Exemplary integration of address data across front and back office systems.

Cybersecurity: why government agencies continue to struggle.

Promoting integrated ICT for civil contingency responders

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THE QUEEN'S AWARDS FOR ENTERPRISE: INNOVATION 2008

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President's address

Hayden Newton, President

Whilst writing this article I have been reflecting on 2010 and the many changes and challenges that we have faced. It is hard to believe how quickly the year has passed, and as we are heading into the winter period I know that all emergency services and statutory authorities have tried and tested plans in place to deal with winter and all that it brings. You can no doubt recall that last year was very severe and that these organisations coped extremely well with some appalling weather conditions across the country. It is clear that some lessons have been learned and these will be incorporated into the planning arrangements for this year to improve resilience, business continuity and to protect the lives and property of the public.

I am sure you have also seen the terrorist threat to our home land is still very real as witnessed by the recent explosive devices found in aircraft in East Midlands airport and the USA. We must congratulate our security services for detecting these devices and stopping undoubtedly another significant terrorist incident. This country is at a critical level of alert and we must remain vigilant at all times. I am confident that the Executive team of BAPCO can and will support the statutory organisations in the quest to protect the world from further terrorist attacks.

Finally, I would like to take this opportunity to wish you and your families a happy, safe and peaceful Christmas and on behalf of the Executive of BAPCO please accept our sincere thanks for your support.

The CAG column: the future for control rooms?

Dave King, CAG Chair

A decision by Cleveland police to put its control room and the functions of other backroom staff out to private tender could be the way forward for the future of control room staff and with the push to save more and more of the public's money, will this become a more common occurance?

Cleveland's chief constable, Sean Price, says that outsourcing to a private firm could save at least £20 million in the first 10 years and that Cleveland was one of the first in the country to consider using a private sector partner for a wide range of support services. He said the public would benefit from savings and the "modern methods" used by private companies. Customer satisfaction would be improved.

He said any new staff would be expected to meet national call handling standards by answering 90% of all switchboard calls within 30 seconds and all 999 calls within 10 seconds. He promised that if things went wrong the buck would stop with him.

In the past, control rooms have often been considered untouchable when it comes to outsourcing or adopting new approaches, but when we consider the fire services' decision to implement FiReControl, which effectively outsources the control room functions to a separate party, we have to now consider a new world where 999 calls are being dealt with by private companies.

Is this a good or bad thing? I suppose only time can tell.

Ben Priestley, the national officer for Unison, which represents the 730 police staff who would be affected by the switch, said the public would find the idea of having their 999 calls handled by a private company "extremely disturbing".

From a commercial perspective I suppose it provides a new opportunity for some companies, but potentially a change of customer for others. This will bring a new approach and some might say accountability for the service will be delivery to agreed service levels. Or will profit be put before public service? Have Cleveland and the CLG adopted this approach because they primarily needed better operational effectiveness or to save money?

I would be interested in your views.

Editor's comment

Jose Sanchez de Muniain

Regionalisation and outsourcing seem to be the buzz words of the day but it is worth noting that whilst these philosophies promise much, they can turn into expensive mistakes. FiReControl could potentially be one such project and although no official word was out when this issue was going to press, indications would suggest that it will be shelved in its present form.

Many people describe the project as a classic example of putting technology before business processes, others use stronger words.

Whatever the future holds, one thing is for sure. The command and control technology sector is about to get very interesting.

New flood warning system for Scots

Scots in flood-prone areas are set to benefit from a high-tech alert system which will warn them by text or phone call when flooding is predicted.

From April 2011, people who have registered for the service will be able to choose how they want to be alerted and flood warnings will then be cascaded from a single system.

Following funding from the Scottish Government, the Scottish Environment Protection Agency (SEPA) awarded a five-year, multi-million pound contract to BT Business and software company HTK to help them deliver Floodline Warnings Direct.

The new service will enable Scotland's emergency flooding management partners and the public to benefit from a system which will deliver better flood warnings and provide valuable extra time to take action.

Flood warnings are currently issued to the police and published on Floodline, an online and recorded message service, in a mainly manual process using phone and fax. However, the new service will mean that SEPA will be able to call on the latest geographic mapping technology to define specific flood areas, and actively send alerts to everyone who has registered in the highlighted area.

BT and HTK's innovative system will involve the creation of a fully-managed, hosted multi-media platform for recording and automatically disseminating flood warnings throughout Scotland to partner organisations like the police, fire and rescue, local authorities and the public.

People will also be able to find flood information on the internet and via the phone through interactive voice response systems based on speech-recognition technology.

BT Business is providing the helpdesk and contractual framework for the solution, while HTK will provide the technology platform, called HTK Horizon. Running Horizon through a standard web browser, SEPA will be able to manage flood warnings and tailor their response to the level of threat and the specific target area.

BT and HTK are working closely with SEPA to develop and test the system in time for a full public launch in spring 2011.

Professor James Curran, SEPA'S director of science and strategy, said: "This is a significant investment in communications technology which has one purpose, to help people. Together we

are building the Floodline Warnings Direct service, which will be at the heart of providing the people of Scotland, at home or in their businesses, with a better flood warning service to help them to take action and reduce the impact of flooding on their lives."

EJ Cay, head of custom solutions at BT Business, said: "Flooding is a major threat to many communities in the UK and across the world. This initiative is a leading example of technology being used to ease the problems caused by extreme weather."

Read BAPCO President Elect's *Wheels of Fire*

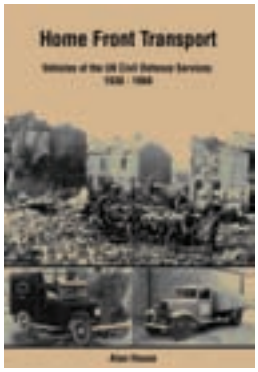
The use of vehicles and equipment by the fire service during and after the Second World War is explored in a new book by Alan House, BAPCO President Elect and retired Deputy Chief Fire Officer of Hampshire Fire and Rescue Service.

It has taken Alan, a keen historian, five years to research and complete *Wheels of Fire*, which is his 19th book.

Wheels of Fire explores fire engines of the Auxiliary Fire Service and the National Fire Service between 1938 and 1948. It highlights the problems of supply, the variety of vehicles and the equipment that was used by the fire service as it dealt with the ravages of fire due to the many air raids on the UK during the war.

Alan said: "The provision of vehicles and equipment for use by the fire service during and immediately following World War Two presented a number of challenges and this book highlights these problems and how the National Fire Service got around them."

Wheels of Fire is available at £22 (+ £5.70 p&p). Proceeds from the book's sale go to the HFRS Heritage Collection which includes the HFRS "Final Salute" Firefighter Memorial located outside HFRS headquarters.



Home Front Transport: Vehicles of the UK Civil Defence Services 1938-1968, also by Alan House, is a detailed account of the many vehicles used by the Civil Defence Services during World War Two, and those organisations – including the Auxiliary Fire Service, the Civil Defence Corps, the Police and the Food Flying Squads – formed in anticipation of attack during the Cold War period. Proceeds also to the HFRS Firefighter Memorial Garden. To order a copy, send an email to: carole.hobbs@hantsfire.gov.uk.

DIGITAL BERLIN

Cassidian (previously EADS Defence and Security) has won a contract to link up digital radio control stations for public safety authorities and organizations in the State of Berlin. Cassidian will link Berlin State's 28 control centres to the digital radio network via two concentrators. This will make the control stations' access to the digital radio network as cost-effective and manufacturer-independent as possible, reported Cassidian.

Reducing Bureaucracy in Policing – final Berry report published

In this the fourth and final report Jan Berry has emphasized that with the coalition government's clear mandate to reduce bureaucracy, the police service cannot afford to miss the opportunity this presents. "With unnecessary bureaucracy being added at every tier of policing; from the local to the national, it is almost impossible to calculate the cumulative effect, but I would estimate one third of effort is either over-engineered, duplicated or adds no additional value. This is unaffordable in the current climate and consideration will need to be given to how savings in time and energy can be realized in hard cash terms."

Two obstacles are identified to making progress. Firstly, bringing clarity to the question at a national level of who is responsible for what. "Who is responsible for policing? Who is in charge of the Criminal Justice system?"

Secondly, what does success in policing look like? "Proposals for the introduction of locally elected Police & Crime Commissioners and the

introduction of a new National Crime Agency may go some way to answering these questions, but what happens in the interim over the next 18 months to fill the vacuum? ACPO, supported by other key stakeholders (Government, Inspectorates, Police Authorities, IPCC) must take responsibility for delivering the necessary change and provide the climate and culture where these barriers can be systematically removed."

Technology-themed solutions identified by the report include:

- Reconfigure force structures to realise and maximise opportunity costs gained by removing, rationalising and streamlining systems and processes.
- Eliminate duplication of effort and waste.
- Develop POLKA (Police Online Knowledge Area) into the search engine of choice.
- Removing unnecessary bureaucracy should be mainstreamed.
- Manage and fully embed streamlined process across all criminal justice partners
- Apply a more risk based and proportionate approach to missing person enquiries.
- Re-focus crime and incident recording.
- Exploit technology through incremental adoption and convergence of national infrastructure; business led common processes; paperless case file; mobile data; and digital recording of interviews.

THE CLOUD LAB

Green Data Systems has announced the opening of a cloud computing laboratory to help businesses, government, research institutions and institutes of higher learning to design, adopt and reap the benefits of cloud technologies; for newer, faster, more efficient ways to compete and grow.

The new lab housed in Deventer, Netherlands is part of Green Data Systems's expansion of its cloud computing capabilities and services around Europe.

The Green Data Systems Cloud lab will work closely with partners to design and deploy their own cloud environments.

GGP Systems launches Gold, Silver and Bronze

GGP Systems has launched a new range of software options to help UK fire and rescue services streamline operations and improve efficiencies.

GGP Response combines award-winning gazetteer management software with a geographic information system (GIS) to provide easy access to centralised address data, integrate front and back office systems and benefit from a set of powerful geographic analysis tools. GGP Response is now available in three options; Gold, Silver and

Bronze, structured and priced to help organisations make the most of restricted budgets while still benefiting from the latest software innovations.

GGP Response is a powerful address-based intelligence solution that provides centralised access to address data and allows organisations to access and maintain national datasets such as the National Land and Property Gazetteer (NLPG) and National Street Gazetteer (NSG). The gazetteer management software also provides the tools to integrate the data with web-based applications and other corporate or departmental systems as well as communicating with the national hub.

CESG certification for BlackBerry and Nokia

Cellcrypt, a provider of encrypted cell phone voice calling, has announced that the latest version of Cellcrypt Mobile 5.5, for both BlackBerry Bold 9000 and Nokia E71 smartphones, has been awarded the CESG Claims Tested Mark (CCTM) certification.

Head of the CCTM Secretariat (ISC) Peter Hayes was delighted to make the award to Cellcrypt. "Our new category of mobile and remote working products at CCTM continues to expand with the addition of Cellcrypt Mobile Version 5.5." said Hayes. "An easy to use, encrypted voice calling product brings welcome assurance for buyers across the wider public sector".

