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This month's front cover shows Microbus' M-PC2 in action.

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President's address

The last month has been a very difficult time in the public safety arena, highlighted by the sad events faced by the Warwickshire FRS which resulted in the loss of life of firefighters and I am sure that you will all join me in expressing our condolences to the families and colleagues of the firefighters that were lost in their line of duty. This is a timely reminder not to take for granted the contributions that staff involved in delivering public safety face every day.

The role that BAPCO plays in introducing and working with new technologies is one area in which we can assist in making the working environments safer.

The BAPCO roadshows which were based around data sharing were very well attended and some robust discussions took place. The feedback from the attendees has been very positive and I am aware that further dialogue will be taking place between attendees.

Recent high tides on the East Coast of England have once again demonstrated how vulnerable we are to the elements. Thankfully the impact was not as severe as expected however, for the people who were affected this is of little consolation. I am however heartened by the fact that interagency working and information sharing seems to be improving quite significantly.

In Europe we continue to be involved in various projects and are currently looking to develop partnerships with a view to having an input into further planned projects and I am sure that when the time is right, our European Manager will be bringing us up to speed.

As usual I would encourage all members to feel free to contact either their regional committees or myself and the Executive Team with any questions or comments that they would like to express.

Ray Trotter, President

Sepura to supply Met with 3,000 TETRA radios

Sepura has been awarded two contracts to supply London's Metropolitan Police Service with more than 3,000 TETRA digital radios. These include a mix of body worn and vehicle radios, and a range of specialist accessories.

The contract award, which was the subject of a competitive tender, followed a stringent year-long evaluation, incorporating challenging trialling. It follows a high number of other wins for Sepura equipment over the last 18 months, from a large number of UK police forces and other agencies, and from a diverse mix of international police forces and security agencies.

David Taylor, Sepura UK and Ireland Sales Director, said: "The range of products, accessories and functionality was designed to meet the challenging requirements of highly specialised user groups, and to allow them to source it all from a single supplier. Sepura equipment has been put through an immense amount of testing, by some of the most sophisticated users in the world." Graham Matthews, Sepura CEO, added: "I am delighted that the Met has selected our specialist radios and accessories. Other customers need look no further than the intense evaluation carried out by the Met over the last year. Few environments or users could be this demanding."

Leicestershire Fire choose CADCORP for GIS

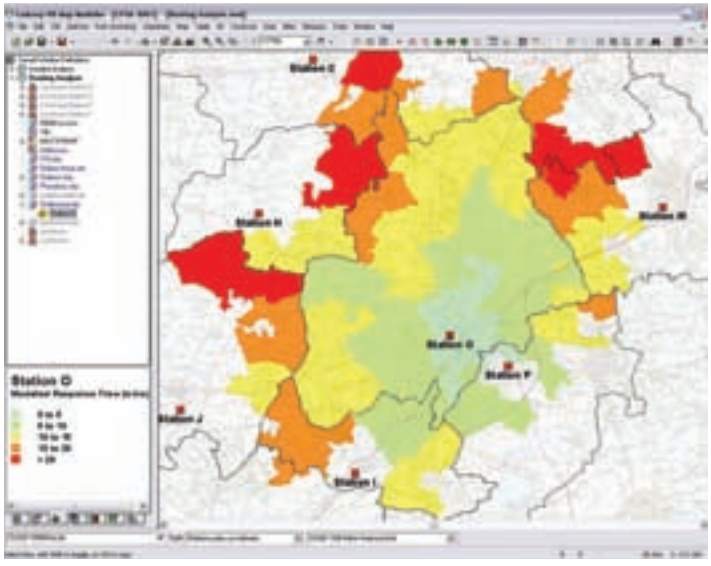
Digital mapping and geographic information systems (GIS) software developer Cadcorp has signed a contract with Leicestershire Fire and Rescue Service for the provision and implementation of Cadcorp SIS – Spatial Information System. The company will provide licences for Cadcorp SIS Map Modeller and Map Viewer.

Cadcorp SIS will integrate with and augment the fire service's existing GIS installations, enabling data from these disparate systems to be input to and accessed from a single spatial data warehouse. This will make spatial data and associated information more readily available to a wider audience within the service than is currently possible.

The new Cadcorp-based GIS will also be used for data manipulation and analysis, risk management analysis, road routing analysis and thematic and geographic map publishing, as well as data sharing with other applications, such as the brigade's performance monitoring system.

"We were looking for a flexible GIS application that would deliver functionality not available on our existing systems, such as the ability to handle data in many different formats without additional translation software, to create new layers from existing polygons and to perform thematic mapping and other data analysis," said Shaun O'Donnell, head of strategic planning and performance, Leicestershire Fire & Rescue Service. "We selected Cadcorp SIS for a number of reasons, including its value for money and in particular, its ability to handle data in a very wide range of GIS, CAD, graphic and database formats, 'out-of-the-box', without translation. This will enable it to integrate with existing systems both within the service and externally, such as at the regional fire control rooms".

The brigade expects the new GIS to bring increased efficiency of its GIS operations in support of business development, change management and the achievement of targets, as well as improve data analysis in support of risk reduction and the prevention of emergency incidents.



Four channels of simulcast for London Fire

London Fire Brigade has taken delivery of a Dalman Solar-Sync system to provide four channels of wide area simultaneous broadcast (simulcast) PMR communications distributed over six sites. The Solar-sync system has been implemented to allow the replacement of the existing analogue microwave links with a ground-based IP network, which offers simplified installation, a reduction in both infrastructure and ongoing maintenance expenditure, and incorporates a much higher resilience to network failure. The existing control room and base station equipment has been re-used, the repeaters are being held on frequency (essential in a simulcast system) by Satsync GPS disciplined frequency generators.

Essex Police to install electronic file link to CPS

SunGard Vivista has announced that Essex Police are now able to send electronic case file details to the Crown Prosecution Service (CPS).

The move to a non-paper based system will help save time for the police by cutting out double-keying and helps facilitate the joining up of the criminal justice system.

SunGard Vivista has worked in partnership with Essex Police, the National Policing Improvement Agency (NPIA), the CPS and other organisations to configure and implement the electronic interface between the Police's National Strategy for Police Information Systems' (NSPIS) Case Preparation system and the Crown Prosecution Service's Case Management System (CMS).

This interface uses SunGard Vivista's OMEGA interface architecture to securely package and transfer case data between the two Criminal Justice organisations.

This implementation was the first one in the Home Office's programme to roll out the CMS interface to all police forces in England and Wales.

The force custody manager at Essex Police, Inspector Les Weller, said, "This interface allows for quicker registration of cases on the CPS system and saves CPS staff time in double keying details of case files. Whilst a manual file still has to be prepared and sent to the CPS at this time, it is hoped that the interface will develop to the point where all information can be sent electronically thus saving both the police staff and CPS staff even more time in the future." SunGard Vivista justice and security director, Paul Jobbins, added, "SunGard takes great pride in being part of an integrated team to connect police forces to other parts of the Criminal Justice system."

Warn and Inform upgrade for City of London

The City of London Police has announced a major upgrade to their real time emergency communication system Priority Alert. Priority Alert has been providing real time security information to businesses since its inception after the Bishopsgate bombing in the early 1990s.

The Police and the City of London have implemented the new service to protect the businesses and residents from a range of incidents including bomb threats, emergency road closures, fire, flooding, building collapse and gas leaks.

The Warn and Inform system will enable emergency voice, SMS text, pager and email messages to be sent to businesses, schools and residents to instruct them of what to do in the event of a major incident. The system also has the ability for maps to be broadcast providing detail of incidents including road closures.

A CCTV first

Street wardens in Durham County are the first to use Wireless CCTV 3G Body Worn equipment in the battle against anti-social behaviour.

Video and audio is being stored at all times on a hard drive. Using 3G mobile phone technology, the live images and sound can be remotely monitored by a supervisor who can evaluate the situation in real-time and despatch assistance if needed. Wireless CCTV has also integrated a GPS receiver allowing to track and map the exact location of street wardens in the field.

HPA research

The Health Protection Agency has announced a research programme into the possible health implications of Wi-Fi technology.

Although no evidence has been found of any harmful effects from Wi-Fi exposure, concerns have been raised — particularly as regards the use of Wi-Fi in schools. "There is no scientific evidence to date that Wi-Fi and WLANs adversely affect the health of the general population," said Professor Pat Troop, chief executive of the government-established Health Protection Agency (HPA). "The signals are very low power, typically 0.1 watt in both the computer and the router, and the results so far show exposures are well within guidelines. Given this, there is no particular reason why schools and others should not continue to use Wi-Fi or other wireless networks."

Automated map loading for Derbyshire

Derbyshire Fire and Rescue Service is to use a Cisco Unified Wireless Network to upload vital map data to all of its emergency response vehicles, giving firefighters an up-to-the-hour insight of the places they are working in.

Currently in Derbyshire Fire and Rescue Service, one person is assigned to the of updating the information. Every quarter, they burn an updated copy of the data onto a CD and then load it onto each of the Service's 44 fire engines, plus 13 special appliances such as aerial ladder platforms, emergency tenders and an environmental unit.

The process requires visits to 31 fire stations.

But, using wireless, the Service's ICT projects officer believes manpower will not be an issue.

"Our strategy is to push the data out to the stations via the WAN and then each appliance will poll the revised database over the WLAN," says Pete Garyga, ICT projects officer for Derbyshire Fire and Rescue. "If the appliance is mobilized during the process then it will ignore the update until it returns."

Automating the updates will provide fire and rescue teams with greater insight in emergency situations and improve civilian safety because new maps can be pushed out whenever there is a change to the database, rather than at quarterly intervals. In addition, the information can be disseminated much more quickly, ensuring that each fire appliance always carries completely up-to-date information.

So far the response to the WLAN offering has been positive. "Pretty much anything that can be accessed using a desktop is also available over wireless, including the management information system that we use for reporting on fire incidents."

New control centre

Local Government Minister John Healey has announced that London's new highly resilient fire control centre will be located in Merton Industrial Estate, Morden, in the London Borough of Merton.

Communities and Local Government has worked in close collaboration with London's fire authority on the project.

The new brigade emergency call handling centre will be part of a resilient national network of nine fire and rescue service emergency call handling centres in England. These will start to go live in 2009 and be fully operational by 2011. This is part of a major Government investment in equipping the fire and rescue service for the demands of the 21st century, which range from natural and man-made disasters to climate change.

Nine control centres will replace the existing 46 local fire service control rooms across the country. The announcement of the location of the London site puts the final piece of the network into place. Given the capital's particular requirements and also the need for world class systems to be in place for the 2012 Olympics it is particularly important that Firecontrol is delivered in partnership between Government and the London Fire Brigade.

The Regional Control Centres are due to become operational in batches of three between 2009 and 2011.

