Keeping traffic in cities safe and efficient, civil enforcement delivers the results protecting priority routes and avoiding blocked junctions

**LaneWatch**

LaneWatch Mk2 has been designed to provide end-users with a re-deployable bus lane and moving traffic contravention enforcement solution. Almost ‘plug & play’ in its configuration, the LaneWatch Mk2 makes use of Automatic Number Plate Recognition (ANPR) software in combination with advanced image processing, a mature technology for the detection and identification of vehicles in contravention. The ANPR engine is optimised to run on the Evidence Processor which is an ‘edge device’ installed alongside the camera head, eliminating the traditional costs associated with expensive fibre optic communications back to a control centre.

The Evidence Processor together with a choice of camera heads makes for a compact and light weight unit that is designed to mount to existing street furniture such as lamp columns, requiring only a mains power supply to operate.

**Camera Head**

LaneWatch Mk2 can come with a variety of camera heads depending on the scene to be viewed and the type of detection taking place. Typically the camera head will consist of a single unit with two built in camera modules, one to provide a close-up view of vehicles in contravention and a second camera module to view the overall scene, providing contextual information in order that operators viewing a recorded evidence clip can establish if there are any mitigating circumstances for the possible contravention.

There are also options for the close-up and overview camera modules to be high definition, for example where more than one lane needs to be enforced simultaneously.

Together with the two camera modules are four LED infra-red illuminators which provide invisible illumination of vehicle number plates. A choice of band pass filters are also available to reduce or increase the amount of white light available in the ANPR close-up image. This can be useful when more vehicle information is required or when the identification of non-reflective number plates is a must.

**Evidence Processor**

The ‘brain’ of LaneWatch Mk2 is the Evidence Processor. The unit features a high power Intel® quad core processor and solid state disc drives. Functionality such as contravention detection, vehicle identification, digital video recording and security encryption are all carried out at the edge, reducing running costs and improving resilience. The Evidence Processor also monitors its own health, reporting possible faults in real-time.

**ANPR**

For the enforcement of bus lanes, one-way streets, no-entry, weight and width restrictions as well as some simple banned turns, the LaneWatch Mk2 camera makes use of ANPR technology.

Able to read and identify vehicle number plates up to a range of 50 meters using the LaneWatch camera head, LaneWatch Mk2 provides an unrivalled ability to enforce bus lanes and moving traffic contraventions, 24 hours per day and in all weather conditions. The ANPR software also has the ability to accurately read the number plates of vehicles from many countries of the world.

**Civil Enforcement**

Keeping traffic moving in cities with such huge variations in the number of vehicles throughout the day requires a complex traffic management system. Siemens have been providing such systems for many years, from junction (intersection) control right through to city wide strategy deployment. As well as traffic management, priority schemes for certain types of transport have been increasingly used to deliver more accurate, reliable travel times throughout the city.

The problem however, is that management, and priority systems only achieve their goals, if the traffic obeys the regulations for example by not using bus lanes, or blocking junctions in an attempt to get to their destination that little bit quicker.

This is where enforcement systems can be successfully deployed to ensure the traffic can continue to flow, and priority systems continue to achieve their goals.

The Siemens Digital Enforcement Solution makes use of a suite of hardware and software products to provide end users with a tool kit of enforcement products that they can use to tackle road safety, traffic congestion, environmental and emissions damage and traffic regulation compliance as well as other traffic related issues including the provision of CCTV images to help traffic authorities monitor the road network.

Based on an enterprise server environment, the Digital Enforcement Solution can be used in both attended (manual) and/or unattended (automatic) modes.

**Attended Enforcement**

In attended mode the system interfaces with existing analogue and digital CCTV recording and control systems. CCTV operators can use onscreen controls to select cameras and start video evidence recording. These recordings will be probable traffic contraventions and so the evidence is automatically transferred to the enterprise servers of which there are usually two, a Render Server for the processing and distribution of video evidence and an Archive Server for the longer term storage and management of video evidence.

It is also possible to use the new wireless TrafficWatch PTZ camera for attended parking enforcement outside schools and at bus stops etc.

As the camera is wireless and operates over the cellular network, parking enforcement and general traffic surveillance can take place at almost any location, on a permanent or temporary basis.

**Unattended Enforcement**

In unattended mode, autonomous contravention detection and video recording devices such as the LaneWatch range of cameras make use of Automatic Number Plate Recognition (ANPR) and Siemens’s own Video Analytics software to automatically detect and record bus lane and moving traffic contraventions which are then wirelessly transferred to the Render and Archive Servers for processing as described above.