A CCTM certificate for Information Assurance (IA) means that UK public sector organisations, including Central Government, local authorities, NHS, education, criminal justice, police and MoD, can recognise a product that has had independent testing, under CESG authority. In addition: "Many private sector suppliers", notes Hayes, "are adopting CCTM certificated products in their solutions for their own government customers".

Team SPARTA is on track to deliver

An industry team led by Lockheed Martin UK is close to completing ground-breaking research that will enable military, blue light services and other public sector bodies to co-operate more effectively in times of emergency.

Team SPARTA was awarded a 29-month contract in 2008 by the UK Ministry of Defence (MoD) to look at ways of delivering a coherent geospatial enabling capability and thus improve interoperability between defence, security and emergency services by enabling them to create and share geospatially referenced information across a range of platforms and networks, removing the need for data silos. The aim is to provide technical evidence and de-risk activity to support possible future possible future developments in this area.

Through a coherent set of standardised and common geospatial services and COTS based functionality, the Common Geospatial Tool Set (CGTS) provides users with the ability to find, create, exploit, view and share geospatially referenced information consistently and securely on platforms and applications across all defence communications infrastructures and stand-alone.

The operational benefits delivered through the implementation of an open-standards based approach include: increased operational effectiveness through information sharing; enhanced shared situational awareness through the delivery of tailored but consistent views; integration of multiple data sources, applications (and vendors) across low/high bandwidth networks; and improved analysis of location based information through the use of wizards and services.

Sharing live footage from Elland Road

Leedswatch, the CCTV operation run by Leeds City Council (Community Safety), has been successfully deployed to support West Yorkshire Police operations at key football matches.

Vemotion video compression and transmission equipment has been installed in the latest Leesdwatch mobile CCTV vans, which are now able to augment the existing fixed camera network in providing live images to Police control rooms (ACRs) as well as to the control room within the Elland Road stadium.

"We have forged an excellent working relationship with Vemotion staff who have adapted their technology to meet our specific need", said Marcus Beacham, Head of Community Safety and Partnerships. "This has enabled us to enhance the support we already provide to West Yorkshire Police in their operations", he added.

Both before and after a football match, mobile CCTV vans can be

positioned and manoeuvered to provide live coverage of areas not adequately covered by the existing fixed camera network as fans travel to and from the ground.

RECRUIT WATCH

IBM and Dorset Police have signed a contract to implement IBM analytics software to aid assessment and ongoing development of new police force recruits. Enabling faster and deeper levels of training and assessment data analysis, Dorset Police are now employing processes intended to gain greater insight into the effectiveness of police training methods to quickly identify performance trends and patterns. The Force are currently looking at the effectiveness of their Initial Police Training Programme which is designed to develop knowledge, skills, understanding, attitude and behaviour required by an Officer in today's society.

Upward trend for cloud-hosted apps and services

A survey of IT professionals in the public sector has highlighted the drive towards cloud and virtualisation technologies.

Cloud-hosted applications and services are now being widely considered across public sector organisations, with 57% of respondents evaluating these approaches. The economic climate is one of the drivers behind these results, with 66% of respondents stating the biggest influence on their IT decision making over the next year will be the need to increase efficiency and reduce costs.

Only 22% have actually deployed cloud technologies. Virtualisation solutions have proved to be popular with public sector organisations with 67% of respondents deploying server virtualisation to reduce their IT costs and consolidate physical hardware. Other virtualisation technologies are also being looked at: a further 28% of respondents are deploying application or desktop virtualisation, and a combined 49% are evaluating these technologies.

The survey of public sector IT decision makers was conducted by Kable on behalf of Insight EMEA.

Exemplary data integration

Cambridgeshire Fire and Rescue Service has recently been presented with a prestigious national award for the work it has done integrating address data across its back office systems and frontline service delivery – the only emergency service organisation to be selected as a recipient of a 2010 NLPG Exemplar Award. Business Information Manager Nicola Smith explains what it's all about and what it means to the service.

Cambridgeshire Fire and Rescue Service was presented with the 2010 NLPG Exemplar Award for best integration at a one day conference, "Everything happens somewhere", on the 20th October 2010 at the Cutlers' Hall, Sheffield. Presented by Councillor Shaffaq Mohammed, Cabinet Member for Communities at Sheffield City Council, the event was jointly hosted by Intelligent Addressing and the Local Government Information House.

Firstly I guess I should explain – for those who don't know – what the NLPG is and why we have worked so hard to integrate it across our organisation. The NLPG, or National Land and Property Gazetteer to give it its full title, is a comprehensive database covering the whole of England and Wales. It uniquely identifies every single residential property, commercial premise and piece of land, and a geographically referenced Unique Property Reference Number (UPRN) is allocated for the whole of its life. This simple 11 (or 12) digit number can be applied to all property related data in order to join up information and therefore services. The NLPG is created and maintained by Local Authority staff called Custodians and is freely available to all signatories of the Mapping Services Agreement (MSA) – so that includes Fire and Rescue Services and Police Authorities as well as National Park Authorities, conservation boards and Passenger Transport Authorities.

The power and benefits of the NLPG are however not just limited to its comprehensive coverage or its availability through an existing data supply arrangement. At Cambridgeshire Fire and Rescue Service we believe the power of the NLPG is the access it can provide to additional data and therefore information. By using the UPRN as a "golden thread" and applying it, where possible, to all operational data, we have joined up previously disparate data and unlocked a wealth of intelligence.

For example the UPRN has already been applied to data created, held, maintained and used in the following service delivery areas: performance (including performance information and performance management), home fire safety, commercial building site assessment, water, CAD and demographic profiles. Unfortunately – due to technical complexities – we are unable to directly integrate the NLPG with the software used in our control room. However, using address matching tools from our GIS supplier – GGP Systems – and the incident recording system developed by the Department for Communities and Local Government (DCLG) we have created a workaround to match incidents, as they are reported, to the gazetteer data. Back office data that we have not matched to the NLPG (nor do we have any immediate intention of matching) includes that used by human resources and finance – due to the large number of records that fall outside of our geographical remit.

However this is not integration for integration's sake! We are not just box ticking. By integrating the NLPG with existing operational data and intelligence we now have a joined up information resource that supports decision making at all levels across the organisation. Information from external sources, such as demographic profiles, can be (and is being) appended to provide additional intelligence for risk analysis, resource management and specific safety campaigns. We have also realised both cashable and non cashable savings including a year-on-year saving in annual licence fees, more than 100 staff days per annum in data management, an 80% reduction in address queries across internal systems and a streamlining of processes.

The integration of the NLPG has not always followed a smooth path, as we have gone through a steep learning curve with software selection, testing, implementation and training. However this process has given us experience and expertise that we can, and are, sharing with other organisations. From simple anecdotal conversations with my counterpart at Cambridgeshire Police to more formal seminars and site visits by neighbouring services we hope to share experiences – good and bad – and help other organisations as they move forward with the NLPG. We have recently taken this approach to the next level and have just instigated a project to provide a neighbouring service with a hosted gazetteer management service. We have also developed strong working relationships with our local NLPG Custodians, helping them to understand how we use the data, how we can add value to it, and how it can be developed in partnership.

We believe the work we've done to date, and our ongoing commitment to NLPG, will put us in the best position to move forward with whatever the future may bring in terms of budget restrictions and service restructuring.

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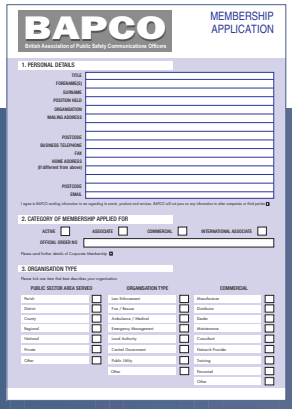

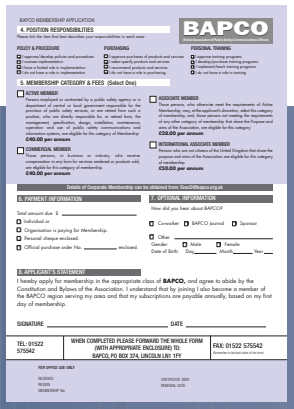

Launched in June 1993, **BAPCO** has grown very fast and is now acknowledged as the association in the British Isles for all professionals in public safety and civil contingencies communications and information systems.

As a not-for-profit organisation, BAPCO is an independent, user led organisation that provides a forum for professionals in the field of public safety and civil contingencies communications and information technology to exchange information, ideas and experiences. In partnership with the industry it maintains regular liaison with manufacturers and other commercial bodies, such as consultants, to monitor developments in technology and future planning.

BAPCO is unique in Europe as the only multi-discipline, multi-level association for public safety communications and information systems managers, users, maintainers and providers. Through it's affiliation to the Associated Public Safety Communications Officials (APCO) in the USA, Canada and Australia/New Zealand BAPCO members become an important part of a worldwide network of public safety communications and information technology professionals.

Individuals experience, knowledge and expertise combined with that of other members worldwide help to achieve the goal of excellence in public safety/civil contingencies services.

Be a part of a unique organisation

Membership of BAPCO is open to all persons in the United Kingdom, the Channel Isles, Isle of Man and Ireland who are associated with the provision, maintenance, and use (managers, engineers, programmers, communications operators, end users, suppliers consultants) of civil contingencies communications and information systems. BAPCO members come from every type of public safety and civil contingencies organisations in the British Isles, including:

- Police Service
- Fire and Rescue Services
- Emergency medical services
- Emergency Planning and Management
- Volunteer Emergency Aid Organisations e.g. St John Ambulance, RAYNET, British Red Cross, Mountain Rescue etc
- Military
- HM Coastguard
- HM Customs and Excise
- First and Second line Civil Contingency responders.
- Emergency Breakdown Agencies e.g. AA, RAC, Green Flag
- Local Authorities
- Central Government
- Public Utilities
- Manufacturers
- Technical and repair services
- Engineers
- Consultants

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All members are enrolled as individuals and enjoy privileges dependent upon their category of membership that reflects their current employment status. However, recognising that a public safety agency or a commercial company may wish to register more than one person as a member of the association, facilities do exist for corporate or group Memberships in which individual changes can be made as personnel changes occur.

The categories of membership available, with the annual subscription fee, are as follows:

1. Public Safety/Civil Contingencies Employees or Volunteer Emergency Aid Personnel

Active membership

Individuals employed by a public safety agency, department of central or local government having responsibility for public safety or a compancy described as responder by the Civil Contingencies Act or retired from such a position and who does not have a conflicting commercial interest, or who is a member of a volunteer emergency aid organisation._(Annual fee £40.00)

Associate membership

Persons who satisfy the above criteria but who do not want to be an Active Member_(Annual fee £28.00)

Corporate membership

An agency that wishes to register more than two persons as members may apply for corporate membership. (Further details of corporate membership and annual fees are available on application to the association)

2. Persons employed in industry, consultants or who have an interest in communications or information technology within the civil contingencies area.

