

Big tech is transforming the security sector ••

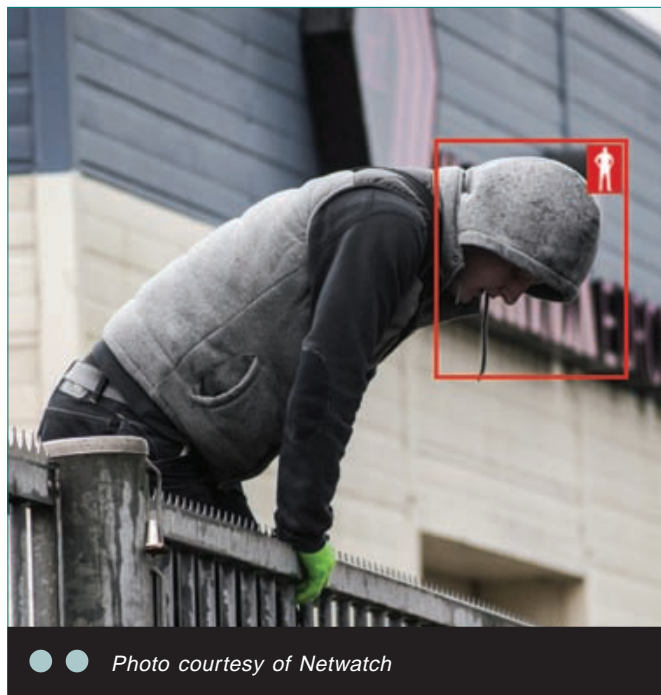
Border security is a vital segment of homeland security for every country in the world. Knowing who and what is coming and going is vital for the well-being of the nation. Niall Kelly, CTO at Netwatch, outlines the latest in border security developments, and reports on how Big Tech is transforming the sector.

Unconstrained by business case or profit imperative, defence budgets have been driven by political rather than commercial aspiration. Trillion-dollar spending and a sophisticated military industrial base have traditionally created technologies whose civilian applications were often of coincidental benefit.

But while everything from duct tape to the jet engine, sat nav to sonar, spy satellites to civilian drones, have their roots in military research, the tables are turning. Today's most cutting-edge tech - deep learning, Artificial Intelligence (AI) and the advent of the Cloud - all started life with civilian user cases, driven not by governments, but by large corporates for competitive gain. Less of an arms race, more of a race to trillion-dollar valuations. While some of their origins stretch as far back as the 1950s, these technologies have all come into their own within the last decade.

This shifting dynamic is especially apparent in security technology, where radar, long range detection systems and thermal cameras were all rooted in military applications. Today, across the expanse of emerging CCTV technologies, quantum strides over the last few years have come not from military oriented research, but from the expansion of processing power. Just as Moore's Law governs the endless duplication of transistor power, so are startling advances in AI evolving to deliver a new generation of smart cameras with incredible image recognition and object detection capabilities.

In the field, the benefits such advances have delivered for border and site security applications are extraordinary. The need for manpower has been mitigated, just as the risks of intrusion have grown, thanks to fast, cost-effective deployments with little need for the supportive power or communications infrastructure that were once necessary. These advances also coincide with parallel developments in autonomous satellite and cellular communications, where higher data rates and global coverage, coupled with Solar and VLP (Very Low Power) device



● ● Photo courtesy of Netwatch

capabilities, are proving vital wherever intelligent surveillance over large, often unmanned terrains is required.

Seeing is believing

Video analytic detection technology is another dynamic innovation whose advances continue to evolve at lightning speed. Today, the ability of analytic software to recognise the difference between an intruder or an animal crossing an area, or other paraphernalia such as vegetation in high wind, and all at very long ranges, is being 'boosted' by off-site image processing in vast cloud-based image processing servers.

