

Electronic Toll Collection (ETC)

Electronic Toll Collection (ETC) is a method of toll collection that utilizes a vehicle mounted electronic transponder (“tag”) containing a radio transmitter and computerized customer account information. As the vehicle passes through a toll plaza, an antenna in the lane “reads” that tag’s computerized information and the appropriate toll is deducted from the customer’s account. It is an example of dedicated short-range communication, discussed later in this chapter. The Authority’s ETC system is called E-ZPassSM.

E-ZPass has expanded into a regional network comprised of 21 public transportation entities in 11 states. This consortium of Northeastern and Mid-Atlantic toll agencies, known as the E-ZPass Interagency Group (IAG), governs E-ZPass. The Authority is a founding member of IAG. Each of the member agencies has a Customer Service Center that maintains pre-paid E-ZPass accounts on behalf of toll customers. The Authority partners with the Triborough Bridge and Tunnel Authority, Port Authority of New York & New Jersey and New York State Bridge Authority to operate



the New York Customer Service Center. The Service Center handles tag distribution, account maintenance, payment processing, call center and violations processing for E-ZPass operations in New York.

The Authority was the first IAG member agency to introduce E-ZPass at its Spring Valley Toll Plaza in August of 1993. By February of 1997, the Authority completed installation of E-ZPass at every toll plaza. Authority personnel maintain the ETC lane equipment (software, firmware, and hardware). The Authority maintains agreements with other IAG members for reciprocity in other states.

E-ZPass is available in all of the Authority's toll plaza lanes. Additionally, many of the toll plazas offer "E-ZPass Only" lanes allowing motorists to travel through the plaza without coming to a complete stop. ETC has helped reduce traffic backups, congestion and delays at toll plazas. Over 50 percent of the Authority's toll transactions are collected through E-ZPass.

The Authority is developing plans to offer priority E-ZPass lanes that allow the patron to pass through the lane at higher speeds. These lanes must be physically segregated from staffed lanes. Therefore, these lanes are developed as part of major reconstruction projects for toll plazas and interchanges. There are currently four priority E-ZPass lanes at the New Rochelle barrier and two at the Tappan Zee Bridge. There are plans for more at targeted higher congested locations.

To view current listing of toll agencies offering E-ZPass, visit www.e-zpassNY.com.

TRANSMIT

TRANSCOM's System for Managing Incidents and Traffic (TRANSMIT) utilizes readers installed along the roadway for traffic management and surveillance applications. Using vehicle-mounted E-ZPass tags, travel time and average speed information on instrumented sections of the roadways is obtained.

