Enhancing *fire service* readiness

Argon Founder and Managing Director Steven Pike explores the role of simulation technology in preparing fire services for chemical, biological, radiological and nuclear threats

Can you tell us a bit about Argon - what does the company do, and what sets it apart in the field of emergency training?

We provide specialist training simulators that enable emergency responders to conduct training exercises involving Hazardous Material (HazMat) or Chemical Biological Radiological Nuclear (CBRN) threats and hazards so they can enhance, maintain and verify operational readiness and most importantly return home safely to their loved ones.

Our highly realistic simulators enable responders to train how, where and when they want with ease and without the need to utilize any form of hazardous substance, specialist safety observers or a ton of regulatory paperwork.

Responders may need to deal with hazardous materials directly, for example in the case of a chemical or gas leak. However, HazMat is often a secondary concern linked to the primary incident, such as a road traffic accident requiring the extrication of injured people. In these situations, the vehicles involved may be transporting hazardous materials—either legally, with appropriate signage, or illegally, creating an additional unknown risk.

A fire at an industrial facility utilizing hazardous chemicals or radiological sources is another example. The same hazards can also be present in other scenarios including air, rail and sea transportation.

Since 9/11, responders have needed to ensure they have the appropriate training to respond to an entirely different kind of scenario – those resulting from intentional acts of terrorism. These can lead to indirect release of hazardous material including chemical or radiation due to damage inflicted upon a facility, or a direct release arising from the weaponization of a chemical container (a chlorine tanker) or a radiological source modified to create a radiological dispersion device, potentially incorporating radiological shrapnel. These situations can be in open public areas or confined spaces like an auditorium or transport facilities.

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We work closely with our customers to understand their needs and will only create a training simulator with the full approval and collaboration of the original detector manufacturer. This approach means responders can be assured our simulators look and feel just like their operational equipment. Accurate replication of the human interface is crucial to providing a realistic training experience, especially when wearing protective gear.

Argon works with fire services all over the world. What does that collaboration look like, and how do you tailor your approach to meet the needs of different regions?

Different organizations across different countries utilize a variety of detection equipment and sometimes fire services within a single country (the USA being a prime example) use different types of detectors.

We identify the detectors being utilized and, contingent upon manufacturer approval and market demand, develop the necessary training simulator.

Your work spans fire services, law enforcement, government agencies, and the military. How does bringing these sectors together improve the way emergency responders train and prepare?

There are several crucial elements in a multi-agency response that must be thoroughly tested to ensure an optimal response when a major event occurs. Although there are always lessons to be learned post-incident, effective multi-agency training exercises help identify and mitigate potential problems that may arise. These exercises help the various agencies better understand the practical aspects of each other's role and how they integrate with one another. They also help verify the effectiveness of communication and decision-making right to the top of the organization.

Responders equipped with detection devices are gathering data – is there

a hazard, what is it, what does the reading mean to the health of the public, my colleagues and myself. How do I communicate this information efficiently and accurately? Depending upon the incident, specialist support teams may have equipment that is not available to those first on the scene, such as Chemical Warfare detectors and radiological spectrometers. Our simulation hazard platform permits a variety of simulation detectors to respond appropriately to the hazard present to ensure consistency across different agencies or teams.

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Effective, realistic exercises enable teams to practice, improve and verify their standard operating procedures, while our environmentally friendly training systems enable the setup of diverse scenarios in nearly any location in under ten minutes.

What are some of the key tools or solutions Argon provides to fire services, and how do they help teams prepare for complex CBRNe incidents?

The primary detection equipment available to firefighters would be a MultiGAS detector, a radiological dosimeter, survey meter and contamination monitor. We have just launched two very exciting MultiGAS simulators; the Xam2x00/5x00 series simulator we developed in collaboration with Dräger and our own generic MultiGAS simulator.

MultiGAS simulators respond to our programable simulation vapor sources that can be placed in the open or indoors where the signal can be constrained by anything that would contain or permit an actual gas release (such as a container, door or window). Users can select a variety of simulation sensors held in the library so that their operational detector can be represented and simulated alarms configured to replicate operational detector settings.

The simulation vapor sources can also represent Chemical Warfare Agents (CWA) so you can have multi substance scenarios. We offer a range of simulated CWA detectors including the Smiths LCD3.3 / LCD4 and Bruker RAID M100 that detect and identify the simulated hazard. Additionally, we provide a simulator

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for the Proengin AP4C detector and S4PE surface sampler. The Smiths and Bruker detectors use different analytical technology to Proengin and several of our customers use both types of detection technology for orthogonal monitoring which our simulation platform faithfully replicates.

Our CWA simulators also incorporate a powerful After-Action Review capability that informs responders and instructors of correct simulator operation.

Our product range also includes a variety of radiological surveys and Personal Electronic Dosimeter (PED) simulators that respond to our GS series simulation gamma sources. This completely safe and eco-friendly electromagnetic simulation source was developed and evaluated with the support of various specialist UK and USA Government agencies, all of whom now use the technology.

The simulated effects of shielding and inverse square law response are extremely realistic, permitting responders to practice the principles of keeping radiation exposure as low as reasonably achievable (ALARA).

Operators can also experience radiation levels that trigger specific response actions, including levels that are potentially life threatening if appropriate shielding is not used. Evidence of effective consideration for this hazard is recorded on the simulation personal dosimeter.

Contamination simulators enable initial contamination screening to take place, enabling the segregation of victims and to monitor responders. CWA and radiological contamination simulators incorporate powerful means to simulate either partial or full decontamination to help optimize decontamination and monitoring procedures.

Could you share a real-world example of how Argon worked with a fire service, and what the outcomes of that partnership were?

A majority of the UK Fire and Rescue services utilize Argon simulators, as do several overseas organizations. The New York Fire Department employ simulators within their superb training facility which

includes a wide variety of buildings and even a replica subway station with railway carriages.

The Scheleswig-Holstein Sate Fire Service School in Germany have built a strong portfolio of Argon simulators, including CWA, and have benefited greatly from improved training and cost savings (there is an excellent case study on our website). Similarly, a number of USA based county emergency management agencies have used Argon simulators to greatly improve their HazMat and CBRN training.

Staying up to date with CBRNe training is clearly important, but why do you think it's becoming increasingly critical for fire services today?

Geopolitical uncertainty has never been so high during most of our lifetimes. Significant numbers of people are transiting countries around the world in the hope of a better life, but not all do so with good intent. There is also the danger of "home grown" actors, which coupled with the accessibility of instructions for making improvised weapons, presents significant potential risk.

The Chernobyl and Fukushima Daiichi nuclear disasters demonstrated that threats need not be within your own geographic location and airborne radioactive fallout is not the only concern. The presence of nuclear reactors within conflict zones poses a significant threat if munitions were to strike these facilities.

As risks and challenges continue to evolve, how does Argon ensure its training solutions stay relevant and effective for fire services?

We continue to engage with our customers and detector manufacturers to ensure we have a strong understanding of future training needs, both in terms of equipment and potential training scenarios. This approach has provided us with a strong product development pipeline with several exiting new products on the way.