Commercial membership

Persons connected with industry providing communications and information technology systems or providing services as consultants in this field_(annual fee £40.00)

Corporate membership

An organisation that wishes to register more than two persons as members may apply for corporate membership_(further details of corporate membership and annual fees are available on application to the association)

3. International Members

The association has a commitment to the global exchange of information, ideas, and experiences and persons involved in managing, using, providing public safety communications and information systems who are resident outside the British Isles are eligible to apply for the following categories of membership.

International Associate

Annual fee £50.00

International Corporate

Further details of International Corporate Membership and Annual Fees are available on application to the Association

To find out more about what BAPCO can do for you and your organisation, visit:

www.bapco.org.uk

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THE BRITISH ASSOCIATION OF PUBLIC SAFETY COMMUNICATION OFFICERS

Beating the budget (with technology)

The Scotland Region of BAPCO have settled on the theme of "Beating the budget (with technology)" for a forthcoming regional event to be held at the Headquarters building of Strathclyde Fire and Rescue Service (ML3 0EA) on Wednesday 23 February 2011.

In these challenging times costs are on everyone's mind, yet technology marches on, and opportunities exist to make the best match of technology to economy.

The committee has invited speakers on this theme and signing up first was Janette Dobson from Analysys-Mason who will be making a welcome return after a well-received presentation two years ago.

On the technologies theme, new kid on the block DMR will be introduced, and hopefully some of the new features on modern TETRA will also be presented – all with cost effectiveness and budgetary constrains as an overarching theme.

The customary mini exhibition will also be laid on, and as always delegates report these events as excellent networking opportunities.

The Scotland Region AGM will also be held at the event, and any member who can offer their services to help for the coming year should also make themselves known now.

Registrations are now being accepted, and contact should be made with BAPCO's Administration Manager, Tracey Langmaid, who is accepting delegate bookings.
To register or find out more call 01522 548325 or email admin.manager@bapco.org.uk.

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FiReControl – where next?

The Labour flagship project to move England and Wales's fire service's command and control rooms into nine dedicated high tech facilities – FiReControl – hovers in limbo as high level discussions continue between the various parties involved. A decision is imminent and the question on everyone's lips remains – has FiReControl died, survived, or will it be revived? Jose Maria Sanchez de Muniain gets the views from some stakeholders.

Kevin Robson (see interview page 17) is Regional Control Centre Director for the North East FiReControl and not even he knows whether FireControl will go ahead in its present format. Kevin is nevertheless a firm believer that despite concerns around the cost of the project, the business case for delivering added resilience and an upgrade in technology to fire control rooms still stands. He points out that the Comprehensive Spending Review's emphasis on modernizing and budgets supports the FiReControl cause: "FireControl contributes to this agenda, including the provision of opportunities for flexible staffing, shared services and back office functions."

The £200m, eight-year Information System contract was awarded on 7 March 2007 to EADS (now Cassidian).

But the number of delays that have affected the project have not been helpful to its image, and even today North East Regional Control Centre is still awaiting for an announcement of when the actual go-live date will be. A fully functional system is contractually expected by the first wave of Regional Control Centres by no later than June 2011. "What the Fire and Rescue Service needs – along with all the local authority-controlled companies that were established to deliver emergency call handling and incident support services to FRS and to the public at each Regional Control Centre – is for Cassidian to prove once and for all that they can deliver against all of the identified requirements."

Personnel close to the project have suggested to *BAPCO Journal* that the project will be cancelled. Indeed, with experts estimating that recruitment, training and technology familiarisation would take at least 12 months to organise, the fact that this process has yet to commence would support that claim.

Some background

In June 2003 Mott MacDonald published for the Office of the Deputy Prime Minister a report titled *The Future of Fire and Rescue Service Control Rooms in England and Wales Update 2003*. An earlier version of that report (2000) had concluded that maximum efficiency could be achieved by the reduction from the then 49 control rooms in England and Wales to nine, via amalgamation. However this goal had been regarded by the earlier report as being too difficult to achieve – indeed the earlier report had instead recommended a rationalization from 49 to 21 sub-regional control rooms. September 11 changed the UK's strategic and tactical outlook on emergency preparedness and resilience. Mott MacDonald was asked to re-look at the whole issue, concluding that the Government should "initiate a national strategy to reduce the number of fire service control rooms by means of fire-fire (sic) amalgamation to form regional controls matched to the Government Offices of the Regions."

Tom Allen, MD of Mott MacDonald, wrote both these reports. "Post 9/11 all sorts of things came into play, and it was considered that better back-up was needed between all these systems, so in the end the revised report said that nine controls were technically possible. But what we envisaged was that these nine controls would be achieved by scaling up existing controls."

Significant savings in on-going costs were outlined in the report, to the region of £20million per annum, whilst providing "a critical opportunity for future organisational development". Interestingly, the construction of new control centres were not envisaged or considered by either of the two reports mentioned. By the time new-builds came into the picture, Mott MacDonald was no longer involved.

> "But what we envisaged was that these nine controls would be achieved by scaling up existing controls."
> *Tom Allen, Mott MacDonald.*

One of the reasons to opt for a highly secure "green field" approach was to prepare against the possibility of an amalgamated control centre becoming itself a terrorist target, and the effect that that would have on emergency response.

It was argued that regional controls would remove the need for individual FRSs to have secondary controls and fallback arrangements in place, because back up and resilience would be inherent within the network.

In the event of an RCC becoming unavailable the system would seamlessly transfer calls to the next available RCC, which would have the ability to handle the call, mobilise

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resources and manage the incident in the same manner as the home RCC.

Tom Allen is slightly skeptical whether, should a risk assessment be carried out today, the business case for purpose-built facilities would stand up. " It might be worth revisiting the question of whether if it was looked at again, that would be the right answer today."

It is also worth considering some of the events that were happening around the time the Mott MacDonald reports were being produced.

Between 2002 and 2003 a major firefighter dispute was taking place when the Fire Brigades Union (FBU) voted to take strike action in an attempt to secure a better salary. The FBU demanded a 39% increase in pay, which would have brought the average firefighter's wage (at the time) to around £30,000. It balloted its members for a strike in late 2002, the industrial action began in November.

George Godliman, MD of command and control systems manufacturer and supplier Fortek, regards those strikes as the opportunity that Government was searching for in order to push a fire service restructuring programme that fitted with its current regionalization agenda. Such a move prior to the strikes could, speculates George, have been unpopular with the public.

Readers may remember that during the strikes fire control duties were incorporated into police control. Fire calls naturally dropped, as the public did not want to burden the system, but it brought to the fore the fact that extensive resources were being deployed in fire control and yet the police control had been able to take on these duties often without missing a beat – or at least that was the impression gained by some people, remarks George. "And if you were a senior minister and walked into a fire control, unless you were visiting a larger metropolitan brigade, you would be unlikely to see a single fire call. So it is easy to get the perception that these guys sit there twiddling their thumbs all day." In addition, 2003 saw the publication of the Government's White paper *Our Fire and Rescue Service*, which refocused the role of the FRS on the prevention of fires and broadened its role in dealing with other growing threats resulting from climate change and man-made disasters. The new statutory framework placed the responsibility on the FRS to produce integrated risk management plans (IRMPs) to plan for, and respond to, a range of emergencies.

The aim of IRMPs is to improve community safety and make a more effective use of FRS resources by: "reducing the incidence of fires; reducing loss of life in fires and accidents; reducing the number and severity of injuries; safeguarding the environment and protecting the national heritage; and providing communities with value for money".

Prevention was the new watchword, and the continuing success of this initiative has had the unwitting effect of questioning whether response resources are necessary at the same levels as in the past. After all, the fire and rescue services are attending fewer fires (32% fewer in England for 2009-10 than ten years' previously), as well as fewer non-fire incidents such as road traffic collisions (13% less than ten years previously). A reflection, perhaps, that the emphasis on incident prevention is working significantly well and paying dividends.

The nine empty Regional Control Centre buildings are costing over a £1million a month in rent alone.

FiReControl

The £200m, eight-year Information System contract was awarded on 7 March 2007 to EADS (now Cassidian). The subcontractors were announced as being Ericsson, Frequentis (UK), Hewlett-Packard, iMASS, Innogistic Software Plc, Multitone Electronics Plc, and Telent.

Following a period of assessment, major building contracts were also awarded for new regional centres.

Much finger pointing has gone on since 2007 as to why the project is over £200m over budget and running late. The nine empty Regional Control Centre buildings are costing over a £1million a month in rent alone.

Without going into details as to how FiReControl has progressed over the last few years (the Select Committee's report has already done that), the overriding impression for many sources close to the project is that it was flawed from the start, reflecting the old maxim that if something is wrong at the outset, it will go wrong all the way down the line.

Some have also questioned why FiReControl was not amalgamated with Firelink, so the two projects could be managed jointly by personnel that were both fire practitioners and field experts. At the time the Firelink team consisted of a number of fire officers, most of whom came from or had managed control rooms up and down the UK including London, South Wales, Mid & West Wales, South Yorkshire, Strathclyde, Lothian & Borders, Suffolk, Hereford & Worcester, Gloucestershire, Kent, Hertfordshire, Avon and West Sussex. Prior to the advent of FiReControl they had sponsored and coordinated a range of fire control room and communications strategies including:

- The widely adopted common communications protocol for fire service networks (GD 92).
- Fire service retained firefighters radio alerting systems specification (known as MG4).
- Telemetry systems for fireground use.
- Channelisation and use of fireground radio.
- Training standards for fire control room staff.

FiReControl – benefits

While much has been made of the negative aspects surrounding FiReControl, the project has nevertheless had

some positive consequences.

George Godliman of Fortek points out that if anything, the project has forced brigades to rethink some of their business models and review the quality of some of their data – which in some cases have dated back to the 70s and 80s.

A fundamental review has taken place as regards how fire engines and other resources are dispatched to an emergency. Traditionally, explains George, each fire brigade was divided into station grounds, and if an incident happened on a certain station ground then an appliance from that station ground attended. A table of predefined appliances and possible incident locations listed the resources that would be dispatched in the nearest order. "FiReControl tried to challenge this strongly and introduce attribute-based mobilizing, where the type of emergency dictated the type of equipment needed and the number of firefighters that would attend. A number of factors were taken into account to formulate a response, including the different types of risk an incident might represent – for example if the incident happened early in the day it might present a different risk to one taking place late in the day."

Technology driving change

While the concept of attribute-based mobilization is regarded by most people as a useful development, George questions whether technology in general should have been the driver for its delivery. After all, this new concept is yet to be widely trialed by the fire service. "I get frustrated sometimes because what we do too often is try to use the technology to force change – and to some extent FireControl has done this.

"By all means the fire services should be challenged in their business processes, but they should have the opportunity to first say whether this or that process would be better. Then the technology should be looked at, not before." Automatic vehicle location systems are an example of where technology has to some extent driven change. "For rural stations where fire engines are usually in their stations I would question the ROI. It is not good enough to say that everyone is going to benefit from a one-size-fits-all technology, so let's not impose it on everybody."

It is perhaps ironic that the deployment of FiReControl has also been responsible for a stagnation of potential efficiency gains for the fire service in general. That FiReControl has stopped the deployment ("stone dead") of new technology in the fire service is a view that George couldn't agree with more. "It has stopped half the fire services in the country from using new technology for the best part of six or seven years because they thought regional control centres were coming in. You have separate organizations in the fire service all charged with service improvements, and yet they are prevented from making those improvements in one particular area – response – because they can't exploit readily-available technology."

