The future of airport security: faster, smarter, safer

Paul Mason at Redline Assured Security explores how future airport security will be enhanced with technologically advanced equipment and artificial intelligence

Airport security is undergoing a fundamental change. New regulations in the industry have been reactive in the past, adjusting in response to criminal and terrorist activity. The 100ml limit for liquids is a prime example, implemented in response to a foiled al-Qaeda plot that intended to conceal liquid explosives in 500ml bottles. However, with the introduc-tion of 3D computer tomography scanners in UK airports as early as 2024, not only will the 100ml liquid limit rule be lifted, but it will also enable aviation security to stay ahead of the terrorist threat as opposed to reacting to threats.

These advanced computed tomography (CT) scanners allow for a far clearer view of the contents of a bag than the current 2D scanners and the scope of their technical capabilities and signal the beginnings of a new reality for airport security. Looking ahead, it's expected that well-trained screeners will be aided by artificial intelligence (AI) to respond to precise, real-time threats as they happen. The future could well see AI doing the bulk of the work with security personnel on-hand to take action in the event of an actual threat detection. The implications for passengers? A

faster, smarter, and overall even more efficient security experience.

What's new in the technology?
Most airports use X-Ray machines to screen luggage, relying on screeners to identify prohibited items from an often cluttered, 2D image generated by the machine using a defined colour palette. This often results in luggage with a range of unidentifiable but safe objects being flagged for hand search, slowing down the flow at security checkpoints and causing long queues.

CT scanners are a vast improvement in terms of efficiency, producing highly detailed 3D colour imagery that can also be rotated 360 degrees, giving screeners the ability to 'digitally reach inside the bag' and see items in their true dimensions and constituent parts without the need to physically search it. The ability to view the contents of a bag in fine detail, recognising even the composition of materials, means electronics and liquids that may be misidentified as potential threats by X-Ray machines can remain inside a bag, discounting the need for a manual hand search in most cases.

The CT scanners currently being trialled are already providing a solution to the long waiting times in airport security. Shannon Airport in Ireland, for example, reported that the introduction of CT scanners halved the time passengers spent going through security, demonstrating their efficiency.

What's next for airport security?
Whilst not currently available commercially, AI is highly likely to become more ubiquitous in future equipment. In CT scanners, AI can be used to identify and isolate threats in bags much quicker than the time it takes to manually process a complex image, providing luggage screeners with a clear, quick image of whether action should be taken. The ability to differentiate easily and accurately between every day and prohibited items means that bag checks will be the exception rather than the norm, and the bags that are flagged are far more likely to contain a real threat as opposed to a false alarm.

Another advantage of AI machine learning is that the database can be continuously updated with new threats as they emerge, meaning security will always be one step ahead. In our training facilities at Redline, for example, we are using our CT scanners to process thousands of bags to build up a framework where the AI can identify a range of threats from every angle. With this wealth of information, AI machines become capable of identifying these threats quicker than human scanners, highlighting the potential for AI to accelerate detection rates and streamline the airport security process even further.

## The changing face of security personnel
At present, it takes varying degrees of time to decipher X-Ray images and recognise threats amongst the varying complexities of clutter in cabin bags that we travel with. Given the critical role security personnel play in ensuring prohibited articles are not smuggled onboard, future airport security needs to be better optimised to retain high levels of protection whilst also increasing passenger throughput and experience. As we move into a new environment where CT scanners and AI become the norm, a bulk of the work completed manually—the deciphering of threats—will be performed by AI in a fraction of the time with a lower error rate. The primary role of airport security will shift from screening to reinforcing decisions made by AI.

As airport security becomes more technologically complex it will continue to need well-trained and highly skilled screeners to make top-level decisions. Since AI can filter through the noise of a regular bag and identify threats with precision, it becomes more likely that screeners will only need to take action when there is a real threat, or where the bag is too complex for automation to be effective. Their roles become more decisive in the overarching goal of preventing prohibited articles coming on board.

