

# TETRA for Public Safety

Mobile communication is a hot topic with Public Safety organisations throughout Europe today. As existing radio equipment approaches the end of its lifecycle, these organisations are turning their focus to digital radio and the open standard known as TETRA.

Replacing aging equipment is one thing, but making the leap from conventional analogue technology to intelligent digital radio networks is much more complex. Besides the technical aspects, there are any number of economical, political and market concerns to be taken into consideration. Developments made at the national level are heavily influenced by efforts to establish a standardised mobile communication solution for the entire European Public Safety community. Such a solution would offer significant advantages such as interoperability for cross border communication, multi-vendor scenarios and technology that will stand the test of time.

To meet the needs of the most demanding Professional Mobile Radio (PMR) users, the European Telecommunications Standardisation Institute (ETSI) has defined an open digital trunked radio standard called TETRA, an acronym for TErrestrial Trunked RAdio.

## Unique co-ordination of frequencies

With the arrival of TETRA it is now possible to achieve significant economy of scale through the harmonised use of frequencies. For the first time there is a practical solution that allows operational costs to be spread out over a number of subscribing organisations. Though TETRA technology is frequency independent, it is through the harmonised use of frequencies such as the 380-400 MHz range, exclusively for use by Emergency Services, and the 410-430 MHz range for civil users, that major operational and cost benefits are achieved.

International public safety organisations can now work more closely together, communicating over the same frequencies. In Spain, for example, police communications are vulnerable to interference from both a French taxi company and a Portuguese power company. Cooperating with police

in neighbouring countries is certainly more practical than reaching agreements with commercial industries, especially as structural agreements within the police community may be feasible within the near future."

## A standard to encompass the globe - the TETRA market

With technology that fulfils the requirements of a broad spectrum of PMR users, TETRA has opened up a whole new global market. In Europe, the harmonised frequencies for TETRA will contribute significantly to the creation of a large market.

There exist both technical and political reasons to encourage this. Existing public safety networks are approaching the end of their economic lifecycle and TETRA provides a number of important features for these services such as encryption, direct mode and fast call set-up time.

TETRA is a viable solution even for other PMR markets such as railways, utility and industrial users. By joining a commercial TETRA network, these users of traditionally independent networks can save in infrastructure investments. The capability for virtual networking within TETRA networks makes this very feasible.

PMR markets have always been defined by a very clear understanding of what is required from a system. Cellular phones may be convenient for stranded motorists, but they don't come anywhere near the levels of reliability, functionality and security required by public safety and service organisations.

## Coverage and accessibility

Unlike infrastructures funded by commercial wireless services such as mobile telephony, public safety systems must reach areas that are of little or no commercial interest.



These systems must be designed to handle potential incidents occurring in remote regions, underground or even in inaccessible areas of buildings. Communication with aircraft and marine equipment also presents special requirements.

TETRA features direct mode operation between mobile radios without the need for network infrastructure. In addition, repeater and gateway functions extend the coverage of hand portable radios in both direct mode and network operation. TETRA radios can also automatically adjust output power (1, 3, 10 or 25W) according to the required field strength.

Operating in the 450MHz frequency range TETRA has an intrinsic range advantage allowing base stations to be located up to 100 km further apart than those for GSM and UMTS. TETRA has proven capable of high-quality, full duplex voice transmission from a mobile phone sized handset while simultaneously sending or receiving data at 28.8 kbits/sec. And rail companies can benefit from TETRA's ability to operate from vehicles travelling at up to 450 km/hr and to cope with widely fluctuating speeds during transmission, both in the open and in tunnel environments.

### Advantages with digital technology

TETRA's ability to filter out undesirable sound is particularly impressive in high-noise environments, providing speech quality nearing that of fixed line telephony. Furthermore, the digital technology allows for the transmission of data as well as voice, so video, still images, timetables, traffic and signalling information, route changes, other audio, etc. can be shared on demand.

### Reliable products for reliable systems

A TETRA network must be extremely reliable and capable of operating in harsh environments where extreme temperatures, dust, rain and water prevail. If a public telecommunication system breaks down during a disaster, the public safety system must work faultlessly in order to allow rescue efforts to proceed unimpeded. Failing system components such as leaking connectors are entirely unacceptable. ■

## Exir Broadcasting & Telecom's Products for TETRA

Exir Broadcasting & Telecom offers a complete range of products that live up to the tough requirements for TETRA systems. These products are designed to work flawlessly for at least 25 years, and have undergone rigorous testing for shock, vibration, water-pressure, dust and aging. Of course, these products have also been installed and operating in such severe environments for many years.

With our products no tape or other external sealing is required. Exir Broadcasting & Telecom's built-in weather-proofing system using O-rings protects systems from adverse leakage.

Exir Broadcasting & Telecom's connectors, jumper cables and grounding kits work perfectly over 0-2.2 GHz, and are consequently suitable for all TETRA frequencies. Smart cable clamps, available with wall attachments, are very convenient, as feeder cables are often installed inside of buildings

Grounding is particularly important in public safety systems in the case of severe thunderstorms. That is why Exir Broadcasting & Telecom has developed EMP-protectors for the 450MHz band to protect the cable's inner conductor from flashover

For Professional Mobile Radio users striving to share base stations, Exir Broadcasting & Telecom has splitters, ndB-couplers and combiners for handling various frequency bands from TETRA to GSM and UMTS. This allows a railway company, for example, to share base stations with a public safety company.

- Connectors
- Jumper Cables
- Grounding Kits
- EMP-protectors
- Cable Clamps
- Splitters
- ndB-couplers
- Filters & Combiners

