Photo courtesy Selex

Personal role radios: enhancing battlefield communications the world over

Reliable communications are a vital part of modern life, but nowhere more so than in the battlefield, where they are literally life-or-death. In years gone by, battlefield communications were based around shouted orders, written notes or a complex series of hand signals. With the advent of personal role radios (PRRs), all this changed. Military operations became streamlined, efficient and secure, improving operational capabilities for defence forces around the world.

We've all seen old films, where orders are shouted across the battlefield by commanders, and messages with essential intelligence or supply re-orders sent further afield by note or messenger. Even a relatively short time ago, battlefield communications were limited to shouted orders, hand signals or other un-secured methods, making military actions and movements more visible and easily-interpreted by the enemy, and instructions easily misheard or overlooked.

The introduction of personal role radios (PRRs) prompted a fundamental change in short-range battlefield communications, and allowed military units to operate with greater stealth and efficiency and to react to situations rapidly with up-to-date information. Indeed, the benefits of PRRs are numerous.

To be of most use to those operating in the battlefield, PRRs must be highly-portable, compact, and extremely reliable. Due to the harsh environments in which they are used, they must also be extremely rugged, resistant to degradation from abrasives like sand or smoke, and be able to withstand reasonable impacts.

The most popular PRR throughout the world is the ultra-high frequency (UHF) transmitter-receiver module produced by Selex (formerly Marconi-Selenia Communications), which was developed in 1999 for use by the British Armed Forces. Development initially took place as part of the Bowman Programme, but the PRR was later spun off so that it could be implemented more quickly. It was brought into widespread military use in 2002.

The features of PRR units

Selex's PRR weighs 1.5kg, has a continuous-use battery life of 20 hours powered by two AA batteries, and operates on the 2.4GHz band. Its range on open terrain is 500m; although it does transmit though thick walls and in enclosed spaces, under these circumstances its range is somewhat reduced. The PRR can be reconfigured in the field to operate on 16 of the 256 available channels using a selector dial on the device. The remaining 240 channels can be accessed using an additional tool.

While the original H4855 PRR did not feature encryption capabilities, AES128 encryption was later added when Selex upgraded the model to the EZPRR (Enhanced & Encrypted Personal Role Radio), also known as the PRC-43. The PRR was designed with a low probability of interception (LPI), ensuring secure communications.

Another improvement from the original model included a wireless press to talk (PTT) fob; the short-range (2m) encoded switch can be installed on weapons or military vehicles to enable communications without the soldier removing their hands from their weapon. Each PRR can work with as many as four codes, which can be easily updated in the field; this is an especially useful feature for soldiers sharing vehicles.

The upgrade also included re-broadcast units, which feature two inter-linked PRRs and filters in a saddlebag for easy manoeuvrability. The re-broadcast units are used when the team is spread over extended distances or when operations take place

under demanding circumstances, i.e. in enclosed spaces like tunnels, or in high-humidity environments like at sea or in the jungle. In these cases, the re-broadcast unit allows the communication range to be doubled. Additionally, a chain of re-broadcast units can also be established to enable communications over much greater distances.

In acknowledgement of the varied needs of the defence sector, the PRR comes with multiple headset options. A lightweight headset that fits comfortably beneath most nuclear, biological and chemical (NBC) suit helmets and allows an ear defender to be worn on top is fitted with a noise-cancelling microphone and works with any secondary radio. Alternatively, a lower profile daylight headset is also available in left-hand or right-hand versions.

The PRR can be configured for single user or dual user modes using the appropriate PTT Switch Pack. With the Dual PTT switch pack, the Commander can connect to the PRR and Combat Net Radio (CNR). The Switch Packs include an audio ancillaries socket in which the lightweight headset or alternative ancillaries can be connected. The dual switch interface means that audio from the CNR and PBR are heard from the same earphone, but not at the same time, thanks to a 'call waiting' audible tone. Second radio interfaces can be provided for MBITR, Harris, SINCGARS, PR4G, Bowman, TETRA, ICOM, Motorola and other professional radios.

One of the most notable upgraded features is the incorporation of data transfer capabilities. Information from small, low-power GPS and other sensors and target designators can be delivered to the desired personnel rapidly.

Image courtesy American Red Cross

The uptake of PRRs are widespread and growing

According to some industry reports, PRR sales have slowed in the current decade as a result of tightened defence sector budgets. However, sales are expected to spike at the end of the decade as the demand for short-range communications devices grows. More than 500,000 PRRs have been sold to date.

In the UK, PRRs are used by all of the British Armed Forces, including the British Army, the Royal Marines, the Royal Air Force and the Navy. Since launching, PRR use has become extremely widespread; the devices are now used by the Canadian Army, the Swedish Defence Materiel Administration (FMV), some US defence forces and even selected United Nations (UN) peace-keeping forces, among others. Beyond military applications, PRRs are also used for blue-light coordination, medical services coordination, wireless intercom, logistic support and inter-agency communications.

The benefits of PRRs in military operations are clear. Enhanced communication capabilities streamline operations and allow members of tactical units to act seamlessly, efficiently and without delay. Increased operations tempo, rapid deployment, improved situational awareness, better resource targeting and improved re-supply operations are opportunities too great to ignore, despite the financial concerns currently faced by many countries. Ultimately, PRRs are a vital component of any battlefield operation. **GMC**

Image courtesy DVIDShub