

key touch[®]

customer magazine
1/2015

New radios!

**From
base station
to space
station**

**Map out
your future**

WHO'S IN THIS ISSUE?

Want to know a little more about some of the experts who contribute to Key Touch? Look no further.



PÄIVI LAAKSO-KUIVALAINEN

writes about PMR Evolution and hybrid networks, among others, and is keen to see things from end-user's viewpoint. In her free time she enjoys skiing, orienteering and other outdoor activities.



TUOMAS KORPILAHTI

writes for Key Touch on control room solutions, smart grids, data and applications. When not working, Tuomas is busy completing his new house and learning about interior design.



PETRA VAKIALA

is Senior Editor for Key Touch and enjoys researching and writing stories for the magazine – there are always interesting new topics to dig into! In addition to that Petra is into horse riding, downhill skiing and interior design. @petravakiala



JEAN-MICHEL DUMAZERT

juggles his time between work, family, scuba diving and being a local councillor. Since September 2010 he's now added to his packed schedule by contributing to Key Touch as Tetrapol correspondent.



TIINA SAARISTO

the long-time Editor-in-Chief believes in sharing information. "Writing for the magazine resembles my favourite hobby, quilting, where small pieces are sewn together to create a fascinating result," she says. @tiinasaaristo



SATU LAMBERG

has worked in TETRA terminals marketing all the way from Nokia days through EADS and Cassidian up to current Airbus Defence and Space phase. Even the company name has changed, the users' need for reliable and efficient communication and radios remain the same. We are here to serve you and provide what you need.



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Key Touch 1/2015 - March 2015

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From the street to space, communications for everywhere



THE 'SPACE' part of our name will get extra attention in March when astronaut Michel Tognini gives his keynote speech at the 24th Secure Networks Users' and Operators' Conference, SNUC 2015 in Cannes, organised by Airbus Defence and Space. There is perhaps no more mission-critical situation than maintaining communications with an orbiting space vehicle and this year's conference will have the theme of 'Keeping people connected when it matters most.' We talk to Michel and discover his best moments in space, and what he dislikes about being an astronaut.

Back down to Earth, 2014 has seen us break records, with over 7,000 TETRA base stations and base station radios delivered to customers. The year also saw our largest single delivery yet, a complete radio communications system that weighed over 60 tonnes.

Confident in our company and in the technology, organisations around the world are continuing to invest in TETRA networks by Airbus Defence and Space, despite the planned sale of the Secure Land Communications division. Good examples include the new TETRA system for the General Directorate of General Security in Lebanon or the expansion of the South Tyrolean TETRA network for civil protection organisations.

The VIRVE authority network is another showcase for long-standing commitment. With high speed data increasingly in demand, VIRVE has a 20 year, five step plan that will see a hybrid network in full operation by 2035. Key Touch outlines the five steps while showing how Airbus Defence and Space will support this evolution with a major contract to modernize VIRVE over the next five years.

These examples clearly show that TETRA, as well as Tetrapol, will remain a trusted technology for mobile voice communications in the public safety sector for years to come. Thus, we are continuing our efforts in these technologies. Key Touch updates you on our latest developments.

This issue profiles our new TETRA and Tetrapol radios, the TH9 and the TPH900. The TH9 article is told from the point of view of a police officer, showing how its features make it very easy to use on patrol. The TPH900 article shows how the new product builds on the best of existing Tetrapol radios while adding new features to make it even better suited to the needs of users in the field.

Nicole Lecca
Senior Vice President
Secure Land Communications

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NEW SOLUTIONS



13 Familiar, yet better

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FROM BASE STATION TO SPACE STATION

The 2015 secure networks conference, **SNUC**, focuses on mission-critical communications and will be addressed by someone who knows first-hand the value of staying connected when it matters most – veteran of two space missions, astronaut Michel Tognini. Key Touch interviews Mr Tognini to find out more.



Spaceflight. Few other activities depend so heavily on reliable communications. It's a topic that French astronaut Mr. Michel Tognini will address during his keynote speech at this year's Secure Networks Users' and Operators' Conference (SNUC). Taking place 4-5th March in Cannes, SNUC 2015's theme will be 'Keeping people connected when it matters most'.

Tognini speaks from experience. That's because on 23rd July 1999, he was aboard the Columbia space shuttle when it launched just after midnight into Florida's dark skies. As Columbia climbed away, multiple failures struck, including a hydrogen leak through three small holes in the nozzle of the right cryogenic engine and an electrical fault; both very serious.

Tognini takes up the tale: "We were aware of the AC power failure from the instruments and because the lights went out inside the cabin. With the crew's training, fast reactions and instructions from mission control, we knew what we had to do. But we didn't know about the engine failure and it was really close."

Although the engines shut down early, leaving the shuttle slightly short of speed, the crew was able to complete the mission successfully. Apart from the 1986 Challenger and 2003 Columbia disasters, this launch is said to have been the most difficult in the shuttle's history, and could have easily ended in catastrophe.

It's a great example of how mission-critical communications, both

voice and data, can help keep personnel safe in an extreme situation. Multiple redundant communications systems protect every spaceflight, Tognini says. "We never have a complete failure. If we did lose everything, a mission could continue safely and we would be able to recover comms, perhaps through GPS or satellite communications. We would still have Internet access too."

Shuttle vs. Soyuz

The Columbia mission was Tognini's second spaceflight. In 1992 he spent two weeks on the Russian Mir space station, travelling there and back on Soyuz spacecraft. Few people have flown on both vehicles, so how did the experiences compare? "The shuttle launch feels faster and stronger than the Soyuz, which is much softer. But we get to space in around the same time, about eight and a half minutes. Re-entry in the shuttle is smoother than in the Soyuz, which creates some very high G forces."

About SNUC

Hear about Michel Tognini's experiences at SNUC 2015, which features presentations from users and operators sharing their experience and best practices. The event hosts an exhibition where around 15 vendors will present their solutions and know-how during the conference days.

And his best experiences in orbit? "As we approached Mir, I saw the station floating nearby, just hanging in space. This huge station with antennas everywhere looked eerie and fascinating. Hard to believe it was travelling at 8 km/s. Also the feeling of zero G after a few days is so natural and easy. You get used to it very quickly. Every day you are in space you feel better and better and want to stay longer."

