

## Upgrading to IP-Surveillance and cutting installation costs.

How Stafford Hospital in the UK, used its existing network infrastructure and Axis equipment to upgrade and network its CCTV system, saving more than £40,000.



Organization:  
Stafford Hospital

Location:  
Stafford,  
United Kingdom

Industry segment:  
Healthcare

Application:  
Hospital safety  
and security

Axis partners:  
Plexnet and  
DV networks



# The Stafford Hospital story

In 2001 the 30 people-strong Portering and Security Services Department of Stafford General Hospital began to express concern about the quality of recorded images generated by the hospital's ageing analogue CCTV system which was by then already more than ten years old.

By this stage the Health Infomatics Service (HIS) of the NHS was in the process of completing an upgrade of the network infrastructure of Stafford Hospital. A 1 Gigabit (GB) backbone had already been installed throughout the main hospital building and 11 MB wireless links had been set up to outlying buildings throughout the hospital's campus.

Understandably HIS project managers were keen to explore the maximisation of this network infrastructure investment by putting any upgraded surveillance system onto the network. HIS staff worked alongside the hospital's security manager Mr Giles Perry to identify the specification required for a networked surveillance system. The project was then put out to open tender in September 2001.

## The pilot project

At the end of the tender process, network security installer Plexnet was selected and commissioned to build a pilot in February 2002. The pilot was conducted with just four cameras - one AXIS 2120, one AXIS 2100 and two analogue cameras attached via an AXIS 2400 Video Server to DV Networks' discover e system\*. The trial proved that output could be successfully taken from both new network cameras and existing analogue cameras so that investment in existing CCTV system hardware did not need to be lost in order to upgrade. Such was the success of the pilot that Plexnet was given the green light to build the full system for the main hospital and two outlying hospital buildings.

## IP-Surveillance creates more than £40,000<sup>1</sup> installation saving

According to detailed estimates, if Stafford Hospital had simply extended its existing coaxial cabling based CCTV system throughout the whole of the main hospital building, out to the Technology Park 1.2 kilometres away and the Occupational Health Unit 400 metres away, it would have cost £75,302<sup>2</sup> in cabling and installation alone. In actual fact the total contract for the IP-Surveillance system using the hospital's existing 1GB Ethernet cabling and wireless links cost £33,000<sup>3</sup> - a saving of 56 per cent. The prospect of this initial installation saving was a clear stimulus to moving the project forward quickly.

\* DV Networks' discover e system is a desktop-based monitoring solution which enables easy display, monitoring, recording and retrieval of images from multiple surveillance cameras.

<sup>1</sup> EUR 60,000

<sup>2</sup> EUR 112,282

<sup>3</sup> EUR 49,205



## NHS modernisation creates demand for surveillance

Hospitals throughout the United Kingdom lost the status of immunity from prosecution in 1991. Since then there has been a marked increase in the deployment of surveillance systems in the UK's National Health Service (NHS) hospitals to help protect staff, patients and visitors.

Several highly publicised incidents including the abduction of babies from hospitals and increased incidence of violence, led to an increased emphasis on security. Most surveillance systems installed in the early 90s were analogue CCTV-based and are now ageing and in need of upgrade.

Simultaneously, the British Government committed expenditure of £2.3 billion for the updating the Information Technology systems of the NHS by 2005, as part of a wide ranging programme of modernisation of the UK's public health service.

A key focus of this IT spend has been on creation of Electronic Patient Records System (EPRS) which will eventually eliminate the need for the transportation of hard copy patient records files between doctors' surgeries, specialist clinics and hospitals.

With the increased traffic of electronic patient data travelling in and out of surgeries and hospitals, there has been a need for investment in robust and well resourced network infrastructures.

These network infrastructures which have recently been put in place in many hospitals have led health service IT departments to look for other applications which can be put onto them. For one hospital in the UK, IP-Surveillance proved a perfect choice saving it more than £40,000<sup>1</sup> at installation and using existing network infrastructure and the Internet to provide campus-wide surveillance and even open up the opportunity for sharing of security resources with other hospitals in the region.