Forward-thinking command training suite

West Yorkshire Fire and Rescue Service has installed a new command training suite running Hydra and Minerva simulation programmes.

Chief Fire Officer Phil Toase said: "We already have some of the best trained officers in the UK, but this will enhance their training and hone their critical decision making skills.

"The programmes are as realistic as possible because they are based on real situations. In West Yorkshire we pride ourselves on our forward-thinking, and this facility will enable our personnel to be prepared for any situation. We are committed to making West Yorkshire safer, and the command training suite will certainly help us achieve this."

Brigades from other areas of the country will also travel to West Yorkshire to use the suite, which is based at West Yorkshire's International Training Centre at its Birkenshaw headquarters. Hydra is a training simulator which provides scenarios for tactics and group decision making, and Minerva is a training simulator run in real-time, which is designed to replicate a real emergency as closely as possible.

Resilient Telecommunications Strategy

The UK Resilence site, run by the Civil Contingencies Secretariat at The Cabinet Office has published the Resilient Telecommunications Strategy, an important element of which is the proposal that each LRF establish a Telecommunications Sub-Group responsible for enhancing the resilience of the communications in its area.

The purpose of this note is to provide guidance to LRFs on the formation of these groups.

For more information, visit http://www.ukresilience.info/news/

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Roadshows to remember

The audience at the BAPCO roadshows will have left with plenty to think about. A well balanced programme highlighted a number of important challenges that face public safety communications officers over the coming months.

With 150 businesses located adjacent to the Buncefield depot, the number of killed or seriously injured could have reached 2,500-3,000 within a few hours had the incident occurred on a working day.

The 2007 series of autumn BAPCO Roadshows concluded at the Royal Berkshire Conference Centre on October 31st. It put the seal on what has been a very successful series of seminars with a total of 250 delegates attending across the three days.

Lessons from Buncefield

First on the programme was Peter Kendall, Emergency Planning Officer for the Hertfordshire part of the East of England Ambulance Service NHS Trust, currently on secondment to the Ambulance Service Association.

Peter reported to the meeting on the outcomes of a multi-agency workshop which was convened four months after the Buncefield explosions and fire and which considered what would have happened, had the fire occurred during the working day.

As it happens, the Hertfordshire Resilience Forum Training Group, which plans and facilitates live multi-agency major incident exercises every two years, was planning just such an exercise at the site for May 2006 and was already in dialogue with the operators. Alas, this planning was overtaken by events.

It was at 06.02 hours on Sunday 11th December 2005 that the Bedford control room of the East of England Ambulance Service took the first of many 999 calls. Although the ambulance service quickly moved to major incident standby status, it never actually went to a major incident footing and in the event dealt with only nine patients. Fire & Rescue Services did not finally stand down until January 9th, but overall the event passed off without causing any significant injury to human life and, amazingly, there were no fatalities.

What would have happened had the time been 9.30 on the Monday morning? And how would have the carefully planned mutli-agency response worked?

Some 150 business were co-located on an industrial estate adjacent to the Buncefield depot and Peter Kendall suggests that potentially the number of people killed or seriously injured could have reached 2,500 to 3,000 within the first few hours. How would emergency services have coped with this scale of mass casualty incident?

These were the questions which the multi-agency workshop, designed and facilitated by the East of England Ambulance Service and attended by representatives of the emergency services and local authorities in Bedfordshire and Hertfordshire, set out to answer. Also at the workshop was an investigator from the HSE team which had been set up to inquire into the incident. Peter Kendall went through the main outcomes arising from the workshop and they made pretty alarming listening. Here are some of the key points that he highlighted:

- The 999 system would have been overloaded. If the public, desperate to get through would have continued to dial 999, the number of calls could have been magnified upwards over an extended period of time.
- It must be assumed that the mobile phone system would fail or become unavailable which means other systems of communications would be required.
- The nearest A&E departments would quickly be overwhelmed with self-presenting casualties, many with serious injuries arriving in cars – most of which will be queuing down the hospital access roads.

- It would be some time before ambulance crews started to leave the site with casualties. The first on the scene would be fully occupied managing and coordinating the emergency effort rather than providing patient care.
- Availability of ambulances – even with regional and national mutual aid, availability would be an issue. As Peter put it 'the normal 999 call demand will not go stop because of these events. On the 7th July the ambulance service was not permitted to relax its response time standards'.
- The number of burns beds available would be quickly exhausted and intensive care units overwhelmed. Many hospitals have closed wards that could possibly be opened, but it is uncertain whether the equipment and staff would be available to resource them.
- Co-ordinating NHS resources, for instance air ambulances, would prove very difficult.
- Just-in-time supplies in terms of treatment packs etc, would be quickly exhausted creating a logistical nightmare.

And so it goes on, the workshop looking at every angle from what assistance could be offered by St John Ambulance crews and Red Cross, to the status of willing but unqualified helpers, the supply of temporary structures by Fire & Rescue Services, the need for reception centres and resilience mortuaries.

As Peter put it, "We had to think the unthinkable. In a mass casualty situation like this we would have to deliver healthcare in a way that is completely alien to most of us. It would require a battlefield culture – it would be very difficult and undoubtedly outside anyone's experience."

On the subject of communications, Peter said that Buncefield had exposed a number of issues. He explained that a growing number of ambulance services use Mobile Data Transmission (MDT) for communications between operational staff and the control room. "Under extreme circumstances, such as those we are proposing here, we believe that there would be a lot of voice communications and there is some evidence that with MDT, the techniques and protocols for voice radio transmission have been lost." The evidence suggests that in such circumstances there were more "conversations" over the radio rather than a radio discipline. "This has suggested that we need to reincorporate the art of radio messaging into our training and I know of one police force which will be introducing MDT has been rethinking their training requirements on the basis of these findings."

He added that there are also outstanding questions about how Airwave would operate under these conditions. "I am not sure that in a mass casualty incident, the number of Airwave sets available would be sufficient. Airwave has been used on exercises but we haven't yet had to use the equipment in the 'heat of battle'. I am not sure whether it will hold up and that means that we do need to have some back up. Bearing in mind all the difficulties around communications following the 7/7 attacks on London, I do think we would be better to err on the side of caution."

Clearly a report such as this can only give a glimpse of what was a very detailed presentation. However, Peter is very happy to give a similar presentation to other relevant agencies or partners who are preparing their mass casualty incident plans. He recently facilitated a session at the Government Office for the East of England which has helped to inform the regional mass casualty planning assumptions.

The potential of cell broadcasting

One of the key points in Peter Kendall's presentation was the assumption that in the event of a major incident, the mobile phone system would go down. Mark Wood, representing the Civil Alert Services Association International (CEASa) had the solution. Mark believes that cell broadcasting has huge potential to be used by public safety organisations as a way of communicating with the general public in an emergency.

Cell broadcasts use an existing function present in most cellular networks which allows a text message to be broadcast to any cellular phone in a given geographical area. Unlike SMS messaging, there is no need to know the telephone numbers of the phones so this makes cell broadcasting ideal for emergency notification when there is no way of knowing who is in the area covered by the emergency or their phone numbers.

The technology will work even if the phone network crashes provided the physical infrastructure is still in place. The base station streams the data and because mobile phones pick up the data passively it makes no difference whether you send a message to 50 people or 50 million. There is no signaling involved, or location finding, and it is impossible to overload the network.

There are practical issues to be addressed but Mark Wood made it clear that these are "political" rather than technical. Because users can turn off this facility, and would certainly do so if they perceived that it was being used to send them spam, it is important that the protocols governing who can send a message and the circumstances in which a message is sent, are tightly controlled.

Mark said that there is an urgent need for a harmonised channel identification scheme to make it a practical proposition for travelers and tourists. And he said that improvement to standards were needed to make sure phones give priority to emergency messages and give a distinct tone. These are challenges that need to be tackled at both national and international level.

One thing is certain, though. Cell broadcasting is on its way. EU Commissioner for Information, Viviane Reding, is on record as saying that the EC is investigating whether and how mobile networks could be used for early warning of the public of an imminent threat or disaster and she highlighted the need to ensure a harmonised implementation of cell broadcast cross the world's GSM networks and phones.

In the US the mayor of the City of New York is proposing to test SMS texting and mobile broadcast systems in a side by side evaluation of both technologies. Incidentally the mayor is looking for a partner in the UK to take part in the trial. Holland has just finished a two-year evaluation of cell broadcasting and is now moving to the next stage.

"We can all learn from Buncefield. Our experience of running a multi-agency table top event in the months after the incident, and escalating to a worse case scenario, means that we have been able to draw up some valuable lessons which we are very happy to share with our colleagues."

Peter Kendall

You can contact Peter Kendall by email at pkendall@bhamb.nhs.uk

Many delegates experienced TEDS first hand for the first time at the TETRA World Congress in Madrid, as EADS showed two way live video over TETRA in real time.

In the UK, this technology falls within the remit of the Cabinet Office and a consultation exercise is expected in the not too distant future. Mark Wood fears that key public safety stakeholders largely do not know enough about cell broadcasting to respond. His message was simple. "You are going to be consulted and if you want to have this technology, you are going to have to fight for it."

TEDS is on its way

TETRA Association Chair, Phil Godfrey, was on hand to update delegates on the rise and rise of TETRA. The number of reported contracts has now reached more than 1,400, double the number eighteen months ago, and not all manufacturers are reporting, so the real figure may be much higher.

Interestingly the fastest growing regions are now the Asia Pacific and the Middle East, and of the 95 countries worldwide which have adopted TETRA, 57 are now outside Europe. That said, the US remains a gaping hole on the map. However, Phil had good news to report on Germany where the government has finally issued a contract – this, he said, will influence Eastern European countries too. Some 48% of reported contracts are in the public safety sector.

Not covered in this issue is a presentation from David Groom of CCT Consultants who talked about BT's 21CN, the replacement for the existing PSTN network which is now 25-30 years old. This migration is under way and will be complete by 2012. We'll be talking to David in the next issue of BAPCO and asking him to highlight how the new network will operate and what this will mean for public safety communications.

Looking to the future, Phil said that it had been recognised some time ago that it would be important to ensure that TETRA remained relevant over the next decade. A special working group was formed to consider future needs and this has focussed on new codecs, air interface enhancements, range extension and high speed data.

The outcome of this work is TETRA Release 2 – the TEDS standard which provides a high speed data capability of up to 500 Kbit/s, a much needed improvement over the existing 28.8 Kbit/s. The TEDS standard was completed a year ago but there are currently no defined timescales for its availability.

However, Phil was able to report that the Norwegian government has awarded a contract that includes TEDS to Motorola which suggests, he said, that they are confident of their ability to deliver TEDS for Nodnett. And EADS were demonstrating TEDS technology at the TETRA World Congress in Madrid earlier this year.

