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Committee for Socio-economic Analysis (SEAC), Draft Opinion, on an Annex XV dossier proposing restriction on PFOA, its salts and PFOA-related substances, 10 September 2015, p14.

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Front cover artwork by: DarrenSmall, www.smallphoto.co.uk

INDUSTRIAL FIRE JOURNAL FIRE & RESCUE FIRETRADE EUROPE FIRETRADE ASIA & MIDDLE EAST

EDITOR'S COMMENT

The US Federal Aviation Administration's rules on commercial unmanned aerial vehicles (UAVs) were relaxed in July 2016, which is expected to provide a massive boost to the uptake of this technology. The fire industry is no exception, and experts believe that drones will find their way into every fire service within the next five years. The potential of drones for firefighting and disaster response is enormous, as they can be deployed in locations where the fire and rescue service previously had no access to help provide situational awareness. Multiple fire departments are already heavily investing in the technology, and despite the fact that manufacturers are now starting to equip drones with thermal imaging cameras, we are only just scratching the surface of this technology.

Another recent high-impact technological development was the launch of Pokémon Go. Huge numbers of people are now playing this Augmented Reality game, sometimes putting themselves at risk in their efforts to catch Pokémon, and by doing so creating a headache for the emergency services. However, this technology also has major potential for the fire service. Associate Professor Dr Ian Greatbatch from Kingston University was partly responsible for the development of the technology, and he argues that Augmented Reality can become an invaluable tool for the fire service to improve situational awareness and provide a clearer operational picture. Enjoy!

Ann-Marie Knegt, Editor

Entries now open for the International Firefighting Team of the Year Award

Entries open…

Do you have what it takes to become the International Firefighting Team of the year 2016? Firefighters from all over the world can now submit their most courageous, technically advanced and most unusual call outs in order to compete for the International Firefighting Team of the Year Award and win a trip to New York.

The winners of the Conrad Dietrich Magirus Award will be flown over to the US to visit the Fire Department of New York, and all finalists will get to attend the awards ceremony in Ulm in Germany.

Submissions should contain stories about courageous rescues and innovative strategies, as well as exciting or intricate firefighting and technical rescue missions. A jury of firefighting experts will assess every entry and select the finalists. The winners of the International Conrad Dietrich Magirus Award 2016 will subsequently be chosen by public online vote and via a further selection process by the jury. Fire brigades from all over the world can find more information on how to apply at www.magirusgroup.com/award. The deadline for submissions is 2 October 2016, and the online voting will take place from 14 October until 11 December. All incidents must have taken place after 1 October 2015, and all types of fire and rescue teams can apply, including volunteer, professional and industrial fire brigades.

Magirus is the organiser of the award, and hosts the award ceremony every year near its headquarters in Ulm. This year's event will take place on 27 January 2017, with over 700 invited guests attending the lavish ceremony. To find out more, visit: www.magirusgroup.com/award.

Terberg DTS to launch compact aircraft incident response vehicle

Terberg DTS's fire and rescue division will launch the latest model in its TACR compact aircraft vehicle range, the TACR4, at the Emergency Services Show in Birmingham (UK) from 20-21 September. The new multi-role TACR4 is built on the Mercedes Sprinter 6x6 chassis, which is supplied by Rossett Mercedes in partnership with Oberaigner Automotive in Austria. The 6x6 is fitted with a selectable low range transmission and independent axle differential locks, ensuring a very high level of off-road mobility. The vehicle's multi-role capability enables the units to be used not only in an airport environment but also in the local authority, industrial and military market sectors. Alisdair Couper, managing director of Terberg DTS UK, explained: 'With its high level of mobility, effectiveness and supportability, the unit can be reconfigured very quickly to suit various incident types, for example, from wildfire applications in summer seasons to flooding or technical rescue applications.' The TACR4 can carry 1,400 litres of water and 80 litres of foam and is fitted with the Hale HPX pump, producing an output of over 900 litres per minute. The vehicle has a pump and roll capability, which allows the front-mounted monitor to be controlled from inside the crew cab while the vehicle is in motion, making it ideal for airport firefighting and also wildfire applications. The vehicle carries a wide selection of equipment with the option for it to be configured to the customer's final requirements.

Scott Safety to launch in-mask thermal imaging system

Scott Sight, the firefighting industry's first ever in-mask thermal imaging intelligence system from Scott Safety, will be launched at the Emergency Services Show 2016 on stand B69. The show will be held on 21-22 September at the NEC in Birmingham.

Scott Sight works with hands-free thermal imaging technology to provide firefighters with a clear, unobstructed view of their surroundings, thus improving their situational intelligence and eradicating the need to stop searching or put the hose down to deploy a hand-held camera.

Despite weighing only 8.5 ounces, Scott Sight is very powerful. It produces 160x120 resolution at nine frames per second through an infinity lens, which ensures a clear picture with no eyestrain.

Longin Kloc, global product manager, Growth Initiatives, from Scott Safety, said: 'We are extremely proud to launch such an innovative product for the firefighting industry. Scott Sight really is a sophisticated imaging tool. It supplements existing hand-held technology by offering configurable hands-free visibility to the wearer in often inhospitable situations.

'To create Scott Sight, we worked very closely with firefighters to develop a thermal imaging solution that is more accessible and easier to use. This means that the wearer's attention can stay focussed on the fire, enhancing the ability to spot hazards and locate casualties, while also providing the means to identify a secondary egress in the event of a sudden change in circumstances.'

LONDON FIRE BRIGADE PACKS AWAY 20,000 OBJECTS TO PREPARE FOR NEW FIRE MUSEUM

Around 20,000 fire-related artefacts and items of memorabilia are being painstakingly packed away in preparation for the London Fire Brigade's new museum, which is opening at the Brigade's former headquarters on Albert Embankment. The artefacts include over 400 tunics and pairs of trousers, around 350 helmets and eleven vintage fire engines, which had to be hoisted onto special flatbed trucks.

The majority of the museum's artefacts at Southwark Bridge Road, which date all the way back to the Great Fire of London in 1666, have been packed away for safekeeping until a new permanent museum is built. Items from the Great Fire include artwork from the 17th century, leather buckets, and a water squirt that was used to put out fire.

From 1966 the museum was based at Winchester House, which was home to the Brigade's first Chief Officer, Captain Sir Eyre Massey Shaw, in the 19th century, but closed its doors to visitors in September 2015 following the sale of the site.

Plans are afoot for a new museum based at the former headquarters at 8 Albert Embankment – the original home of the museum prior to 1966. It will be part of the Brigade's work with its developer partner, U and I Group Plc, on a major multi-million pound redevelopment scheme. The plans will also see an upgrade to Lambeth fire station and a brand new community hub within the next three to five years.

TAIPEI FIRE DEPARTMENT AWARDS PPE ORDER

The LHD Group Deutschland (LHDD), known for its protective clothing range from Lion, has been awarded a major contract by Taipei City Fire Department.

Following a competitive tendering process, the Taipei City Fire Department has chosen firefighting garments from Lion. The fire department said that the clothing range exhibited a convincing and exceptionally high level of wearer comfort and safety features, combined with materials such as PBI Matrix and Gore-Tex membrane.

Daniel von Chamier, COO of the LHD Group Deutschland, said of the order for 760 protective suits: 'It is not only quality that wins the day; fire services also expect constant progress in protection and wearer comfort in their apparel. As a company we like to constantly excel ourselves.

'In order to achieve this, LHDD caters for the individual wishes of the customer, and the garments for Taipei are not just an off-the-peg product but instead have been specifically designed to meet the customer's requirements,' he concluded.

The fire services in Wuppertal, the district of Offenbach and Hamburg are some of the major customers of LHDD in Germany.

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NFPA'S FIREFIGHTER FATALITIES REPORT SHOWS A DECLINE IN ON-DUTY FIREFIGHTER DEATHS IN 2015

The National Fire Protection Association (NFPA) has released its annual US Firefighter Fatalities report, which showed that a total of 68 firefighters died while on duty in the United States in 2015. This represents the fourth time in the past five years that the total number of deaths has been below 70. The number of deaths of volunteer firefighters was the second lowest total ever reported, with 32 deaths.

The largest share of firefighter deaths occurred while firefighters were operating at fires (24 deaths), accounting for just over one-third of the on-duty deaths last year. This is the fourth time in the last six years that the total has been fewer than 25 deaths.

'For several years, the number of on-duty firefighter deaths averaged around 100 per year, but recently there's been a fairly consistent decrease in the annual totals,' said Rita Fahy, NFPA's manager of fire databases and systems. 'The 10-year average has now dropped from approximately 100 firefighter deaths to 81.'

Of the 68 firefighter fatalities last year, 32 were volunteer firefighters, 24 were career firefighters, six were employees of federal land management agencies, three were federal contractors, one was an employee of a state land management agency, one was a civilian employee of the military, and one was a state prison inmate.

Overexertion, stress and medical issues accounted for by far the largest share of firefighter deaths. Of the 40 deaths in this category, 35 were classified as sudden cardiac deaths, usually heart attacks, with onset while the victim was on duty. This reflects only one less death than the 2014 total, reinforcing last year's finding, which showed that the general downward trend in on-duty sudden cardiac deaths since 2007 has stopped. Cardiac-related events accounted for 51% of the deaths in 2015, and 42% of the deaths over the past 10 years.

NEW TACTICAL ARFF SIMULATOR IS DESIGNED FOR EASE OF TRANSPORTATION

Rosenbauer's Panther tactical simulator is now available as a mobile, stand-alone training system that can easily be transported between fire stations.

The new simulator is housed in a ro-ro container swap body vehicle and only requires a 400V electricity supply for operation.

Two sections make up the unit, a simulator and an instructor room, both fitted with powerful air-conditioning units. The simulator room is an exact replica of the Panther cockpit, with seat, steering wheel and joysticks in the same place. The steering has been designed to provide feedback on terrain, for instance, as regards steering resistance and automatic redirection when emerging from bends. The view from the cockpit is projected on 140cm, ultra-high-definition monitors with two screens forming the front windshield. Two more screens represent the left and right lateral windows with integrated rear view mirrors, while a roof monitor shows the extinguishing arm and the roof monitor.

The US Army stationed in Germany has become the first customer to use the mobile Panther tactical simulator.

DUPONT TO PAY US$5.1 MILLION IN DAMAGES

A jury in Columbus, Ohio, has found Dupont liable for a man's testicular cancer.

During the trial, David Freeman claimed that Dupont had knowingly dumped perfluorooctanoic acid (PFOA) – also known as C8 – into the Ohio River. This is the second payout for contamination with C8 chemicals.

Freeman lived in Little Hocking, Ohio, which was served by the largest rural water system in Washington County. Little Hocking Water Association last year settled its lawsuit against Dupont for polluting its well fields.

Freeman had alleged that Dupont was aware of the potential toxicity of C8 as early as 1954, and that its own researchers knew that it was toxic by at least 1961. Plaintiffs argued that the company didn't inform the public of the hazards of C8 until 2012, when it was forced by regulators to fund a comprehensive study that found probable links between C8 exposure and certain kinds of cancer.

PFOA is a synthetic perfluorinated carboxylic acid and fluorosurfactant that was used in the manufacture of Teflon as well as aqueous film-forming firefighting foams. This is among the first lawsuits to go to trial from around 3,500 other personal-injury lawsuits set up in 2013 that allege Dupont dumped the chemical into the Ohio River from its Washington Works plant near Parkersburg, West Virginia.

Last year a jury awarded US$1.6 million in compensatory damages to kidney cancer survivor Carla Bartlett who sued over the contamination. In contrast with Bartlett's purely compensatory damages, Dupont is now also facing punitive damages after the jury found actual malice in the latest verdict – the first of the Dupont C8 trials to result in such damages for the plaintiff.

Dupont's shares declined by 1.8% following the verdict on 6 July. While Dupont is the named defendant in the case, a recent spin-off of its performance chemicals segment, Chemours, will cover its liability. Chemours' shares dropped more than 22%, and it has said that it will appeal the verdict.

The verdict has been welcomed by Keep Your Promises, a community-based organisation that is dedicated to holding Dupont to the promises it made to the people of the Greater Mid-Ohio Valley in connection with the C8 exposure.

Austin Fire Department receives first large-scale mobile ventilation unit

In May, the Austin Fire Department (AFD) took on a truck-mounted, large-scale mobile ventilation unit coined the Smoke Buster. The acquisition of the ventilator was the final result of nearly 18 months of testing and research.

AFD began the initial purchasing process in 2014 when it solicited the help of some local university engineering students. They ran a number of ventilation tests and simulations within large structures. Simultaneously, the department used the opportunity to evaluate a number of mobile ventilation products from some leading manufacturers in the world. The conclusions of the study were clear: particular incident types require large-scale ventilation beyond the level that traditional positive pressure ventilation (PPV) and positive pressure attack (PPA) fans are capable of.

Austin needed access to such a solution. AFD's Smoke Buster uses a Tempest MVU-L125 mounted in the bed of a Dodge Ram heavy-duty diesel pick-up truck. The final custom fabrication and installation of the apparatus was delivered by Skeeter Brush Trucks out of Hillsboro, Texas.

The Smoke Buster was showcased at Tempest Technology Corporation's booth at FDIC 2016 in Indianapolis. Tempest has more than 200 similar ventilators in operation around the world.

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21-22 SEPTEMBER, HOME SAFETY 2016, NEC, BIRMINGHAM, UK

Fire and rescue services will share details of how they are collaborating with other partners to help people live safely in their homes in a new show taking place at the NEC, Birmingham. Running alongside the annual Emergency Services Show, Home Safety 2016 will comprise a free two-day seminar programme and a dedicated exhibition showcasing specialist equipment for the safe home. The new event is supported by the Chief Fire Officers Association (CFOA) and the Fire Kills campaign.

Opening the Home Safety 2016 seminars, Ged Devereux, health improvement manager, Public Health England North West (currently seconded to CFOA), will talk about the recently published document, *Working Together*, which explores how health, social care and fire and rescue services can increase their reach, scale and impact through joint working.

The seminar sessions which follow will include case studies from fire and rescue services that have expanded their work into the health area by working alongside the NHS, as well as partnering with other agencies such as Age UK and the Alzheimer's Society. Steve Chu, chief executive, Age UK, Sheffield, for example, will talk about how fire and health can work together to keep older people safer in their homes. As Home Safety 2016 takes place during Gas Safety Week (19-25 September), the programme will also cover various aspects of gas safety, showing how fire and rescue services can work with partners at a local level to ensure that being CO aware is core to the 'safe and well' visit.

Companies, organisations and emergency services who will be available to speak to visitors in the Home Safety 2016 exhibition include CFOA Fire Safe, Cleveland Fire Brigade, Hampshire Fire & Rescue Service Fire as a Health Asset, Leicestershire Fire & Rescue Service, Mangar Health, MPL Locksmith Training, National Grid, Plumis – The Automist Innovators, Retractalarm and Royal Society for Public Health.

Visitor entry, seminar theatres and parking at Home Safety 2016 and The Emergency Services Show are all free. For more information and to register visit: www.homesafetyshow.co.uk

21-24 SEPTEMBER, SAPEUR POMPIER, PARC DES EXPOSITIONS, TOURS, FRANCE

The 123rd edition of the French National Firefighting Congress will be held in Tours this year. SDIS 37 (Departmental Service of Fire and Rescue) as well as the Departmental Union of the Firefighters in the Indre and Loire region in the middle of France were chosen to host the national event this year. This will bring benefits of over 2 million Euros to the region.

