The National Cyber Security Centre in London, England is designed to improve Britain's fight against cyber attacks and act as an operational nerve centre

INTERNET
ARMS RACE

Anthony Tucker-Jones *talks to Kevin Woollard, BT's Research and Technology Operations Director, in the first of a two-part interview about the escalating threat posed by cyber crime and cyber warfare*

ATJ: A case has been made that a global security arms race is taking place within the internet, from an R&D standpoint is this simply scaremongering or reality?
KW: We at BT are very much of the view that the industry is now in an arms race with professional criminal gangs and nation states, which are highly adept at deploying ever-sophisticated tools and techniques designed to steal data and cause major disruption to the day-to-day running of major businesses, organisations and national communications infrastructure.

Cyber crime is a rapidly expanding market, which requires little resource and risk on the part of criminals to enter. So security specialists such as BT need to continue to innovate in this space to help stay one step ahead of today's ruthless cyber crime entrepreneurs. Our R&D efforts are helping governments, businesses and public sector organisations to better protect their growing digital assets as well as planning for, identifying and responding to cyber attacks.

ATJ: Just how much has the threat escalated?
KW: Over the past 18 months we've seen a 1,000 percent increase in the volume of threats directed at BT's network and our customers' networks. So we've stepped up our security investment and are taking an intelligence-led, proactive approach to identifying the increasingly global threats that we're seeing across the network. By spotting any attacks and vulnerabilities rapidly, we're able to speed up our response and take the most appropriate course of action.

ATJ: The Americans formulated the concepts of cyber warfare, security, strategy and conflict in the information age during the nineties. They argued that without cyber defences the state and civil society was at risk. From your experiences would you say their fears well founded?
KW: The incidence of state-sponsored attacks across the globe is well documented and it's clear that governments need to take this issue seriously. As the delivery of public services have become digitised, citizens are of course conducting more and more of their everyday transactions online, whether that's booking a doctor's appointment, arranging benefits payments, filing a tax return or voting online. Meanwhile, cyber crime continues to grow in terms of the scale and sophistication of the threat.

ATJ: Are we facing a potential tipping point?
KW: The issue of cyber security and raising awareness of the potential impact and damage that cyber crime can inflict on individuals, society and government has never been so critical. That's why the UK Government launched its National Cyber Security strategy last year, which we are supporting and provides a comprehensive approach to securing the country's critical communications infrastructure.

ATJ: Can you briefly tell us about the development of BT's Martlesham Heath site?
KW: BT's Adastral Park facility, which celebrated its 40th anniversary at the end of 2015, was officially opened by Her Majesty Queen Elizabeth II in November 1975 as a new centre for telecommunications research, replacing the wartime Dollis Hill research station in North London. Prior to that the site was known as the Post Office Research Station, Martlesham Heath.

The change to the current name actually occurred in the late nineties. In keeping with the heritage of the site, which was formally home to RAF Martlesham Heath, the name Adastral was chosen as it derives from the motto of the RAF — *per ardua ad astra*, or 'through adversity to the stars.' This is just one of our many links with the UK defence sector, stretching back decades into BT's history.

ATJ: How did Adastral Park become the home of BT global research and development?
KW: When Adastral Park was given its current name in the late nineties, the aim at the time was to transform the site into a high-technology business park no longer exclusively for use by BT. Today it is BT's global engineering HQ and the focal point of BT's R&D efforts. More than 95 hi-tech companies are co-located with BT at Adastral Park, which is also the largest test and integration facility in Europe.

ATJ: Adastral Park styles itself as 'the home of UK Broadband' how did this come about?
KW: We're very proud of our long and distinguished track record of achievement in the field of telecommunications and innovation. In fact, we can trace our roots back to the very first communications company in the world, the Electric Telegraph Company, founded in 1846.

At this point I'd like to highlight the work of Tommy Flowers, who was an electrical engineer working in the telecommunications division of the General Post Office, which later became BT. It was Flowers who helped develop Colossus, the world's first programmable computer, which was instrumental to successfully cracking the German Lorentz code at Bletchley Park, playing a critical role in the success of the D-Day landings and Allied war effort. Following the war, Flowers focused on telecommunications research and his work led to the introduction of the first all-electronic telephone exchange.