Training and more training

Tognini's CV is immensely impressive: degrees in advanced mathematics and engineering; Brigadier General in the French Air Force; fighter and test pilot with 4,000 hours logged in 80 different types of aircraft, mainly high performance jets; former Head of the European Astronaut Centre of the European Space Agency; and holding several medals and awards. Oh, he is fluent in English and Russian too.

For his total of nearly 19 days in orbit during both missions, Tognini spent many years in training, an aspect of being an astronaut that he says is vital, but long and repetitive. "The training is not really difficult, but you do it again and again. In space, if something goes wrong, then the training enables you to respond automatically, which is really important. Astronaut training is much more simulator based than test pilot training. As a test pilot you fly almost every day, with simulator sessions once in a while, but as an astronaut you are in a simulator almost every day and fly once every seven years," he quips.

Many years of VIRVE,

As far back as 1998, Finland began building the TETRA-based VIRVE public safety network, one of the world's first to replace aging analogue technology with digital. Now, a major upgrade and extension to meet the needs of the country's railways are set to enable VIRVE to meet changing needs far into the future.

The Finnish government's radio network VIRVE continues to evolve, with the government having signed the latest upgrade contract with Airbus Defence and Space.

Created to give authorities their own nationwide and secure radio network, planning for VIRVE began in the early 1990s, a time when analogue authority networks were considered to be expensive to maintain and when the demands on authority communications were growing. Construction began in 1998, with the network achieving nationwide coverage in 2002.

Today there are more than 60,000 users and about 1,300 base stations across the whole country. It serves users from all public safety and security services - police, fire, social, health and ambulance services, as well as the armed forces. Without doubt, VIRVE is an essential tool for ensuring the country's security, guaranteeing its users uninterrupted network performance and quality of service.

Keeping its edge

Finland continues to invest in TETRA technology, ensuring VIRVE remains an example of a modern authority network.

Airbus Defence and Space has been asked to modernise VIRVE through a 30 million euro project to renew about one third of the network's elements and to update software over the next five years. The goal is to ensure the high functionality and performance of the radio network far into the future.

The renewal covers the exchange of crucial components of the network, including 450 base stations. A "disaster recovery solution" will allow even better functioning in extreme conditions, such as storms and flooding, which might cause damage to the network's hardware or transmission lines.

Jarmo Vinkvist, CEO of VIRVE operator Suomen Virveverkko Oy, part of the State Security Networks Group, says: "Finnish emergency and security services



Timo Lehtimäki (right), CEO of State Security Networks Ltd and Hans Holmberg, CEO of Airbus Defence and Space Oy, signing the VIRVE frame contract.



Image: VR Group

many more to come

rely heavily on the communications systems provided through VIRVE. TETRA will remain our technology for mobile voice communications in the public safety sector for years to come. Thus, we are continuing our investment efforts in this technology.”

Railways join the party

In a move aimed at rationalizing its radio systems, the Finnish Government recently decided that country’s railways will move from its own GSM-R based network to VIRVE for train communications.

Finnish Rail currently uses a GSM-R train radio communications system known as the RAILI network. This needs replacing due to its age and because of the interference it is causing with commercial 3G networks.

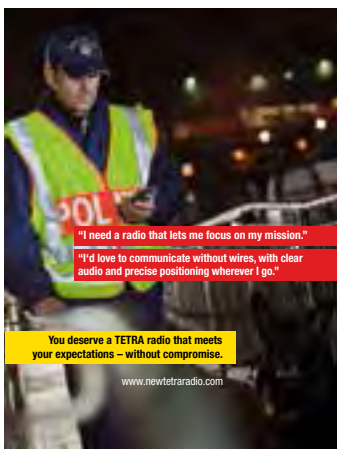
The Finnish Government has calculated that moving from GSM-R to the VIRVE TETRA service will provide significant savings. The additional initial investment in the TETRA network, as well as the operating costs to meet the railway’s needs, will be significantly less than the costs needed to support two separate networks.

The board of directors wants to switch to the VIRVE TETRA network as soon as possible and is hoping to complete the full transformation by the end of 2018.

At the end of the project, Finnish Rail will be able to communicate through the reliable, secure and proven shared TETRA based VIRVE network, bringing all its benefits to the railway and its staff.

My TH9 radio lets me focus on my mission

As a frequent user of professional radios, I have high demands and requirements for my communication tool. It must be simple and intuitive to use, yet offer lots of features and functions, like Bluetooth®, Java, GNSS and Voice Feedback. Of course, loud and clear audio, as well as a robust design for use in the field, are essential. Not every radio meets my needs, but the TH9 certainly does.



Power on hand

I don't need to worry about power – the TH9 offers 1.8W of output power, which is definitely enough for me. The radio also automatically recognises how I am carrying it, whether it is in my hand or in its holster, and then chooses the best display mode and audio power level. This saves its battery and gives me maximum use time. I work both day and night shifts and I can also optimise the display with a special Night Vision mode for the hours of darkness.

I communicate without wires

I don't need to worry about wires, since I don't have any. I normally wear my radio on my lapel for easy reach and to benefit from the Bluetooth connected earpiece. My motorbike helmet is also equipped with a Bluetooth headset. Sometimes I take part in covert operations where Bluetooth provides discretion. If Bluetooth is not for you, don't worry – the TH9 can also be delivered without it.

I hear it clearly

I have been impressed with the new audio, which has clearer and better sound. And the audibility for voice calls is really excellent. This is very important for me, especially in the noisy environments where I often work. The TH9 is easy to use and with its voice feedback feature, it can talk to me in my own language, so I can use it without looking.

Wherever I go

Precise positioning is crucial in my job. I feel safer in the field

knowing that my colleagues know exactly where I am and I can get help if I get into trouble. The "Where are you" function is a brilliant way to share position information between the team members and the "Lifeguard" feature can actually save me. Additionally the Global Navigation Satellite System (GNSS) inside the TH9 means more accurate and reliable location information. This is because it has improved sensitivity and can make use of two satellite systems at the same





time, out of the four possible: GPS, Glonass, BeiDou or Galileo. For me, this means that TH9 is also a future-proof product.

The TH9 TETRA radio meets my expectations – without compromise.

I am Bert Policeman and this was my view of the TH9 which I found on the Internet. You should check this too: www.newtetradio.com



DID YOU KNOW...

Make your radio fit your work pattern

Did you know that your radio can change profiles automatically to do things your way, whatever you are doing.

Every day is different. In fact your working environment can change totally even during the course of one shift. You are constantly on the move, from a silent office to the noisy scene of an incident. You drive a car, use several types of accessories, wear a helmet and other special gear and sometimes attend meetings.