It is the second time that the congress is being held in Tours. The first time was in 1985.

The event takes place over four days, and the National Firefighting Union of France has its annual meeting during which many new contracts will be awarded and decisions will be made for the upcoming year.

The exhibition is also open to the public, and admission is free. There is also a large industry exhibition which will feature leading exhibitors from all over the world.

There will also be lively firefighting-related entertainment and festivites in the centre of Tours during the event.

For more information visit: www.congres2016.pompiers.fr

8 OCTOBER, NATIONAL BA CHALLENGE 2016, FIRE SERVICE COLLEGE, MORETON-IN-MARSH, UK

The time has come again for teams to test their skills in fire rescue operations at the National BA Challenge.

The challenge comprises a scenario based around a single fire vehicle attendance at a property fire. Crews are made up of five personnel and have 30 minutes to tackle the incident.

Each member of the crew is assessed in their roles: OIC, BA team, fire ground/driver and BA entry control operative. The assessors are subject matter experts in their respective disciplines and are selected from many services around the country.

The scenarios are designed to challenge the OIC's in their decision making. BA crews have to call upon their tactical experiences to control the conditions to make maximum progress. Fire ground/drivers work extremely hard to get water supplies augmented, hose lines laid out, equipment dumps and casualty handling areas set up. BAECO have the job of relaying the OIC's plans to the BA crews, and all the time ensuring their safety is paramount.

The challenge is supported by Draeger again, which has continually given its backing throughout the eight previous challenges. 'NBAC is extremely grateful for the company's support,' said organiser Dave Payton.

'It has to be said that without Draeger's support the National Breathing Apparatus Challenge would not have developed into what it is today. We are aiming for 21 teams this year, and we already have a fair few attending, so don't delay your entry. We would love to welcome new teams into the competition.'

To register for the challenge, visit www.nbac.co.uk or email nationalbachallenge@gmail.com

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2016: the year of the drone

The US Federal Aviation Administration's rules on commercial unmanned aerial vehicles were relaxed last month, which is expected to provide a massive boost to the uptake of this technology. But where are we as regards incident response? Jose Sanchez de Muniain reports.

The sound of the flight of the drone is getting louder in all corners of the world, and the indications are that quite soon this aerial technology will be commonplace for both emergency responders and operators of high-hazard industrial sites.

The trend is being driven by a number of factors, namely the dramatic decrease in the price of the hardware, coupled with new drone technology, that is opening up a whole raft of new applications in the emergency response and security field. A high-tech drone that might have cost US$140,000 three years ago is probably now available with a higher tech spec for as little as US$11,000.

It is not surprising then that the technology is beginning to be taken seriously as another tool for emergency response, with many emergency services currently conducting trials for use of drones in chemical spills, road traffic incidents, wildland fires and rescue operations.

Developments are taking place in all corners of the globe. The technology is certainly not new in China, and last year the country's Ministry of Public Security dispatched drones to around 500 incidents. The Shanghai Fire Department this year became the first public security force in China to have access to drone support 24 hours a day.

Things are hotting up in the US too, where in June the FAA announced that the rules regarding flying drones in the country are to be greatly relaxed. From August, commercial operators no longer need a licence to fly drones weighing less than 25kg, nor do they require a Section 333 exemption, which had previously been required on a case-by-case basis and which could take six to nine months to secure. In fact, the new regulations state that commercial drones can be flown as long as the pilot is over the age of 16 and has passed an aeronautics safety test; has the drone in his line of sight; and does not elevate over 122m above ground level.

Drone technology is beginning to be taken serious by emergency response teams.

One of the countries leading the way in drone use is the UK, where the Civil Aviation Authority has just granted Amazon permission to carry out extensive drone trials in Cambridge without the requirement to adhere to its strict flying restrictions. The CAA is allowing Amazon's employees to operate its drones without a direct line of sight to the device, trialling 'sense and avoid' technology that lets drones automatically avoid obstacles while in the air. In addition, one person will be allowed to control multiple drones.

The UK's emergency services are also actively engaging with the technology, and it was recently reported by Sky News that two thirds of UK fire services and half of police forces are planning to use drones or are already doing so. Last year, Greater Manchester Fire and Rescue Service became the first to enjoy 24/7 access to drone support from a number of trained operators. Another pioneer is Mid and West Wales FRS, which bought a number of drones in 2015 after securing a US$30,000 grant from the Welsh Government.

One company that is riding the drone wave is Rectrix AS, a tech start-up based in Stockton-on-Tees in north east England that is carving a niche in the industrial high-hazard sector and the emergency response field for its UAV services.

'We wanted to focus on the industrial side because we find that many people are using drones for cinematography, which is fine, but they can be used for a lot more than people realise,' says RectrixAS founder and owner Alex Westwood, who explains that the emergency services, including onsite response teams, are waking up to the potential applications and benefits of drones.

'In the UK we recently carried out some thermal inspection work on an array of steam pipes because the client wanted to know where the thermal insulation had broken down. We were able to execute the task to the client's needs, providing the radiometric thermography information without the need for

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Experts say that drones will eventually find their way into every industrial facility and fire service.

aerial platform hire or expensive scaffold hire. A three or four day operation was conducted in one day.'

The company receives enquiries from all over the world to either carry out periodic inspections or to supply a ready-made package of drone capability, where many different sensor technologies are integrated onto the drone airframe.

RectrixAS was recently approached to carry out pipeline inspections in northern Alberta, Canada, to ascertain whether produced water, a by-product of oil extraction, was leaking into the environment and damaging nearby swamps. The company is also working on a project to develop a drone that can autonomously conduct daily patrols of an 80km pipeline in the West Nile Desert in Egypt.

Passive fire protection manufacturer and industrial trainer Advanced Industrial Solutions recently formed a strategic partnership with Rectrix AS to bring a range of services in the energy and construction industries.

Together the two companies are offering specialist services including visual surveys, thermal inspections and risk assessments, using drones for inaccessible places such as oil platforms or offshore wind turbines where it can be difficult, or costly, for engineers to safely reach.

The addition of drone inspections will, in many instances, rule out the need for expensive scaffolding, which in some places, such as an offshore environment, is difficult. Ultimately, Westwood believes that drones will eventually find their way into every large-scale industrial facility and fire service, albeit with a number of roles. 'In the next five or ten years the drones will be fully autonomous and will provide the security aspect, lifting off the ground every hour and patrolling the fence lines looking for anomalies and unauthorised activity. They will also be used for asset integrity management and routine operations such as flare stack inspections,' says Westwood.

It is in the field of situational awareness during an incident that Westwood sees the real safety benefits, however, with drones providing better information quickly and in a safer manner. 'The technology is getting smaller every year, which opens up the possibility for drones to carry technology such as chemical identification sensors and radiation analysis equipment. You could send the drones over a hazmat event and pick up particulate matter such as asbestos on a sticky cloth and then test it on the ground. Or you could test the concentration of a gas cloud – the data is all geo-tagged so it could provide the concentration in any part of that cloud. This is where the research is moving.'

Westwood predicts that in the not-so-distant future, most response teams in the world will adopt UAVs into their core service work as just another tool in the box. Indeed, the company is currently working with a fire truck manufacturer to provide UAV capability as part of the vehicle equipment package.

The drone, attached to the back of a fire truck, would be launched at the touch of a button and be directed by the incident commander on the ground. 'The concept is a bit like a telescopic tower, but whereas these are 10-15m in height, the drone would have a range of 100m, limited only by its optional tether. A tethered system means that the drone is being powered from the ground and can stay in the air for 24 hours if necessary, transmitting data wirelessly for protracted incidents.'

The potential of drones for post-incident investigation is also developing due to the possibility of acquiring 2D or 3D analysis immediately after an incident, before the scene is contaminated with operational activity. 'This post incident forensics ensures immediate data capture to assist with determination of causation and consequential impacts,' says Westwood.

Manufacturers have also spotted this gap in the market and are actively courting it with ready-to-fly bundles especially aimed towards first responders. In April, Flir Systems began bundling packages of its technology within DJI's Inspire 1 drone in 'aerial first responder' kits that are available in basic or advanced versions. These kits provide airborne thermal imaging, which means responders can see through smoke, monitor structural conditions and carry out SAR operations even during the night.

So far, however, the emergency and industrial worlds are only just scratching the surface as regards potential applications for UAVs – as some research efforts around the world are demonstrating.

Earlier this year a team from the University of Nebraska-Lincoln in the US demonstrated a drone that it had designed to carry out prescribed burns. These burns are used to reduce instances of uncontrolled wildland fires and are normally instigated by low-flying helicopters – a dangerous and expensive operation.

The Unmanned Aerial System for Firefighting drops ethylene-filled ignition spheres, which burst into flames on hitting the ground. The technology could easily also be applied to fighting wildland fires for the creation of fire paths.

In Asia, Korea's Advanced Institute of Science and Technology has developed a wall-climbing scout drone that is designed to find the source of fires and locate people trapped inside high-rise buildings.

The aramid fibres-covered Fireproof Aerial Robot System (FAROS) can swap from flight mode to 'spider' mode to crawl on walls and manoeuvre through narrow spaces filled with debris and rubble inside a blazing building.

The drone estimates its position with a 2D laser scanner, an altimeter, and an inertia measurement unit sensor to navigate autonomously, and it uses a thermal imager to recognise people and objects as well as detect the fire.

The devil is in the detail, however, and back in the real world drones still face some challenges that they will need to overcome if they are to be fully embraced in life-saving scenarios. Weather is still a factor with most air frames, ie fixed wing, rotary or hybrid, and the fuel source (lithium/hydrogen fuel cell/petrol) impacts the flight time significantly. Off-the-shelf 'pro-sumer' devices generally have flight times of 15-18 minutes, dependent on payload. In addition, most regulations also require that operators have line of sight of the drone, which, according to the UK Civil Aviation Authority, equates to 500m horizontally and 120m vertically from the pilot.

Furthermore, the market has yet to respond comprehensively to calls for the ability to connect accessories such as gas or radiation monitors as well as universal delivery systems for carrying small items of equipment.

Nevertheless, one thing is clear: drones have arrived and they are here to stay (once the battery is recharged anyway).

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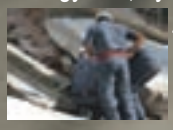

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National Inter Agency Liaison – creating resilient response

Inter-agency liaison between the emergency services and their partner agencies has developed significantly since the mid 2000s, when the role was initially established by London Fire Brigade following a review of major exercises testing the multi-agency response to a terrorist attack in the UK capital, writes Dean Elliott, Fire Service National Inter-agency Liaison Officer.

The selection and training of experienced operational personnel from the emergency services to carry out closer working practices, and the sharing of intelligence with a wide range of responding agencies, has shaped this key function into its current format. The National Inter-Agency Liaison Officer (NILO) is now a recognised role within the Joint Emergency Services Interoperability Principles (JESIP), the fire service Incident Command System (ICS) and the police and counter terrorism command structure for dealing with terrorist events.

Across the UK there are now more than 700 emergency service operational managers qualified as NILOs who are responsible for providing intelligence briefing and tactical advice to operational, tactical and strategic commanders. The NILO is also a key function that supports the UK's national response to any CBRN (chemical, biological, radiological or nuclear) or MTFA (marauding terrorist firearms attack) incident.

The realisation and escalation of the emerging threats to the UK from international terrorism has required emergency services and other specialist services to work more closely together. They now share intelligence and resources to support each other's core functions in a coordinated way. This has led to more efficient and effective collaboration over a prolonged period of austerity, and has produced an overall reduction in cost to the public purse without affecting service delivery.

Preparation and delivery of the Olympic Games in 2012 highlighted the importance of this collaborative approach to achieve a safe and successful event.

Since 9/11, the UK strategy for countering terrorism – Contest – specifically targets four key areas: pursue, protect, prepare and prevent. The necessary expansion of counter terrorism work carried out by the police has resulted in the selection and training of a number of NILOs to work within the counter terrorism units across the UK. As these officers – from the fire and ambulance services – have become embedded within the CTUs, and their knowledge, skills, experience and capability have supported Contest through developing close working relationships within specialist police departments, leading to an influence and impact in all of these four key areas.

The Fire Service College in Moreton on Marsh delivers the NILO course, which has been created specifically to bridge the interoperability gap across the emergency services and partners in extreme or emerging threat environments.

The fire service-embedded NILO in the south east counter terrorism unit (SECTU) has been in post since April 2014. This was initially a 12-month pilot scheme that has been extended a further two years following a successful review. The role is currently being carried out by an operational officer from Buckinghamshire FRS and is equally funded by the eight fire services in the south east region (Berkshire, Buckinghamshire, East Sussex, Hampshire, Kent, Oxfordshire, Surrey and West Sussex). The benefit of this arrangement is that each service contributes equally and receives support from the seconded officer through a number of avenues.

The role works to the regional NILO lead and one of the key objectives is to act as a single point of contact for the south east NILO network – which currently stands at 80 fire and ambulance NILO – providing regular briefings and updates on the regional and national counter terrorism status. The officer filling this embedded role brings assurance for all of the aspects linked to counter terrorism, national security and organised crime by attending regional and national multi-agency meetings, and providing the regional lead with a single point of contact for the many supporting agencies within SECTU.

Part of this coordination is to be an active member of the regional Contest Board, allowing the embedded NILO to

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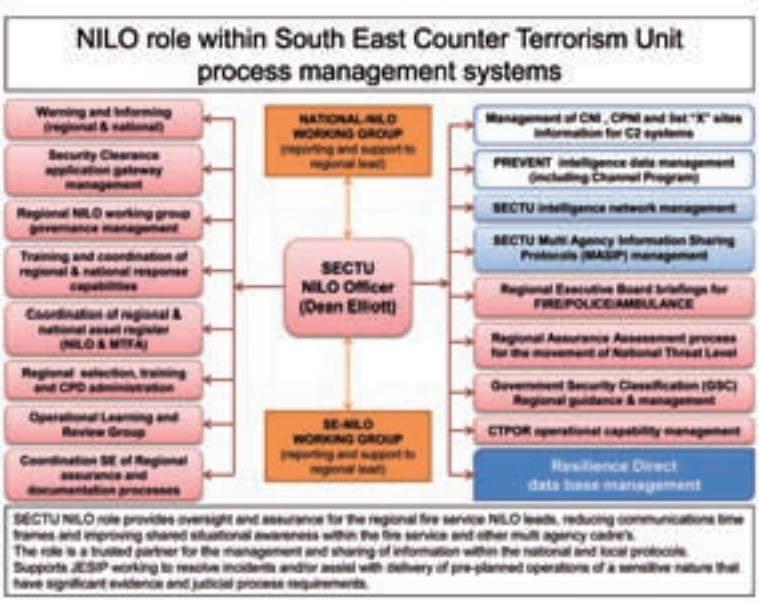

The NILO plays an essential role in maintaining the UK's resilience.

access intelligence on operations and sensitive information up to Government Security Classification set at Secret level.

