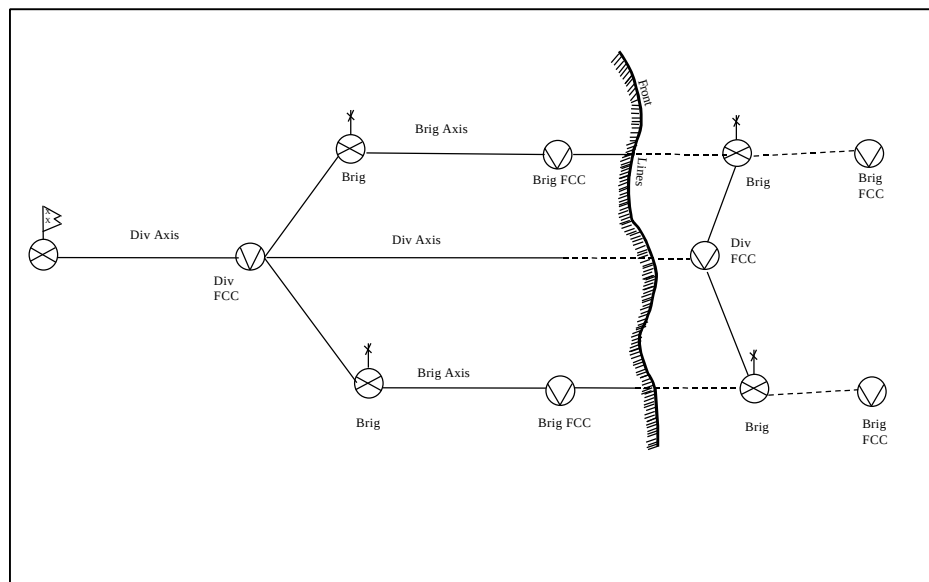


Figure 14. Infantry Division Wire Diagram in the Offense.
Source: *Signal Communications for All Arms*, 1922-1923, Plate No. 3.

Signal Communications for All Arms provided doctrinal use of radio communications within the division. It broke down the amount and type of systems and how they were employed and manned down to the battalion level. At this time, the division still used both radiotelegraphy (telegraph) and radiotelephony (voice) equipment, in all modes of operation.

The Radio Net in Table No. 7 of *Signal Communications for All Arms* (see figure 15) described the capabilities of an infantry division to communicate by radio. The larger population of radios in the division allowed for a separate Infantry Division Radio Net (division headquarters to all major subordinate headquarters), Infantry Brigade Radio Nets (brigade down to regiments), and Loop Set Radio Nets (regiment to battalions). The infantry brigades down through battalion now communicated with both send and receive radiotelegraphy. The infantry brigade through battalion could now communicate (both send and receive radiotelegraph) with its supporting artillery regiment and battalions. The infantry brigade radiotelegraph sets were also able to tune into airplane and meteorological data nets.²³

Aviation and artillery were the only units at the division level to have send and receive radios (radiotelephony) for artillery-aviation liaison. The aircraft and artillery were able to enjoy radiotelephony on the artillery nets due to the newer SCR-68A radios mounted in aircraft and SCR-109 radios on the ground. These radios worked both in radiotelegraph and radiotelephony, the latter having less range. Additionally, some aircraft had “send only” radiotelegraph sets, which communicated with “receive only” sets in the artillery battalions.²⁴ The robustness of the radio in the artillery and aviation