**Mobile Enforcement**

Mobile Enforcement Vehicles can also seamlessly interface with the Digital Enforcement Solution Suite. This form of enforcement can also be used in attended or unattended mode and evidence is transferred via a wireless link or using USB memory sticks.

**Gateway Interface**

The Gateway Interface module allows third party enforcement and video recording devices to interface to the Digital Enforcement Solution, providing traffic authorities with a future proof solution, capable of using both Siemens manufactured enforcement devices and others.

**LaneWatch**

LaneWatch Mk2 can come with a variety of camera heads depending on the scene to be viewed and the type of detection taking place. Typically the camera head will consist of a single unit with two built in camera modules, one to provide a close-up view of vehicles in contravention and a second camera module to view the overall scene, providing contextual information in order that operators viewing a recorded evidence clip can establish if there are any mitigating circumstances for the possible contravention.

There are also options for the close-up and overview camera modules to be high definition, for example where more than one lane needs to be enforced simultaneously.

Together with the two camera modules are four LED infra-red illuminators which provide invisible illumination of vehicle number plates. A choice of band pass filters are also available to reduce or increase the amount of white light available in the ANPR close-up image. This can be useful when more vehicle information is required or when the identification of non-reflective number plates is a must.

**Evidence Processor**

The ‘brain’ of LaneWatch Mk2 is the Evidence Processor. The unit features a high power Intel® quad core processor and solid state disc drives. Functionality such as contravention detection, vehicle identification, digital video recording and security encryption are all carried out at the edge, reducing running costs and improving resilience. The Evidence Processor also monitors its own health, reporting possible faults in real-time.

**ANPR**

For the enforcement of bus lanes, one-way streets, no-entry, weight and width restrictions as well as some simple banned turns, the LaneWatch Mk2 camera makes use of ANPR technology.

Able to read and identify vehicle number plates up to a range of 50 meters using the LaneWatch camera head, LaneWatch Mk2 provides an unrivalled ability to enforce bus lanes and moving traffic contraventions, 24 hours per day and in all weather conditions. The ANPR software also has the ability to accurately read the number plates of vehicles from many countries of the world.
Vehicle Identification

The identification of vehicles in contravention is essential if a fine or ticket is to be issued. This not only includes the identification of the number plate but often the identification of the vehicle make, model and colour as well. Siemens have made the task of identification of these additional criteria a simple click of the mouse. By using Vehicle ID software, running on the common Evidence Processor, an operator is able to request the required information from the DVLA via an extract file ‘look-up’. The returned identification information is then automatically added to the correct evidence fields of the Review Client and included in the Evidence Pack. This improves the speed of review as well as the accuracy.

Authorised Vehicle Lists

LaneWatch Mk2 cameras differentiate between authorised and unauthorised vehicles by using an authorised vehicle list, commonly known as a ‘white list’. The white list is normally managed by Siemens on behalf of the end-user to avoid security issues but it can also be enabled on the Review Client to enable administration by operators or supervisors.

It is also possible to set up vehicle of interest lists, commonly known as ‘black lists’ to automatically detect when a vehicle of interest has been viewed by a camera. This information can then be used to alert an operator or the Police.

The LaneWatch Mk2 can operate with multiple white lists that can be scheduled by time/day such that some or all vehicles can be allowed in a zone at certain times of day depending on their classification.

<table>
<thead>
<tr>
<th>Technical Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions: Camera Head: 163 x 163 x 114mm</td>
</tr>
<tr>
<td>Processor: 305 x 260 x 50mm</td>
</tr>
<tr>
<td>Combined Unit Weight: 10Kg</td>
</tr>
<tr>
<td>Environmental: IP65/68</td>
</tr>
<tr>
<td>Temperature: -20°C to +55°C</td>
</tr>
<tr>
<td>Power: 230v AC / 46Watts</td>
</tr>
<tr>
<td>Approvals: CE / VCA Approved</td>
</tr>
</tbody>
</table>

**Features**

- Automatic vehicle detection & identification
- Detects bus lane and moving traffic contraventions
- Standard or High Definition camera modes
- Infra-Red or white light ANPR modes
- Multiple white lists & operating schedules
- Black list (Police) mode
- JTA Interface
- Wireless 3G / 4G operation
- VCA ‘Approved Devices’ certified

**Benefits**

- Low installation costs
- Efficient running costs / self-financing
- Easy redeployment
- High quality video / still image evidence
- Enforce bus lane and moving traffic contraventions
- Highly effective
- Pre-approved for deployment and live operation

LaneWatch Mk3

The LaneWatch Mk3 camera builds on the success of the LaneWatch Mk2 but adds the ability to detect and enforce traffic contraventions at complex traffic junctions such as yellow box junctions (intersections) etc. and other complex moving traffic contraventions.

