ISSN 2350-109X
www.indianscholar.co.in

Indian Scholar

An International Multidisciplinary Research e-Journal

# ROLE OF MILITARY COMMUNICATION IN EMPOWERING DEFENSE SYSTEM OF A COUNTRY

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**Abstract**

This research paper goes over how military communication technologies have evolved throughout time and how they aid in fortifying a country's defense system. This research paper also goes over implementation of military communications in WW1 and WW2, and after. The research paper highlights how requirements for communication increased as time went on.

**Keywords**: mobile radio, communincation, radiotelegraphy, radiotelephony, JTRS (joint tactical radio system)

## Introduction

Any effective military action has always required a clear and compact interchange of information, and none more so than in current times. All facets of combat were rapidly mechanized in the early twentieth century. On the battlefield, the substitution of horsepower with internal combustion engines, as well as more effective armament, resulted in significant changes. Soldiers would no longer battle shoulder to shoulder, and commanders would no longer be able to see the action up close. As a result of these developments, having a good communication system has become even more important. The evolvement of these methods of communication has rapidly helped in reinforcing a countries military might and defense.

Theory

Beginning of WW1, both the sides were in access of, to a limited degree, modern means of signal communication but were not in realization of the load it would place on the communication systems to be in charge of the massive forces of the Allies (Western Europe, The United states, Soviet union) and the Central Powers. In terms of structure and efficiency, armies were vastly different.

On one hand, Great Britain possessed a small but well-developed signal service, whereas Russia's signal service was inferior to the Union Army's at the end of the American Civil War. It was apparent to both the sides that the commanders were incapable of managing and directing huge fleets of modern army without signal communication that was efficient enough. This had led to errs from each of the sides: 1) a forced halt to the German offensive north of the Marne, and a subsequent retreat. 2)the Russian forces' failure in East Prussia, which culminated in a catastrophic loss at the hands of General Paul von Hindenburg in the Battle of Tannenberg, was largely owing to a near-total lack of signal communication.Field telephones and switchboards were developed quickly, and those that were already in use were upgraded. A complicated telephone system with thousands of lines exists on both sides.Pole lines with several crossarms and circuits arose in the rear of the opposing troops, and buried cables and wires were inserted in the elaborate trench systems leading to the front lines. Lateral cable lines roughly parallel to the

ISSN 2350-109X
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front crossed the main arteries travelling from the rear to the forward trenches.Engineers of the belligerent nations soon developed portable radios with batteries, using low aerials. The predominant unreliability and need of encoding made them auxiliary to wire systems and last resort for when wires get cut.For conveying predetermined signals, pyrotechnics, rockets, Very pistols, and flares were often used. Messenger services expanded to the point that they were used with motorcycles, bicycles, and cars. The employment of homing pigeons as one-way messengers from the front to the back was widespread, and they performed admirably. Dogs were regularly utilized as messengers, and their effectiveness in the German army was great.

The introduction of planes in WW1 heavily complicated communication as air to ground communication were rarely ever put to use. The pilot had to land or drop messages to make his reports, and he received instructions from strips of white and black fabric called "panels" put out in an open field according to planned patterns while in the air. Between the aircraft and ground headquarters, extensive attempts were made to employ radiotelegraph and radiotelephone. Many planes were fitted with radios in the last months of the war, but the service was never acceptable or dependable, and thus had little impact on military operations. Wireless telegraph system was deployed and thoroughly used as well; it used ship and shore communications over long distances. By 1938, mobile radio instruments had also been developed by Germany to aid ground and air forces.

Between the periods of WW1 and WW2, frequency-modulated (FM) radio had been developed by a major in the U.S. Army Signal Corps during World War I, Edwin H. Armstrong. FM offered the reduction of ignition and unnecessary noises heard when using radio in vehicles. On the eve of World War II, all nations used military signaling in a similar manner. Foot, horseback, motorbike, vehicle, aeroplane, homing pigeon, and messenger dog were among the messenger methods. Flags, lights, panels for signalling aeroplanes, and fireworks were among the visual agencies. Wire systems for telephone and telegraph service, including the printing telegraph, were welcomed by the electrical agencies. Radiotelegraphy and radiotelephony were widely used, but radiotelephony had not yet shown to be dependable and sufficient for tactical military communication. The world's navy began World War II with highly developed radio communication systems, both telegraph and telephone, and several electronic navigational aids in the works. The blinker-light system was still in operation. On navy boats, the usage of telephone systems and loud-speaking voice amplifiers had also becoming widely used. Air forces used cable and radio transmission to connect their bases and landing fields, and built airborne long-, medium-, and short-range radio equipment for air-to-ground and air-to-air communication. SCR – 300 mobile radios were put under use.