You need your radio to keep up, which is why radios from Airbus Defence and Space adjust to suit your work pattern. However and wherever you need to use it, your radio will change the way it operates to suit what you are doing.

This radio adjusts itself

Your radio will automatically adjust to your work by changing profiles, freeing you from having to make constant routine changes yourself. This means you have less to remember and adjust, minimizing the risk of making mistakes. The radio helps you in many situations and optimizes itself at all times. It automatically recognizes a carrying device, a car kit or an accessory that you connect to the radio and changes the profile accordingly. For example, in the carrying profile, the radio locks the number keys and optimizes audio settings and power consumption.

Remote control of profiles

Your team can even control your profile remotely, if required in a specific situation. In applications like Call-out, the dispatcher can send specific over-the-air commands for radios to change from a silent profile and thus activate the radio whenever needed. A smart accessory can also remotely control the radio profiles and change them as needed, again reducing the need for manual adjustment.

Set it for your action

To get the best out of your radio, check your profile settings and personalise them for your use. Configuring your radio to meet your real needs enhances its use.

Setting up the radio for the first time to suit users' needs is made easier by the wealth of options available. The user organisation can set up a radio to fit the individual's tasks and to match how the organisation works. Later, if needed and the organisation allows, you can also change profiles manually. This is very easy and is performed through short-cut keys or a menu. TETRA radios from Airbus Defence and Space have more options and can be configured more flexibly than other devices on the market.

When a situation or task requires your full attention, you are free to concentrate on the job, not on your radio.



NEW TETRAPOL RADIO is familiar, yet better

Welcome to the new TPH900, the latest Tetrapol radio with advanced features to help officers do their jobs more easily and safely.



*Watch the new
TPH900 Tetrapol
radio on video*

Airbus Defence and Space set its design engineers a tough challenge – create a Tetrapol radio with the best feature set on the market, yet familiar enough for all users to be able to pick it up and start communicating without negotiating a steep learning curve.





- Comfortable grip
- Easy to use
- Larger display and keypad
- Powerful battery
- Fast swap feature

The company's P2G and TPH700 radios were already in wide use, so it was important that the new radio was familiar, easy to use and offered a good ergonomic design. The result was the TPH900. With a compact design and a comfortable grip, it fits easily in the hand, while a larger PTT button provides natural access to PMR audio. The unit adds dedicated buttons for volume adjustment as well as a larger display and keypad.

The radio's powerful battery offers up to 13 hours of use, while its fast swap feature means the user only needs a few seconds to change to a new battery and the radio takes only 20 seconds to restart after the battery has been changed. All the user's settings are unaffected following the battery swap.

As with the TPH700, operational menus in the TPH900 can be customized to suit the user or

organization's procedures or adapted to suit a particular user profile.

Basic needs with added features

Tetrapol's basic characteristics are autonomy, quality and volume of the audio, and robustness. All these aspects are fundamental features of the TPH900, which achieves the highest market standard based on these characteristics as well and four main functionalities: Bluetooth, integrated GPS, Man Down and vibra mode.

The Man Down function protects officers working in the field. If the radio stops moving or remains horizontal for too long, a local alert is triggered. If the



- ▶ Bluetooth
- ▶ Integrated GPS
- ▶ Man Down
- ▶ Vibra mode
- ▶ Wide range of accessories



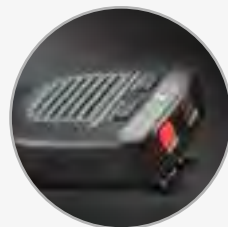
user does not respond, the radio automatically activates an emergency call over the Tetrapol network. Within a few moments, the alert is displayed on the control center screen. Using GPS, the operator can alert the field officers closest to the event. This feature can be activated as many others during terminal customization at the terminal programming station.

Wide accessories

The embedded Bluetooth allows access to a wide range of accessories, enabling end users to free themselves from wires, while the vibrating alert enables discreet notification of incoming calls or messages.

As with the TH9 TETRA radio, it will probably be first adopted by police officers in the street. A standard outfit including a remote speaker microphone and a pouch are available for this use. Dedicated accessories will also be available to support fire-fighters' needs.

Welcome to the new TPH900 – the Tetrapol radio that's so different, yet so familiar.



New in 2015 will be accessories to address more complex use cases: wireless audio and data, tactical outfit, and basic covert solutions.



A dose of TETRA helps improve patient care

A Finnish hospital is now using the VIRVE network and radios from Airbus Defence and Space to bring faster, more efficient healthcare to its patients. But it wasn't always that way...

Highly capable radios supported by an excellent communications network must be every hospital's dream. Yet those radios are of little use if they are simply gathering dust in the offices of admin staff.

That was the situation at Vaasa Central Hospital in Western Finland. Despite them lying around unused, monthly fees were still being paid for the 70 radios. With the hospital growing and communications becoming daily more critical, something had to be done.

Auli Virtanen decided she needed to take action. A specialist in anesthesia and acute nursing care assigned to the emergency room, Virtanen was determined to bring the radios into operational use, allowing the hospital to overcome its biggest communications challenge - making sure the right information reaches the right people, quickly and at the same time.



The situation is staged. © Vaasa Central Hospital's photo archive / Kaija Löschner

Used by the right people

The equipment was re-distributed to those who really need them - especially nurses.

"Finally when the devices were used by the right people for operational work, their benefits quickly became visible," says Virtanen. "I started training staff on the basics: what button to press, how to talk etc." When people started to use the radios, they very quickly didn't want to

work without them. Using the radios reduced effort, saved time and made it easy to call for help where and when it was needed.

"Whenever a patient comes in to the emergency room, everything must work as planned; each part of the chain must work correctly and at exactly the right moment," says Virtanen. "This would not be possible without an effective means of communication."

Most of the radios are TH1n handhelds, but the THR880i model is also used. Without these radios and the VIRVE network a real-time and effective communication between the hospital's critical points, would be virtually impossible, she adds.

"When we get information that there's a patient who has suffered a heart attack and is in critical condition, it is essential that the information about this event can be transmitted as quickly as possible to all who are involved in the treatment of the patient", Virtanen says. "In practice, this means that the emergency room nurse is aware of the patient before their arrival, and may call all the relevant parties to be present well in advance. The ambulance drivers also use TETRA radios, so they are always up to date with the situation."

