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Primetech and Aireshelta support Surrey's new state-of-the-art ICU



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Surrey FRS's state-of-the-art ICU delivers outstanding flooding performance

Primetech's advanced communications technologies (including High Definition incident ground video imagery, a fire sector first), and Aireshelta's shelter system, have been combined to create a spacious new ICU for Surrey FRS, which proved itself highly capable in the recent floods.

When Surrey Fire and Rescue Service's new ICU vehicle was deployed to provide communications support for the service's wide-area, multi-agency flood rescue operations along its sector of the flooded river Thames in early 2014, the benefits of the service's communications planning were apparent for all to see. Under very difficult conditions, the service was able to deliver very high levels of satellite broadband command communications, both for itself and for all local emergency services.

This was as a result of in-depth strategic incident command planning by Surrey FRS, plus the support of mobile satellite broadband supplier Primetech. Using Primetech's Ka-band systems, the service was able to provide high bandwidth mobile satellite broadband capacity for emergency command teams from all local emergency services and agencies.

But mobile satellite broadband, using the new Ka-band frequency (which delivers higher data capacity than the older Ku-band system) is not the only distinguishing feature of the Surrey ICU. The unit is also able to collect and transmit high definition video imagery from around an incident ground, from body-worn and aerial cameras, a major breakthrough in command communications.

Another unique feature of the Surrey ICU is the space provided by its unique large L-shaped shelter, supplied by leading shelter manufacturer Aireshelta. With the space provided by the shelter the unit is able to handle, simultaneously, a diverse range of command functions, from IT and communications support to command meetings, administration and briefings. Shelters made in new, lightweight fabrics reduce the weight carried and are easier to deploy.

Surrey FRS's new ICU was deployed to its Chertsey station (a few miles south west of Heathrow) which was the incident joint forward tactical operating base for around two weeks in mid-February, during the height of the flooding crisis. Based in the station's car park, and connected into the main building, it was able to provide previously unobtainable levels of satellite broadband communications capacity in support of command and field teams from the fire service itself, along with police, ambulance and other agencies, the local authority and volunteers, as they battled to help local communities.

Primetech's advanced communications technologies (including high definition incident ground video imagery, an industry first), and Aireshelta's shelter system, have been combined to create a spacious new ICU for Surrey FRS, which proved itself in the recent floods

That it was able to do so was no accident. Surrey FRS's new ICU probably represents the state-of-the-art in ICU thinking. When the service identified a requirement for a new, next-generation ICU it looked into the issue in great depth.

After the management team had set the strategy for incident command the project team looked at what functionality was required to deliver on the strategy. The ICU would be one of a number of vehicles and systems Surrey FRS planned to use for incident command, albeit the most sophisticated in terms of its technology and functionality.

Surrey FRS has a step approach to incident command. The larger the incident the more tools and functionality are rolled out to provide the command infrastructure. Incident commanders are trained to understand and use these tools to be able to perform their management of incidents. The ICU is used as part of this overarching command strategy

The service has rapid command units, which are converted Combo vans that carry a small Aireshelta, whiteboards and documentation, but are without satellite communications. At the next level is the Forward Command Unit, based on a Ford Transit van, which has satellite communications technology from Primetech, a laptop and tablet computers, and a high level of communications. It can be a hub for incident command and is used for more significant



The large additional space provided by Aireshelta's L-shaped shelter means the Surrey ICU is able to handle, simultaneously, a diverse range of command functions, and the overall size of the ICU vehicle can be reduced

incidents but is also available for quick response.

The main incident command unit is interoperable with the other vehicles. It can be interconnected fully with the Forward Command Unit and is used for major incidents, to provide much more advanced levels of functionality to joint silver commanders. The complete system is looked at as an integrated package. If one vehicle drops out of the system, for example if it needs to be serviced, then there is resilience. No individual vehicle can ever be available 24/7 all year round, so the service has a structured approach to ensure a command vehicle is always available.

Surrey had some vehicles that it could have converted. The old ICU vehicle would have required a lot of capital expenditure to bring it up to standard and was already many years old so it was decided to acquire a new vehicle platform.

