

## Liverpool's Flagship CCTV

Famous as the home of the Beatles and inspiration for numerous cultural milestones of the twentieth century, with its instantly recognizable Mersey waterfront architecture, Liverpool is a city of national and world-wide renown.

One of the UK's largest cities, its population of almost half a million people is boosted each year as the city's successful tourist industry booms, attracting millions of visitors. Featuring the rejuvenated Albert Dock area that houses attractions such as the Tate Gallery and Maritime Museum, the city center is also home to architecture of international praise. Most notable being the St George's Hall, Liverpool Museum, Walker Art Gallery, Liver Building and its imposing Anglican and Roman Catholic Cathedrals. With a rich blend of culture and dynamic forward thinking behind its ongoing regeneration program, it's no surprise to learn that the city has recently been named European Capital of Culture 2008.



Ensuring visitors and residents feel safe and secure in the city is a key objective for Liverpool City Council, who through their involvement with the 'City Safe' partnership, endeavour to proactively tackle all aspects of crime and anti-social behavior in the city. To this end, there are various integrated security measures in place within the city center and surrounding areas, the most recent of which is one of the most sophisticated CCTV systems installed in the UK. At a cost of £6 million, the size of the investment reflects the confidence Liverpool Council have in the ability of this large scale public area surveillance scheme to fulfil its role.

Based on Synectics' latest SynergyPro control and Time-lapse Later digital recording equipment, the CCTV surveillance system incorporates 240 cameras spread across four key zones of; Liverpool (center), North Liverpool, Kensington, and South Liverpool. Images from each camera are fed via a 70km network of fibre-optic cabling to a central control room, known within the 'City Safe' partnership as 'City Watch'. Located amongst the imposing Merseyside waterfront architecture, the state-of-the-art control room includes a video wall featuring 60 monitors. Incorporating Synectics' award-winning SynergyPro™ control software deployed at five workstations, the sophisticated system is manned with CCTV operators comprising Liverpool City council staff and Police Officers.

### Powerful Control

Ensuring a simple and intuitive operator interface to the complex, large-scale Liverpool installation, the SynergyPro™ control software deployed capitalises on Synectics' vast experience within major systems, to create an optimum workstation environment. Addressing the requirement of City Watch's system operators and managers to provide a practical control and administration solution that can deliver a high-level of flexibility of operation, SynergyPro's human interface to Liverpool's multi-vendor hardware, ANPR and audio helppoints etc, furnishes the system's operators with a fast route to all common system functions. Allied to this, at all times, supervisors have the ability to monitor system usage and override its operation if and when necessary.

Within SynergyPro™, a handy feature for checking the status of all 240 cameras on the system at any one time helps to maintain the effective operation of the system. Synectics' 'Camera State' function is available to operators at each of the workstations; this verifies and displays a camera's status at that time; i.e. locked, in use, or 'Incident'. Commenting, William Vaughan, City Watch's CCTV Controller explained: "This feature is particularly useful if camera positions have been vandalized, or purposefully moved out of position to prevent criminal activity from being detected - a particular problem in some areas covered by the system. This function means we can check the operation and position of all two hundred and forty cameras in an instant, initiating call-out maintenance if necessary."

### **Operational Reporting**

Another powerful function of SynergyPro is 'Incident' (in progress) feature. This is used by Liverpool's operators during the course of tracking a 'live' event on screen; creating a fully documented audit trail of the incident. The 'Incident' feature also locks-out other station operators from using the specific 'live' camera during the crucial incident tracking period. The date, along with start and finish time for each event is stored automatically within the evidential video created, and tagged with a full audit trail of information, indexed to the operator's initials. Vaughan explains the advantages for the system's operators: "With this facility, I can be confident that when tracking an event, each action taken is recorded and fully documented for future reference, if required for evidential purposes. Prioritized Supervisor access permits the tracking of a particular event, to determine which cameras were used to view the incident, how and when they moved, the sequence of camera switching, and which control room operator was controlling them at that time."

Overseeing the correct usage of the system, SynergyPro™ also creates comprehensive reports for the system's managers, to provide a single audit trail associated with visual evidence that enables assessment of the system's correct use, (or abuse). System misuse could include operators viewing windows of private residence's or businesses either unintentionally or otherwise, often a problem for city center systems due to the increase in urban occupation. This is prevented at Liverpool with the installation of Synectics' award-winning PRIVacy feature. When applied to any area of a scene under video surveillance, an onboard image processor mounted at the camera head generates a tracking '3D Spatial' mask, which varies proportionately in size and position during pan, tilt, and zoom operations. This restricts operator viewing and prevents sensitive scene areas such as windows in private dwellings from being viewed and recorded.