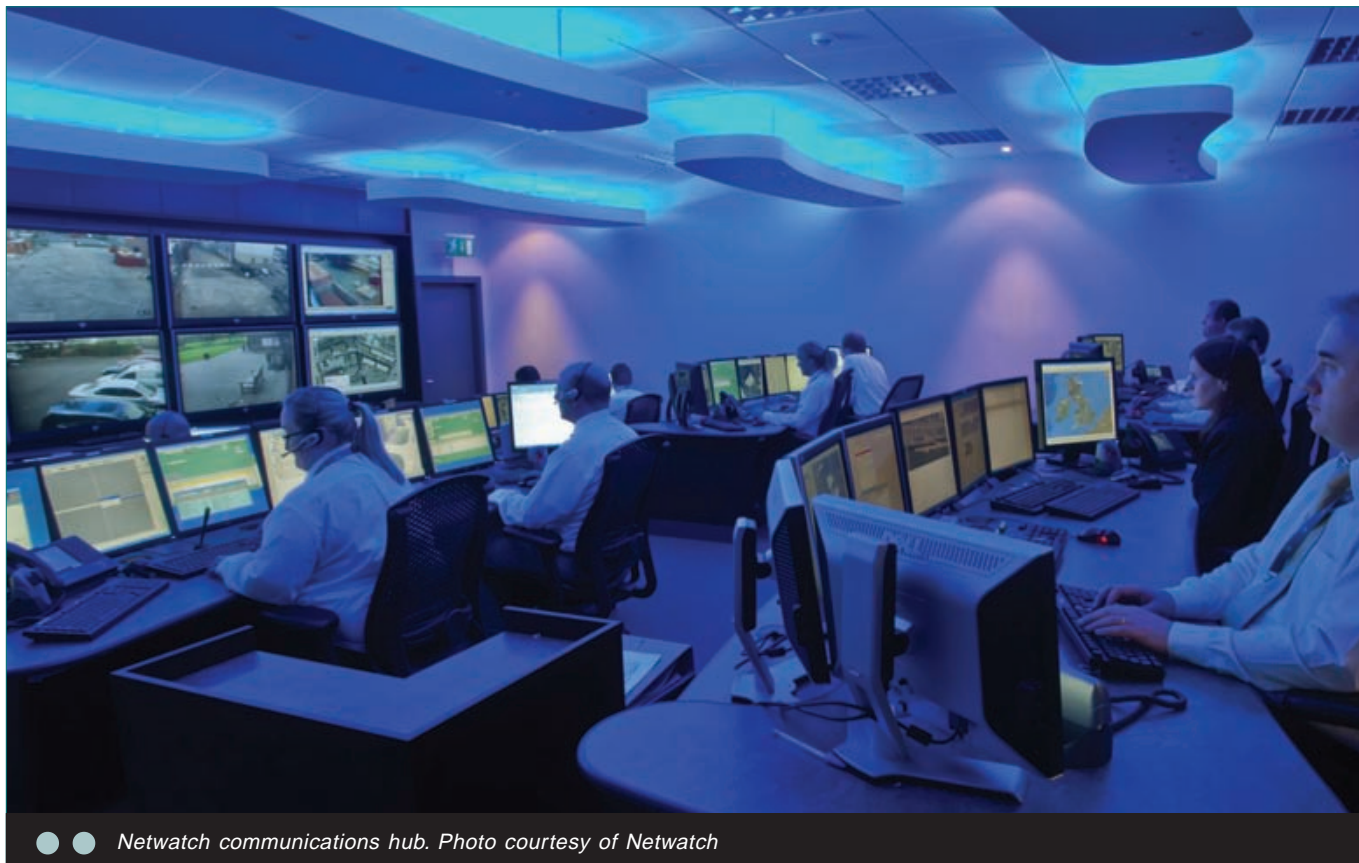
CCTV images can be sent from the field for off-site processing and returned with classification to appropriate field personnel, in seconds, with accuracy levels of 99.9 percent. Our own image recognition system, CRATOS, has pioneered the application of proprietary software to a degree that achieves differentiation between human and animal shape intrusion of 99 percent. Armed with satellite, cellular or WAN communications capability, and able to stream live to a remote command centre or PDA/tablet style device, allowing situational awareness for Command and Control situations, CRATOS is a component of our proven technology suite that features extended long-range detection with thermal CCTV coupled with microwave and laser scanning, similar to radar, with ranges up to 5km and longer.

Such extended range human and vehicle detection technologies have had successful parallel applications in civilian deployments such as airports, high value mines, data centres and the financial sector, where intruder and trespasser prevention and identification are crucial. Where such valuable assets are widely spread over large areas, rapid deployment units can now be cited quickly, and inexpensive tower systems with autonomous fuel cells with three-month power capabilities can be towed or dropped into place for tactical or longer durations.

