Integrated Roadshow

Promoting integrated ICT for civil contingency responders was the theme of the Arqiva-sponsored BAPCO roadshow that took place in Preston on the 15th of October. The complexity of the challenges ahead and the gargantuan efforts being made to overcome them were ably presented, reports the BAPCO Journal.

"There were five scenarios, all RTCs, all set in Shropshire. The largest scenario escalated into near riots, and the Gold Command was set up."

Simon Case, BAE Systems Advanced Technology Centre.

Project OASIS: Simon Case, BAE Systems Advanced Technology Centre

Starting in 2004 out of Framework 6, Project OASIS (Open Advanced System for Disaster Management) is a European Union project involving 15 partner companies in nine countries, and co-ordinated by EADS.

The OASIS Project addresses the strategic objective, "Improving Risk Management", of the second call for tender of the European Commission FP6 Information Society Technologies program. One of the goals of OASIS was to improve interoperability on a number of levels, and this is being achieved by the Tactical Situation Object.

The Tactical Situation Object (TSO) describes an incident, the resources engaged, and the tasks in progress precisely and unambiguously. The TSO is a schema that allows cross-service responsive information to be delivered in a form that can be used across national borders.

Essentially, explained Simon Case, this means that the same message can be seen and understood by a UK system as well as a Dutch one. This could include description of an incident, resources responding or available etc. The concept has been evolved and a number of trials taken place, and work on standardisation is going forward.

One trial took place in Shrivenham to ascertain whether the Tactical Situation Object (TSO) was an effective way of encapsulating information and passing it to other agencies. The users involved, were Shropshire Fire and Rescue, Cleveland Police, Thames Valley Police, East of England Ambulance, and the Highways Agency.

"We wanted to use a road collision scenario because it involved multiple services. We focused on command rooms, and how the system helped to escalate the information to gold command." The OASIS system takes the information from each service, passes it through an "adaptor" and then delivers it to others (if relevant).

"We could not get access to East of England's despatch system so we had to simulate it, using an ambulance data terminal. We then took the information out of that and into OASIS infrastructure." The same situation took place with the police data, but as regards fire, Imass joined the project and provided the GIS system with its own data network. "There were five scenarios, all RTCs, all set in Shropshire. The largest scenario escalated into near riots, and the Gold Command was set up."

Case shared a short video about the project, showing some of the comments from the participating agencies. One participant remarked, "We had the information from OASIS so we did not have to ring the other agencies. I think it helped and there were no glitches in the software. We used it and in one case it probably helped to save a life." Another remarked, "Today our scenario is far more than basic accidents. It's a complex scenario involving a stolen car, houses getting set on fire, and civil unrest. Now we have a near riot developing, and three senior users are pretending to be at home and have been called. I was called at home and I could access OASIS remotely so we were able to see various aspects."

Carrying on the presentation following the video, Case recapped. "We think it went very well. It reduced the use of telephone calls between control rooms, and reduced delays by being able to observe the responses from other services. Gold command appreciated having a common picture, and the users were keen to hold a live test. It also proved effectiveness via sharing that information across the control rooms. My favourite comment, however, was from the user that said, 'When it was switched off, I missed it.'"

The Interoperability Programme: Paul Kinsella, National Policing Improvement Agency

The Interoperability Programme is being headed by Michael Hallowes of the NPIA, and consists of Dave Lindridge (London Fire Brigade), Paul Kinsella (West Mercia Constabulary), and Paul Gibson (London Ambulance Service).

On secondment to the NPIA from West Mercia Constabulary, Chief Inspector Paul Kinsella started his presentation by pointing out that while everybody uses the term "interoperability", its definition is harder to pin down. "Across the years that I have been using that language I have never seen a definition."

This had prompted the team to seek its own definition, using as a basis the definition compiled by the Institute of Electrical and Electronics Engineers: "The ability of two or more systems or components to exchange information and to use the information that's been exchanged."

The team has added the words "organisations" and "decision-critical" to appropriate the definition to the emergency services. "Interoperability is the capability of two organisations or discrete parts of the same organisation to exchange decision-critical information and to use the information that has been exchanged."

While many reports have highlighted the need for the emergency services to talk to each other, and indeed a system will be in place allowing the communication between agencies and across borders, there is no current doctrine or working practices on how to make this happen.

