

# CCTV Image

OFFICIAL PUBLICATION OF THE CCTV USER GROUP

Winter 2004  
[www.cctvusergroup.com](http://www.cctvusergroup.com)



## Bug Eyes

**Is this the future of video surveillance?**

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**Review: User Group Autumn Conference**

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**Talking Shop**

CCTV consultant Colin Greene makes sense of TV lines and digital recording



This issue sponsored by: **BT**

**redcare**

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CCTV Image is published six times a year on behalf of the CCTV User Group by STL Publishing. It is sent free of charge to members of the CCTV User Group. For circulation details, please contact the Commercial Director.

Subscriptions: If you don't receive a regular copy of CCTV Image, you can subscribe by sending a cheque made payable to "CCTV Image" to the administrative office listed above.  
 Annual subscription rates:  
 UK – £25  
 Europe – £35  
 Rest of world – £45

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# CCTV goes bug-eyed

What started out as a quest for a camera that would provide automated monitoring for neighbourhood watch-type schemes has ended with the creation of a camera that looks like something that came from outer space. Tom Reeve reports

STUART THOMPSON, THE MANAGING DIRECTOR of Viseum, set out four years ago to create a camera that would detect and record suspicious behaviour automatically.

The idea was to create a solution to address the need for something he calls "Group Shared Security", which is where people on a residential road club together to buy security – in this case, high-tech CCTV. He needed to find a solution that would provide 24/7 CCTV monitoring and be cost-effective while offering guarantees of privacy to members of the public who would subscribe individually to the service.

## Inspiration

Stuart didn't start out in the security industry. The inspiration for Viseum came from a business he had started which involved setting up home networks in the Kensington and Highgate area of London.

"Our customers wanted to network their houses together because they lived in the same road," Stuart explains. "So I did that. Then they wanted to share CCTV cameras, and I started looking at how this could be a service to National Neighbourhood Watch."

Stuart went to visit the National Neighbourhood Watch Association where they ended up discussing CCTV more than anything else.

At the same time, in his own residential area in a town in Kent, there was a horrific attack on a woman, and he began asking people on his road if they wanted to have CCTV installed to protect them.

The feedback he received was initially negative. He says, "They said no way. We don't want people watching us on our own road. So I said, how about if you control it and no one ever sees the video? They said if you can do that, then yes."

What followed was a feasibility study and meetings with people in the security industry, with Stuart trying to get to the bottom of why this hadn't been done before. "They told me the millions of reasons why it was a stupid idea," he says, but rather than get discouraged, Stuart used the information to shape the concept still further and to understand why the potential market for automated CCTV hadn't been addressed before.

The camera had to be self-guided, able to track and record suspicious behaviour autonomously, to avoid costly transmission and monitoring charges; it had to keep the images safe from unauthorised access and viewing; it had to be entirely self-contained, with all image processing undertaken by a standard PC; the images had to be recorded digitally to eliminate hassles with tape management; and it had to be simple to operate because the people administering the system would be members of the public who wouldn't necessarily have a great deal of technical training.

And following discussions with the CCTV User Group, he quickly accepted that the camera would have to address legislative issues such as the Data Protection Act and Human Rights Act if it were going to be used for public area surveillance.

## Automated eyes

Viseum is not the first or only software package that claims to automate the monitoring process. There are almost as many products on the market as there are universities, and there are many notable examples on the



Picture by Matt Barnes

Forward Vision has created this high-tech Viseum camera

market, originating from the UK and elsewhere around the world.

In the USA, Object Video is one product that is making great headway in the quest to dominate this emerging market. This intelligent algorithm will be incorporated into the new CCTV system being planned for the city of Chicago which will consist of over 2000 cameras when it is completed.

In the UK, IpsosTek produces an image analysis programme called Cromatica which detects unusual activity by recognising pre-programmed behavioural patterns. The 16-channel capacity system incorporates digital video recording and camera selection and management functions, and can recognise intrusion, congestion, abandoned packages and loitering.