TEDS enhances the existing standard and provides a variety of data rates. And why was this important? He explained that there are now a growing number of wideband technologies available, for instance GPRS/EDGE, 3G data services, WiFi and WiMax, but these public systems are provided by commercial organisations and can either be turned off or go down during major incidents. "They do not provide the guaranteed availability that the public safety sector needs."

Project MESA will address these issues, said Phil. MESA is a joint initiative between ETSI (European Telecommunications Standards Institute) and APCO to develop a standard for deployable broadband systems for mission critical users. However, progress has been slow and the project is now being dominated by the public carrier sector so the advantages of private systems may be lost.

Another important project which is moving forward is ISI (Inter System Interface). Part of the TETRA standards suite, ISI has been published by ETSI and defines the technical interface between two radio networks. The specification was produced by a combined working group from the Belgian, Dutch and German security agencies in conjunction with Motorola and Nokia. Based on practical tests carried by multi-agency teams during a pilot project in Aachen, the specification details the communication technology needs based on the scenarios developed.

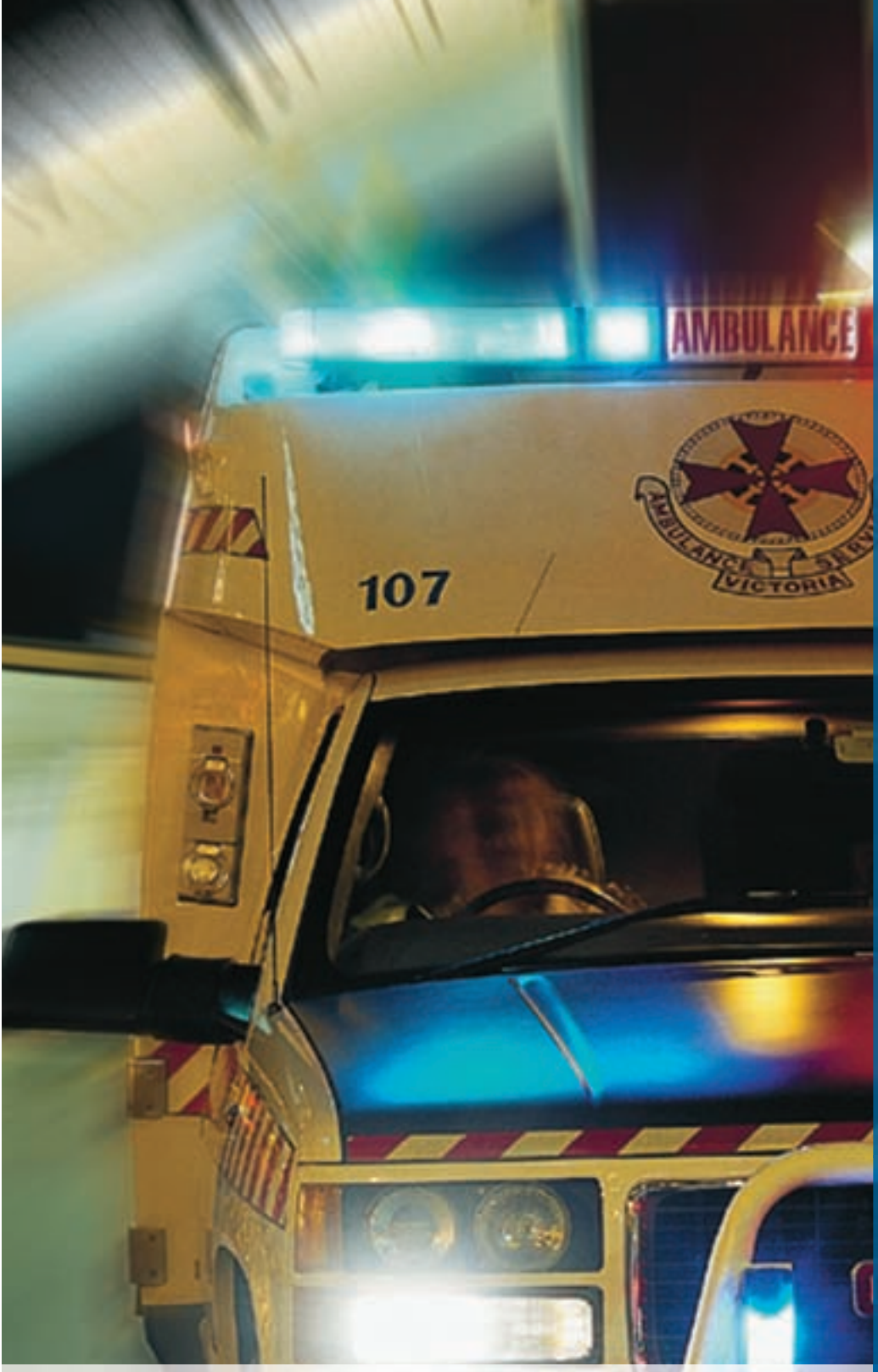
Pressure for the ISI is growing but the reality, said Phil, is that it is likely to be at least a year or so before the ISI hits the streets.

Phil finished his presentation by making clear that TETRA serves a much wider market. "This is not just about voice radio for the police," he said. "TETRA is being used in a variety of applications including airports, mass transit systems, utilities, petro-chemical and many others. TETRA Release 2 will ensure that it serves these sectors for many years to come."

Phil also took the opportunity of addressing an audience of key players in the public safety sector to encourage their support for the emergency services to be given their own spectrum for wideband data.

"The fact that emergency services will almost certainly want to use more and more data in the coming years means that they will be looking for web-based applications and broadband type capabilities. The analogue TV switch off will create a digital dividend. However, the current regulators, and this includes OFCOM, don't seem to be interested in the needs of mobile users. There are some very powerful lobbyists out there and I get the impression that the government is more interested in auctioning off the spare spectrum than listening to those who need it most. Unless someone does something, UK public safety is going to miss the boat."

Phil asked anyone with links back into government to raise this as a serious issue. "This is a once in a lifetime opportunity to secure some spectrum. I implore anyone who can lobby through their own channels to do so."



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Satellite comms aids efficiency in flood response

Satellite communications helped Gloucestershire Fire and Rescue Service cope with the widespread flooding that affected their county during the summer months. Dawn Davison-Read talks to Rob Lacey, Head of IT and Communications, Gloucestershire Fire Service, about the brigade's foresight, and she reports on how the solution enabled an improvement to the incident command.

Gloucestershire Fire and Rescue Service's involvement with satellite communications began some five years ago, and since then satellite technology has become an integral part of their major incident management, as explained by Rob Lacey, Head of IT and Communications, Gloucestershire Fire Service, "Once we had begun to utilise satellite communications in large incident command, we quickly realised the benefits it would bring to our command unit, such as video and remote access, and perhaps more importantly the flow of information in real time, which is essential when managing an incident on a significant scale such as the floods during the Summer of 2007."

Gloucestershire first installed satellite connectivity on their Incident Command Unit, a large bus that has been converted especially for large incident management. The ability to access the Internet, email and HQ-based systems from the vehicle proved a valuable addition. It soon became apparent that the enhanced communication facilities could greatly assist incident commanders and help support the entire command structure. Because of this, the decision was made to acquire a second system, but built into a trailer.

Primetech refurbished and installed all the equipment within ten days of the request from Gloucestershire FRS, as Henry Walker, Primetech, explained, "Since Gloucester had its own trailer, the timescale was literally ten days – if we were to build a trailer from scratch then the average delivery times would be about six weeks."

Continuing Lacey said, "Whilst our command unit is great, we found ourselves in a situation where having a more manoeuvrable and easily deployed system was beneficial. The command unit is well suited to environments where you need both connectivity and a place to work. However, there are downsides to using a large vehicle – for a start, you need staff members with a relevant PCV licence to drive it.

"In addition to which, the command vehicle may be unable to gain access to certain locations in the county due to its size. Introducing a second system installed in a trailer, which can simply be towed via a standard car, provided additional resilience and efficiency to the brigade."

During the July floods, Gloucestershire Shire Hall was closed, so emergency planners and other GCC staff decamped to Tri Service Headquarters for five days.

A complete communications package

Discussing the communications element, Lacey explained that prior to the satellite solution, the brigade had laptops with GPRS access and laptops with an access database or chemdata installed. However the service had never had the real time communications and high bandwidth that having a satellite system provided.

"We can now pretty much do anything we want that is office based," added Lacey. "Some of the simplest applications are what we use the most, such as Internet access and email, which have brought untold benefits to incident management."

Gloucester also utilises video applications via remote cameras, and in actual fact has a camera mounted on top of the command vehicle to provide incident commanders with a clear picture of the surrounding areas involved in the incident. The trailer (and command unit) is also used for charging fire ground batteries if required and enables the use of WiFi communications as and when needed by operational staff.

The transmission of mobile data can also be applied over the satellite system if required, but as pointed out by Lacey, one of the most important aspects to the solution is the ability to work remotely. "In the event of any incident, information can be fed to remote operational staff which certainly helps with incident management, and the incident command can be extended to several locations if required."

In addition to the benefits that the satellite communications brings in terms of information management via email and Internet access, Henry Walker of Primetech believes that the WiFi technology incorporated within is underestimated in its capability. "As Rob said, there is nothing magic about it, providing you have power, but the equipment we are providing is aimed at the first responder. We can provide first responders with a wireless network within 20 seconds. But having provided the network the question is what you're going to do with it. I believe it extends the incident command vehicles capabilities inasmuch as the operatives on the ground have constant communications – if they want it – with their command vehicle."

Efficient use during the floods

The ability to build the satellite communications solution within a lightweight trailer proved invaluable to the brigade during the floods. Lacey explained, "The areas around Tewkesbury and the Mythe pumping station were inundated with water – my operational colleagues therefore decided to set up a Strategic Holding Area at Strensham Services on the M5. All of the resources that came in from all over the country were taken to Strensham and deployed from there."

Thanks to excellent support from Roadchef and Travelodge, the brigade was able to use the conference room in the services, which ultimately became the sector command centre for Tewkesbury and Mythe incidents. "This is where the trailer came into its own," added Lacey. "Our command unit was deployed at the Walham and Castle Meads incidents in Gloucester, where the vital substations were under threat from rising river levels. We took the trailer to the services at Strensham, simply parked it outside, ran a couple of wires in and within two hours we had a full command office up and running. The trailer ultimately provided us with full Internet access, email and access to all the information held at HQ – basically everyone involved in the strategic holding area. And the briefings held with local representatives and so forth were all able to be conducted from there. I believe that this was the first time this sort of contingency holding area scenario has been used in anger."

Many forms of information management were carried out in Tewkesbury sector command. The recording of incident logs, resources, emails and voice communications were all performed on laptops from the holding area. This information could be sent to HQ in real time, even imagery that was being received from the RAF was being sent to the holding area, enabling incident commanders to act upon the data without having to be at the HQ. In addition, all the information was available to other agencies involved in the flood response if required.