The training requirements for 2D and 3D scanners are very different, and the transition from using X-Ray to using CT is challenging. Whereas training for 2D involves mostly finding the threat in a static 2D (flat) image and then applying threat image recognition, in 3D machines the image has depth and is interactive. Often the threat has already been recognised and is therefore more geared towards decision-making. At Redline, we have integrated our CT machines into our security training, allowing screeners to have a hands-on experience with the new technology and to build understanding and confidence. The result will be highly trained, assured screeners taking accountability for
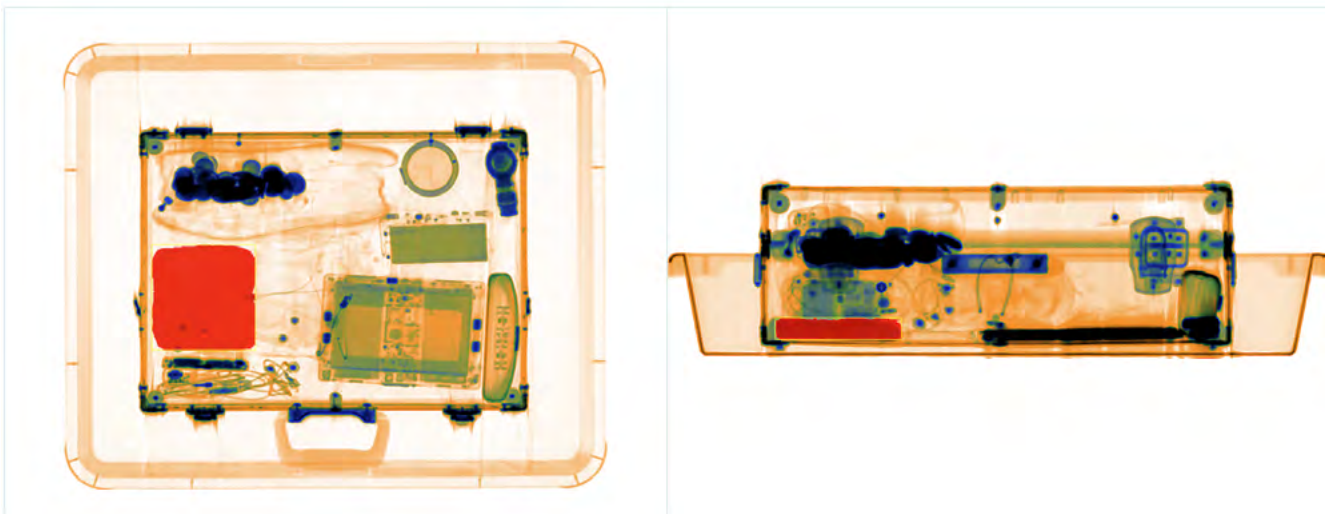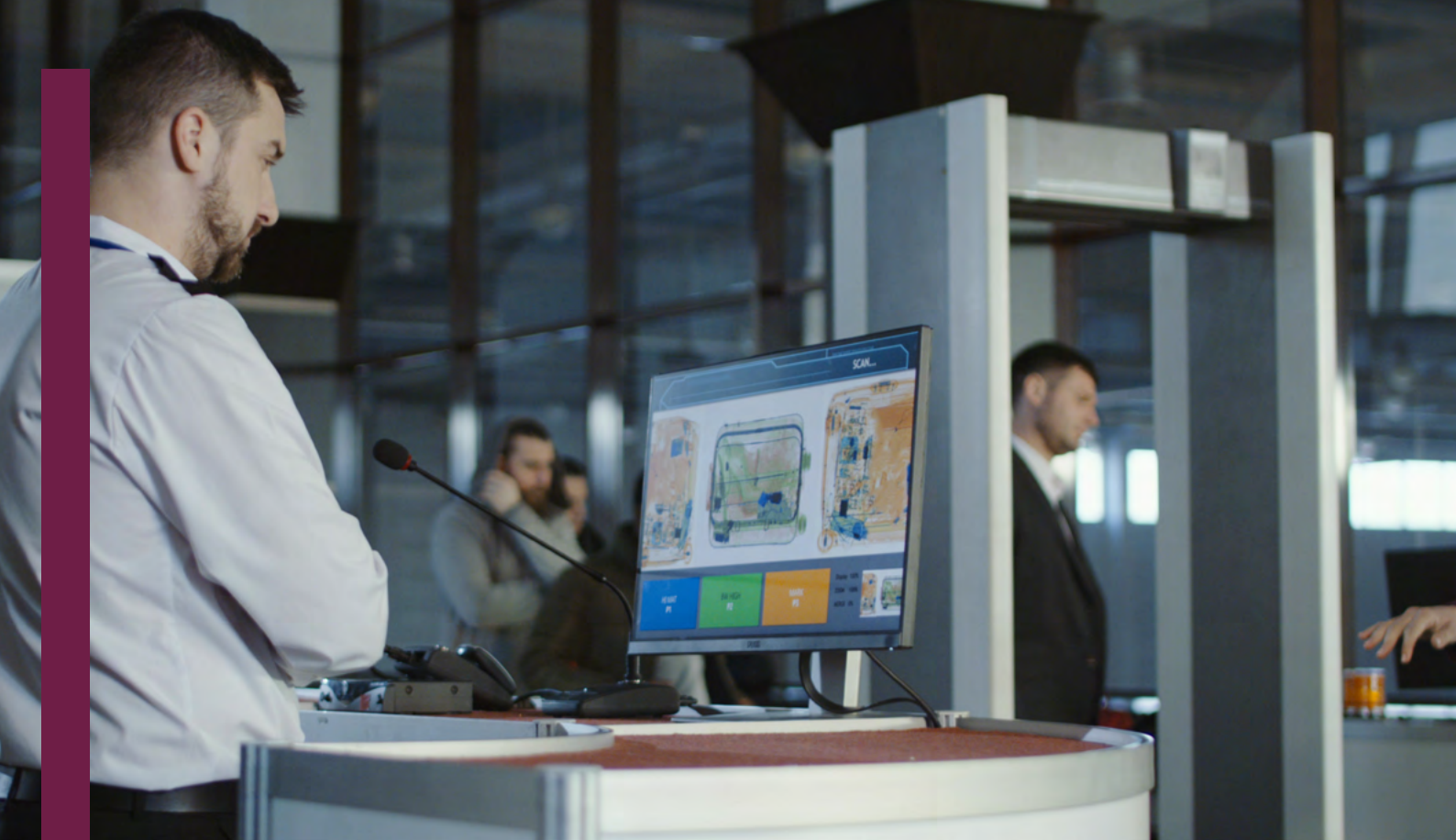
critical security decision-making.