For Fortek, as a company involved in the delivery of command and control technology, the impact has not yet been massive because FiReControl is not in force, and because fire brigades are still having to replace their aging systems. "If it comes in, we'll lose business on the support side. But we have spent lot of time working with English brigades to keep their mobilizing systems going, and discussing their future requirements with or without FiReControl. We've also been looking to supply into Scotland, Wales and overseas." Outside of England Fortek has projects that include the Welsh Assembly, six fire brigades in Scotland, and a national project in Norway.

The future

"If the current FiReControl command and control project were to fail, then the easiest thing to do might be to revisit the original assessments, and then either go back to the nine upgraded existing controls, or go back to 21 major ones, which could be a lot faster, simpler and probably cheaper," believes Tom Allen of Mott MacDonald,

George Godliman agrees with Tom as far as revisiting the business processes, but he thinks trying to fit business processes into an artificially-created model would be to repeat the mistakes of the past. "We should be looking at the business processes and changing them, before we start restructuring control rooms. FiReControl had it the wrong way round. Forget the technology for the minute, let's go back to the fire service and say, 'the need remains to achieve these objectives, how should they be achieved?'".

The high investment already placed in FiReControl should be set aside, says George: "If the fire service comes back and says that this is what they want, then fine. But to have the argument that a fortune has already been spent and that therefore we must continue, that to me is the weakest argument of the lot."

> "But to have the argument that a fortune has already been spent and that therefore we must continue, that to me is the weakest argument of the lot."
>
> *George Godliman, Fortek.*

That something must be done is clear. Fortek has been installing command and control systems in fire brigades for over 30 years, in George's opinion making dramatic improvements in terms of efficiencies in response. Yet these installations have not resulted in a reduction in staffing – at least none that George has noticed. "Let's go back to the business and say what is the best model in today's world for the fire service as a body, and how would that then reflect their requirements for control rooms. Because most of the fire controls I'm going to today are set up in almost identical fashion to when I first walked into one in 1978, with the same staffing numbers. And yet the service has different requirements in the control room today to what it had back in 1978."

Whether FiReControl is the right answer to the question – delivery or no delivery – is still debatable. The fact the question is still being debated after seven years is perhaps the most concerning thing of all.

Q&A: The view from the ground

Just getting to where it is today has taken a tremendous amount of work for all parties involved. Jose Maria Sanchez de Muniain talks with Kevin Robson, North East Regional Control Centre Director, FiReControl, about some of the challenges.

Where is NERCC now in terms of going live?

While we understand that Cassidian have to deliver a fully functional system to be deployed in the North East and other first-wave RCCs no later than June 2011, we are currently awaiting an announcement from DCLG of when actual RCC go-live is likely to occur. Although no firm date is known, a number of staff from the regional project team and the Company have been continuing to work closely with DCLG to determine national ways of working and to develop national performance standards.

With the advent of nine RCCs, we have also contributed to the identification of pragmatic operational solutions that can be applied consistently across the network, to meet both specific local and broader national needs.

In brief, then, many generic processes to ensure FRS and RCCs operate to the same high standard throughout the country have been agreed, and are now being regionalised to ensure consistent understanding across FRS and RCCs, and to enable smooth implementation.

As far as the company is concerned, since its establishment in 2007 we have worked closely with the board of directors, comprising representatives of each of the four North East fire and rescue authorities, to agree governance arrangements and the strategic direction of the organisation. Together with the board we have consulted extensively with staff and their representative bodies, and reached an agreed position on the majority of policies and procedures – based on existing good practice – that will be adopted once the centre goes live. This includes revisions to the existing shift patterns to better match resources to demand at peak periods, staffing numbers from go-live, through transition and at steady state (when all the RCCs

Kevin Robson says that in broad terms the four brigades and their Chief Officers in the North East have remained positive throughout.

are live), annual leave arrangements and ongoing training provision. We continue to plan for the transfer of staff from existing control rooms, and have consulted on the processes that will be used to select staff for each of the new RCC roles. Further, the development of training content to be delivered regionally is also well under way, although some content cannot be finalised until the Cassidian solution is available and tested.

What have been NERCC's main challenges?

As with any newly-created company there have been many challenges. As an example, DCLG's imposed governance arrangements which demanded the formation of a Local Authority Controlled Limited Company (LACC), wholly owned by the four fire and rescue authorities in the region, brought its own issues. Not least of these has been to assist board members to understand their specific responsibilities as company directors, which may potentially bring them into conflict with their roles as members of fire authorities.

A further challenge is that around the country each LACC is autonomous and hence free to make its own decisions in areas such as determining organisational design and terms and conditions for staff. As any decision taken by an individual LACC is likely to impact on other RCCs in the network, RCC Directors have been working together to ensure that there is an agreed approach to issues such as RCC roles and responsibilities, and where practicable, economies of scale within the network are maximised, for example in procurement of back office systems.

Much of the work of the FiReControl Project has been further complicated by the absence of any single authority with the ability to take decisions on behalf of all of the fire and rescue services. For national issues this often results in a need to constantly review project outputs with a view to reaching consensus, potentially causing further work and contributing to delays.

It's not hard to see that the key to many of these challenges is communication. As with any large business change project this is essential at all levels, and in the case of FiReControl particularly from and between all delivery partners including DCLG, Cassidian, CFOA, individual FRSs, LACCs, staff and representative bodies. I think all involved will agree that there have been occasions when relevant and timely communications could and should have been much better, if only to dispel much ill-founded and inaccurate speculation that has regrettably accompanied the various stages of the project.

What level of support have you had from North East fire brigades?

In broad terms support from the four brigades and their Chief Officers in the North East has remained very positive throughout. However today, due to the numerous delays in the project and the current uncertainty around its future, support at all levels in the service is understandably mixed. In the early days there were high levels of interest and engagement, and the project was involved in many areas where brigades were seeking to make improvements. Unfortunately, due to other pressures – whether driven through financial constraints or the need to further modernise and adapt – brigades have had to introduce change without the RCC and its functions in place to support them, although there have been some benefits in the region such as the roll out of the Firelink radio system.

What positive and negative aspects have come out of NERCC/FiReControl in terms of analysing business processes?

The business process maps developed as part of FiReControl defined in detail the business of a fire control room for the first time. This work demonstrated a great deal of similarity between control rooms for core business, but also highlighted the great disparity in terms of non core functions that each control room performs. Historically, smaller (mainly county FRS) control rooms have had the capacity to take on a much wider range of tasks than the larger (mainly Metropolitan FRS).

The full range and added value of these tasks was not previously understood outside of the control room and this has proved a challenge in many ways for their FRS as non core business will either have to be discontinued or passed to other resources to undertake once FiReControl goes live.

Further, using FiReControl as a catalyst, brigades in the region have been examining the processes through which they deliver their services and have identified a number of areas where they can work more effectively. They have also taken steps to improve data quality.

Thus, the original concept for the project still holds true, particularly on introducing improved ways of working such as mobilising the nearest appropriate resource rather than by fire station, building a new gazetteer that will enable premise-based mobilising and moving the service onto a data-driven mode of operating, rather than by voice or paper, enabling crews to have the latest available data delivered in real time at the incident ground.

Given the progress made to date, for me the most important thing is that, even if the FiReControl project does not go ahead, brigades do not lose the impetus in implementing many of the efficiencies identified by FiReControl, and deliver the business benefits to partners and the public that go with them.

What kind of staffing/infrastructure savings is NERCC estimated to result in for fire brigades in the NE?

As the RCC requires fewer staff to operate than currently deployed in the region's four control rooms, we estimate staffing savings in the region of £1m. However, the overall costs of the RCC building, including the premium to meet critical resilience standards, coupled with the fact that there are only four fire authorities to apportion costs between, means that there is an overall net additional cost to the region. Government has agreed to meet these additional costs, initially for a period of three years.

The days of the ICCS are numbered

Many legacy control room technologies will need to be refreshed within the next five years, but are ICCS platforms still fit for purpose? Analysys Mason suggests that a new technology – the ESB – could deliver systems that are simpler, more powerful, more flexible and more cost effective. John Wittams, Lead Consultant with Analysys Mason, explains why the days of the ICCS as we know it are numbered.

John Wittams is a Chartered Engineer and a member of the Institution of Engineering and Technology. A Lead Consultant within Analysys Mason, he has worked in the radio communications industry for over 25 years

Integrated communication control systems (ICCSs) have come a long way since they were developed in response to the Hungerford massacre in 1987. They are now a crucial part of emergency service control rooms, with many suppliers offering their third generation of solutions.

But persistent problems with the bespoke nature of these systems, and increasing pressure from government to merge control rooms and reduce costs, raises doubts about whether the ICCS is a suitable platform for the future.

ICCSs are the main platform for integrating control room functions into a common man–machine interface. However, organisations that install ICCS technology find they are drawn into a long process of detailed specification and a complex procurement. Selected suppliers then frequently have to invest time in developing the many bespoke elements required. This is, at best, expensive and time consuming, and, at worst, a process that is characterised by delayed implementation and spiralling costs, where the final deliverable often falls short of client expectations.

Even when successfully completed, the classic ICCS solutions tend to be "closed" from a technical perspective, and lack the flexibility to integrate future requirements without further specification and development.

Future emergency control rooms face new technology challenges as the range of service delivery applications is ever increasing and coming on-stream at an ever faster rate. Over the next five years it is foreseeable that the current limited range of ICCS applications such as radio, telephone, CCTV, vehicle location, mobile data, and basic interfaces to incident management systems, will be considerably extended with a plethora of new services and begin to look more like those shown in Figure 1.

So, given ICCS systems already require a large number of interconnections (with bespoke development), and given that there is pressure to remove barriers between agencies, regionalise control rooms, and reduce costs – should control rooms continue with ICCS?

Figure 1: it is foreseeable that the current limited range of ICCS applications will be considerably extended with a plethora of new services and begin to look more like those here.

How do control rooms move away from the current closed architectures?

What is needed is a radically new way of delivering control room systems that are simpler, more open, more powerful, more flexible and more cost effective than the latest generation of ICCSs.

A possible alternative is the Enterprise Service Bus (ESB) technology that is now available from a number of vendors. The ESB is, in essence, a powerful, IP-based messaging engine between software packages. It supports standardised interfaces for communication between different applications running on different physical machines across a data network. The various control room applications can then be developed in different computing languages, and run on different operating systems, with the ESB providing the means to integrate them. As such the ESB would support all voice (VoIP) and data services, from different software vendors across the same platform, and permit full network access across different locations within an organisation, and with external agencies.

Within the control room system, the ESB becomes the core technology – with all applications and solutions communicating via this medium. The ESB therefore offers a much simpler approach as shown in Figure 2.

