

# Electronic Vehicle Registration

When Public Safety and Security Matter Most



*TRANSCORE*

## Automated Enforcement of Vehicle Regulations, with Unsurpassed Safety and Security

Vehicle registration is the first step in a cascade of events that ensure the safety of motorists and all those who live and work along area roadways. And electronic vehicle registration (EVR) represents the next leap ahead in this cascade.

EVR provides a technology platform that can dramatically improve public safety and homeland security, enhance law enforcement and inter-agency operations, reduce pollution, increase local and regional revenues, and improve traffic flows in busy cities and at national borders.

TransCore's EVR automates critical aspects of the registration, inspection and enforcement process using "smart" registration stickers (tags) on vehicles and a network of wireless, radio-frequency identification (RFID) "readers" that can communicate with those tags, even while the vehicles are in motion.



Used for registration purposes, this technology...

- ▶ Expands a jurisdiction's capacity to monitor more vehicles for compliance
- ▶ Increases compliance with vehicle safety, emissions and insurance requirements
- ▶ Recovers lost revenues

The intelligence inherent in the EVR tag also makes it the ideal platform to support or enhance a variety of related applications, including...

- ▶ Accident management
- ▶ Search for lost citizens
- ▶ Commercial vehicle zone restrictions
- ▶ Vehicle recovery
- ▶ Criminal investigation and apprehension
- ▶ Border security
- ▶ Toll payment
- ▶ Traffic management

### EVR Benefits

Electronic vehicle registration offers numerous benefits to a jurisdiction and the people it serves, including:

- ▶ Safer vehicles, safer travel
- ▶ Cleaner air
- ▶ Improved security
- ▶ Recovered tax and fee revenues
- ▶ Route restrictions ensured
- ▶ Enforced insurance coverage
- ▶ Efficient violations processing
- ▶ Fast and accurate accident reporting
- ▶ Increased public confidence

## EVR System Elements

The EVR system consists of several key elements, including:

- ▶ Tamper-resistant sticker tags applied to the vehicle windshield during annual inspection
- ▶ Readers that can read data in the tags and can also securely write new data into them
- ▶ Lane controllers with status lists, database access and processing capabilities
- ▶ Vehicle presence detectors along the roadway
- ▶ Cameras to capture license plate images when necessary
- ▶ Back office software for tag management, database interface, and customer support
- ▶ Violation processing system that verifies non-compliance and issues citations



*EVR System Elements*

## The High Cost of Registration Non-Compliance

Up to 30% of vehicles may be non-compliant with regulations in some regions.

In the U.S. alone, an estimated 5-15% of vehicles are unregistered, costing the nation as much as \$1.5 billion in lost revenues each year.

Registration non-compliance costs responsible drivers in higher insurance premiums. According to an Insurance Research Council report, the chances are 1 in 7 that an at-fault driver in a collision with another vehicle will be uninsured.

## How TransCore's EVR Process Works

The process begins by tagging vehicles and ends with violation enforcement, which ultimately returns vehicles to the streets better suited to share the roadways with fellow motorists. In between, a number of critical steps ensure the process works effectively.

- ▶ **Sticker tag distribution.** During annual inspection, the vehicle receives a new windshield sticker tag. This contains a memory chip that records information such as the vehicle ID number (VIN), license plate number, make, model and year. The inspector then "writes" the current inspection date into the tag's memory and locks it using a handheld device. No owner information is stored in the tag. Initial transition to smart sticker tags may take a full year's inspection cycle to complete.



- ▶ **Vehicle presence detection and license plate photos.** A device in or above the roadway registers the presence of a vehicle and tells the associated reader to look for a tag. It also tells a camera in the lane to photograph the vehicle's rear license plate. Vehicle presence and photo records include a time stamp.



- ▶ **Tag reads.** Readers on the roadside read the tags on passing vehicles and record the tag ID and transaction details such as time and date.
- ▶ **Data updates via EVR database.** The effectiveness of any EVR system relies heavily on the accuracy and completeness of the jurisdiction's own database that provides vehicle owner information to the system. As appropriate, the system looks up owner data, then updates information in the back office processing software, and in some cases in the tag itself, to reflect changes in status and to add current transaction data. Only violation- and list-related vehicle presence events are retained in the system.