### **Intelligent Functionality**

Within major public space surveillance systems, the sheer number of cameras means that operators devote their time manually controlling key cameras. To ensure that cameras are not left static for long periods of time, the system employs PTZ camera tours, split into two variants, a day tour which looks at road intersections and the main shopping areas etc, and a night tour, which keeps a watchful eye over pubs, clubs and cash machines. "These tours are used so that residents and potential offenders can see the cameras moving, therefore reinforcing the presence of the system and its effectiveness as a deterrent," explained Vaughan.

If an incident occurs that may require additional support, the control room can directly route live camera video via SynergyPro's 'Follow Me' feature and fibre link to a plasma monitor located at Police Headquarters. Operators can feed live events directly to this screen, enabling police controllers to follow a situation as it develops; enabling them to assess and commit the correct level of response. This invaluable feature will soon be joined by similar links to both the Liverpool Ambulance, and Fire & Rescue Authorities.

For use in conjunction with the SynergyPro software interface, the control of cameras' PTZ functions is performed with the aid of Synectics' unique, multi-functional 'Navigator' Joystick control unit. Featuring side-mounted buttons, these can be assigned to user specific functions, such as to enable the selection of the 'Next' camera on a geographical basis i.e. North, South, East or West of the current camera. Monitors can also be selected using a combination of function button and joystick. The Navigator can be used to select DVR playback control too, to control playback speed and direction. This provides the operator with simple, seamless integration between camera and playback control functionality. The design idea behind Navigator's symmetrical form enables it to accommodate both left and right-handed operation. Described by Vaughan as a, "A well thought through, quality addition to the overall user control interface."

Another invaluable crime fighting tool for the authorities is the system's ANPR (Automatic Number Plate Recognition). At Liverpool, all the system's 240 cameras are equipped to monitor incoming vehicles to the city. This powerful feature has the ability to alert operators to known number plate registrations entering the area, such as vehicles belonging to criminals, or stolen cars. Operators can then act accordingly to track vehicles, with the system automatically predicting a vehicle's possible route, enabling a second or third ANPR 'hit', plotting its route though the city.

### **Time-Lapse Later**

Rather than compromising the usefulness of information gathered by restricting their recordings to time-lapse only mode, The Liverpool scheme addresses the issue by permitting the benefits of real-time recordings to be made at the start of the recording process. This enables operators to choose recording strategies that match the risk profiles of individual cameras, based on events or time, rather than compromising on a fixed time-lapse only strategy.

To achieve this highly-effective scenario, the Liverpool scheme uses Synectics' unique, patented Time-lapse Later (TLL) enterprise-class digital recording solution. With TLL, the automatic intelligent redistribution of the digital storage capacity available allows the benefit of any of the system's 240 cameras selected to be recorded in real-time. Automatically recording whichever camera(s) the operator is using, enabling highly detailed, broadcast quality images to be captured at the very start of the recording process i.e. when it is liable to contain the most 'evidential value'. Only later, after a 24-hour period is time-lapsing introduced; to reduce the frame rate of the stored evidence down to one frame/second for the remaining 30 days, and correspondingly reduce the storage capacity required for its retention. In addition, unlike with standard digital recording systems, the Synectics TLL recordings employ very high-pixel count images, measured in Common Interchange Format (CIF). Typically 4CIF, these recordings are four times more detailed (by pixel count) than those commonly offered, permitting more detailed recognition; a crucial factor in the presentation of key evidential information.

### **Evidence Handling**

The 240 cameras on the installation create a huge amount of visual information to process and potentially retain for further investigation. Catering for this, the Liverpool system utilizes SynergyPro's 'Evidence Locker' management feature. A robust server configured to handle and store video evidence, the Evidence Locker provides a useful resource, acting as a central point for evidence management.

Providing a full managerial audit trail, all usage is logged onto a database, and for future authentication purposes, a unique 128-bit MD5 hashing encryption code is created with every minute of video footage. If a copy of footage is required to be taken off-site, the system saves the video clip and evidence's hashing code, logged and detailed in the form of a 'Digital Evidence Certificate' to prove its legitimacy.