Kinsella showed a graph created by the emergency planning college showing the information demand curve at an incident. It illustrated the tension between the demand for information at the start of an incident and the information available. "If you consider what OASIS was describing earlier, you can see how that information availability might start driving forward the three services. I talk of the three services but we should be doing the same for other categories."

Paul Gibson, the ambulance representative on the NPIA team has come up with an acronym for their principles: INTEROPS, which aims to deliver the vision of increased personnel and public safety through improved multi-agency communication and co-ordination.

"The first letter stands for 'integration', and we talk about a common operational picture. How do you co-ordinate all the information quickly so that all the three services can understand what's going on?"

The rest of the acronym reads: Normal business; Training and Exercising together; engagement (co-operation); Resilient communications; Operationally acceptable; Purpose (doctrine); and Subsidiarity.

Kinsella pointed out that there is currently no interoperability doctrine for Airwave. That will be the first hurdle, a mechanism for exchanging information across the three services and one that can scale up – but without requiring a new way of doing things.

Increasingly communications department are asked to do things differently, but fiddling with the fundamentals of working processes can affect the results. "So we have to make it work for the users."

Joint training and exercising is beginning to be developed, and ideally there would be multi-skilled tactical Airwave advisors that could advise across all three services. "But we need to build it to all levels, including Bronze."

Engagement and co-operation does not come just from having the right kit and right Airwave talk groups, he emphasised. In Shropshire for example there is a "Sleeping Silver" group that gets together to discuss their mutual contingency plans below the level of the West Mercia LRF. This group involved the individuals who would work together when a crisis occurred. "So we know the people involved and we have a good working relationship. When flooding came we each understood the others' roles and responsibilities and, most importantly, we knew and trusted our colleagues. Joint training, exercising and working can support trust and understanding."

Kinsella then talked about some of the work he is currently doing with the NPIA. One of the projects involves the development of a joint doctrine with a clearly articulated common aim, which will provide a framework for other Category 1 & 2 Responders (CCA 2004). "The NPIA creates various doctrines, covering a spectrum of policing activity; this is different in that it is for the health service, CFOA and CCS. While it is a doctrine written by the NPIA it is not NPIA doctrine but triservice."

The last part of the vision principles is "subsidiarity", a new term drawn from the CCS principle of operations which describes devolving decisions to the lowest appropriate part of a hierarchy. The Interoperability Programme use it to describe capacity to exchange mission critical information to achieve a common operating picture at the appropriate level.

The emergency services now have the means, he said, and Airwave allows communication with other agencies. The aim now is to get to the stage where training with other agencies becomes business as usual. Airwave in London Underground is currently being tested and how the three services work in that environment is being looked at. He also mentioned the approach taken in Wales and the commitment made by the Welsh Assembly to the three services working together there. Describing the challenges, he said, "We have to work out what training and exercising looks like. There are many silos within the environment and a lot of positive work is going on but frequently we don't know what is happening next door."

Following on from Kinsella's presentation there were many concerns to address from the audience.

"When flooding came we each understood the others' roles and responsibilities and, most importantly, we knew and trusted our colleagues. Joint training, exercising and working can support trust and understanding."

Paul Kinsella, National Policing Improvement Agency.

Opposite page: The Shrivenham trial ascertained that the Tactical Situation Object was effective in encapsulating information for other agencies. Above left: The Future for Information Sharing roadshow took place in Barton Grange Hotel, Preston, in October.

Exhibitors at the Preston roadshow were: Tait, Cyfas Systems, APD, Arqiva, European, Antennas, Traka, Autopage, Samdale, PJ & RHS, Panorama, Microbus.

BAPCO President Ian Readhead pointed out that BAPCO was attempting to create a nationally-accredited control room standard and asked whether Kinsella felt that that kind of initiative would be a useful enabler. "I think there is a need but I'm not sure about a willingness." Kinsella added that he'd created the idea of a 'superior controller' that would draw information from all three services to oversee joint operations and provide interoperability. "And there are assumptions that we all work the same way and, having discussed it with my fire and ambulance colleagues I'm not convinced silver and gold mean exactly the same for fire, police, and ambulance."

