Hytera

Connect

Hytera customer publication & channel news

Special edition

Digital connections at IWCE 2016

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Right: Chen Qingzhou, president of Hytera, beside a display of handportable radios on the company's stand at IWCE 2016 in Las Vegas

Below: guests from around the world sign in for Hytera's Worldwide 360° Seminar 2016, which took place alongside the IWCE event

Editor's note

In March, some 300 international guests, including mobile radio dealers, distribution partners and system integrators from around the world, converged on Las Vegas to attend Hytera's Worldwide 360° Seminar 2016. In two days of presentations, they learned about innovative digital radio applications in many countries, including several of Hytera's recent successes. The company is now rated the second biggest maker of two-way radios and the global Number One in DMR trunking infrastructure. They were also given insights into forthcoming products from Hytera, the company's future plans, and its new 360° customer care concept. On these pages you can read about some of the topics covered during the seminar – and see them showcased on Hytera's exhibition stand at IWCE 2016, which took place in Las Vegas during the days following.

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In this issue

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An ecosystem in three words

Hytera is working to strengthen its fast-growing business through its new Three Cs theme in customer care. This was introduced to trade partners at the Las Vegas meeting by Cai Hai

"I like to think from your perspective", said Cai Hai, Hytera's general manager for international business, speaking at the company's Worldwide 360° Seminar 2016 in Las Vegas. "We deeply understand the technologies that you currently use and those for the future. We provide multiple choices and adequate resources. We embrace open standards. We are cost-conscious too. We want to protect what you've spent. I want to use 3C now as our concept of what Hytera is going for, to sum up all our ideas"

The three C-words which represent this holistic concept, Mr Cai explained, are *coverage*, *care* and *capacity*.

"Motivated by users' demands, we are achieving full coverage of the technologies", he continued. "We provide 360° coverage, end-to-end solutions from devices, infrastructure and also applications. So 360° coverage is about our full range."

Investment, solutions

Next came care: 360° care of Hytera's partners, with the emphasis on business solutions, delivery, growth, sustainability – and on their concerns about profitability and market share. "Our care will be around you", Mr Cai promised; "and then for our users, technology advances in an open ecosystem, protection of investment and a one-stop solution."

The objective of Hytera's care and coverage, he said, lay in the third C – capacity: "Let's form capacity together, partners exploring new markets; acquire profitability and succeed in fierce competition with our 360° care programme". There would be capacity for users too, as they achieved high efficiency by adopting Hytera solutions.

And he summarized the entire concept in this single sentence: "We are committed to building comprehensive capacity together with you by caring about all your needs through our coverage of a full range of technologies and expertise."

Right now, he concluded, the mobile community, and Hytera with it, stood at a crossroads. "Twenty years ago, everybody just used analogue cellphones. Ten years ago, most people used GSM. Now I think everybody is using 4G, or even 5G. Only in this industry is the convergence point, the end of analogue and also ongoing digitization and the approach to broadband.

"Only in the PMR industry exists this kind of point. So I want to say: together with Hytera, from this point, we will fly together in the highest skies."

Below: Hytera's new 360° theme is introduced by Cai Hai, vice president and general manager for international business. "It's a kind of concept we want to deliver", he said

Support for partners

"When an opportunity is forthcoming, Hytera and its partners will jointly work together to try to transfer it into final achievements and try to reach customers' expectations", promised Long Fei, channel director. "We're living in an era in which change is constant and always happening. But what decides the relationship between Hytera and its partners is unchanged value and mutual business: that is, trust, respect and commitment.

"Customers are more and more looking for total solutions and managed service instead of only products. That is why Hytera supplies a comprehensive service to our partners which includes after-sales service, integrated delivery service, and service management either for customers or for partners.

"Our corporation has a regulation that all customer should be responded to in 24 hours, offered a solution in 72 hours.

"When you are dealing with Hytera, no matter whether you are distributor, a value-added partner or a reseller, there is a place for you in our Hytera channel ecosystem."

He ended by restating one of Hytera's basic principles. "That is", he said, "success for our partners means success for Hytera."

Hytera

Private LTE, professional LTE

Long Term Evolution or Long Term Employment? Probably both, quipped John Hu, Hytera's LTE director, during a presentation to trade partners on the company's broadband strategy

Above: John Hu emphasizes a point during a discussion session. On the platform are (from left) Matthias Klausing, chief executive officer of Hytera Mobilfunk; Alex Richardson, market analyst from IMS; John Hu; Lance Johnson of PDV Wireless in the US; GS Kok, senior vice-president of Hytera; and Phil Kidner, chief executive of the TETRA and Critical Communications Association

Above right: Hytera's 2016 Summit was attended by some 300 of the company's trade partners from around the world

Nowadays our customers require more and more data and video. Some are already using smartphones to access databases and to transfer images. In public safety, more and more police are using video for crime investigations. This is the future of PMR. It's a fact that the PMR industry must go to broadband.

Some of our customers already utilize commercial radio – 3G and 4G – for their data use. So a lot of broadband products, and an LTE-based broadband network, are emerging, but in reality private LTE is not mature. Mission-critical push-to-talk is not supported in the existing commercial radio networks.

So one question is: is the commercial broadband network enough for the future? The answer from me, and also from Hytera, is no. Why? The goal of the public network is maximal revenue and profit. Its coverage is based on population density. It also lacks reliability and resilience. So it cannot meet the requirements of public safety users.

But if we want to utilize private broadband, we have several requirements to meet. For example, we need to support mission-critical push-to-talk, we need to have dynamic groups, one-to-many communication.

Another Interesting point is for the commercial radio networks, there is lots more download than upload. But for a private broadband network, we are going to have more uploads. So there is a conflicting interest between public broadband and private broadband for public safety users. We also need QoS, priority differentiation and dynamic priority status.

The state of play

What is the current status of private LTE? We have several elements to consider: policy, technology and cost. First we need to think about the frequency allocation. Currently in most countries, a frequency for private LTE has not been allocated. So there's still lots of discussion. But frequencies are a very scarce resource. If you want 5 MHz or 10 MHz for LTE, it's very hard to get.

We also need to think about the standard. All over the PMR industry, experts are doing their best to push more PMR-related features into the standard. But 3GPP is driven by the public's seven billion subscribers, and in PMR we have only 40 million. So PMR's future is in 3GPP.

Fortunately, mission-critical push-to-talk was finally adopted in 3GPP Release 13 [March 2016]. But even after this, we need two more years to get the infrastructure and the terminals ready. Another two important features – mission-critical video and mission-critical data – are still under discussion in 3GPP.

Hytera's emerging P-LTE wireless solution

"Right now, we have very mature analogue, DMR, PDT and TETRA solutions", said John Hu, introducing Hytera's P-LTE product plans. "We are also putting lots of resource into working on LTE because we think broadband is the future of PMR. It's also the future of Hytera.

"We are going to have a common platform to support both narrowband and broadband. This is the core network. With the same hardware and the same product, we can support voice, data and video and those kinds of multimedia applications.

"Right now we are also doing an all-in-one base station. That means we can put the baseband processing and the radio in just one box.

"We are going to have a unified, convergent network management system. This one can support or can connect to our broadband and also the narrowband – the same hardware and the same software – to manage narrowband or broadband or both in one hardware.

"The dual-mode radio we are doing now is not just simply putting narrowband and broadband together. There are lots and lots of technical issues to consider: power consumption, radio frequency, mechanical, user interaction features, applications.

"We are going to support multimedia applications – voice, data and video. So a real-time, visual dispatcher could be a very important service for our customers. We can imagine lots of new and fascinating applications that we are going to utilize because of the emergence of broadband."