## EVR Sticker Tags:

- ▶ Inexpensive
- ▶ Tamper resistant, secure
- ▶ Battery-free
- ▶ Read/write capable
- ▶ Data lock feature
- ▶ Factory programmed unique ID
- ▶ Uses proven radio frequency identification (RFID) technology
- ▶ No owner data in tag
- ▶ Multiple uses

► **List lookups for vehicle status.** Once a tag has been read and its data

Violation Status		Watch Types		Urgent Types	
Name:		Description:			
Name	Description	Update	Clear		
LOAD	Weighted				
DATA	Vehicle and Owner information has been reviewed - ready for image review				
ACCEPTED	Violation has passed image review/Document created				
REJECTED	Violation rejected				
SCREEN	Supervisor Review				
TRANSPORT	Violations created ahead with Transportation Agency				

Violation Status		Watch Types		Urgent Types	
Name:		Description:			
Name	Description	Update	Clear		
REG	Registration				
SAFETY	Child/Infant/Child				
INSUR	Insurance				
PH	Not permit to drive during Hours				
SCORE	Not permit to drive on Score				
TRUCK	Not permit to drive a Truck				
WANTED	Wanted Vehicle				

recorded, it is matched with additional information in the system and checked against any relevant lists. **Watch** lists identify vehicles that are non-compliant with one or more regulations (e.g., registration expired, inspection overdue,

fees/taxes unpaid, no insurance coverage). **Urgent** lists specify vehicles associated with crimes, missing persons and other circumstances that may require a priority alert to law enforcement agencies.

► **Law enforcement alerts.** When a vehicle on the **Urgent** list passes a reader, the system can issue an alert to law enforcement for immediate action.



► **Violation processing.** License plate photos for non-compliant vehicles move to a centralized violations process system (VPS). All other photos are discarded. The VPS converts images to machine-readable characters using optical character recognition (OCR)



technology. Personnel may also verify plate numbers. The system then searches for the appropriate vehicle owner contact information and issues a citation.

Violation Report										
Report Created	Report Date	License Plate	Violation Reason	Violation Type	Violation Code	Tag No	Tag Make	Station Photo	Location	Time
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM
11/11/2011 10:00 AM	11/11/2011 10:00 AM	12345	EXPIRED REGISTRATION	REG	REG-001	12345	ABC	12345	Highway 1	10:00 AM

### Three Ways to Read Vehicle Tags:

► **Fixed** readers mounted on roadside poles or overhead gantries



► **Transportable**, trailer/tripod-mounted readers for variable checkpoints



► **Handheld** readers for inspections, traffic stops and accident reporting





**Border Crossing**  
Ogdensburg, New York

Over 71,000 TransCore tags have been deployed specifically for EVR to date.

TransCore also provides security technology in 22 border locations monitoring 95 traffic lanes, with an additional 29 locations and 44 lanes under contract.