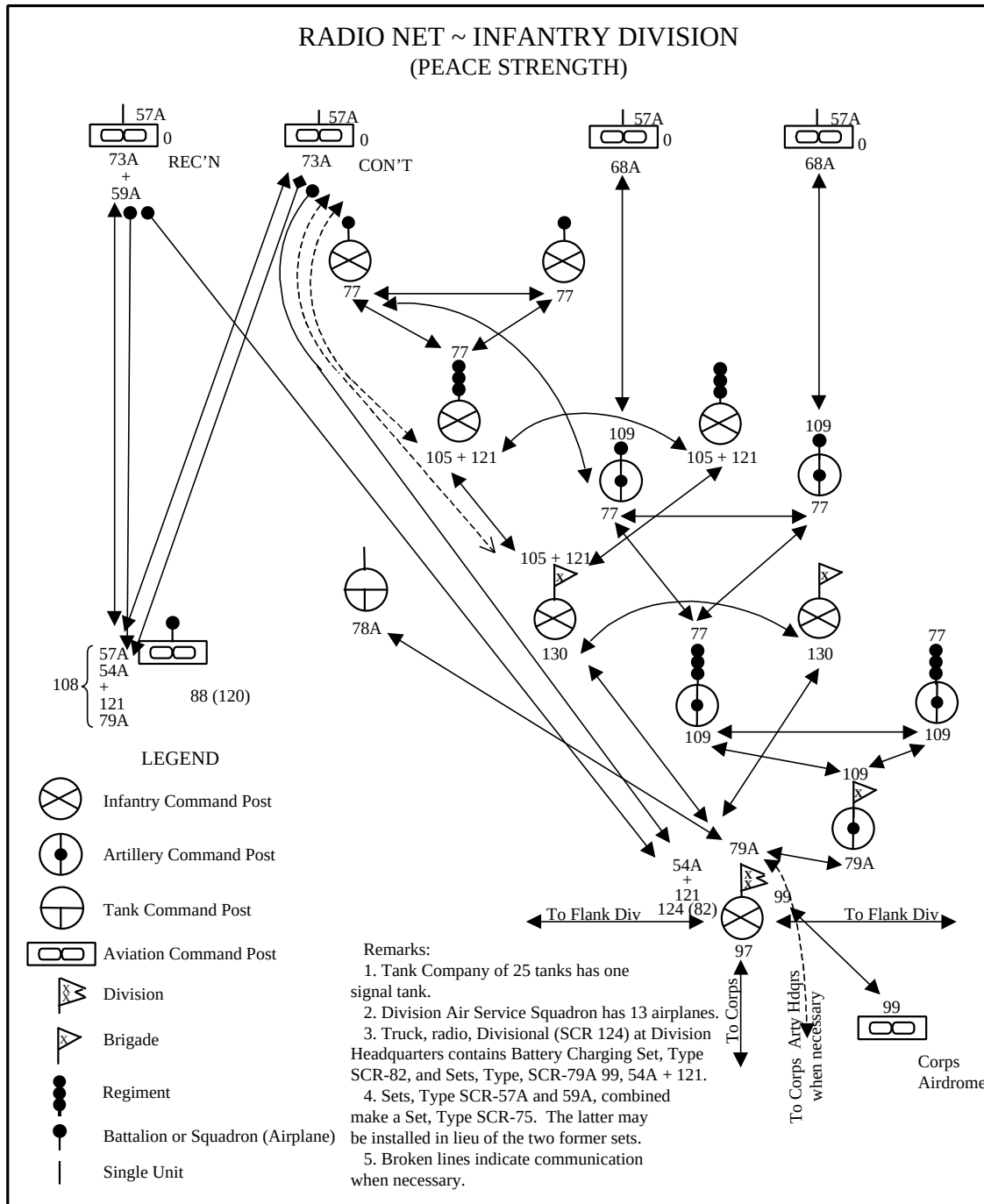


Figure 15. Source: *Signal Communications for All Arms, 1922-1923*, Table No. 7.

units showed their proliferation in the division down to the battalion level (as opposed to an infantry regiment during World War I). An infantry battalion could call for and adjust fire by radio to its supporting artillery unit. Additionally, infantry regiments had the ability to communicate with aviation support if needed.

