

Digital Trunked Radio

Is it right for my organization?

White Paper

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INTRODUCTION

What are network operators looking for in their radio communications network today? The spectral efficiencies of both legacy analog trunked networks and the new digital technologies available are generally well understood. If you are planning to upgrade or migrate your current network, the business benefits you seek are likely to include:

- ▶ efficient workforce planning and management,
- ▶ increased worker safety,
- ▶ communications security,
- ▶ efficient use of available frequencies,
- ▶ clear return on investment,
- ▶ combined voice and data communications,
- ▶ reliable service,
- ▶ optimized network management.

Network operators who identify a number of these drivers as important considerations should be investigating a trunked radio platform.

Many astute network operators – including those who do not identify lack of frequency as a challenge – choose trunked technologies because they understand the compelling network and workforce management benefits.

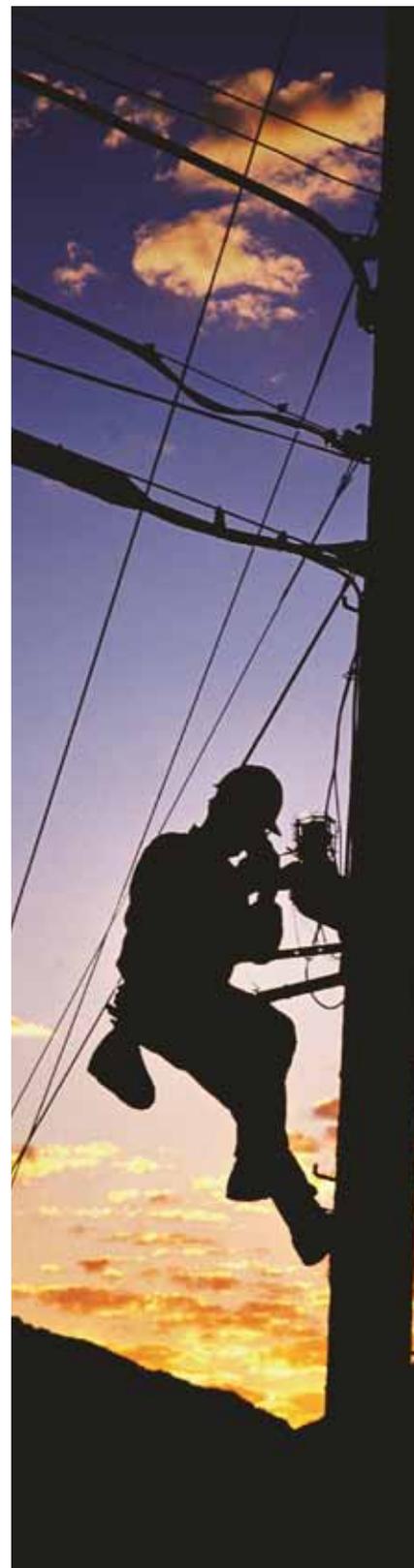
This paper will:

- ▶ dispel the perception that trunked radio is more complex and costly than other alternatives,
- ▶ consider network-level advantages, available now, and for future proofing identify technical benefits that simplify network operation,
- ▶ identify workforce management and user adoption benefits,
- ▶ examine a real life conventional-to-trunked upgrade,
- ▶ advise how to choose a communications partner.

CONVENTIONAL OR TRUNKED – UPFRONT COST VERSUS TOTAL COST OF OWNERSHIP

Firstly, let's consider one of the key barriers to transitioning to a digital trunking platform. Trunked networks are often perceived as complex and expensive. As a consequence, some operators do not benefit from the long term return on their investment opportunities that trunking offers and instead select the familiar, conventional technology when upgrading.

Since there is a lower initial CAPEX investment, a conventional network's upfront cost may indeed be less. However this does not take into account the considerable long term financial and operational advantages that lead to lower Total Cost of



Ownership of a trunked network. In addition there are the very real gains that digital trunked networks offer, in terms of worker safety. As an example these include fast access to the network in an emergency situation.

Trunked radio networks are more technically advanced and therefore they may seem more complex. However, to the operator and the user, most of this complexity is concealed and automated by the trunking controller which runs the network. Once installed and configured, on a day-to-day basis a trunked network is demonstrably less complex, less demanding of your technical resource and more accessible to your workforce.

In some circumstances, upgrading to a digital trunked platform can deliver spare network capacity. This provides an opportunity to generate an additional income stream for the operator, by leasing the spare capacity. Trunking talkgroup management maintains communications integrity between user organizations so each can operate independently.

In the next section, we present some compelling information why you should consider trunked radio for your organization's communications future.

