



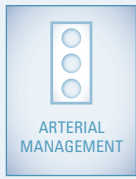
***Motorola Intelligent Transportation Systems (ITS) Solutions***

Motorola's Wireless Broadband Solutions are  
a Driving Force in the Global Adoption of ITS





# Intelligently Addressing the World's Toughest Transportation Challenges



ARTERIAL  
MANAGEMENT



FREEWAY  
MANAGEMENT



TRANSIT  
MANAGEMENT



EMERGENCY  
MANAGEMENT



ROAD WEATHER  
MANAGEMENT

Getting from here to there is becoming more difficult, and everyone who travels the roadways in metropolitan areas around the world knows it. In a 2001 study<sup>1</sup>, almost 80 percent of Americans perceived that traffic congestion has gotten “much worse” in the past five years. Is the situation getting any better? Not really. In a 2005 U.S. survey<sup>2</sup>, 85 percent of respondents felt that congestion was as bad or worse than in the previous year. In most countries around the world, the situation is much the same.

## High Cost of Congestion

Traffic congestion costs money, imperils public safety and influences the family and social lives of billions of people. In 2003 in the United States alone, highway congestion cost over \$63 billion in travel delays and wasted fuel. In international business, congestion affects the bottom line by impacting everything from inventory control to shipping to customer relationships. Finally, congestion and other roadway safety issues are partially to blame for traffic fatality rates that have begun rising again after years of decline. To help solve these crucial challenges, the world is turning to Intelligent Transportation Systems (ITS) solutions.

## ITS and How to Use It

ITS solutions are transportation-centric systems comprised of a broad range of wireless and wireline communications-based information and electronics technologies. When integrated into a transportation system's infrastructure—and in vehicles themselves—these technologies are proving to help relieve congestion, improve safety, increase mobility and enhance productivity.

ITS solutions are proving their value around the world in a wide variety of transportation-based applications.

<sup>1</sup> U.S. Conference of Mayors survey on traffic congestion (2001)

<sup>2</sup> National League of Cities survey of cities (2005)

# Motorola's ITS Solutions Clear the Way to More Effective Transportation Operations

As an acknowledged global leader in wireless technology, Motorola provides high-speed communications technologies that are the driving force behind many of the world's most successful ITS systems. Motorola networks enable widespread automated collection of data at the roadside and from vehicles. They deliver secure, real-time transmission of—and access to—this data. They allow the aggregation of data to help streamline system and operations management. Importantly, ITS is technology of today, not sometime in the future. Government Departments of Transportation, transit agencies and commercial transportation organizations worldwide are already relying on the numerous benefits provided by Motorola ITS solutions.



In general, these benefits fall into four categories:

- Management.** By enabling real-time collection and distribution of actionable roadway information, Motorola ITS solutions help a wide range of organizations better manage their fleets and operations. Common applications include freeway and arterial management systems that incorporate 24/7 surveillance of roadways and railways, ramp control systems, lane and rail crossing management, automated traffic signals and switch control, incident detection and more. Other management applications include transit management, electronic toll collection and emergency management that encompasses public safety applications such as police, fire and rescue operations.
- Information.** ITS systems collect and transmit a wide range of useful, real-time information to inform and empower both transportation professionals and highway travelers. These include traveler information applications such as dynamic highway signage, weather updates and automated information systems. In a typical example, a Los Angeles, California study noted that when motorists were informed about construction projects through an automated work zone information system, nearly 80 percent of them altered their routes. The results? Reduced congestion, faster travel times, increased productivity, decreased fuel consumption, and lower frustration levels.
- Prevention.** ITS solutions also enable a wide range of enhanced prevention services. These include systems that alert officials to an increase in traffic volumes, enabling them to activate traffic signal control programs that help prevent congestion. They also include crash prevention and safety systems such as intersection crossing detection systems, pedestrian safety systems, rail-highway crossing systems and many more to help prevent accidents and delays before they occur.
- Response.** By alerting first responders and other public safety professionals to road, traffic and weather conditions, ITS systems enhance public safety by enabling faster, more informed, more successful responses. Real-time dispatch, remote traffic signal control and other applications also help improve response to traffic incidents, fires, police emergencies and disaster situations.

**Some of the most important functionalities of ITS systems and the benefits gained by the public, municipality or enterprise include:**

FUNCTIONALITY	BENEFITS
Congestion and accident prevention, traffic incident alerts	Increased public safety, reduced municipal risk and liability
Real-time data collection and transmission	Better performance monitoring and improved planning
More reliable public transportation systems	Increased usage of public transportation, fewer vehicles on roadways
Intelligent traffic control and monitoring	Automatic fine assessment, increased revenues, safer roads and intersections
Centralized information aggregation and consolidation	Increased operational efficiencies and reduced operating and management costs
Shared data with other systems	Integrated voice, video and data, higher ROI from converged systems

# The Pivotal Role of Wireless in Smart Vehicle and Smart Highway ITS Solutions

Today's highly advanced wireless technologies are a primary enabler in the sky-rocketing growth of ITS. Comprehensive monitoring and management of large scale, widespread transportation systems have been hampered when only wired systems are in place. By extending real-time data collection and monitoring to encompass entire transportation systems, wireless broadband equipment enables more efficient, more cost-effective roadway, railway and other transportation operations.