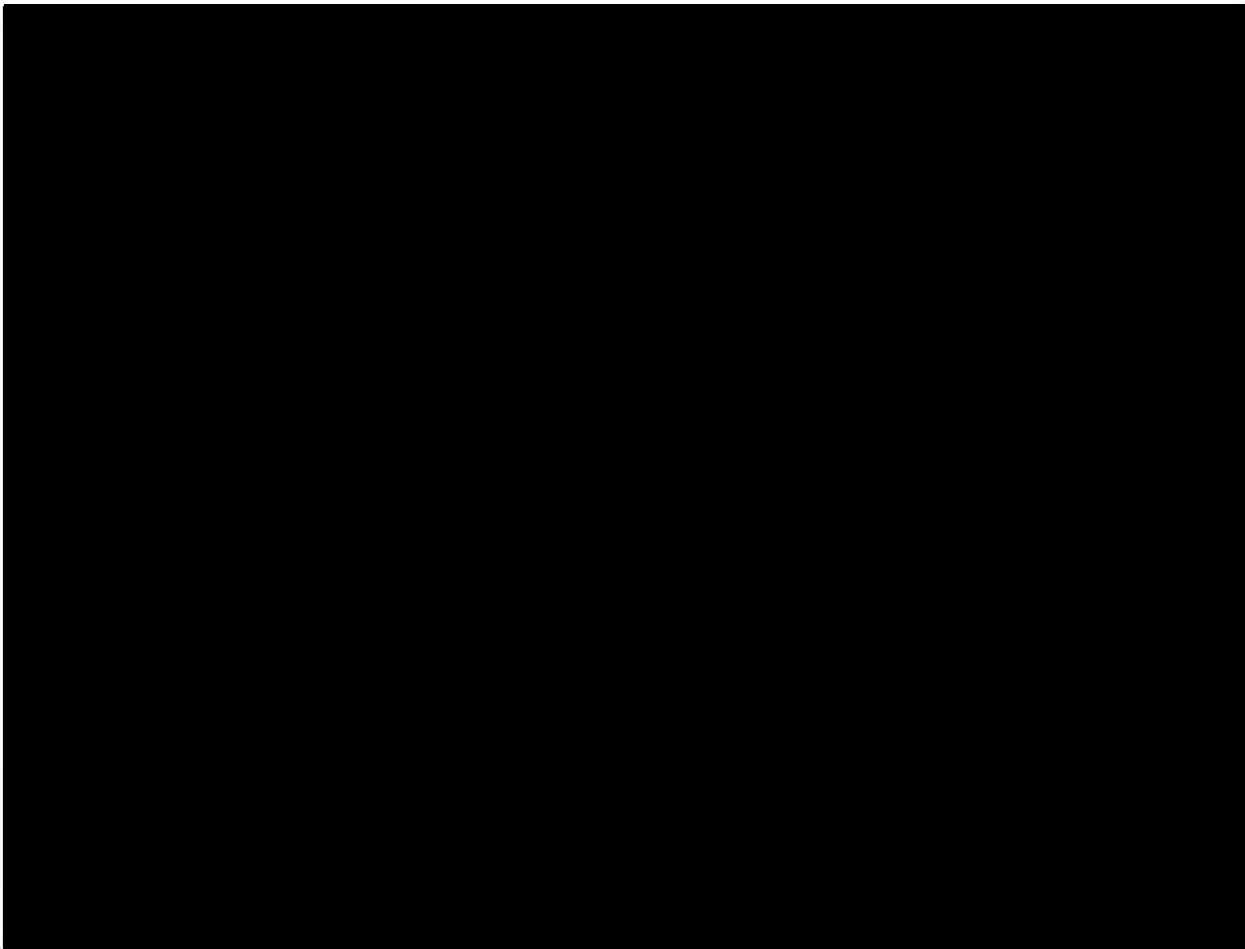
The information is transmitted to TRANSCOM via a local server, where it is encrypted and processed. Once the data is encrypted, the privacy of the customer is protected. By comparing the information with historical data, TRANSMIT can detect slowdowns, incidents and bottlenecks. Continuously updated real-time speed and travel time information is transmitted through TRANSMIT's regional architecture to work stations at various agencies. Quick identification of trouble spots means faster response times and reduced traffic delays.

The TRANSMIT system can provide origin and destination data and information on travel patterns of customers with E-ZPass. This information will be valuable to the Authority and its transportation partners for estimating traffic volumes, managing transit fleets and in planning future needs and operational improvements on the

transportation network. It will also be used to determine the level of staffing required in tollbooths by measuring traffic volume by day and time of day.

TRANSMIT was first implemented by a partnership between the Authority and TRANSCOM in the New York metropolitan region in 1994 along 18 miles from the Garden State Parkway in New Jersey to the Tappan Zee Bridge. Since its inception, TRANSMIT has been implemented on over 100 miles of roadway in the New York metropolitan area. The Authority is planning expansion of TRANSMIT with the installation of additional sites in the Buffalo and New York Divisions.

TRANSMIT readers can be located anywhere along the roadway where power and communication lines are accessible. The readers are generally mounted on the overhead structures of roads with three or more lanes and on the shoulders of ramps and two lane roads. For incident detection, the readers are generally sited from one to two miles apart for maximum effectiveness. Greater spacing can be used for measuring travel times. The readers must be closer together for incident detection because a queue can build quickly when an incident occurs. The closer together, the faster irregularities in traffic flow can be detected. The reliability and accuracy of TRANSMIT improves with the growing number of vehicles equipped with E-ZPass.



Management of Data

Data Collection and Archiving

To measure and evaluate the effectiveness of ITS, data must be collected from the devices. This might include information on traffic volume and lane occupancy, traffic speed and travel times, weather information, TRANSMIT data, construction information and incident data from CAD. The information is maintained for planning purposes and for historical comparison when new situations arise. An exception is CCTV images. In accordance with Authority policy, images from CCTV are not stored.

The collection and storage of traffic data is vital to the evaluation of incidents on the roadway and for the analysis of traffic patterns and conditions. It is also the basis for evaluations of traffic conditions compared to prior conditions for a similar situation.

The Authority can then determine if the traffic situation is due to recurring congestion or a unique incident. The information supports planning efforts and decision-making for Traffic Management.