Since then BT's technological innovations have continued to play a critical part in building today's modern communications networks. In 1984 our research team at Adastral Park developed the first commercial single mode optical fibre network. Today, this technology plays a role at the heart of all global networks, including our own, which spans more than 180 countries.

ATJ: What else helped put you on the map?
KW: In 2003 it was BT's VDSL (very-high-bit-rate digital subscriber line) interoperability testing that helped establish the global standard for the VDSL technology that is powering BT's roll out of fibre broadband today. More recently, BT has pioneered

> # CYBER CRIMINALS POSE A CONSTANT THREAT TO MEMBERS OF THE PUBLIC AND GOVERNMENTS

the use of ultrafast G.fast technology over copper, and also successful transmitted world record-breaking speeds of 5.6Tbps over a single optical fibre, so our leadership in both copper and optical fibre continues apace.

ATJ: How many staff does BT employ at the site and what key areas are they working in?
KW: Around 4,000 people are based at Adastral Park, including 850 people from BT's industry partners such as Alcatel-Lucent, Cisco and other smaller players. Our people are actively engaged in research relating to a wide range of critical technologies, including networks, security, cloud computing, mobility, The Internet of Things (IoT), Big Data analytics and TV and content distribution.

ATJ: What is BT's role with Innovate UK or the Technology Strategy Board?
KW: We maintain good links into UK and EU Governments and all their science and engineering bodies. Indeed, Tim Whitley the MD of Research and Innovation for BT has just taken on a board position for the Engineering and Physical Science Research Council (EPSRC) and Paul Jenkins is Chairman of the EIT digital London Node, demonstrating our commitment to academic excellence in UK and EU research. We maintain a close relationship to Innovate UK, as we did with its predecessor the TSB, and we are a keen collaborator in UK science and innovation projects in security, IoT and other related fields.

ATJ: BT's Defence Division recently hosted a defence tour at the park. What was it that prompted this?

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KW: There are many new, innovative technologies that have been developed at the park and are being trialled with customers in other sectors globally, which can also be of benefit to the defence sector. Our defence customers are looking for more off-the-shelf orthogonal solutions – so we wanted to highlight the work we're doing at Adastral.

> ## 'ADASTRAL' WAS CHOSEN AS IT DERIVES FROM THE MOTTO OF THE RAF – *PER ARDUA AD ASTRA*

ATJ: In what key areas does BT work with the defence sector?

KW: Our aim is to enable information superiority – helping to get the right information to the right place at the right time, so the best-informed decisions can be made. This relies on more collaborative technology, including mobility, which provides the armed forces with the flexibility to communicate with colleagues when they're away from their desk whether that's on the home base or when deployed.

ATJ: What systems has BT provided the British armed forces in recent years?

KW: In 2015 BT won the Integrated User Services contract providing fixed and mobile voice solutions across the Ministry of Defence. We're also providing Defence Business Internet (DBI), which offers increased flexibility for personnel on UK bases to receive and carry out orders when away from their desk.

ATJ: Cyber security is now big business, what sort of R&D work is Adastral Park conducting in this field?

KW: Continuous innovation is, of course, key if we are to outpace the cyber criminals who pose a constant threat to members of the public, businesses, organisations and governments.

ATJ: Can you be more specific?

KW: I explained earlier how we're focusing on taking an intelligence-led, proactive approach to cyber security, and key to this is our use of Big Data Analytics. BT's Cyber Security Platform, and specifically the visual analytics SATURN tool, which was used to great effect during the London 2012 Games, allows our customers to benefit from real-time data, situational awareness and a clear understanding of cyber threats. It provides early warnings of suspicious behaviour and allows for a rapid response.

ATJ: What can be done to counter encryption breaches, as these seem to be getting worse?

KW: Another exciting field is Quantum Key Distribution (QKD). This involves the transmission of encryption keys across fibre optic networks. The technology works by encoding each bit of data on a single particle of light and any attempts to intercept that data are easily detected. If that happens, the entire transmission can be stopped and a new encryption key sent, keeping the data secure. This type of encryption technology provides an extra degree of sophisticated security that could be deployed by the likes of banks, credit card companies and the defence sector ●

Anthony Tucker-Jones is *intersec*'s Terrorism and Security Correspondent. He is a former defence intelligence officer and is now a widely published defence commentator specialising in regional conflicts and counter terrorism.

Adastral Park, in Martlesham, Ipswich is the epicentre of BT's research, technology and IT operations

Picture credit: BT