Sharing with other agencies

Gloucestershire Fire and Rescue Service is part of the Community Safety Directorate of Gloucestershire County Council. During the July floods, Gloucestershire Shire Hall was closed, so emergency planners and other GCC staff decamped to Tri Service Headquarters and worked there for five days. Lacey adds "The IT recovery for the entire county was here, all of the emergency management staff were here, and ongoing, reliable connectivity was paramount.

"As it was, our normal ground based connectivity stayed available, but it was reassuring to know that we could call on satellite broadband to back up our Internet connectivity if necessary." Lacey also pointed out that any partnering agency – if it has its own laptops – could access communication via the brigade's satellite links to ensure continuity of service.

Resilience

Discussing the benefits of the satellite solution over 3G, Lacey pointed out that 3G wasn't available at a standard that could effectively be utilised across the county. Whilst the brigade does have GPRS, as Lacey explained, it is mobile phone dependent and whilst they have ACCOLC SIM cards, speed and reliability are issues. "Satellite communications are not locally dependent," added Lacey, "and whilst we have mobile phones, I wouldn't like to depend on GPRS access. Furthermore, speed is a major issue because you can't send moving images such as those of a decent quality that we received during the floods from the RAF." In terms of resilience Lacey believes you really get what you pay for. "We are using commercial grade networks, we are not in a position to launch our own satellite or buy dedicated bandwidth, but business continuity-wise we looked very closely at the service we use and believe it is totally suitable for our needs."

Discussing how Tewkesbury would have been managed differently if the satellite communications had not been available, Lacey believes that even with the use of laptops, staff would have had to rely on accessing other people's

"Our normal ground based connectivity stayed available, but it was reassuring to know that we could call on satellite broadband to back up our Internet connectivity if necessary."

Rob Lacey, Head of IT and Communications, Gloucestershire Fire Service

Primetech refurbished and installed all the equipment into the trailer within ten days of the request from Gloucestershire FRS.

The trailer ultimately provided the brigade with full Internet access, email and access to all the information held at HQ.

email facilities – which would not have been efficient and more importantly the brigade would have been reliant on other organisations. "During a conversation with our Deputy Chief Fire Officer, he said to me we needed to keep working when nobody else can – and he's absolutely right. These solutions allow us to be independent to the best of our financial ability."

Even had there been power failure, the trailer, with its built-in generator and considerable battery, would have enabled those dependent on it to maintain working conditions and communications. "We are completely self contained with the trailer and it is the same with our command unit. And should the generator fail – well, our trailer can also be run from a car battery or even a wind turbine or solar panel," added Lacey.

Lessons for the future

Prior to the floods, Gloucestershire Fire Service had never experienced the need to set up a new office in a completely unrelated building and maintain secure access to all information. The trailer enabled this and as added by Lacey, "In fact, we could have been anywhere, it didn't matter, even in a field. This is not something we could have achieved without satellite communications. We knew we might have to – and we knew we could do it with satellite broadband – which is why the trailer was purchased.

"Since the floods, we have now prepared a 'grab pack' so in the event of any incident we now have a box at the ready which contains eight laptops, surge protected power supplies, data cabling, network switches etc, which ultimately means we are even more prepared to set up an office of whatever configuration and locate it wherever it is needed, in an instant."

Lacey also believes that whilst other brigades have satellite solutions, until the system is actually used in anger, the benefits are not fully highlighted. "We are also very lucky here at Gloucestershire," added Lacey, "because we have a very strong link between the operational side of communications and IT. This essentially means that many of the initiatives we instigate within IT have a direct bearing on operational communications and incident command, and vice-versa. This environment enables us to achieve a number of solutions jointly, for instance the command vehicle can also be used as a secondary control room if required. We can see exactly what is occurring on control room systems via our satellite units if we need to, and conversely staff in Control can watch the incident remotely from our live feed cameras."

Lacey strongly believes that the solution has altered the way in which the brigade deals with large incidents, not in operational procedure, but in the way that the sheer amount and quality of information that can be made available to officers in charge so that they can make informed decisions.

"Without good communications, important information from HQ may well have to be delivered to an incident by hand using a vehicle. That can take a long time, and when much of the county is flooded, may become impractical. The reality is that no longer do you have to rely on people driving around the county with important documents, but the data is instantly accessible via email. Or indeed, there is no longer a requirement to locate a fax machine and then receive reams of data on paper. Now, if we have an incident, Control will take a screen dump from the mobilising system about all attending officers and appliances and email it to the command unit. Prior to this facility, operators would need to read out the information over the air – so in addition to speed we are also saving large amounts of radio time and allowing operators to concentrate on receiving and managing calls."

Gloucestershire Fire Service has also looked closely at its voice communications since the floods, and has found that point-to-point communication was sometimes quite difficult. Mobile telephone networks were creaking, and main scheme radio is not used for direct communication between incident sites. To reduce the reliance on mobile telephony and create simple, dependable voice links, the brigade is looking to increase its fire ground communications ability using other means. There are many radio-based options available, and good communications at up to ten miles have been tested.

And to the future

Gloucestershire Fire and Rescue Service is now looking to improve its communications at Strategic Holding Areas. By definition, any area used for a Strategic Holding Area will be large, and perhaps geographically dispersed. At Strensham services for example, the north and southbound service areas are a mile distant, and GFRS has developed the means of connecting them together. Lacey explains "Our sector command was on the northbound carriageway, and the Strategic Holding Area was on the southbound. The ability to connect both sides together would certainly have provided enhanced operations.

Therefore we are looking at options to connect both sides of the motorway via wireless bridging and tactical masts. Although this is a very simple project, it is very exciting in terms of what we will be able to achieve. It's an idea that can easily be transferred to other large, open areas"

The brigade is also looking at an online web based incident management system, explained Lacey, "This will enable instant updates both at holding areas and HQ, plus an audit trail can be activated. With incident logging, sector command can see in real time what is actually occurring. At the moment, incident logs are kept in word documents or similar. I'd like to put them online, so they can be viewed in real time from anywhere with the correct secure access."

One option is to connect both sides of a motorway via wireless bridging and tactical masts.


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Time to play VoIP catch up

As VoIP begins to roll out into the public safety space, we find out what impact it will have on back-office systems and the technical and organisational issues that will have to be faced. Carol Debell reports.

"The old telephone systems had a telecoms manager but with IP, organisations are moving to a data environment, so there will need to be a migration of knowledge."

Arno Sybrandy, CyberTech.

The Ofcom consultation on the regulation of VoIP services and access to the emergency services closed on 20th September and it is likely that we will have to wait until the New Year before we hear what the next steps will be.

But while the issue of access to 999 calls remains very live, what lies behind this concern is the rapid uptake of VoIP within the community at large. The number of households using VoIP telephony doubled during 2006 and it seems likely that 2007 will see similar levels of growth. For emergency service operators, this means that increasing numbers of calls from the public will come via the IP route.

All the arguments that are making IP telephony attractive to the general consumer also apply to emergency services which not only have large internal voice networks but also a high level of inter-agency communications. Until recently, however, this sector had approached the new technology with a certain amount of caution. Paul Collins, Public Safety Business Development with Verint, says this was to be expected. "The public safety sector tends to be very conservative. It can't afford for its voice communications not to work so it wants to test new technology before it commits." But he adds that VoIP is beginning to roll out into the public safety space. "What we are seeing is a move to deploy VoIP in the back office – people want to see how it goes before taking it to the front line." But he adds that all the major infrastructure providers are moving to IP-based systems which means that increasingly contact centres will be able to benefit from lower call costs and the added advantage of not being tied to propriety hardware.

US-based Verint Systems acquired Mercom's Audiolog brand in July 2006. Audiolog provides recording solutions for mission-critical public safety and government-regulated environments and with the resources of Verint behind it, the brand is now being actively marketed throughout Europe.

But if the public safety sector has been slow to move to VoIP, it is certainly playing catch up now. Arno Sybrandy, Global Marketing Director with CyberTech, confirms that there has been a significant increase in interest in IP solutions over the last six months. "Everyone has been talking about IP for the last couple of years and suddenly we are getting a lot of questions from public safety/emergency services about issues surrounding implementation." These organisations, he says, face both technical and organisational issues.

CyberTech, a global player in the voice recording sector recently acquired a majority share in its long-term distributor in the UK, Activa Solutions, who over the years has provided communications recording solutions to more than 130 emergency services and public safety organisations in the UK.

One of the most organisational issues to be addressed is the fact that when telephony moves from conventional to an IP platform, existing support services may lack the necessary skills. Paul Collins says this means that the skills

Dumfries & Galloway are early VoIP adopters

One constabulary which has already gone down the VoIP route is Dumfries & Galloway. One of the main benefits of the VoIP network is that it dispenses with traditional cabling costs. At Dumfries & Galloway, following the approved Cisco pattern, telephone cables are not required and category 5 and 6 'Gigabit' Ethernet cabling is used instead (1Gb/sec) to improve speed and capacity. This means there is no network disturbance and downtime as and when additional users are added.

John Hughes at Dumfries & Galloway, was tasked with upgrading and future-proofing the force's communications systems. John concentrated on replacing legacy systems and dispensing with their associated manpower and media costs, such as storerooms of accumulated tapes. Hence he needed a recording solution that would cover the constabulary's VoIP, digital and analogue telephony over one IP enable network.

The network needed to be distributed across 18 different locations and centred upon the force headquarters at Cornwall Mount which is also the location for the new Vivista DS2000 Integrated Command and Control System. In addition to VoIP the constabulary benefits from Airwave digital and TETRA radio technology.

John Hughes chose the AudioSoft solution. In order to record, monitor and playback data from the IP telephony system, AudioSoft's hardware solution features standard PC rack mounted units which handle 32 analogue and 40 IP channels with playback through a desktop PC. The playback uses COTS equipment and so has a very low cost of replacement and maintenance.

In addition to cost savings, John adds there are a number of other benefits including improved capacity and improved integration. Dumfries & Galloway officers work away from the HQ and dial in to the force network using a standard VoIP telephone at local police stations. The calls themselves can be recorded and replayed in exactly the same way as any other call. All recordings are legally admissible, having been evidentially proven and complying with Home Office guidelines. Streaming enables records to be played seamlessly over the internet, LAN or WAN to other users at their desktop, saving time and cost,

All standards-based VoIP communications over a network can be recorded including both internal and external calls. The AudioSoft system logs all calls-related information thereby negating the need for costly and complex caller telephony integration, while the architected recording solution ensures that no additional load is place upon the network.

The AudioSoft system is modular and allows expansion to the system. It is easy to upgrade and integrate with associated equipment that may be added at a later date, for instance encrypted pages, mobile phones etc as well as the full range of existing Airwave radio systems, analogue and digital telephony which have not yet migrated to an IP platform.