The Ku band was also looked at for satellite communications but it was thought that there might be capacity issues. In particular, there were concerns about situations such as the London bombings, when the internet was overloaded, and if under similar conditions the service would lose capability. At that time the Ka-band system was being developed, so the Surrey ICU team did a lot of work with Primetech to determine where the Ka-band system was going supported by in-depth testing. It was found that, even in the early days, the Ka-band receivers were working very well in Surrey and around the borders of Surrey.

The service looked at the long-term benefits of the Ka-band, bearing in mind that it was buying a vehicle that needed to be future proofed. Surrey was originally going to have one Ka-band receiver on its main vehicle and a Ku-band receiver on the Forward Command Vehicle, but by the time the service was due to go live it asked Primetech to swap out the Ku receiver and put a Ka one in instead. Staff are delighted that they did so, because this vehicle has cameras as well, and with Ka it now has extra capability to use high definition video. Henry Walker at Primetech was praised for helping Surrey to find solutions, for going the extra mile to help out. Surrey took delivery of the vehicle in January 2013.

Working with multi-agencies was a key part of the planning for the ICU. There was a definitive user requirement stating what was required in terms of inter-agency liaison: being able to have access to the media, for conferencing, briefing crews, holding silver command meetings, and collecting information. All this went into the service's specification, as it is now doing more 'blue light' preparation than at any other time, working closely with the police, the ambulance service and the local authority on interoperability. The project team worked with other agencies in defining the specification, and they are continuing to work with other agencies now.

The service is anticipating that the use of high definition video at incidents will have a major beneficial impact. It is also in the market for two new aerial appliances, and part of that requirement will be for HD cameras. These aerial appliance-mounted HD cameras will allow commanders to access superb overhead video imagery in the command vehicle, for monitoring wild fires, other major fires and flooding incidents.

"Working with multi-agencies was a key part of the planning for the ICU"

Part of the rationale for specifying Ka-band has been not just to see benefits in the short term but also to see benefits in the medium term. The vision is that senior strategists and commanders will be able to sit in Gold command and monitor images in high definition beamed back from the incident area, to allow them to support decision-making. The service has laid firm foundations by investing in these new technologies.

Surrey has one helmet-mounted camera for beaming imagery back to the ICU. That was partly so managers could see what could be achieved. It is currently looking towards the possibility of more widespread use of helmet-mounted cameras in the future, and the possibility of imagery being viewed more widely throughout the County Council, using web-based technology. It is considered to be work in progress at the moment but early signs are exciting.

Regarding incident ground Wi-Fi, the vehicle already establishes a Wi-Fi network, covering an area of up to 500 metres, depending on ground conditions and other buildings. It is excellent around the vehicle and within the Aireshelta area. Incident ground Wi-Fi is another area that Surrey wants to enhance, and Primetech has now developed a Peli-case mounted portable Wi-Fi unit using COFDM communications technology.

One of the reasons Surrey chose Primetech for its ICU communications was the research and development capability and expertise the company provided. The company has been working with Surrey FRS to improve systems and support its requirements. Surrey wants to enhance the spread of its wireless network, and is already looking at a project to use tablet-style computers for sector commanders and other officers around the incident ground.

When the team was defining how it wanted the ICU and its associated shelter configured they decided that they needed three distinct areas: an area where skilled operators could work, working with IT, broadband, Wi-Fi, radios etc; they wanted an area where senior commanders could meet and make plans, again with IT support; and they wanted another area where they could hold meetings and conduct briefings for crews. That is why it specified the very large, L-shaped Aireshelta. The shelter is quite unique, because it creates a number of work spaces around the vehicle, tripling it in size.

Aireshelta is a leading international shelter maker based in the UK. It also manufactures decontamination, medical support and other shelter types, using both continuous air and sealed beam construction.

Surrey FRS worked very closely with Aireshelta. Aireshelta designed the L-shaped shelter specifically for Surrey FRS. In addition to being very big, it is free standing, providing added



Incident Command Unit - Surrey FRS's new ICU, with Ka-band satellite communications supplied by Primetech, can receive and transmit high definition video, an industry breakthrough

flexibility. So, if the service has an incident such as flooding, it could, if required, set the shelter and vehicle up, and while still conducting incident command in the shelter the vehicle can be driven away. This aspect had a lot of thought put into it. The shelter can also have external monitors mounted, so that crews can be briefed, on incident layouts for example.