## Registration Compliance...and So Much More

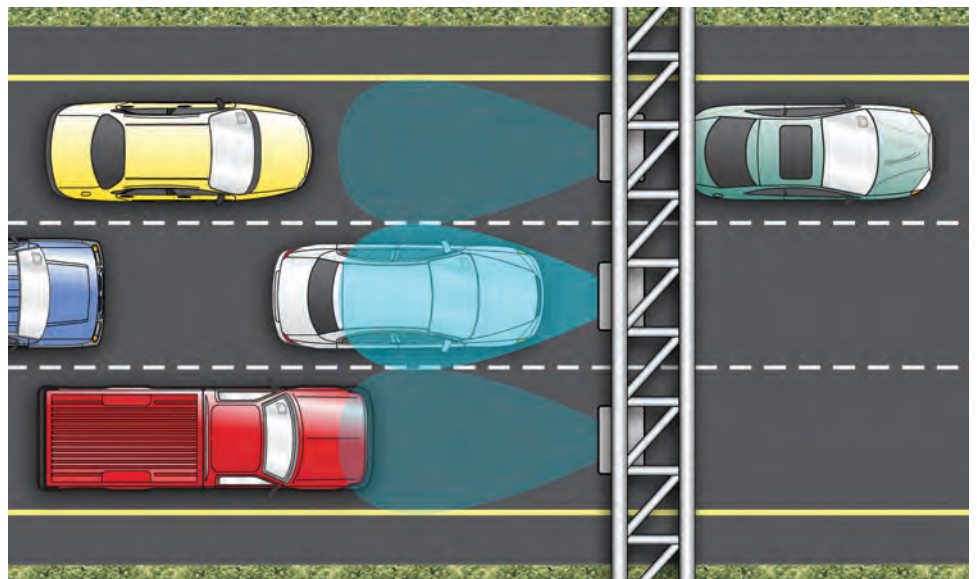
Automating critical parts of the vehicle registration process is only the beginning. Your EVR infrastructure and tag base can also enable a whole new range of safety and mobility applications.

## Registration Monitoring and Enforcement

Current methods of monitoring registration compliance involve random sampling of vehicles, often in the course of traffic stops or at checkpoints. These methods capture only a small portion of the total vehicle population and are extremely time consuming for law officers.



EVR can monitor every vehicle that passes by a reader – thousands of them, 24 hours a day. It captures registration information from each tag and compares it to the **Watch** list in milliseconds, without requiring the intervention of an officer. Each time a non-compliant vehicle passes a reader, the system recognizes it and only removes it from the list when all outstanding issues have been resolved.



For checkpoint applications, the system can compile violation evidence in real time, and officers have the option to issue citations on the spot. For fixed installations, the system can be configured to automatically process and issue citations with fines for each infraction.

### Revenue Recovery

Research indicates that in some regions, as many as 30% of vehicles are non-compliant with applicable regulations. In the U.S. alone, an estimated 5-15% of vehicles are unregistered, costing the nation as much as \$1.5 billion in lost revenues each year.

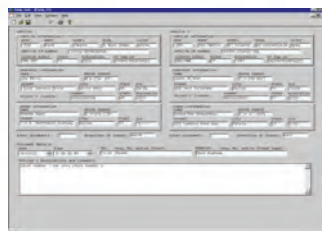
EVR has the potential to dramatically reduce the rate of non-compliance and thus restore lost tax and fee revenues as well as introduce new revenues from fines levied on violators.



### Accident Management

Typically, officers at the scene of an accident must collect and record data manually, sometimes under the most challenging of conditions, taking considerable time and producing forms whose entries may be illegible or may be subject to transcription errors. More important, paperwork associated with an event can take attention away from those involved and can put motorists as well as officers at risk while traffic is disrupted.

With EVR in place, officers can use handheld readers to instantly capture data from each vehicle's sticker tag. They can then match that data with other relevant information through database and list lookups. Patrol cars may even be equipped to print out accident reports at the scene for drivers involved. The efficiencies afforded by a fully deployed EVR program can help reduce traffic disruption and improve the safety of those involved in an incident.



### Electronic Registration Facilitates Accident Management

Widely adopted EVR pays off with numerous benefits when accidents occur.

- ▶ Better focus on the people involved
- ▶ Faster, automated collection of vehicle data
- ▶ More accurate and complete reports
- ▶ Instant check against *Urgent* list vehicles
- ▶ Insurance data automatically captured
- ▶ Accident report copies printable from patrol car
- ▶ Expedited return to normal traffic flows

## Enhanced Safety and Efficiency for Law Enforcement

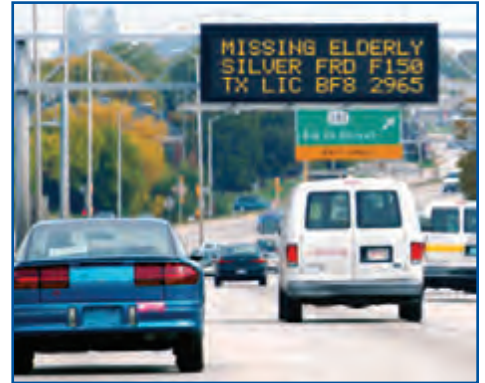
Electronic registration technology increases the effectiveness of law enforcement operations while ensuring that those who protect citizens are, themselves, kept safe from avoidable harm.

