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IP Technology Brings Freedom and Flexibility to Tactical Communications

EB Tactical Wireless IP Network (TAC WIN) installed in an army vehicle.
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The Challenge

The last time you installed a network application on your home computer; did you need a project manager and a multi-million-dollar budget? You might have set up an email client or Skype so you could chat with people on the other side of the world. In doing that, you integrated with the largest network in the world in only a few clicks. So why, to have a new tactical application, do you have to wait months, or even years, and secure a huge budget to pay several layers of contractors?

The military environment is different and security and bandwidth constraints must be considered, but the technical tools for interoperability are available. Open standards for networking mean that making use of a new application is a matter of exploitation, not revolution. Modern military communicators are highly skilled and understand the constraints and freedoms that different networks allow. They should be given the freedom to manoeuvre in order to support the mission.

Computer Information Systems (CIS) in the tactical space have standard applications that require network interconnectivity, such as Battlespace Management applications, Shared Situational Awareness and messaging. These core applications may have been delivered within a tactical CIS, but they can also extend from a higher-level system and therefore are required to support standards. A tactical system is not deployed in isolation; information will flow across tactical radios, through gateways into trunk systems, and perhaps even across national boundaries. These flows must be planned and deployed in strict timelines in uncertain environments.

Unpredictable Requirements

For any given operation, the CIS will vary according to many factors, such as coalition partners, civil agencies and host nations, each having specific needs. It may be that the rules of the theatre demand biometric information transport. With all the scenarios that could be listed, we can be confident that there will be at least one niche application requirement that could not be predicted. It also cannot be assumed that interaction will just happen at strategic level, as it now happens from the lowest tactical level upwards.

This ease of integration is beginning to happen at higher levels of command with enduring operations utilising Commercial/Military Off-the-Shelf (COTS/MOTS) infrastructure to deliver a specific application set.

At the lowest tactical levels, the environmental constraints call for military-grade communications, but there is no reason the software approach should be different.

As with all military operations, it is impossible to predict the exact nature of the next campaign. The same applies to the applications that will support that operation. The military trains to be reactive and adapt to a changing environment. Most supporting communication infrastructure does not, however, offer the same flexibility. You do not need to refer back to the truck manufacturer when you want to change from moving munitions to distributing humanitarian aid. Likewise, adapting the supporting applications should be in the hands of those who understand the needs best.

What is Required

In order to give this flexibility to the users, a communications system must expose open standards. It must give the option of choosing a radio system suited to the terrain and spectrum constraints of that specific theatre of operations. It must be able to integrate with other manufacturers' radio systems and with COTS networking infrastructure. It must allow trained users to configure it to match the environment. Whilst being used, it needs to be simple enough that the low-level user can utilise it without being concerned about how it works.

The Solution

Elektrobit provides just such a solution in the **EB Tactical Wireless IP Network (TAC WIN)**. EB TAC WIN is a high speed IP-backbone solution for tactical communications on battalion and brigade level. The system provides high capacity wireless IP links between various command posts and vehicles supporting simultaneously Mobile Ad-hoc Networks (MANET) and point-to-point and point-to-multipoint topologies. It has all the standard physical and network interfaces required to integrate with COTS/MOTS infrastructure. It is flexible in deployment, with different radio heads that provide different topologies and spectrum usage to suit the situation. The use of standard network protocols means it can incorporate legacy data radios or interface with coalition partners. It is configurable by communications specialists and usable by anyone on the battlefield.

The use of standard internet protocols means that new applications can quickly be established and can start exploiting the network. If a coalition operation has spawned a new network and application set, then **EB TAC WIN** can be incorporated much quicker than more proprietary tactical CIS.

EB Tactical Wireless IP Network

We Don't Set the Requirements, You Do

The **EB TAC WIN** system brings the flexibility of a standards-based system down to the lowest tactical levels. In complex operations, the information requirements at platoon level and below can be almost as demanding as at battle group level. The use of a flexible and deployable network allows those needs to be met in a system that can be adapted to each unique situation.

The flexibility does not stop at just the network level. The **EB TAC WIN** system uses Software Defined Radio (SDR), which means it can develop and adapt as new waveforms appear. This could be a shared coalition waveform which allows radio-to-radio communications across national boundaries. It also gives the

hardware a degree of future-proofing, for instance when new standards appear, perhaps from the civilian 4G market, they can be exploited and implemented in a military system.

Voice is Still at the Heart of Military Communications

Whilst data communications is a relatively new phenomenon in the tactical space, voice communication is an old and enduring need. As data radios become more compact, an obvious exploitation path is to use Voice over Internet Protocol (VoIP). What VoIP brings to tactical communications is the flexibility to support different requirements at all phases of a conflict. VoIP is traditionally associated with simple telephony, and certainly the ability to make point-to-point calls can be invaluable for command purposes. VoIP, however, can also include group calls, which blur the line between telephony and all-informed voice nets. A group call can be established quickly over a data network without having to plan a separate voice network with the associated problem of key and fill distribution. The reach of a data-based voice system is not limited by the propagation range of the underlying radio system, as mesh topology and data routing mean it can reach throughout the theatre and even back to home base.

VoIP is accepted in strategic communications, but has not yet made an impact in the lower tactical levels. Making VoIP viable in the dynamic and resource-constrained tactical space requires understanding and adaptation of the VoIP protocols. This maximises performance, whilst limiting the network impact and also allowing external interoperability. **Elektrobit,** with its **EB Tough VoIP** product line, has brought the adaptability of VoIP into the tactical space. The use of military-grade voice compression provides the usual voice quality with as little as a tenth of the bandwidth usage of a comparable COTS solution.

VoIP in the Tactical Space - a Game Changer

The **EB Tough VoIP** family also supports a self-discovery mode which allows phones to find each other dynamically on a network with no pre-planning. This is distributed and avoids the single point of failure inherent to a server-based architecture, which is often unsuited to the tactical environment. Whilst adapted to the tactical space, these products retain full compatibly with VoIP standards such as those that may be used in strategic systems.

EB Tough VoIP is easy for operators and can be deployed rapidly wherever a standards-based data network exists. It can be run standalone to just fulfil the needs of the lower level or expeditionary commander. It can also be integrated into any voice network through a VoIP server, allowing communications when required from anywhere on the battlefield to any phone on earth.

EB Tough VoIP can be used together with **EB TAC WIN** to provide a voice and data solution for the tactical space. It can also be readily integrated with other manufacturers' data radios and with national legacy systems.

Tactical CIS needs to be adaptable and dependable whilst supporting open standards. We do not know what the full information needs of the next conflict will be, but we can ensure that we will be able to adapt to meet them quickly. Only by selecting a system based on open standards and protocols can a CIS be tailored quickly to the needs of a specific operation.

EB tough VoIP Field Phone *as an example from the Tough VoIP product portfolio*