With this new level of integration, how will the operators manage the array of services available? One strategy is to give the graphical information system (GIS) greater prominence, so that the control operator could see all their tasks in a geographical context on a single large computer screen. The operator would then be able to manage and control emergency service resources via this touch-screen with a geographically-based display. This could include, for example, a map of the incident area overlaid with all the radio, telephone, GIS and incident handling functions required. This would offer a far higher level of integration than is typically provided today, where operators often use a number of separate screens and undertake time-consuming activities, such as moving data between screens and applications.

In short, a new approach is needed to the design and specification of control room systems. Functional specifications previously used for ICCS procurements are

onerous to develop and have, in the past, been subject to a high degree of interpretation between suppliers and clients. The new ESB solutions – which manage an increased level of complexity – require that clients focus on defining operational requirements, rather than functional requirements. This hands some of the risk and complexity to the system integrator. That is not to say, however, that users can avoid rigorous definition and specification – without this, projects can be exposed to scope creep.

The dilemma for emergency services

Across the UK, many emergency service organisations rely on legacy control room technologies that will need to be refreshed within the next five years. The crucial issue is whether to jump early and opt for the latest ICCS technology, or to wait and embrace the new ESB at a later date. Updating legacy ICCS technology will mean that users face constraints in the future, whereas ESB deployments will provide a platform that saves costs, provides a simplified route for integration of applications, and embraces networking with neighbouring and other agencies.

It is important to remember that the next generation of control room solutions may well be in operation for the next 15–20 years, and the selected platforms must be able to adapt to any new radio, telephone and server-based technologies that come along. That is why the ESB is perceived as so important: it is not necessarily an upgraded system design, rather it is a new way of thinking about system integration within the control room environment. As such, the days of the ICCS as we now know it are numbered, and ICCS functions will become applications within the wider control room solution.

In conclusion, the question is not whether ESB-based technology will be available, but how soon? The drivers for migration suggest that users will not have long to wait. Of course, suppliers and customers should not underestimate the complexity of moving to this new technology, but nor can they ignore the huge benefits that it could bring.

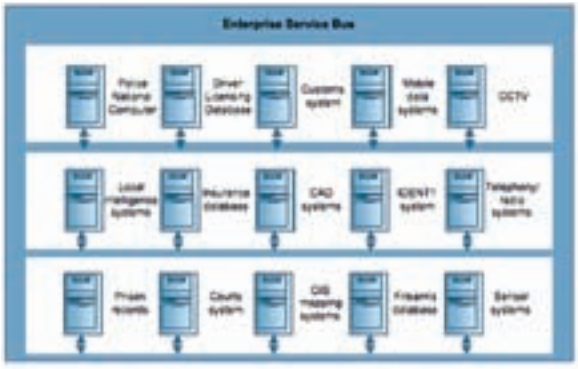

Figure 2: the ESB offers a much simpler approach within the control room system, becoming the core technology for all applications and solutions.

Policing in times of austerity

Can police do the same job on a much lower budget? Intergraph's Nick Chorley says they can – and explains how.

The severity of the challenge now faced by the Police is underlined by the title of HM Inspector of Constabulary's (HMIC) October report, *Police Governance in Austerity*. In HMIC's words: "The Spending Review…confirmed that Central Government police funding will reduce by 20% in real terms by 2014/15. Almost two thirds of this will be cut in the first two years [and] police authorities will be responsible for making the difficult decisions on where cuts should fall". HMIC concludes that the actions taken by police authorities – and police forces – will be focused on "where and how to cut deep".

The challenge ahead is of a "significantly different scale, requiring tangible savings, not just efficiencies", according to HMIC, which observes that around 80% of police budget is spent on the workforce. "Police authorities will need to make difficult decisions, rarely made before, to improve productivity while reducing costs."

But how? Reducing overtime and enforcing guidelines on officer retirement after 30 years will help: but will retiring officers be replaced – or will front line numbers shrink? HMIC has already observed: "The public needs reassurance that what matters is not the number of police officers, but what the police do", and also commented that greater productivity means it is possible to deliver public confidence with fewer officers.

In contrast the Chancellor has insisted that in his Spending Review the "aim is to avoid any reduction in the visibility and availability of police on our streets".

However, police forces could protect the public with smaller numbers of officers on the street and without risk to public safety, if technology was used as the engine for cashable-savings transformation programmes that increased police productivity.

Industry experience shows us that a technology-empowered mobile police officer with an interactive comms link to full command and control data including online intelligence can be 50% more effective than one using less sophisticated policing tools. Technology could also be used to capture and compensate for any loss of corporate memory caused by retiring officers.

When North Wales Police (NWP) implemented a joined-up, technology-driven policing strategy, replacing 39 IT systems with Intergraph's "I/CAD" command and control system (plus records management) as its operational hub, it used activity-based (ABC) costing to measure the return. NWP was able to reduce staffing levels by 13% and improve productivity to a degree equivalent to recruiting 180 new officers.

Large savings could also be made in other areas. Take the demanding roadside assistance market, where "auto dispatch" software is used to allocate and dispatch the best resource for a given incident. Here, related headcount has been reduced by as much as 70% as a result.

HMIC reports that for 15 of the 22 police authorities, "the contribution of regional collaboration is not adequately addressed". There are clear opportunities to reduce costs here by sharing one system tomorrow in place of many today. This would deliver immediate infrastructure savings as well as efficiencies in data and human resource sharing.

The control room technology that supports a shared command and control (C&C) service must be highly resilient and scalable to the thousands of users inherent in a shared system. The technology must promote data sharing but also allow each agency to retain its core identity and discrete data. Where these capabilities are present the cashable benefits provided are considerable.

Here, the experience of other services is relevant. The ambulance service entered a new, more cost-efficient era in 2006 when it reorganised into 12 regional Ambulance Trusts, while FiReControl promises nine regional control rooms rather than the current 46.

South Central Ambulance Service (SCAS) is typical of the new breed of trust that uses technology to function cost-efficiently (see page 32). Its regional "one CAD system serves all", virtual C&C environment is powered by I/CAD, which is scalable and allows SCAS to share demand peaks across three emergency operations centres.

It is a myth that when neighbouring police forces have the same, but separate C&C systems, this improves regional policing. However the same forces sharing one C&C environment delivers efficiencies in regional policing and also allows costs to be cut, deeply.

Options for deployment across multiple forces include cloud computing via software as a service and, more radically, "zero client" technology using a "PC over IP" approach that removes the need for PCs entirely.

These mainstream computing money-savers have yet to be adopted by the police service, but there is no reason why they should not, given strong, scalable public safety systems and a willingness to embrace change.

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FireLink goes live

Mark Pearson, Account Director, Airwave, discusses the benefits that the FireLink programme is bringing to the fire and rescue services across Britain as the service goes live across the nation.

Over the past three years Britain's Fire and Rescue Services have been engaged in one of the most wide-reaching communications projects seen in the UK's public safety sector: FireLink. Now rolled out across England, Scotland and Wales, FireLink is already improving the way the fire and rescue services (FRS) communicate. Providing greater coverage, resilience and security than the analogue radio systems it replaced, FireLink is helping crews mobilise faster and providing them with a level of information not possible previously. Importantly, it has delivered the ability for national and cross-agency teams to interoperate, which provides the potential to improve response through more efficient coordination of resources.

Initiated by the Communities and Local Government's Fire and Resilience Programme, FireLink set out to replace the aging wide area radio communications networks of the FRS with a single, unified platform that is able to cope with the challenges faced by modern FRS, including the increased potential of large-scale disasters such as the flooding and the terrorism threat.

Airwave is proud of the role it has played in helping the Fire and Rescue Services of England, Scotland and Wales meet the considerable challenge of overhauling their communications systems. We have been responsible for delivering the FireLink programme: which delivers enhanced coverage, resilience, interoperability, security and increased capacity using the TETRA network that underpins the solution. It is through the Airwave network that FRS can enjoy advanced digital voice and data communications that connect crews to control rooms and each other efficiently and effectively. In addition to the network, Airwave has installed radios and mobile data terminals in frontline appliances, officers' cars and other supporting vehicles. This rollout is now complete, providing a good time to look at the benefits the FireLink solution will deliver to the FRS and the public they serve.

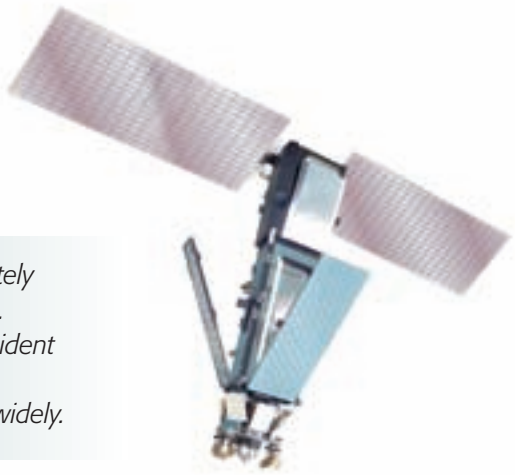
In essence, the FireLink solution will improve dispatch processes for FRS, enabling control rooms to mobilise appliances more effectively and efficiently in response to incidents. Airwave has facilitated this through mobile data, allowing text information to be sent between control rooms and crews reliably and securely.

Using Airwave's mobile data service, the FireLink solution empowers fire crews with immediate access to a level of data that would once have been impossible – not just the address of an incident, but also information on how many other appliances will be attending, whether there are any hazardous chemicals on site or whether there is a risk to surrounding buildings, for example. This allows crews to attend an incident fore-armed with all the information they need to respond effectively. Furthermore, the mobile data terminals which receive the information are equipped with AVL (automatic vehicle location). This effectively means that a control room can view each fire vehicle on a virtual map, via the inbuilt GPS in the MDT. As the devices are two-way, command and control now has greater visibility of the location of appliances and can deploy them based on how long it will take to attend the emergency rather than on proximity alone.

The Airwave service also delivers one of the main drivers behind FireLink: interoperability. Using the Airwave service, the FRS are able to communicate nationwide, allowing them to seamlessly interoperate in the event of large-scale incidents requiring cross-border support. The Airwave service also allows FRS to interoperate with other agencies, including the police and ambulance services, a core imperative of the FireLink programme. Over time this ability will grow in importance and will allow all three blue light services to work together in a way not seen before, helping them to resolve incidents more efficiently and ultimately save lives.

During the course of this programme Airwave has been working closely with the 57 FRS across England, Scotland and Wales as well as representatives from Firelink, Communities and Local Government, the Government and the devolved assemblies in Wales and Scotland. This truly coordinated team effort has resulted in delivering one of the most efficient and resilient wide area radio communications solutions in the world and one which will benefit both the crews that use it and the public they serve.

Testing your sat links



The fact that not all satellite phones are suitable for all applications was acutely highlighted by a comparison report carried out recently by Frost and Sullivan. Jose Maria Sanchez de Muniain interviewed Don Thoma, executive vice president (marketing) of Iridium – the company who commissioned the independent evaluation report – to find out why differently satellite solutions can vary so widely.

On September 21 Frost and Sullivan published the results of an exhaustive study of the differences between two satellite phones: Inmarsat's IsatPhone Pro and the Iridium 9555 satellite phone.

Test locations were selected and they included Anchorage (Alaska), Fort Lauderdale (Florida), and Fort McMurray (Canada).