One delegate asked when he could expect to receive guidance on interoperability across all three services, and Kinsella said that category 1 guidance should be concluded around March next year.

Project SECRICOM – Seamless Communication for Crisis Management: John Stoodley, Ahmed Aldabbagh and David Traynor of QinetiQ

SECRICOM (Seamless Communication for Crisis Management) is a collaborative research project of the Seventh Framework Programme (FP7) aiming at the development of a reference security platform for EU crisis management operations. It emerged after September 2006 when the European Security Research Advisory Board (ESRAB) published a report setting the European security research agenda that contained basic requirements. The project consortium consists of 13 EU organisations, coordinated in the UK by QinetiQ Portsdown, which is represented by Mr John Stoodley (Project Manager), Dr Ahmed Aldabbagh (Technical Lead) and Mr David Traynor (Exploitations).

"We don't want this to be just a research project that sits there, we want it focused and to identify where ideas can be further exploited," explained David Traynor.

Ahmed picked up from David. "This project is not only aimed at the UK emergency services but also spans across Europe. Being driven by the European end user requirements means that interoperability problems are at the heart of this project. As we learned earlier, trying to integrate the UK emergency services is difficult. Here, we have to achieve integration across international boundaries as well." Clearly, the project team's ambitions are to solve or mitigate current problems in crisis communications infrastructure, and add usability while helping tri-collaboration and interworking between different emergency responders across Europe.

Dr Ahmed Aldabbagh, QinetiQ, presented on project SECRICOM.

Ahmed outlined some challenges for the technological solution developers in terms of reliability, security, applications and infrastructure, adding that at the centre of the information delivery system there had to be a dynamic system management and control capability. To cater for the need for governance, "elements of confidentiality, integrity and availability are necessary to address questions such as who needs to know what, how accurate information is and what is the point of having a multibillion dollar system that isn't there when you need it?"

SECRICOM is being designed to use multiple communications bearers – including legacy equipment. "We don't want to exclude anyone out of the game," said Ahmed. Multiple bearers increase resilience and ensure information delivery; irrespective of whether by carrier pigeon or fibre optics, "this is all about information and the guaranteeing of its delivery."

The emerging IP version 6 standard has been chosen as the communication protocol. This is because of its non-proprietary "open" nature that inherently brings technological interoperability and overcomes some of the shortcomings of the current IP version 4 standard, as used by the internet, particularly with regards to exhaustion of address space and security.

SECRICOM is likely to adopt an overlay network infrastructure, neatly bypassing legacy problems that would inevitably cause problems if they were to be connected together with a simple interface. "Why do we like this approach? By their nature, the availability of a given network changes in time. An overlay network built upon a number of other networks has the ability to present a fairly static network to the end users given the time-varying networks upon which it is built. Clearly, this approach has an inherent robustness providing graceful degradation, recoverability (e.g. self-healing) and extendibility capabilities. User mobility is well catered for by the architecture leading to an increased level of communications sustainability in areas of where current communication coverage is low. It is also the means to bring different people and technology vendors to the party, along with IP version 6."

David concluded by saying that the project aimed to make the end user agnostic to the technology and to demonstrate it as such. "The program has just started so we can only say what we think the problems are and outline our aspirations within our intended road map."

Project MESA – high bandwidth, self healing communication networks applied to highways emergencies in England: Peter Kenington, (Highways Agency/WSP/Linear Communications)

Project MESA is the name given to the research and development work that the Highways Agency (HA) is currently undertaking to examine the use of mobile broadband technology to enhance the communications capability for its Traffic Officer Service as well as improve inter-working with the emergency services. Peter Kenington, speaking on behalf of the HA's Project MESA team, presented on MESA system's capabilities.

Besides the benefits of improved inter-working and data sharing with the emergency services, MESA technology

could potentially reduce the time taken in clearing incidents on the strategic road network.

By providing more information quickly to those in command of an incident, and by providing higher quality information to those attending, response units can be better equipped to deal with that incident efficiently.

The HA MESA Project is not to be confused with the International Standardisation activity, also called Project MESA, which is a joint initiative between the technology standards bodies ETSI (European Technical Standards Institute) and the TIA (Technology Industry Association) in the US, explained Kenington. Project MESA is an international partnership producing technical specifications for digital mobile broadband technology, aimed at the sectors of public safety and disaster response.

