Picture credit: Rapiscan Systems

NO ROOM FOR ERROR

Steve Revell *reveals the future trends, changing threats and current capabilities in explosives and narcotics detection*

The security landscape is constantly changing. Threats and their method of delivery are constantly evolving, becoming ever more sophisticated in their attempts to outstrip detection methods. Today's increasingly asymmetric threat environment requires manufacturers and security services to stay consistently and comprehensively ahead of even the most challenging and unexpected threats.

It is therefore vital that manufacturers continue to innovate and introduce technology to meet the challenges of this ever-changing landscape, and that security services and governments work closely alongside them to ensure that threats to life and critical infrastructure are understood and preempted.

Of all ongoing security threats, those presented by explosives represent one of the most dramatic security risks we face today, and arguably the threat that grabs the public imagination the most. As with all security threats, measures can be taken to mitigate the damage from explosive devices; building materials can be reinforced and Hostile Vehicle Mitigation measures like the Jersey Wall can be employed, but these measures are reactive. The aim of every security agency, governmental organisation and public sector body when faced with potential threats is proactivity, and the first step towards eliminating an explosive threat is detection.

Although for many the concept of explosive threat detection begins and ends at 'hard' security checkpoints in environments like airports, ports and entrances to large-scale events, this is a simplistic view. Current and future methods of explosive threat delivery mean a comprehensive approach to explosives detection must be undertaken, and as such a flexible array of detection technologies must be employed.

Threat detection must be fast and accurate as well as comprehensive

There are a large number of technologies available to detect explosives, from x-ray scanners using explosive detection algorithms, to trace detection systems designed to detect the smallest amount of explosives and quickly identify the substance. The systems used vary depending on the demands of the environment they are used in – some need to be large enough to accommodate items ranging from aircraft hold baggage to entire vehicles, others need to be able to detect other non-explosive threats, such as narcotics or biological agents.

The need to detect and protect against explosive threats is not the only factor that security advisors need to consider, however. When planning how best to prevent explosive threats from affecting high-profile targets such as landmarks, corporate, Government buildings and public spaces such as airports, efficient and consistent throughput is important, meaning threat detection must be fast and accurate as well as comprehensive.

Rapiscan Systems manufactures proactive, high-grade security screening and detections systems. Working alongside international users across a broad range of applications, it prioritises accurate threat detection, balanced with meeting the varied requirements of users across different industries. These systems include the Orion 920CX checkpoint screening system, RTT-110 baggage screening system, MobileTrace handheld and Itemiser 4DX explosives and narcotics detector.

FINDING A BALANCE

Airports are arguably the clearest example of the need to balance explosive threat detection with factors like throughput rate and customer experience. While it is important to keep a steady flow of baggage and people to minimise disruption, passengers and airlines alike understand the necessity of thorough screening for explosive threats. Checkpoint operators are under immense pressure to provide a consistent rate of baggage and passenger throughput, something exacerbated by ever increasing air passenger numbers, while not compromising on threat identification.

Rapiscan Systems' Orion technology was developed to help operators identify and mitigate threats faster and more accurately by offering best-in-class image quality and material discrimination. Orion technology incorporates ground-breaking innovations in imaging such as detectors and generators and deep learning algorithms, which provide significant improvements to overall screening and performance.

The systems architecture allows for an upgrade path, which enables future implementation of new imaging components across multiple platforms and a wide range of tunnel sizes. In addition, the innovation path encompasses an open architecture, which enables security screening technologies to be integrated across multiple platforms and allows customers to update their security infrastructures more rapidly.

Orion supports higher system uptime and improved serviceability, as well as an enhanced operating system, variable conveyor belt speed and intelligent bag management technology. Each solution also contains additional innovative detection capabilities such as real-time screening algorithms created to identify explosives threats with a high degree of accuracy.

Supporting operators in making accurate decisions to demanding timescales is as crucial when scanning high volumes of hold baggage, as it is when scanning in-cabin passengers and luggage. Larger bag sizes increase the opportunities to conceal explosives or hazardous substances, enabling potential threats to be carried onto the aircraft and transported worldwide.

There is an obvious need for consistent scanning without room for error, but this faces challenges similar to those operators face when scanning passengers and hold luggage – increasing demands for faster and more seamless boarding, higher throughput and minimised flight delays.