The main advantage is that regular face-to-face contact within the CTU provides the foundations for sharing intelligence without delay. Intelligence assessments carried out by the Joint Terrorism Analysis Centre are fed into the NILO network expediently, allowing for principal management of services to be briefed in time to deliver an informed, defensible decision, based on the assured information received.

An example of this was the knock-on effect of the terrorist attacks in Brussels earlier this year, and Paris and Tunisia in 2015, which led to counter terrorism assessments and Advisory Group messages being published to the CT network within hours of each attack. These messages were carefully disseminated using the 'Warning and Informing' protocols set up within the NILO secure network on the Home Office portal Resilience Direct.

The current UK threat levels require emergency services to maintain effective business continuity and operational response at each level set by JTAC. By assessing the threat levels and providing guidance to the south east region, the NILO officer within SECTU has contributed to a standardised approach to any increase in threat level (move to Critical), and therefore has assisted in improving the resilience and collaboration between emergency services, military and local resilience forums during this period of heightened awareness.

During any major terrorist incident, the NILO will be required to support the emergency service Incident Command Structure and the police counter terrorism command structure, which feeds into ICS. This CT structure is managed through the Counter Terrorism Police Operations Room, and the NILO officer within SECTU is responsible for coordinating those NILO who are suitably qualified and trained to carry out this function.

The NILO officer within SECTU also acts as the administrator for the south east NILO working group, supporting the regional NILO lead Area Commander Iain Houseman (Surrey FRS), and acting as a conduit to the NILO national coordinator, Assistant Commissioner Tim Cutbill (LFB). The priority objectives of this area of work focus on managing the continuous professional development of the 80-strong NILO cadre, which includes security vetting. By supporting and coordinating exercise planning and delivery across the multi-agency groups that link into JESIP, the operational learning and review is fed back into the national and regional working groups, with actions recorded and audited.

The Prevent strategy has come under scrutiny in recent years with an emphasis on more responsibility sitting with community service providers, therefore reducing the forward-facing police role. The NILO within SECTU is assisting the Prevent Board in delivering the key objectives through the links within the established fire service community safety teams, and working closer with those responsible for safeguarding the community as part of the Channel programme.

The NILO role within SECTU has made significant savings to the region's emergency services by reducing the number of individual attendances to meetings, coordinating actions and standardising the flow of information, which has increased productivity. By developing and managing the dedicated secure pages on Resilience Direct – for both the region and the national NILO network – the officer has improved the national resilience of the NILO role and is also supporting the work stream to make the NILO a national mobilising asset.

Assistant Commissioner and NILO national coordinator Tim Cutbill says: 'The roles in the Counter Terrorism Units are a vital coordinating capability to ensure that the JESIP command principles are exercised in this challenging environment. The role ensures that information can be validated and disseminated quickly, concisely and appropriately to allow decision making with trusted information that has been agreed by all the responding partners to events of a CT nature.'

ABOUT THE AUTHOR

Dean Elliott has 27 years of experience as a response officer for Buckinghamshire Fire and Rescue Service and is currently seconded into the South East Counter Terrorism Unit (SECTU) working for Thames Valley Police. dean.elliott@thamesvalley.pnn.police.uk

Second edition of Joint Doctrine launched by JESIP

The Joint Emergency Services Interoperability Programme (JESIP) has announced the publication of the second edition of the Joint Doctrine: *The Interoperability Framework – 2nd Edition*.

Since publication of the first version of the guidance in 2013, JESIP has seen a step-change in the attitude towards joint working across the emergency response sector. The clarity it has provided about roles, responsibilities, and the practical tools it presents, have been well received.

The main changes in edition two include:

- Content re-organised to reflect the flow of events when working together at incidents
- More open and inclusive language appropriate for all parties involved in emergency response
- More emphasis placed on the principles for joint working
- Clarity about use of JESIP for all joint working
- Specific guidance for control room joint working
- Further guidance given on developing 'Shared Situational Awareness' and establishing a Common Operating Picture (COP)
- Includes use of METHANE outside of major incidents
- Inclusion of a recognised briefing tool
- Inclusion of guidance on logging joint decisions
- Inclusion of Decision Controls with the Joint Decision Model
- Clarity on use of Interoperable communications and information sharing, especially at major incidents
- Additional section on working with the military at multi-agency incidents
- Inclusion of the Joint Organisational Learning (JOL) arrangements as the standard for multi-agency learning

The Joint Doctrine can be viewed via the JESIP website and is accessible on any type of device. There are many supporting documents and templates linked directly from it. The Joint Doctrine itself, and many of the documents, are also available to download individually for easy reference. With the new edition published, the central team is working to bring other areas of work in line with the revised version; this includes the JESIP website and mobile App. The ongoing challenge is to truly embed JESIP across all organisations involved in emergency response activities and those who provide support. A wealth of tools, teaching aides, training packages, templates and more is already available via the JESIP website to help organisations with this.

Carl Daniels, JESIP deputy senior responsible officer, said 'We are extremely pleased with the final document and hope others will find it useful, informative and fundamentally easy to understand and apply. It is essential that we do what the public expect and respond to incidents efficiently and effectively. The JESIP Joint Doctrine 2nd Edition allows us to do just that and to continue working together – saving lives.'

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Research into silo working

Hazmat tactical advisor for Hampshire Constabulary Pc Mike Batten, MSc, shares his research into silo working within the emergency services, and how this can be overcome to achieve interoperability and address some of the persistent failings in multi-agency response to major incidents.

In 2008 I was posted to Totton Police Station in Southampton. Part of my responsibility as a hazmat tactical advisor was to liaise with Hampshire Fire and Rescue Service, and I quickly established a good working relationship with Watch Manager Chas McGill at Hardley Fire Station.

Over the following years, McGill and I planned and executed a number of multi-agency exercises simulating a response to an incident at the nearby Exxon Fawley refinery. As these exercises grew in scale and complexity, I realised that the degree of cooperation and joint working between responders did not always go to plan. I was keen to develop my understanding of these issues, and in 2012 I embarked on a part-time Master's degree in Emergency Planning and Management at Coventry University.

The course gave me a fascinating insight into emergency planning, which I was keen to apply to my day job. This led to an interest in understanding why multi-agency working wasn't always successful, and the subject of my dissertation was silo working in the emergency services.

By good fortune, this coincided with the introduction in 2012 of the Joint Emergency Services Interoperability Project, JESIP. This two-year project was set up by the UK Government to address persistent failings in the UK emergency response to large-scale/disaster incidents.

Over the next two years, more than 100,000 UK emergency services personnel were trained in the Joint Doctrine, which provides a framework for the emergency services to work together to achieve a successful outcome at disaster events.

JESIP was concluded in 2014 and was superseded by the Joint Organisational Learning programme (JOL). This builds on the JESIP framework to encourage responders to share lessons learned locally and submit them to the JESIP JOL website for the benefit of responders nationally.

The JOL programme therefore is a repository of hard-won knowledge, used to develop a national response strategy to multi-agency incidents.

During the course of my research, I was able to draw on the work of JESIP and its partners. This article is a condensed version of my dissertation, and represents my research into the causes and effects of silo working in the emergency services and its impact on interoperability.

Ambulance and fire service pictured together during Exercise Shannon at Fawley Refinery in Hampshire in 2012.

Silo working and its effect on emergency services interoperability

A series of high-profile disaster events in the UK in the last 30 years – including the 7/7 London bombings in 2005, Buncefield in 2006, and severe weather events such as the flooding in Gloucestershire in 2007 and Somerset in 2013/14 - has led to a growing realisation within the emergency services and among critical observers that emergency response to major incidents has not always enjoyed a uniformly successful outcome. The continuing threat of a major terrorist incident in the UK underlines the need for responders to train and work together to achieve the best result.

In recent years, considerable work has been carried out in the UK to identify and address the issues surrounding multi-agency working and to achieve interoperability. This arose from the recognition that the same mistakes were being repeated at successive major incidents, and ultimately led to the introduction of JESIP in 2012.

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The concept of interoperability, what it constitutes and how it is to be achieved, is surprisingly complex. It is not a quick fix and, in reality, interoperability is a single word that encompasses many processes.

While JESIP has arguably been successful in promoting interoperability, it could be argued that the problems it was created to address are too deeply seated to be dealt with in the original two-year timeframe. The advent of JOL, whilst continuing the push towards effective multi-agency working, may not have the required impact to achieve success if the underlying problems have not been correctly assessed. To use a medical analogy, failure to identify the correct symptoms may lead to a wrong diagnosis and incorrect treatment, which may only be partially successful or create further complications.

The path to interoperability

In her 2011 report on the London bombings, Lady Justice Hallet said: 'The importance of effective inter-agency liaison and good communications at the earliest opportunity should not be underestimated' (Hallet: 2011:35).

The Civil Contingencies Act 2004 and government guidance on national resilience (UK Cabinet Office: 2013) require and encourage responders to work together, and while recent government cuts have forced greater inter-service collaboration, this is driven by the need to save money rather than improving service delivery.

During my research, one of the major obstacles to interoperability identified by responders was silo working. However, this was imperfectly understood and in most cases identified as a failure to communicate. Considerable time was therefore devoted to establishing the true meaning, causes and effects of silo working.

In her 2010 report, *Interoperability in a Crisis*, Jennifer Cole (RUSI) stated that 62% of respondents to her survey cited 'silo thinking' as a 'barrier to organisational interaction' (Cole: 2010:8), however, 'silo thinking' was not defined.

The presence of silos was further identified in a 2013 parliamentary report, which stated: 'The silo mentality prevails in key areas such as organisation, planning, training, personnel, infrastructure, doctrine, concepts, information and logistics' (Ellwood & Phillips: 2013:6).

Silo working

The term 'silo working' has gained currency in recent years and has been used to describe the restriction of communication, cooperation and coordination within and between organisations.

A silo is a tubular metal container, commonly used for bulk storage. It therefore represents a simple analogy for the containment and restriction of ideas and information within an organisation, to the detriment of other personnel or departments within it, or those outside (Select Strategy:2002).

However, this analogy does not recognise the complexity of the individual silos, which potentially cause the greatest problems, as they need not necessarily be confined to the sharing of information.

Work by American academic Marion Biggs defines silos as 'invisible barriers that can exist between team members and departments within organisations. The barriers can often lead to miscommunication, the absence of collaboration, a failure to calibrate factual data, and a lack of consistent practices' (Biggs: 2014:3).

Although her work is based on the corporate environment, Biggs identifies eight distinct types of silo across a broad spectrum of activity (Biggs: 2014:71-73). In particular she identifies four types relevant to the emergency response arena:

- Communication – the need for individuals and teams to listen to and constructively discuss information or issues relevant to all of them.
- Calibration – the sharing, analysis and interpretation of information to reach consensus and mutual understanding.
- Collaboration – ensuring there is inclusivity, whilst accepting, by all team members, the differences of those same team members.
- Purpose – understanding the reasons why the work of an organisation or team is done in a certain way.

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Exercise Shannon (Hampshire 2012) highlighted how silo working can affect emergency services for Mike Batten.

When applied to the work of the emergency services, it is the effect of these four silos that may encompass many of the problems encountered within and between responders, and create the conditions for failures in the response phase of an incident, which have been highlighted in post-incident lessons learned (Pollock: 2013).

Single-service protocols and training and response regimens are necessary to train effective personnel and to provide an effective incident response within the confines of the role of a particular agency. However, when personnel from the respective services come together, the Communication, Calibration, Purpose and Collaboration silos defined by Biggs may be seen and experienced by responders in simple terms as a failure to share information, have a common understanding of what the incident involves, or to reach consensus as to how it should be dealt with.

Silo working in the emergency services is therefore a more complex matter than simply addressing problems with communication, or the issue of personnel within the services applying their own, single-service approach to incident response.

While there are obvious benefits to be derived from the JESIP training, it could be argued that unless a long-term, ongoing embedded training programme, involving all the emergency services, is developed, existing silos will not be removed and the underlying problems will not be solved.

The degree to which organisations and individuals within the emergency services can adjust their behaviours and working practices to overcome silo working is a moot point. At any large-scale incident, teams of responders must come together spontaneously and work equally effectively with each other. It is highly likely that teams from each service have never worked together before at a disaster event.

The understanding and enabling of interoperability is therefore increasingly complex as it moves from the simple exchange of information to incorporate organisational cultures, behaviours and working practices to overcome silo working.

The future

There is clearly a need to identify and clarify the different types of silo that may exist within and between UK emergency services. The silos between the services may vary from county to county or even within county boundaries, but if a common understanding of what constitutes silo working and its various forms cannot be reached, progress towards true interoperability may be limited.

It is therefore worth identifying three interlinking areas for further research, which could be key influences on silo working and interoperability.

- Communication and how this is undertaken through incident command and control.
- Organisational culture and how this may affect inter-agency communication.
- Training and exercising, and the degree to which frequency and exposure may affect or influence inter-agency communication and cultural issues.

While there may be a desire on the part of the services to work together, the reality of embracing and understanding cultural differences and adapting working practices to enable this to take place may be difficult at both the personal and institutional level. In fact, it may be entirely possible that personnel within the respective services, while willing to work interoperably, simply do not understand exactly what is required to enable that to happen.

Conclusion

Emergency responders thrust together at an incident come from disparate teams and cultures. They must rapidly build a common picture of the incident, identify clear single-service as well as multi-agency objectives, and integrate their efforts accordingly. The effectiveness of these processes will frame how the incident response unfolds.

There must therefore be clear, unambiguous leadership from individual commanders and a readiness to exchange time-critical information. However, in order to succeed, these principles must be embedded prior to the onset of the event.

In order to address silo working within the police, fire and ambulance services there must first be a wider recognition of both its existence, and of the nature of individual silos. This requires a balancing of the mix of service cultures, communication, inter-service trust, leadership and team building that make up a complex synergistic picture.

In a sense, both interoperable and silo working can be seen as an incredibly complex jigsaw comprising innumerable pieces. Reaching a universal understanding of what the individual pieces are and how they may fit together seems to be the true challenge.

Ultimately a solution is required that, as far as possible, takes into account the various objectives and competing agendas within the responding agencies, and also seeks to achieve the best possible outcome for the victims and those caught up in emergencies or disaster events.

It could be argued that, until such time as the emergency services are brought together under the control of a single government department, with nationally-agreed interoperable working policies and supported by a common education and training regime, true interoperability will be difficult to achieve.

The Civil Contingencies Act provides a foundation for this to take place, however, 'in the absence of an entity that has ownership of the joint response, joint working will only take place if the environment is created whereby each agency gains advantage from enhanced communication with each other' (Bell & Cox: 2006:36).

As cynical as it may seem, perhaps progress will only be made if clearly demonstrable benefits for each service are apparent, or perhaps conversely, financial or legal penalties are imposed for failure to routinely train and exercise together. A litany of historic investigations identifying the same failings clearly does not provide the appropriate degree of motivation.

ABOUT THE AUTHOR

PC Mike Batten MSc joined Hampshire Constabulary in 1992 and has served almost 25 years in frontline policing. He qualified as a roads policing officer in January 1999 and as a force hazmat tactical avisor in 2006. Based in Southampton from 2008, he worked extensively with Hampshire Fire and Rescue Service, emergency responders and industry partners to build response capability and awareness to Hazardous and Petrochemical incidents. He graduated from Coventry University with a Master's Degree in Emergency Planning and Management in September 2015.