Meanwhile in France, Blue Eye Video is a product which claims to do many of the things that Viseum can do, including following a person with a PTZ camera as well as recognising suspicious or unusual behaviour like entering a secure zone, staying longer than expected, moving faster than normal or large crowds of people gathering unexpectedly.

## Closely guarded secret

But Stuart claims that Viseum is unique because the software "intelligently controls a moveable camera using information from video content" – or in other words, it tracks objects and people with a PTZ camera based on parameters set by the system administrator. While other systems use intelligent video analysis to detect suspicious behaviour and raise an alarm, Viseum uses the information to also track the subject, something which Stuart says has been tried by other companies with limited success.



The first thing you want to know about Viseum is, how does it do it? Unfortunately, Stuart is keeping shtoom on the subject. Over four years of software development has gone into the project, and he's not about to spill the beans now.

What he will say is that it analyses pixel changes and compares that with all other pixel changes to build a picture of what's happening in a scene. Then the software uses its knowledge of the physical world and the laws of physics to compute the speed, direction and size of objects to determine if they fall within the parameters set by the user.

That's the basic concept, but there's quite a lot of detail that Stuart won't go into, alluding only to a "secret ingredient" that drives the entire system. It took two years to crack the basic concept and create a workable prototype, with another two years spent refining the concept and bringing it to the stage where it's ready for market.

## Scrutiny

But setting aside how it does it, what it does is impressive. An array of fixed cameras around the top of the camera unit provide a fixed panoramic view of the surrounding area. The Viseum software constantly scrutinises the scene to identify suspicious behaviour. When it gets a hit, this is where the software distinguishes itself from other products on the market: rather than simply trigger an alarm, it directs a PTZ camera to focus in on the suspicious activity. This enables the system to acquire much more detailed images than would be possible by simply recording the fixed cameras.

Stuart explains that the parameters for "suspicious" behaviour can be adjusted, depending on the site and the clients' requirements for monitoring, but examples of behaviour it can detect include loitering, erratic movement, violent behaviour, abandoned objects, vehicle movements and so on.

Placed on the side of a building or on a lamppost on a road, the Viseum camera can monitor the comings and goings of residents and visitors, providing a digital recording of significant events on a standard PC hard disk. It can also trigger an alarm to notify residents if certain types of events occur.

Viseum is designed to be a cost-effective alternative to monitored CCTV systems. By analysing the scene automatically – and locally – you eliminate at a stroke two of the most significant ongoing costs of CCTV systems: transmission and monitoring.

To answer the public's concern about people using the system to snoop on them, Viseum has safeguards built into it which limit access to the recorded images to authorised users only. If required, it can be set up so that images can only be viewed in the presence of the system administrator and a police officer.

## Watching the community

There are many potential applications for automated monitoring and tracking technology. Among these are town centre monitoring, ANPR, border control, rapid deployment cameras, perimeter protection and internal building security. But Stuart's favourite application is the one he built it for – community safety.

Viseum have registered the trademark "Community SafetyWatch" to describe their concept of licensing the product to neighbourhood watch groups that want to install self-monitoring CCTV on their street.

The service would be sold on a subscription basis to residents who would benefit from having their property monitored. In addition, part



Stuart Thompson with Plettac prototype of camera in Erith

of Stuart's plan is to piggyback wireless data services – ie, broadband internet – on the back of the system, to give subscribers an added value benefit.

The host PC would be located in one resident's home, linked via a cable to the camera unit outside. Access to the system would be via web browser interface, but strictly controlled according to the rules set out by the neighbourhood watch group. For instance, they might require that at least two members of the group were present to authorise access to the images, or only the chairman and deputy chairman would be allowed to access the images in the event of an incident having occurred in the area.

## Prototype testing

A prototype Viseum camera has been on trial at Erith in Kent for the past seven months. Using version 1.1 of the software, the camera has found the environment to be quite challenging because of the level of activity in the area. "We actually built it for quieter environments," Stuart explains.