Training

The massive expansion of the training base during the war to meet the demands of the growing Signal Corps has been already mentioned. The end of the war found Camp Alfred Vail, New Jersey (the future Fort Monmouth, home of the Signal Corps for the next fifty years), as the new center for Signal Corps training and research. It was here that the Signal Corps School and Signal Corps Laboratories were located in the immediate postwar years.²⁵

The sphere of postwar peacetime training within the Signal Corps is such a large topic that it cannot be covered extensively in this thesis. However, there are several items worth noting. The Signal Corps continued to train its soldiers on the latest means of communication, to include wire, radio, visual, and pigeon.

From 1919 to 1920, the Army Signal School, located at Fort Leavenworth, Kansas, taught technical and tactical courses for Army signal officers. In 1920, this school was closed, but was replaced by the Signal Corps School at Camp Alfred Vail in 1920. The purpose of this school was to train officers and enlisted men in signal communications. The company officers course (nine months) was for Signal Corps officers, while the communication officers' course (nine months) was for regular army officers of other branches. National Guard and reserve officers attended a three-month

version of this latter course. An officer advance course for field grade officers and senior captains was authorized, but not conducted due to shortages in personnel. The Signal Corps School enlisted soldier curriculums included a radio electrician's and telephone electrician's course, which was nine months in length.²⁶

The need for a pool of trained officers for rapid expansion of the Signal Corps led to a number of World War I signal officer veterans accepting commissions in the Signal Corps Reserve. Another means of gaining trained candidates was the establishment of Reserve Officer Training Corps Programs (ROTC) in a number of large universities across the country, to include the Massachusetts Institute of Technology, Georgia Institute of Technology, and Cornell University. Most of the enrolled personnel were Electrical Engineering students.²⁷ Due to the growth of military radio usage during peacetime, the Signal Corps operated and maintained over 100 radio stations, as part of the Army Communication Net, across the continental United States and Alaska by 1924.²⁸

Technology

The postwar communications equipment of the infantry division still had many of the older systems from the Great War. Field telephones, wire carts, and switchboards had minor improvements made during the war, but were relatively unchanged. The flag, semaphore, and heliograph were virtually unchanged from the Spanish American War. However, in other areas of communications, the Signal Corps made great gains, which did not see fruition until after the war.

The short duration of the war did not allow the full industrial and technical capacity of the U.S. to come to bear in the fielding of communications equipment to the Signal Corps, as it would in World War II. As discussed earlier, most of the earth telegraphy and wireless radio equipment used by the Signal Corps at the division level were of French or British manufacture. The Signal Corps began designing, building, and testing new equipment for the infantry divisions of the AEF when war was declared. Most of the new equipment that was fielded to the division was not actually distributed to the units until after the 11 November 1918 Armistice.

In the field of radio, the Signal Corps made its greatest gains. Crucial to the improvements in radio was the use of vacuum tubes, replacing the earlier spark-gap radios. Although spark-gap radios were useful, the vacuum tubes allowed continuous wave (CW) to be practical in battle. By wars end, the Signal Corps had four improved T.P.S. (earth telegraphy) sets, three types of CW sets, a radiotelegraph set for tanks, and radio operating and repair trucks.²⁹ At the division level, both CW and improved spark-gap radios were fielded.

Another critical improvement in battlefield radio communications was the invention of the SCR-77; a two-way radio loop set (spark-gap). A common problem with radios during the war was that their antennas made great targets for the enemy (and therefore made it dangerous to be an operator). This new radio set, which was send and receive radiotelegraphy, laid the receiving antenna on the ground, while the transmitting antenna used a small loop connected to the spark-gap transmitter. This radio had a range of six miles, could transmit on two wavelengths and was transported in three sections, each weighing less than thirty pounds.³⁰ The SCR-77 radio demonstrated great

improvements in both survival of the operator and usefulness in close ground combat. The great leaps made in radio technology during the war paid dividends when America entered her next war twenty-three years later.

