

# Transport for London Toll charging scheme



## Project Overview

Under the plans put forward by the Lord Mayor, Ken Livingstone, the Transport for London (TfL) scheme is designed to gather tolls from all vehicles entering a designated area within central London. This area is defined as a ring that falls within the boundaries of the M25 orbital motorway and encompasses the City, West End and areas north and south of the river Thames. Toll billing and ticketing is managed through a comprehensive video network of some 1300 cameras, with clusters of cameras located at each road junction that intersects the ring. The video information is analysed for number plate identification and subsequent ticket checks. The project concept was developed in 2000 with trials held in late 2002/early 2003. COE Ltd was sub-contracted to COLT to provide the fibre optic transmission solution.

## Technical Overview

The video network consists of fixed cameras placed in clusters or nodes, with typically 4 to 6 cameras at each node. Camera placement at the nodes ensures the capture of vehicle number plates as they enter the centre



of London. The images are transmitted to Central Control where computer analysis enables identification of the number, a check against the owner of the vehicle and establishes whether the owner has purchased a valid ticket. Fines are sent automatically to vehicle owners not holding a valid ticket for the day in question. An analogue approach was adopted as it was seen to be the only way of guaranteeing picture quality for the computer number plate recognition software. In addition to the fixed cameras, surveillance cameras with full Pan/Tilt capability were included, thus providing additional protection to London with respect to terrorism and crime. Three key parameters needed

to be met for the transmission network: quality of transmitted image to enable computer recognition accuracy; high channel count to minimise fibre usage; and redundant transmission paths to meet system availability specifications. A combination of COE C-class and V-class was chosen due to its ability to meet all three criteria and provide network management information for COLT's network management system, as well as providing real-time diagnostic feedback.

## Transmission Network

The transmission network is based on COE's fibre optic based V-class II; a multi-channel FM video system which has a capacity of 128 channels per fibre. Each node has an 8 channel FM transmitter and data transceiver incorporating the latest optical technology. This allows 8 street nodes to be gathered on one singlemode fibre core for transmission to the Central Control point. In addition to the optical technology, dual redundant fibre paths are utilised to protect transmission routes in the case of cable breaks and equipment failures. Automatic switching is incorporated at the Central Control room to minimise system-downtime with estimated switchover time at less than one second.

## Network Management

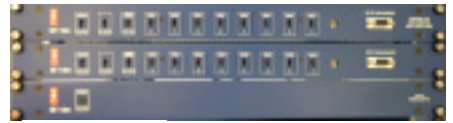
A comprehensive network management system was provided by COE Ltd to allow remote system wide monitoring of all V-class transmission node equipment at the Central Control room. This is integrated into COLT's computer based solution, with network mapping and icon-driven navigation for fast and easy fault location. The system was specified for extremes of temperature, vibration and dirt in a highly demanding environment and detailed analysis of reliability, network management requirements and site call out activity after more than 35 months of operational service, shows that actual failure rates have been just under 10% of forecast, i.e. 10 times more reliable than predicted.

In summary, this network solution designed by COE Ltd is a state-of-the-art design incorporating the latest optical multiplexing and laser technology and is the model for large metropolitan networks where high quality, real-time video transmission is required.

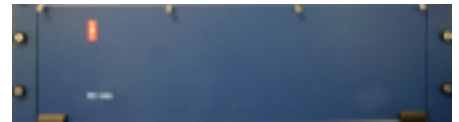
## Key Application Benefits

- Fully Data Protection Act compliant
- High channel count, minimising fibre usage
- Provides predictive and preventative maintenance measures
- X-wave technology enables cameras to see far better in limited light conditions
- Guaranteed picture quality for the computer number plate recognition software
- Dual redundant fibre paths to protect transmission routes in the case of cable breaks and equipment failures
- Automatic switching in less than one second at Central Control, keeping system down-time to an absolute minimum
- Remote system-wide monitoring of all equipment from Central Control, integrated into COLT's computer based solution with network mapping and icon-driven navigation for fast and easy fault location
- Proven reliability – actual failure rates 10% lower than forecast

V-class II



C-class



## Reference sites .....toll and road monitoring schemes

- Dartford Crossing
- Antwerp Ring Road
- Junction A40/A6 (France)
- Singapore EMAS I (CTE)
- EMAS II (ECP/AYE)
- EMAS III (PIE/SLE)
- Forth Road Bridge, Scotland
- A55 North Wales

For further information, visit [www.coe.co.uk](http://www.coe.co.uk) or contact:

**Headquarters** -COE Limited -Photon House -Percy Street -Leeds LS12 1EG -England  
Sales Direct Tel: +44 113 230 8801 -Fax: +44 113 279 9229 -Email: sales@coe.co.uk

## Asia Pacific Offices

**Singapore** -COE Limited - 20 Malacca Street - #15-00, Malacca Centre - Singapore 048979  
Tel: +65 6325 6018 - Fax: +65 6223 0372 - Email: sales@coe.co.uk

e-volving a future for your VISION

