

Extracts from.... **THE VMARS NEWS SHEET**

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Great War Military Communications

The Western Front

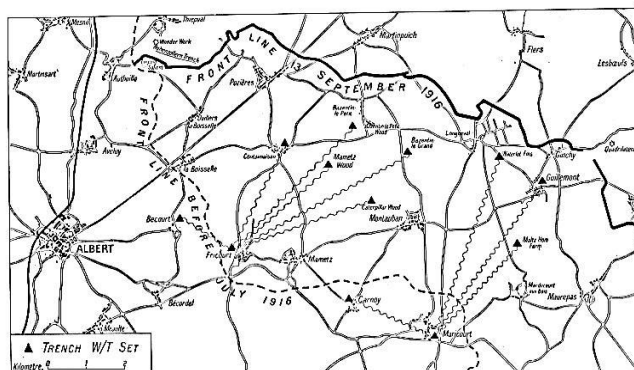
The British Expeditionary Force sent to France in 1914 was a relatively small force of regular soldiers, allegedly dubbed by the German Emperor Wilhelm as 'General French's contemptible little army'. Their objective was to stop the German advance through Belgium and their planned encirclement of Paris. Over-optimism in Britain led to the belief that it would 'all be over by Christmas' but, after suffering appalling losses at Ypres and Mons, the two opposing armies entrenched themselves in a stalemate on what was to become known as 'The Western Front'. Until that time, British commanders had envisaged a rapid mobile war ending in a quick victory with France and Russia over Germany. The British Army was ill-equipped for the scale and type of war that resulted and the vital resource of communications was very poorly organised.

In 1908, the Royal Engineers Signals Service (RESS) was made officially responsible for all military communications, a role that they took over from the Telegraph Troop of the Royal Engineers who had maintained that responsibility since 1870. Despite this, artillery batteries and infantry battalions had their own signallers and operated their own independent communications networks which they steadfastly refused to pass to the control of RESS, a situation that was tolerated by senior commanders. It was not until the chaos created by the German Spring Offensive of 1918, when most British communications cable networks and wireless equipment was lost to the advancing enemy, that artillery and infantry signallers were forced to come under the command of RESS in order to gain access to the emergency cable networks still under RESS control.

In 1914, wireless stations were extremely large and cumbersome affairs, requiring equally large and cumbersome aerials in order to operate on the long wavelengths used which, in the early days of the war, were measured in hundreds of metres. The British Army wireless 'British Field Set' known, to the amusement of the operators as the BF Set, was a 50 W spark transmitter with a carborundum crystal detector receiver. It operated, without tuning, over a wavelength of approximately 555–349 m (540–860 kHz) over a short range. The size and weight of power sources with sufficient capability to deliver the power required by the transmitting and receiving sets was an additional problem. For portable operation, this meant using large and heavy accumulators and having a means of recharging or exchanging them. Elaborate aerial arrays, supported on poles, were very easily picked out by enemy spotters, who would then pour down fire upon them. By the First Battle of the Somme in July 1916, a new wireless set known as the 'Wilson Set' was introduced. This employed improved techniques for generating the transmitter spark which provided more output power and improved range. The wavelength used was similar to the 'BF Set' and the receiver was unaltered.

Signallers at 'the front' ran enormous risks by being exposed to enemy fire while erecting aerials or running out telegraph and telephone cables. One RESS signaller wrote, in his memoirs, a graphic account of his experience in moving a wireless station forward during a British advance. *"The Roelincourt station! That was Hewitt and I and an officer! Four infantrymen were to assist us in carrying our weighty apparatus, the set, accumulators, dry cells, coils of wire, earth mats, ropes, and other details..... Hewitt and I immediately set about erecting a 60-yard aerial on 18-foot masts. It was an uneasy task erecting this fully exposed to the vicious enemy fire. Actually, I counted afterwards ten men who had been killed outright by shrapnel near us, as we secured the masts."* The wireless station was needed quickly in order to provide initial contact with senior commanders until wired telegraph and telephone links could be established.