<sup>1</sup> EUR 56,630



"HIS project managers were keen to explore the maximisation of this network infrastructure investment by putting any upgraded surveillance system onto the network."

# Frame rate adjustment offers control of bandwidth usage and image quality

The discover e system enables Mr Giles Perry, the hospital's security manager, to control the variable frame rate for viewing and recording to the server.

This is important because some areas where there is high traffic such as entrances, a high frame rate is crucial to ensure all people entering are captured and identifiable from the images stored. Frame rate can be lowered in areas where there is less traffic in order to restrict bandwidth usage.

The hospital was also able to use the discover e system to determine the number of days of recordings that could be safely stored. Given the numbers of cameras and amount of storage, the system was able to store up to 15 days of images. This proved more than adequate for Stafford Hospital's needs.

## Collecting evidence around the clock

Four duty supervisors operate on a shift basis around the clock. Mr Perry explains: "These duty supervisors work over a four week period, morning, afternoon, night and then switch each month. So if evidence is required at short notice in the early hours of the morning, whoever is on duty that month has the training and authority to select relevant images, burn them to CD and issue them to the police."

"All evidence that we provide is in compliance with the Data Protection Act 1998 and all relevant other acts and regulation around the provision of digital evidence. All information is kept on one hard drive for two weeks and key evidence is then transferred as AVI files onto a dedicated computer. Events which require police involvement are then captured on CD and sent to the police. A great deal of recorded evidence has led to successful prosecution."

Mr Perry keeps his own personal collection of images of crimes in action. He only keeps images which capture events that are likely to lead to prosecutions in the future. These images are also held on the dedicated computer and can be burnt to CD and couriered or simply e-mailed to Staffordshire Police if the need arises: "After incidents such as the break in of the vending machine we burnt images to CD and sent them to the police. We also printed copies of some key images and distributed them around the hospital to warn staff to be on the look out for these youths which we knew had keys to vending machines on hospital premises."

## Security reporting

All digital evidence is supported by incident forms which are completed after events such as this where a crime has clearly been committed. All incident forms are kept on file for up to four years and still images associated with these incidents will be kept for the same length of time.

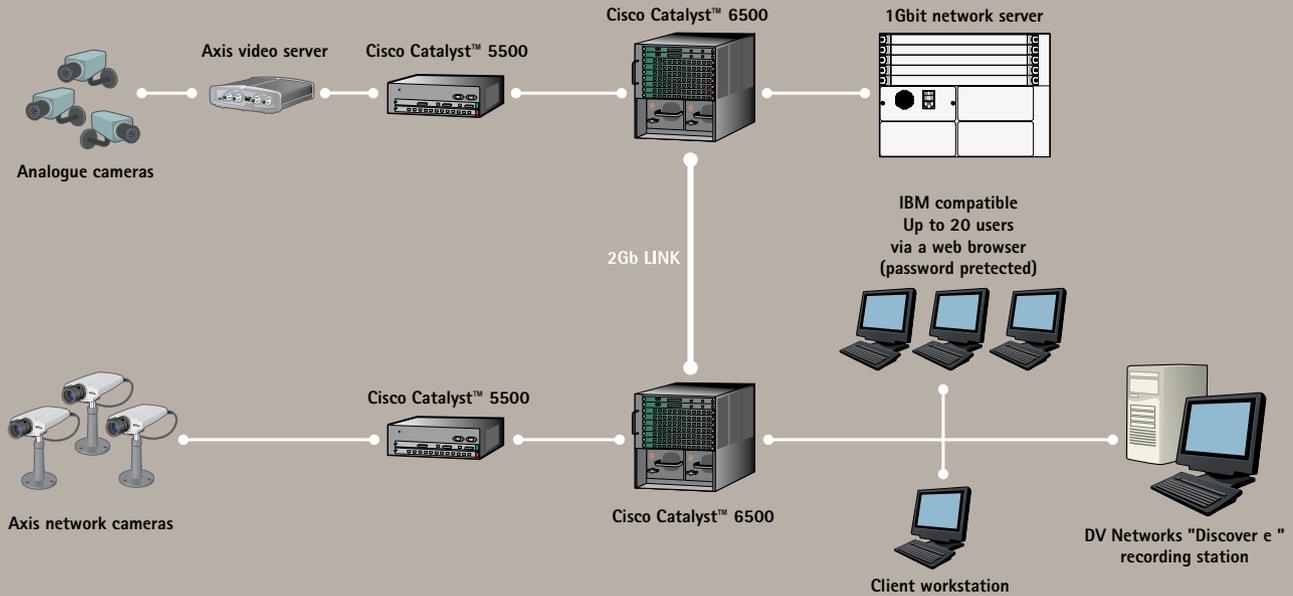
The system is used purely retrospectively partly because of a lack of resources and partly because the level of crime is such that it does not make economic sense to have operatives monitoring output from the cameras or responding to alarms around the clock.