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Once all this data is collected and securely stored, the Authority designates a retention period for the data, known as *data archiving*. This retention process is modeled after the Data Archiving Market Package from the National ITS Architecture. The retention process contains the retention periods for information, definitions of what the Authority retains, where the information is retained, and how it is accessed (means for retrieval).

The Departments of Operations, Planning and Information Technology are primarily responsible for collecting, securing, storing and archiving collected data for the stakeholders. The stakeholders are those that will need to retrieve and analyze the information, including Planning, Operations, IT, Maintenance, Traffic Engineering, Traffic Management, Construction Management, Design and Legal. The information may in turn be shared on a case-by-case basis with the Authority's regional transportation partners.

Data Security

Beginning in the early 1990s, a significant focus has been placed on educating and assisting State and local governments on the need to establish controls to protect technology and information assets. A variety of best practices, policies and awareness materials were published through the efforts of the New York State Forum for Information Resource Management (the Forum) and the New York State Office for Technology (OFT) to aid governmental entities in implementing control mechanisms to secure technology and information.

In response to the events of September 11, 2001 and directives from the federal Office of Homeland Security, Governor George Pataki established the New York State Office of Cyber Security and Critical Infrastructure Coordination (OCSCIC) in 2002. OCSCIC's primary mission is to address cyber readiness and the protection of critical assets at all levels of government in a coordinated and comprehensive manner. Since its creation, OCSCIC has published reports entitled "Cyber Security Protecting New York State's Critical Infrastructure" and "Best Practices and Assessment Tools to Promote Cyber Security Awareness" which continue to highlight the fact that security is as much a management issue as it is a technological one.



Since the mid-1990s, the Authority has been an active participant in the efforts and initiatives of the Forum, OFT, and more recently, OCSCIC. This participation has fostered a commitment by executive and senior management, with assistance from the Department of Information Technology (IT) and the Authority's Information Security

Officer (ISO), to develop and implement administrative and operational security measures and controls to protect technology and information from malicious and unintentional acts.

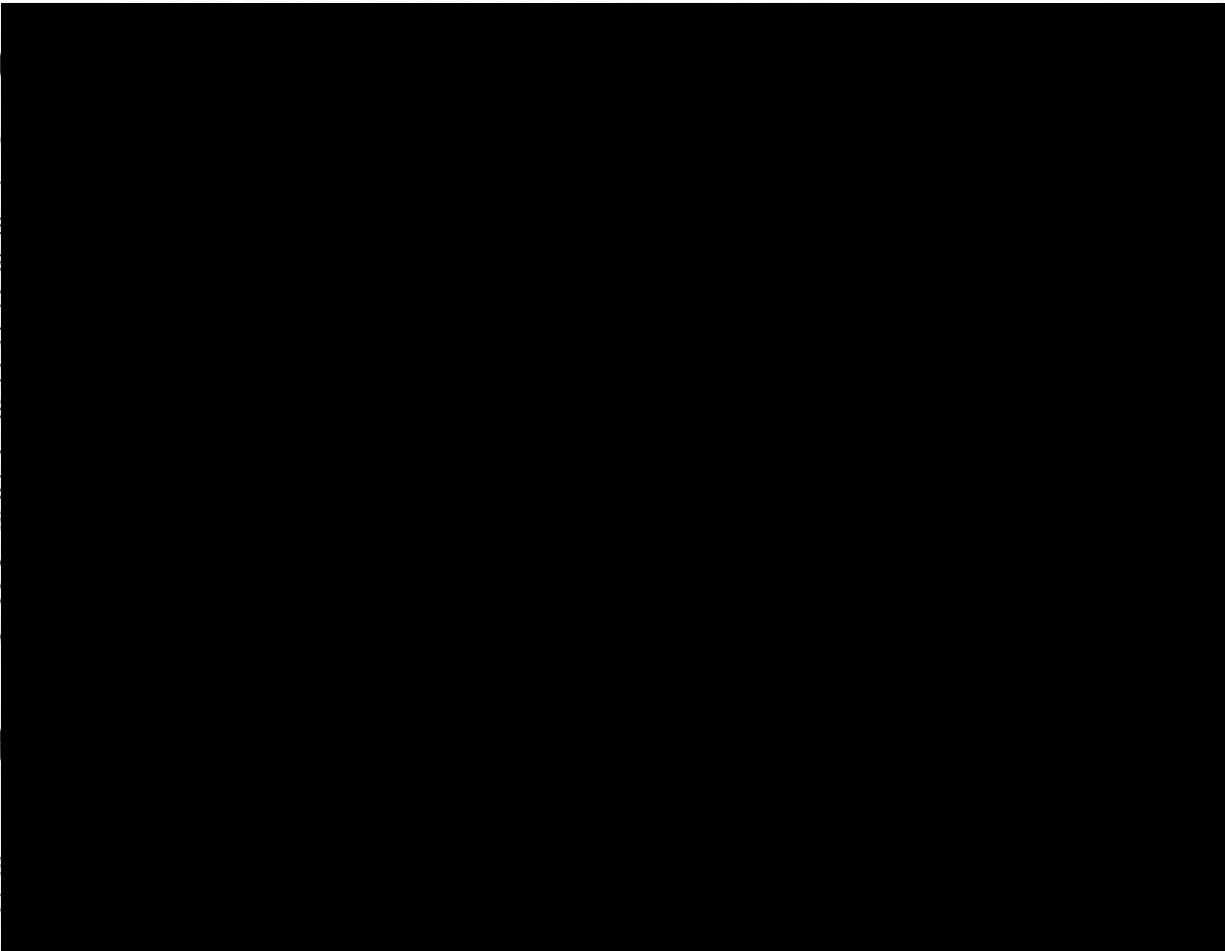
Security measures and controls utilized by the Authority are reflected in formal policy, standards, procedures and organizational internal control programs that are considered to be administrative controls. From an operational control standpoint, IT protects technology and information assets through a variety of methods, including but not limited to: designing and developing appropriate security controls as part of any new systems development project; defining user access rights and restrictions to network, hardware, software and information resources; checking file integrity during transaction processing; performing nightly system back-ups; and updating network and system resources with the latest security patches.