PREPARING FOR THE FUTURE – UPGRADING TO TRUNKED NETWORKS

PREPARE FOR INCREASING DATA APPLICATIONS THAT WILL INFLUENCE HOW YOU DO BUSINESS.

The rapid increase in data applications will dramatically influence how you operate the business in the future. Data capability is inherent in modern trunked networks, utilizing the trunking control channel to deliver some of these applications. At its simplest, this may mean sending SMS status messaging or location information to your workers. Advanced features include the ability to use traffic channel data, efficiently updating changes in workflow; or remotely monitoring and managing aspects of the electricity network.

"Prepare now for increasing data applications that will influence how you do business."

INVEST IN A HIGH-CAPACITY SMALL NETWORK NOW; WITH FUTURE EASY UPGRADE

Modern trunked networks with one voice channel can deliver the same capacity as an analog conventional channel. A single 12.5kHz-equivalent TDMA channel can behave as both a trunking control channel and a voice channel. As capacity demand expands, more channels can be added easily.

MORE USERS, FEWER CHANNELS, LESS CONGESTION

Quite simply, trunked networks can accommodate more users, on fewer channels. Trunked technology efficiently rationalizes spectral congestion, allocating channels on a call-by-call basis. This results in fewer license fees and less site equipment, reducing costs significantly.

"Two or more organizations may share the management and overhead of a trunked network, yet operate with complete independence and privacy."

CONTROLLED NETWORK ACCESS PROTECTS NETWORK INTEGRITY

Unauthorized users cannot easily access your trunked network, because controlled network access is an inherent feature of every trunked network – unlike conventional networks that can be accidentally or deliberately used by unauthorized parties. Each mobile or portable is uniquely registered to your network and authenticated each time a call is transmitted or received.

SHARED NETWORKS: INDEPENDENT OPERATION DAY TO DAY AND INTEROPERABILITY IN AN EMERGENCY

During an emergency dispatchers can select and regroup operational teams into new talkgroups across a range of disparate organizations, allowing them to communicate directly, reducing response time and optimizing resources.

MANAGE, LOCATE AND RECOVER MISSING ASSETS

If a portable radio, or a vehicle with a radio installed is missing or stolen, radios can be easily blocked, or removed entirely from the network to protect your communications. Alternatively, a missing or stolen vehicle can be tracked via your trunked radio network using the radio’s AVL/GPS functions.

PRIVATE, RELIABLE, MANAGEABLE - TRUNKED RADIO REDUCES OVERHEADS

PRIVATE GROUP COMMUNICATIONS

One of the key features that separate conventional from trunked communications is talk groups. Trunking ensures that only one group has access to a particular channel at any one time, making the communications difficult to intercept or access. Trunked channels are assigned dynamically and therefore it is extremely difficult to identify which channel any given group will be using. Only designated members of the assigned group can hear those communications.

REDUCED NARROWBANDING CHANNEL MANAGEMENT OVERHEAD

On a conventional network, each narrow banded frequency offers two effective channels which must be individually allocated to radio users - this effectively doubles your channel management overhead. However, because the trunking controller automatically assigns available channels to a user or group, that technical overhead is not required.

COMMUNICATIONS CONTINUE THROUGH CHANNEL OUTAGES

In the event that a traffic channel fails and become unavailable; the trunking controller will simply allocate another available channel to any affected users or groups. In a conventional network, the call will simply be lost. Users on the affected channel are now without vital communications. This is particularly relevant in an emergency situation where worker safety is paramount. Trunking safeguards against this by re-directing the traffic immediately to a free channel.



LOWER MAINTENANCE OVERHEAD TO RESTORE COMMUNICATIONS

As soon as a channel outage is identified, full channel availability can be restored quickly on repair or replacement of the affected channel. Users' radios will not require reprogramming or channels reallocating to restore availability, because the network will simply detect the restored channel and make it available again to all registered users on the network.

"Minimize risk associated with communications network failure."

REDUCE TECHNICAL OVERHEAD FOR CHANNEL ALLOCATION AND MANAGEMENT

Individual radio users and user groups do not need to be assigned a channel, nor do they have to change channels as they move through coverage areas. They can send or receive on whichever available channel is nominated by the system, this occurs dynamically without the need for manual channel allocation.

EXPANSION THAT'S SIMPLER AND LESS COSTLY

In the future, a larger, more mobile workforce, and the dramatic increase in data applications will lead to a network expansion requirement. A trunked network can be easily expanded by adding channel equipment at existing sites. Standard trunked networks support 100 physical channels per site, delivering 200 voice channels, before additional nodes are required. This is where operators see significant payback from their trunked networks investment.