Charles McGill made an MBE after 50 years of protecting community

Britain's longest-serving operational firefighter from Hampshire Fire and Rescue Service has been made an MBE as he marks 50 years of active duty.

Charles McGill – known as Chas to his colleagues – has been awarded the prestigious medal in the Queen's birthday honours list.

The 66-year-old Hardley station commander, who is also port liaison officer at the service's HQ in Eastleigh, is believed to be the longest-serving operational firefighter in the country.

He said: 'I had tears in my eyes when I found out I had got this award. I'm still emotional; it hasn't sunk in.

'The service is my family. When I go to an incident and deal with it, that is the best part of my life. I love what I do.'

Chas was obsessed with toy fire trucks as a small boy and by aged nine was spending time outside his local station, hoping to watch the crews as they were mobilised.

When he was old enough to join the service, he worked across the county while doing an apprenticeship outside of the service to become an electrical engineer. He was later instrumental in setting up the station where he currently works.

It was there that he was promoted, at the age of 32, to Sub Officer – one of the youngest in the country at the time.

During his five decades of service he has dealt with more incidents than most, driving to many in a Green Goddess, the iconic fire engine produced in the 1950s.

One of the biggest incidents Chas attended was the 1970 explosion and fire aboard the Pacific Glory, which was carrying 70,000 tonnes of crude oil when the Allegro, carrying 100,000 tonnes of crude oil, collided with it.

It took 40 hours to battle the flames during the incident off the coast of the Isle of Wight in which 13 members of the Pacific Glory crew were killed.

More recently he was a tactical advisor at the Swinley Forest fire in Berkshire in 2011, at which 50 engines from seven counties were deployed along with more than 200 firefighters.

Since lifting up his first hose in 1966, the fire service has been where Chas feels most at home, and he still remembers being a fresh-faced teenager looking up to his grizzled superiors who had fought in the Second World War.

In particular, he remembers the expert tuition and guidance given to him by the late Charlie Holmes and Colin Falconer, both of whom he describes as father figures.

He has seen hundreds of people train under him, including some of the most accomplished in the service, and he is now looked up to with the same admiration by the potential fire bosses of tomorrow.

While he may have a lifetime of experience etched on his face, appearing every inch the rufty-tufty firefighter, Chas is one of the first to embrace the future of the service, which he feels is making confident strides forward in many areas.

He said he was thrilled to see the service working more closely with Hampshire police, and that he has always benefited from the expertise of PC Mike Batten of the roads policing unit.

Chas also said that he is excited about the prospect of closer partnership working, having the force relocate to his station, and sharing an expertise and passion for keeping the public safe.

He added that the service was far more engaged with the public than it had previously been, placing itself at the heart of the community.

Another positive development is that more women are joining the fire service. Chas has recently started working with a female firefighter, Julie Jacobs, and says she has set the bar high for recruits of both sexes.

While the faces may have changed, Chas believes bravery and respect for people are qualities that have remained universal among firefighters over the years.

Hampshire Fire and Rescue Service Chief Officer Dave Curry, who wrote in support of the MBE nomination, said: 'Chas has always contributed far more than most, and dedicated himself to protecting and serving his community in the best possible tradition of the fire service.

'He brings a high degree of commitment and professionalism that has been instrumental in protecting the population of Hampshire.

'On top of all of Chas's operational work, he has also been instrumental in developing the high-volume pumping capacity in the UK.

'His hard work in this area has probably made him one of the most knowledgeable people in this field in the UK.'

The latest gong will go with other awards Chas has been given in his career. including one for his pioneering work with Airwave Network, which revolutionised the way the fire service could communicate with the police and ambulance service.

Chas MCGill has been instrumental in organising several major exercises in Hampshire and on the Isle of Wight.

Augmented Reality

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Pokémon Go should not be seen merely as a challenge by the fire services. If used to its full potential, the the way we work. Report by Dr Ian Greatbatch, Associate Professor at Kingston University.

A long time ago, when I was working as a very junior researcher, my boss asked me if I knew what Augmented Reality (AR) was, and whether I could build a 3D model of the university. I said of course I knew what AR was (I didn't), and that the 3D model would be simple (I had no idea). So, over the next few months, I was involved in a project that was one of the first to use GPS technology to bring AR out of the lab and onto the streets.

The prototype system was developed for a research paper [6], and built around the university campus. The intention was that it could be used by new students to orient themselves on campus and find lecture theatres, shops and transport links, etc. That project seemed pretty far fetched at the time, and although we could see the applications for navigation, it was hard to imagine how powerful a tool AR would turn out to become.

Needless to say, the technology has improved and been miniaturised – to the point that it can be contained within a mobile device – and it is the potential for AR in gaming that has resulted in Pokémon Go, an AR-based game in which people catch virtual pokémon characters in the real world - inadvertently creating something of a crisis for the emergency services.

The chances are you have heard about Pokémon Go as a result of recent news stories about people getting robbed, finding dead bodies [5], walking into traffic, getting shot [4], walking into the sea or off cliffs [7,8] in their attempts to catch pokémon.

But, while these threats are real, and more AR games will be developed in the future – meaning that fire services need to develop a set of policies to deal with them – the technology poses more potential than it does risk.

It is worth revisiting what AR actually is before we consider the possibilities. AR places information (factual or fictional) over a real world view through a screen of some sort. In Pokémon Go it is the screen of your phone, but it could easily be smart glasses, the screen of a vehicle, or the visor of a fire helmet. AR uses a range of technologies to determine where the viewer is, and what they are looking at, and adds information to that view – it augments your reality.

One of the original ideas for AR was as a smart city guide – for example, highlighting entrances to underground stations, providing directions to museums, and giving the viewer additional information about landmarks. Another intended application was surgery [2], with the surgeon able to see a 'map' of the body overlaid onto the real patient. Military applications were also at the forefront of thinking, with pilots using a head-up display (HUD) to overlay target information and other intelligence over the landscape [3].

Then there is the potential for adding information to a firefighter's view. Road traffic collisions make up a significant portion of fire service work each year, and often involve making cuts to, or working with, cars that contain potential hazards – airbags, batteries and so on. The Mobile Data Terminals on fire appliances contain information about almost every make and model of car, highlighting these hazards. But what could be achieved if we could take that data out of the MDT and into AR?

As a firefighter approached a damaged vehicle, the AR system in their fire helmet would recognise the make and model of car – through shape recognition, a marker of some sort or possibly the registration plate. The AR system would then overlay, through the visor, any hazards in that car, and even highlight the best locations for cuts, avoiding these hazards as well as hardened bolts and mechanisms. If firefighters could use the absolute minimum number of cuts, this could mean significant savings in time and life.

Learning the layout of vehicles is a staple of the rookie's life, and a wireframe showing the location of each piece of equipment overlaid on the truck would be an incredible learning tool. This could also be useful to experienced

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– a life saver?

Augmented Reality technology on which it is based could revolutionise

AUGMENTED REALITY FIRE VISOR

A Swiss research team from the Ecole Polytechnique Fédérale in Lausanne is working on a smart visor which, combined with a thermal imaging camera, will help firefighters see what's around them in real time, even at night and in smoke.

All firefighters, volunteers and professionals alike, have to learn how to deal with flames. But fire is not the only risk they face. Toxic, impenetrable smoke and darkness add to the dangers and slow firefighters' progress. Clad in protective gear weighing over 20kg, firefighters may also be dragging a firehose behind them and carrying a thermal imaging camera to help orient them, analyse their surroundings and locate victims.

'Firefighters really count on the thermal imaging camera, but it gets in the way and forces them to interrupt their search if they want to analyse a room,' explain Adrien Birbaumer and Martijn Bosch, the engineers behind the VIZIR project at the Images and Visual Representation Laboratory. To overcome this handicap, they have come up with a solution that frees up the firefighters' hands. Their solution consists of placing a mini infrared camera on the helmet and incorporating a transparent screen in the oxygen mask.

Thus equipped, firefighters see two images in their field of view: what their eyes see and what the thermal imaging camera records and displays in real time. This allows firefighters to move around more easily and avoid obstacles without having to interrupt the search process.

'We worked on the best way of representing hot and cold zones,' says Birbaumer. 'We used red and blue, of course, but we had to find the right tones that would be visible on a transparent surface.'

The two engineers are testing their prototype – a pair of augmented-reality glasses for the time being – with the help of ECA, the public fire and natural disaster insurance company in Vaud Canton. Firefighters wear the prototype during training sessions to test its effectiveness and then give feedback.

Jean-Marc Pittet, who is in charge of firefighter training in Vaud Canton, is involved in the tests and the approval process at each step of the development. 'At first it is hard to know what you're seeing – if it's the real thing or not – but you get used to it surprisingly quickly and can easily handle the two overlapping views.'

The next step will be to incorporate the screen in the oxygen mask itself and reduce bulk by eliminating some of the wires.

Pokémon Go has captured the imagination of the world, but an inadvertent side effect is the dangerous behaviour that some users engage in, causing a problem for emergency services worldwide. ©Shutterstock.

firefighters working with a truck from another service, or simply a different make/type/layout of truck. In a hurry they could use a microphone in the helmet to give a search command, and the location of all the nearest tools on all vehicles at the scene would be highlighted.

By teaming this search technology up with the 'Internet of Things', we could create locationally-aware tools that could notify crews when they are missing, in the wrong place or in need of repair. This could seriously reduce the incidence of vehicles leaving a scene minus key pieces of equipment, which not only impacts operational effectiveness but also costs fire services money.

The most obvious task fire and rescue services face is building fires. By taking information from a number of sensors, we can overlay a whole host of information on the building through the fire helmet visor. This information could come from the building's fire alarm system, potentially linking smoke, heat and gas sensors to give a 3D view of the entire fire. We could gather additional data using drones or robots, again with sensors to determine the location and intensity of hazards. Using ad hoc mobile networks, we could turn our colleagues into sensors, with each fire helmet detecting, monitoring and reporting environmental conditions.

Simply adding known pre-existing hazards (high voltage systems, gas, vulnerable people) and assets (water supplies, dry risers, exits) to the building's architectural plans and overlaying them over the actual building would be an enormous boon to firefighters. Imagine an architectural wireframe, used in conjunction with an HUD thermal imager? Smoke-filled rooms would present far less of a hazard to firefighters, and the possibility of disorientation within a building would be radically reduced.

While fighting wildfires, we could take real-time weather information, thermal data from drones and the location information of other teams and equipment, to give each commander and firefighter an overview of the whole fire. Any changes to the weather, the intensity of the fire or the location of teams would be instantly available.

Finally, in a post-disaster environment (say a wide area search scenario), building footprints can be identified under rubble. They could be linked to demographic information, informing search teams of who should be there. Once searched, the status of the site can be uploaded and shared with all other teams, showing search dates, results, hazards, casualties and entrances in and out of the site, effectively replacing the current UN INSARAG spray-paint symbols that can easily be misinterpreted or covered over.

This could also be employed in flood operations, recording properties still occupied, showing safe landing zones, known hazards and the location of infrastructure covered by water.

Technologically we are a long way from this, but the individual components have been demonstrated to work. It is just a matter of time before they are combined into a working system.

So, in conclusion, AR is pretty much like any new technology – it brings a mix of risk and opportunity. Fire and rescue services do need to consider how the increasing prevalence of AR games will potentially put people at risk in their regions, and should continue to monitor and warn people of the dangers. On the other hand, if AR is harnessed for use with current firefighting gear and procedures, the potential for lifesaving, improved fire operations and firefighter safety is immense.

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Masters in training

Newcastle International Airport Training Academy now offers City and Guilds accredited aviation fire training courses. Commercial training manager John Purdy invited *F&R* to come and see how the academy operates. Report by Ann-Marie Knegt.

Gone are the days when the airport fire service sat waiting for an incident to occur. In current times, an airport fire station is often a commercial hub providing all types of services to the rest of the airport, including winter maintenance, bird and wildlife control, and even painting lines on surfaces and aircraft marshalling.

However, Newcastle International Airport Fire Service has gone further and developed a commercial arm, something that has evolved very successfully over the last 20 years. Newcastle International Airport Training Academy is a reflection of the global hub that the fast-growing airport has become. With flights coming in every day from Dubai, the United States, Mexico and several popular destinations in Europe and the rest of the world, the airport has also scooped up awards for its great facilities, including its shops, bars and restaurants.

Over £14 million has just been invested in the upgrade of the terminal, and its successful mix of low-cost and upmarket destinations puts the airport in a very healthy financial situation.

Ranging from International Civil Aviation Organisation (ICAO) category eight up to nine, when the daily B777 Emirates airplane from Dubai operates, Newcastle Airport Fire Service's main station is situated next to the runway, and the airport's Training Academy is located there as well. John Purdy, commercial training manager, is responsible for the management of the academy, which offers a range of courses in aviation fire training, industrial firefighting, first aid, security and offshore emergency response, crisis management and a range of other safety-related courses.

Purdy is very proud of the training ground, the quality of his staff and the service they deliver. 'All our instructors are the best we can source and are employed full-time or part-time. We have our multi-purpose aviation fire training rig, which can simulate any type of aircraft incident, including engine fires, undercarriage fires and many other incidents. We can also use this for practicing the piercing of the fuselage with the HRET, (high reach extendable roof turret). The simulator can do any type of live burn, including LPG, kerosene and many internal scenarios including a flashover, so students can experience how a fire behaves for real.'

Airport firefighters can attend several aviation courses at Newcastle, including Supervisor and Crew Commander Initial / Revalidation, Firefighter Initial and Revalidation, and Bridging Courses. Part of the Incident Command course takes place in the new Air Traffic Control tower, which also houses a virtual reality training facility that features a uniquely designed environment identical to the airport. Here Incident Commanders can practice their decision-making skills in a high-tech environment that offers the opportunity to recreate any type of scenario that can occur at a large airport.

Newcastle's training academy has trained students from airports all over the UK, including Gatwick, Heathrow, Liverpool, and Highlands and Islands, but has also opened up to an international audience. 'Recently we have had students from the Seychelles Aviation Authority, Faro and Lisbon Airport, who took part in Crew Commander training with combined VR exercises as well as active ARFF training,' says Purdy.

He adds that more and more firefighters in offshore environments and places like hospitals have to deal with helipad and helicopter incidents. Newcastle has built a raised helicopter dual fuel simulator and helideck to fulfil this training requirement.

Other facilities at the training ground include CFBT containers, a light aircraft, and a confined-space facility, and the academy offers nearly every possible course including:

- Industrial fire team training
- Fire team leader courses
- BA wearer
- BA instructor
- Chemical spillage incident trainers

- Confined space training
- Advanced confined space training
- Event cover
- A range of OPITO approved offshore courses, delivered with training partner AIS

The academy, through its partnership with Newcastle College, also offers City & Guilds-approved airside courses, including Wildlife Management, Aircraft Marshalling and now Aviation Firefighting.

Purdy said: 'We are extremely pleased to be able to announce this accreditation for our Aviation Firefighting courses with City and Guilds. The accreditation ensures that the training and assessment is of the highest standard giving our customers comfort that we will continue to meet their requirements in an ever changing industry.'' ''City and Guilds are a well-respected educational organisation who have a strong presence both in the UK and throughout Europe and we know following discussions with many airport fire managers that this will offer an alternative solution to accreditation following the removal of the CAA`s accreditation of training providers earlier this year'

The academy also offers basic fire safety and first aid courses to companies in the local area and throughout the UK.