Looking ahead to the airport of the future

The introduction of CT scanners is the beginning of the future for airport security. As the technology becomes more widespread and streamlined in its application, security will become far less intrusive than it is at present. AI is also likely to be introduced to body scanning technology, pinpointing threats on the person without the need for a pat-down, resulting in an airport experience that is more leisurely and less invasive. Instead of long queues, bagged liquids

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and multiple trays, the future airport may feature security that feels as simple as walking along a travelator, with offending bags taken to the side.

This future, however, does rely on greater public education on prohibited articles. Whilst false alarms will largely become a thing of the past and we will be free to take full-sized tubes of toothpaste on holiday, the flow of airport security will continue to be interrupted by passengers inadvertently bringing lighters, pocket-knives, scissors, and other such items that are nonetheless forbidden on board. The aviation security sector has a responsibility to contribute to providing greater awareness of prohibited articles, and to encourage the public and security personnel to work together to make checkpoints as seamless as possible.

Whilst shorter waiting times are certainly an appealing aspect to the future airport, the main aim of security as we go forward is to make sure the likelihood of someone being able to bring prohibited articles on board is reduced to zero. New technology operated by highly-skilled screeners and backed by AI is crucial in achieving this goal and will ultimately make

airports more secure—criminality will inevitably be forced down as smuggling prohibited articles becomes increasingly difficult.

About the Author

Paul Mason is Managing Director for Redline Assured Security, part of the Services Division of Air Partner, a Wheels Up company.

With over 25 years of aviation experience, Paul was at the helm of Redline from inception in 2006 to acquisition by Air Partner in 2019. Redline Assured Security offers a range of industry leading government standard security solutions, spanning all aspects of safety and security, training, consultancy, quality assurance and innovative software products.

With over 15 years' experience, the organisation is trusted across the globe to provide safety solutions for security critical industries, including aviation, rail, and Critical National Infrastructure. Redline Assured Security is one of 36 ICAO (International Civil Aviation Organisation) recognised Aviation Security Training Centres worldwide.

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