Talk groups keep everyone in the loop

The benefits are now clear. Receiving of patients is faster because the right people are always on hand. "Communication and patient positioning and treatment have improved a lot. Using the TETRA radios has also cut around 200 daily calls to the lab."

Effective communication is made possible thanks to talk groups, which allow the entire group to hear all message traffic at the same time. Each member can pick up the content relevant to their own work. Without talk groups, this would not be possible in a large hospital environment, where different staff can be at sites far from each other.

There are plenty of reasons to use TETRA radios but there are a few features that rise above the rest. "As well as ensuring the patient's well-being and security, they help us to use our work time in the best way. Cutting out unnecessary steps means we can save time that can be used to take care of our patients. Our staff wouldn't agree to work without these communications tools a moment longer in their shifts."

This article is based on two previously published articles; one from Erve News 12/2014 <http://erveuutiset.erillisverkot.fi/> as well as another one published by VIRVE Products and Services Ltd during spring 2014, <http://tuotekuvasto.virve.com/uutiskirje/>.



Auli Virtanen (left) took the action to take the radios into operational use at Vaasa Central Hospital.

German Armed Forces 'to go the last mile' with **comms** for every soldier

The German Armed Forces (Bundeswehr) are closer to providing voice and data to every soldier following the latest round of testing of two mobile and one deployable combined TETRA/LTE networks.

Supplied by Airbus Defence and Space and Alcatel-Lucent, the mobile TETRA LTE radio system uses vehicle-mounted base stations and switches.

The network uses the 400 MHz spectrum for voice over TETRA and data over LTE transmission,

giving the Bundeswehr the power to run broadband data and voice services in one integrated solution. This spectrum is generally allocated for military and German security authorities and organisations, in which military has its own share. Using this frequency means the system offers the similar large coverage for data transmission as already known from narrow band voice services.

Better than expected

The latest series of tests builds on results obtained in 2013 and has proven the system to be even more capable than expected. For stationary cells, and depending on distance and the height of the antenna, data rates of between 100 kbps and 2 Mbps and distances of up to 20 km were attained when LTE and TETRA were used in parallel.

The tests have investigated the performance of functions such as simultaneous operation of LTE

and TETRA, stationary and mobile in the dedicated spectrum, DXT-DXT networking via Satcom Link, tracking and interfacing to existing applications and IT Systems and TETRA gateways to vehicle intercom and VHF Tactical Radio.

Full integration

The tests proved that the network, known as HochZeN (Hochmobile Zellulare Netze or Highly Mobile Cellular Networks) can achieve full integration with existing German Armed Forces' IT and communication Infrastructure.

The network could offer communications in a number of scenarios, for example maintaining contact within a convoy use case including the backhaul to a Headquarter via SATCOM. The systems can be used for military or peace keeping operations and improve the easy co-operation with public safety organizations for disaster relief.

Preparing for service

The radio system will undergo further tests with the Bundeswehr until the end of 2015. These tests will involve end users from different branches of the armed forces to assess the system's behaviour in real-life conditions.

Administrators will receive training to enable Operational Tests in a military environment to be conducted up to March. Operational Field Trials will start from March until the end of 2015 within several military organizations and facilities, for example Air Force, infantry and Special Forces.

HochZeN is one of the Ministry of Defence's 'lighthouse topics' and is seen as the answer to bridging the "last mile", allowing voice and data to be available to every single deployed soldier.



Twenty year

Finland is looking to the future and planning how to get the most benefit from a network that will increasingly provide high speed data facilities to its users. Based on five steps, the plan looks ahead to the hybrid network that covers user needs all the way until 2035.

A transformed network

➔ During these five steps, the narrowband TETRA network will transform into a TETRA critical voice service server and the operator will learn how to operate a broadband network. Users will have a high-speed data service that enables them to benefit from data applications and to develop information-centric ways of working.

In Finland, we are witnessing a secure and controlled evolution towards a hybrid network for mission critical users. Their experience points the way for other critical users to examine how they can best use radio communication and broadband.

**Critical content
via TETRA,
non-critical
via broadband**

Setting up an MVNO and using commercial broadband

Step 1

➔ Step one is to set up a mobile virtual network operator (MVNO) to meet increased data requirements. This will be accomplished by supporting the provisioning of users on a broadband network. Initially, externally purchased subscriber identity module (SIM) cards will be used, with the next phase being to own and control subscribers in the LTE core.

Step 2

➔ Critical voice and messages will run in the narrowband network, with high-speed non-critical (but secure) data running in the commercial broadband network.

plan maps out Finland's hybrid network

Own dedicated broadband in some areas

Step 3

Step three will see expansion of the owned LTE core to an owned dedicated broadband radio access in chosen locations, providing critical-grade data services.

Excellent voice services in both networks

Step 4

When critical Voice over LTE standardization is ready and the TETRA supplier supports group calls over LTE on the TETRA side, the two networks can be connected. This will mean the same voice services are available in both narrowband and broadband — in the dedicated networks on critical service levels and in the commercial operators' networks up to the levels they can provide.

Mature broadband takes over

Step 5

The final step is dismantling the TETRA radio access once broadband service availability and reliability meets public safety requirements. In some, mainly rural, areas, this might occur only when the spare parts stock for the narrowband network runs out.



This item is based on an article that was previously published in RadioResource International magazine, Quarter 4 2014, by Jarmo Vinkvist, Tero Pesonen and Matti Peltola.



Finland's 5 steps to critical broadband to bring fast mobile data-access to field operations

VIRVE currently serves around 34,000 subscribers from all public safety and security services and armed forces in Finland, guaranteeing its users uninterrupted network performance and quality of service.

Airbus Defence and Space has been awarded a major contract to modernize VIRVE, renew about one third of the TETRA network's elements and update software over the next five years. The project aims to ensure the high functionality and performance of the radio network far into the future and support the customer's long-term strategy.

Demand for high-speed broadband data services is building, so an evolution path from TETRA technology in the 2020s leads to LTE technology. This can be achieved in phases, using the current TETRA switches as critical communication servers for the LTE-network. A step-by-step also reduces the probability of misjudgments and poor investments. A hybrid solution consisting of a combination of dedicated networks owned by the authorities and commercial networks is proving to be an efficient answer for a country like Finland.



Questions on LTE – part 1

Interested in broadband and LTE but still a bit confused about what it could mean for you? Want more information on speeds, security and reliability? Our two-part guide to everything related to LTE starts here, with more of your questions answered in the next issue of Key Touch.



1

What is LTE?