However, permanent the deployment, wherever there is temporary power such as solar, the analytics powered by long-range thermal cameras with point-to-point connectivity enable rapidly-deployable centres of surveillance excellence to be established and linked in minutes to monitoring stations anywhere on earth, with no need of human intervention.



● ● Niall Kelly, CTO at Netwatch



● ● Netwatch communications hub. Photo courtesy of Netwatch

Looking ahead, one important area where the fusion of video analytic and AI technology will make a massive contribution in military applications, will be that of digital imaging and body-worn imaging devices. Unprecedented research is being conducted into the possibilities afforded by the real time analysis of live images from body worn devices, whether visible, infrared or thermal.

Live streaming of such images to cloud-based processing algorithms enables decisions to be made relating to threat analysis or long-range object recognition with processing that is way beyond the ability of any combination of human eye and brain. In their accuracy and speed, these technologies may well

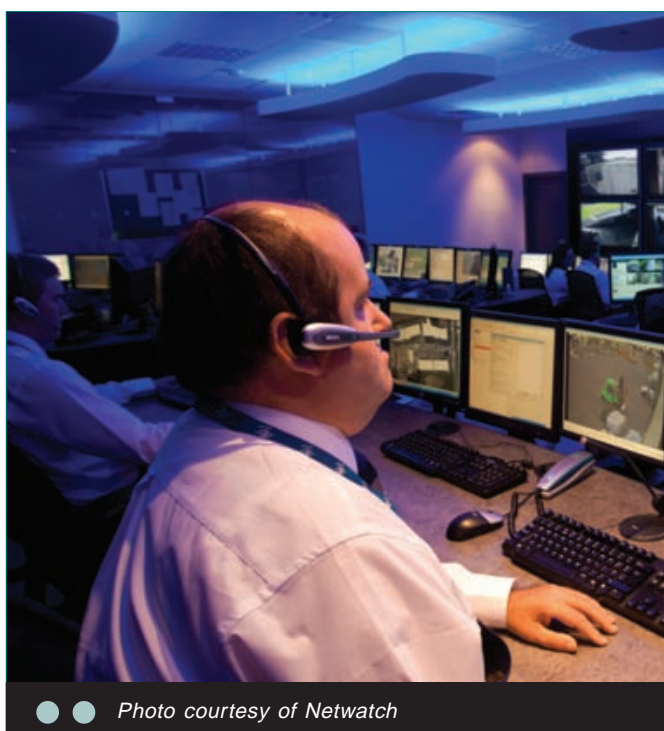
afford the upper hand in situations where immediate, critical decision making is of the essence.

High pressure? Cloud to the rescue

The common thread to much of all this innovation is the cloud, which in military and security applications has been delayed by the fear of disruption, concerns over data security and attacks; classified material and networks of interconnected, shared computers do not mix easily. But when measured against the sophistication on offer from the likes of ultra-competitive upstarts such as Amazon and Google and judging by the interest we have seen from military users across the world, fears of loss of control are gradually giving way to new thinking in military circles. From emerging abilities to create mini clouds in specific assets or scenarios, to the enormous economies of scale and reduced costs, cloud technology is of relevance to more and more mission critical military applications.

A little hazier may be the requirements for GDPR compliance which came into force across the EU in May 2018. The demand for protection of personal information in the public space is obvious; but perhaps less so where issues of national security, terrorism, or border security come in to play. Members of the general public can rightly expect any images captured of them, for example, when crossing a state border, to be properly stored, encrypted and eventually destroyed to proper standards, but probably accept that issues of national security can supersede any privacy rights if serious enough; but it certainly is a fine balancing line. Looking ahead, border security, as we see on both sides of the Atlantic, presents ever more pressing challenges, as witnessed by flows of mass immigration and the threats of sophisticated terrorism. New thinking and new technology are combining to meet these threats, not merely by upgrading the old, but with entirely new transformations. Data driven, AI and machine learning enabled innovations are giving birth to unmanned, autonomous robots and intelligent drones, powered by nanosecond networking and revolutionary methods of energy production and storage.

This astounding pace of change makes it difficult to keep up with, let alone predict, the astounding advances yet to come. **GMC**



● ● Photo courtesy of Netwatch