The security team therefore relies on duty supervisors who have a security remit, or other hospital staff or patients to spot and report incidents. If witnesses can provide a rough time of an incident, the duty supervisor can locate the relevant images very swiftly using the DV Networks' discover e system.



"Events which require police involvement are captured on CD and sent to the police. A great deal of recorded evidence has led to successful prosecution."

# The technical solution



Axis network cameras are installed at the main entrances of the main building, inside the main hospital and at the Technology Park\* 1.2 kilometres away linked via an 11MB wireless link.

Axis video servers take output from 14 existing analogue cameras already installed in the main building, so that images can be transmitted over the network.

Cameras inside the hospital and the Technology Park are sited at the reception, on entrances and exits, at the special care baby unit, maternity wards, in the infirm elderly unit and at the cardiology and acute stroke unit.

\* The Technology Park itself provides additional accommodation for 100 hospital staff that have access to the hospital's computer network.

Two workstations support the system. One provides the recording to hard disk and viewing. The other provides back up storage particularly for images which may be used as evidence of a crime at some future date.

DV Networks' discover e Version 4 was deployed to view and store all images. The discover e system takes images generated by all cameras and displays these in quad or single view on a PC monitor and saves them down to a hard disk drive of a PC in the hospital's main security office.

## Network Infrastructure at Stafford

- > Stafford Hospital operates a 1GB backbone containing two Cisco Catalyst™ 6500 core switches with 2GB connection running between them
- > These core switches link to 20 Cisco Catalyst™ 5500 edge switches
- > The entire network is configured as a number of Virtual Local Area Networks (VLANs) routed via on-board Multi Switch Feature Cards (MSFCs) operating inside the core switches on the supervisor boards



## 56% installation savings

One of the key factors in the decision to upgrade Stafford Hospital's surveillance system to IP was the clear cost savings. To illustrate the sorts of costs at work in this case, Plexnet supplied some estimates of the comparative costs involved in installation of an upgraded CCTV system as compared with installation of the IP-based surveillance system that was actually installed. The estimate assumed linking up of seven new cameras (4 in the hospital itself and 3 in the Technology Park 1.2 kilometres from the main hospital).

### For the Internal Coaxial Cabling installation in the hospital building and Technology Park

- > New ducting, retainer trays, installation work itself (based on 5 man days at £240 or EUR 358 per man day + £500 or EUR 745 for installation materials) = £1,700<sup>1</sup>
- > Internal Coaxial Cable (costing 20p or .30 EUR per metre x 350 metres) = £70<sup>2</sup>

### For the External Coaxial Cabling to the Technology Park 1.2 kilometres away from the hospital

- > External coaxial cable (at 86p or EUR 1.28 per metre x 1,200 metres) = £1,032<sup>3</sup>
- > Installation of the cable itself = £500<sup>4</sup>
- > Contractor work (diggers, retarmacing, laying of new turf, drilling etc at £60 or EUR 89.5 per metre) = £72,000<sup>5</sup>

Therefore the total cost of internal and external work for upgrading of traditional analogue CCTV system (excluding security equipment) = £75,302<sup>6</sup>. This compares with the actual cost of the installation of a new IP-based system (excluding security equipment) of £33,000<sup>7</sup>. This is equal to a 56.18% saving on this installation.