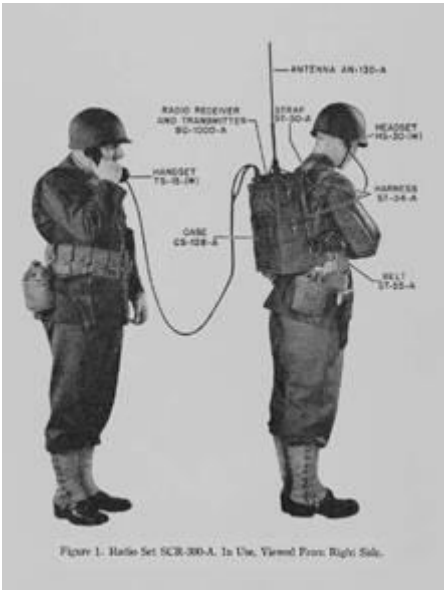

Figure 1: Radio Set SCR-300-A. In Use, Viewed From Right Side.

The need for communications and radio has surpassed their capacity after WWII. The communications–electronics industry's research and development reached unprecedented heights, and manufacturing capacity had to be expanded. High-powered mobile radio systems were popular at the division and regimental levels. With these

ISSN 2350-109X
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devices, telegraph transmission may be carried out across lengths of more than 160 kilometers with vehicles in regular road traffic. There were constructed and utilized sets that used frequency modulation and carrier techniques, as well as radio relay sets that used radar pulse transmission and reception techniques and multiplex time-division methods to acquire several voice channels from a single radio carrier. A radio teletypewriter relaying system was devised, allowing a radio teletypewriter operator in Washington, London, or other capitals to send messages by teleprinter to the commander in any theatre of combat. A system of torn-tape relay centers was also devised so that tributaries may send messages through the major centres and retransmit them swiftly by shifting a perforated tape message from the receiving to the sending places. A technique for hosting teletypewriter conferences was also created. These "telecons" allowed a commander or his staff at each end to examine incoming teletypewriter communications on a screen as quickly as the characters were received. [1]

**Rifleman radio**

The Rifleman Radio is a small, durable portable radio that uses the Soldier Radio Waveform to transmit speech and data (SRW). The Rifleman Radio is a self-contained router that does not rely on established infrastructures like mobile phone towers or line-of-sight communications. Soldiers may speak with anybody on the network and transfer data up and down the chain, as well as into the Warfighter Information Network-Tactical network backbone (WIN-T). The Rifleman Radio may also be linked to the Nett Warrior, an Android-based smartphone that allows Soldiers to exchange messages, access mission-related apps, and use GPS technology to monitor one another's movements. Leaders can also use digital communications to track Soldiers' locations and give protection in hostile situations. This enables large squadron forces to move in synchronization and plan better offensive and defensive attacks and counter-attacks[2]

**JTRS (joint tactical radio system)**

The JTRS is based on the Software Communications Architecture (SCA), an open-architecture framework that instructs designers on how to integrate hardware and software. It regulates the JTRS' structure and function, allowing programmable radios to load waveforms, run programs, and be networked into a system. Every hardware set must have a Core Framework, which provides a common operating environment. Because the same waveform software may be simply transferred to various radios, interoperability across radio sets is improved.

The full collection of radio and/or communications operations that occur from user input to radio frequency output and vice versa is referred to as a waveform. Waveform Application Code, Radio Set Devices, and Radio System Applications make up the JTRS waveform implementation. Initially, there were 32 JTRS waveforms which are now down to the following 9:

Â· Wideband Networking Waveform (WNW)
Â· Soldier Radio Waveform (SRW)
Â· Joint Airborne Networking?Tactical Edge (JAN-TE)
Â· Mobile User Objective System (MUOS)
Â· SINCGARS
Â· Link-16
Â· EPLRS

ISSN 2350-109X
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Â· High Frequency (HF)
Â· UHF SATCOM

## CONCLUSION

The evolution of military communication has heavily impacted the capability and effectiveness of an army on a battlefield. Developments such as mobile radio, FM radio and JTRS have proved major roles and aided large forces such as allied and central powers. Without communication, the large forces would prove difficult to control and co-ordinate.

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