The features that were evaluated were size and weight; keyboard; display; antenna; battery use and charge life; battery charger; and construction and overall feel.

The results from Frost and Sullivan's report were quite conclusive, in that the Iridium sat phone provided better quality and was faster in finding the satellite network. It offered the ability to use the phone as a modem for a laptop, and it worked even when the antenna was down. Crucially, Iridium's satellite network offered better coverage and it could be used in Anchorage, where the competing product was inoperable. All these things aside, nevertheless the Inmarsat IsatPhone Pro was less expensive than Iridium's product and it also had lower usage charges (per minute).

Iridium's current satellite network consists of 66 satellites and seven spares, all of which are interlinked to form a mesh network. The company is currently planning to repopulate its network with new satellites and spares.

According to Don, the decision to commission the report was based on industry worries that there were some solutions on the market that were not performing to the standards required by the public safety sector. "We felt it was important to have a fair objective comparison of the phones in the environments where they would be typically used."

The locations were picked so Iridium could test its own understanding of varied regional performance by Inmarsat. Inmarsat satellites' center points cover mid-sections of the globe but not the far northern or southern reaches, so it was Iridium's understanding that signals are weaker the further the user's region is from each satellite's center point. Because of that, more user intervention is required to orient and hold a line-of-sight connection with the Inmarsat phone the further away the user is from the satellite's center point. Holding a line-of-sight connection is not a problem when using an Iridium phone because its network of 66 low-Earth orbiting satellites are continuously orbiting overhead in all regions in the world. The set-up of the Iridium phone is straight-forward in this respect – it doesn't vary by region. All a user needs to do is orient their Iridium phone's omni-directional antenna upwards to the open sky. However, the further the IsatPhone user is from the satellite, the more directional orientation will be required of the antenna.

The bottom line, explains Don, is that for first responders the ability to switch on a satellite phone and make a call immediately is of paramount importance. "Having to point it at the sky and wait several minutes to register and set up a call has an impact on how you operate. You cannot be hampered by the usability factors of a geostationary system."

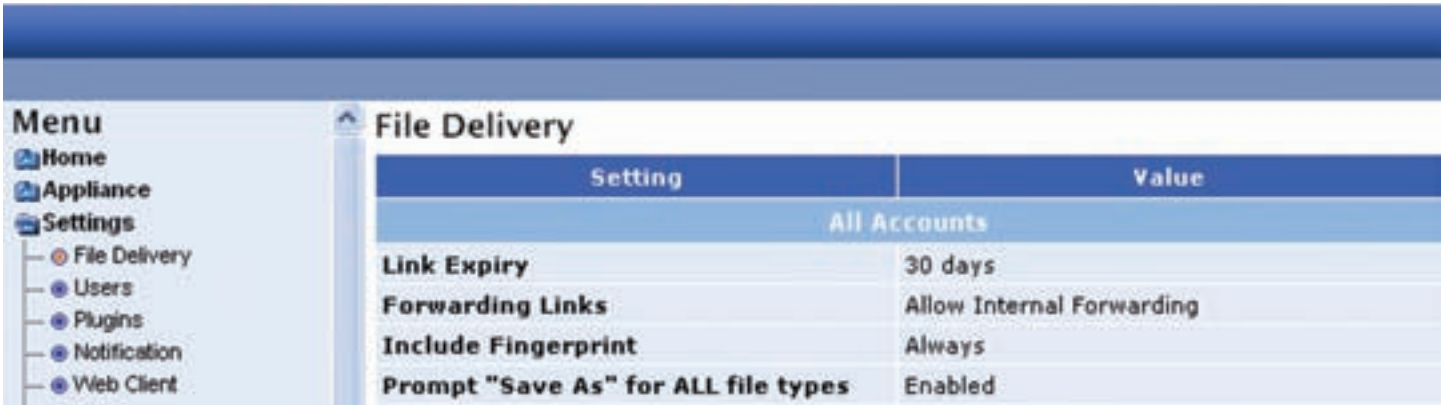
> "You cannot be hampered by the usability factors of a geostationary system."
> ➲ *Don Thoma, Iridium.*

Don goes on to point out that being able to also receive calls with the antenna down is a matter of operational practicality. "We know responders will keep their satellite phones under their belt while they are on the move – they can't do that and receive calls at the same time with a geostationary system either."

It all comes down to the fact, says Don, that Iridium was designed for mobile communications, and the company is keen to ensure that the technology works first time when it is needed. Every year it organizes a "test your satellite phone" awareness campaign to alert first responders to test their batteries, the process of dialing and using a satellite phone, etc. "We provide a checklist and encourage them to make a call using a toll-free number. And it's not just for our customers – any sat phone user can dial it to test their phone, but for our customers it's toll free. It is not unlike the fire service's campaigns to encourage people to test the batteries on their smoke alarms."

Another initiative involves "quick-start guides" that can be attached to individual phones, so users don't have to go searching for instructions when an emergency arises.

Iridium's phones can receive calls with the antenna down, something that Don Thoma (below) says is important for responders who are on the move.



Share large documents securely

Whether it is medical information, military reports or other large confidential documents, government agencies continue to struggle with growing e-mail security and bandwidth concerns, writes Dr Paul Steiner, Managing Director (EMEA) of secure file transfer specialist company Accellion.

Paul Steiner explains the security shortcomings of traditional methods for the transfer of large files. Top: Accellion's secure file transfer manager.

Government agencies that fail to protect the confidential information of citizens regularly suffer the embarrassment of a data breach and financial penalties. For example, as of June 2010 organisations within the UK's National Health System have accounted for a quarter of all data security breaches reported to the Information Commissioner's Office (ICO). If this trend continues, the ICO could become a profit centre with its new powers introduced last April that allow it to impose penalties up to £500,000 on offending organisations.

Whether mandated by legislation or dictated by policy, every organisation has an obligation to ensure the security and integrity of the information it handles. That obligation doesn't stop during the process when information is transferred from one party to another. A secure file transfer solution is no longer a luxury, but rather a necessity. The IT departments of government agencies and corporations have a responsibility to select and provide a solution that meets the security and compliance requirements and fits into the regular workflow of business.

The problem with email for file delivery

The ease with which email can be used to send attachments makes it the most frequently used file transfer mechanism in business today. While sending files through email is very convenient, email systems were never designed to efficiently handle the volume and size of attachments that are required to support business today. The result is a degradation of email server performance and slower message delivery times. Because as much as 80% of email storage can be taken up with email attachments, solving the attachment problem is becoming increasingly critical for IT administrators and users.

To stop email servers grinding to a halt due to file attachments, a common practice is to put a limit on the size of file attachments and a quota on mailbox size. Unfortunately imposing such email attachment size limits results in users seeking other IT workarounds resulting in potential security breaches. To overcome the limitations of email, organisations have turned to non-secure file transfer methods such as FTP, CDs, thumb drives, and P2P. Unfortunately, each of these options compromises security, ease of use and reliability.

FTP is not as convenient for file transfer as email because it does not allow for ad hoc collaboration. Users don't like FTP because it is difficult to use and IT doesn't like it because it is difficult to maintain.

The use of personal Webmail accounts such as Google mail generally bypasses organisational messaging security defences and does not allow files to be tracked.

Burning files to CDs and then sending via overnight delivery is expensive, much slower than electronic delivery and susceptible to data loss.

Organisations that handle confidential information including personal health information need to be confident that each file is sent only to the intended recipient and that the data will remain secure. With increasingly stringent regulatory and information security compliance requirements, many organisations are instead switching to secure managed file transfer.

A new way of thinking about file transfer

The key to sending files efficiently and securely does not lie in coming up with new or smarter ways of using email or ways to circumvent the email security system. Instead, it is important to recognise that secure file transfer is a core

business process that is best served by a system deployed in parallel with the email infrastructure. In short, what IT administrators and/or users need is a secure file transfer solution that integrates with existing email while hiding the underlying technical complexity of sending large files.

A secure file transfer solution enables users to send files securely to trusted users without relying on FTP, USB sticks, or other unsecured methods. The solution transfers files securely over channels that can be monitored and managed by the IT department. Reporting tools confirm which files have been received, who accessed them, and when. The best solution supports two-way communication among all authorised users, including partners and trusted users outside the enterprise. Employees are not tempted to abandon the secure solution as soon as they need to transfer files to a recipient who might not already have an account. The solution enables secure communication with the enterprise's community of business users, adapting as that community grows and evolves.

By adopting a secure file transfer solution and abandoning risky file-sharing practices, government agencies can better protect confidential data and simplify compliance with industry regulations and governmental data-security laws.

The key features of such a system should include:

- The ability to preserve the ease of sending files through email by mimicking email functions but without being part of the messaging infrastructure. This minimises end user training requirements, while at the same time offloading attachments into a parallel file transfer infrastructure, thereby relieving email of as much as 80% of the storage it carries today.
- A low total cost of ownership by minimising the amount of management and maintenance required for the system by the IT department.
- Audit and tracking. Current business practices, as well as legal and regulatory requirements, demand that organisations implement auditable business processes, including tracking and auditing of ad hoc file transfers.

Secure file transfer at the UK COI

The need for secure file transfer has been recognised by the UK Central Office of Information (COI). Following the release of the Hannigan Report on data handling procedures in government, the COI undertook its own internal review of sharing procedures and has subsequently adopted the Accellion Secure File Transfer solution.

The COI works with government departments and the public sector to produce information campaigns on issues that affect the lives of every citizen – from health and education to benefits, rights and welfare. Given the nature of its role, data security is of the utmost importance when collaborating on ideas and sharing information internally and externally with suppliers/clients.

The COI previously relied on e-mail to share information. For files exceeding the government's 10MB limit on e-mail attachments, information was copied onto an encrypted media and sent via courier. However, this method proved to be costly and lacked the level of security the COI required. FTP wasn't a long-term option as it was too technical for the average user and required ongoing IT involvement.

The Accellion file transfer solution enables government agencies such as the COI to securely send and receive files and folders up to 50GB in size. It validates recipients so confidential information is not overexposed, and provides an audit trail for tracking and reporting who received a file and when. In addition, it integrates both on-premise and off-premise deployment options for cloud and virtual environments, which work together seamlessly.

Conclusion

The COI has recognised that the volume and size of attachments sent through email will continue to increase. Due to this trend, there is a growing need to find a more efficient, less expensive and easy-to-use alternative for sending files. By switching to secure file transfer organisations can help meet security and compliance requirements while preserving processes.

The lower cost of management and the ability to offload as much as 80% of the storage from email satisfies many IT requirements. As collaboration via electronic methods continues to grow, managing the secure exchange of files is an issue that needs to be addressed urgently.

Maximising resources during an emergency

Dr Socrates Varakliotis, Mohamed Ahmed, Renzo De Nardi, and Stephen Hailes of UCL write on the potential usage of unmanned aerial vehicle (UAV) systems that have been enhanced with cognitive ratio resource management techniques to operate autonomously in flash-crowd scenarios.

Dr Socrates Varakliotis received his engineering and informatics degree from the University of Patras, Greece and his M.Sc. and Ph.D. in computer science from University College London. He is now a senior researcher at UCL where he has been involved in many European and national projects.