Below: John Hu, director of Hytera's LTE department, advocates a convergent solution for professional users, combining narrowband with broadband

Hopefully next year these will be frozen in 3GPP Release 14.

So the most optimistic timeline for private LTE could be 2019 or 2020-something. In China, some vendors are pushing some kind of mission-critical push-to-talk feature. But it's just for domestic usage, it's not for a global standard. In Hytera, as a global company, we fully embrace 3GPP, we fully embrace open standards.

For the deployment of private LTE, we also need to think about the cost. It could be a burden for the customer to have full coverage.

A dual approach

So what is the strategy of Hytera? We think a narrowband-plus-broadband convergent solution is the best way, because of the cost and because of the maturity of the solution. From my point of view, and also our company's, mission-critical voice is still the core application, the killer application. Broadband right now can only provide some kinds of non-mission-critical data application.

In reality, we think we have several stages to go. Nowadays we can utilize the public broadband and narrowband voice plus the public broadband data. Some of you may be already utilizing the second of these. We are going to deploy private data and image; as I mentioned, public networks still cannot meet the requirement. Eventually, after 2020, some of our customers will move totally to a P-LTE-based broadband.

But I just want to emphasize one thing. Twenty years ago, GSM was mature. Ten years ago, some of our colleagues thought that GSM was dead. But do you think that GSM is dead? No! GSM still plays a very, very important role in the commercial radio network. If you place a call using your smartphone, almost all the voice still goes into GSM. The same applies to narrowband. We think that narrowband still has 20–30 years of service. Even after 2020, lots and lots of our customers will still utilize their narrowband for their daily work. So with this narrowband and broadband convergent solution, there is still a long way to go.

Right now, we have more than 1,500 engineers working on our P-LTE solution. Five years ago, we officially started the research and development. Three years ago, we established our broadband product line and last year we made our first LTE call. Today we are doing a field trial in Shenzhen, our headquarters, and in the second quarter we are going to do a preliminary deployment. At the end of this year we are going to do a commercial release and next year we are going to do the commercial deployment. That's the progress of Hytera, broadband progress. We are dedicated to continue to work on LTE.

Hytera

Radio: it's for you to define

A highlight of the Las Vegas summit was a visionary presentation by Hytera's GS Kok, who touched on strategy, challenges and, first, a product roadmap for trunking and dual-mode radios

Below, far right: GS Kok: you'll no longer work alone, he promised

The interesting thing is what Hytera is going to do in the future. We are developing a dual-mode radio for both DMR and TETRA. For DMR, it's going to come in many flavours. There will be private networks in China for DMR with broadband, and there will be public networks for DMR with broadband for the rest of the world. At the same time, Hytera will also develop a dual-mode radio with TETRA plus LTE.

Terminal products always come with accessories. But most of them are dumb devices – they are usually wired, you plug them into your terminal, and they have limited functionalities. But in the future, accessories will be devices that have a brain of their own.

One new development is the new DMR PD98X series, which has an increase in IP rating – to IP 68. This radio can withstand immersion in one metre of water for up to two hours. Its continuous rotary channel knob enables users to select more than 16 channels from the channel knob itself. In addition, its memory has been increased so that more features can be supported. At the same time, Bluetooth 4 support is an available option, as is the ability to make and receive duplex calls.

Below: at the IWCE Expo in Las Vegas, Hytera's terminals chief Gee Siong Kok (left) watches as a show visitor discovers the company's trunking product range

In TETRA we have been evolving much faster. The Z1p F1, already available, is the smallest full-power radio. The TETRA standard allows three watts portable power and this Hytera terminal is actually 3W, even within that small size.

Our highlight this year will be the launch of Hytera ATEX for TETRA. This is a very special ATEX compared with other ATEX. This ATEX is classified in Class 1 Zone 0, or Class 1, Division 1. During the rest of the year, the ATEX product will be released in additional bands.

Our first TETRA ATEX radio will be followed very closely by our DMR ATEX, both ia and ib safety standard. These radios have three levels of protection to achieve their ia rating. The other one is that they must also comply with M1 [methane gas] requirements, because ia radios are intended to be usable in mines. These are the two major stringent conditions that make our ia product different from those of our competitors. Compliance with global safety standards allows it to be used in Class 1 Division 1 (Zone 0 and Zone 1) environments; ib compliant equipment can be used to Zone 1 only.

Things that are missing in Hytera's portfolio will happen. A lot of this is to do with TETRA for public safety – for example, tamper-proof and TEA2 encryption. The other big one is repeater mode and gateway.

Our Generation 2 TETRA will support both TETRA 1 and LTE, and in the fourth quarter we will release a simplified version for narrowband and broadband data.

Smart features

So, where does this take us? With 3W audio, we will be the loudest radio in the PMR market. And we've also introduced a new

noise cancellation IC with built-in echo cancellation. We support a single-frequency repeater. Fast charging is optional: you can achieve 80 per cent charge in 1½ hours. Duplex calls will also be supported. We've got a higher data rate, lower power consumption with Bluetooth 4, and at the same time we are going to implement the smart battery. We can know when the battery is coming towards the end of its life and it can inform you to start ordering a spare battery.

Software features will be text-to-speech, speakerphone, repeater access, TF [microSD] card storage, Bluetooth API, the new DMRA GPS protocol, and Tier III (PDT) advanced features.

Converging with 3GPP

So where is the future heading? Everybody talks about data, data, data. But there are some big challenges, such as pectrum. Some [bands] have already been allocated, some are still being proposed and discussed. The LTE standard is another big headache: if the standard is not mature and you buy a system, it's considered a proprietary system.

ProSe, GCSE, private call, group call – people have to work like mad to get them into the 3GPP LTE standard. The LTE standard has still got a long way to go and Hytera and many LMR manufacturers are working very hard to make sure that the new broadband standard meets LMR (PMR) and public safety and security requirements. But while all are working hard on this one, 5G is already starting. So where do we stop?

Well, right now it looks as though PMR will adopt 4G. If 4G works, and it's good for PMR, then 4G is here to stay. One thiny is for sure: that Hytera has embraced open standards. Whoever comes out with an open standard, Hytera will build for it, because that is our commitment to our dealers and customers.

Look at Hytera now! We started as an analogue company. In 2008 we started to venture into digital migration, launching digital products in 2012. In 2016 and beyond, what are Hytera's plans? We are converging broadband and narrowband together, and what do we want to achieve? Effective public safety solutions, efficient emergency

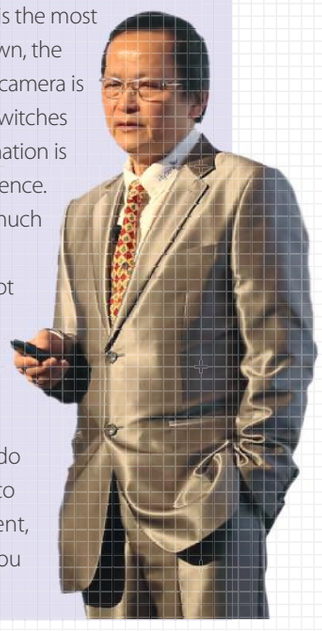
Road and wind noise: GS Kok demonstrates the performance of Hytera's new noise and echo cancellation chip with a playback before an audience of trade partners at Hytera's Worldwide 360° Seminar. The improvement in speech clarity was striking. "As technology advances, when we do a refreshment we will put in the latest technology that is available on the market", he said. "And this noise cancellation I see as one of them." All new DMR and TETRA products from Hytera will be equipped with the new chip

services, and effectual evidence-gathering. Hytera wants to be the centre of excellence of both technologies and we think we can achieve it because Hytera is investing heavily in research and development to change the future of two-way radio.