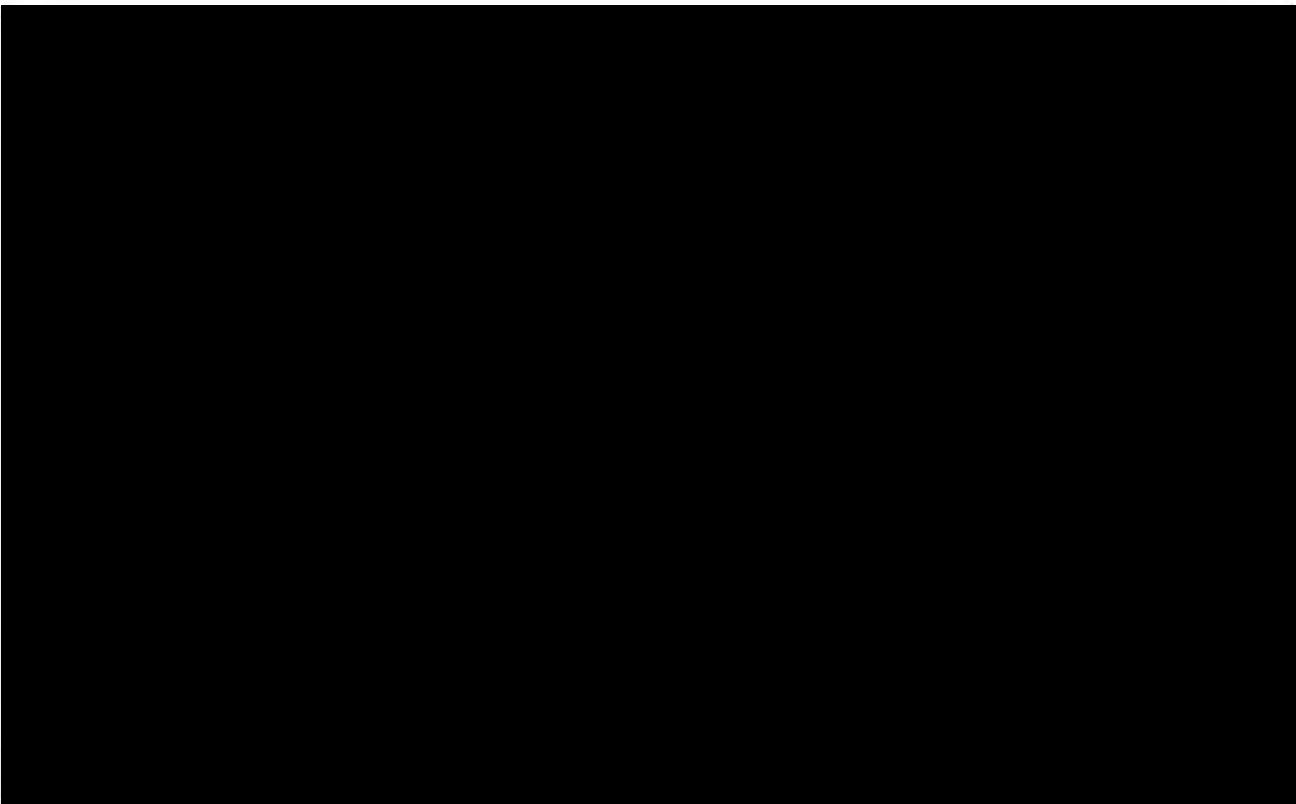
Security measures and controls must continue to be developed and implemented to ensure conformance with existing internal policy, best practice and directives from