The camera uses sophisticated video analytics, especially developed by Siemens for the detection and tracking of vehicle movement. For example, when a vehicle within the cameras field of view moves in a direction of interest, perhaps performing a banned turn, an alert is triggered and the camera records the potential contravention taking place and identifies the vehicle registration mark. Likewise, if a vehicle stops in an area of interest, perhaps blocking a yellow box junction, again the camera is triggered.

The Evidence Processor together with the overview and close up camera heads make for a compact and light weight unit that is designed to mount to existing street furniture such as lamp columns and requires only a mains power supply in order to operate.

**Camera Heads**

The LaneWatch Mk3 can be used with a variety of camera heads depending on the scene to be viewed and the availability of night time street lighting. Typically, two camera heads will be used that make use of existing lighting levels. However, where necessary additional infra-red (IR) lighting can be provided to supplement the scene and improve the visibility of vehicle number plates.

**Evidence Processor**

The ‘brain’ of the LaneWatch Mk3 camera is the in-house manufactured Evidence Processor. This unit features a high power CPU and solid state disk drives. The Evidence Processor carries out the contravention detection function using the SVA software and also the digital video recording in H.264 format as well as evidence encryption and transmission. It also carries out other legislative functions such as automatic environmental monitoring and fault reporting.

Optional dual SIM, Mesh and Wi-Fi communications are available.

**Avoiding blocked junctions with LaneWatch Mk3**

Improving the efficiency of junctions by keeping vehicles moving and ensuring that exits do not get blocked, the LaneWatch Mk3 enables traffic to keep moving.

Video Analytics allows moving traffic offenses to be detected and evidence to be recorded, encrypted and securely delivered to an instation for processing and subsequent penalty processing.
Video Analytics
For the enforcement of complex moving traffic contraventions such as those witnessed at yellow box junctions, it is necessary to track the movement and path of individual vehicles. When those movements match a set of pre-configured parameters, the cameras evidence recording system is triggered and a contravention ‘evidence pack’ is produced and wirelessly sent for processing and review.

The SVA software was specifically developed for use in the traffic enforcement industry. It can be configured to detect stationary vehicles, vehicles that make an illegal turn, vehicles that drive the wrong way down a street or perform an illegal U-turn for example.

Each camera, once installed has a learning facility whereby the software is tuned to the scene and the traffic movement that is of interest. Sophisticated movement filters can be applied to ignore vehicles that come from certain directions or are legally turning right and are prevented from doing so only by oncoming traffic.

The learning process and the directional filtering help to reduce the number of false positives that can sometimes be associated with other manufacturers products.

Technical Specifications
- Dimensions: Camera Heads (2): 95 x 126 x 304mm
  Processor: 305 x 260 x 50mm
  Brackets (2): 50 x 50 x 300mm
- Combined Unit Weight: 12kg
- Environmental: IP68 / IP65
- Temperature: 20°C to +55°C
- Power: 230v AC / 55Watts
- Approvals: CE / VCA Approved

Features
- Automatic contravention detection
- Automatic vehicle identification
- Enforcement of banned turns and yellow box junctions
- Standard & HD camera modules
- Supplementary Infra-Red illumination
- Can also be used for bus lane enforcement
- Wireless 3G / 4G / Mesh & Wi-Fi connectivity
- Compact & light weight
- VCA ‘Approved Devices’ (Manufacturers) certified

Benefits
- Efficient detection of contraventions
- Improved accuracy
- Reduced review requirements
- High quality video and still image evidence
- 24/7 operation
- Moving traffic and bus lane enforcement
- Low cost evidence transmission
- Mounts to existing street furniture
- Low administrative requirements (VCA Approved)

TrafficWatch

The TrafficWatch PTZ camera is a revolution in CCTV enforcement, enabling traffic authorities to monitor traffic flow and when necessary carry out enforcement using a 3G/4G enabled fully functional CCTV camera.

Attended Operation
In attended mode, the camera can operate like any other functional CCTV camera, providing the remote user with pan, tilt and zoom capabilities. By utilising a variable bitrate video stream, the latency often experienced when using CCTV over the cellular network is vastly reduced, allowing accurate positioning of the camera when viewing parking contraventions.