Smart accessories

With data networks linking up the smart personal radio accessories of tomorrow, GS Kok foresees a new era across the whole spectrum of professional radio – for example, in policing and the emergency services. "We no longer work alone because the command centre can monitor our heartbeat, our sweat glands, whether we sleep well or are calm enough to handle a stressful situation. It can project an image of the fugitive that we are supposed to apprehend right in front of our eyes and give us the fugitive's GPS location. And not only that: officers can assign the most appropriate person to handle the situation because they know who is the correct candidate, who has had the best sleep, who is the most alert. "When a gun is drawn, the alert level is raised. If the camera is not on, it automatically switches on. And whatever information is recorded is taken as evidence. That makes policing so much more effective, so much more efficient. You are not ever going to be alone because your boss is right next to you.

"The future is up to your imagination. How do you think data is going to help you be more efficient, more effective? It's for you to define."



Trunking Pro, Trunking Lite

With a market share in DMR Tier III trunking infrastructure which has recently hit 65 per cent, Hytera can comfortably claim to be the global leader in this new-generation technology

"DMR trunking is based on the ETSI standard", says Ken Dai,. "Hytera released this system in 2011. With the past five years' persistent product improvement and marketing, our DMR market share has become No 1 in the world"

One of the numerous projects which Hytera has won in recent years is a 660-site system for the Public Security department in Chongqing, China. It is the biggest DMR Tier III trunking project in the world.

"For public security we can provide a system with high capacity", comments sales director Ken Dai. "One base station can support 16 carriers – 32 channels – which are enough to support as many as 3,000 users on that base station.

"Second, reliability and security are also very important considerations for public security users. Hytera's DMR Tier III base station employs redundant design of components such as control channel, base station control unit and power supply, to guarantee the system reliability. Features such as ESN check, authentication, end-to-end encryption, etc., ensure end users' communication security on different levels.

"Moreover, Hytera DMR Tier III supports innovative features such as triple-diversity reception: uplink coverage is enhanced by the use of three receiving antennas to enhance the received signal strength. For DMR trunking, only Hytera provides this design.

"Another is a trunking simulcast system, which means that simulcast can also be used in the trunking system, enabling base stations to share the same frequencies. This can greatly save frequency resources."

Dual-mode working

Beside DMR Trunking Pro, Hytera can also provide a cost-effective system with less capacity, suitable for commercial users. It is called DMR Trunking Lite. "It's more cost-effective, but we can also support innovative features", Ken Dai continues. In particular, he says, Hytera's DMR radios and trunking infrastructure support conventional as well as trunking. "This means that the customer can deploy a conventional repeater – and if more users join the network, they can upgrade to DMR trunking mode just by software.

"Another innovative feature is that Hytera's DMR Trunking Lite system can work in both MPT and DMR trunking mode. The transceivers can be set to operate either

in MPT trunking or in DMR trunking mode. Just set as what you want! The controller is a unified controller and the MSO [Mobile Switching Office, the trunking switch] is also unified. If the customer now has an MPT system, then he can build up to DMR Trunking Lite. He can set (maybe) two channels as MPT, and the MPT radios can also use our system. And then he can migrate step-by-step from MPT to digital."

Below: packed with innovations, the latest Hytera radios on show at IWCE Expo in Las Vegas

'We flipped the switch and it all worked'

How an effective new digital radio system from Hytera turned a regional electricity utility around in just two days

Data breaches and IP security have been much in the news lately, and for energy companies they can be a special concern because of the ever-present danger of malicious attack. Eddie Lucas, president of Lucas Communications Solutions in Florida, came up against the problems this could generate when his company updated the radio network of a local electricity provider, Central Florida Electric Cooperative. The new network, based on Hytera's DMR Trunking Lite family, serves the company's area and its fleet of 70 trucks from five tower sites, but already a further three sites are under consideration.

"Throughout the entire network", said Mr Lucas, "they monitor every single bit of information that comes in and out: where it goes, where it's intended to go and how it is handled. Fortunately for us, the Hytera system has been built in such a way that all of that monitoring is very easily capable, and it met the needs of a customer."

In the electrical co-op industry, operators like to keep their systems entirely separate from anything else. "This particular customer runs a virtual air-gapped system, so the system is for all intents and purposes completely isolated from the outside world", Mr Lucas continued, pointing out that remote diagnostics and support therefore represented a particular challenge. "You cannot just log into the system from anywhere. When we go in, they will only allow connection to the system through another isolated system, and then using a third-party system to come in, and then you do diagnostics."

Even applying software updates for the system was a lengthy process. "When we brought in the update file loads, it took us two weeks to get through IT security. The files had to be scanned multiple times from multiple virus files. Once the system passes, then we can start moving it through."

A need to modernize

The need to replace for the co-op's elderly MPT1327 system had become acute, Mr Lucas found. "When we got to the customer, the first thing we had to look at was a system that actually worked. The system they were currently using had less then a 10 per cent success rate of working! They needed at least 95 per cent coverage over their area [of more than 2,300 square miles]. They needed dispatch consoles, AVL and audio call logs, and possible future integration into their Milsoft OMS system (the OMS is a system designed to monitor electrical outages). That system is based on the same type of data that the Hytera system puts out, and that would allow us in the future to directly take the data from the AVL system and integrate it to the outage management system."

Also needed was the ability to make private calls, group calls and, especially, emergency calls – a feature lacking on the old system, Mr Lucas said. "They had an incident, not long before we came around, where somebody had gone out to turn the power off and that person was held at gunpoint for four hours!"

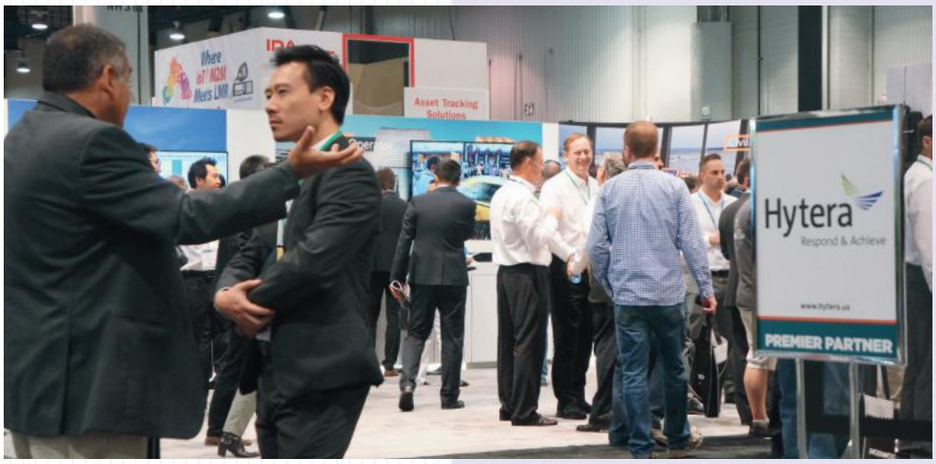
For this non-profit organization, price was a significant consideration, and so a DMR Lite system was chosen. But deciding on the radio terminals was easy. "When we're selling to customers, then rather than the customer asking you what can the radio do, when you're talking about Hytera product we ask them what they *need* it to do", Mr Lucas said. "In most cases, if they can dream it up, somehow we can make that radio do it. These Hytera units are just so full of features."

To minimize the cost of the project, the team re-used as much of the existing system's equipment as possible, including amplifiers, antennas, combiners, multicouplers and the backhaul links, which operated on non-licensed frequencies in the 900 MHz band.

Also minimized was downtime during the installation: from picking up the equipment from Hytera's Florida base to completing the deployment took the team less than 48 hours. "That is, all installs, dispatcher up and operational, all sites up and operational", Mr Lucas said, with pride. "The deployment went seamlessly. Not a hitch, not a hiccup. Nothing happened. We flipped the switch and it all worked."