For long-term storage, visual data from the Evidence Locker is archived onto DVD, or if required for evidential purposes, downloaded to CD, allowing the valuable Evidence Locker storage space to be freed-up. This facility can also be used to 'restore' footage back to the Evidence Locker from the archived DVD format. Under the 'restore footage from media' function, a search can be used within the media management suite, to inform the operator on precisely which DVD the footage can be found, using search parameters such as event type, time & date, or via descriptive text of the incident. Once the correct disc is loaded, in compliance with data protection guidelines, the system then restores only the piece of footage requested from that disc.

Operators use their own initiative and wealth of experience to determine the importance of incidents, dealing with the retention of video information in the system accordingly. In conjunction with the 'Incident' facility, events are automatically stored in the Evidence Locker where it is retained for seven years, utilising the systems 70-Tb storage capacity, again, to comply with data protection requirements relating to the storage of evidential material.

Linked directly to St Ann's Street police station 2 miles away, Merseyside police are able to extract information from the Evidence Locker remotely. This facility means fast, direct access for Police Officers, as Sergeant Lee Walters who over sees the City Watch control room explains: "We can act on a request from the Police to provide surveillance of a certain suspect, recording their actions whilst keeping Police officers directly informed". This direct link to the SynergyPro system means Police have unlimited access to the information City Watch have provided.

For evidential presentation in court, the digital information must be presented on CD. This process consists of a written police request being submitted to the CCTV control room, where the video footage required is burnt on to CD, containing the specific camera(s) and time. It is then delivered to the police station in a sealed box, where the police produce a working copy. This process forms a definite beginning and end of the evidential image procedure, incorporating a full audit trail, including unique crime reference number, time and date and evidence exhibit number, which are included on the CD - information which are all vital to assist in an effective prosecution.

### **Distributed Users**

In the near future, the system will see the utilization of another Synectics award-winning feature, SynergyMobile™. This will give police and Community Safety Officers the ability to view the system's camera images, as they are transmitted from the control room directly to officers in the field equipped with PDA handsets. This powerful asset will enable suspects/offenders to be clearly identified, so that officers can immediately confirm that persons within an incident being monitored, are also those being apprehended – making the job of the police on the ground far more effective.

High definition video footage from the CCTV system is proving to be beneficial in a number of ways, as Vaughan explains: " With more incidents being caught on camera, a higher percentage of offenders are now deciding to plead guilty when the case progresses to court. Offenders are made aware that high-quality footage of their acts exists, and subsequently they are pleading guilty in the hope of a reduced sentence. This is saving on valuable court time and just as importantly taxpayer's money! "

Distributed user, Liverpool Urban Traffic Control has limited access to the surveillance system, which is proving an invaluable tool, assisting with their management of vehicular movement around the city. During rush hour periods, potential bottlenecks can be spotted and relieved through the manipulation of traffic signalling. Accidents are also monitored and recorded, allowing the emergency services to be summoned quickly and effectively.

The installation is having a positive impact to reduce vehicle crime in and around Liverpool city center, both by its deterrent value and detection, either whilst an incident is in progress or subsequent to its conclusion. In the case of a recent road traffic accident resulting in a death, video footage was tracked back to trace a vehicle's movements prior to the incident. The presiding Judge in the subsequent prosecution passed appreciative comment on the, "high-quality and importance of the CCTV footage", to bring a successful conclusion to the case. Summarizing the key benefit of the scheme, Sergeant Walters stated that: "The results of this advanced system means those with criminal intent now find the city of Liverpool a much harder place to carry out crime."

### **About Synectic Systems, Inc.**

Synectic Systems Inc. (Synectics), a wholly owned subsidiary of UK-based Quadnetics Group Plc, is an engineering, integration and manufacturing company with expertise in IT and networked systems, CCTV control systems, enterprise storage and command control software applications. Quadnetics is listed on the Alternative Investment Market (AIM) of the London Stock Exchange.

Synectics' unparalleled ability to deploy custom, enterprise-class DVR solutions that integrate with existing legacy systems and future technologies has established them as a market leader in the Middle East, the UK, Europe and in North America. For more information about Synectics, go to: [www.synecticsusa.com](http://www.synecticsusa.com)