Purdy says that the wellbeing of the students is at the heart of all courses, and that there are excellent facilities at the academy where students can be trained, briefed and take breaks. Multiple classrooms, changing and catering facilities provide a learning environment that is really appreciated by our customers.

'However, where we stand out from other training providers is that we make great efforts to offer bespoke courses that are completely tailored towards the customers' requirements. The oil and gas industry, for instance, is now quite suppressed as a result of low oil prices. Gone are the days when this industry was cash rich and could afford to send people to various training courses, book them into different hotels in Aberdeen and pay for their transport. Now they are looking for the cost-effective solutions, and this has really helped strengthen our position in this market because we can offer very tailored and cost-effective packages that include fantastic accommodation for a large number of people at our training partner AIS`s Hotel or the onsite DoubleTree Hilton.

Purdy believes that the good transport links from the airport into Newcastle are another selling point for the academy. 'The feedback from students shows that they love the training and the standard of the accommodation, but they also like the easy access to Newcastle and the North East coast via the metro link into the city. This allows them to access the fantastic social and cultural life that the area has on offer.'

The operational station and the training academy operate four Rosenbauer Panthers, three of which are equipped with high reach extendable turrets. He explains that this technological advancement has changed aviation fire training at Newcastle International Airport and across the globe.

'Having three HRETs and using them aggressively significantly changes tactics. In order to get the optimal benefit from them, we find you have to initially deploy closer than we used to in the past. Effective bumper monitors complement the HRETs and allow for effective foam blankets to be laid down.

'The crews here are very well trained now and have tested lots of different approaches. It is all about getting close quickly, and repositioning the vehicle if you need to. We no longer just approach an aircraft with the mentality of deploying once; we are now smart about how we do it and re-deploy if needed,' he explains.

Purdy believes that HRET technology has made a big difference to safety, since the need for side lines is reduced, and the equipment can reach areas that firefighters can't access without serious risk to life.

Newcastle Airport bought a VR simulator after the arrival of their first Panther in 2005. 'This proved invaluable because we were able to use the appliance operationally very quickly, and it saved us a lot of wear and tear during the initial training phase. As well as conventional monitors, the HRETs enhance the training we provide, allowing us to meet the needs of all our customers.

The academy has thousands of customers annually which helps to provide the airport a significant additional income. Purdy is constantly looking to grow the business by working with customers and providing training solutions. The facility also provides response teams, including a Heliport team for the RVI Newcastle Hospital, where staff members are on standby at strategic points when helicopters come in. Team members are also trained in CPR and initial medical care.

On 31 March 2016, the Civil Aviation Authority abolished its accreditation process for training schools, and Purdy believes that even though this was a negative for training providers in one sense, it did open up opportunities. European airports in particular are now coming under increasing pressure to operate at higher standards, so they are looking for the best training methods.

'We see various methods of operation with crews from different countries and we are always looking to learn and adapt our training methods. We try to polish up their skills if needed and, where operational procedures are lacking, we offer alternatives. It is all about customising the training to the specific requirements of the client,' he explains.

'There are core methods of operation including deploying, safe and effective monitor or HRET use, and safety issues, that you always have to keep in mind from an incident command perspective, and we try to emphasise this in our training. We have had feedback from our clients that this works really well for them,' says Purdy.

The Training Academy benefits from operational aviation instructors who know which challenges customers face on a daily basis and can relate to their issues; this helps them provide training that is current and effective in an ever-changing industry.

'However,' he concludes, 'I believe that the secret to our success lies in how passionate we are about providing a truly excellent service by being flexible and proactive in meeting our customers' needs.'

The simulator can do any type of live burn, including LPG, kerosene and many internal scenarios including a flashover, so students can experience how a fire behaves for real.

Photo: © Ron Campbell Photography

The Airport Fire Officers Association has announced the line-up of its annual conference, held at the Hilton London Gatwick on 18-19 January 2017, reports Ann-Marie Knegt.

The AFOA Annual Conference 2017 could not be more current, because the event has an extremely strong aviation security-focussed theme. This has never been more relevant for emergency responders than in this climate.

The current high terror alert level is presenting an extremely challenging situation for airport incident response agencies, and the now almost-daily attacks are becoming more complicated in nature. This is forcing the fire service to extend skill sets and responsibilities towards dealing with situations that would formerly have been handled by the police or other agencies. Obviously, the need for extensive cooperation between different agencies and emergency services has never been clearer.

The keynote address will be delivered by Carl Daniels, the Joint Emergency Services Interoperability Programme's deputy senior responsible officer, and will provide a potted history of JESIP, explaining why the scheme was set into action, what it has achieved and what the next steps will be. More importantly, it will cover the impact this will have on joint working between civil fire and rescue services and UK airport fire services.

Pictured below is Matt Whipp, who will be delivering a presentation about airlines' incident response 'Go' Team processes, during which he will discuss the deployment of an airline support team and the associated roles and responsibilities.

'After nearly 20 years, the Airport Fire Officers' Annual Conference has grown beyond recognition,' says AFOA chairman Simon Petts. 'It has now become the RFFFS/ARFF industry's major thought leadership event, bringing international leading experts on matters ARFF and incident response to our audience, who are responsible for safety at airports all over the world.

'Whereas our annual event used to be primarily focussed on the UK and Ireland, it has evolved into a major international conference with speakers highlighting new firefighting doctrines and major aircraft and airport incidents. Our growing international outlook is also reflected in our membership, and we are seeing an increasing number of senior airport fire officers from all over Europe and the Middle East sign up to become members of AFOA.'

The changing role of the airport fire service is also reflected in the line-up of speakers. Dean Ulrich, Deputy Chief of LA Fire Department, was the officer in charge when the 2013 LA International Airport shooting occurred. In the aftermath of this incident, he ensured that all members of LA Fire Department received extensive training in dealing with active shooters, a very relevant skill in the current climate.

To take this one step further, Ronald Dom, Head of Emergency Response for Brussels Airport, will provide his account of what happened during the tragic Brussels Airport Bombing earlier this year, while BA Captain Chris Henkey will explain how he faced the incident that every airline captain dreads. He was the Captain in charge when a massive engine fire broke out at Las Vegas McCarran Airport in September last year, and all passengers had to be evacuated via the emergency slides.

Gerry Keogh, Chief Fire Officer of Dublin Airport, will discuss how he and his team responded to a major hangar fire that broke out at Dublin Airport on 25 August, 2015. 'A major fire broke out in a paint spraying hangar with over 200

people at work at the time, with the added complication that two aircraft could not be moved from the hangar, which was full of fuel,' Keogh explains.

'It is a great honour for me to lead AFOA into the 2017 event. I'm very conscious that it has become an internationally-recognised industry conference for aviation professionals, and that the way we conduct our business is watched by a wide range of countries and organisations. I have been a member of AFOA for many years now and have seen it develop hugely. We have regular engagement with co-responding organisations and emergency planners and continue to actively engage with more.'

Matt Whipp, training manager, cabin safety and security at Virgin Atlantic Airways, will be delivering a presentation about airlines' incident response 'Go' Team processes, during which he will discuss the deployment of an airline support team and the associated roles and responsibilities.

'It is great to be at AFOA once again as it provides the opportunity for both emergency services and airlines to learn from each other and appreciate each other's working environments,' Whipp says of his involvement.

These are just a few of the high-profile speakers lined up to speak at the event. Others include Rebecca Milner, business psychology consultant, ARUP; Neil Gray, senior aerodrome inspector, CAA; George Farquhar, Chief Fire Officer at Highlands and Islands Airports.

'I am also pleased to announce that we have gained the support from Rosenbauer UK as our platinum sponsor,' says AFOA chairman Petts. 'Oliver North, the MD of the company, is extremely committed to supporting our association, and we could not organise the conference without his support or the support of our other exhibitors. We are extremely grateful.

'Several suppliers and manufacturers have already committed to a stand at the exhibition that we hold alongside the conference. Organisations that are looking to expose their products to an audience of more than 200 senior airport fire officials for two days can still get in touch with us to book a stand. Exhibiting with us will enable them to benefit from excellent brand exposure to a highly specialised audience, combined with the fantastic networking opportunities on offer during the first evening and the gala dinner at the end of the second day.'

To register please visit www.afoa.co.uk, to exhibit please contact John Purdy at jsp@newcastleinternational.co.uk or Ian Webb at ian.webb@baesystems.com.

There are many networking opportunities at the AFOA Annual Conference. Picture: © Ron Campbell Photography

Small, fast and safe

Kaj Lehtovaara from Swedish manufacturer Safe at Sea outlines the company's light and manoeuvrable water rescue craft Rescuerunner and explains why training is so important to ensure effective use in emergency situations. Steve Banner reports.

A big, fast rescue craft that rushes to the aid of an individual struggling in the sea and at risk of drowning can paradoxically end up endangering the person they are trying to save. These craft are large, the man, woman or child in difficulty is comparatively small, and they can end up accidentally hitting them, with potentially tragic consequences.

What is required in such situations is something small, quick and highly manoeuvrable, a craft that can get close to whoever is in the water without running them down. The person in difficulty can then be safely pulled to safety.

Such a craft has to be capable of operating in shallow water, on lakes and in flooded inland areas. Yet at the same time it has to be robust enough for use in coastal waters and to withstand high waves on the open sea. It may also be asked to operate in white water and among rocks and reefs – places where a bigger vessel could not go without risk of damage.

Made in Sweden by manufacturer Safe at Sea, the Rescuerunner has been designed to fulfil all these roles and is becoming increasingly popular among emergency services worldwide.

The Rescuerunner is virtually unsinkable.

On initial inspection Rescuerunner looks rather like a jet ski, but it is much more than that. 'The size and method of propulsion are certainly the same, but everything else is specially-designed in line with the requirements of our customers,' says Safe at Sea chief executive officer, Kaj Lehtovaara.

For example, the hull, which encapsulates the glassfibre cartridge with the engine and the drive train, is much more rugged and more stable than one used for a conventional personal water craft.'

The Rescuerunner´s hull is made from polyethylene rather than glass fibre, which means that it is difficult to break. If it does get damaged it can be fixed in a matter of minutes with a repair kit, and it can also be replaced easily if necessary.

The craft's power comes from a 110hp Yamaha V1 four-stroke engine delivering a top speed of 38 knots. The 70l fuel tank gives Rescuerunner a range of more than 90 nautical miles. With a dry weight of 385 kilos and a load capacity of up to 400 kilos, the little craft can be slung underneath a rescue helicopter which can then be flown at up to 88 knots.

The craft's overall length is 3.6m with a beam of 1.5m and a draught of just 0.3m. Flush with the surface of the water, the 1.2sqm deck offers sufficient space to accommodate someone who has just been pulled out of the water and for the rescuer to administer first aid if required.

An auxiliary electrical system can be added which enables options as plotters, navigational lights, work lights and also an Automatic Identification System transponder. They are all available as options, as are heated handlebars if the RescueRunner is to be deployed in low temperatures.

Fredrik Falkman played a key role in the early development of the craft. Back in 2002, the RescueRunner project was at the heart of a thesis he was working on at Konstfack in conjunction with the Swedish Sea Rescue Society (SSRS). Based in Stockholm, Konstfack is Sweden's largest university college of arts, crafts and design.

A prototype Rescuerunner funded by SSRS was built and tested the following year, and SSRS subsequently put the new craft into production. The first six to be constructed were

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named after six members of the crew of a Swedish military helicopter who were killed in November 2003 when it crashed off the coast of Sweden during a joint training exercise involving the Swedish Armed Forces and SSRS.

Three years later Safe at Sea was formed and acquired the rights to Rescuerunner. The company has been building and further developing it ever since.

Rescuerunner already has customers all over the world, including the Hong Kong Fire Services Department. Other customers are based in the United Arab Emirates – eight of its craft are with coastguards there – South Africa, Sweden, Norway, Finland and Italy. A fire department in France recently bought the country's first unit and is planning to buy more, and the craft is also finding a home in the Baltic countries.

The craft is ideal for use by countries on the front line of the current refugee crisis, says Lehtovaara. Italy and Greece continue to face influxes of desperate refugees who often arrive on leaky boats that sink before they reach the shore, with catastrophic results. 'In this part of the world they have very difficult archipelagos with sharp reefs. You cannot manoeuvre through these with a naval vessel or a standard jet ski because it's just too dangerous.

'However, we can beach our craft on those reefs and pick people up. Even if you damage the hull in the process you can continue the operation and simply fix it when you get back to shore.'

Safe at Sea can even offer to fill the hull with foam. 'If we do that, the unit can actually be certified as unsinkable,' says Lehtovaara. 'Even without the foam we say that it's virtually unsinkable. Rescuerunners are built to last. SSRS still operates units from 2005, although we've done some refurbishment work on them since.'

Rescuerunner is particularly effective when it comes to rescuing people who have fallen into the sea close to or underneath oil rigs. Safe at Sea has been working on this with BP in Aberdeen in Scotland.

'In these circumstances Rescuerunner is typically launched by the rig's supply vessel. You can easily manoeuvre it beneath the rig to carry out the rescue, then return to the supply ship for treatment if necessary.'

One of the key differences between a typical jet-ski supplier and Safe at Sea is the support package. 'We can deliver specialised launch and recovery solutions and we can also organise training,' says Lehtovaara. 'We carry out an initial analysis with each new customer to establish their operating conditions, who will be crewing the vessel and the level of skill they have. A training package can then be implemented that meets the client's needs.

'We can also help customers to train their own instructors so that they can carry out their own training going forward and develop it to meet their needs. What we find is that once a client starts to operate Rescuerunner, they find new ways of using it and can then adapt their training accordingly.'

Safe at Sea is constantly refining its own training – the latest course addresses swift water rescue in currents and rapids – and Lehtovaara says he cannot stress the importance of training enough. 'After all, the unit will be no better than the crew managing it.'

And he is also convinced that not only does RescueRunner have a bright future commercially, but that the craft has a genuinely important role to play in water rescue. 'We're definitely challenging fast-rescue boats in the market because we have a craft that is not only effective but also cost effective.'

New Queensland foam

Highly restrictive environmental management requirements effectively ban aqueous film-forming foam (AFFF).

The Department of Environmental and Heritage Protection of the state of Queensland, Australia, has published its long-awaited operational policy on the environmental management of firefighting foam. The new policy outlines the requirements for the handling, transport, storage, use, release, waste treatment, disposal and environmental protection measures around firefighting foam in Queensland.

Minister for Environment and Heritage Protection and Minister for National Parks and the Great Barrier Reef, Dr Steven Miles said: 'Queensland is adamant that firefighting foams containing highly persistent organic pollutants including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) implicated in the contamination of the Oakey Defence base need to be phased out.

'The Government will require that any existing stocks of foams containing PFOS and PFOA are withdrawn from service at commercial and industrial premises, and similar products phased out and replaced, as soon as practicable with more sustainable alternatives.'

Situated in the north-east of the country, Queensland is the second-largest state in Australia and is home to six World Heritage-listed preservation areas including the Great Barrier Reef. The state has a large coal, mineral and gas resource base with a modest scale chemical industry.