Recommendations from the official reports of the past emergency events have advocated a strong need for zero-configuration communication networks that can effectively be used during large incidents. Many studies and projects have conducted or are still performing ongoing research to enable the design and dynamic deployment of robust communication infrastructures that will help in dealing with emergency response situations. Usually, these solutions have the purpose of providing easy and adaptable communication infrastructures that complement or completely replace existing networks.

Recent disasters, such as 9/11, confirmed the need for a technology that is able to work on heterogeneous devices to send and receive messages across different comms systems, adapting to different environment and conditions as necessary [1] [2]. Such heterogeneous networks must operate in a range of frequency bands and over a range of protocol stacks, thus requiring the radio systems to function across different modes of communication – a natural fit to the capability that can be provided by cognitive radios.

Cognitive radio resource management in networks enables the dynamic allocation of different frequency bands and cross-layered optimum data delivery models to enable delivery of the critical information to the end destination. We will use the generic term CRM below to refer to cognitive ratio resource management techniques.

Wireless traffic patterns exhibited during emergency events often call for managing unexpected flash-crowd effects that are created by the sudden demand for the sparse wireless resources at the incident site. Efficient delivery of such critical traffic requires dynamic, fast and optimal use of the wireless network. We present below a set of key high-level emergency situations in which radio networks can effectively be used. In each case we briefly analyse what problems responders might face and discuss how CRM-enabled networks can provide solutions. We then describe prototype unmanned aerial vehicle systems (UAV) that have been enhanced to operate autonomously in a CRM-enabled fashion in such flash-crowd scenarios.

Flash-crowd detection and prediction

Consider the example of the London bombing of 7/7/2005, in which a flash-crowd effect was triggered by the traffic injected by victims, citizens and first responders into the fixed and mobile telephone infrastructures. The mobile phone network was saturated. The traffic and control channel were occupied by the SMS messages and existing voice calls. The licensed and unlicensed band used by the first responders (eg TETRA channel used by the police units) experienced a high degree of congestion. In the pre-emergency phase, technology that is capable of detecting and predicting flash-crowds is essential.

The initial signs of the flash-crowd could have been detected by an appropriate CRM system technology that monitors the congestion levels at different bands of the spectrum. A prediction unit can predict the traffic-pattern in the near future, which in turn can trigger resource allocation mechanisms (for example, channel access and bandwidth management).

Dynamic resource management under flash-crowd

During the emergency phase, network congestion builds rapidly, and the need for reliable and fast delivery of messages is one of prime importance to the emergency services and the victims. Heavy traffic injected into the GSM network due to phone calls and SMS messages increases the delay experienced by first responders due to congestion or even leads to voice calls and text messages to be dropped. Appropriate CRM technology can recognise the crowded frequency bands of the response team and the parts of the licence-free spectrum that is sparsely used. It can immediately re-configure the radio network of the response teams to operate in the sparsely-used spectrum. As a context sensitive system, spectrum access rules can be relaxed and certain non-emergency licensed bands used.

Integrating different communication systems

Different communication systems, like cell phones and WLANs, use different protocol stacks and frequency spectrum. However, for the purpose of emergency detection and appropriate emergency response, there is a need to provide an instant and integrated support that aids in serving operators, first responders and victims.

Ad-hoc emergency communication wireless networks can be quickly deployed. CRM-enabled systems could recognise

the different wireless communication components across different frequency bands and dynamically scan the radio activity. Signalling data from the different subsystems could be recognised and the CRM-enabled network could provide emergency traffic prioritisation or load balancing at overloaded network points and efficient routing (single-hop and multi-hop) of the data to the nearest centre that can appropriately service the request (for example, IP-traffic routed to the nearby access points and GSM calls and text messages routed to appropriate GSM base stations).

Interference handling at emergency sites

Even when successfully deployed, an emergency communications wireless network may suffer from other radio technologies operating simultaneously in theatre, or even by a malicious jammer, threatening to severely degrade the transmission quality. The CRM-enabled system could detect the interference, could try to find optimal configuration in the current band that still satisfies the application and, if not possible, switch the transmission onto another radio interface/technology (eg UMTS).

Micro-copter UAV systems

To better deal with emergency situations similar to those described in the above flash-crowd scenarios, the Mobile and Wireless Systems research group at UCL Computer Science, has built micro-copter systems such as the one depicted in Figure 1. These are based on off-the-shelf remote-controlled, electrically powered UAVs enhanced with autonomous flight control and networking capabilities for a variety of tasks. At the moment, these prototypes fly outdoors aided by a high-accuracy GPS control subsystem for navigation and radio profiling.

Motivated by the increasing demand for multimedia and data-oriented application support in emergency scenarios (US DHS SAFECOM [3], ETSI/TIA Project MESA [4]) we have equipped the UAV's monitoring subsystem with video cameras and a variety of other sensors (including eg CO sensors at present). They are also capable of high bandwidth radio communications, bearing three wireless interfaces at 2.4GHz and 5GHz for control and data, as well as spectrum sensing software (eg WiSpy). The particular UAVs described here can lift around 500g worth of equipment in addition to the batteries they use to fly; however, slightly larger flight platforms can carry 1-1.5kg if necessary. The payload also includes a very small form factor computer to process data captured by the sensors.

The goal is to offer the UAVs as an inexpensive and simple mobile IEEE802.11 bridge between a set of ground nodes and a distant (command and control centre) sink. In order to achieve this we have made them fully autonomous in the phases of take-off, flight and landing. The start phase includes take-off and positioning. On take-off the UAV moves to a given initial location. It then explores the area in a spiral search. During this step it scans the medium to build a model of the spectrum. It also identifies other radio transmitting and receiving devices (clients) and selects an appropriate initial

Figure 1: quad-rotor UAV equipped with sensors and Cognitive Radio. Figure 2 (opposite): UAV bridging wireless communications.

radio channel to aid radio communications. During the bridging phase the UAV continuously collects feedback from clients, thus maintaining active measures of satisfaction. The objective is to use CRM technologies to optimise overall system performance, as measured by RSSI and goodput. The UAV uses these measurements in a decision tree process to choose an adaptation strategy, such as changing the channel in use, the XYZ position, or the transmitting slot allocation. We refer to this research approach as the multi-factorial optimisation problem for UAVs.

We study how the micro-copter prototypes can effectively be used in flash-crowd detection, by monitoring, for example, the frequency of "channel request" messages received by the base station and the rate of changes. We explore how UAVs can be used in flash-crowd avoidance by allocating new Random Access Channel (RACH) depending on conditions, and broadcast a new policy rule to the users. The number of new RACHs can be also increased depending on the level of calls.

The UAV approach described here is not limited by the emergency scenarios described. The technology is broad enough to capture variations of the above, while not necessarily operating in an emergency services context. The CRM aspects of this research have been studied by the ARAGORN project [5] in a wider application area of radio communications in the digital home. The autonomous flights of rapidly deployable UAVs in individual mode, or in the highly survivable swarm mode, are being studied by the SUAAVE project [6]. Civil applications may include search and rescue operations, pollution monitoring, chemical/biological/radiological weapons plume monitoring, disaster recovery, and damage assessment.

Professor Stephen Hailes is Professor of Wireless Systems and Deputy Head of the Department of Computer Science at UCL. He also holds a visiting chair at the Royal Veterinary College.

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Welsh Ambulance hits the Airwaves

The Welsh Ambulance Services NHS Trust (WAST) has recently completed the roll out of the Ambulance Radio Replacement Project (ARRP) across the whole of Wales. All emergency medical service (EMS) vehicles, patient care service (PCS) vehicles and all three air ambulance helicopters are now using the Airwave service for all operational communications. Jim Abernethy, Principal Communications Consultant, Hyder Consulting, writes.

The introduction of the Airwave service is seen as providing a solid foundation for future communications requirements to build on, and this has already allowed the Trust to implement a mobile data solution from Terrafix, across all three operational regions.

As the biggest single project ever undertaken by the Trust and with a value of some £55m it was decided to bring in specialist knowledge to work alongside Trust staff to ensure all aspects of the project were delivered. Hyder Consulting (UK) Limited were the company selected to provide this support and I (Jim Abernethy, Principal Communications Consultant) was the man chosen to take the lead role in delivering this major project.

"All in all, delivery of the Airwave service into WAST has been a total success with little disruption to operational services."

The project began in earnest in July 2007 with the following key deliverables to be met:

- Installation of all Airwave services, including SunGard DS2000 Integrated Communications Control System, to all three Control Rooms
- Installation of Sepura radio terminals in 700+ vehicles
- Radio Terminal training for almost 1900 staff
- DS2000 ICCS training for 200 control staff
- Integration of existing services e.g. telephony, command & control.

The installation of Airwave and SunGard equipment was the initial element of the service to be delivered and in order to complement the introduction of the new equipment it was necessary to re-arrange existing services, install additional power, re-evaluate desk layouts and provide additional structured cabling within the control rooms.

This equipment was installed in line with initial project timescales but work was paused in order to address several issues that were identified within the applications software of the DS2000 ICCS. Once these issues were resolved, work continued to complete the project as quickly as possible.

It should be noted that although the Trust has three Control Rooms the Airwave service is only directly delivered to two Points of Presence (PoP). The PoPs are located at North Region Control in Llanfairfechan, North Wales, and South East Control which is located in Vantage Point House in Cwmbran in South Wales. Both of these sites are connected via megastream services to the third control room at Llangunnor in Carmarthen. This solution provides access to the Airwave service for Llangunnor Control and also provides resilience for the PoP sites.

During the pause referred to above it was decided that work would commence on the installation of radio terminals in the Trust's fleet. This was a particularly onerous piece of work that required detailed planning to ensure that installations were carried out with no operational impact on service delivery. In order to achieve this, a Vehicle Installation Team was put together to plan, co-ordinate and deliver the installations. It is with great pride that it can be reported that during the entire installation programme only three installs were missed and that there was no impact on service delivery.

As the vehicle installation process progressed, WAST

asked if it was possible to make use of the Airwave resources installed to date. Together with Airwave, we put in place an interim automatic vehicle location service (AVLS) whereby GPS information received by the vehicle and handheld radios was transmitted back to Trust computer-aided dispatch (CAD) systems. This information was then displayed on Trust GIS mapping services thereby allowing visibility of resources for the first time in the control rooms. This was a major benefit for the control room staff as it allowed more efficient use of resources to be made when dispatching.

As existing services were integrated into the DS2000 ICCS system, much testing took place to ensure the integration operated across the entire service and that sufficient resources were available to support the operation of the new service. An integral part of the integration was to ensure that frequently carried out actions were programmed onto soft keys on the radio terminals and that radio terminals on the same vehicle were configured up as resource groups on the DS2000 ICCS. By doing this it effectively allows a radio user to press a single key to inform Control that they wish to speak to them and Control, in turn, can respond to all radios in the resource group by selecting a key on the ICCS screen. This method of working reduces the amount of communications required, which in turn reduces the amount of system resource utilised by the Trust.