Compared to previous systems, savings on DVD-RAM media (for storage) and the time and manpower previously necessary to transfer them, are significant. The cost of DVD RAM archiving in hardware terms alone has been calculated to 0.76% of those of DAT tapes. Factor in that operators only need to change the DVDs every 60 hours rather than every two hours with tapes, says John, and this becomes a compelling argument for making the jump to a digital network-enabled recording solution.

of the maintenance engineers will need to change. "There will be a need to retrain maintenance and support staff – in future they will need to be network specialists." Arno Sybrandy agrees. "The old telephone systems had a telecoms manager but with IP, organisations are moving to a data environment so there will need to be a migration of knowledge."

Both Paul and Arno highlight the importance of having the right bandwidth in order to get the right quality. Paul Collins says that quality has been one of the major issues holding back VoIP. Arno points out that just because an organisation already has an IP network, it is not necessarily ready for the IP telephony environment. "In our experience, cabling is always an issue and it is important that organisations check their cabling to ensure that there is sufficient bandwidth to handle all the VoIP traffic before they commit. In our view, good testing of the network is essential."

The stringent requirements placed on emergency services to record and archive all voice messaging means the ability to integrate VoIP into existing recording solutions is essential. Paul Collins says that emergency services will need to be able to live in a hybrid environment for some time to come. "What we are seeing is one part of the building using VoIP, while another part of the building is on a traditional telephone platform. Our system is agnostic and this means that organisations can make a painless move to the IP environment – it protects their investment in the existing infrastructure."

The latest version of Verint's Audiolog features high scalability and capacity and increasing recording throughput in order to support the adoption of VoIP technology. "The result", says Paul, "is that the system offers increased performance, scalability, stability and feature richness with enhanced compression and transfer of multi-channel VoIP recordings and associated call data."

Arno Sybrandy believes that future-proofing is very important, particularly as IP solutions are developing very quickly. He points out that there are recording systems on the market which have been designed for the analogue environment. "If you are looking at migrating to an IP solution over the next six months to a year, it is very important to make sure that the recording system you buy will be able to handle the new IP-based technology." CyberTech's Myracle and Pro recording systems can be used in traditional, Internet Protocol (IP) or mixed telephony environments and deliver high quality recordings for all applications including verification and compliance, dispute resolution, and quality monitoring.

He adds that CyberTech solutions are based on standard, common-off-the-shelf (COTS) hardware which means that users can maximise the attractions of IP telephony. As Paul Collins points out, open standards is one of the reasons that VoIP is so attractive to high volume users. "Historically control centre systems have all been proprietary systems which have tied users into expensive hardware. Now people have the option of lower cost solutions that are easy to deploy and support."

"The public safety sector tends to be very conservative. It can't afford for its voice communications not to work so it wants to test new technology before it commits."

Paul Collins, Verint.

OBSCURE technology?

In a crisis, data needs to be available both to the emergency services and the public. Dan Worth investigates a new solution from Thales that allows data to be shared with those who need it – and in a secure manner.

"You can provide data about incidents on a public website, with details of the incidents and so on, and the press can access that information that way. This works for both large-scale incidents, and also for updating smaller stories or providing general safety information."

Rachel Craddock, Thales.

In a crisis, events move quickly and so data needs to be available and easy to access by both the emergency services and the public. However, issues of security mean some information must remain private and only available to those with the appropriate authorisation. For the emergency services this may include being able to see the current and best deployment locations of their units, while not allowing such data to be publicly available. It is imperative that they can share this information with those who need it while keeping certain aspects secure.

Thales Research and Technology, a company that makes up a network of research centres situated in the UK, France, Netherlands and Singapore, has developed a secure situational awareness tool that allows data from multiple sources to be collected into a common data area, with security controls to keep the information secure. Using a technology called OBSCURE (Object Based Security) data can be securely shared between the organisations that need to access it, without compromising the confidential aspect of the information.

The software was originally developed for coalition forces to allow them to share certain information, while limiting access to other data. The idea of making this technology available to the emergency services was hit upon when the potential of using web page 'mash-ups' for situation awareness was realised. As Rachel Craddock, Principal Engineer, Thales, explains. "By being able to bring all the data into one place you can allow people to see all the information they need. Of course some information needs to remain private and so the technology allows you to provide access to the relevant organisations, or even just select individuals, while keeping other data private."

Thales Research and Technology are hoping to have the software available for the emergency services within the next 12 months and will be developing a final version based on the feedback from Hampshire Fire and Rescue Service.

Thales Research and Technology has used the Buncefield Oil Depot explosion of December 2005 as the basis of a demonstration to show how the technology could be utilised at a major incident. Information on road closures, diversions, and accommodation information for those forced to evacuate, would be made available to everyone via public information websites, using services such as Google maps. For the emergency services the data on where their units were stationed, how many were present, and where they may need to be deployed over time is kept private and made available only to those who need to see it. This allows both the public and the emergency services to use the same tool for their own needs without compromising security or blocking access to the data.

The OBSCURE security technology works by applying protection to the information itself rather than to the underlying communications infrastructure. Using secure "digital containers" that contain the data, authorisation policies can be used and decryption keys generated to allow specified users access to the information.

Hampshire FRS is very keen to use this tool and so Thales Research and Technology has begun work on developing a trial version for evaluation purposes, as Rachel explains, "The emergency services need software that can be used everyday so that once they have become comfortable using it on a regular basis, when a major situation arises they know exactly what they are doing. As well as this, the cost-to-use ratio must be considered so we need to develop a piece of kit that is in daily use."

Ease of use is something that Rachel doesn't believe will be much of an issue. "As it is based on Google maps and similar software, people are already familiar with it. As well as this, the system of how to reveal or hide information is just a selection of tick boxes so it's very straightforward."

Another benefit is the aspect that allows data access rights to be adapted as required. For example, data access rights can be set up so information can be made available for a specified time period to specified users who may not normally have access to it. After the specified time period, these people can no longer access the data, unless new access rules are created.

Hampshire FRS intend to use the system to address another aspect of information distribution during a crisis – dealing with the press. "You can provide data about incidents on a public website, with details of the incidents and so on, and the press can access information that way. This works for both large-scale incidents, and also for updating smaller stories or providing general safety information. This all helps save time for the emergency services."

Cross-agency data sharing

The Collaborator pilot taking place between Gloucestershire Police and the Highways Agency could have significant repercussions for multi-agency co-operation throughout the UK's public safety services.

A cross-agency data-sharing pilot is now underway between Gloucestershire Police and the Highways Agency, its aim to drive efficiency savings, data and incident sharing without re-keying the information. The idea behind the Collaborator may sound simple, yet its successful outcome could have significant repercussions for inter-agency co-operation throughout the UK's emergency services and related agencies. Chris Pine, Commercial Director of Extent Software, explains the benefits of the Collaborator and explains the plans for the future of a company not afraid to think big.

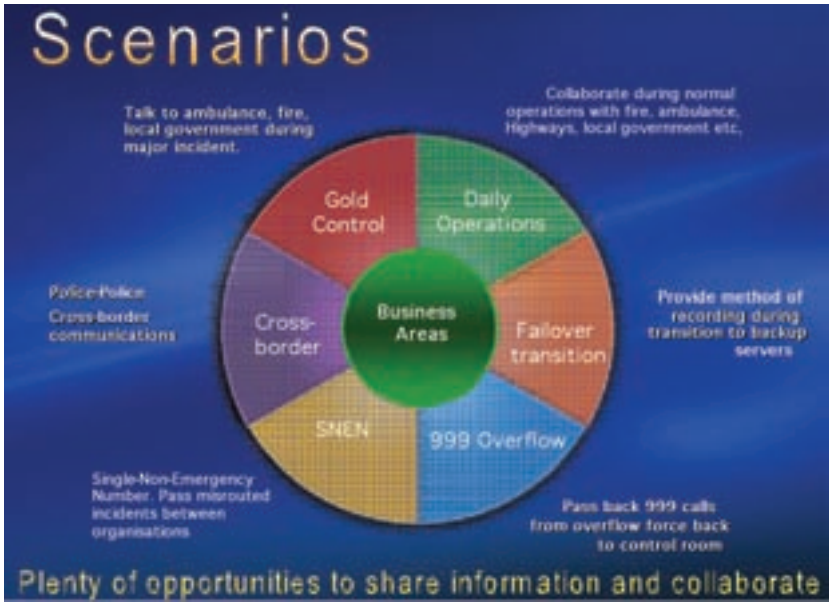
"I recently attended a symposium on mobile communications organised by the NPIA. One of the presentations immediately grabbed my attention. It said that 70 per cent of information captured by police force systems were used in other processes – and crucially that data had to be re-keyed into those other systems. It is that replication of time, effort and resources that is one of the key drivers for the Collaborator."

The Collaborator negates the requirement for re-keying of data that has already been captured in a call to enable it to be sent to another force or agency system. Traditionally, information that had to be shared with the Highways Agency, for example, required a separate "action" involving both parties inputting and logging an incident – no more. The Collaborator requires that data to be recorded only once. "And it is significant that not all the information that has been captured has to be relayed onwards. The system is sophisticated enough to accept that some data might be confidential, and as such it can be tailored to the needs of whichever agency or agencies are involved."

Each party can attach additional data to incident reports – whether it be video, voice, photographs or Word documents – and a full audit trail is laid automatically. "As each operator receives and relays an incident from one system to another, there is automatic acknowledgment of receipt. As the incident progresses, the system updates all parties involved as to what action has been taken. When the police dispatch two cars to an RTC for example, the Highways Agency is automatically updated."

Gloucestershire Police, adds Chris, has been Extent's "product champion" as regards the Collaborator, and there are many eyes waiting to see the outcome of the pilot, which is expected to end March 2008. "Gloucestershire's senior management team has been very forward thinking and we have been working very closely with them in exploring other potential applications outside command and control, such as crime recording, 999 overflow, Gold Command, multi-agency working, mobile data and VoIP.".

Currently a select few command and control centre operatives are participating in the pilot, but as time rolls on the size of the team will increase. The system has been designed with the look and feel of Microsoft Outlook, and as such is highly intuitive. "Trained operators who are used to the command and control systems will find the Collaborator easy to use and an online learning course will be available which will facilitate the training."



It may be early days yet but Extent Software already has a clear idea of where it wants to go with the Collaborator. Although at this moment only Gloucestershire police and the Highways Agency are connected, Chris believes there is the potential to link other neighbouring southwest police forces and indeed those in the Midlands. "This would enable Gloucestershire Police to share incident data and intelligence with their neighbours electronically. Our challenge then would be to integrate each force's command and control systems and other systems to Collaborator." And of course, there is also potential to share information with both fire and ambulance services.

Further applications for the Collaborator are already in development by Extent Software. Local Authorities could also benefit hugely. "Some LAs have a single non-emergency telephone number for members of the public to call in case of a non-emergency incident such as graffiti and anti-social behaviour. In a situation like this, the LA may have to capture the data and then contact the police, who will have to re-key that data. The Collaborator could easily integrate all these systems."