According to a media statement by the Queensland Government, the impact of the ban will be felt by a small number of industry sectors in Queensland that continue to hold stocks of PFOS and PFOA foams for use in emergency situations, such as industrial ports and bulk fuel storage facilities.

'Our focus is on those who hold large stocks of toxic firefighting foam for use in an emergency situation, as they have the potential to cause significant environmental harm, if used,' Dr Miles said.

Large stocks of PFOS foam are known to be held throughout Australia despite the current knowledge around PFOS's adverse effects. The policy document highlights an incident involving a one-tonne spill of PFOS-containing foam that occurred in Queensland into a body of water connected to the Great Barrier Reef Marine Park in January 2013.

The policy outlines that foams containing C6 can still be used for firefighting operations when they are the only viable option and if they meet a number of strict requirements. There can be no releases of C6 foams directly into the environment – for example, uncontrolled drains or soakage pits – and all releases must be fully contained on site.

Significantly, only C6 foam that is 'purity-compliant' can now be deployed in the state. For foam concentrates to meet this requirement they must not contain more than 50 parts per million of PFOA and PFOA precursors, says the report. Companies that hold stocks of foam above this limit must prepare a disposal plan for it in the next six months.

Although the new policy's comprehensive explanatory notes acknowledge that C6 foams are now widely available as alternatives to more bioaccumulative, longer-chain compounds, they point out that significant concerns are emerging about all PFCs – including short-chain compounds (i.e. C6 and below). A degradation endpoint compound for new-generation C6 foams is perfluorohexanoic acid, which is reported to be three to five times more acutely toxic than PFOA for some aquatic species.

In addition, the notes point out that there is still insufficient independent information publicly available on C6-based or C6-pure foams to conduct realistic environmental risk assessments due to major gaps in information.

The policy has not been welcomed by the fire industry. Fire Protection Association Australia has voiced concerns regarding the consultation and implementation process of the policy, in particular the lack of transitional mechanisms for existing users of now banned foams to move to fluorine-free alternatives. These concerns have been supported by the US-based Fire Fighting Foam Coalition, a not-for-profit industry association.

FPA Australia has also said that it is deeply concerned by the Queensland Government's view that potential environmental

Aerial view of Upolu coral reef at the Great Barrier Reef near Cairns in Tropical North Queensland, Australia.

impacts alone should determine foam selection and use.

Matthew Wright, Chief Technical Officer/Deputy CEO of FPA Australia, said the ban was a simplistic response to a complex issue and that it could be potentially dangerous. 'Environmental impacts must be a key consideration in the selection and use of firefighting foams, but this policy naively ignores the new generation of short chain ≤C6 fluorinated foams, which are non-toxic and non-bioaccumulative, and simply draws an unrealistic line between fluorine-free and fluorinated foams as the deciding factor for selection,' he said.

'If a foam is not effective for the hazard, the environmental impact will be magnified by the persistence and potential escalation of the fire event itself, damaging smoke, and potentially carcinogenic products and run-off, regardless of whether the foam is fluorine free or not,' said Wright.

The Environment Minister Dr Miles, however, has pointed out that Queensland Fire and Emergency Service has been using PFC-free firefighting foam since 2003. 'Non-persistent firefighting foams are available, effective and certified for all major firefighting applications. They can break down or biodegrade should they be released to the environment.'

The Association is calling on the Queensland government to suspend implementation of the policy and to work with industry to develop alternative transitional arrangements.

The Environment Minister has said that over the coming months the government will work with ports and bulk fuel storage facilities to ensure they fully understand the government's new strict policy: 'Businesses failing to comply with the policy to replace such stocks will face enforcement action. Businesses that supply or replenish portable extinguishers will also need to comply with the policy.'

Dr Miles has also clarified that contamination caused by the historical use of these firefighting foams during training exercises at a range of facilities, including defence bases and airports, was largely the responsibility of the users such as the Department of Defence and Commonwealth Government.

You can download the full policy and comprehensive explanatory at www.hemmingfire.com

A different class

Fighting flammable liquid fires or suppressing vapourisation at hazardous material incidents requires a tactical plan, writes hazardous materials and spill response specialist Michael F Schunk.

A tactical foam deployment plan can be adopted to fit the specific needs of the department, but it should have general concepts that almost always remain the same. Since hands-on training with foam is expensive for most departments, and these incidents do not always take place frequently, this makes 'the plan' even more important.

The infrequency of Class B flammable liquid firefighting foam concentrate use can be attributed to many reasons. Cost, storage, training, transportation to scenes and frequency of use may prohibit an adequate supply for flammable liquid tank fires.

On our tanker fire in Hazel Park Michigan 2009, eduction equipment had deteriorated and our vacuum pick-up tube would not draw properly. We had an adequate supply of concentrate but suffered equipment issues. This happens occasionally as little-used equipment does not always receive adequate servicing. Always attempt to minimise this situation as much as possible with regular scheduled maintenance.

After choosing the type of foam concentrate, eduction equipment, apparatus systems and water supply, a strategy for your tactical implementation is required. Let's look at five basic elements and apply them to the above scenario. They are:

1. **Assess the need for a foam attack (flame colour?)**
2. **Alert resources (this may include the call for eduction equipment)**
3. **Set-up and positioning (water supply and upwind, uphill, and upstream placement)**
4. **Simultaneous attack/continuous flow (throughout the incident)**
5. **Post-fire security (clean-up)**

Fire in tank with gasoline on may 23 2013 at Duque de Caxias City near Rio de Janeiro, Brazil. Pictures: ©Shutterstock

1. Assess the need

Upon arrival, the initial team/crew can determine their general tactics without any identification needed at hazardous material responses. What is the colour of the flame? If it has a characteristic black plume with fire inside, you can be sure this is some type of hydrocarbon fuel. If it is clear or has a light colour, you are either dealing with a compressed gas or an alcohol-type fire.

As modern foam concentrates handle both, only the tactics will change. Compressed gasses reach their boiling point as soon as they escape to the atmosphere. This means there will be no pooling of the product to apply the foam to. Alcohols and hydrocarbon fuels are liquids when released from their containers, and thus do form a pooled surface for foam application.

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With compressed gasses, the biggest threat is that of BLEVE (boiling liquid expansion vapour explosion). Since there is no pooled surface, foam application with these gasses is not required. Instead cooling water should be directed at the upper portion of the tank involved. As there is no liquid-faceted product (compressed and cooled gas in a liquid form for economical transport) inside the upper surface, the tank may fail catastrophically, igniting all the remaining contents and creating a destructive BLEVE.

As both these products are three-dimensional fires, as cooling proceeds, extinguishment is done in combination with dry-chemical agent. The alternative is to continue cooling and allow the remaining contents to burn itself out. This will require greater water cooling resources (additional attack lines) to increasing areas of the tank as the liquid level of the compressed gas lowers through burn-off.

With flammable liquids, the biggest threat is flaming run-off and the involvement of adjacent exposures. Additionally, heat failure of the remaining tank and contents will increase these hazards. This is where Class B foam excels. All pooled or flowing streams of burning fuel should be kept covered to extinguish the fire, eliminate vapourisation, and stop re-ignition. Once again, this is a three-dimensional fire, so the final extinguishment at the leak site will require a dry-chemical attack in concert with foam application. In our case, foam eduction became non-existent so we were forced into a cooling and dilution tactic.

2. Alert resources

Assuming no mechanical issues, remember that foam application becomes a constant operation throughout the fire and post-fire clean-up. This means that all your resources of foam concentrate may be called into play. It is critical to start this procedure immediately. Foam stores may have to travel long distances to reach your site. Loading and unloading time will lengthen your ability to apply finished foam to your fire.

Your resources may become exhausted, depending on the situation, so be sure to develop long-term relationships with distant communities to ensure additional resources will be available when you need them. Many communities form foam banks or store quantities at neighbouring locations. This should be done well before your community has a response. Pooling these resources can reduce the financial burden while affording the proper response. To avoid a dilution and hence re-ignition, you must have enough concentrate on-scene before application begins.

3. Set-up and positioning

Once the need is determined and the resources are on-site, your foam attack operation can begin. Since these incidents are likely long-term, the upwind, uphill and upstream placement of engines and foam concentrate is essential. Personnel must not be placed in a vapour inhalation area.

Also critical is the delivery of foam supplies and water. Highways often provide adequate back-and-forth delivery of concentrate, but hydrant access may be limited. Your operation should be placed near a water source for the engine responsible for foam operations. This may require various locations for supply lines, tanker drop operations, natural waterway drafting or whatever situation you normally operate within.

Depending on the foam concentrate container your department uses, appreciate that the most versatile eduction point is at the pumper panel. This procedure affords the

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NEW MUNICIPAL FLUORINE-FREE FOAM

Angus Fire has announced the launch of a new fluorine-free foam aimed at municipal fire and rescue services. Angus Respondol ATF is part of the company's Integrity foam concentrate range and is a high-performance fluorine-free foam developed to meet the specific mix of challenges faced by local authority and municipal responders.

Angus sales director Charles Boon explains that Respondol ATF is a synthetic, fluorine-free foam concentrate formulated from a patented combination of surfactants and other ingredients to create a high-performing, multi-purpose foam with minimal environmental impact.

'Respondol ATF is the ideal foam to use where environmental pressures require firefighters to apply a fluorine-free foam,' says Boon. 'It offers fast knock-down and extinguishment, exceeding the requirements of EN158 parts three and four, and has a lower viscosity than some fluorine-free foams to ensure easy induction.'

According to Angus Fire, Respondol ATF is the first fluorine-free foam to achieve 1A/1A approval, using both sea and fresh water, in the demanding EN1568:2008 parts three and four testing regime. It is available in 3-3 and 3-6 grades and is ideally suited to the mixed risks municipal firefighters may encounter, whether they face hydrocarbons (such as oils, gasoline, diesel or aviation kerosene) or polar solvents (such as alcohols, ketones, esters and ethers).

The development of Respondol ATF follows on from the introduction of Angus Jetfoam, a high-performing fluorine-free foam targeted specifically at the aviation industry. Jetfoam is a synthetic fluorine-free foam concentrate, designed for extinguishing and securing flammable aviation fuel spills and fires (Jet A and Jet A1). Jetfoam passes all elements of ICAO Level B certification (both fire and physical properties). Due to its unique physical properties, Jetfoam is simple to induce (low viscosity) and will film form on aviation kerosene.

Angus Fire will be presenting both Respondol ATF and Jetfoam and the other Integrity foam concentrates at its stand H78 at the Emergency Services Show in September.

engineer the ability to monitor and exchange foam concentrate containers as he/she uses them. If subsequent foam resources become available, they can be pumped out of larger containers into a smaller one for eduction.

Remember, pick-up tubes for portable eductors should not be longer than 5.5 feet. Past this length and the Venturi effect may not deliver concentrate at the proper rate. Since your operation will be continuous, allow for an area around your foam pumper to stack empty containers so that exchange can be made as new supplies arrive. This will clear the work area while recycling the empty foam concentrate containers.

A truck carrying petrol crashed into a construction divider in Roseburg,Oregon. ©Shutterstock.

4. Simultaneous attack/continuous flow

All attack lines must begin flowing finished foam at the same time. Any line adding pure water to the finished foam will dilute the foam blanket, causing vapours to escape and find a hot re-ignition point. If this occurs, flame burn-back will eliminate the previously applied foam, wasting resources and setting you back to square one.

Orchestrating the initial attack at the same time becomes more difficult as the number of foam pumpers increase. All foam pumping locations must be in communication with each other and able to discharge finished foam at the same time. Once this has begun, foam concentrate supplies must be continuous to these discharge locations.

5. Post-fire security

This has two main purposes. The first is to allow crews to attack the three-dimensional fire for final extinguishment with their chosen dry-chemical method under relatively safe conditions. The second is to permanently secure fire or vapours from generating to a re-ignition point. It also allows clean-up crews to begin their operations.

Post-fire security usually involves assessment of the resulting contaminant solution of foam/fuel mixture so that proper remediation techniques can begin. In the case of hydrocarbon fuels, once vactored up, this mixture can be transported to fuel facilities where separation can reclaim the majority of the flammable liquid for reuse. The resulting separated foam solution can be safely discarded as waste water in most cases.

So, to recap, the key elements of your tactical plan should therefore be: assess the type of flammable fuel; alert foam resources; set-up your attack pumper(s); ensure that all participants appreciate that this operation must be continuous while starting together in concert; and continue at this level throughout the final extinguishment.

Finally, providing post-fire security foam application minimises the threat to firefighters and environmental clean-up personnel. Following these procedures will help to lessen fire damage, reduce environmental atmospheric contamination, and minimise exposure destruction to the surrounding equipment, areas, and affected personnel.

If you formulate your plan well ahead of time, then you will be able to perform a successful foam firefighting attack within your own department, or as part of a multi-jurisdictional response at any incident scene. The key to a successful foam attack is proper pre-planning and the subsequent implementation of these basic tactics to secure a safe community..

ABOUT THE AUTHOR:

Michael F Schunk serves as adjunct faculty in higher education facilities throughout Michigan,including Oakland Community College, Oakland University, Michigan State University and Madonna University. Michael was featured as a presenter at the First State Hazardous Materials Convention at Crystal Mountain, involving dry decontamination, LEPC planning and methamphetamine clandestine drug lab response. His on-site response has mitigated all types of events throughout Michigan, Illinois, Ohio, Indiana, and West Virginia, while instructing at facilities throughout the United States and Canada. You can follow his blog on http://www.hazmatmike.com/about-mike/

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Brothers-in-arms: using guns to fight fires

Recently Bettina McDowell of the International Water Mist Association (IWMA) wrote about lances and nails, as well as fire engines and trolleys that make use of water mist to fight fires. Today's topic: water mist guns – and that's only half the story.

It goes without saying that there are many different fire scenarios and many different ways to deal with them. It should, of course, always be the intention to extinguish a fire as quickly and as early as possible. In order to do that it may be necessary to incorporate different methods of firefighting.

So, what if a system could provide the firefighter with a choice? What if the firefighter could decide whether to use pure water mist, a water jet, something in between, or maybe even add foam? This is what is currently happening as manufacturers as well as firefighters are opening up to the idea of integrated systems and flexible tools.

The Fogguns from Cologne-based company Fogtec are an example of this. The Foggun 3 comes with three different spray patterns and is, according to the manufacturer, sufficient for most fire scenarios. Firefighters do not need to change hand position when selecting the pattern and they can adjust flow and pressure.

With the Foggun 5, firefighters can choose from five jet settings ranging from pure water mist to a full jet. The option in between is to use a water jet as a carrier for water mist.

Additionally, for both Foggun types, a foam pipe can be fitted that generates effective low expansion foam, moving the system into the region of a Compressed Air Foam System. The foam is sticky, which means that surfaces within the area of the fire can be covered and also cooled, reducing the possibility of fires leapfrogging from one place to the next.

Rüdiger Kopp, Fogtec's manager for fixed systems, says: 'With the volume flow up, the range of the jet is obviously bigger. With the volume flow down, the water damage can be

With the Fogtec's Foggun 5, firefighters can choose from five jet settings ranging from pure water mist to a full jet.

lessened. This would also be the setting of choice in the final phase of a fire.'

The two Fogguns form the core of a self-sufficient system. The systems deliver the power and, if required, water and foam.