LTE stands for Long Term Evolution. It is a standard for wireless communication of high-speed data for mobile phones and data terminals. The standard is developed by the 3GPP - 3rd Generation Partnership Project.

2

Why were LTE networks and standards developed?

LTE is a further development of the 3G standard. It offers major cost improvements for mobile operators as well as faster connection set-up times and lower latency times in data connections for end users. This can be easily seen in many popular applications, like messaging solutions, email and many others.

3

Can you make voice calls on an LTE network?

Today, only a few commercial operators offer voice services over LTE, with most offering voice via GSM and 3G networks and providing data services over their LTE networks. Although the LTE standard does support voice services, these require a high Quality of Service (QoS). Group calls are currently not supported in LTE standards.

4

Can critical users like police or other authorities have priorities in an LTE network?

Some priority features are included in the LTE standards. Equipment vendors and mobile operators do not currently offer this option widely.

5

Is an LTE network safe from eavesdropping and fake base stations?

Current 3G network standards offer features to prevent eavesdropping and fake base stations. However, vendors and mobile operators have not taken these measures into use. This applies also to LTE networks.



Stay tuned for the part two in the in the next issue of Key Touch!

How hybrid networks bring extra value to users

Key Touch looks at how professional mobile radio (PMR) networks are evolving to meet the data application needs of users and how hybrid networks bring value to users in many ways.



Today's public mobile radio networks deliver reliable and secure communications that critical users have learned to trust. Yet these networks did not come into being overnight. It took years of hardware and software development, testing and implementing the best technology to achieve the functionality we see today. Significant investments have also been made in training, developing opera-

tional models and integrating the radio networks with other critical systems and command rooms.

Of course, new needs arise constantly, with access to data applications being one of the most high profile demands currently. To meet this need will require broadband networks and Airbus Defence and Space has been working on the issue for some time to combine professional radio networks with broadband networks into a hybrid solution.

Getting value from broadband

A variety of MVNO (Mobile Virtual Network Operator) projects and broadband pilots have shown how broadband solutions bring clear benefits for users.

Complementing an existing public safety network by one or more dedicated broadband, satellite or commercial networks results in a hybrid network.

The benefit from a hybrid network is that users and user organisations do not have to "know" or see what networks they are using or who owns the base stations - they simply use applications and services from trusted service providers who solve multi-network issues on their behalf.

Best of both worlds

With a trusted service provider and a smooth and incremental evolution towards hybrid networks, users get service and support that meets their requirements and can use broadband data while maintaining the high availability and coverage provided by TETRA or Tetrapol networks.

Making work easier

The first priority for users is that the new applications make their work easier. They should also be able to use the same applications the same way wherever they are.



Convenience for users means they do not need to solve the technology evolution and security aspects of the network and will have the services they need to conduct their daily work.

Hybrid favored by EU Commission Report

According to a European Commission report (*Is Commercial Cellular Suitable for Mission Critical Broadband?*), a hybrid solution would be the best option for mission critical users, utilities and public transport. Each sector uses broadband in quite different ways, from image services, database access and streaming video, to very low-latency telemetry and real-time control.

Getting from single to hybrid

Adopting the Tactilon® Suite for broadband is the smooth route to a hybrid network.

Tactilon Suite brings clear benefits to users.

Privacy: Trusted stakeholders continue to own and manage the subscriber data. Connections to intranet application servers and databases are protected with special VPN tunnels.

Applications: Applications enhance the mission-critical communications mix and add new services. They can make work easier and safer. They can improve the quality of response. They give completely new possibilities.

Control: Interoperability between authorities is normal today, making similar interoperability with high speed data applications essential. Tactilon Suite integrates users from several networks, improving the coordination of operations.



High speed data and applications can create significant value for users, but the current status quo must not be compromised.

Airbus Defence and Space has developed digital radio networks to take these considerations into account, supporting customers with its Tactilon Suite for broadband solution for hybrid networks.

7.0

TETRA System Release 7.0 – What's that?

System Releases? They're what make your radio work.

When you use your radio, it is operating in a network based on the the TETRA system. This system, with its hardware and software, is what makes everything possible. The different functions and other features you use are the result of your radio and the TETRA system working together.

Like all systems, it needs to be upgraded every so often to bring

new capabilities and other improvements. For TETRA, this is achieved through System Releases, essentially updated versions of the software.

Your network has probably been upgraded to a new software release several times. It's important because the newest software works well with the latest versions of network elements and also includes the latest bug fixes.

Upgrades ensure your network continues to offer reliable services for you and other users. TETRA System Release upgrades take place every two or three years and are carefully planned to avoid interrupting your work.

Your TETRA network operator will be planning to introduce System Release 7.0, so here we take a look at what you can expect from the upgrade.



System Release 7.0 in a nutshell

The new System Release 7.0 brings some exciting improvements to your network. For example, your dispatcher has two new ways to ensure that

important information will get through to you, while the system will continue working even through the worst of disasters.

Your discussions and data have new protections, while you and your colleagues can use smart devices the right way in professional operations.



Failure is not an option

Your radio network has been designed to stay functional even in exceptional circumstances. For example, a big accident, a storm, or just a major sporting event may make commercial mobile networks too congested to use. With a public safety network, you and other users can count on it being available when

you need it the most.

But what if a major disaster takes out a vital part of the system, like a network switch? Previously, responders might have to use Direct Mode, or make do with communications that a single base station can offer.

Software Release 7.0 solves this with the ability to make up for the lost

parts, quickly and automatically. Another switch will take over the tasks of the damaged switch, and first responders can continue operations.

See how a disaster is averted. Watch this on video:



Built for security

Your TETRA system is designed with advanced technologies that work together to keep your communications and information safer. With ever more IP connections being used,

even more security mechanisms are needed.

Release 7.0 includes mechanisms that encrypt your communications while your radio moves between base

stations and switches, as well as when it is using an Internet connection. As soon as the call or message reaches the base station, it is encrypted for transmission to the switching site.



Grouped like never before

A new feature means your dispatcher can create a new talk group when they want to and send it to your radio over the air. You don't have to do anything: you will automatically be a member of this new group and can start communicating in the group at once.



Not reachable? No problem

If you don't carry your TETRA radio everywhere, you can still make sure that people can reach you. The new Call Forwarding function lets you redirect your incoming calls to another number, either a TETRA radio or even a mobile phone.



How a group call can connect smart device users and TETRA users.