The ICU has CCTV on board, so it can record all the actions and messaging for post-incident reviews, learning and health and safety. The ICU continues to evolve, however; development is not fixed, and it is a work in progress.

Concerning staffing and training, the ICU has specialist operators on board but Surrey also currently has trained firefighters who understand and can use the functionality of the vehicle, and Surrey has held a series of exercises to consolidate this.

Rory Coulter is head of logistics at Surrey FRS, in charge of all of the service's vehicles, IT and buildings. "Three Bronze commands were running for the February flooding, at Sunbury, Walton and Chertsey. It was decided that Chertsey would be the incident joint forward tactical operating base, acting as the joint tactical focus and forward logistical interface and be the lead of the three stations for the flooding, and that the ICU would be based there.

"Initially the ICU was set up at the front of the station for Bronze command. It was later decided to move the command team into the building, but still to use the facilities that the vehicle could provide, using the satellite to give them a better network. So a far better link into the command structure was established using the vehicle rather than by using the station alone. It was deployed for around two weeks, for the worst of the flooding being around the weekend of Valentine's Day, the week before and the week after.

"Ka-band gave us a much better broadband capacity than we could achieve within the station. But it wasn't only us using the station; it was all the other agencies – the police, the HART teams, the local authority, plus volunteers. The station became the hub of everything for our area of the river Thames. New Dimensions national resilience coordination also had its own control set up at service HQ at Reigate, liaising with Chertsey.

"Staffing was with teams 24-hours-a-day. We wouldn't have been able to provide the level of information transfer which they achieved without the Ka-band communications systems of the ICU vehicle. Following the wind-down we will now be undertaking a post-incident review."

"Ka-band gave a much better broadband capacity than could have been achieved within the station"

Commenting on Surrey FRS's use of Primetech's Ka-band mobile satellite broadband systems and high definition video imagery, Henry Walker of Primetech, said: "We are delighted we have been able to support Surrey FRS during this highly stressful and difficult period.

"In the mobile satellite communications arena Ka-band is the newer emerging technology and we are now supplying this technology to Sky News, who are using it to transmit HD news video in the broadcast field. A key feature of Primetech's approach to its markets is the introduction of cutting edge emergency management technologies and communications solutions which deliver real benefits for fire, police and ambulance services.

"The new ICU supplied to Surrey FRS incorporates video recording equipment enabling the unit to send full High Definition video from the command vehicle back into the command headquarters over the Ka satellite system. Two areas have come together here. We have used our expertise from the Sky arena, delivering daily high quality video technology from their vehicles to the broadcast studios, and taken that technology and implanted it into the HQ and ICU, so the emergency services are now able to do the same thing as TV broadcasters.

"We have brought the two industries together, allowing the emergency services to have the same high quality video as broadcast TV. Before we had the incredibly large bandwidth capability of Ka we couldn't do this.

"Other technology on the Surrey FRS vehicle includes COFDM cameras. Body-worn cameras send imagery via COFDM to both the main vehicle and a support vehicle. These also both have Wi-Fi technology delivering capability onto the incident ground for tablet PCs and ruggedised laptops.

"The benefits of Wi-Fi- which can be limited because it is a very congested network – can be spread across incident grounds using Primetech's own incident ground solution – a COFDM drop-down unit housed in a small, battery-powered Peli case unit. This is a COFDM/MESH node that can be taken away from the command vehicle and positioned so that it can create a link from the box back to the command unit."

Kevin Bradley of Aireshelta said: "The shelter we have designed and developed for Surrey FRS shows how emergency services of all kinds can expand substantially the amount of space they can provide for emergency teams, at a very reasonable cost. As a company that specialises in the manufacture of inflatable shelters, which are quick and easy to deploy, robust and very flexible in terms of designs and sizes, we are delighted that Surrey FRS has shown how such a shelter can be used to obtain maximum benefit from their investment in their advanced ICU."

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