These extreme difficulties, combined with the poor reliability of equipment due to the harsh conditions of trench warfare, limited knowledge of grounding and aerial matching techniques and the widespread belief of many local infantry commanders that wireless was vulnerable to eavesdropping, jamming and fake enemy signals, all of which was true, made the use of wireless very unpopular in some quarters.



Dispositions of wireless sets deployed along the British front line in 1916

By 1917, a few 'wireless tanks' had been specially fitted out with wireless equipment, installed for communication with Battalion or Brigade HQs. It was quickly found impossible to operate the sets when mobile, largely because of very high levels of interference from engine ignition systems but also because of violent movement and noise inside the tank itself. Instead, they would stop and erect a separate aerial to make their reports and receive orders. As the

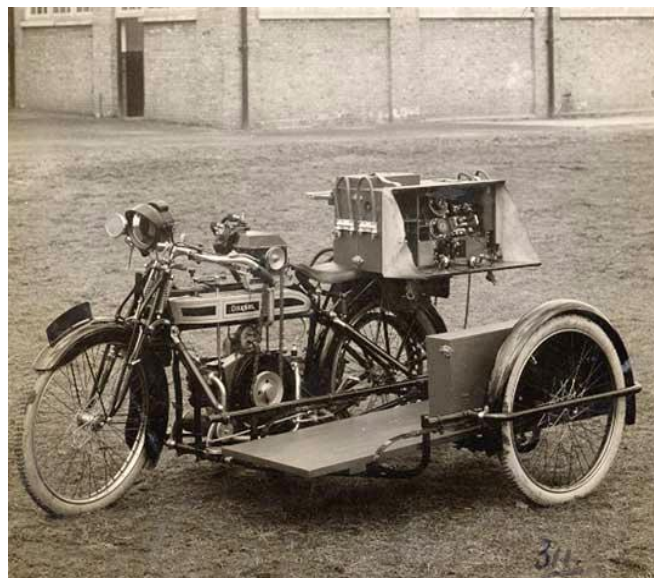
war progressed, wireless communication at Corps and Divisional level was undertaken quite extensively but usually as an adjunct to other forms of communication, relying heavily upon written messages which were regarded as being much more secure. Away from the front line, at Headquarters locations, more powerful 1500 W Marconi transportable wireless stations installed onto horse drawn wagons were used and formed the basis of a relatively reliable communications network.



The horse drawn Marconi 1500 W transportable wireless station used in the Great War. The articulated rear section containing the wireless apparatus is detachable so that it can be removed for repair or connected to a replacement front section containing banks of freshly charged accumulators

A newly developed 1917 trench warfare set provided a technological leap in the form of the Marconi 'W/T Set Forward Spark 20 Watt B' which quickly became known as the 'Loop Set' due to its 3 foot square brass tubing loop aerial with an adapted bayonet for a ground mounting. The transmission was still spark generated but was now tuneable between 79–65 m (3.8– 4.6 MHz), as was the

revolutionary receiver, which contained two valves. The working range of the 'Loop Set' was only about 2,000 yards, but it required little training to use and was relatively compact, making it more easily transportable. Throughout the war, the Marconi Company experimented with a variety of portable wireless sets, including using a packhorse mounted set and a motorcycle and sidecar arrangement with the wireless apparatus, ancillary equipment and de-mounted aerials carried on the sidecar. At the chosen operating location the wireless set would be fitted to the motorcycle saddle and powered by an auxiliary generator driven from the motorcycle engine.