Inter-agency collaboration has always been at the heart of the emergency services, but the technology to manage that communication as efficiently as possible has – believes Chris – only just arrived.

Although only Gloucestershire Police and the Highways Agency are connected at the moment, there is potential to link other neighbouring police forces and to share information with both fire and ambulance services.

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E-notebooks on the streets

The Lothian and Borders Police Mobile Data Project, which began in 2003, is the first Police Mobile Data Project to totally replace the traditional paper-and-pen notebook. Temporary Chief Inspector Norman Dixon, Project Manager, talks about a project that has set the agenda for the Scottish Police Force's National Mobile Data strategy.

"We see PDA e-notebooks at the front end of our future information management structure in line with national developments."

The Lothian and Borders Police Mobile Data Project, which has been wholly developed and funded by the Force, is based on the "Systems Thinking" principles of designing core business processes from the perspective of the customer. Norman Dixon says that the aim is to increase the value work that is being carried out by staff and eliminate wasteful working practices and duplication of effort.

Working with front line operational police officers and police support staff as well as internal and external partners – most notably the software development company Kelvin Connect Ltd – the project has evolved in four phases with each phase gradually increasing the number of police officers involved in the project from the original 6 to now over 800. The project is on course to have 1,000 trained by Christmas 2007 and 2,500 by April 2009.

Temporary Chief Inspector Norman Dixon,Lothian and Borders Police Mobile Data Project Manager.

One of the major achievements of the Mobile Data Project is that it has produced a direct electronic link with the courts.

Norman says this slow measured way of working has reduced the risks and allowed rapid application development to take place in line with real operational requirements. The result is the creation and operational deployment of PDA electronic notebooks that allow Police officers to gather, manage and transfer information in a completely electronic format.

By harnessing new technology and creating PDA e-notebooks the force has given police officers, at the point of contact with the public, the ability to capture and place information into the relevant core business processes in an electronic format. This, combined with a better understanding of the business process information requirements and the creation of structured templates for police officers to utilise, has result in better quality of information. Once captured, information can then be managed in a more efficient and effective manner reducing unnecessary and repetitive police bureaucracy.

The PDA e-notebooks are a complete replacement for the traditional paper and pen notebooks, and allow police officers to gather information in an electronic

format in over 18 predictable core police business processes. These include witness statements, crime recording, HORT/1, Scottish intelligence database 5x5 reports (SID), vehicle defect forms, domestic incidents recording, missing persons, conditional offer fixed penalty notices for road traffic and anti social behaviour offences and sudden death reports. Other predictable police business processes are currently under review and will be included on the devices.

The PDA e-notebooks combined with mobile printers, supplied by Brother, allow officers to work in processes that issue tickets or leaflets such as conditional offer fixed penalty tickets for RTA offences, delivering advice to victims of crime and fixed penalty tickets for anti social behaviour. In the past, all these forms would have had to be carried separately and hand written, and the potential for error was high. Norman says that being able to offer the public clear, typed forms is a major bonus. "The officers like using it and it provides a far more professional and up to date image of Lothian and Borders Police to the public." He adds the combined weight of a PDA e-notebook and printer is less than that of all the books and forms the officers used to have to carry around with them.

One of the major achievements of the Mobile Data Project is that it has produced a direct electronic link with the courts in relation to conditional offer fixed penalty tickets for RTA offences, and fixed penalty tickets for anti social behaviour. Information captured on the street is sent via the PDA e-notebook management system straight into the court computer systems without the need for any further reprocessing of that same information.

Similar direct interface development is taking place with UNIFI Crime recording, SID Intelligence recording and the creation of Standard Prosecution Reports. Discussions have started regarding direct integration with the new STORM command and control system. At present, information is copied and pasted into STORM, and this already saves the re-keying of information.

The work of the Mobile Data Project also links into the West Lothian and Edinburgh criminal justice projects. Norman Dixon says this has the potential for addressing challenging statement disclosure issues within summary justice reform.

Overall, the PDA e-notebooks have delivered significant business benefits, says Norman. "They have improved the security of data, improved data quality, increased speed of submission of data, delivered the ability to manage witness statements quickly, increased intelligence submissions, greatly reduced end-to-end times in processes, increased police officer visibility and reduced duplication of effort. Very importantly they have improved morale."

With regard specifically to police visibility and officer time savings in carrying out administration processes, he emphasises that the use of PDA e-notebooks does not deliver more police officers. "What it does do is allow you to do more with existing resources, both in terms of operational police officers and back office police support staff."

The force is committed to introducing PDA e-notebooks to all operational police staff. "The current training programme is prioritised towards the training of front line operational police officers in line with anti social behaviour legislation enforcement."

New recruits into the force arriving back from their initial training at the Scottish Police College are now being trained in the use of PDA e-notebooks and now work is ongoing to include specialised officers such as CID, licensing etc. and certain support staff members within the project's scope. The plan is that all the Force's operational staff will be using PDA e-notebooks by March 2009.

Norman says the work of the Mobile Data Project and the PDA e-notebooks touches on all the Force's major projects. "'We see PDA e-notebooks as the front end of our future information management structure in line with national developments."'

The information management system that holds all the notebook entries is managed on a hierarchical structure giving immediate supervisory access to data once a PDA e-notebook has been synchronised. This has improved supervision of officers' work and in particular increased the ability of supervisors to manage their probationers. Information from this database can be exported and be used to analyse performance from individuals, teams, stations, divisions and as a force. This has still to be refined and work is ongoing with the force performance unit to make best use of this ability.

Norman Dixon says they are aware of the further benefits that remote access to information can bring to police officers to help then make better informed decisions and provide them with information to assist them to do their job. "However, we have concentrated on the 'pull' of information into the organisation. The devices we have purchased do have wireless capability and now that we are satisfied that we have a solid platform to built from we will start to look at methods of starting the 'push' of information out to the police officer such as PNC and SCRO information."

The Force is working in collaboration with all other Scottish Police Forces to develop the ACPO(S) National Mobile Data strategy that is built upon the PDA e-notebook designed by Lothian and Borders Police.

"They have improved the security of data, improved the data quality, increased speed of submission of data, delivered the ability to manage witness statements quickly, increased intelligence submissions, greatly reduced end-to-end times in processes, increased police officer visibility and reduced duplication of effort. Very importantly they have improved morale."

Temporary Chief Inspector Norman Dixon, Lothian and Borders Police Mobile Data Project Manager.

Happy officers in Lothian and Borders – the combined weight of a PDA e-notebook and printer is less than that of all the books and forms the officers used to have to carry around with them.

Feel the power – why the Li-ion battery is currently the undisputed king of the jungle

It seems like only yesterday when Li-ion batteries started being introduced into the market, replacing Ni-Cad batteries. Three years later, the march of the Li-ion seems unstoppable as its benefits – which include 18 to 22-hours of power – become widely recognised. Dan Worth investigates some of the benefits these batteries are bringing to the emergency services – and hence to public safety.

Public safety relies on the emergency services being able to communicate effectively with other units on the ground and with their control rooms. Few would say that the widespread implementation of new technological devices has been anything but beneficial to increase the quality of this communication. However, that is not to say there have not been new problems encountered with this increase in personal technology.

With officers now equipped with devices that require regular use, the potential for battery failure at a critical time is increased. Carrying spare batteries is limited in its feasibility by issues of size and weight, so devices need to be able to last an entire shift, often being used for the majority of the time.

Right, Hampshire Police Constabulary has just used Multiplier UK to install a battery management and maintenance system called Cadex. Far right, from the top, batteries from Motorola, Nokia and Sepura.

Instead of carrying additional batteries the solution is to provide batteries with higher capacity and to ensure that systems are implemented to ensure batteries provide longer life spans. A major new development in increasing battery technology has been the recent implementation of the Lithium Ion battery known more commonly as the Li-ion battery. They have been quickly introduced to the emergency services across the UK as they were the first power devices for the digital handsets used for TETRA, and each of the terminal manufacturers settled on Li-ion as the standard battery

Around two to three years ago the industry began to introduce Li-ion batteries to replace Ni-Cad batteries. Motorola, a supplier of batteries to a large section of the emergency services, were one such company – along with many others – to bring them in due to the variety of benefits and features over Ni-Cad batteries. Graeme Loughrey, TETRA product manager, explains. "It's all about getting more power but with a smaller power source. The benefits of Li-ion batteries mean the terminals can be smaller and weigh less which is very important for the emergency services." Motorola also issued public safety officers with information to explain why they had undertaken the change to Li-ion batteries, outlining the benefits. The advantages of the batteries are numerous and Graeme believes they are a significant step forward from traditional Ni-Cad batteries. "The charge densities are higher for Li-ion batteries so they can last for a lot longer in a shift. Traditional Ni-Cad batteries could last for about 700 charge cycles but would only just squeeze through a shift with about eight or nine hours of use. Li-ion batteries might last about 450 charge cycles but the advantage is they last between 18 and 22 hours on a single charge."

Li-ion batteries have a longer charge time than the older Ni-Cad batteries, but the final 20 percent of the charge takes almost the same amount of time as a Ni-Cad battery

and it is only the first 80 percent, which is the easiest part to re-charge, that has a different time length. However, Li-ion batteries have a tough chemistry and so are able to cope with being recharged, even if they are not fully drained, far better than Ni-Cad batteries. This is another benefit of Li-ion batteries that is of enormous assistance to the emergency services.

Luca Fiore, sales director of Advanced Charger Technologies (ACT), a company which provides charging and conditioning regimes, also use Li-ion batteries and he explains why they are becoming so widely used. "Every blue light service makes use of portable electronic devices that obtain their power from an integrated source. The main advantages of the Li-ion battery are the high power densities ensuring that the additional features that TETRA offers can be utilised in a compact terminal."

However, there are still issues with these new batteries. As Luca points out, "with technological advances often come some new problems. The batteries require a protection circuit to stop them over-heating." The consumer market witnessed this problem when Sony had to recall over a million laptops with batteries susceptible to over-heating.

Battery recall is often an area suppliers are forced to confront. Nokia recently issued a warning about an over-heating risk on 46 million copies of the BL-5C battery manufactured between December 2005 and November 2006 that are used in a range of their products, including wireless GPS modules and a range of phones, and so were forced to offer a recall system. Obviously, for public safety this is not something the emergency services forces can afford to have happen, and it would be a disaster if it did. Luca concurs, "For the emergency services poor battery performance isn't an option and purchasers tend to only specify cells and battery pack assemblies from companies with a proven track record."

Luca explains that ACT have demonstrated that Li-ion batteries show enhanced performance, and battery life of up to three years has been observed. With more emergency services forces adopting further digital devices such as PDAs, energy dense and compact battery packs are needed to meet the power demands they make. Because of this, Li-ion battery use will most likely con tinue to increase within the emergency services.