High-speed wireless Motorola solutions that are powering ITS networks around the globe include:

- **Video Surveillance.** Wireless broadband networks are giving new meaning to the phrase "keep your eyes on the road." By enabling IP-based video surveillance of roadways and intersections, wireless technologies are able to provide closed circuit TV systems for real-time monitoring virtually anywhere and everywhere on the road system. Equally important, they are able to distribute that video in real time to virtually anyone and everyone who needs it.
- **Traffic Control.** Around the world, automated traffic signal control programs provide significant reductions in accidents, travel times and savings from reduction in fuel consumption and carbon emissions. Motorola wireless broadband infrastructures distribute real-time information that enables remote configuration and management of traffic signals to respond quickly to developing conditions due to weather, accidents or traffic build-up.
- **Integrated Corridor Management.** Motorola wireless technologies can enable one of the most promising concepts in reducing traffic congestion and improving safety: Integrated Corridor Management (ICM). ICM helps mitigate congestion by empowering multiple organizations and stakeholders to manage local and regional transportation corridors—consisting of roadways, rail lines and bus systems—as an integrated system rather than as individual assets.

- **Bridge Monitoring.** In countries with ageing infrastructures there is growing concern about the integrity of bridges—as evidenced by the 2007 bridge collapse in Minneapolis—and other structural elements of the roadway systems. Motorola offers continuous structural health monitoring solutions that combine embedded sensor systems with wireless communications networks to identify potentially dangerous structures, and to pinpoint conditions that can be repaired well before a bridge fails.
- **Transit Management.** One of the most important ways of reducing traffic volumes and congestion is the availability of an efficient, reliable public transportation system. Time and again, studies indicate that people are more than willing to use public transportation as long as fares are reasonable and service is predictable. Motorola wireless broadband ITS networks are helping public transportation systems with solutions such as video surveillance and data collection technologies that provide real-time visibility of the entire system as well as remote management capabilities that enable instant response that helps vehicles stay on schedule.
- **Information Systems.** In the transportation industry, what travelers don't know can not only hurt them, it can also tarnish the system's image and undermine public confidence. Motorola wireless broadband solutions help organizations keep the public informed through applications such as electronic bus stop information systems, dynamic highway signage that can warn of congestion or provide approximate travel times, and roadway information systems that can keep drivers informed of construction zones and other traffic-related developments and issues.

"Implementation of red-light cameras gives the City of Dallas an additional measure of traffic control, making our citizens safer. Motorola Point-to-Point wireless technology has enabled us to meet our goals while keeping costs low."

**Zaida Basora**  
Assistant Director of  
Public Works  
City of Dallas, TX

# Motorola Wireless Technology Drives ITS Mobility, Safety and Efficiency Improvement

Motorola's portfolio of fixed and mobile wireless broadband networks offers exceptional performance, reliability, security and management capabilities for multi-modal transportation systems.

"Motorola wireless technology allows us to operate our adaptive traffic signal system more efficiently with reduced costs. That's a positive outcome both for us and for the motorists we serve."

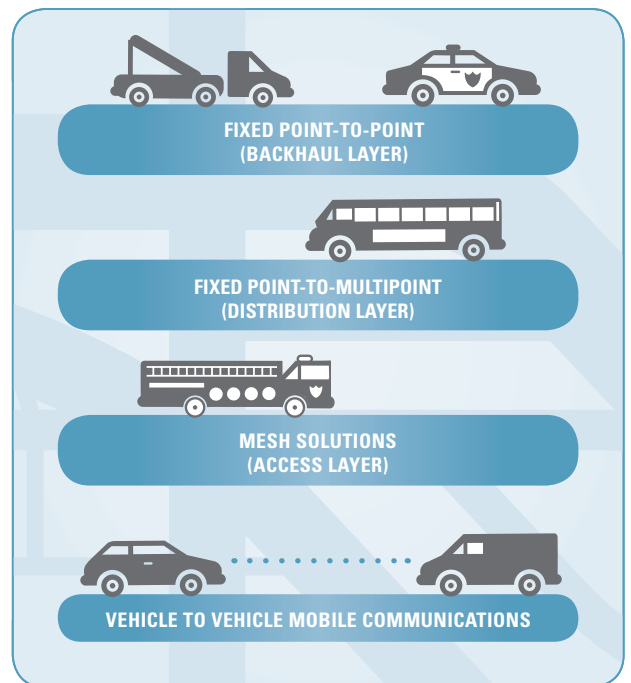
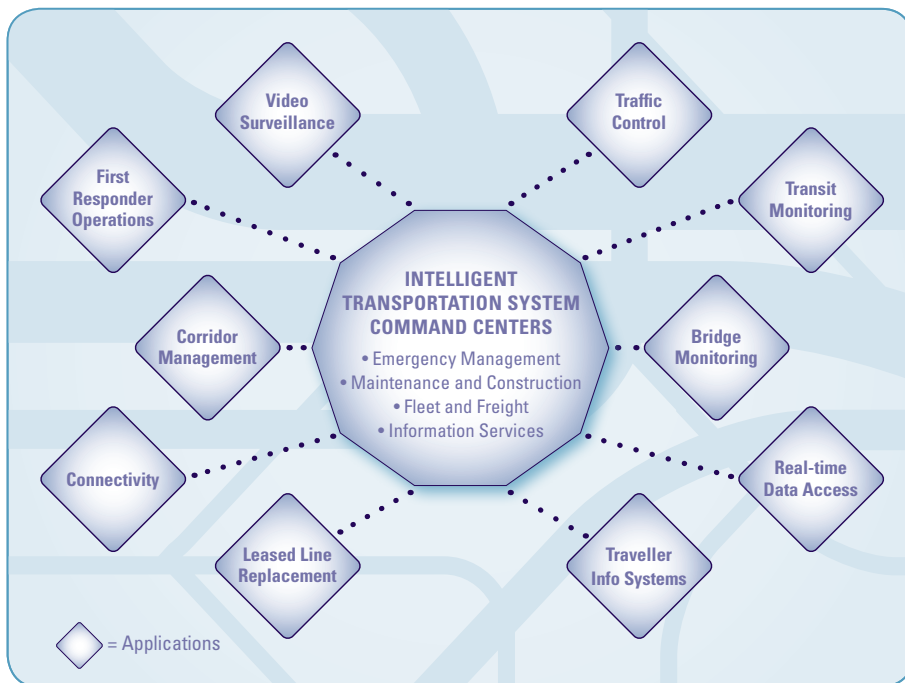
**Brent Blair**  
 Managing Director  
 Road Commission for  
 Oakland County, MI