EVR can support law enforcement with a number of helpful benefits, including:

- ▶ Automated tracking of stolen or crime-related vehicles
- ▶ Secure, remote pursuit of criminals and suspects
- ▶ Data can be instantly shared across multiple agencies
- ▶ Information automatically compiled and integrated
- ▶ Rapid collection of vehicle data upon suspect apprehension

### ***Search for Missing Citizens***

Vehicles associated with missing or abducted citizens can be flagged by the system under its ***Urgent*** list, with codes that ensure appropriate authorities receive alerts – along with time, location, vehicle image and other information – as soon as the flagged vehicles pass by a given reader.



### ***Vehicle Zone Restrictions Enforcement***

Wherever vehicle access is restricted, EVR technology can help automatically enforce those restrictions and alert appropriate personnel or agencies when unauthorized vehicles have entered a secured zone.



### ***Stolen Vehicle Recovery***

The EVR infrastructure can support law enforcement in its efforts to recover stolen vehicles. Even without valid license plate or tag data, the system captures a visual image that can identify a given vehicle and its location at a fixed point in time for tracking purposes.

### ***Criminal Investigation***

The EVR infrastructure can identify the passage of vehicles associated with crimes or persons of interest and forward relevant information to law officers. Using the EVR technology to implement an all points bulletin (APB), for example, can improve the safety of officers who need to covertly track potentially dangerous individuals and apprehend them. Data gathered through EVR can be shared automatically among agencies to improve interagency responsiveness and operational effectiveness.



### Border Security

A well adopted EVR program provides the ideal foundation for the enhancement of border security, especially to speed the throughput of commercial vehicles. EVR tag records that are linked to database information – identifying approved trucks, drivers, crews and cargo – allow for expedited processing and free customs agents to focus on critical inspections.



### Toll Payment

Motorists in certain areas may also be able to register their EVR tags for automated toll payment in compatible systems on toll roads and bridges, and at airports and parking facilities. The same tag reports transactions at tolling points and triggers payment to the toll authority through an account established by the vehicle's owner.

### Traffic Management

EVR tags can serve as "data probes," reporting traffic flow information to local traffic management facilities. Traffic volume and average speed between readers deliver precise views into congestion on roadways and the impact of accidents and other events. Whether reported directly to drivers via variable message signs on the road or integrated into media traffic reports, probe data can help drivers find the best routes to their destinations.



## TransCore: Setting the Bar for Standards Worldwide

TransCore technology has been selected as the basis for transportation standards around the world, including:

**ATA (American Trucking Associations):** *Automatic vehicle and equipment identification*

**AAR (Association of American Railroads):** *Automatic equipment identification (including railcars themselves)*

**UIC (Union Internationale des Chemins de Fer):** *European rail transport equipment*

**ISO (International Organization for Standardization):** *Tolling devices, vehicle registration devices and intermodal freight containers*

**ANSI (American National Standards Institute):** *Standard for automatic identification of freight containers*

**CEN (Comité Européen de Normalisation):** *Automatic container identification*

**Title 21 California:** *Automatic vehicle identification equipment*

**NTCIP (National Transportation Communications for ITS Protocol):** *A joint development of ITE, NEMA, and AASHTO*

## Outstanding Results Speak for Themselves

Electronic vehicle registration is already proving its value in real-world installations where challenges were substantial and the benefits continue to accrue.

### **Bermuda: World's First Countrywide EVR**

In 2007, the island of Bermuda became the first to implement countrywide electronic vehicle registration. Prior to that time, the Transport Control Department (TCD) estimated it was losing millions of dollars per year in tax-based revenues, with approximately 8% of vehicle owners "cheating the system" and avoiding critical regulations.



