

The future is calling out

TETRA digital radio has oft been hailed as the great enabler to – amongst others – interagency communications with law enforcement and medical responders. *Fire & Rescue* reveals some of the applications that TETRA will bring, and finds out some of the issues that fire brigades may need to be aware of as regards TETRA communications with partner agencies.



and interoperability with other organisations such as the police and ambulance services.

Currently the UK fire service is undergoing the installation of new mobile data terminals (Motorola MW800) and digital radio equipment (Motorola MTM800 and MTH800) in its fire vehicles. Around two thirds of its 8,440 fire and rescue service (FRS) vehicles have so far been kitted out.

The delivery of TETRA Airwave to the UK fire and rescue service is being managed in three phases. Phase A involves the installation of Airwave into each FRS control room. Phase B involves the installation of voice equipment into each fire appliance. In-vehicle data terminals are currently in Phase C, which will also involve the delivery of Airwave to the English regional control centres, which are currently being developed for the fire service.

Stephen Northcott, Senior Solutions Marketing Manager, EMEA, Motorola, has seen TETRA technology that was initially rolled out for police forces now being adopted by fire services world wide.

Northcott believes that as public safety bodies (such as those in the UK) look to leverage the TETRA technology and existing assets that are already in place for law enforcement, sister agencies such as fire services will take up TETRA.

As a result, Motorola has been taking a close look at the requirements of the fire service in order to offer a TETRA solution tailored specifically to meet their requirements from alerting to mobilisation and fireground communications. One such solution is Call Out. "Traditionally retained firefighters and specialist officers have been called out using a paging system," explains Northcott, "but we have developed a call out capability on Motorola phones that enable dispatchers to use TETRA to mobilise firefighters."

The system can be set up so only retained firefighters in a particular area are called out to report to the fire station. "Retained firefighters then have the option to say 'yes' or 'no'. Dispatchers receive the acknowledgement that the message has been received, as well as whether the firefighter can make it. If not, and additional firefighters are required to make up a full crew or a specific skill set is still required such as pump operator, then additional messages can be sent out until there is a full crew."

Using TETRA technology means that a dispatcher has better intelligence on how many retained firefighters are responding to an incident, explains Northcott. "It means not everyone on duty has to be sent out to an incident, which can result in cost savings. More sophisticated messages can be sent out too, for example asking firefighters to report to station B instead of station A, or to turn up at a certain time."

Motorola's Call Out solution is available now and shows our commitment to develop innovative new solutions to meet the needs of our customers, says Northcott. Indeed Motorola has worked closely with a fire brigade in Scandinavia to develop the solution. Even accepting the fact that for the most part fire ground communications remain analogue, says Northcott, and that TETRA talk groups are mainly aimed at command level, there is still a solution. "We provide the capability for switching between analogue and TETRA, allowing integrated communications. This can be a long term solution or part of a migration towards using purely TETRA at the fireground. Indeed, in some countries this is already the case and I think going

While it would be fair to say that using TETRA or the US equivalent standard P25 for interagency communications (i.e. between fire and police/ambulance) is an avenue that for the most part is yet to be fully explored by fire departments, in the UK it may be about to become a reality.

Here, an earnest drive to improve communications between emergency responders has to a large extent been driven by weaknesses highlighted in the aftermath of terrorist incidents.

The London Regional Resilience Report on events of 7 July 2005 concluded that communications between agencies was inadequate, especially outside the emergency services and among senior colleagues at strategic level.

In the UK the Airwave TETRA network will be the new national communications service for the fire and rescue services (FRSs) of England, Scotland and Wales. Known as Firelink, it replaces an outdated system providing improved coverage, security, resilience

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forwards, more fire brigades will follow."

Keeping TETRA terminals up to date with the latest features such as Call Out is a serious consideration for fire brigades, and to this end Motorola has developed its integrated Terminal Management solution. "It is an effective way of implementing new features and settings to everyone's radios at the same time. All firefighters have to do is put their radio to charge in their locker and it will automatically download the latest software. It ensures talk groups are up to date as things change."

Recording TETRA communications with partner agencies

The capability to communicate with other responders may also increase the importance of having a full audit trail of communications, believes Paul Collins, Director of Business Development for Public Safety at CyberTech.