Once an operator has logged on to the system, they are invited to select up to 8 cameras to view simultaneously on their PC screen. Automatic timers can be set to detach video streams if the user is not actively viewing the cameras.

When a contravention is witnessed, the user can manually select the appropriate camera to view full screen and trigger the recording process.

The user can then operate the on-screen controls for camera pan, tilt and zoom or use the optional joystick control. Positioning the camera in this way allows the user to record the correct vehicle every time or even multiple vehicles in contravention at the same time. Alternatively, the user can also select one of the user defined on-screen pre-set positions, triggering the camera to automatically pan, tilt and zoom in order to identify the contravention.

Pre-set positions can be easily setup by using an onscreen overlay, which indicates to the user which pre-set to select when a vehicle becomes stationary. The camera can also be programmed to move to a pre-set shot of the appropriate warning signage in order to include an image in the evidence pack before returning to provide an overview of the whole scene.

Built in dynamic privacy zone software prevents users from viewing private dwellings or other areas deemed sensitive.

Following the witnessing of a contravention, the Evidence Processor securely encrypts the digital video recording and wirelessly sends it to the enforcement instation via the 3G/4G cellular network for processing and ticket production.

When the cameras are not being used for enforcement purposes, they can also be used for normal traffic or security monitoring. They can be remotely configured to send their video recording to alternative systems or store them for wireless download at a future time and date.
PTZ Camera Head

The TrafficWatch camera is available with a number of different, fully functional cameras heads from simple dome cameras to the more robust ‘Predator’ and ‘MIC-1’ cameras. A specially designed mounting bracket is used to fix the camera and Evidence Processor to existing street furniture such as lamp columns.

Evidence Processor

The ‘brain’ of the TrafficWatch PTZ camera is the in-house manufactured Evidence Processor. This unit features a high power CPU and solid state disk drives. The Evidence Processor carries out the contravention recording, encryption and wireless transmission of the H.264 recorded video evidence.

Communications can take place via 3G/4G or optional dual SIM, Mesh and/or Wi-Fi for flexibility.

Technical Specifications

- Dimensions: Dome Head: 183 x 183 x 226mm
  Processor: 305 x 260 x 50
- Combined Unit Weight: 12Kg
- Environmental: IP65/68
- Temperature: -20°C to +55°C
- Power: 230v AC / 55Watts
- Approvals: CE / VCA Approved

Features

- Compact and light weight unit
- Manual and automatic operation
- View up to 8 cameras simultaneously
- User defined on screen pre-set zones
- Full pan, tilt and zoom capability
- Wireless 3G/4G operation
- VCA ‘Approved Devices’ (Manufacturers) certified

Benefits

- Low installation costs
- Efficient running costs / self-financing
- Easy re-deployment
- High quality video / still image evidence
- Can be used for parking, school keep clear, bus lane*
- Highly effective
- Pre-approved for deployment and live operation

*with appropriate LaneWatch camera

Mobile Capture

The Mobile Capture vehicle represents a highly visible platform for traffic and parking enforcement. It benefits from both static CCTV cameras and functional pan, tilt and zoom (PTZ) cameras, allowing both attended and unattended enforcement to be carried out.

A variety of different vehicles can be used as the platform for the enforcement vehicle. Previously the Toyota Prius, IQ and Land Cruiser have been adapted as well as the Smart car and several different designs of public transport buses.

Hardware

Mobile Capture is a self-contained enforcement module. The main hardware consists of:

- Automotive PC
- Automatic Vehicle Locator (AVL)
- GPS / GIS Antenna
- Static ANPR Cameras
- Functional PTZ Camera
- 3m pneumatic mast
- Wiring loom

All control equipment is built in to a steel protective housing that can only be accessed by authorised personnel.

A specially adapted automotive PC is used for the high resolution digital video recording and processing of contravention evidence. The PC also securely encrypts the evidence data and transmits it wirelessly for later operator review.

The location that a contravention has taken place as well as the synchronised time and date are all important and that information is provided by the AVL system. The AVL is a combination of a Global Positioning System (GPS) and Geographical Information System (GIS) together with physical inputs from the vehicles control systems.

The CCTV cameras complete with Automatic Number Plate Recognition (ANPR) and Infra-Red lighting capture contraventions in real-time and are operated via the inbuilt touch screen monitor.

Software

The Mobile Capture software enables the effective and efficient recording of parking, bus lane and moving traffic contraventions. The powerful software guides the operator through the security logon procedure, checking credentials in real-time with the back-office via the wireless 3G communications link.