State and Federal government. Any technology initiatives undertaken by the Authority must consider existing internal policy that address information security and control such as those outlined in Administrative Services Bulletins entitled COMPUTER SECURITY POLICY (1993-19) and COMPUTER SECURITY PROGRAM – DATA SECURITY STANDARD (1994-6) and the Executive Instruction called E-MAIL AND INTERNET USE POLICY (2001-7) (see Appendix C), as well as any additional directives established to conform with state and federal mandates.

The establishment of technology and information security and control standards requires input from the Department of Operations, IT, the Legal Department, the ISO and any other major stakeholder. Assuring compliance with established policy is a joint responsibility shared through monitoring activities performed by the Authority's ISO and systems and network administrators in IT.

The Authority designs data security measures into its systems at the system architecture level. The establishment of operational, technological, and administrative safeguards ensures that only authorized individuals have access to data. Any person or agency that is granted access to Authority data must comply with the Authority's data security standards. The Authority is in the process of developing MOUs with some of its transportation partners to provide a foundation for future agreements regarding sharing and accessing data.





Transportation Operations Coordinating Committee (TRANSCOM)

TRANSCOM was created in 1986 by the Port Authority of New York and New Jersey. The goal was to provide a coordinated approach to managing transportation in the New York/New Jersey/Connecticut metropolitan area through interagency communication and enhanced utilization of existing transportation management elements. The Authority and NYSDOT are just two of the 18 participating transportation and public safety agencies in this coalition.

TRANSCOM's System for Managing Incidents and Traffic (TRANSMIT) utilizes E-ZPassSM technology to detect congestion and provide collective speed and travel time information. Transponder readers along the road detect E-ZPass tags and scramble the tag information for privacy. TRANSMIT then compiles the time lapse between readers. The information is useful in identifying bottleneck areas or to adjust toll plaza staffing in response to traffic conditions.