A flutter that paid off well at a big casino resort

How perseverance brought home a big order from a sceptical customer



Animated discussion on the Hytera stand at IWCE Expo 2016

Among recent DMR deployments described at Hytera's Las Vegas seminar was a large radio upgrade at a casino and hotel complex. This was not, however, a nearby one, but was at a centre some 1600 miles distant, in Minnesota

Retelling the story, mobile radio dealer Mark Greenlee, of Professional Wireless Communications, described how his company had scooped the job with a Hytera-based offer when it seemed already a done deal based on another major manufacturer's solution.

"We've been with Hytera for 12 months now and it's been unbelievable change in how we can compete in our marketplace", he told his audience. The location, he explained, was the Treasure Island resort in Welch, Minnesota, a prolific user of radiocommunications – and its managers appeared to have committed already to their radio upgrade even though had not yet implemented it.

"We call them up and say we'd like to come and see you", recalled Greenlee, "and he said the normal things – 'Well, we're pretty well set'. "I appreciate that", Greenlee responded, "but I think I've got a product here you should take a look at. And if you decide it's not for you, then you know you've done your due diligence."

Greenlee duly drove over for a meeting, though without any great hopes of persuading his contact to alter the decision – especially when it emerged that he had never heard of Hytera. "We weren't expecting much because – well, what's the chance?", he continued. "But I opened the case, I pulled out a PD662 and handed it to him. And I started talking about it. I said, 'This is what it does, these are things that you can benefit from'.

"But he's not listening to me, because he's so busy rotating it in his hands. He says, "Can you excuse me for just a minute? I'll be right back'."

Weighing the options

When the man returned to the room, he was holding a DMR handportable in either hand – the Hytera unit and the other manufacturer's flagship model – and was comparing their weight. "I looked at him and I said, 'What's going to blow you away is what the price point is for the radio in your left hand'. And that was ***it***."

And so the mood of the meeting veered abruptly. Shortly Greenlee was being shown around the site. It was a large operation, with more than 40 radio talkgroups and 600 portables, but its existing system had been pieced together using three different dealers and did not properly satisfy the users' needs. However, the manager had already put a proposal to his board and would have to get it changed.

"We were short on time and we asked, 'What will it take to get Hytera in here?' And he said, 'Well, I'd probably have to have a demo'… I'm probably going to need 50 units'." This was a tall order, but Greenlee put it to Hytera America. "We called up, and we said, we need 50 radios and a repeater, and, by the way, we need them in four days. They *did*. They delivered."

During the trial, the Hytera radios were switched around among the various departments, and all those who tried them seemed to like them – especially the director of security, who declared himself willing to stick his neck out in favour of a change of plan. "He went before the board, made the presentation, and they said, 'All right, we're going to do it'."

"We ordered the stuff up", Greenlee continued. "The timeline was incredibly tight, to the point where we were saying, 'Will those speaker-mics arrive from China in time to next-day air them?' And everything came in, and we were able to deliver everything in accordance with their schedule. So a huge, huge success on that."

Putting a squeeze on data

Talking telemetry with TETRA: how some ingenuity can help to do a lot with a little

In the oil and gas industry, explosion-proof ATEX radios are an obvious communications essential. But another key requirement is wireless data, including machine-to machine communication, for remote monitoring and operation of plant, and for tracking people and vehicles.

Among the expert speakers at Hytera's Worldwide 360° Seminar was wireless telemetry specialist Johan Hoolsema, of the South African company Expert System Solutions (E-S-S). E-S-S has collaborated with Hytera Mobilfunk in several significant TETRA projects – notably, at Sasol's two vast petrochemical plants in South Africa, and at the surrounding coal mines which supply their raw material.

With some 12,000 TETRA subscribers in a confined area, the traffic loading makes these sites some of Hytera's busiest. All base stations serving the chemical plants have been expanded to eight carriers, while in the mining areas they operate from two to four carriers.

Data now accounts for about a quarter of the traffic, Mr Hoolsema says. "It's not only telemetry", he adds. "Every portable is sending vehicle tracking in the background, and it takes up a lot of data.. But even with the amount of data that they do, they haven't put in any additional data channels. The control channel is still enough to handle the telemetry as well as the GPS data."

What makes this possible is E-S-S's method of reducing the volume of data sent over the radio channels, without dropping any of the essential information. "It's a more clever way of analysing the data before you send it to your central control room", Mr Hoolsema explains, demonstrating one of his TETRA-enabled remote terminal units (RTU). "And that you can only do if you have got a high level of processing power in your RTU. So we've got an embedded microprocessor running a Linux operating system. Having a fully embedded computer, you can do a lot of tasks."

A typical application might be with a remote device such as a power meter, which traditionally would have been read centrally by polling it through a Scada system (Supervisory Control and Data Acquisition). The routine of request and response had to be repeated endlessly, even if the measurement did not change. "And that really eats up a lot of bandwidth", comments Mr Hoolsema.

But while there's no possibility of altering standard industry data protocols such as Modbus or DNP3 to make them less talkative, something that can be changed is the way in which the data is communicated over the TETRA network. "That we *can* control", he explains. "Although we still send it in TETRA format, we analyse the data, and we only send the data when there is a change."

But even though no news may be good news, users need an assurance that the link is still working, and so a brief 'keep alive' message is periodically sent over the TETRA system. "If it's non-critical, you can send it once an hour. If it's critical, you can send it every minute. It goes automatically, 'I'm still here'."

Besides communicating amongst themselves, the RTUs can also transmit messages direct to individual workers' radios – for example, to alert them to situations requiring their attention.

Below left: in the energy industries exhibit on the Hytera stand at IWCE, wireless data specialist Johan Hoolsema, of the South African company E-S-S, demonstrates radio telemetry and telecontrol for industrial applications

Wireless smartness at work

Ke Lu, assistant to the president of Hytera Communications, offers insights into the future of public safety communication systems and the technologies which will come to underpin them

Besides TETRA terminals and infrastructure, Hytera's public safety showcase at IWCE featured DMR Pro, a high-reliability implementation of the standard with full duplication of essential infrastructure elements

Today's world is a very complicated system. We are human, we are social. So in the past 100 years, we've created something called a megacity because we want to live and work together happily. We are *Homo sapiens*, we like to live together and we are social, so we will keep driving towards cities.

We want to live there safely, to enjoy a beer after work and get from point A to point B. We want to take the subway in the middle of the night without somebody harassing us. So every city government faces tremendous pressure because, as the population increases, they have to fight on two fronts. The first is so-called city security: this means they have to secure the city in certain ways so that people can feel safe. For example, on the mass transportation system, you have to have enough police presence – so in the middle of the night when people take the subway, they feel safe.

The second scenario is emergency management, to prepare for the worst. When something happens, like a large-scale fire, a snowstorm, the city has to have a plan. It has to quickly mobilize its first response team. These are the two big challenges that every city faces.

A layered approach

Our understanding of today's public safety and security solution is basically layered. So let's talk about the bottom layer – the device layer or hardware. In this layer we have radio, of course. Everyone knows police use two-way radio: everywhere you've got PMR, land mobile radio trunking systems. We know this industry, so this is what we do the best.

The second layer is what we call the interconnection layer. What we have here is called SmartOne. SmartOne is a piece of software which unifies all the different communications together and makes them easy to operate and makes them user-friendly. It covers dispatching, audio and video (video will be so important in the future), unified positioning (where is my police cruiser? where is my fire engine?). Unified communication puts voice, data and video together, unified under the same platform, called SmartOne.