### Enabling pro-active surveillance

"In the integrated world an alarm could trigger a camera to begin recording if an unauthorised person has entered a restricted section of the car park for example. Cameras could track that same individual into the hospital. Suddenly proactive surveillance becomes a realistic possibility as there is sufficient time to alert security staff who can then ask the relevant individual to verify his identity at the entrance of a hospital building."

Giles Perry, Security Manager, Stafford Hospital

<sup>1</sup> EUR 2,535

<sup>2</sup> EUR 102

<sup>3</sup> EUR 1536

<sup>4</sup> EUR 746

<sup>5</sup> EUR 107,360

<sup>6</sup> EUR 112,355

<sup>7</sup> EUR 49,206



"The great thing is as we extend the surveillance system beyond the walls of the hospital the cost benefits start to multiply."





## IP-Surveillance offers ideal solution for cabling management

There were not only cost advantages involved in the decision to go IP. Cabling management is a huge issue in all hospitals because of the vast infrastructure involved in running a hospital. Cabling, pipe work and ducting is needed for telephones, heating, water, electricity, air conditioning, air filtration, telecoms and computer networks. All this is housed in the roof voids of hospitals between the ceiling and the floor above. Because all this cabling takes up a great deal of space in these voids, there is very little spare room for any additional cabling.

Using coaxial cabling would have meant creating a completely new carrier system - a major job requiring teams to work overnight to minimise disruption to hospital staff and patients. Night working can double the above conservative installation costs, pushing up overall costs considerably. The IP-Surveillance solution, on the other hand, meant that the only additional cabling required was running electricity cables to new devices. Fortunately no new power supply points had to be created as cameras were sited within easy reach of existing power sockets. An additional area of significant savings came with the need to put a surveillance camera into Stafford Hospital's Occupational Health Unit based 400 metres across the hospital's car park.

### Another wireless link increased savings

A traditional CCTV installation would have demanded laying cables under the ground with the attendant costs detailed above, in addition to the disruption that would undoubtedly have been caused. But this unit already had a wireless link which could be deployed for the network camera that was now installed, at virtually no extra cost other than the unit itself.

### Expansion into car parks

In October 2003, as part of an efficiency drive and following the success of the IP-Surveillance project, the trust decided to take the hospital's car park security in-house. This development will lead to the deployment of a further 19 external network cameras. These will replace the existing analogue CCTV ones which are now more than 15 years old.

### Ease of integration

Mr Perry and his team hopes that over time he will be able to integrate the existing access control system with the IP-Surveillance system operating inside the hospital and the surveillance system covering the car parks which will now be integrated with the indoor IP-Surveillance system.

### Sharing of security resources nationwide

As hospitals install more comprehensive networks and link via larger bandwidth lines onto Wide Area Networks (WANs) it will become possible for hospitals to share IP-based security resources using the services of a central monitoring station covering several hospitals. If one hospital can provide a remote monitoring centre for several, this means that some will not have to devote resources to building and maintaining a security office with all its attendant monitoring and control systems. Stafford Hospital, for example, is already networked with its sister hospital within the Mid Stafford NHS Trust in Cannock some 15 miles away.

### Hospitals around the world are choosing Axis

The challenges faced at Stafford Hospital are faced by many hospitals around the world. Axis has experience of working within the constraints of these sorts of organisations and is now building up best practice examples to help organisations across multiple sectors to upgrade their CCTV systems to IP-Surveillance.

## About Axis Communications

Axis is an IT company offering network video solutions for professional installations. The company is the global market leader in network video, driving the ongoing shift from analog to digital video surveillance. Axis products and solutions focus on security surveillance and remote monitoring, and are based on innovative, open technology platforms.

Axis is a Swedish-based company, operating worldwide with offices in more than 20 countries and cooperating with partners in more than 70 countries. Founded in 1984, Axis is listed on the OMX Nordic Exchange under the ticker AXIS. For more information about Axis, please visit our website at [www.axis.com](http://www.axis.com)