Normally the Foggun 3 comes with a water mist unit called KFT 40/120. The Foggun 5 is generally latched onto the KFT 25/120. Both are high pressure pump units working with 120 bar, which equals 1740 psi. The KFT 40/120 reaches a maximum flow rate of 40 litres per minute. In the case of the KFT 25/120, the limit is 25 litres per minute. The pressure within the nozzle lies at around 100 bar, which equals 1450 psi. Both KFT units come with their own combustion engines, normally a petrol engine, but this could also be a diesel engine if required.

'High pressure is necessary for the atomisation of the water – to actually produce water mist – which has a high cooling effect,' explains Kopp. 'In addition, the small droplets turn into steam, which has a localised inerting effect.'

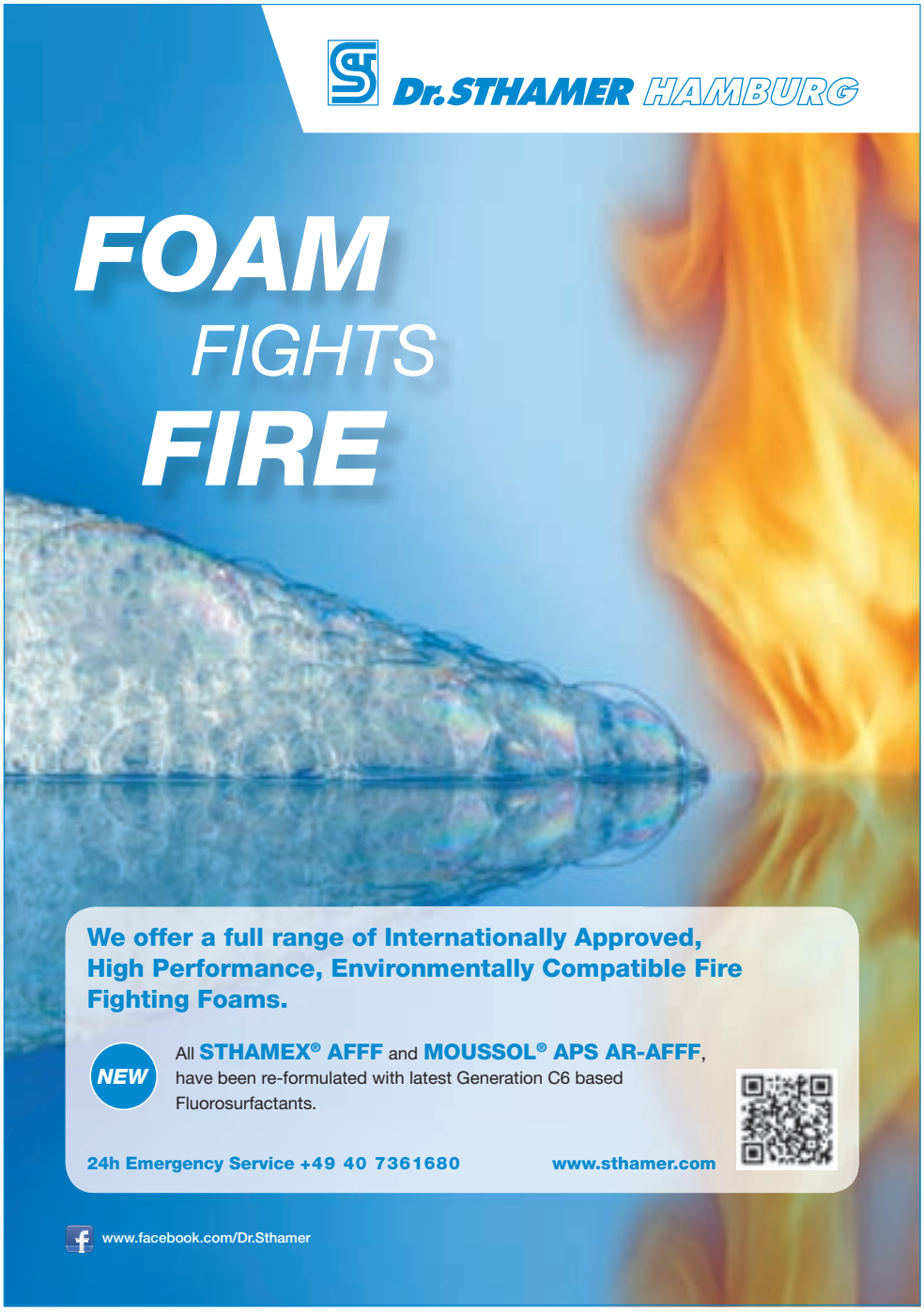
The KFT 40/120, which can spray larger amounts of water, is often used by fire brigades for a larger spectrum of applications. They may want to spread the water mist over a larger area and therefore need additional volume flow.

However, the units are also in use in high-risk sectors within the industry, for example, in areas where workers carry out welding. In this case, wheels can be added to the KFT 25/120 unit, which could then be kept nearby in case of need. In contrast, the KFT 40/120 is more likely to be embedded into a small-size fire engine. Thus, both systems can be used for rapid intervention – the KFT 25/120 because it can be tucked into a corner near the hazard area, and the KFT 40/120 because it is installed in a smaller vehicle that can often reach the scene of a fire faster than a full-size fire engine.

According to Kopp, the company's systems have been installed in many hard-to-access or remote areas, which make conventional firefighting equipment difficult to use. 'We have delivered many of these systems in old cities with small alleys and in remote mountain villages in the Swiss Alps, as well as in China and India where many streets are too narrow for a regular fire engine to pass through. In Japan the systems are mounted onto scooters for the same reason. There, they are called mist dragons.'

In the UK, the Greater Manchester Fire & Rescue Service have fitted some of their fire engines with this technology to allow a flexible firefighting approach to any situations they might encounter.

The KFT 25/120 operates as a stand-alone unit with attached mounted water tank and the rapid intervention Foggun, while an optional foam injection provides an addition to existing fire safety systems.



New firefighting lance to be launched at ESS

Angus Fire will be displaying its new firefighting lance called Coolfire at the Emergency Services Show held at the NEC in Birmingham, UK (21-22 September).

Coolfire is a rapid response technology that enables firefighters to attack fires from a relatively safe position outside a building or structure. With the ability to penetrate a wide range of materials to deliver high volumes of gas cooling water droplets, the new cutting extinguisher offers greater opportunities to firefighters.

'We call it 3D firefighting,' says Angus sales director Charles Boon. 'Coolfire eliminates the need to deliver gas cooling through a conventional opening such as a door, and can also be used vertically, giving firefighters a whole range of new positions for attack.

'For example, using Coolfire, a firefighter can attack a fire through a windowless end-wall of a row of houses, into a shop or factory unit that has security shutters on all openings, through a partition wall in the roof space of one property and into the burning roof space of an adjoining property, or up through a ceiling into the roof space or room above. '

Coolfire was in development for two years, and Angus worked in consultation with firefighters at all levels to ensure the new technology would meet their operational needs, whether these relate to ease of use, performance, simplicity, transportation or support. The result, asserts Boon, is the 'lightest, simplest and most advanced cutting extinguisher' on the market.

Abrasive water cutting extinguisher technology is now widely accepted as an invaluable gas cooling tool for firefighters, which is reflected in its rapid adoption around the world, particularly in the UK and northern Europe. It not only contributes to firefighter safety, but also offers economic, logistical and environmental benefits.

Abbrasive water cutting extinguishing technology is now widely accepted around the world.

However, while the benefits of gas cooling have been recognised for some time, traditional methods of applying water have until now limited the positions from which a firefighter can attack a fire to openings such as doors and windows. These bring with them the danger of air entering a compartment, and frequently require two firefighters.

High pressure abrasive water jet cutting extinguishers have brought about huge advancements in gas cooling and compartment fire suppression in general, and also reduced firefighters' exposure to harmful chemicals by reducing smoke levels.

Boon says that Coolfire builds on these advances by offering new methods of attack not easily possible using conventional methods. 'With the power to penetrate concrete, Coolfire can be used from above and downwards to attack a fire in a basement, or upwards, through the ceiling of a lower apartment, to attack a fire in an apartment on the floor above. These methods of attack are achievable in minutes or even seconds using Coolfire.'

He adds that Coolfire can also be used to fight hard-to-access fires such as those in transformer stations, cable tunnels, storage tanks and units, armoured military vehicles or marine vessels (where Coolfire can penetrate and then mist though steel decks or even the hull itself).

The design of the cutting extinguisher has also taken into account practicality and ease of use, with an emphasis placed on making the system simple, compact, lightweight and reliable. A small footprint, and the fact that minimal water is required to achieve high levels of cooling, means that it is ideal for mounting on small, lightweight vehicles. It can also be fitted/retrofitted to larger vehicles without using significant locker space.

Angus Fire will have a fitted version of the Coolfire system on display on stand H78 at the Emergency Services Show in September and will also have more information and a demonstration video available.

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The Cool Solution for Smart Firefighting

Visit us at the ESS Stand H78

Angus Fire presents CoolFire at the ESS show.
CoolFire is a rapid response, cutting extinguisher technology to attack fire from outside a building or structure.
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COOLFIRE

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ANGUS FIRE

Setting new standards

Meath County Extrication Team, based in County Meath, 20km north of Dublin, has experienced a steep rise to rescue fame over the last couple of years. Not only did it host the Irish National RTC and Trauma Rescue Challenge, which took place on 21-22 May 2016 at Tayto Park, Ashbourne, Co Meath, but the highly skilled firefighters also won the event. Team manager Padraig O'Longaigh is the Senior Assistant Chief Fire Officer for Meath County Fire and Rescue Service as well as secretary of Rescue Organisation Ireland.

Meath County's star is rising on the rescue firmament. Not only did it come joint second in the World Rescue Challenge in Lisbon last year, the team also won the prestigious 35,000 Euro Extrication Challenge, which was organised by rescue equipment manufacturer Holmatro at Interschutz. The team's Incident Commander Paul Colleran took the top prize for IC at both events.

Meath Co Extrication Team won the Holmatro 35,000 Euro Extrication Challenge at Interschutz in 2015.

Meath County first held the Irish Rescue Challenge in 2012 at Ashbourne Fire Station, after the team won it in 2011. O'Longaigh says: 'We ran a very good event again this year. Normally our challenges are only run in local fire stations and with local crews. However, we decided to change the format slightly, increase the size of the event and look beyond our borders. So I contacted the owners of Tayto Park, a theme park in our county, and they were very happy to host the challenge.'

Making the backdrop to the event a family entertainment theme park also meant a broader audience and an extra incentive for public and emergency practitioners alike to attend.

The Irish National RTC and Trauma Rescue Challenge is organised every year by Rescue Organisation Ireland, a member of the World Rescue Organisation (WRO). Meath County decided on a slightly different approach in 2016, and sent out an open invite for international teams to attend.

Hereford and Worcester from the UK, Bombeiros de Albufeira from Portugal, and Conscorcio de Valencia from Spain all accepted the invitation and competed in both the Road Traffic Collision and the Trauma Challenges, while Dudelange from Luxembourg entered the Trauma Challenge. The event was also opened up to the Irish Civil Defence Force, which is separate from the fire service in the country, a motorsport rescue team and a mines rescue team.

'We thought it was important to open the event up, so it was not exclusively limited to the fire service. So we opened it up to other emergency services while also broadening the scope by making it an international event to keep the levels up. For the same reason we also ran the first World Rescue Organisation-accredited assessor workshop at Ashbourne Fire Station on the day before the main event.'

This workshop was delivered by WRO assessor coordinator Bill Denny and WRO head assessor Michael Gahan, who

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for rescue

Competing in events including the World Rescue Challenge and national rescue challenges will improve standards for firefighting staff. Padraig O'Longaigh, manager of Meath County Extrication Team, explains why. Ann-Marie Knegt reports.

provided current and upcoming WRO assessors with both theoretical and practical knowledge to improve the skills and attributes required to assess at rescue challenges. The secretary of the World Rescue Organisation, Cameron Black, was also present.

'We had assessors attending from all over the world, including the US, South Africa, England, Czech Republic, Switzerland, Spain, Portugal, Luxembourg and even Colombia. The training proved very useful and assured that the WRO assessors' skills were all up to standard. A number of the attendees then went on to assess in the subsequent days, so it all tied in very nicely,' comments O'Longaigh.

During the Irish Rescue Challenge, teams competed in two disciplines, road traffic collision and trauma scenarios, which is the same format as the World Rescue Challenge. The contestants get marked and scored on three different areas: incident command, technical ability, and medical capabilities.

'Since we first entered the Irish Rescue Challenge in 2009, we have seen our skill level increase immeasurably,' says O'Longaigh. 'When you compare firefighters who are not part of an extrication team to those who are, you see a noticeable difference. Overall, the confidence, competence and casualty care is better with firefighters who compete as a team. I suppose they become slicker and sharper, which is not taking away anything from other firefighters. Competing has definitely enhanced our skills and our team members have become a lot more comfortable dealing with road traffic incidents.

'The team also uses tools that they might not have normally thought about before, such as the reciprocating saw and impact wrench, and we are using more battery operated hydraulic equipment. Another benefit is that they are not just cutting every part of the car, but are looking at the most efficient way of extricating the patient with the optimum tool. For instance, a seat or a door can be quickly removed from a car by using an impact wrench,' he explains.

With the right kind of training and leadership, fire brigades can implement a stronger response structure. Being a good fire department is not all down to money, says O'Longaigh. 'There is certainly some amazing equipment out there, and having the money to buy this is great, but at the end of the day it comes down to how you approach an incident and how you use the tools. Equipment is only as good as the man holding it.

'Fire services in different countries have different budgets available, yet every country will come across the same type of scenario and incident. It is the approach that counts. The communication between the team members and the incident commander must be perfect. The IC must direct his team to deploy the right safety procedures and consider the casualty's welfare and their own.

'These are standards that could be improved upon and trained for time after time. It is why the World Rescue Challenge concept is used by emergency services across the world, and why they can all compete in an international World Rescue Challenge with standard marking systems.'

O'Longaigh is convinced that entering rescue challenges drives an improvement in standards, and this is something that Meath is keen to convey to the international fire and rescue community.

Last year, at the World Rescue Challenge in Lisbon, the Lisbon team won the competition on their own turf while Meath County came in joint second with Hampshire. 'Even though it is a competition, when people are competing it drives them to improve their team, safety and casualty care approaches, which are primary elements during these types of scenarios. When you compete on an international level, you can pick up many new skills, tricks and techniques as well as new approaches to safety.

'Everybody is watching everybody, discovering how to carry out the job more efficiently, and always picking up new skills. There is a lot of communication between the teams afterwards and no huge rivalry. We hold an open discussion with each other and, of course, there is a bit of socialising involved at events as well.'

O'Longaigh is proud of his team and of the fact that they have all volunteered to participate in these challenges. His only concern is to get the right funding, because Meath County is keen to participate in the 2016 World Rescue Challenge in Brazil, to be held in Curitiba, Parana, from 19-23 October, where he is hoping to again finish in the top five, and better if possible. The team is currently looking for a commercial sponsor to work with and help them with their funding for Brazil.

'I would encourage as many people as possible to get involved in rescue challenges,' concludes O'Longaigh. 'It is a bit daunting at first, but once you get started you will see a massive improvement in how you perform as an emergency service practitioner. You will feel immensely satisfied because you are doing something worthwhile and hopefully it will help save lives.'