Summary

The Signal Corps assets within the infantry division made significant changes in organization, doctrine, and technology in the immediate postwar years. The infantry division signal organization changed primarily due to the lessons learned on the Western Front. At the same time, improved and standardized signal doctrine tied the organizations together with the increasingly sophisticated wireless radio technology. Together they improved the command and control within the postwar infantry division

Although the organization of maneuver elements in the infantry division did not change radically, the shift of signal personnel was significant. The breakup of the field signal battalion and the creation of infantry brigade, regiment, and battalion communications platoons were a direct result of lessons learned on the bloody fields of France. The permanent assignment of signal personnel to those units was a significant improvement to what existed during the war.

Signal doctrine was formally standardized with the publication of *Liaison for All Arms (Provisional)* and later the later *Liaison for All Arms*. These works stand out as major contributions to improved signal doctrine and tactics from company through division-level. Wire and radio communications doctrine made great leaps by standardizing the roles played by each signal element within the division. Predetermined radio nets from regiment through division level were a far cry from the single radio net

and frequency for an entire division at Soissons.³¹ The great leap forward in radio technology and distribution within the postwar infantry division was also a significant event. The standardized radios at each level of command, with the ability to intercommunicate with other radio nets, greatly expanded the role of the Signal Corps in improving command and control within the division.

32

¹United States Army Signal Corps, *Report of the Chief Signal Officer to the Secretary of War, 1919* (Washington, DC: U.S. Government Printing Office, 1919), 1.

²United States Army Signal School, *Historical Sketch of the Signal Corps (1860-1928)*, Signal School Pamphlet No. 32 (Fort Monmouth, NJ: United States Army Signal School, 1929), 111.

³General Service School, *Tables of Organization Infantry and Cavalry Divisions* (Fort Leavenworth, KS: The General Service School Press, 1922), 4-6.

⁴*Ibid.*, 7. The Special Troops Battalion included a Headquarters and the following companies: Headquarters, Signal, Ordnance Military Police, Quartermaster and Light Tank.

⁵*Ibid.*, 10.

⁶*Ibid.*, 11.

⁷*Ibid.*, 11.

⁸*Ibid.*, 10.

⁹Historical Division, Department of the Army, *United States Army in the World War 1917-1919, Organization of the American Expeditionary Forces* (Washington, DC: U.S. Government Printing office, 1948), 363.

¹⁰General Service School, *Tables of Organization Infantry and Cavalry Divisions*, 17-18.

¹¹*Ibid.*, 18.

¹²*Ibid.*, 20.

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- ¹³Ibid., 23.
- ¹⁴Ibid., 24.
- ¹⁵General Headquarters, American Expeditionary Force (AEF), *Signal Communications for All Arms (Provisional)* (France: GHQ, AEF, 1919), 43.
- ¹⁶Ibid., 7-15.
- ¹⁷Ibid., 22.
- ¹⁸Ibid., 22.
- ¹⁹Ibid., 125-129.
- ²⁰Ibid., 102.
- ²¹General Service School, *Signal Communications for All Arms* (Fort Leavenworth, KS: The General Service School Press, 1922), v-viii.
- ²²Ibid., 25-26.
- ²³Ibid., Table 7 & 9.
- ²⁴Ibid., Table 9.
- ²⁵Dulany Terrett, *United States Army in World War II, The Technical Services, The Signal Corps: The Emergency* (Washington, DC: Office of the Chief of Military History, Department of the Army, 1956), 21.
- ²⁶United States Army Signal School, *Historical Sketch of the Signal Corps (1860-1928)*, 120-121.
- ²⁷Ibid., 122.
- ²⁸Army Times Editors, *A History of the U.S. Signal Corps* (New York, NY: G.P. Putnam's Sons, 1961), 124-5.
- ²⁹Dulany Terrett, *United States Army in World War II, The Technical Services, The Signal Corps: The Emergency*, 18.
- ³⁰Ibid., 19.

³¹Henry L. King, “A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons” (Individual Report, Fort Leavenworth, KS: Command and General Staff School, 1933), 39, 77.