A comprehensive range of training packages were developed in-house and this training was delivered by dedicated members of operational staff selected from each region. It was necessary to ensure that staff training absences did not impact on the operational delivery of service. Training was carried out on a regional basis and support across regions was provided where required. Due to the length of time between initial training and go live it was necessary to provide a refresher service to ensure that any skills erosion was catered for, and to ensure all personnel were adequately supported in the go-live process.

The go-live of the Airwave service was carried out on a phased basis commencing with EMS services in North Wales in late October 2009. This was followed by all other EMS and PCS services throughout the Trust with the final element going into service in late April 2010. During all of the go-live processes it was vital that service delivery was not compromised as a result of the new service being introduced. Regional management teams have stated that the introduction of the Airwave service was seamless and did not impact on service delivery at all.

The final chapter on installations was that of the three air ambulances which the Trust utilise. These three helicopters (two EC 135 Eurocopters and one Bolkow 105), were installed with Sepura SRH3500 solutions during April and May this year. All airframes underwent rigorous testing following installation and all were successfully passed as fit-for-purpose to enter service.

Jim Abernethy, writes that the project's total success would not have been possible without the strategic direction of David Jackland, ICT Director and Project Sponsor, and the operational direction of Gavin Bryce, Programme Manager.

Some of the main benefits that have been realised since the introduction of the Airwave service are:

- Vehicle coverage has increased from approximately 50% to almost 100% across Wales and handheld coverage is now available in almost all built up areas.
- Interoperability with other agencies is now able to take place. All WAST radios are configured with a variety of talkgroups that allow communication across disparate agencies during major incidents and events
- Improvements in Category A response times
- PCS planning greatly enhanced.

All in all, delivery of the Airwave service into WAST has been a total success with little disruption to operational services. This would not have been possible if it were not for the leadership and strategic direction provided by David Jackland, ICT Director and Project Sponsor, and the operational direction and overall day-to-day support provided by Gavin Bryce, Programme Manager.

From my perspective the work has emphasised the importance of good project management, as this ensures that defined mechanisms are effected at all times, thus ensuring that all issues arising are addressed in a controlled and co-ordinated manner. This type of framework ensures that all project personnel are working and adhering to known standards and this approach has ensured a successful delivery of the ARRP Project across WAST.

Monitoring patient turnaround time

South Central Ambulance Service (SCAS) is the first NHS Trust to install a new patient handover system developed by ambulance services technology specialist Intergraph – and is measuring patient turnaround performance improvements of 50.7% (at Queen Alexandra Hospital), 47.1% (at Wexham Hospital) and 29.4% (Southampton General Hospital) where the system has gone live.

The "turnaround time" is defined as the time from the patient arriving at hospital to the ambulance being cleared and available for further, onward use. "Turnaround" can be further split into "handover" time and "clear up" time. "Handover" is the period of time from the patient arriving at hospital to the patient being handed over to the hospital staff. "Clear up" is the time from handover to the ambulance being cleared and available.

The "patient handover" screen allows SCAS operations centres to monitor the turnaround time of ambulances at hospitals to which they transport patients.

When an ambulance picks up a patient and reports that it is leaving the scene the crew is prompted by their in-vehicle mobile data terminal to indicate which hospital they are travelling to. Immediately an external-link website presents incoming patient information to that hospital, on-screen, including an up to the minute ETA for the ambulance. Each hospital is given a login and password to view its own incoming patient information, which is generated by the SCAS 'I/CAD' computer-aided dispatch system.

As soon as the paramedic team reach the hospital and hand over the patient they press an on-screen button in the Intergraph system to record the exact time of handover. Significantly, for the first time, in the new environment both handover and clear up times are now accurately recorded.

Being able to view incoming patient information in this way allows hospitals to improve the patient experience as they have better, earlier information, not only on ambulance arrival but also on incoming patient age, gender and medical status.

"This helps to ensure that patients receive care in a timely manner as hospitals can now plan ahead and be more proactive in their care" says Luci Stephens, SCAS Assistant Director, EOC. "Importantly it also makes SCAS a more active partner in the healthcare economy", Stephens adds.

The new environment also allows SCAS to improve vehicle availability. "We can now clearly see when incoming patient flow is slowing, and as the information is hospital-specific we can respond", Stephens explains. "We can also now get crews back on the road more quickly".

"Apart from performance improvement that saves time in an often life-critical environment, the biggest impact the system has had to date is to highlight the need for timely handover, within the hospital", adds Patient Handover System Project Manager Georgie Cole. "Now they know exactly what is incoming the hospital can plan ahead to build capacity".

Cole explains: "At every hospital where we deploy the system we create a project team comprised of hospital leads – who, importantly, are hospital staff – plus primary care trust members; a really multidisciplinary team". All hospital project teams have to agree improvement targets for the new patient handover environment.

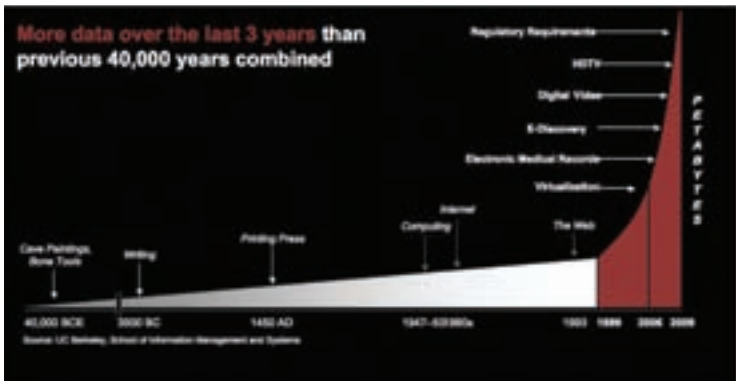
"When I first started working on the project it quickly became clear that being able to accurately measure handover time was key to the changes we needed to make", Cole says.

"Without that measurement we weren't able to hold the hospitals to account for their delays. Neither were we able to manage our own ambulance crew delays. In the past SCAS had been charging the primary care trusts (PCTs) for turnaround delays, while they in turn were trying to recharge the hospital, who might then point out that they did not wish to pay for non-active ambulance crews.

"The four hour target for Emergency Departments (EDs) exacerbated the problem: if there was as influx of SCAS ambulances and the ED was full, hospital would often make us wait until they could take an incoming patient", Cole recalls. "We estimated that 15,000 ambulance hours per annum we being lost, unnecessarily.

"But that is all changing. Measuring the handover process as we now do, accurately, saves time, money – and almost certainly, lives", Cole concludes.

Managing the data explosion



The traditional architecture for data storage involves estimating how much data will be required in the future and then migrating everything in the current system to a new one. But is this the best way to approach data storage in this data-hungry world, and are there any alternative solutions that are more cost-efficient?
Jose Sanchez de Muniain talks to Jeff Ready, CEO of Scale Computing, a US company that addresses this issue and which has announced its first UK customer – the London Metropolitan Archives.

Scale Computing has only been around for three years but since the launch of its third-generation storage solution 18 months ago it has quickly grown. To date over 1,100 systems have been shipped worldwide and its revenue is expected to hit $25m in 2010 – up from $550,000 in 2009.

In layman's terms

The traditional architecture model for data storage is not wholly different to buying storage for a laptop, explains Jeff Ready, in that a forecast of future storage is made and the necessary capacity is then bought and installed. "Carrying on the analogy, you buy the additional storage and hope that you don't run out before upgrading laptops."

In the world of data storage the norm is for a company to have a storage cabinet into which hard drives are slotted in until the last slot is filled. At that point, the decision has to be made on buying a bigger cabinet into which all data has to be migrated.

This brings a couple of issues into play. The obvious one is that data storage solutions are not low cost items and secondly the fact that an organization is investing in something it already has: "You are essentially repurchasing storage you are already using because if you are using 10 terabytes today, and you are replacing the data storage to 20 terabytes, the first 10 terabytes are used up as soon as you migrate the data over."

That might not be too much of a problem until it's placed in the context of global trends in data generation. "Half the data generated in the last three years' alone represents the entire data generated in all of human history. And the expectation is that in the next three years it will double again. A study carried out by the University of California, Berkeley, graphs this out and the slope of the line representing data growth is almost vertical."

Public sector organizations that try to forecast their future data needs in the view of trends such as these might be understandably worried. Forecasting data storage needs for the next three to five years is hard enough. Buying storage that reflects tomorrow's exponential growth trend at today's prices would, believes Ready, be prohibitively expensive. "I can guarantee it would be some ridiculous number you are not going to want to pay for today."

Scale out solutions

The unified protocol-agnostic and file-level system that has been patented by Scale Computing has on the other hand been designed to allow additional storage to be bolted on at the same pace as the needs in data storage increase. "You can buy less storage now than you would with the traditional model (as no migration is required), and you are able to buy storage at the current price of storage and not at yesterday's price. Everyone knows that the price of storage on a per terabyte basis is going down – today it might be 80 dollars per terabyte but 10 years ago it would have been 1m dollars. If you can delay your purchase you are not only delaying your expenditure but you are going to spend less when the time comes to buy capacity."

Part of the breakthrough revolves around the use of so-called Intelligent Clustered Storage technology, where the smallest-sized cluster consists of three nodes working together in a cluster. The system has been designed so that even if one node is lost, all the information and data is still accessible and online. "We do that by making one component redundant to another not within the same node but within the same cluster."

This approach differs to what Ready calls "the space shuttle" system, where if one circuit goes wrong then there is another one elsewhere that isn't doing anything and which can take over: "And that's traditionally how

Jeff Ready points out that there has been more data generated in the last three years than in the 40,000 years before that. Top slide: data from the School of Information Management and Systems, University of California, Berkeley

things have been architectured."

Another issue that this approach tackles revolves around the two different types of storage in general use – block storage and file storage.

"In a worst case scenario a person in IT may say, 'ok I'm going to spend X amount on a block storage system because we are deploying virtualisation software.' And then the following day a director comes in and says they need to store 10 terabytes of medical images, which would be better served on a file-based system – and you don't have it."

While small and mid sized IT departments might not have been faced with these types of nuanced storage problems, the concept of a unified (and scalable) storage system would address this type of problem by allowing the compartmentalization of terabytes for either block or file storage.

> "It is possible to deploy these storage systems in individual locations without it being incredibly expensive."
>
> *Jeff Ready, Scale Computing.*

In the context of public safety organizations Ready sees a particularly good match, especially in the case of small locations where data is being collected (eg video surveillance) and where having a data storage solution in multiple locations has hitherto not been financially viable.

"It is possible to deploy these storage systems in individual locations without it being incredibly expensive. Currently the most likely time for data collected from a remote location to be lost is during transit, before it makes it into the central repository.

"Now we can deploy a system that is as small as 1.5 terabytes, which is still three 500 gigabytes apiece. Most systems start at 10 terabytes which can equate to £100,000 for a system.

"This is why we have attracted a number of large enterprises too, such as Motorola – who aren't our normal customer base – because they were able to deploy our system in areas wherhe they didn't think it was possible to deploy, primarily because of cost."

Scale Computing's latest launch is the N05 starter cluster, a unified clustered architecture of both SAN and NAS arrays delivering enterprise features at an affordable price.

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