In unattended mode the enforcement solution will work automatically without needing input by the vehicle driver. Location based enforcement is achieved using GPS coordinates and triggering is activated by ANPR technology.

Features

- Mobile enforcement
- Secure operation
- Simple touch screen controls
- Static & functional (PTZ) CCTV cameras
- Optional 3m mast
- H.264 digital recording to HDD / USB / SD
- Wireless evidence transmission
- Choice of vehicles
- DfT ‘Approved Devices’ certified

Benefits

- Enforcement anywhere
- Data is protected
- Easy to operate
- Attended and unattended operation
- Mast allows easy viewing of traffic flow
- High quality, small file size evidence
- Automated evidence transfer
- Own vehicle or Siemens supplied
- Approved for enforcement use

Mobile Enforcement
WebView is a simple online evidence viewing service that directly interfaces with the Digital Enforcement Solution. It enables motorists that receive a Penalty Charge Notice (PCN) relating to CCTV evidence of a possible contravention to view that CCTV evidence online via their home PC or smart phone. WebView is compatible via most major web browsers. Access to the PCN supporting still images and video evidence is restricted to the registered vehicle owner by virtue of the PCN number and the associated vehicle registration mark (VRM).

After singing in to the website, the motorist will have instant access to the evidence for a period of 90 days from PCN issue. It is also available for longer periods on a per request basis. The efficiency of the WebView service comes from not having to have all the video and still image evidence stored on the WebView server at all times. Instead the evidence is made available for the 90 day period after which time it is deleted. WebView server at all times. Instead the evidence is made available for the 90 day period after which time it is deleted.

Website Design

The WebView website can be customised for each traffic authority, using their own corporate identity and layout. Alternatively the standard Siemens design can be used.

View the solution here: http://www.viewmypcn.com

Features

- View evidence from PC or smart phone
- Secure and instant access
- Still image and video playback
- Option to pay the fine or challenge
- Website can show corporate logo/layout
- Back office access via hyperlink

Benefits

- Reduced travelling / supervision for viewings
- Access via the Internet
- Increased payment rates
- Simple to use
- Non-confrontational

Review Client Software

The Review Client software is used by traffic authorities to review and process traffic and parking contravention video clips. The evidence gathered by Siemens enforcement devices as well as third party CCTV recording systems from DVTel, Meyertech and SEA can all be reviewed, processed and transferred to any of the major back office Notice Processing System providers.

Enforcement Service

The Review Client can also be used to replay and process CCTV evidence produced by other traffic authorities. This ‘bureau service’ helps to make the solution even more efficient by lowering operating costs.

Connectivity

Connected via LAN, WAN or the Internet, the Review Client software will run on any modern PC workstation. It can also be installed on the Capture Station (where used) to reduce internal IT spend and to save on desk space.

The software has many special features to enable operators to quickly and efficiently process enforcement clips and generate compelling evidence packs which are automatically passed on the back-office Notice Processing System, regardless of type.

Operation

In operation, the evidence clips produced by the gathering devices can be made available for review within seconds of being captured and are all stored on the evidence server in chronological order. A unique colour coding system allows operators to in easily process base on time priority.

The clips can be viewed with control for fast forward, rewind, pause, and still image grab. Whilst replaying the clip, operators can select the most appropriate images to be transferred on to the back-office for penalty charge notice (PCN) processing. All images can be ‘masked’ to aid data protection where necessary.

Automatic Vehicle Identification

Another feature of the Review Client software is the ability to automatically look-up registered vehicle information based on the vehicles number plate. The system automatically checks the registered vehicle details such as the correct make, model and colour against a DVLA database improving the time taken to process clips as well as improving quality and reducing mistakes.

Report Generation

Reports can be generated with useful management information. For example, the number of contraventions captured by operator, by camera number or the number of contraventions reviewed by operator within a specified time period.

Data Connector

The Data Connector (ZDC) is used to communicate to and from the Review Client software, regardless of where it is located. When used over a secure LAN or WAN the ZDC is used in unenclosed mode. However, then the Review Client software is used over an insecure network such as the Internet, the ZDC can operate in encoded mode which fully complies with the DfT ‘Approved Devices’ certification.

Using the ZDC in encoded mode can reduce communications charges and allow traffic authorities to make use of Home Working.

Benefits

- Highly efficient
- Intuitive operation
- Automated for faster processing
- Data protection tools
- Report generation system
- Third party video processing
- Low cost connectivity options
- Cross authority usage
- Approved for enforcement use