Sepura specialises in the design, manufacture and supply of secure TETRA digital private mobile radios for emergency services across the world. Its radios use Li-ion batteries to meet the power demands required by the emergency services. The Enhanced Standard Capacity battery has 1230mAh capacity, providing up to 15 hours of operational use, while the Enhanced High Capacity battery is 1900mAh, offering 22 hours of service. Both contain embedded circuitry to manage charging cycles and to protect the battery from over heating.

Sepura also offers a wide choice of battery chargers including 12-way and 24-way chargers, a personal rapid charger and a rapid charger for in-car use. The chargers provide top-up power and back-up batteries that ensure ample power is always on standby during times of heavy and extended operational activity.

Multiplier UK is a supplier of after-market batteries to the emergency services in the UK for modern TETRA Airwave radios as well as for older analogue radios. General manager for Multiplier UK, Paul Baker, explains how the company operates. "We provide high quality aftermarket batteries that generate significant operational cost savings but also provide after-market services for emergency services to ensure they optimise the performance of their batteries. They use our service because we offer comparable quality to original manufacturer's batteries at a lower price, a strong warranty program that assures satisfaction, and because we are specialists in the battery industry."

The performance and capacity of batteries is very important for first responder officers as they must be able to rely on them to last an entire shift while they are out on the beat; "If you're involved in a fire arms situation and suddenly your battery goes dead it's not what you want to happen so now the issue is about capacity," Paul notes. "Our new Nokia batteries have a capacity of 2,200 mAh, which represents a 16 percent increase on older technology. The importance of having a battery that lasts an entire shift is vital for all officers and so by increasing capacity we can help meet the demands of the modern emergency services worker."

The other major issue for batteries is wastage. Hampshire Police Constabulary has just used Multiplier UK to install a battery management and maintenance system called Cadex. The benefit of this is that it can, within three minutes, analyse the batteries and decide if they can be saved or if they are too old. "Recovering batteries thought un-usable is an important cost-saving device and is a major way to reducing operating costs," explains Paul.

There is one final area in which Li-ion batteries are bringing benefits to the emergency services which in turn benefits public safety: cost. Because Li-ion batteries are so much easier to produce and economies of scale are able to help producers and suppliers lower their costs that they can pass on to the emergency services. Where before, a police force may have had to purchase 60,000 batteries and 30,000 chargers, it would have been a huge expense. The old Ni-Cad batteries would cost around £40 for a battery and £100 for a charger but now with Li-ion it can be just £20 for a battery and £20 for a charger. The cost saving means the police can provide their officers with personal chargers and batteries. It is important though to make sure that the batteries that are handed out are used, as Graeme from Motorola points out, because they are no good sat in a locker going unused. 'Li-ion batteries are like pearls – you need to use them. Because they are easy to produce it is much better to use them and re-order than to over-order and have them sitting at the backs of lockers. Before long they can become unusable.'

As technology continues to improve and the emergency services are able to benefit from these advances, the future for batteries and chargers will continue to improve too. This is an area that is ever evolving and where technology changes rapidly. What the future will hold no one can be entirely sure of and, as Luca of ACT says, "maybe one day communication and mobile devices will be topped up by the kinetic energy generated by police officers as they walk the beat." An idea that perhaps isn't as far fetched as it sounds.

"It's all about getting more power but with a smaller power source. The Li-ion batteries mean the terminals can be smaller and weigh less which is very important for the emergency services."

Graeme Loughrey, Motorola.

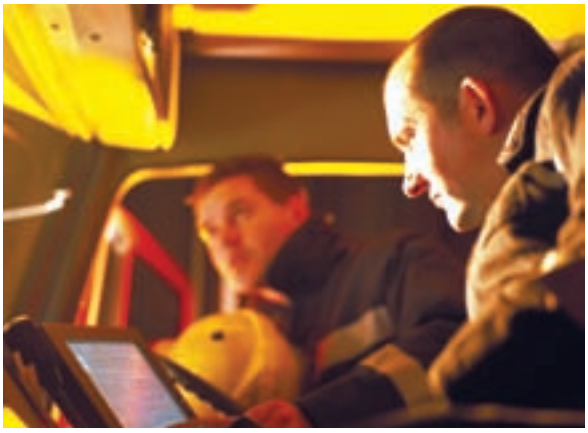
In-vehicle workhorses

In the last few months there has been much focus on MDTs, in particular PDAs, to the extent that one would be forgiven for thinking that PDAs are the sexy side of MDTs. And yes, while PDAs have a highly important part to play in terms of improved efficiency and better serving the public – and in such a visible way too – the workhorse that is the in-vehicle terminal, with its much greater capacity for, well, everything, should not be forgotten. Here we look at the some of the developments in in-vehicle hardware, and catch a glimpse of some future developments.

Hub Mobile Computer systems

Just a glorified lap-top? Well, not quite, says Bob Schimmelman of Hub Systems Ltd and he should know after reviewing the test results of his company's latest model in the Nevada desert.

Hub Systems' latest in-vehicle MDT, the M6, has the brightest ruggedized touch screen on the market at an outstanding 1,200 nits (candelas per square meter, a measure of brightness), more than twice as bright as standard MDTs. "The way we see it, the moment you cannot see the information on the display, it is useless. We wanted to achieve 100 per cent readability in any environment, so we took a prototype with 900 candelas to the desert. It was fine, but then we tested it again while wearing sunglasses and that's when we knew it had to be in excess of 1,000."



Top and right: The Microbus M-PC2 can run a host of applications, including automatic number plate recognition. Its touchscreen design uses daylight-viewable TFT colour screens with resistive touch overlay.

Brightness is one thing, but being able to process the large amounts of data required by the modern police force is another. "In-vehicle MDTs are a growing business and the requirements are being driven by components that have low power consumption but high processing power for software applications such as mapping. That's why we have provided the Intel Pentium Core Duo processor as an option with our new M6 System."

Hub Systems' latest MDT, the M6, has the capability to support a digital video recorder, utilising up to four in-vehicle cameras, which could include a rear-view camera covering a suspect in the back of the car.

Interestingly, Bob has a software partner to make the most of the M6 with a new application in video streaming. "One potential application is the ability to control a fixed roadside CCTV camera from the car. The idea with this software is that, say a car is called to a scene in the centre of town, one officer drives while the other checks the scene on the MDT. The officer could select a camera from a drop-down list, zoom into the area concerned, and identify the suspects before arriving. They could even look at the last 15 minutes of footage. A common complaint from police officers is that when

M-PC2 In-vehicle PC

The M-PC2 In-vehicle PC from Microbus offers the vehicle-based user the full functionality of a desktop PC but from a system designed specifically for the harsh vehicle environment.
While offering a wealth of features and connectivity, the lightweight, compact system offers ease of installation into vehicles and occupies minimum space.

- Low power computer system reduces load on vehicle battery
- Windows® XP based for multi-application support
- AES5 Issue 10 certified for compatibility with Airwave radios
- Daylight-viewable colour touchscreens make data entry easy
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Driving vehicle PC technology forward

"A common complaint from police officers is that when there are many people in a scene, the suspect can simply walk away in the confusion."

Bob Schimmelman, Hub Systems Ltd.

there are many people in a scene, the suspect can simply walk away in the confusion."

Live digital video streaming could have other applications too. "I'm active in the UAE, where they recently had a crash of a regional national airline. They said that if they could have streamed video from the car to the control room it would have been very useful during the first response to ascertain quickly whether the best response should be rescue or recovery. In that initial time period of a disaster there is an information vacuum and this would help fill in the gap."

Another significant feature of the M6 is on the maintenance side. "Our new system takes two thumb screws to replace the CPU, and one thumb screw to replace the hard drive. That is relevant because hard drives are the biggest reason for maintenance, and if they are fixed inside the processor they have to be sent back by the fleet manager. With ours, you can have a drawer full of hard drives for quick replacement." Bob adds that Hub Systems also offers a hard drive imaging kit, which means that a fleet operative does not need to reinstall every program and setting from scratch, but simply copy the standard set in one move.

Panasonic – tough yet flexible

The Toughbook brand has been in the market worldwide for a good 12 years now, and there are no less than eight different versions of which the CF-19 is the latest A&ES5-accredited version for the emergency services.

Launched within the last year, the touch-screen CF-19 presents an alternative option to the traditional in-vehicle fixed MDT which has a screen at the front of the vehicle connected to the hardware at the back. The CF-19 is a convertible tablet PC that is marketed towards emergency services that are looking for a more flexible approach, as Russell Younghusband of Panasonic explains.

"There are two versions of the CF-19: touch screen with XP Professional; and digitizer with XP Tablet. The touch-screen version can be taken out of the vehicle if necessary to a location or crime scene. It can be used as a fixed in-vehicle terminal but it also lends itself to being taken out easily. We are finding that there is a growing interest for this type of hardware – but we don't see it as being used by every police officer." Applications include the capability to download images straight to the PC for sending to laboratory for analysis direct from a crime scene. The Toughbook could also be used to carry out PNC or ANPR checks and is powerful enough to efficiently work with some processor intensive GIS applications.

"The touch-screen version can be taken out of the vehicle if necessary to a location or crime scene. It can be used as a fixed in-vehicle terminal but it also lends itself to being taken out easily."

Russell Younghusband, Panasonic.

Within the fire service, explains Russell, CF19s and CF18s (the CF19 predecessor) are fitted in the front of appliances and used as command and control devices, checking chemical info for hazmat, and identifying hydrants in the area. Fire and Rescue services using it include Surrey, Hertfordshire, Bedfordshire and Luton. Fire safety officers also use the Toughbook as a training tool for showing video demonstrations to members of the public – and multiple location visits are possible with its seven-hour battery life.

In the police, trials are underway with three forces and Russell adds that the CF19 is the ruggedised PC of choice for the Met. In the ambulance service, East of England, Lancashire and East Midlands have Toughbooks in use. "In the US and Canada we have a considerable install base in the market, but they have different requirements to the UK. In North America law enforcement vehicles are much bigger and are able to have the Toughbook fitted in the front of the vehicle, while in Europe we work with a couple of long-term established partners to mount the Toughbook in the back of the vehicle and provide a reliable and robust screen at the front which can handle day and night ambient lighting conditions."

The CF19mk2 released in November will be available with an optional HSDPA (3G) module, which offers a bandwidth of up to 3.6Mbps and further more will be able to be upgraded to 7.2Mbps in the future without the need for a hardware change, providing something akin to a broadband experience. This will also help with future proofing the customer as the demands for remote mobile data transfer increase. "We have also introduced a new high brightness screen, crucial for outdoor working with the Digitiser model now capable of up to 540 nit – and 500 nit on the touch screen version."

