PowerTrunk

Whitepaper

DATA: TETRA's COMPETITIVE EDGE

How Data & Applications Can Improve Operational Efficiency for Professional Radio Users On Narrowband TETRA Networks

Whether your operations are business or mission-critical, data can add significant value. Real-time information provides the vital link needed to make better decisions and operate more efficiently.

Utilizing data can minimize costs by reducing the amount of time spent retrieving or filling information, but also by lowering network usage (compared to voice), allowing for expansion or other activities without the need to add extra capacity, thus avoiding additional CAPEX and OPEX costs. TETRA technology's unique data capacity enables efficient applications to run in parallel of essential voice communications.

Users nearly always carry a radio, so why not use it to generate efficiency and benefits for your operation. This can be done either by using applications on the radio or by attaching a tablet or PC to the radio to provide a secure and cost-effective means of communication.

Utilizing data can improve the speed and accuracy of communication, providing clarity, brevity and an auditable trail, as well as reduce the margin for human error.

Clarity of communication aids good and rapid decision making and, combined with timely inputs from the field that can be automatically processed and distributed, provides a real-time view of progress and an overview of the activities being monitored.

Routine tasks and processes can be automated to save time and ensure predictability. Using applications can support your existing processes, streamline field work, and automatically present the information needed at each step, leading to a more efficient workflow and helping to enforce processes and ensure quality.

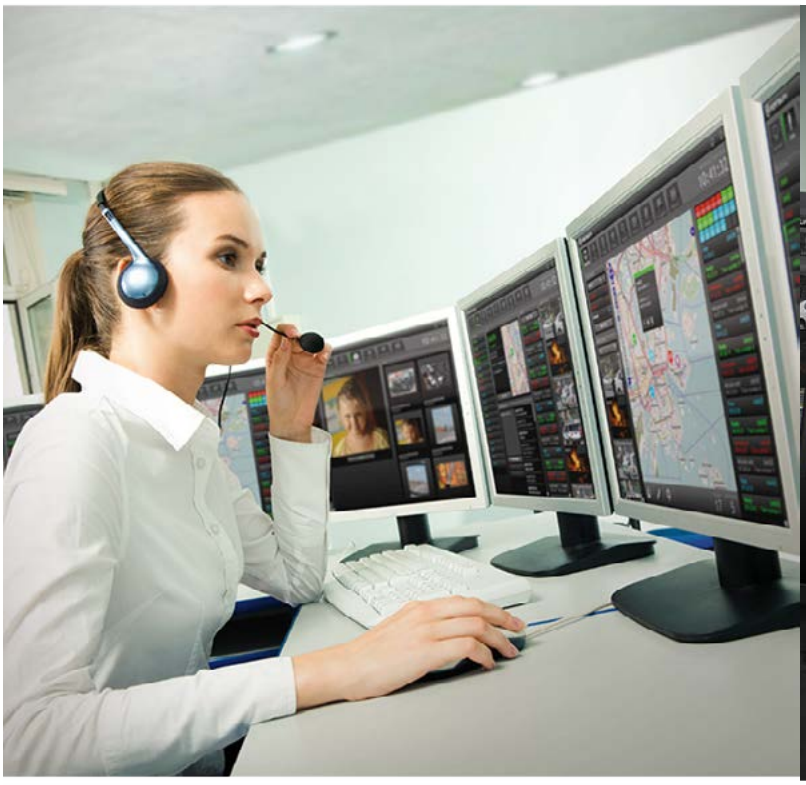
Integrating the collected or distributed data with your IT systems provides an opportunity to use analytics and automated intelligence to improve your operational efficiency and overall customer satisfaction.

Applications Drive Efficiency

TETRA radios usually have large sunlight–visible displays and an ability to host applications, utilizing either text messages, IP data, or both to provide a communications platform. IP packet data is not always the optimal delivery mechanism for applications on narrowband networks; messaging (text, binary data, and status) with group delivery for radio-efficient communications can also be used. Choosing the right transport mechanism for your application can deliver a very responsive and rapid service.

The table below shows how both narrowband and broadband data can provide a service for the typical types of application used by professional radio users. While the ability to deliver high resolution images or streaming video requires broadband networks most applications can be realized over narrowband networks if the right data bearer is used and the application is "smart" regarding the data it transfers or – more importantly – doesn't transfer across the air, resulting in a very low-latency transaction times.