The next layer is actually the most innovative part of the system. It sorts through all kinds of different information and makes it meaningful to the people who actually use it. For example, a call-taker: traditionally we could only take voice calls, but in today's world, the call coming in could be a text message, it could be someone's picture, it could be anything.

Another example: video surveillance. Video cameras are at every street corner. How do we pull the video signal in to the place when we need it? What do we need to find? And so on. This is the power of SmartOne. When the criminal robs the bank, the video camera probably captures that individual's face, and if that is the case then immediately his picture will go around everywhere in the city. Then

the video cameras should capture every individual's face and try to say if it matches. If there is a match, we immediately know where the bank robber is.

Smart decision-making

Hytera is actively working on an integrated command and control centre and we've actually won several big contracts in China. It includes a large display with video capability which feeds all the relevant information to the centre and to the decision-makers so they can make smart decisions.

This command and control system has evolved through multiple generations. Back in 1985, when we all used wireline, we called 999 and somebody would send the emergency vehicle to our place, according to the address in the telephone book. In the second generation, we added a GIS system so at least the caller's location could be identified and some smartness added in the address, the situation, and so on. Currently, we have this third-generation command and control part which is SmartOne. It can synthesize video and voice from many different systems together – analogue, DMR, TETRA. It can combine that information together and send up meaningful information to the command centre.

Hytera not only manufactures the telecommunications equipment and the portable devices, we also modify the vehicles. We retrofit the communications equipment into the emergency vehicle. We modify the equipment and we put it on the bus, we put it on the trailer and so all this can be integrated together.

Making things happen

In the future we'll talk about an intelligent security system. It not only reports simply what happens, it also helps people to anticipate what could happen. That means that if there is a fire in some place, the system not only reports that at locations A and B there is a fire, it also raises a red flag and says, 'Attention, near this site there is a propane storage area'. So when you go there, not only do you have to control the fire, you also have to be aware that the fire could spread to the propane tank and cause an explosion. So the system will add

Left: With video wall and operator terminals, Hytera's demonstration command and control centre at IWCE Expo

Unified dispatching for an efficient emergency response

"This is Hytera's command and control system", says Lawrence Yu, sales engineer, at the IWCE show. "This system is for public safety, like police departments, fire fighting, emergency rescue. It helps them to improve their efficiency and also a quicker response.

"In short, it's call-taking and handling and unified dispatching. We can dispatch radios and also we can see the CCTV cameras outside. All this can help the commander to make the right decisions

"Normally this can be for a city, but if you want to build a larger command and control system it can be *very* large – even a national command system. We can meet all requirements. We've been developing it for several years and we have delivered many projects already."

Below: sales engineer Lawrence Yu demonstrates a control room system on Hytera's stand at IWCE 2016

Hytera

more and more intelligence to secure the city.

The interconnection solution, SmartOne, has a hardware piece which links not only DMR and PDT, it also links the telephone voice call, the MPT voice call. More important, we've added simplex, we've added GSM, we've added HF radio, which is often used by the military. And we'll also add LTE in future, which will put video and voice through.

This is the SmartOne solution!

A powerful, stable, reliable TETRA infrastructure

Behind the headline features of Hytera's latest TETRA infrastructure products is an advanced network management system which reveals detailed, real-time information about the system's status. "Everything that happens to the system, you can find out from this network management system console", says John Zhou, beginning a quick demonstration. "You can manage all the network just from your office. For example, all the components here, we have one-plus-one backup and it supports hot swap."

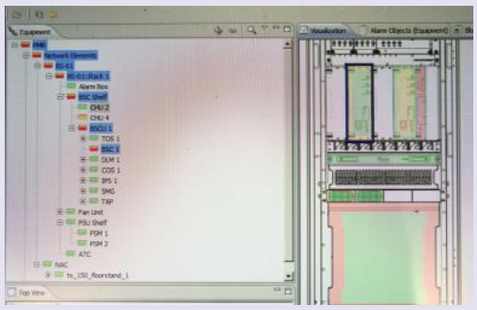
To prove it, he deftly withdraws one of the power modules from the rack, and – apart from flagging up a red warning on the screen nearby – the system simply carries on working undisturbed. "As if nothing happened", observes John. "No influence. And, you see, one-plus-one backup TETRA fulfils mission-critical."

Alerts such as this example can also be relayed by messaging or email, as the user chooses. "So you don't need to stare at the screen all the day", comments John. "Your cellphone can receive a message about which component in which base station has a problem."

One deployment in which the new equipment will play a key role is in the Netherlands, where Hytera is installing a new TETRA system for the emergency services. This will be a complete replacement for their original C2000 TETRA network, which was built under a contract awarded in 1999. "The customer is public safety and security for all the country", John Zhou explains. "They know what TETRA is, because they already use TETRA for 15 years. They know what is good and what is not.

"And they are building a new network not for three years or five years, it's for more than 10 years. So the reliability and performance of the system is very, very important. They want good quality.

"This project is very big, so all the vendors took part in the competition. The competition was very fierce, and the customer tested the systems themselves. And after a long-term comparison, they found that Hytera was the best."



Upper left picture: in Hytera's public safety zone at IWCE 2016, John Zhou demonstrates the company's new TETRA base station

Bottom, left: remote diagnostics with Hytera's free network management software. The red flags make it easy to narrow down a fault: in this example, John has pulled one of the duplicated power supplies from the rack

Far right: Hytera's push-to-talk app enables Android smartphone users to make group calls and individual calls to TETRA radios by touching a PTT button on the screen

Far right: Hytera's digital recorder maintains a detailed record of activity on the radio network. Individual events and messages can be quickly retrieved by time and date, with the help of the on-screen calendar

Banking on TETRA

Hytera radio systems have played a key role in some important world events – among them, the 2015 World Bank meeting in Lima, Peru. In the 2016 International Critical Communications Awards, this deployment was judged the year's outstanding single-site TETRA project

When the annual meeting of boards of governors of the World Bank group took place in Lima last year, some 80,000 participants representing 180 countries converged upon the city. To guarantee the safety of the VIP visitors and their organizations during the week-long gathering, a robust, high-density communication system was needed – a requirement which posed significant technical challenges.

"The customer, the Ministry of Economy, wanted to have a seamless voice and data communications system, and they demanded a lot of video and data communications", recalled Luis Perez, of Hytera Mobilfunk's Peru office, reviewing the project during Hytera's seminar in Las Vegas. "More than 22,000 police officers with more than 4,000 radios were providing the security for this event in a small area. Mission-critical features like encryption and authentication and enable/disable were also requested."

In addition, the system was to be integrated into the existing public safety network, a TETRA network supplied by Hytera for Peru's national police force. So the new system was implemented as a virtual private network within the national system.

"Hytera provided all the communications system and also the TETRA terminals, and 2,000 smartphone applications integrated into the network", Perez continued. "In the operation and control centre, we integrated 2,400 cameras and also 450 cameras for different operating systems for the city. In total, on the big day we got 350,000 calls during the event."

But why TETRA?

Why TETRA? "The customer was requesting an open standard with feature-rich security applications and also future-proof equipment – not only with TEDS, they were also looking forward to integrating LTE, converging networks into the same platform. One important thing was also the integration with smart applications."

Luis Perez, of Hytera Mobilfunk, outlines the radio system deployed to support this high-profile global event

Hytera supplied its DIB-R5 advanced TETRA base stations, together with a network administration centre equipped with voice and data dispatch applications and voice recording. "Really important for the unified communications console was an interoperability platform", Perez added. "We integrated 2G, 3G, 4G and LTE in our solution. That meant that from one smartphone we could communicate with the TETRA radios in both directions, also sending data, images and videos."

For redundancy, the main network control node in Lima was duplicated by a second control node 700 km distant in Trujillo, Peru's second city. An important reason for this was that Lima lies within an earthquake zone.

