



**CCTV**

**Successful Implementation Using Wireless**

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## Introduction

This paper is intended to examine best practice for implementing a wireless network infrastructure to relay CCTV images from remote locations to a central monitoring suite(s). Issues considered in this paper apply to both real-time surveillance and Automatic Number Plate Recognition (ANPR) applications.

A separate paper (available on request) details the implementation of a Greater Manchester network by Airfibre's associate company, Manchester Metronet, to support CCTV infrastructure for The Greater Manchester Police and Manchester City Council. An independent Case Study commissioned by 'Security Management Today' of this work may be found at <http://www.info4security.com/story.asp?sectioncode=10&storycode=3093658&c=1>

## Wireless – a reliable communications infrastructure?

Regardless of what Vendors might have you believe wireless networks are inherently unreliable, and should not be regarded as plug and forget. That is not to say traditional fixed line communications circuits present some form of panacea for they too are subject to periodic failure for a variety of reasons; most notably human error when configuring and building out network infrastructure.

Carrier grade wireless network connections require Line of Sight; and it is this point at which wireless networks are prone to failure.

Modern urban environments are increasingly dynamic. Regeneration projects lead to constant change with new buildings being erected, cranes appearing over night, etc. Interestingly the same dynamism affects traditional fixed line circuits on a daily basis but (diggers being the primary culprit) are less easily resolved. (Wireless network outage due to Line of Sight failure is usually easily rectified by the simple relocation/alignment of equipment).

In a CCTV context, the application determines that there is additional risk from a disgruntled community that will seek to disrupt service either for political or criminal means. Whilst attempts to vandalise a camera, for example, may not be successful, the action could result in a radio transmitter being knocked off-line.

Regardless of the relative resilience of wired and wireless networks, both are prone to failure.

## Identifying the risk

CCTV Controllers are not, and nor should they be expected to be, 'Network Managers'; and it is unfair to expect them to monitor the quality and availability of network connections to remote cameras.

The common process in CCTV Control Centres is technical problems are referred to the CCTV Manager for resolution. There ensues an indeterminate dialogue with one or more suppliers to establish where responsibility for resolution resides; a notoriously unpalatable challenge!

The problem is exacerbated in heavily populated Control Rooms equipped with facilities to monitor tens and hundreds of cameras. Here, a given camera not having been manually monitored for a period of time may only be discovered to be faulty when a specific requirement for viewing arises. Clearly, in these circumstances, the discovery of a fault happens at a mission critical point resulting in questions being raised and enormous pressure being applied by interested parties.

The problem is worse in an ANPR context, where applications are designed to run unattended raising alerts to specific conditions as required. Here it is conceivable that a problem will not be identified for hours; days possibly? The resultant loss of intelligence and opportunity to progress criminality is unacceptable.

A wireless network that is built by a third party and passed over to the CCTV/ANPR Controllers for management and maintenance demands that the Customer invests in personnel and management utilities to ensure that services are operating and can be repaired as required. Further investment is required for back up equipment and repair resource including, perhaps, Cherry Picker Vans that allow access to cameras in otherwise unreachable locations.

## **Wireless Networks Delivered as a Telecommunications Service**

Airfibre has built out its commercial proposition as a telecommunications service to which strict Service Level Agreements apply; a model of excellence for servicing CCTV/ANPR communications.

By concentrating all communications service over its powerful back-bone network, Airfibre is able to monitor, real-time, all connections to and from cameras and Control Centres.

An automated network management system monitors the quality of every link in the network and raises alarms if there is any danger of interruption to services. Detailed analysis of the links identifies missed packets, errored packets, loading, latency and equipment responsiveness. Having identified a problem alerts are generated to appropriate engineers via email and mobile phone SMS texts and the Service Level Agreement (SLA) kicks in.

The SLA has financial teeth and commits the Company to addressing disruption inside four hours. Only qualified engineers are sent to address problems; engineers that are equipped with spares, knowledge and the authority to resolve the issue at hand. This in contrast to traditional network operators working in a multi-vendor environment where different parties squabble about who might be at fault.

The net result of the Telco approach is that it is incumbent upon the Supplier to proactively resolve problems that arise from time to time. A specialist IT Company that builds and passes responsibility for a network to the Customer will always be reacting to issues and problems as they are reported. The difference to the Customer is that the former commits to 99.95% service availability and the latter simply can not.

## **Opening horizons**

Airfibre consolidates traffic across a fault tolerant network introducing a powerful capability to share images between Agencies. Precedent already established within Greater Manchester where the GMP cooperates with Local Authorities to share camera resource.

The marriage between Police and Local Authorities has obvious attraction as it allows consolidation of budgets, and it ensures that CCTV images are monitored on a 24/7 basis by professionals equipped for the task, whilst ensuring that evidential quality images are available to the Police for criminal prosecution.

As the network expands, its value as an effective counter-terrorism tool cannot be underestimated.

With Towns and Cities across the UK implementing Ring of Steel projects, considerable investments are being made in real-time ANPR technology. The wireless network implemented in Manchester affords an opportunity to maximise return on investment by supporting dual purpose applications with the same cameras being used to support surveillance and ANPR as required.

## **Summary**

Wireless communications to support CCTV image relay is becoming increasingly understood. Whilst different implementations produce varying results that manifest in differing image quality, and telemetry response; no one vendor can claim to have a 'unique' advantage.

Distinction can however be made post installation of a project when inevitable problems occur. As outlined earlier, wireless networks will experience problems and it is at this point that CCTV Managers must have a contingency plan in place to effectively deal with issues and keep systems operating.