	TETRA Short Data	DMR	TETRA IP Data	Broadband IP data
Database search	✓	✓	✓	✓
AVL	✓	✓	✓	✓
Messaging/ Email	✓	✓	✓	✓
File transfer e.g. still images	✓		✓	✓
Slow scan video			✓	✓
Streaming video				✓



Efficiency Savings When Using Data

When used to access back-office data, traditional voice communications usually involve multiple transactions between the person in the control room and the person using the radio; the person in the control room searches for the relevant data and reads out the result to the radio user.

This has two disadvantages; it takes two people to complete the task, and there is also a high chance of inaccuracy due to missed or misheard data when it is verbally relayed.

This sort of transaction is shown below, and can take a minute or more to complete, depending upon the amount of data to be relayed and how much repetition is required to ensure that all the data is captured.

Voice

Unit 5, calling Dispatch, over

Please check vehicle Delta - Lima -One - Two - Alpha - Mike - Seven, Three, Seven, over

Dispacth, please check vehicle owner

Thanks. Unit 5, out

Dispatch

Go ahead Unit 5

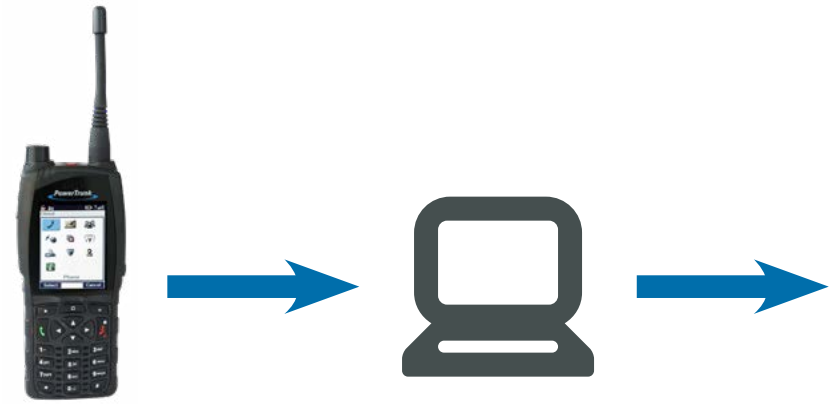
Database search DL12AM737

Vehicle is a white BMW Series 3. Tax and insurance are not valid, over

Driver database search 09046711K

Driver reference zero-nine-zero-four-six-seven-one-one-kilo. Owner name is John Doe. Licence is suspended, over

A typical database query from an application running on a radio goes directly to the back-end systems without intermediaries and is usually contained within one text message, as shown.



DL12AM737	BMW White 3 Series
DL Number	090467112K
Name	John Doe
Tax	NOT VALID
Insurance	NOT VALID
Licence	Suspended
Vehicle details	
Driver details	
Tax details	

When these two processes are overlaid, there is a large difference in the time and resources it takes to achieve the same goal. The application is much faster and uses significantly less network capacity and resources.

In this case, the voice channel is utilized for approximately 55 seconds and by two people, whereas the application uses two text messages and the transaction is completed in approximately 11 seconds. This makes the application TEN TIMES more efficient.

Some requests are repeated by personnel many times each day, multiplying the benefits of using data and the return on investment for doing so. If this activity where used 2000 times per day, the daily saving would be 55 hours of effort when compared to using voice. That is the equivalent of six extra people working every day!

Application projects are also relatively low-cost, with disproportionate savings in expensive time and resources. The benefits can be substantial when time and network costs are included; in some cases 40% or more of total benefits are from data and apps on a network. The cumulative benefits of replacing voice with voice and narrowband data on TETRA networks are high.

TETRA Data In Action: Case Studies

The following case studies show the range and scope of possibilities for applications, in particular, querying or pushing data to back-end systems, across a range of sectors.

New Jersey Transit AVL

The New Jersey Transit PowerTrunk TETRA network provides state-wide coverage along New Jersey bus routes, including three light rail systems: Hudson Bergen Light Rail (HBLR), Newark Light Rail (NLR), and River Line Light Rail.

The TETRA network provides NJ TRANSIT with the first mission-critical land mobile radio system in the United States that has sufficient data capacity to support the voice and data needs of transit operations over a single LMR network. The network significantly enhances the safety and efficiency of existing NJ TRANSIT operations because it (1) delivers carrier-grade speech quality, (2) carries data services on a system with mission-critical reliability, and (3) offers higher data capacity which enables advanced data-centric applications such as AVL and real-time bus information data in the Control Room.