High-volume baggage scanners need to strike the balance of consistently high throughput with ease of use for operators and dependable threat detection. High-quality, full volumetric CT imaging of baggage allows operators to manipulate images to get a full view of potential threats, while automated EU-approved Standard 3.1 EDS algorithms flag a full range of potential explosive threats and provide a level 1 decision before bags have even exited the machine.

Easy to interpret displays, designed with input from detection system operators themselves, provide a low false alarm rate, allowing operators to resolve alarms quickly, minimising downtime and reducing the risk of delayed baggage.

THERE IS A NEED TO THINK LONG TERM WHEN CREATING SCANNING TECHNOLOGY

High-throughput demand necessitates that systems run quickly with minimal errors, as interrupted service can lead to knock-on effects with other security and airport processes. Design with a low-part count and multiple layers of network redundancy act as insurance and peace of mind for operators, ensuring optimum levels of system availability and fail-safe operation.

Faster and more seamless identification of potential threats not only increases safety, but also throughput and footfall, keeping operations running as smoothly as possible.

Speed of explosive identification is paramount, as speed of detection will naturally lead to speed of action in threat resolution. The Itemiser 4DX can analyse, register and alert users to threats in as little as eight seconds, covering a broad range of current market threat explosives and displaying results requiring minimal operator interpretation. This allows users to concentrate on sample acquisition and reporting protocols. Able to analyse even trace amounts of explosives residue on skin, clothing, bags, cargo and vehicles, it is usable in a broad range of security roles.

While checkpoint systems fit a spectrum of necessary security screening tasks, they are understandably limited by their static placement – while the full range, in-depth imaging analysis of CT scanner technology would be the ideal when looking for explosive threats in most environments, unfortunately the technology to

provide this in rapid-deployment, fluid threat analysis scenarios is not yet in place.

Many roles, especially those in a law enforcement capacity, necessitate a flexible EDS solution that can deliver accurate results across a full range of threats while maintaining a high degree of portability and straightforward operation, as users may be undertaking detection actions as part of a situation that may divide their attention, or in an environment where scanning needs to take place quickly.

AIRPORTS NEED TO BALANCE DETECTION WITH THROUGHPUT RATE AND CUSTOMER EXPERIENCE

Handheld units provide intuitive, easy-to-learn scanning solutions for a wide range of explosives and narcotic detection applications. With fast detection times, typically in as little as 10 seconds, these units allow operators to detect and react to potential explosive threats with the speed necessary to ensure maximum safe resolution.

Able to detect all major classes of explosives, including peroxides, nitrate-based and plastic explosives, and allows users to expand their library of explosive threat types to accommodate situations where there are unique threats or user requirements.

In high-pressure, fast-moving situations, simplest can mean safest, and the MobileTrace provides simplified sample results to cater to even non-technical users, with visual indications of alarms precluding the need for in-depth technical analysis. A common frustration across all handheld devices, both those that reside in the sphere of security and those outside of it, is battery life – the idea of an explosives detector unable to be used because it has not been charged is one that does not bear thinking about. A state-of-the-art battery, coupled with internal back up batteries and the ability to 'hot swap' prevents this outcome entirely, meaning uptime and use can be maintained in critical scenarios.

RISE TO THE CHALLENGE

As security threats change on a near daily basis, there is a need to think long term when creating scanning technology. While the explosives used today, and their methods of delivery, are understood and can be routinely traced, future threats may come from totally unexpected areas; either incredibly high-tech, or crudely simplistic. It is therefore vital that explosives detection product ranges consider this, and include measures to allow them to be upgraded or kept in-step with emergent threats.

With the correct balance struck between security community collaboration and manufacturer technological innovation, operators will be able to share information and make the informed equipment selection decisions that ensure threat detection can continually adapt to the changing security landscape – keeping standards of safety, consistency of explosive threat detection and confidence in security infrastructure high into the future, whatever the emerging security challenges may be ●

Steve Revell has over 30 years' experience in the security industry, and is the Senior Director of Aviation CT at Rapiscan Systems, specialising in CT screening and working closely with airports to understand its needs now, and for the future.

Speed of identification of explosives is vital, as rapid action is required

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