They have used the feedback and test data from the site to refine

Cont'd next page



the software to enable it to distinguish between suspicious and normal behaviour. "At the beginning of this installation, there was an enormous amount of movement on the activity graph of the user interface, indicating a lot of suspicious activity. That significantly dropped due to two reasons: one, we only record on the PTZ 'suspicious behaviour' [and the algorithms were improved to be more selective] and two, the camera has been a deterrent and actually moved trouble away from the area."

Stuart adds, "It's been a success to such an extent that the police and local authority have asked my company to install more. They actually asked us to move it, but we said we wouldn't because the residents would be very upset if it had to move because the trouble would come back."

The trial at Erith is being jointly funded by Viseum and one of its licensed build partners, Plettac, a specialist manufacturer of security equipment and member of the CCTV User Group.

## Licensing the detector

Viseum is the licence holder of the software, but it doesn't make the cameras itself. It has licensed production to Plettac and Forward Vision, each of which make their own intelligent camera unit, incorporating the Viseum software.

"We are selling the software like Microsoft does," says Stuart. "Each computer which is a computer control unit has to have a software pack installed." The company also licenses the "build rights" to the software whereby a company can incorporate the software into its products, as in the case of Plettac and Forward Vision.

Peter Stubbs, managing director of Plettac Security UK, says they have been working on the development of a camera unit for about a year with Viseum, with a production model scheduled to come to market in the beginning of 2005.

Plettac sees a market for the camera units for town centre monitoring, especially during quiet hours and for less busy parts of the town. Peter is particularly interested in the new "point and track" capabilities of the software, which enables an operator to click on a person or object in a scene and then let the software take over the job of tracking. "There are times when you don't want the system to be fully automatic," he says, noting that in a town centre environment, automatic tracking software can get confused by too much activity. "You want it to be automatic but controlled, but with this system you simply nominate an object or person that you want it to follow and let it do the rest."

The model that Plettac has produced can accommodate up to seven static "reference" cameras around the top of the unit which give it a maximum of 340° of view. "Obviously, it has to be mounted somewhere, either on a wall or a pole, so you aren't going to get 360° panoramic views."

The one installed by Plettac in Erith has 180° of view and can track anything up to 60-70 metres away. "If the object gets too small, the refer-

**After a Viseum demonstration Peter Fry, director of the CCTV User Group, wrote:** "Well designed and well managed CCTV systems in the UK have proved themselves time and time again to be valuable tools in the reduction of anti-social behaviour and criminal activity, and in the post-incident identification of offenders.

"However, the considerable costs – of installing the number of cameras necessary to adequately monitor an area, the transmission system and provision of a control facility able to adequately record the images – have meant that up to now it simply has not been cost effective to introduce systems that monitor small local shopping parades or residential areas.

"I was personally very impressed with the Viseum technology that has now overcome virtually all of these constraints and provides a well engineered system at a cost that makes it a viable solution for both smaller neighbourhood watch groups and groups of retailers.

"Apart from the technology involved, the whole concept of using it as a prime element of a Community Safety Watch system is a major step forward, and I was equally impressed by the detailed work undertaken developing the necessary procedures to take into account all the legislative implications in respect of data protection and human rights for systems used for public area surveillance.

"I look forward to seeing the future development of the system."

ence cameras can't recognise it."

Peter sees many target applications for the cameras. "Best case is working as an alarm system in a vacant area. It picks up an intruder and then follows them around. Unlike an alarm system, which gives you a snapshot of what has happened, this will follow him so the operator gets a continuous picture of the perpetrator coming into that area."

He adds, "It's ideal for conditions where there is some activity but not overly active."

Reaction to the Viseum camera has been positive so far. Plettac showed it at IFSEC for the first time this year and had a great deal of interest from people who wanted to see the production model. Plettac is putting the finishing touches to a system which is installed in a demonstration vehicle to take out to customers.

In addition, interested customers can log into reference installations which are accessible via the internet and try out the system themselves.

Says Peter, "We are very keen to get the product on the market. It is for new markets and not just for existing sites – areas where some automation of the monitoring function would help."

**• In the next issue of CCTV Image, we will look at a range of other intelligent video solutions on the market.**

**essa**

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