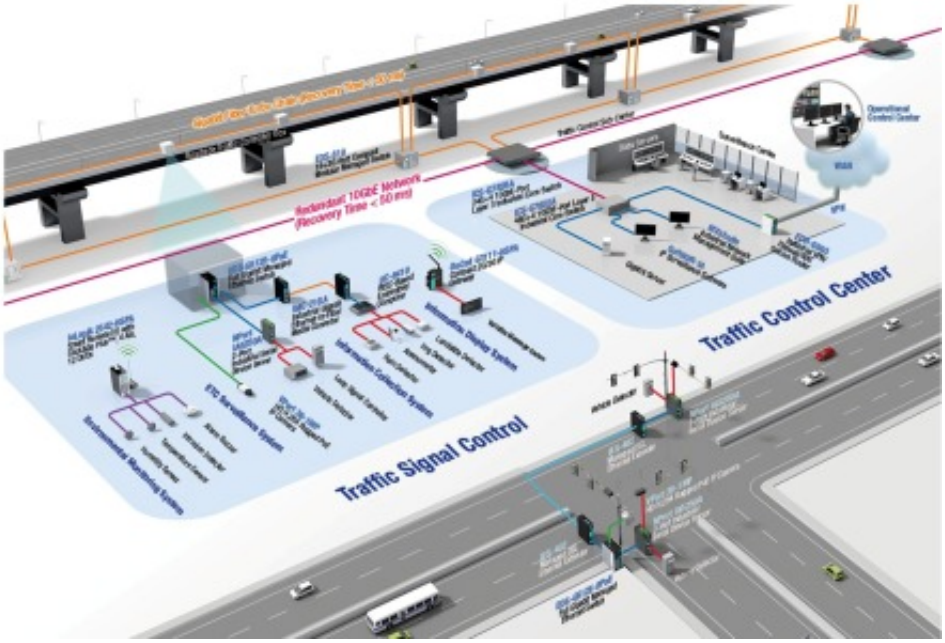
# Advanced Transport Management Systems

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**Introduction**

Today?s road operators are faced with many challenges. For example, better management of the often near capacity traffic levels on highways and city streets can improve safety and reduce travel times and greenhouse gas emissions. In addition, replacing low-bandwidth legacy copper ITS with high data rate real-time network backbones can reduce traffic accidents by providing control center managers with the critical road condition information they need to react quickly and decisively.

Commuter, holiday, and event related traffic flows need the same timely management to prevent traffic jams, and a real-time system is needed to warn drivers of bad weather, road construction, and other unexpected situations, or even close roadway access automatically to prevent accidents from occurring.

## Network Requirements

### Reliable, High Capacity Hierarchical IP Network

An ATMS needs a multi-layered network to interconnect the large number of monitoring nodes that deliver traffic and road condition data and signaling information to and from centralized controllers. Top layer full-Gigabit Ethernet switches can be used to aggregate multiple lower level 10/100 Fast Ethernet switches housed in wayside cabinets onto high capacity SDH or 10G links. The entire network needs to be resilient and redundant enough to ensure that data gets transmitted even when faced with network failures or unanticipated data bursts that exceed the network?s capacity. Furthermore, the entire network needs to be easily managed and serviced using a straightforward management platform that can be remotely operated from a central control location.

### Efficient Video Surveillance System

Traffic engineers need access to a reliable video feed to see current traffic levels, road incidents, and weather hazards. The video stream should use optimal video compression for efficient transmission over high capacity Gigabit Ethernet networks, and support features such as IGMP snooping and multicast filtering.

### Real-Time Advanced Traffic Management System

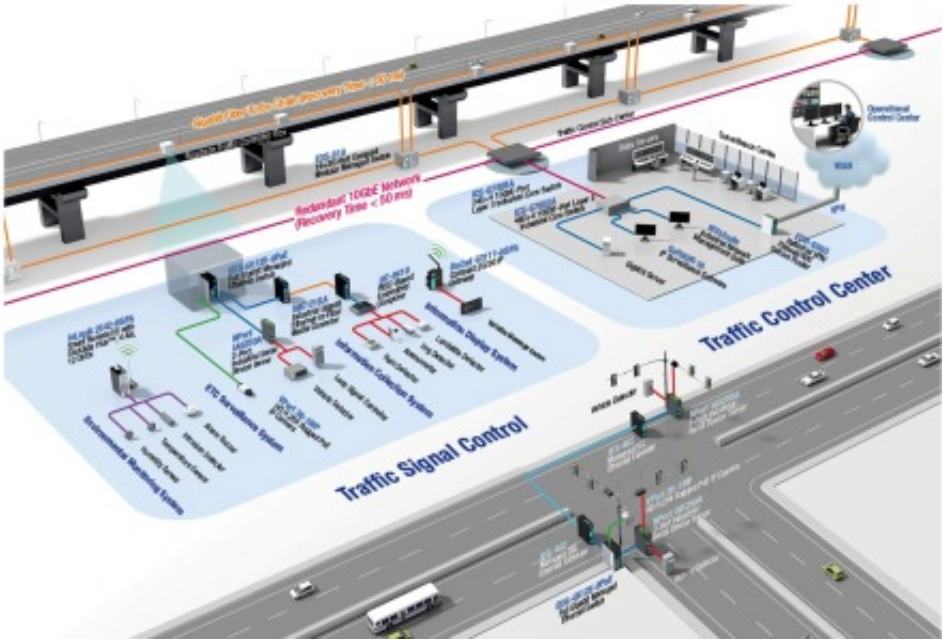
Central controllers digest data from sensors monitoring current traffic and road conditions to operate variable message signs, roadway access controllers, traffic lights, and the dispatch of emergency vehicles. Advanced sensors that actively respond to pre-defined events can be used to update variable message signs in real time to warn drivers of accidents, treacherous weather conditions, and heavy traffic, resulting in safer driving conditions and more efficient and comfortable travel. Over-utilization of roadways can be prevented using controlled roadway access, which can also prevent the accidents that often accompany stop-and-go traffic.

### Reliable and Secure Control and Monitoring of City Traffic

Traffic controllers and network cameras in any city or street intersection must be rugged enough for wide temperature environments to provide constant remote traffic flow information for automated traffic signal control. Network encryption and authentication over public wired and wireless networks are essential to protect information access and asset security from cyber-attacks.

## Moxa Solutions

- Comprehensive portfolio, including wired and wireless devices, HD video solutions, remote I/Os, and serial-to-Ethernet devices
- Up to 1GbE/10GbE speed edge-to-core industrial switches
- Redundant technologies: Turbo Ring and Turbo Chain (recovery time < 20 ms), GuaranLink (wireless)
- Easy-to-use, complete software: MXstudio network management suite, NVR and VMS surveillance management, and open OS platforms
- High speed firewall and VPNs for uncompromised cybersecurity
- Rugged operation in harsh, -40 to 75°C conditions
- Active OPC-enabled I/Os reduce the loading of networks and control centers
- Complete management and security features: Modbus/TCP, LLDP, QoS, VLAN, IGMP snooping, IEEE 802.1X, SSH, and more


Redundant 10GbE Network
(Recovery Time < 50 ms)
Traffic Control Center
Traffic Signal Control