

## TRAFFIC MANAGEMENT – DIGITAL TECHNOLOGY AND IVS WELL SET TO DEFUSE THE EXPLOSION

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Population growth, extensive urbanisation and wealth creation have combined to create a veritable explosion of traffic on South African roads and highways, particularly in main centres. Digital and Intelligent Video Surveillance (IVS) technology are at the forefront of viable solutions to the problem.

Traffic volumes are expanding faster than we can upgrade our road systems. Upgrading and building more roads is very costly and probably beyond our scope. So, in order to restore some normality to our congested city and inter-city traffic we need to make our road systems more efficient.

Traffic congestion and control has become a common topic for conversation at work, at home and at play. The sheer volumes of traffic are creating problems for daily commuters and “rush hour” is no longer accurate. In fact, traffic congestion can now occur at almost any time, particularly as traffic pressure has led to rising accident rates that further hinder traffic flow.

The simple facts of the matter are that in major cities traffic congestion is no longer confined to peak hours and therefore traffic flows need to be monitored and managed. How do we do this effectively? We turn to technology, which is getting closer and closer to providing a holistic solution and can take us a long way forward in the quest to optimise traffic flow and increase road safety.

The past 20 years have seen huge advancements in video systems, more recently the development of intelligent video surveillance (IVS) and automatic number plate recognition which offer urban administration and road traffic authorities sophisticated solutions for the management, control and policing of traffic.

### Integrated Management

Critical to effective traffic management is a support system that integrates into a single user management platform, all available cameras, intelligent video surveillance (IVS) software and sensors, such as automatic number plate recognition.

A full-blooded network-centric surveillance system that integrates a variety of systems and centres will present accurate, timely and high quality visual information to traffic management operators, allowing them to activate a series of set procedures to deal with any given situation

The key is to present the information in a fashion that fully supports pro-active control and management of traffic flow by timeously displaying incidents, accidents, vehicle break-downs, weather conditions, unusual traffic build-up or congestion and other factors that may impede traffic flow.

The presentation must employ high quality video displays with high resolution graphics and logic within the system to enhance and improve the overall capability to manage traffic. A unified front end to see and control all of the systems from a single screen, presenting operators with a single system even in applications where large numbers of cameras (800 or more) are deployed, is the benchmark if the following must-haves are to be achieved:

- Real time recognition of traffic problems
- Immediate situation analysis
- Networked collaboration and response co-ordination
- Quality recording of images/data sequences for evidence.

## System capabilities

The system must offer a very flexible display format designed to rapidly adapt to user needs -- whether it be visual monitoring of traffic, incident management or crime management – and result in lower overall operational costs.

Intelligent video surveillance (IVS) technology is most desirable as it requires fewer operators to monitor greater numbers of cameras and provides many features critical to effective traffic management, including:

- Automatic number plate detection
- Vehicle pattern detection
- Individual vehicle speed
- Average flow speed (all vehicles)
- Average speed between two points.

The solution should also be capable of detecting variances in vehicle behaviour that system administrators may use to improve overall traffic management. IVS can detect and highlight stationary vehicles, illegal use of lanes or improper use of emergency lanes, vehicles travelling in the wrong direction, negligent, irresponsible or reckless driving such as swerving across lanes or driving at excessive speeds, overloaded vehicles, those emitting excessive exhaust smoke or non-vehicular objects such as people or animals on the road.

## Key technologies

Automatic number plate recognition has emerged as a key technology for effective traffic management. ANPR is used to monitor moving vehicles travelling in single or multiple lanes. Its capability to register and capture number plates at speed enables ANPR to be used to identify vehicles that are stolen, involved in a crime or a hit-and-run. It will also monitor vehicles that misuse lanes that may be allocated to buses or taxis in peak hours. The technology also allows speeding tickets to be automatically created. These are all elements that traffic and law enforcement authorities will find most useful.

ANPR functionality includes licence plate recognition and vehicle colour identification, alarm generation and video data storage. Vehicles are detected using various trigger mechanisms which could include advanced video motion detection, licence plate detection using optical character recognition (OCR) or external triggers such as loops or beams. All of the traffic data captured can be stored on a database and accessed by the authorities as required.

Undoubtedly an appropriate system will improve the general traffic command and control for traffic management and law enforcement authorities as well as overall road safety. Variable road or highway signage/driver information systems can be seamlessly integrated into databases such as a national traffic information system. Information on traffic conditions or weather systems likely to affect other centres or routes can be quickly made available to other cities or traffic control centres.

ANPR also has the ability to measure the average speed of vehicles crossing two points many kilometres apart, so traffic management authorities could use it to identify vehicles that may be adhering to limits at individual speed traps but are generally significantly exceeding the overall limit that prevails between the two points.

## Design and configuration

It is important that the traffic management system integrates to non-specific hardware and most of the currently available operating systems. It should not be limited by image resolution or recording rates and should seamlessly mix analogue and digital products, standard CCTV and high definition TV of all classes.

Another essential is a standardised command set with product-specific drivers to integrate to an extensive variety of OEM products, offering options for the implementers and users of Traffic Management Systems.

The goal of a high technology traffic management system is not merely to create a means of automatically dispensing fines to road users who transgress; rather it aims to improve traffic conditions and flow for the benefit of all road users, to warn motorists of changing conditions, incidents or accidents and to enable police and emergency services to attend with minimal delay. If, at the same time it acts as a deterrent that will curb poor driving, improve general road skills and behaviour and reduce accidents and incidents, will anyone say that is a bad thing?

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