- **Fixed Point-to-Point (PTP) Wireless Ethernet Bridges.** Extremely reliable even in the harshest, most challenging RF environments, Motorola Fixed PTP solutions operate in licensed and unlicensed frequencies. They provide carrier-grade service between two points in either Line-of-Sight (LOS) or Non-Line-of-Sight (NLOS) environments and offer simple, fast, affordable deployment. ITS applications include high-speed backhaul of bandwidth-intensive traffic like video and high-speed connectivity between transportation centers.
- **Fixed Point-to-Multipoint (PMP) Wireless Access Networks.** In many dynamic transportation environments, difficult weather conditions and unpredictable vehicle and motorist behavior can cause unexpectedly adverse traffic conditions. Motorola's robust PMP systems transmit information reliably to transit systems in both licensed and unlicensed frequencies. Using a patented signaling technique that delivers an industry-leading Carrier-to-Interference (C/I) ratio, Motorola's PMP systems are currently providing high performance, cost effective connectivity in more than 4,000 networks in 120 countries.

- **MOTOMESH™ Mesh Solutions.** Bringing unprecedented mobility to transportation networks, Motorola's MOTOMESH wireless broadband network solutions capture telemetry and traffic data at highway speeds. The self-forming, self-healing capabilities of MOTOMESH are particularly well suited in transportation systems where alternate travel route information is essential for nonstop movement of people and products. Applications include onboard communications, video surveillance and vehicle performance and diagnostics. The MOTOMESH portfolio includes MOTOMESH Duo, a solution offering 802.11 b/g connectivity plus an additional 5.8, 5.4 and 4.9 GHz radios; and MOTOMESH Solo a single radio solution based on Motorola's proprietary Mobility Enabled Access technology (MEA). Finally, MOTOMESH Quattro is a four-radio meshed WiFi network with MEA technology.

Motorola's Intelligent Transportation Systems solutions also include Enterprise Wireless LAN (WLAN) for indoor communications and the One Point Wireless Suite, a powerful set of software solutions that help in the design, deployment and ongoing management of Motorola's wireless ITS solutions.

Wireless technologies enable integrated control and management of a wide range of ITS applications.



# The Technology of Choice for a Wide Range of ITS Systems

At this moment, Motorola wireless broadband technologies are providing a myriad of benefits in a wide range of transportation-based applications worldwide.

In addition to specific ITS advantages—such as improved traffic and roadway management capabilities, more efficient information collection and transmission, enhanced prevention applications and improved situational response—Motorola solutions offer important added benefits, including:

- Fast, simple deployment
- Affordability and lower cost of entry
- Scalability at your own pace
- Superior reliability
- Ability to leverage existing IT network
- Elimination of recurring connectivity costs

To help bring real-world perspectives to the advantages of deploying Motorola ITS technology, we have included thoughts from a number of industry professionals. These help demonstrate not only the superior performance of Motorola's portfolio of solutions, but also Motorola's understanding and leadership in the ITS marketplace.



"The Michigan Department of Transportation has had significant success with Motorola on many past projects, which made them a natural choice for this critical project. The challenges of integrating multiple systems over the communications link and the need to go from a concept to an installed and operational system in three weeks presented many unique challenges. However, we were already confident in the performance of the Motorola equipment, as well as Motorola's understanding of the urgency and high visibility of the project, so we knew they would be able to implement a reliable and effective communications system on time."

**Gregory D. Krueger** Statewide ITS Program Manager Michigan Department of Transportation



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