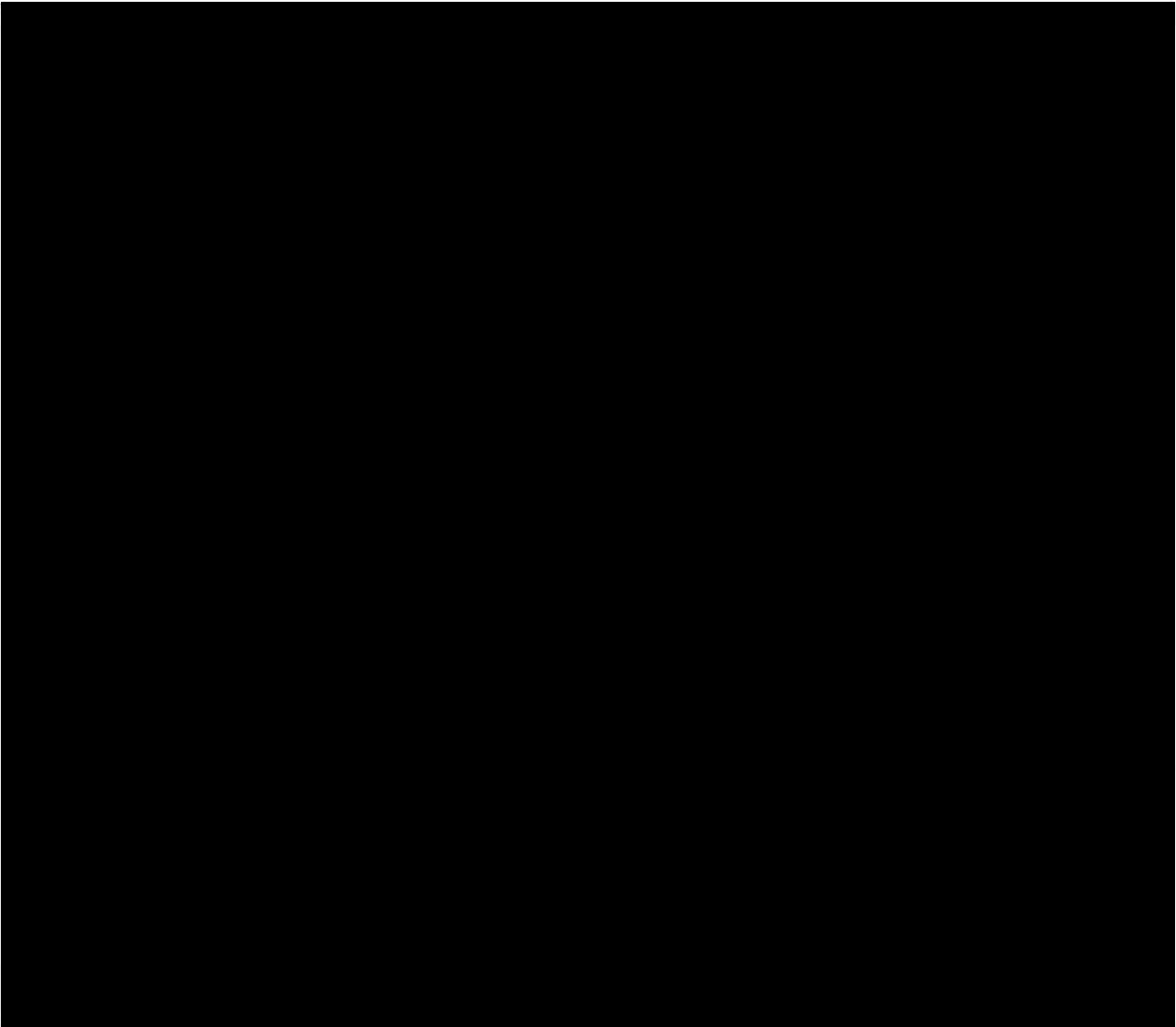
Sharing information and resources allows information to reach a wider traveling public throughout the tri-state area and its periphery.

TRANSCOM's Operations Information Center (OIC) gathers information 24 hours a day about incidents, special events and construction. The information permits the Center to maximize capacity around major incidents and on parallel or intersecting highways. TRANSCOM's OIC disseminates

notices to affected agencies and coordinates incident responses to major incidents using its member agencies' various ITS elements.

Sharing information and resources allows information to reach a wider traveling public throughout the tri-state area and its periphery. One way TRANSCOM shares information is through an Interagency Remote Video Network (IRVN) system it has developed. Through participation in the IRVN system, over 150 video feeds from other member agencies are available to the Authority at one workstation. In return, the Authority provides feeds to the IRVN system from a switcher in the New York Division.

TRANSCOM is a private, not-for-profit corporation, partially funded by its member agencies and the FHWA. It is governed by a Board of Executives comprised of the chief executives of its member agencies. All actions require their unanimous approval.





Public and Private Agencies

In addition, the Authority routinely partners with other public and quasi-public agencies to further its research and development efforts. Many relationships are established between partners that will advance transportation initiatives. Such partners include other state Departments of Transportation, toll agencies, transit agencies and authorities and customs and border crossing regulators.

Frequently, private entities will approach the Authority to pilot a new transportation technology. The Authority can help develop, assess and test the new technology while keeping costs under control.

E-ZPass is an example of an ITS element that resulted from a private sector partnership. A private company supplies the transponders and services customer accounts. The Authority benefits from the electronic toll collection technology by improving customer service and decreasing wait times at toll plazas, thereby reducing congestion and emissions.

Another example of E-ZPass technology at work in a public/private partnership is the Authority's application of intelligent transportation technology to Commercial Vehicle Operations (CVO), including OSCAR (One-Stop Credentials and Registration) and weigh-in-motion. These applications benefit private sector users in the trucking industry. This partnership directly impacts the bottom line of the Authority's commercial customers and helps keep traffic moving.

In the ever-changing field of ITS, it is important to maintain public and private sector partnerships for the benefit of all. These partnerships allow the Authority to share ITS expenses and resources, while continuing to advance its methodologies and service customers.