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CHAPTER 6

CONCLUSION

Each army corps and division 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.¹

General John J. Pershing, *Report of the Chief Signal Officer to the Secretary of War, 1919*

Introduction

The U.S. Army Signal Corps was effective in supporting division-level maneuver units during World War I. Despite the Army and Signal Corps being totally unprepared for operations on the Western Front when war was declared in April 1917, progress was made in providing relatively dynamic signal support at division level by the end of the war. Unlike the Allies, who had over three years to experiment and improve signal support, the U.S. Signal Corps had only eighteen months from the declaration of war to the Armistice. The progression of signal support within the 1st and 2d Infantry Divisions clearly shows the growth and development of signal organization, doctrine, training, and technology as applied to an AEF infantry division; and postwar improvements in these areas confirmed the lessons of the war.

Organization

As shown in the previous chapters, the signal units within an AEF infantry division changed their organization numerous times from the start of the war through the

immediate postwar years. These changes followed a natural progression to better support the maneuver units within the infantry division. As an example, with the creation of the “square division” and increase in the size of the infantry brigades in the middle of 1917, the outpost company of the field signal battalion increased dramatically in personnel to accommodate its support role.² However, this change did not always solve the problem. The increase in personnel was good, but attachment of soldiers down to the infantry brigades and below for combat operations was problematic.

The tables of organization within the field signal battalion and infantry brigades, regiments, and battalions were obviously flawed and needed adjustment. The 1st Division’s Division Signal Officer and 2d Field Signal Battalion’s struggle with this problem after the battle of Soissons clearly showed an effort to make changes and adjustments to the table of organization in order to better support the infantry.³ These changes were directly linked to previous combat experiences by the 1st Division in the first half of 1918. These improvements, learned and validated under fire, saw their fruition in the immediate postwar year table of organization for an infantry division. The organization of the signal units within the division changed to better support the infantry brigades, regiments, and battalions. The reduction of the field signal battalion to a signal company was directly correlated to the increase of signal personnel within the maneuver units.⁴ Under the postwar organization, infantry commanders owned their signal personnel as opposed to the system of attachment used during the war. Although no system is perfect, the postwar changes reflect changes that came from firsthand experience in France.

Doctrine

The Signal Corps, like all of the Army, was clearly lacking in a cohesive doctrine for division level operations for much of the war. The efforts of the Army in publishing British and French manuals, such as *Forward Intercommunication in Battle*, *Liaison Instructions for All Arms*, *Inter-Communication in the Field*, and *Liaison for All Arms*, were laudable. The problem was there was no one standard manual across the AEF until after the war ended. The 1st and 2d Infantry Divisions tended to be closer to French signal doctrine due to their initial training by French signal personnel, although they both used some of the British doctrine also.⁵

Even though there was not a single doctrinal manual for the divisions to use, signalmen made large efforts to modify existing doctrine to better support the maneuver units. Through trial and error, both the 1st and 2d Divisions made changes to internal doctrinal memorandum and policies to better support their infantry brigades, regiments, and battalions. While the 2d Division did make changes to its doctrine in France, they are not preserved in the World War I records. As shown in the previous chapters, the 1st Infantry Division has a well-documented record, which clearly shows progression throughout 1918 in how it doctrinally supported its maneuver units.

The 1919 publication of the AEF *Signal Communications for All Arms (Provisional)* and the later *Signal Communications for All Arms* rectified the wartime problem of a single doctrinal signal manual for the U.S. Army. These manuals were specifically tailored to U.S. Army organizations, equipment, and wartime experiences. Doctrinally, the postwar Signal Corps took a great leap forward with the publication of these manuals.

Training

Like the rest of the Army, the Signal Corps expanded its training bases at the start of the war in order to support its rapidly growing force. Camps were formed and courses set up to teach the latest in electronics and radio theory. At the start of the war the Signal Corps made good use of recruiting civilians (management and labor) with technical skills from the growing telephone and radio industry.