IMPROVE WORKFORCE RESPONSE WITH MANAGED, TARGETED COMMUNICATIONS

MANAGE YOUR WORKFORCE MORE EFFICIENTLY WITH DYNAMIC REGROUPING

Remote network management allows supervisors to dynamically group – and regroup workers. Tasks can be assigned, prioritized and managed, responding immediately to new situations. Task-based groups can communicate freely and then be regrouped remotely as new tasks are assigned. Workforce communications become even more effective with GPS and AVL applications.

FASTER EMERGENCY RESPONSE

In an emergency, the benefits of dynamic regrouping are significant. By reallocating groups, the supervisor can assign new priorities or tasks to the users as required allowing response teams to be in full communication, saving precious time.

RADIO USERS ADOPT TRUNKING COMMUNICATIONS QUICKLY AND POSITIVELY

Radio users will never need to remember which channel they are assigned to, because the trunking controller locates an available channel for them to use. If users are part of more than one operational group, they can move between groups using either a pre-programmed control knob or via the keypad.

USER ACTIVITY CAN BE CONTROLLED AND MANAGED

Supervisors can apply call limits to avoid congestion, improving overall call throughput. Flexible, remote network management means that these limits can be easily adjusted, especially during peak load times, becoming effectively immediately or at preset times.

MIGRATING YOUR CONVENTIONAL NETWORK TO A TRUNKED SOLUTION

Migrating to a Tait trunked network presents opportunities to improve performance, efficiency and reliability. If you're looking to upgrade to a trunked network while operating your existing communications infrastructure, a well-planned and clear migration path is vital. By ensuring a comprehensive plan is in place, your business case and your workers safety will be protected.

Staged and seamless migration pathways are inherent in all Tait Communications solutions. By focusing on flexibility, reduced complexity and value, Communications Network operators can feel confident in partnering with Tait Network Planning and Migration specialists. Tait experts can assist with navigating the operational and financial challenges, ensuring your outcomes are met.

CASE STUDY: NEIGHBORING UTILITIES INCREASE EFFICIENCY IN HARSH WORKING ENVIRONMENT

Two investor-owned utilities were operating across neighboring regions on incompatible and aging conventional radio networks. Although the networks were designed to ensure a safe work environment and coordinate maintenance crews in this challenging mountain terrain, radio users had low confidence in the system. Network performance was poor, and users and dispatchers often had to search for an available channel before they could communicate.

When the time came to replace their radio networks, the two organizations specified compatible, standards-based trunked networks including:

- ▶ full system redundancy to minimize the risks associated with communications network failure,
- ▶ reliable radio coverage to improve worker safety,
- ▶ assigned talkgroups that allow efficient response to outages, even in extreme weather,
- ▶ remote diagnostics and AVL applications,
- ▶ a clear migration path to digital communications.

The two organizations share a single dispatch center, their radio users roam within their two coverage areas using the same mobiles and portables in each. Regional talkgroups mean the dispatchers can communicate efficiently with specific teams on a day to day basis. No longer spending time searching for specific users they can now set up and select a talkgroup to call multiple users. This is critical for storm restoration work in this harsh mountain environment, assigning talkgroups for

"...coverage has exceeded staff expectations and users are amazed with the voice quality and overall fidelity of the system."

prompt response, and keeping communications open and their workers safer.

Read the complete case study.¹

CHOOSING YOUR TRUNKED COMMUNICATIONS PARTNER

Trunked technology can help deliver excellent return on investment with optimized network design. Ensuring coverage and capacity needs are met requires thorough investigation, high levels of technical precision and “on the ground” expertise.

Tait Trunked radio expertise spans several decades: Tait experts have been involved in the development, design and implementation of open standard trunked radio solutions for over four decades. Drawing on this experience, Tait understands the challenges you face. Our commitment is to ensure your communication solution meets all your expectations.

TAIT TRUNKED RADIO SOLUTIONS

Tait Trunked Radio Solutions are mature, full featured, and integrate easily between analog and digital platforms and equipment. Tait digital trunked platforms include P25 and DMR.

GLOSSARY OF TERMS

CAPEX – Capital Expenditure

AVL – Automatic Vehicle Location

GPS – Global Positioning System

P25 – Project 25, a digital radio standard designed for public safety users

DMR – Digital Mobile Radio, an ETSI based digital radio standard

TDMA – Time Division Multiple Access

SMS – Short Message Service

Footnote:

1. <http://www.taitradio.com/industries-and-solutions/industries/utilities/black-hills-power-usa>