But above all, the CF19 is built to be tough, with a full magnesium case, shock mounted hard disk drive, a 1.2 metre drop and an IP54 rating, giving it a high protection against water and dust ingress. "The Toughbook is fit for purpose and will offer a reliable solution that will last longer in the field, why change devices after three years? Some CF18s have lasted for seven."

Microbus – the next generation

Microbus' M-PC2 is the company's third generation of in-vehicle computer. Thousands of Microbus computers are installed in UK emergency service vehicles as well as in taxis and public utility vehicles. In the case of the emergency services, the M-PC2's wireless connectivity is providing crucial real-time information in the hands of first responders.

"Whilst the M-PC2 offers full desktop PC functionality, it is essential that the computer works symbiotically with the vehicle," says David Bates of Microbus, "and it has a wealth of features crucial to reliable operation in the vehicle, managing its temperature, shock, vibration and voltages. For example, the system continuously monitors the vehicle's battery status, and if the voltage is low it sends out a warning to avoid draining further power – and can even perform an organised shutdown if necessary."

As a full Windows XP based system the M-PC2 can run a host of applications that include ANPR, remote database access, traffic law enforcement systems, mapping and satellite navigation, AVLS and CAD systems. It also supports an extensive array of features such as an integrated power supply, multiple camera inputs, Wireless LAN, Digital I/O, plus 4 external serial ports and USB ports for interface expansion.

The touchscreen uses daylight-viewable TFT colour screens with resistive touch overlay and rugged metal casings. User-definable day and night brightness settings can be controlled through the system's utilities software.

A new feature that Microbus has developed is in

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"By using a dedicated video encoder inside the M-PC2 there is little or no effect on the main CPU performance and therefore existing applications can run unaltered."

David Bates, Microbus.

response to the demand for digital video recording. As a result, its integrated digital video recorder has the ability to record an entire shift's worth of digital material for traffic forces. David adds, "By using a dedicated video encoder inside the M-PC2 there is little or no effect on the main CPU performance and therefore existing applications can run unaltered. We offer a solution that can record to a local 80 gigabyte disk, flash drive, or via a DVD burner." Despite the functionality of the M-PC2, Microbus has maintained a low power design that performs with a reduced load on the vehicle battery. It's fundamental to the design of a vehicle-specific system, according to David.

Other features of the M-PC2 include power management to peripherals such as the radio to maintain battery integrity. "One specific advantage of the M-PC2 is the disk heater which maintains the hard disk temperature and therefore removes the possibility of damage caused by cold starts and the risk of data loss. Shock and vibration mounts also protect the system, all of which have undergone exacting testing on Microbus's own in-house test equipment."

A critical part of Microbus' product development is ensuring adherence to legislative standards to limit the chance of conducted/and or radiated emissions affecting vehicle safety systems. For Europe this is the "e" mark. AES5 is a UK specific test designed to discover if equipment will adversely affect, or be affected by, radios operating within the frequencies used by police forces and fire brigades, "For the next generation it has been critical to develop hardware with TETRA compatibility and we have recently developed a variant of the M-PC2 that is certified AES5 Issue 10. This means that the National Policing Improvement Agency has tested it to ensure there is no interference with TETRA radios."

Arqiva – no compliance issues

OK, Arqiva doesn't manufacture MDTs but its position as a mobile data solutions provider gives the company a broad perspective of the MDT market – after all, it has to work with whatever model has been chosen by the service/force.

As far as Peter Harris of Arqiva is concerned, MDT hardware has now got to a level where there are no compatibility problems even with off-the-shelf MDT solutions. "We get involved sometimes at the beginning of a purchasing process, sometimes at the end. Primarily, our solution will work with any MDT as long as it is a Windows XP device."

Arqiva however does get involved with the certification of MDTs as regards vehicle installation and safety. "We have a specialist unit that designs the installation to ensure all the relevant minimum safety requirements for crash testing are met, and that there is electromagnetic compatibility so there is no interference with other vehicle systems such as braking."

Does Peter believe any improvements are necessary in existing standard MDTs? "Not especially, because the technology has evolved so far. As ruggerised versions of desktop computers, they are designed to work at low temperatures and they come equipped with a range of input and output connections. There are more practical issues with PDAs."

One area which may need development in the future is related to digital video streaming. "Once you start recording onto the hard drives of MDTs you run into other issues – there is so much information it is difficult to know how to store and catalogue the thousands of hours of footage that will need to be archived." Peter also sees some issues with integrating everything into one unit – including TETRA radio control and blue lights controls, for example. "Some forces do it but if that unit breaks down then you have lost control of everything."

One thing is certain, however, and that is that MDTs are here to stay. It is about getting the right balance between the different user groups within a force. "Many officers will find a PDA more useful but MDTs are much more powerful, with more functions so are ideal for vehicle based officers where application such as mobile data and ANPR can be run on the same device."

Arqiva has a specialist unit that designs the installation of MDTs to ensure relevant minimum safety requirements for crash testing are met, and that there is electromagnetic compatibility.

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THE BRITISH ASSOCIATION OF PUBLIC SAFETY COMMUNICATION OFFICERS

Ready for the future? All eyes on Scotland

Advance notice is given of the forthcoming Scotland Region event whhich will be held on Wednesday 27th February 2008 at Strathclyde Fire and Rescue Service Headquarters, Bothwell Road, Hamilton.

The Scotland Region AGM will be held on the same date.

This is the same venue as was used in February 2007 for a successful event, and we hope that the planned 2008 Regional Event will be even more successful.

The Scotland Committee is putting together what we believe will be an interesting and varied programme under the title: *Ready for the future*.

We have already had commitments from speakers on subjects such as:

- The Glasgow Airport terrorist attack.
- Operation Crystal
- Glasgow Subway preparedness
- Scottish Resilient
- Telecommunications Strategy
- Firelink

The Regional Events are always a good opportunity to network, and we ensure that there is a small but interesting selection of relevant exhibitors.

Please contact the Chair, Scotland Region, with anything relating to membership or event queries and we will be pleased to help.

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British Association of Public Safety Communications Officers

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Please tick one item that best describes *your* organisation

PUBLIC SECTOR AREA SERVED		ORGANISATION TYPE		COMMERCIAL	
Parish	❑	Law Enforcement	❑	Manufacturer	❑
District	❑	Fire / Rescue	❑	Distributor	❑
County	❑	Ambulance / Medical	❑	Dealer	❑
Regional	❑	Emergency Management	❑	Maintenance	❑
National	❑	Local Authority	❑	Consultant	❑
Private	❑	Central Government	❑	Network Provider	❑
Other	❑	Public Utility	❑	Training	❑
		Other	❑	Personnel	❑
				Other	❑

BAPCO MEMBERSHIP APPLICATION

BAPCO
British Association of Public Safety Communications Officers

4. POSITION RESPONSIBILITIES

Please tick the item that best describes *your* responsibilities in each area:

POLICY & PROCEDURE

- ❑ I approve/develop policies and procedures
- ❑ I oversee implementation
- ❑ I have a limited role in implementation
- ❑ I do not have a role in implementation

PURCHASING

- ❑ I approve purchases of products and services
- ❑ I select specify products and services
- ❑ I recommend products and services
- ❑ I do not have a role in purchasing

PERSONAL TRAINING

- ❑ I approve training programs
- ❑ I develop/purchase training programs
- ❑ I implement/teach training programs
- ❑ I do not have a role in training

5. MEMBERSHIP CATEGORY & FEES (Select One)

❑ **ACTIVE MEMBER**

Persons employed or contracted by a public safety agency or a department of central or local government responsible for the provision of public safety services, or are retired from such a position, who are directly responsible for, or retired from, the management, specification, design, installation, maintenance, operation and use of public safety communications and information systems, are eligible for this category of Membership

£40.00 per annum

❑ **COMMERCIAL MEMBER**

Those persons, in business or industry, who receive compensation in any form for services rendered or products sold, are eligible for this category of membership.

£40.00 per annum

❑ **ASSOCIATE MEMBER**

Those persons, who otherwise meet the requirements of Active Membership, may, at the applicant's discretion, select this category of membership, and, those persons not meeting the requirements of any other category of membership that share the Purpose and aims of the Association, are eligible for this category.

£28.00 per annum

❑ **INTERNATIONAL ASSOCIATE MEMBER**

Persons who are not citizens of the United Kingdom that share the purpose and aims of the Association are eligible for this category of membership.

£50.00 per annum

Details of Corporate Membership can be obtained from: ExecD@bapco.org.uk

6. PAYMENT INFORMATION

Total amount due £ _____

- ❑ Individual or
- ❑ Organisation is paying for Membership.
- ❑ Personal cheque enclosed.
- ❑ Official purchase order No. _____ enclosed.

7. OPTIONAL INFORMATION

How did you hear about BAPCO?

❑ Co-worker ❑ BAPCO Journal ❑ Sponsor

❑ Other _____

Gender: ❑ Male ❑ Female

Date of Birth: Day_____ Month_____ Year____

8. APPLICANT'S STATEMENT

I hereby apply for membership in the appropriate class of **BAPCO,** and agree to abide by the Constitution and Bylaws of the Association. I understand that by joining I also become a member of the BAPCO region serving my area and that my subscriptions are payable annually, based on my first day of membership.

SIGNATURE _____ **DATE** _____

TEL: 01522 575542

WHEN COMPLETED PLEASE FORWARD THE WHOLE FORM (WITH APPROPRIATE ENCLOSURE) TO:
BAPCO, PO BOX 374, LINCOLN LN1 1FY

FAX: 01522 575542
(Remember to fax both sides of the form)

FOR OFFICE USE ONLY

RECIEVED
REGION
MEMBERSHIP No.

CERTIFICATE SENT
RENEWAL DATE

ACCESSORIES

ANTENNA

ANTENNA

CALL RECORDING

COMMUNICATIONS SOLUTIONS

COMMUNICATIONS SYSTEMS

COMMUNICATIONS SYSTEMS

COMMUNICATION SOLUTIONS (RADIO & PAGING)

CONSULTANTS

CONSULTANTS

FIREFIGHTER ALERTERS

GPS COMPONENTS & ACCESSORIES

HEADSETS

MOBILE DATA

MOBILE INSTALLATIONS

RADIO

arqiva

On the frontline you need information you can rely on

Information is vital
You don't care how, you just need it
Arqiva gets the information to you

Mobile Radio Networks
Telecommunications Networks
Managed Services
Mobile Data Solutions

To find out more about Arqiva's Public Safety group call 0845 650 4020, email public.safety@arqiva.com, or visit www.arqiva.com/publicsafety

Airwave. The UK market leader in public safety communications solutions.

Every emergency and public safety service in Britain relies on Airwave. They trust us with good reason – our voice and data communications offer unrivalled countrywide coverage, delivered across a secure network designed to withstand even the most severe attack.

To understand why we're the only choice when reliable communication really does matter, call our experts on 08000 113399 or visit www.airwavesolutions.co.uk

AIRWAVE