The best way to use smart devices

Smartphones and other smart devices are now so common that there must be ways to include their users in various operations. Release 7.0 now supports the right way to use smart devices in professional group communications – the secure and controlled way. There are five components to the solution:

- Release 7.0 which makes things work
- The talk group which defines the people to be connected
- The dispatcher who has the authority to define communication rights
- The app on the smart device
- The tools for managing users regardless of their network.

The result is that the talk group members can communi-

cate together whether they use a TETRA radio or a smart device. The smart device users can talk to the group by pressing the PTT key on the smart app - they hear the other members and all members can also exchange messages in the group.

The cooperation between the smart device users and TETRA users is easy and intuitive. Smart device users have an easy to use application, and TETRA users communicate over their radios the same way as always.

Professional communication using smart devices is for users who do not require an always available service. For mission critical operations, TETRA is the best choice.

Updating your network to Release 7.0 will be done automatically - all you will see are the benefits of a better operating network.

In the numbers: **Claricor® 3**

0.3

SECONDS

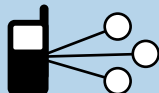
8m 

distance by a F1 car



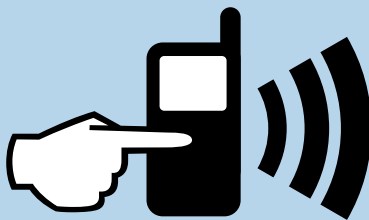
2

blinks of an eye



1

Group call setup
time in Claricor 3



1*PTT



...call to
all group
members

PICTURE THIS

Availability
>99.999%

Based on the same
software that connects
4,000,000,000
users worldwide



CLARICOR 3 BENEFITS



OLD vs NEW

Updating your old communication system is a good idea, but why exactly? What will happen to my business? What are the advantages? Will the new communication system make a difference in everyday duties? After reading this comparison table you should be able to launch your project.

**Typical/
traditional
communication
system**

VS

**Modern,
hybrid
communication
system for
oil & gas**

FLEXIBILITY

Each region needs its own radio system, which are difficult or even impossible to connect. For example, a maintenance technician moving from one region to another cannot use the same radio to access both his own group and the regional groups.

When building a communication network, **you can start with a small network for a region and when needed, enlarge it to cover more areas**. For example, the maintenance technician can use the network anywhere and use his own groups and regional groups for communication. Also **management (changing of groups, new users etc.) and technical management of the network can be done from anywhere in the network**. Headquarters can remotely control all areas if that supports the organisational model.

**Typical/
traditional
communication
system**

VS

**Modern,
hybrid
communication
system for
oil & gas**

PERFORMANCE

Analogue communications are easily drowned out. A user working in a noisy environment, like an oil refinery, cannot hear conventional radio communications, even when using an earpiece.

With **excellent voice quality**, all communication can be heard loud and clear. Plus, the modern communication system eliminates the background noise from the machinery.

Organized criminals and other miscreants can all too easily eavesdrop on communications. They could also interfere with communication by using **jamming**.

When an oil & gas company faces security risks, such as the threat of terrorism or organised crime, **encryption of communication, authentication of radio terminals and base stations** are excellent ways to stop eavesdropping.

Complicated installation.

Simple, fast installation for both small and large networks.

When maintenance staff need additional information sent to them, such as maps, reports and database access, this is not possible because of the system's **limited or non-existent data communication**.

Maintenance staff can carry their IT tools with them everywhere, making their work easier and themselves more efficient. When even more (and faster) data is needed in the future, Airbus Defence and Space offers a hybrid solution. **Telemetry and surveillance data (among others) available in the control center** offer major improvements to the control center's ability to control the up-stream, mid-stream and down-stream processes.

Redundancy and availability not high enough to offer full protection to vital oil & gas facilities.

During hurricanes and winter storms, we need oil & gas pumping stations and refineries and the whole process to function properly. Modern communication systems from Airbus Defence and Space offer **high redundancy and availability**, ensuring that the oil & gas company's communication system will continue running when both old and commercial systems fail.

A lot of time and money is spent on management issues, such as introducing new users and new groups to the network and the technical management of the network elements. These tasks cannot be done from one place with modern and easy to-use tools.

Easy-to-use modern tools for both operational and technical management. **Rights to manage** can be defined exactly as the company hierarchy requires. Management can be done from one point (command centre) or can be divided over several areas.

AIMING HIGH

Secure radio communications on the 160th floor and beyond

High rise buildings present particular challenges to owners seeking to provide the best radio communications solution.

It must meet the needs of building staff, businesses occupying the building and the emergency services, while the capacity required depends on the number of users and organisations and the amount of traffic. A good solution allows new users and organisations to be added easily.

Operating expenses must also be considered.

Choosing a radio coverage method

Radio waves propagate very differently in buildings. Walls, floors and ceilings attenuate the radio signals, while openings and gaps make it easier.

There are three options for radio coverage in high rise buildings - direct mode (DMO) communication between handheld radio phones, a cell enhancer to extend the coverage of an existing outdoor radio network into the building, or installing a base station to provide coverage in the building.

Direct mode? Not enough coverage

DMO alone cannot provide reliable and stable radio coverage for a building. Radio coverage depends on the users' locations so it is unpredictable. In addition, losses apply to both ends, which reduces the range of radio coverage.

Cell-enhancer? Not enough capacity

A cell-enhancer will only repeat a signal coming from an outdoor base station. That base station



will have to handle additional traffic from the users inside the building. This eats up its capacity.

Distributed Antenna Systems can provide coverage to a whole building

The best way to ensure indoor radio coverage is to distribute the signal along the confined area through a distribution network.

A Distributed Antenna System (DAS) uses indoor antennas distributed throughout the building. It is usually fed either by a cell-enhancer (repeater) which captures (and repeats) an existing outdoor signal, or by an indoor base station.

Setting up a base station to serve the building is the best choice. It is possible to get full coverage and capacity by installing one TB3p or TB3hp TETRA base station and connect it to a DAS. The DAS can consist of 3-4 antennas, one near the lift and the others at the edges of the building.

What about another radio system?

In theory, in-building coverage can also be provided by a new

radio system, such as a DMR system. However, although lower frequencies can provide good coverage over long distances, small-scale propagation is more complicated. They are also more sensitive to man-made noise.

A VHF solution cannot accommodate the 380-400 MHz frequency bands, preventing public safety professionals from using radios inside the building.

The best option is a TB3p or TB3hp TETRA base station connected to a DAS. This is easy to set up, is small with large capacity and requires very little maintenance.