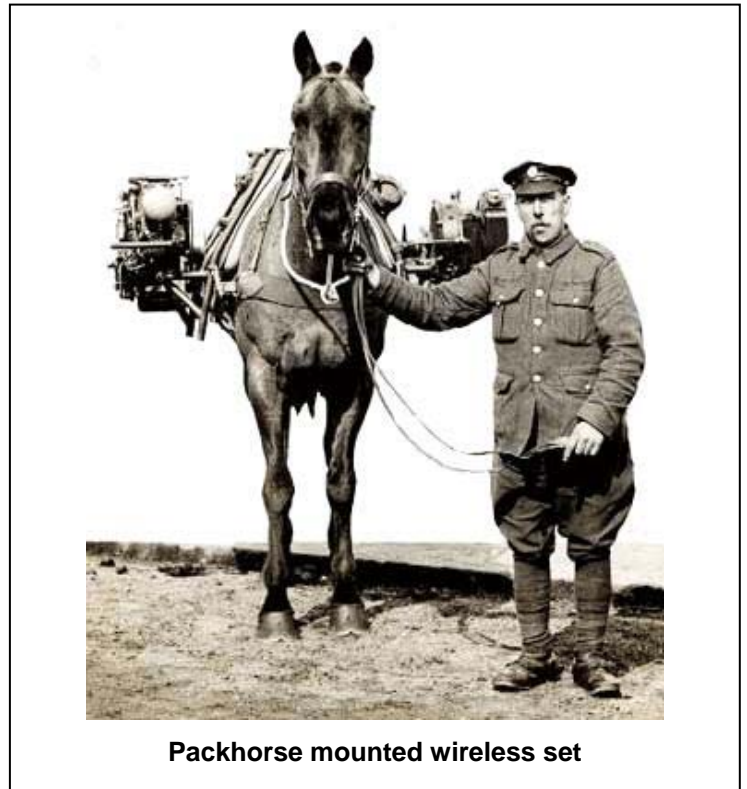
A Marconi developed motorcycle with a power take-off to supply the mounted wireless set

Despite these scientific and novel developments, field commanders remained cautious and were much happier with tried and trusted wired telegraph and telephone lines. Troops at the front still made extensive use of the kerosene powered 'Begbie' signalling lamps and heliographs, as well as rockets, Very lights, klaxons, rattles, whistles and megaphones. WWI saw a huge increase in the use of carrier pigeons, which proved very effective, and the British Army also introduced motorcycle despatch riders in large numbers for the first time. Over shorter distances between trenches, messengers were used where necessary, but this work was very dangerous and the runners suffered exceptionally high casualty rates. Telegraph and telephone lines were initially laid point to point but were susceptible to damage from troop and materials movements and by enemy shellfire, even though the standing order was that they should be buried at least 18 inches below the surface, which was frequently not possible. Later, a grid system was introduced so that damaged sections of wire could be bypassed until they had been repaired and it was not unusual for these lines to utilise a single wire with an earth return, which was eventually to prove problematic for security. With lessons learned from repetitive damage or destruction of telegraph and telephone lines on or under the ground, a strenuous effort was made by the RESS to install wires on telegraph poles away from the front line, where they proved to be less susceptible to damage from artillery fire. Lines were lifted clear of ground movements which also made it much easier to locate

and repair damaged circuits.

Large telephone exchanges were built in protected areas and operated by signallers in much the same way as civilian exchanges back at home. The widespread grid network of communications lines made them vulnerable to interception and, where the enemy were unable to tap directly into them, which they devoted a great deal of energy to achieving, the German Army developed a detection capability based on the 'Moritz Listening Set' which detected small movements of inductance created in the ground by the earth returns of the British telegraph and telephone lines. Morse buzzers could be detected in this way at distances of up to 1 km. The British knew their plans were being compromised but were slow to comprehend how, believing for a long time that they were the victims of systematic espionage. When realisation dawned following the accidental discovery of the weakness at a Signals training camp in Canada, a young Captain Fuller of the RESS developed a device for sending secure Morse code messages over the telegraph lines and named it the Fullerphone. This set adopted a circuit which eliminated the compromising effects of the ground returns and it quickly replaced all existing trench sets used in the front lines. Fullerphones proved to be highly effective in transmitting secure signals by wired telegraph and were further adapted to send secure telegraph messages simultaneously with voice calls over the wired telephone network. They were still in regular use throughout World War II and beyond.

By the end of the Great War, British military commanders had learned a great deal about the value of a properly organised, secure and co-ordinated communications systems and, in 1920, the Royal Corps of Signals was formed.



Packhorse mounted wireless set



A RESS Corporal signaller taking down a signal