Additionally, the commander of the AEF General John J. Pershing realized the need for division, corps, and army-level schools in France. The school system was very effective for the units arriving in France prior to the spring of 1918. These units were provided hands-on training under field conditions normally ending in a large field exercise.⁶ The AEF schools were not as effective for units arriving during and after the German offensives in the spring of 1918. This was because units were being sent to fill gaps in the Western Front after receiving what would now be called “orientation training” only.⁷

Technology

At the start of the war, the Signal Corps did not have the latest equipment being used by the Allies on the Western Front. Although the U.S. Signal Corps’ equipment was useful for operations in Mexico and on the Western Plains, it was woefully inadequate for the challenges faced in France. Much to the Army and Signal Corps’ credit, it rapidly equipped itself with state-of-the-art Allied radio equipment and signal projectors upon arrival in France. This was necessary due to coalition operations (as shown by the 1st

and 2d Division operations adjacent to and in support of a French headquarters). It was also necessary due to the Signal Corps lacking its own equipment.

The battle of Soissons and the actions in the Meuse-Argonne show the primary reliance upon wire telephone communications and runners to support command and control within the division. Radio did not play an important role in command and control in early operations. Later operations do show the greater use and reliance of radio in passing critical messages during battle.

The postwar influx of American-built radios into division-level organizations down to the infantry battalion level clearly shows that the radio had proved its worth in combat. Improved receivers, transmitters, and antenna proved that wireless technology was the way of the future in command and control communications within the infantry division.

It must be said that although radio would revolutionize tactical command and control in future wars, it did not meet this mark during the Great War. Signalmen did the best they could with the technology they had on hand. Radio was not the panacea for all command and control problems as it would be in World War II. Regardless of technology, there is a strong case that the sheer willpower and “can do attitude” of the Signal Corps personnel in the division was the greatest of all assets available.

Summary

The U.S. Army Signal Corps was effective in supporting division-level maneuver units during World War I. Although faced with the enormous challenges of rapid expansion, inadequate organization, as well as new doctrine, training centers, and

equipment; the Signal Corps forged ahead. Through the personal courage and initiative of its soldiers, the Signal Corps successfully supported the maneuver units within the AEF infantry divisions. Although much was learned through trial and error, units progressively became more adept at providing command and control communications from the division down to the company level.

The U.S. Army Signal Corps clearly made the right choice in adapting the tactical signal doctrine of the Allies. Although this caused conflicting doctrines and techniques within Signal Corps units supporting the AEF, it was better than having nothing at all. The ability of the Signal Corps to adapt their own lessons learned from experiences on the Western Front and add that to the French and British doctrine was the most critical attribute to success. This ability to incorporate lessons learned allowed progressively better signal support for AEF maneuver units in succeeding battles on the Western Front.

The history of the Signal Corps in support of the AEF infantry division during World War I provides a lesson on the rapid transition and adaptation of new organization, doctrine, training, and technology during a condensed time period. As depicted through the preceding chapters, the current Army's transition pales in comparison to what occurred from 1917 to 1921 within the Signal Corps.

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¹Office of the Chief of Signal, *Report of the Chief Signal Officer to the Secretary of War, 1919* (Washington, DC: U.S. Government Printing Office, 1919), 524.

²Rebecca R. Raines, *Getting the Message Through, A Branch History of the U.S. Army Signal Corps* (Washington, DC: Center of Military History, 1996), 178.

³Henry L. King, “A Critical Analysis of the Employment of Signal Communications by the American Division at Soissons” (Individual Report, Fort Leavenworth, KS: Command and General Staff School, 1933), 59.

⁴General Service School, *Tables of Organization Infantry and Cavalry Divisions* (Fort Leavenworth, KS: The General Service School Press, 1922), 4-6.

⁵Edward M. Coffman, *The War to End All Wars, The American Military Experience in World War I* (Madison, WI: The University of Wisconsin Press, 1968, 136-137.

⁶Raines, *Getting the Message Through*, 179.

⁷Office of the Chief of Signal, *Report of the Chief Signal Officer to the Secretary of War, 1919*, 103.

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1

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