Contact marketing@cassidian.com to learn more on how to create reliable, business-enabling secure radio communication solutions for your buildings. In the email, please mention "TETRA for high rise buildings."

Airbus Defence and Space has supplied digital radio communication solutions that are in use in high rise buildings: the Burj Khalifa in Dubai and the Petronas Towers in Kuala Lumpur, for example.

New videos worth watching

New videos on professional radio communications are now available.



Make work life easier with aliasing

Learn how aliasing can make work life easier for professionals who use TETRA radios.



How to use smartphones the right way in professional operations

Did you know that people with only a smartphone can take part in important group communications with first responders who use TETRA radios? This is just one example of when this possibility would be useful.



Learn how to prepare for the worst case scenario with Disaster Recovery

First responders depend on their TETRA radios for critical communications. If a disaster takes out parts of the radio network, you need the Disaster Recovery solution.





Key Touch 10 years ago

The future looked bright in TETRA Touch (now called Key Touch), issue 1-2005.

Germany was closer to national public safety network

The qualification phase had started, and the RFQ for the nationwide network was expected to be issued in June that year.

"The Länder are clearly hoping for a network that is not tied into a single proprietary system but which can use standard equipment from large and well developed market."

"The "multi-vendor confidence" is clearly vital for major investments. This

is one of TETRA's greatest strengths, with the technology currently being supported by 16 independent manufacturers of TETRA infrastructure and terminals. TETRA is clearly in the running for this major contract."

Meanwhile in Belgium, users were rushing to ASTRID

"ASTRID has signed up its 17,000th user, evidence that the nationwide Belgian security network is proving popular with authority organizations. February alone saw 1,000 ASTRID radios activated."

"The network itself is growing steadily. Of the 435 masts originally planned for ASTRID, 352 have already been integrated into the network. At the beginning of April, radio

coverage was complete in all Flemish provinces and in the Brussels region. Things are also advancing in Wallonia, where almost half the police zones now have good coverage."

New network promised to keep Paris trains and buses in touch

"RATP, the French transport company responsible for moving more than 9 million commuters and visitors around Paris each day, is preparing to roll out a TETRA system to provide integrated radio communications across its entire network of buses, underground and overground trains."

EADS had announced the acquisition of Nokia's PMR business, and we all know the success story that these ten years has been. For example, exactly like the Editorial predicted, the combined business has brought a wider presence in the market.





Bigger TETRA network will cover all South Tyrol

Airbus Defence and Space has won a contract to expand the TETRA network serving the province of South Tyrol in Italy, bringing secure digital communications across the entire region. The deal extends the project to implement a single TETRA system to replace the 50 analogue systems currently being used which we reported in Key Touch issue 3/2014.

In partnership with Austrian company Center Communications Systems, the €3.5 million contract will see the addition of 47 sites based on the advanced TB3 TETRA base station. The addition of a second digital DXT3 TETRA switch will improve the network's redundancy and capacity, while also allowing future expansion to fill any remaining coverage gaps.

Better subscriber management will be possible with the addition of

a Tactilon subscriber management system, while a SDS (Short Data Service) Centre will ensure that text messages are delivered even if a recipient is not registered on the network at the time.

A new training system based on both classroom training and an e-learning tool will ensure users a painless transition as they move to sharing the new expanded network.



Lebanese security strengthened by nationwide TETRA

Lebanese security forces will soon enjoy advanced digital communications across the entire country with the imminent completion of their own nationwide TETRA network.

Supplied by Airbus Defence and Space to the country's General Directorate of General Security (GDGS), the network will comprise TETRA switches, base stations, dispatcher workstations and more than 2,000 radio terminals. The new system is expected to be fully deployed by the first quarter of 2015.

The TETRA network will replace the existing analogue networks and will be made available to more than 3,000 subscribers of the government intelligence services, which ensure national security and public order throughout Lebanon. Airbus Defence and Space's network will offer full coverage across the whole country, allowing the security forces to secure communication at sensitive locations such as airports, seaports and borders.



Record in TETRA equipment deliveries

The Airbus Defence and Space shipment figures from 2014 hit an all time record on TETRA equipment deliveries.

In 2014, the company delivered around 5,800 TETRA base station radios, more than any previous year. The TB3-series models have become the most popular in the world, maintaining their hold on the market by offering unbeatable coverage and sensitivity.

TETRA base stations scored another important first too, with the introduction of the world's smallest high power

er TETRA base station, the TB3hp. This offers up to 50% more coverage than its predecessors in the mini category.



Complete network. 2441 pallets. Complete delivery.

In summer 2014, Airbus Defence and Space's Helsinki staff were kept super-busy managing the company's largest single delivery of a complete radio communications system. The full shipment, sent to the customer on dedicated cargo planes, weighed a total of 293 tonnes, had a volume of 1964 m³ and was packed on 2441 pallets.



For the record: The role of public safety recording systems

by **Patrick Salg, Director International Sales, ASC Technologies AG**

Recording systems play a vital role in helping protect lives and property. Particularly during an emergency, they must meet special demands, improve performance and make a tough job easier for police, firemen, air-traffic controllers and other public safety officials.

After an event, they must help people understand what went on during the incident as they seek to streamline procedures and response times to help save lives in the future.

Performance during an event

During an incident, the support tools used by public safety officials must function flawlessly if they are to resolve the situation quickly and efficiently. For this reason, recording systems must meet certain basic requirements.

The most important is 100% reliability during rapidly changing circumstances. Whether it's a hostage situation or a mother worried about

a sick child, recording systems must work flawlessly. Every single word must be preserved and integrated with time stamps accurate to one-hundredth of a second.

System architecture can use a modular design to avoid unnecessary complexity and decrease the likelihood of a malfunction. This also saves money that can be invested in other life-saving equipment.

An advanced GUI makes the recording system easy to use so dispatchers can focus on the situation at hand rather than the technology.

All encompassing

Recording solutions for public safety agencies should cover traditional telephony, Voice over IP, trunked radio communications and screen activities. For companies switching from standard phone systems to VoIP, hybrid solutions should record both types of transmission using the same server.

Recording systems should span local centers, TETRA networks with several tenants and distributed environments without sacrificing the security of the transmission. A police station in a certain locality, for example, may need to monitor the latest reports to fire stations about the spread of wildfires in nearby communities. Recording solutions may be used to integrate emergency centres to improve coordination, while protecting privacy with the highest level of security.