Integration was completed in just three weeks, creating a system with more than 400 TETRA terminals for the event organizers, 4,000 TETRA terminals for the public safety forces and 2,000 connected smartphones, all working within a unified platform.

Hytera

Why the Netherlands is replacing TETRA with TETRA

Hytera has recently begun deploying a complete replacement for the existing C2000 public safety network in the Netherlands. Markus Oltmanns outlines the project and the reasoning

Below: Markus Oltmanns, of Hytera Mobilfunk, describes a second-generation TETRA rollout in the Netherlands. The deployment, now in progress, will wholly replace an existing TETRA system dating from around 2000. Hytera Mobilfunk, based in Germany, is the former PMR infrastructure division of Rohde & Schwarz; it became a part of Hytera some four years ago

C2000 stands for *Communicatie 2000*, which is Dutch for Communications 2000. C2000 is nothing less than the oldest public safety TETRA nationwide network in the world.

The customer is – directly – the Ministry of Safety and Justice of the Netherlands and the end-users are the first-responder organizations of the Netherlands – the police, the fire brigade, the ambulance.

The population density of the Netherlands is quite high, with an average of over 1,000 inhabitants in a square mile. So they have really high demands for their communications infrastructure, especially for public safety.

We have been talking a lot about LTE and about the future of public safety and security. And now we are replacing an existing TETRA public safety network with a new TETRA public safety network.

The case for C2000 is that our customer truly believes that TETRA will be the only suitable technology for fulfilling its mission-critical communications needs for at least the next 10–15 years. It is shared, I would say, across Europe in public safety organizations. That is because LTE is not suitable for mission-critical purposes now. And we are replacing an existing TETRA system now.

That does not mean that LTE-based solutions that are under development now are not suitable to fulfil these requirements in five years, or maybe in three years. But for now, as renewal takes place, our customer says that TETRA is the technology of his choice.

A winning formula

Why have we won? First of all, it is the competence of Hytera Mobilfunk in TETRA. We are known specialists in the field of TETRA communications. We deployed the first TETRA network on German soil back in 1999. Already we have many big deployments: we have nationwide networks in Malaysia, we have a big network in Qatar as well as in Oman and many more networks around the world.

Our customer has confidence in Hytera as the right partner, and that does not mean only Hytera in Germany, it means Hytera on a global basis as a globally-active company.

Leading-edge technology

One more point: we have the best TETRA product. It's the DIB-R5 TETRA base station. These base stations comprise the most modern, latest, leading-edge technology. They have been developed according to the TETRA 2 standard. They are future-proof, they include TETRA enhanced data services (TEDS) and they have a low-power consumption to reduce total cost of ownership.

Imagine you have a nationwide network. You have about 600 base stations, running 24 hours a day, 365 days a year, and for more than (let's say) 15 years. If you have a power consumption that's 500 W per site or 1,500 W per site, it really matters. It gives you a benefit in total cost of ownership when you go green with your public safety product.

A promising future in digital radio for PAMR operators

Steve Cragg, sales director for Hytera America, looks at the opportunities now open to public access mobile radio operators as they contemplate a migration to digital technology

It's very hard to pin down a PAMR user. They come from all walks of life – oil and gas, taxi companies, airports, education, construction – but they share some common requirements. Typically you see wide-area coverage; that was particularly true of MPT systems, which were the earliest wide-area system. There's a lot of small users in there. So really its key is providing a system that those users couldn't afford for themselves.

Let's talk a little bit about legacy PAMR migration, and let's start here in the US. With the exception of Nextel, which rapidly evolved into a cellular network, we didn't have very many really wide-area public access systems. The predominant ones were LTR. And now what we're seeing is that those that still exist, they are looking for a digital alternative. Their logical solution is XPT [Hytera's 'Extended Pseudo-Trunking'].

XPT is a great solution for North America because of the spectrum that we have. The majority of the spectrum in the US is shared by multiple users, and so you cannot have trunking solution like DMR Tier III where you have a continuously transmitted control channel.

Globally, there's a lot of MPT1327 systems. If you look at that, it's a straight swap: MPT1327 goes to DMR Tier III. You don't need to change any of your sites, and you can use your existing channelization.

A PAMR shopping list

What are people looking for as they are migrating? They are looking for increased capacity, lower costs (you can either add capacity or you can take the lower cost), and, obviously, a reliable network, versatile services, flexible management.

Anybody who is moving from one system to a digital system will ask you about migration – and the good news here is the we've got a great story for you, particularly if you are moving from MPT to DMR. First of all, we have a SmartOne Gateway: we can connect your old network to your new network through the gateway, which means that people making calls on one system can be heard on the other system.

But perhaps the best thing we have for helping PAMR operators doing migration is the dual-mode radio. A dual-mode radio working in MPT1327 and DMR Tier III means that somebody can be given a radio that today works on MPT and tomorrow can work DMR. If you know you are going to change, you can start selling the radios today. There is no requirement for a big bang and 'we've got to change every radio today'. You can start buying them perhaps a year or two before you start changing the system, and then seamlessly move over.

In summary, if you look at the Hytera product range, and you look at the public access market, you can genuinely say that in having XPT, DMR Tier III – both Lite and Pro – and TETRA, Hytera has a solution for every single one of those either migrations or new systems. I think really we are the only company who say that. Which, I guess, is why we are leading the market.

Steve Cragg, of Hytera America, surveys Hytera's digital solutions for PAMR operators

Hytera

Where business success is just a PTT call away

A successful DMR upgrade to a PAMR network in South Africa has boosted usage and shrugged off the challenge from cellular. Brett Nash, managing director of network operator Altech, explains

Above: Brett Nash, of Altech, tells a South African success story

Fleetcall is the only commercially-licensed, proudly South African, national trunked radio operator. We have over 25,000 subscribers, 177 sites, and we cover just over 83 per cent of the population. We have our own national sales team, maintenance field force and our own NOC. But what makes this peculiar is that our regulator saw fit to select the 250–270 MHz range for trunked radio in South Africa – which makes it a bit of a challenge and a bit of a unique case study in the MPT space.

Our biggest competition in South Africa is the cellular operators. So we had to come up with a better proposition that gave us an opportunity to compete with them. As a result, our tag line is basically unlimited voice, unlimited data, for a fixed monthly price. And this allows us to compete head-to-head with the cellular operators and give the customers a value proposition that they can understand.

The customers that we serve are a diverse lot. Our biggest current vertical is transport companies, and that was exceptionally important to us when we were making the decision on which technology to choose when we were going ahead with digitalization of the network.

We offer services that provide national coverage, multi-regional coverage and single-site coverage. But we don't compete very well with single-site coverage because we've got the community service repeaters. They can provide analogue radios and services for about a dollar a month. That's what we're competing against.

Why did we do it?

Embarking on the road from analogue to digital obviously is mired with pitfalls. Why did we do it? The [old network] was bought some 22 years ago, and it was a case of either divest or invest. It was end-of-life, poor quality… there were no handovers, no voice security (a lot of security customers were complaining about that)... limited features (group calls were limited to two nationally)… and point-to-point leased line connections to sites were a real challenge for us. So we had to make a decision. And we decided then to embark on investing a significant amount of money to start the upgrade.

We considered the three main technologies, but in the end we chose to go with DMR. Basically the reasons for it were that coverage was the same as our existing networks; less opex; we had a look at DMR pricing and we compared that with TETRA. But one of the main advantages was the fact that we had a single device that could support MPT1327 as well as DMR. That was important because we were swapping out radios for customers, and customers don't want to have multiple radios in-cab, and they don't want to carry multiple radios.