A local MESA network would be formed using both infrastructure radio nodes located on the roadside as well as vehicle radio nodes located in the responders' vehicles.

To communicate with the HA and/or other emergency service control centres a MESA network would utilise whatever infrastructure is available at any given time and location, such as satellite, wi-fi, cellular, etc. In the context of the UK's roads, this can be the fibre-optic network that runs throughout the motorway network.

"If there is no communications infrastructure then the vehicle based nodes will talk between themselves forming a local incident area network. This would allow responders to an incident to talk and work with each other even if there is no communications path to a regional control centre. If a user's vehicle radio node fails or the vehicle leaves the scene (e.g. an ambulance), the network will automatically take that into account and will 'self heal'. It will seamlessly heal around the part that has disappeared and communications will continue uninterrupted."

Peter explained, "A person (for example, an HA Traffic Officer) arriving at an incident could become the main node or hub of the network, and as other responders arrive they become part of the network as well. Nobody has to press any buttons to join or leave the network and, if another vehicle arrives and has a better communications link to the backhaul infrastructure, the network will reconfigure itself and route traffic through the optimum path."

Eight months ago the HA MESA team put together a demonstration to show that the concept is realisable with today's COTS (commercial-off-the-shelf) technology. The demonstration took place in a hilly area with lots of trees and buildings, no direct line of sight between the radio nodes as well as a steep hill. One of the reasons for choosing this site was that it presented significant communications challenges. If the concept was shown to work there, then operation in a motorway environment should prove reasonably straightforward.

The hardware used for the demonstration included vehicle nodes similar in size to that of a wi-fi home router or A5 note pad, which sat in the vehicle connected to an external antenna. The vehicle antennas can be little bigger than a £1 coin. The roadside nodes used were about twice the size of the vehicle nodes and were mounted on temporary masts, also fitted with external antennas.

In the demonstration, a webcam mounted on the dashboard of a vehicle provided video images from the scene of an "incident". Peter presented recorded video clips taken during the demonstration and drew the audience's attention to the data rate of 4Mbps. "We deliberately picked high data rates to stretch the system's capability, but we would not use that in real life."

MESA trial: full duplex voice using VOIP – Voice over IP.

Two video clips were shown, including the high quality images transmitted from a vehicle driving around within the MESA incident area network, followed by the vehicle being parked and the camera viewing the people moving around outside whilst attending the 'incident'. These images could be viewed by anyone with access to an internet-browser. During the demonstration the images were viewed on a laptop within the MESA local incident area network as well as on a PC from a remote office location many tens of miles away.

High resolution still images were also demonstrated. Pictures taken on a standard 10 megapixel camera were immediately transmitted across the network. Within seconds they had been received on a laptop in one of the team's vehicles. The images were also immediately and automatically uploaded to a photo sharing website whereby control room staff or incident commanders would be able to view the images without delay.

A public photo sharing website was used for the purposes of the demonstration; for an operational system a secure emergency service data sharing page should be created. Alternatively the Civil Contingencies Secretariat (CCS) Extranet or the OASIS tool could be used for this purpose.

Phase I of the MESA project comprised a feasibility study, and Phase II focused on the demonstration and research into the HA's user requirements.

"We are now in Phase III, raising awareness amongst the police, fire and ambulance authorities, promoting the goal of enhanced inter-working between the HA and the blue-light emergency services. The idea is that this system enables and encourages interoperability, sharing data, moving video and hi-resolution stills images, as well as providing the ability to download information such as lorry manifests, detailed traffic management instructions or perhaps accessing some of the pages that the CCS presented earlier in the day."

Peter concluded by saying, "We are very open to any input. Maximum value will come from having multiple users and we would like to hear from you regarding your interest in the system, how you would use it and any issues we should be aware of. Ultimately we would like you to be involved, to equip your vehicles with this technology and ensure we all have the capabilities to use it."

"Maximum value will come from having multiple users and we would like to hear from you regarding your interest in the system, how you would use it and any issues we should be aware of."

Peter Kenington, speaking on behalf of the HA's project MESA team.

On show was the new Samdale Pegasus system, an integrated real-time TETRA service monitoring and optimisation system.