Bring up the last call

One particularly useful feature is called Last Call Repeat. It lets the dispatcher replay a call even while it is still in progress. This helps the dispatcher get a clearer idea of what callers are saying even if they are panicking or incoherent.

A keep/delete option allows a current call to be recorded from the beginning at any time during the



conversation, useful as evidence if it turns out to be threatening. This capability also protects against invasion of privacy, with the option to either store an entire phone call from the beginning or completely delete it.

Performance after an event

Analyzing an event after it occurs incorporates an important function of communications recording: quality monitoring. This helps supervisors train their staff by following best practices.

Quality monitoring solutions often let the supervisor add comments to recorded calls for later review. Recordings should be easily emailed back and forth and features such as a “call collection box” allow the grouping of recordings from the same event for easier retrieval and analysis.

Public image

Calls from the public may be based on the incoming or outgoing phone num-

ber, or the time or duration of the conversation. Speech processing allows a search for threatening keywords such as “bomb”, while voice recognition and emotion detection are also useful.

Public safety agencies may also need to protect themselves from liability by collecting evidence admissible in a court of law. Recordings should be time stamped and provide tamper-proof data, free from manipulation both during and after an event. Encryption algorithms are used by high-end recording systems to provide and protect solid evidence.

Today’s solutions allow nearly unlimited storage of recordings online as well as the use of archiving devices employing optical disks and network-attached storage (NAS). Recording solutions must also include redundancy as an essential feature both during and after an event.

Recording systems are essential to emergency personnel in their efforts to help people in distress. They should be evaluated carefully for their contributions, both during and after an event.

About ASC Technologies AG



ASC Technologies AG, a partner of Airbus Defence and Space, is a world-leading software company with innovative solutions to record, analyze and evaluate communications. If you are attending SNUC, please take time to meet the ASC Technologies AG representatives at the event.



Paging is ideal for alerting first responders to an incident. Yet, today's paging systems have two major drawbacks. Because they are still based on analogue technology, they are nearing the ends of their lives. Paging is also only one way - there is no way to tell if the alert has gone through, and the person receiving the alert has to phone back, which can be very inconvenient.

This was the situation facing the German State of Hesse, which wanted to improve its paging system by carrying out paging and critical voice and data communication over the same network. This would both save money and produce operational benefits from two-way paging.

The active pager

It was clear that the existing TETRA radios would be too bulky and expensive for use as pagers. The pager needed to fit into a pocket

and have an excellent battery life.

The response from Airbus Defence and Space was the P8GR active TETRA pager, which, as well as alerting staff, provides a way to see whether a person was reached and available for duty. Those sending the call out no longer have to send the alert and hope for the best - instead, they get real information on who is available.

The P8GR is the smallest ever TETRA radio. With its internal antenna, it will receive messages as well as handheld TETRA radios with their external antenna. Although small, it is also robust enough to exceed the strict requirements of public safety users.

Easier and better paging

The P8GR is extremely easy to use. When the call-out arrives, the user only needs to press one key to accept or reject the task. The control centre staff can manage tasks and resources because they will know who can be reached

and who will be arriving on duty.

When paging is implemented over the same TETRA network as other critical communications, it saves money for both the user organisations and the TETRA network operator. The existing command and control centre applications can also be used.

Calling all units

The P8GR active pagers and the other TETRA devices are completely interoperable, meaning the same call-out message will reach the intended users whether their device is a P8GR pager, a handheld TETRA radio or a vehicle radio. What's more, the same message will reach the device regardless of its maker - an advantage that only TETRA can offer.

The convenience of paging over TETRA can also attract new users and completely new user organisations to the network - a welcome possibility for operators.

The result of vision and design - a customer need translated by top engineers into a solution - the P8GR active TETRA pager from Airbus Defence and Space enables new ways to use well-established methods.



No loading
at any time

A job I would never change

Finland's first female Head Firefighter enjoys every moment of her work

Few women have entered the ranks of firefighters. However, the profession was attractive enough for Heli Hyttinen, Finland's only female Head Firefighter, to give up her previous career to completely change her life.

Heli Hyttinen began dreaming of being a firefighter while still training to be a nurse. Turning her dream into a reality was certainly a challenge – only six women in Finland have passed the entrance exam for the Fire and Rescue College. Yet, Heli not only achieved her dream, she

went on to become a Head Firefighter at the Fire and Rescue Service of South Savo in Mikkeli, eastern Finland.

Her work includes a range of tasks that only a regional hub with lots of surrounding countryside can offer – from extinguishing urban fires to rescuing cows from pits.



Making history

Heli is the only woman who has proceeded to sub officer training. It was a natural step for her and she was already thinking about it when training for the entrance examinations.

"It has been easy to slip into the ranks of the Fire Service as we have a great team," she says. There is no distinction made between men and women in the fire service; Heli performs exactly the same tasks as her male colleagues.

The best thing in my job

"The best parts of the job are my colleagues and the variety of tasks. No work shift is like any other – every day you have a chance to learn something new, making it a great feeling to come to work."

Even though incidents can sometimes be quite harrowing, experience has taught Heli how

to leave work behind her when off duty. "In the beginning, I was thinking about some cases long afterwards", she explains, "but today, work is not on my mind during my free time."

Robust, easy-to-use radios are essential

Secure VIRVE radio communications from Airbus Defence and Space have been a daily tool for Heli throughout her ten-year career. According to her, firefighter radios must be very easy to use and extremely robust. The northern climate of Finland imposes special requirements on TETRA radios – they must be easy to use while wearing thick winter gloves.

VIRVE is used by every firefighter during operational work. Most commonly it is used to coordinate the work of different units, keep in touch with Emergency Response Centres and police

units and keep up to date with units' status. The key benefit of the VIRVE TETRA service is in delivering the same information instantly to all members of a talk group, making communication quick and efficient.

Availability of the radio service is as important as usability: "VIRVE and the THR880i radio provide us with ultimate reliability," says Heli.

Our interview is interrupted as a fire alarm goes off. Within a minute, Heli jumps into her gear, gets into a fire engine and drives away with her team. It's a job like no other.

TH9 – Power on hand

RADIO POWER:

With 1.8 W output power and high reception sensitivity, the TH9 keeps you connected. And with faster and more accurate positioning, you can trust the TH9 in the field.

AUDIO POWER:

Get a better audio experience with the TH9's powerful built-in speaker. Everything will be loud and clear, from quiet offices to noisy streets. Hear the difference wherever you go.