Why Hytera? We had to take this decision quite seriously. The reasons we went for it were first of all they were the leading brand in Tier III DMR in the world… Hytera was one of the main contributors to the standard… their large product portfolio and software applications… and their willingness to customize radios and base stations for the 250 MHz frequency band in a very short period of time. From requesting it to having delivery was just under six months, which is remarkable! Ask any of the other OEMs to do the same thing and you are going to get a different response.

Tailored solutions

In terms of the flexibility, I want to touch on three examples where Hytera came to the party and provided us with some bespoke, unique solutions. The first one was they did some data gateway software upgrades which allowed us to start extracting GPS data that we could then use. The DWS [Dispatch Work Station] system that Hytera currently has is a very, very good solution. The problem is that it's relatively expensive for our end-user customers that have got five trucks, or have got 10 users on the network. They don't want to invest in a system. And so what we can do is we can extract the GPS data and use a third-party application to sell that value-added service to the end customer. An immediate, low-cost solution for our market.

One of the other things that Hytera did for us which was incredibly useful was they developed a reporting system in their NMS to monitor our own third-party microwave transmission systems – alarms and so forth – saving us money. And thirdly, the PSTN gateway – this was a 20-year-old system – they developed a plan so that we could start using the dual-mode radios. So: three very clear and key examples of where Hytera demonstrated some phenomenal flexibility, came to the party, listened to their customer, and provided us with solutions that we could go out and monetize.

So how far are we? We have finished Phase 1 – that's 50 sites we've upgraded. We are running the MPT1327 network where we've got 25,000 customers and we are starting to deploy the DMR network on top of it. That went very, very successfully. Phase 1 gave us 143,000 km^2 of coverage. Phase 2 is going to give us just over 320,000 km^2 of coverage. And when we have finished phase 3 and 4, we will just over 1.2 million square kilometres of coverage.

So what have we achieved? We've already seen a drastic reduction in subscriber churn. Subscriber churn has almost halved. And we've also seen a 200 per cent growth in DMR calls. So what can you take away from this? Three things: with the right technology, the right technology supplier and understanding your customers, success is only a PTT away.

Finding out what's really happening

"In the PAMR operator industry, in the coming several years the service revenue of the PMR industry will greatly increase, especially the service part", says Sophia Yin, of Hytera's overseas business development department. "So the PAMR operator industry is picking up. As a solution provider, Hytera provides PAMR operator solutions to our customers. Usually we will suggest a cost-effective DMR trunking or a TETRA system.

"Hytera provides deep customization to our partners, the PAMR operators. For example, we customize the authentication, OTAP and channel monitor, the transceiver monitor, base station monitor. Most resources and devices of the whole network support remote monitoring to improve management.

"There are two more reasons to make Hytera unique in the PAMR operator industry. The first is that Hytera not only focuses on the technical, product and network construction, but Hytera also thinks a lot about how to maintain the network. In this way, the PAMR operator can reduce their OPEX.

"The second thing is that operators want to monitor traffic in their network. Hytera provides the Air Analyzer to implement deep signalling analysis for the PAMR operator. This is available in both DMR and TETRA networks."

Sophia Yin, of Hytera, introduces an over-the-air signal analyser, a tool which enables PAMR operators to gather accurate diagnostic data about the performance of their networks

Hytera

Speeding into the future with TETRA

Good radio communication is a vital need for public safety forces, but so it is in transport services such as railway operations. Dr Michael Meincke, of Hytera Mobilfunk, sets the signals

Dr Michael Meincke is vice president for systems business overseas of Hytera Mobilfunk – the company's division specializing in TETRA and DMR infrastructure

Right: Insun Savitskiy, IT director for the Kazakhstan railway project, outlines the train-borne communications installation during a presentation about the railway's radio communications system.

For railway systems, we do not have a worldwide standard in terms of communications systems. We have existing communication systems, analogue or MPT, and we have DMR Tier II, DMR Tier III. We also have TETRA and, especially in Europe, we have the situation that they are working with GSM-R systems because this is required by the standard.

Of course we have to have voice communication, emergency calls, but we also have needs in terms of signalling, Scada systems, information exchange, passenger information systems, high-speed Internet access. These will need to be supported by a suitable radiocommunication system in the future.

Everybody is talking about LTE as the solution which can cover all these needs. But the standardization of LTE to provide mission-critical voice is still ongoing, and we have to wait some more years until we have a standardized system to provide these communication needs.

But when we supply solutions today, we have a solution – and this solution is called TEDS, TETRA 2. The increasing requirements of data solutions can be fulfilled to a certain extent already today by using TEDS, providing higher data throughput – with 150 kHz TEDS, up to 500 kbit/s.

In Europe, GSM-R is a must when you do train signalling for railways. But more and more TETRA systems are used for ETCS train signalling systems. If you look at the call setup time, TETRA is much faster than GSM-R, so especially for emergency situations you have a benefit by using TETRA. Also, the frequency range is much better suited for different countries because the 800–900 MHz range for GSM-R is not available everywhere.

Most important, the cost: we have made different evaluations and we see that we can provide a TETRA system with much lower cost than a GSM-R system. GSM-R is expensive because you do not have real competition in GSM-R.

Dynamic train control for extra capacity

Along Kazakhstan's new railway, a TETRA network provides digital signalling for train movements as well as train-to-ground voice and data communications.

A feature of the system is dynamic control of the spacing between successive trains, which does away with traditional lineside signals. On-board systems determine the exact location of each train and report it to the control centre. Computers at the control centre then determine the point at which trains must brake in order to maintain sufficient separation. By enabling trains to travel closer together, the system increases the capacity of the line.

Trackside infrastructure consists of Hytera Accessnet-T base stations situated every 20 km along a route of more than 200 km. Overlapping coverage between the stations ensures that railway operations can continue unaffected even if alternate sites are knocked out.

Exclusively published by LAND mobile

Resilient, reliable

So what can we provide with a Hytera system for the transportation segment? We can provide a very reliable system with full redundancy and no single point of failure, with local or geographic redundancy and a full-featured fallback mode. We can provide systems with high efficiency by integrating different kinds of applications into a dispatch and command and control centre.

Of course, we need some base stations, indoor coverage and stations, coverage in tunnels, normal antenna coverage outside. Usually we have dedicated train-borne radios, which are connected to the internal interfaces of the train. And of course we have portable radios for the maintenance staff and managing the whole system.

Very important for these scenarios is the operation control centre where all the information is connected and where the decisions are made regarding the handling of such a system.

Hytera is able to bring a full solution for such a communication system, a so-called one-stop solution. We have a complete product portfolio with terminals, infrastructure, base stations, applications, as well as analogue DMR and TETRA systems – whatever is required. We are able to do flexible customization depending on the customer's needs, because usually each and every system is different.

Extensive experience

We have realized more than 50 metro and railway projects all around the world. They all have in common a very high demand for maintenance and service. Of course they need very close local maintenance and service. Within the Hytera family, with more than 36 offices and subsidiaries and more than 135 service partners, in total somebody has calculated that we have more than 1,500 trained people outside in the world and we are able to fulfil these requirements of the customers.

So we have a state-of-the-art product covering the main radio technology with top performance and we have a powerful customization development. We are proving this in different projects.

Travelling on the fast track with digital mobile radio

Mass transit railways were among the subject areas featured on Hytera's stand at IWCE Expo. A full suite of TETRA-based communications elements, including a dispatcher terminal, control room installation and cab radio or 'train phone' were demonstrated by Teddy Zhang (above). "Here we are focusing on an urban railway, mass transit or subway", he says. "TETRA is our best choice for that – but also for an intercity railways, long-distance. We have also successfully deployed a DMR network similarly."

DMR trunking, he explains, can be attractive because of its long transmission range, especially for operators replacing MPT trunking – they can re-use their existing radio towers.