Commercial organisations who are interested in sponsoring Meath County Extrication Team should contact the team at polongaigh@meathcoco.ie.

The Irish rescue team took second place at the World Rescue Challenge in Lisbon last year.

Rallying for the rescue

Rescue training coordinator David Dalrymple reviews the first truly comprehensive training programme for emergency responders working at rally events, from course development to the insights that will continue to improve the vital education of workers in this challenging, multi-disciplinary arena.

Rally drivers race under an umbrella of protection from a number of hazards. This safety net ensures that they can focus on the event in the knowledge that the emergency services are on hand to mitigate any incidents.

While the safety of vehicles has improved over the years, this has created additional challenges for emergency responders at rally events. Not only can increasingly complex vehicles defeat rescue tools, but responders must care for, manage and mitigate spectator injuries, and provision also has to be made for the surrounding community. Organisers have to ensure that all these concerns are covered, which is a tall order for a group of volunteers.

The question of training looms large in all of this. Where does a person gain the training and education to fulfil all these different tasks? On-the-job training simply isn't appropriate, and many training classes lack the depth and scope to adequately cover such events.

Tim O'Neil, a five-time US and North American rally champion and organiser of the New England Forest Rally, is all too aware of these concerns. In September 2014, I met with O'Neil at his rally school and motorsports shop to discuss the practicality of creating an educational programme for emergency services providers at rally events.

The prospect of basing such a programme at the rally school offered a range of possibilities, not least the availability of current vehicles, rally roads and an actual event environment. So, over the next nine months, a new training programme was developed, called the Emergency Services Rally School.

The training team provided cutting-edge training equipment for the extrication sessions.

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The students also learnt how to secure the vehicles and maintain fire protection.

The ESRS developed into a 20-hour educational programme, roughly split 50/50 between classroom and practical sessions, and based on best practice concepts originating from both the FIA and emergency service principals. We designed it to be as 'real-world' as possible, using cutting-edge equipment and taught by the best people from the emergency services and rally world. The course also meets both the NFPA 610 (the standard for operating at motorsport venues) and NFPA 1410 (the standard for fire service instructors).

The classroom modules include: an introduction to rallies, the vehicles, drivers, co-drivers and support staff; scene, venue, medical, firematic and rescue considerations; PPE and education; plus a table top exercise, summary and classroom review.

The course also covers an equipment review for stage set-up, with practical sessions offering a four-station rotation of firematics, rescue, driver packaging and removal, and scene stabilisation. A practical scenario sees the students work as a team to respond to an incident and evaluate, stabilise, manage and successfully mitigate the incident.

In addition, there's an interactive, hands-on session that provides an overview of emergency services equipment. The aim is that all students, regardless of their specialty, are fully versed in all medical, firematic, rescue and support equipment. As the course is based at the rally school, the students also have the opportunity for hands-on experience with a variety of rally cars and the motorsports shop, which is invaluable for allowing them to understand how these vehicles are maintained and built.

A short, written exam followed by a final Q&A session and programme evaluation completes the course.

In July 2015, 11 students and 12 educational and support staff arrived at the Team O'Neil Rally School in Dalton, New Hampshire, for the first three-day ESRS programme. All students were experienced emergency service workers from a variety of venue and motorsports backgrounds – from open wheel, road racing and drag racing to rallying and motorcross – as well as all emergency services specialities including fire, rescue, medical, and towing and support.

As programme lead instructor, it was my role to lead the classroom modules, covering the emergency services aspects in an interactive multi-media environment. Travis Hendon, Team O'Neil's lead instructor, followed with the rally-specific modules, and we finished with a joint Q&A session before heading out to the Team O'Neil Rally School for the hands-on sessions.

The hands-on sessions are key to the programme, covering a lot of equipment that would be unfamiliar to students. For example, we introduced third-generation battery-powered self-contained hydraulic rescue tools. Also in the mix was cutting-edge PPE and 'soft' items such as eject helmet removal systems and crash recovery software.

Following the review of equipment, O'Neil took over to cover 'All things rally'. He gave students a tour of a 2013 Ford Fiesta, its equipment, and how this interacted with the driver and/or co-driver. Each student was also offered the chance to get strapped in. In the motorsports shop, O'Neil and shop manager Pascal Belperron, explained how the Fiestas go from a street car to a rally car. The session closed with an overview of stage equipment.

One of the goals of the programme was to provide students with as much of a real-world environment as possible, therefore all the practical sessions were presented on the school's rally track. These kicked off with a review of safety items, guidance and rules.

The first of the four practical stations, patient packaging and removal, allowed students to use a variety of devices to remove a driver from the vehicle. They also practised helmet and head and neck restraint removal.

At the firematics station, students used extinguishers with wetting agents on board as well as a backpack compressed air foam extinguisher. Besides simple vehicle compartment fires, a fully-involved rally car fire was extinguished using only the backpack unit.

The students then used a variety of hydraulic rescue tools on vehicles at the rescue station. The vehicles included two older rally cars while the rest were current school cars, so students could experience the difference between older and newer vehicles. The newer cars presented far greater challenges because of the use of ultra-high-strength materials in, for example, the roof posts/pillars, footwells, and rocker channels, and the students were able to test a variety of tools, including the crash recovery software, to assess which were most effective.

The final practical station was scene stabilisation, and the students had to stabilise and secure a vehicle as well as mitigating all the hazards at the incident.

The final module was the practical incident scenario involving an older Subaru WRX in a single-vehicle incident.

The students used a variety of hydraulic rescue tools, including cutting equipment, on vehicles at the rescue station.

The Subaru had gone wide, struck a tree and rolled over. The co-driver was basically uninjured but the driver was semi-conscious, had an altered mental state and was hanging upside down.

The students used a demo rapid response unit with an onboard compressed air foam firefighting system. The incident saw the students secure the vehicle, maintain fire protection, commence patient management – including requesting an aeromedical asset – and release the driver for transfer to the ambulance. The scenario took a little over 14 minutes.

The programme finished with a review from both sides, pairing a critique of student performance with their views on the course and instructors.

The lessons learned from this initial delivery of the ESRS programme included a number of important insights. For example, the students found the firematics sessions especially helpful, particularly the medical personnel who had never extinguished a live fire or used this type of equipment. Both students and Team O'Neil staff found the rescue station very informative, particularly the difficulties encountered in the newer vehicles. The medics also appreciated the challenge of patient management and packaging in the live scenario session, gaining vital practical experience.

In addition, the interactive, hands-on session that allowed students to explore the equipment and vehicles, combined with the classroom sessions, gave them great insight into the sport and the skills to perform in the practical exercises.

These insights have filtered into the next delivery of the programme, with students now able to ride as a co-driver in a simulated stage, switch roles, and mitigate a second practical scenario. We are also trying to add in current vehicles from different manufacturers.

All in all, we felt we met our primary goal of delivering a high-speed, high-performance educational programme in a real-world setting. From the moment they arrived to the moment they left, our students were totally immersed in the rally world, and while each worked in their particular speciality, we gave them the tools and experience to fulfil other roles. As the course progressed, we felt we were making the rally world safer, one person at a time.

David Dalrymple
30 years in emergency services
Career- RWJUH EMS
Volunteer- Clinton EMS/Rescue
Rescue Instructor for 19 years- Vehicle Rescue is my specialty
TERC US – Education Chair
International certified extrication assessor- judged & lectured in US, Canada, UK, Europe & South Africa
2007 Harvey Grant award recipient
International registered SAVER instructor by ICET
Columnist-Best Practices Vehicle Rescue FireEngineering.com
Team Captain-World Champion Vehicle Rescue Team 1998
Educator- RoadwayRescue LLC
Member- International Council for Motorsport Sciences
Member- SAE Task force on Hybrid & Electric vehicles (xEVs) 1st & 2nd Responders
Author – Vehicle Extrication DVD series

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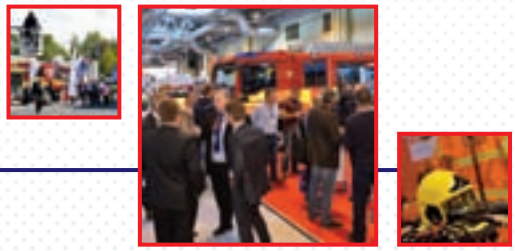

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Toxic betrayal

Firefighters training at Australia's Fiskville CFA Training College are entitled to redress after being exposed to chemicals that can cause cancer, a Victorian parliamentary committee has found. Report by Lotte Debell.

The committee, which was set up in 2014 to look into claims of contamination at the site, also found that members at all levels of the Country Fire Authority's executive management had some degree of knowledge of the contamination and repeatedly failed to deal with the risk it posed to those living, working and training at Fiskville.

'Instead of ensuring the safety of the people who protect us, some CFA senior management and board members allowed firefighters and their families to be exposed to toxic chemicals with known links to cancer and other illnesses,' said committee chair Bronwyn Halfpenny, MP, in her foreword to the inquiry's final report.

The final report was published in May 2016 and contains 125 findings and 31 recommendations. It is the result of an in-depth inquiry covering everything from the history of the site, the contamination and how it occurred, to the organisation of the CFA and its approach to health and safety, the role of past and present CFA executive management, the regulation of Fiskville by Worksafe and other regulatory agencies, the consequences of the contamination for human health, remediation and justice for the victims.

The Fiskville site was set up in 1972 to coordinate the training of Victorian firefighters on a state-wide basis and became the CFA's principal training centre. It is described as the 'spiritual home' of the CFA and the report acknowledges the emotional attachment of many CFA members to the facility. It is this attachment, says the committee, which has contributed to the anger and sense of betrayal felt by those connected to Fiskville over the CFA's handling of the issue.

As part of the inquiry, the committee found that the contamination at the site took place over two 'distinct but related eras'. The first relates to the chemicals that were stored, burned and buried at the site – many of these unknown as a result of poor record keeping – leading to the contamination and the exposure of those working and training there, and the second to the contamination of the water used in firefighting training.

Committee Chair Bronwyn Halfpenny and committee member Tim Richardson.

The dominant contaminants at Fiskville have been identified as PFCs (perfluorinated chemicals), mainly PFOS (perfluorooctane sulfonate) and PFOA (perfluorooctanoic acid) contained in fire-fighting foams. The report states that firefighters and others working at Fiskville were subject to a 'multiplier effect' because of the mix of chemicals they were exposed to, resulting in a more dangerous effect than each chemical individually. The impact of these exposures is catalogued in the report in the form of an examination of the health effects of chemical exposure, health studies related to Fiskville, and witness testimony.

A study by Cancer Council Victoria analysed the cancer risk of 599 men who worked and trained at Fiskville and identified 61 with cancer and four with secondary cancer. The most common cancers were prostate and melanoma.

A second study from Monash University commissioned by the CFA investigated the risk of cancer and mortality for individuals who lived and worked at Fiskville, focusing on 606 people. The study found that those in the high risk group had double the risk of cancer, with high incidence of melanoma and testicular cancer, while those in the medium risk group showed an excess of brain tumours.

The inquiry received submissions and heard statements from over 500 witnesses, many of whom were suffering from illnesses they feared may have been caused by contamination at Fiskville. These witness testimonies, such as the one from Colin Cobb who was a senior instructor at Fiskville from 1984-87, present a tragic litany of illnesses, mainly cancers, in people who worked at, lived near or attended school at Fiskville. Another witness spoke of a number of birth defects suffered by members of his recruit course who trained at the facility. There was also evidence from former students at the Fiskville school, local residents, contractors and others affected by unsafe practices at the site.

While acknowledging that the link between hazardous materials and diseases is difficult to prove, committee chair Bronwyn Halfpenny MP said in her foreword that the committee heard extensive evidence highlighting the link between the two and that the report 'validates the testimony' of the witnesses.

'To the question: ''Could unsafe practices at Fiskville have caused my illness?'' – the answer is, in all likelihood, yes,' she stated. 'To the question: ''Did CFA management and Board members know that practices at Fiskville were unsafe or contravened standards and safety regulations?'' – the answer is yes, some did.'

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The Fiskville site was set up in 1972 to coordinate the training of Victorian firefighters on a state-wide basis and became the CFA's principal training centre.

On this point the report is particularly damning. The contaminations claims first came to public attention with the publication of an article in the Herald Sun in December 2011 in which former Fiskville instructor and later CFA chief officer Brian Potter spoke of his concerns about the chemicals he and others had been exposed to, and his own illnesses which he feared were a result of this exposure. Despite former CFA staff and management stating that they were unaware of health and safety concerns at Fiskville, the committee found evidence that knowledge of the contamination of the site existed within the CFA executive management and at board level before this article was published.

For example, the report states that the board was made aware of contamination of PFCs at the site in 2010 by Air Services Australia and did not investigate, and that it was aware 'from 2009 at the latest' that contaminants in Dam 1 were an ongoing potential health threat.

Furthermore, the report states that CFA senior management repeatedly avoided taking responsibility for water quality at Fiskville, ignored the concerns of the United Firefighters Union about possible contamination and failed to implement recommendations of external reviews in the area of occupational health and safety. The committee went on to say that the CFA also failed in its responsibility to provide sufficient information about the contamination to those affected, and this failure heightened the anxiety of staff, trainees and the local community about the issue. The CFA was not alone in failing the Fiskville firefighters and local community, however. The report also criticised Victoria's occupational health and safety regulator Worksafe for being 'entirely reactive' in the performance of its regulatory role at Fiskville.

The committee found evidence that knowledge of the contamination of the site existed within the CFA executive management and at board level before this article was published.

In particular, the inquiry found that Worksafe inspectors failed to address many of the occupational health and safety issues that were examined during the inquiry, despite 117 visits to the site between 1991 and 2011, and that it failed to adequately respond to two requests by the United Firefighters Union to investigate concerns at Fiskville. In the first instance, the watchdog did not carry out any independent tests when asked to investigate water quality, and in the second, took an unacceptable length of time to respond to a possible breach of the Occupational Health and Safety Act 2004.

Moorabool Shire Council and the Environmental Protection Agency Victoria also come in for criticism, with the report saying of the EPA that it failed in its statutory role at Fiskville by allowing the CFA to contaminate the site 'to such an extent that it has been closed down and is now the subject of complex and very expensive remediation'.

In addition to the failings of the CFA and others, the late delivery of the report is also addressed. Its publication was delayed twice, attributed to the unnecessary delay in obtaining documents from all departments, particularly the CFA. The Victorian Government Solicitor's Office was 'obstructive and uncooperative in the document recovery process', taking too long to release documents, making unnecessary redactions and 'swamping' the committee with paperwork. This frustrated the committee to such an extent that it tabled a 'Special Report on the production of documents' in November 2015. The report also makes a number recommendations covering the entire scope of the inquiry, including that EPA Victoria conduct regular environmental testing of fire-fighting training facilities in Victoria and that the Victorian Government audit CFA occupational health policies. A number of recommendations centre around the need for greater knowledge of the behaviour and effects of PFCs and better monitoring of levels in firefighters.

Finally, the committee recommends a dedicated redress scheme for those affected by Fiskville that is developed in consultation with victims, has a low evidentiary requirement and a range of redress options that take into account the differing needs of individuals.

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