CyberTech International is one of the fastest growing communications recording providers and a recognised innovator in the development of voice recording and monitoring applications.

"Communications between different emergency services attending an incident can form a vital link in the chain of evidence and offer valuable lessons for future joint missions, so voice and data recording solutions must deliver information that is complete, accurate and tamper-proof."

Recording systems, underlines Collins, must be secure against unauthorised access or tampering, yet off-the-shelf hardware and

open systems are preferred for interoperability. "If the captured information is to be shared between different emergency services for analysis after a joint incident then this information must be stored in industry standard file formats." Also, he recommends that for the captured information to be used for post incident analysis, suitable applications must be available to all agencies to facilitate quick and accurate presentation of the relevant data.

"As well as communications, emergency services may need to save other data such as workstation screens or ambient audio in incident rooms. Communications recording and screen recording, coupled with ambient recording and individual recording of key individuals can be used to give a full picture of the incident during an incident reconstruction or inquiry."

CyberTech voice recording solutions have been designed for mission critical command and control room environments, says Collins. By taking advantage of commercial off-the-shelf (COTS) hardware and brigade-provided network storage devices, this future-proof solution for the capture, storage, retrieval and playback of voice, radio and data communications provides high functionality whilst reducing a fire department's total cost of ownership. Solutions are also even available that record conversations by wireless microphones worn by key incident room individuals: this can record not only what was said but by whom it was said. Audio and screens are stored in industry standard formats and can be played back by authorised users on standard multi-media workstations. Relevant captured information can be shared between emergency services using email.

How can TETRA communications match the fire service's hierarchical structure on the fireground?

Tero Pesonen of EADS Security and Communication Solutions takes up the challenge.

In an analogue environment typically all firefighters on site use the same channel (or "talk group" in TETRA terms), which means that as soon as an incident grows in size the channel becomes very busy. Additionally, as there is no speech control, it might happen that multiple persons talk simultaneously thus blocking the successful delivery of at least some information to some participants. It has been shown that occasionally a strong character without formal leader position can become the de facto "fire chief", which can result in serious consequences including loss of life.

Furthermore, other studies have proven that the decision speed of fire chiefs is negatively impacted if they can hear communications between group leaders and individual firefighters, because fire chiefs automatically try to solve his firefighters' (easy) issues before addressing the more serious challenges impacting the entire scene. With TETRA it is possible to isolate the communication streams to the relevant receivers. The fire chief communicates to the group leaders and to the heads of other

agencies, whereas the group leaders communicate further to their group members and report back to the chief. In this way, the group members only hear each other in addition to their own leader, and they also know that all information coming out of their radio is relevant to them.

The group leader in turn communicates with his team members and reports (and receives commands) to the chief's talk group. This can be done with two separate radios attached to the different groups or by using priority scanning mechanism that enables the radio to monitor activity to both groups, while toggling the higher priority group over the other one ensuring that the information rated as being of higher importance always comes through. In case of a single radio the group leader himself benefits from dual PTT (Push To Talk) functionality supported by at least one TETRA manufacturer enabling him to speak at any time either with the chief or his group without having to manually change groups. The chief in turn has either all the

other agency liaison officers or field commanders assigned into the same group (as group leaders) or – especially in large and complex incidents – he also has a separate co-operation group for support organisations including the command and control centre dispatcher.

In many countries fire incident related interagency cooperation is lead by the fire chief, and other organisations such as police and health take a supportive role. Therefore it has been a natural progression that the interagency cooperation talk groups have been assigned under jurisdiction of the fire services.

In practice other agencies agree tasks and report on them in a "cooperation talk group" rather than reporting to the operational talk groups of firefighters on the site. This makes perfect sense as the duties are rather specific and also much of the information delivered needs to remain within that specific organisation – such as information related to potential criminal investigation for police or the patient records for the rescue/health services.



Tero Pesonen points out that Fire Chiefs' decision time can be negatively impacted if they can hear firefighters talking with their group leaders. Why? Because Chiefs automatically try to solve their staff's issues before addressing the more serious "bigger picture" challenges.