Compared to other TETRA systems, he adds, railway installations need to be extensively customized – in particular, for functions such as on-board public address, and for data applications such as automatic train control and automatic train supervision (ATC/ATS), and ETCS over TETRA (ETCS is the European Train Control System).

"Also, we have another function, which is that it will automatically change the talkgroup folder every time the train enters into a new station, based on the ATS system for signalling. It's fully automatic."

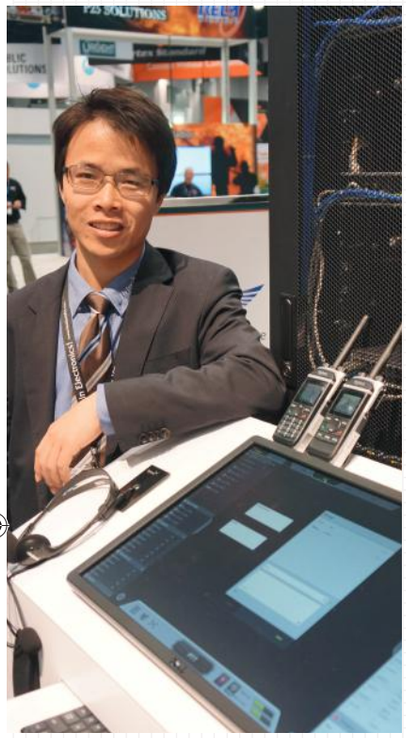
Some examples from around the world:

- Two of the top ten busiest metro networks are in Hong Kong and Shenzhen. The Metro in Shenzhen is under implementation: they have more than 70 base stations running with more than 1,500 terminals.
- Santiago de Chile, the largest South American metro project. We have realized the first line's communication, integrating train radio, the dispatch system and supplying services for more than 2,000 users.
- And, last but not least, a system in Kazakhstan. What's interesting is it was our first project where we implemented an ETCS train control system over TETRA.

Hytera

XPT: a powerful new package

With this digital PAMR solution, connecting to a larger number of users has never been easier



On Hytera's stand at IWCE 2016, Hyman Lu of Hytera introduces the company's XPT system. XPT is an Extended Pseudo Trunk solution, an effective alternative for system operators to connect a larger number of users with voice and data. "There's four repeaters here and it just connects with an IP cable to the switch", says Mr Lu. "Fast deployment and easy maintenance!"

"XPT is Hytera's very great innovation", declares Hyman Lu, deputy director in the product marketing department. "This is very important for some special markets – for example, the US market. Many customers don't hold a trunking control channel licence, so they cannot deploy a standard DMR trunking or TETRA trunking network. With this solution, trunking and terminals share all the frequency channels.

"It's based on DMR technology but with some innovation. It really is an affordable and cost-effective solution for the small or middle-scale, for example a factory, port or airport – for a customer with 100, or maybe 1,000 subscribers. For example, in one base station we can place 16 repeaters together, half for voice and half for data channels. Each repeater has two slots, so eight repeaters have 16 slots for voice. They can support many customers.

"We can use this same hardware as a conventional analogue repeater and also as a DMR repeater and also an XPT trunking transceiver. And it can upgrade to standard trunking, DMR Tier III. This is especially for some small PAMR operators: at first they begin from a single repeater; then they go to IP link, then they go to XPT trunking; then maybe finally they go to standard trunking. It will be a smooth migration, using the same hardware."

A single-site XPT version was released in 2015. "It's been deployed in several important cases in the US", Hyman continues. "For one big sports event, it used eight carriers with more than 500 users. It worked very well."

For IWCE 2016, Hytera introduced a multi-site version, with additional features such as a powerful dispatching solution and a free network configuration and management system, Using the dispatching system, a customer can cross-patch XPT and a conventional repeater together, making it possible to deploy XPT in a central zone and a conventional repeater in outlying areas.

"Also, there is fault-tolerance", Hyman adds. "For example, if this repeater hardware maybe has something broken, you can keep other repeaters powered up and just power-off this repeater, take it out and repair it, and power on. There's no need to power off the whole system."

Radios: they won't cost you anything!

The opportunity for digital radio in business was illuminated by Michael Gary, sales director of Hytera North America. 'Monetize and digitize' is Mr Gary's motto for prospective users.

"A lot of people say, 'Monetize? How do you monetize radio?'", he told his audience. "Well, you don't monetize the radios – you *use* the radios. You use them to generate a profit, because they are tools."

Mr Gary recalled a conversation with the president of a corporation. "He asked me how much the radios were. I said, 'They won't cost you anything!' The man looked at me like I was crazy! Well, I proved it to him: he bought two of them and realized how they did it.

"He called me a couple of weeks later and said, 'I've bought 20 more radios'. I said, 'Why? You told me radios didn't do anything.' He said they paid for themselves in two weeks, just in the time that he saved."

Resellers should help their customers understand this, he urged,."You've got to let them know what you can do. You are providing a solution for them.

"As resellers, you understand what your customers need. Everybody wants always-available communications. You want a reliable product; their personal safety is always utmost, up there with what they need to do. They need robust applications and they want to enhance their productivity."

A money-back guarantee

Radio dealer Bob Moayeri shares with his peers a way to win over the sceptical customer

"I have something that I've used in my own business which definitely made me successful, and I want to share it with you guys", began Bob Moayeri, engagingly. "Hopefully it will leave a few of those items in your mind, if not all of them, and help you all."

Moayeri, who has more than 35 years' experience in the two-way radio business, is president of Vision Communications, a mobile radio dealer in the Los Angeles area. Penetrating such a mature communications market with something different could be very hard, he told his audience. But he had plenty of advice to offer.

"If I go talk to the customer, I try to *listen*", he said. "When you talk to the customer, listen more than you talk. One phrase some of you might have already heard: 'do not show up and throw up'. At that stage, what you have to think about is what the customer's project, what the customer's pain is – so you want to become a consultant more than a salesperson or a dealer to sell any product.

"Think of yourself as the end user. You have to put yourself in their shoes, and then you can come up with a solution. And again, listen more. It has to be interactive – back and forward with customers.

"If they have radio already, you want to know if he has any preference with the radio he's using, because if you throw any other radio other than what the customer has, you're going to get negative points towards you. So you have to walk a fine line there.

"If the customer says, 'No, we do have a preference for one radio versus the other radio', then you want to evaluate why the customer has a preference. Is it because the customer likes that logo only, or is it some feature that the other radio provides that Hytera doesn't provide? (In my opinion, on most of their features we are pretty much one-to-one, and we can accommodate them.)

On the stage is mobile radio dealer Bob Moayeri with a generous delivery of practical advice for colleagues in the radio distribution business

Time for a demo

From the standpoint of the customer, they may not have heard about Hytera, and you'll want to do a demo project. Hytera has a demo programme for you to put that radio in their hands, let them use it, let them see how it operates side-by-side. You will be surprised by how soon they will change their mind, because at that point their feature doesn't become an issue. Now it becomes the price, without you giving up the price. You still could keep the price high with a good margin for us to make money. So definitely consider the demo.

"I want to stress that point – make yourself a consultant rather than a salesperson. Recommend what your proposal is for them. You want to make sure your recommendation will take care of the customer 100 per cent because, if you do not provide that 100 percent guarantee, you cannot really win that customer. Be willing and ready to take that equipment back and give them 100 per cent credit for whatever they want.

"So in my talk with the customer, I let them know: 'If for any reason you are not happy in 30 days or 60 days – guess what? I'll take those back, and give you 100 per cent… This manufacturer supports their equipment so much that they are willing to take it back and give you guys 100 per cent. They are *that* confident that you are going to be happy.'

"I have yet to take any back!"

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