TETRA technology data management capacity together with a Synchronous Data Manager (SDM) polling application has been included in the solution, allowing the refresh of information of the entire fleet (4000+ units) in just a few seconds.

This application, based on the TETRA Short Data Service (SDS), allows third-party applications to download polling tables into the TETRA system for much more efficient collection of periodic parameters (e.g., GPS position data from vehicles). SDM's slot pre-booking techniques make individual polling messages unnecessary at the application level. The fleet management application features SDM which guarantees the best possible performance for a given amount of available spectrum (update all NJT vehicle GPS positions every 30-40 seconds).

French Railways

TETRA radios help SNCF minimize costs, accelerate communications, reduce human error, and improve customer satisfaction.

SNCF is using applications on their TETRA radios to broadcast pre recorded announcements, update information panels on platforms, streamline train preparation and dispatch, and make train shunting much safer.

In many cases, the data messages replace instructions spoken into an analog radio or shouted to a colleague, enabling more efficient communication. In other cases, applications update back-end systems directly, eliminating the need to relay information from the platform to a third party for data entry.

Information transmitted by the applications directly updates SNCF's back-end systems, making it much easier to carry out post-event monitoring and performance reporting based on the more complete and accurate data. SNCF can easily see, for example, how long it takes to carry out individual operations during the train preparation process, how many trains leave each station on time, and which station a train has reached.

European Union Presidency

During Finland's EU presidency, a significant element of police duties centerd on monitoring convoys.

Instant messaging was used on both TETRA and GSM networks. With support, agents were able to message between the two technologies, allowing real-time status updates and freeing voice channels for emergency calls.

Instant messaging was also used to secure meeting places and visitor accommodation and to effect vehicle and person check-outs.

Agnico Eagle Mining

The Meliadine project, located in the low Arctic of northern Canada, is Agnico Eagle's largest development project based on mineral reserves and mineral resources. The project has 3.4 million ounces of gold in proven and probable reserves and a large mineral resource. The Meadowbank open-pit gold mine in the Kivalliq region of Nunavut was Agnico Eagle's first low Arctic mine. Both sites rely on TETRA technology for voice and data communications.

The engineering team at the mine added Short Data Applications (SDAs) to TETRA radios over the short data messaging service. Requiring no firmware changes, SDAs enable the automation of work flows, job allocation, and remote control capabilities, and provide intuitive display of information. Ultimately, purpose-built SDAs empower users to make better decisions, increase efficiency, and work more effectively.

Blast Notification
During the mining process there is often the need to carry out scheduled blasts, which are controlled explosions used to break rock for excavation. Although heavily monitored, these are inherently dangerous occurrences and all safety precautions must be taken to ensure the well-being of workers. Advanced announcements notifying employees of upcoming blasts are therefore of critical importance. The final announcements are always made via a voice call to everyone, but there are also displays around the mine that broadcast messages such as: "Be aware there is a blast scheduled for today at 12:00."

Stench Gas Release
Another common procedure is to request a Stench Gas Release in certain locations of the mine. Stench gas is commonly used in underground ventilation systems as an alert gas for emergency evacuations. The powerful odor can be quickly dispersed throughout an underground mine to alert workers of impending danger. A Stench Gas Release therefore tells everyone underground that they need to immediately retreat to a refuge station and prepare to evacuate the mine.

Currently, the stench gas release is done one of two ways: manually, where a person opens a bottle of the gas into the entilation system, or through a Human-Machine Interface (HMI) at the surface where a person presses a button on a computer system releasing the gas. The SDA was therefore custom-designed to allow a TETRA portable terminal user to request a gas release; first by entering a PIN, and then confirming the location and time.

BMW

BMW's manufacturing plant in Dingolfing, Germany, is the company's largest production site and produces the BMW 5, 6, and 7 Series.

When maintenance repairs to a production line are quickly addressed, output and revenue are quickly restored to optimum levels, so BMW wanted to replace and improve the automatic fault notification system in the production line to gain more efficiency.

This was achieved through an entirely automatic fault notification solution which unifies voice and data and improves efficiency within the plant. Whenever a fault occurs on the production line, the maintenance
team receives an automatic message via an application on their TETRA terminals, and a team member must then accept the job manually. If no team representative is able to accept, the system resends the SDS up to three times, after which the request is escalated to a supervisor who then decides who should take on the task.

The application considerably simplifies job allocation by minimizing the number of interactions needed to accept or reject a job. It also provides automatic registration of job acceptance on the server, with confirmation being sent to the user upon allocation.

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