Following a year-long program of transition to EVR sticker tags as part of the normal inspection renewal process, all four-wheeled vehicles were tagged (approximately 30,000). Fixed read points with presence sensors, cameras

and lane controllers were installed on four of the island's main roadways. Transportable and handheld readers completed the initial system, all linked to the central violation processing system (VPS).

By July 2008, registration compliance had increased from 92% to 96% – and the rate of non-compliance dropped by half from 8% to 4%. By 2009 the TCD estimated non-compliance had fallen to a mere 1%, with 99% of vehicle owners meeting the country's registration requirements. Revenues from the EVR system are now being applied to maintaining roads and improving safety-related programs.

*"Today I can report that our roads are indeed safer than they were before EVR...as unlicensed vehicles on the road equate to greater risk because unlicensed vehicles have not received an annual safety inspection."*

~ Bermuda's Premier, Dr. Ewart Brown

## World's First Countrywide EVR Implementation *Bermuda 2007*

After a one-year roll-out to complete vehicle tagging via the annual registration and inspection cycle, the non-compliant rate was cut in half, achieving 99% compliance.

Within the first month alone, hundreds of thousands of dollars in fines had been collected.



### **Rio de Janeiro: EVR Boosts Public Confidence in Brazil's Mini-bus Service**

Prior to 2003, as many as 75% of mini-buses transporting passengers between Rio de Janeiro and remote Brazilian cities failed to comply with one or more registration requirements. These requirements mandate fee payments, insurance coverage, inspections for mechanical safety, and route restrictions designed to keep buses off unauthorized or unsafe roads. As a result, public confidence in the mini-bus system had significantly eroded.



Working with state sponsors, transportation agencies and the bus operators' cooperative, as well as state military police and insurance companies, TransCore's partner Integra-Brazil launched the EVR program in 2003. By 2004, 2200 mini-buses had been tagged.

The program included 15 "ReadPoints," covering a total of 46 lanes, served locally by an operations center and a technical support center.

After some 4 million bus crossings at ReadPoints, the program had issued over 4800 citations with fines, and had intercepted nearly 3000 illegal vehicles. Registration fee payments had increased by 25%. And mini-bus services saw a 15% increase in passenger patronage as a result of renewed public confidence in the system and in the safety of mini-bus operations.



Authorities are now looking ahead to extending the program to include tourism vehicles, taxis, full-size buses and commercial vehicles, and to implementing EVR in other states in Brazil.

### **Successful EVR for Mini-bus Services Brazil 2003**

When the EVR program began in 2003, as many as 75% of mini-buses running between Rio de Janeiro and remote cities were non-compliant with registration regulations that specified:

- ▶ Fee payments
- ▶ Insurance requirements
- ▶ Safety inspections
- ▶ Authorized route restrictions

In the first year, registration compliance increased by 25% and patronage improved by 15%.

With 2300 mini-buses tagged and 46 lanes equipped with EVR readers, Brazil saw over 4 million transactions logged, 4800 citations issued, and over 3000 illegal vehicles intercepted.

## Providing versatile transportation solutions for over 75 years in 50 countries worldwide.



**Asia:**

- Hong Kong
- India
- Indonesia
- Japan
- Malaysia
- Singapore
- South Korea
- Thailand
- People's Republic of China
- Republic of China (Taiwan)
- The Philippines
- Saudi Arabia
- United Arab Emirates

**Africa:**

- Botswana
- Mauritania
- South Africa
- Swaziland

**Australia:**

- Australia
- New Zealand

**Europe:**

- Austria
- Belgium
- France
- Germany
- Italy
- Monaco
- Norway
- Poland
- Portugal
- Romania
- Russia
- Slovenia
- Spain
- Sweden
- Switzerland
- The Netherlands
- United Kingdom

**North America:**

- Bermuda
- Canada
- Dominican Republic
- Jamaica
- Mexico
- Puerto Rico
- United States

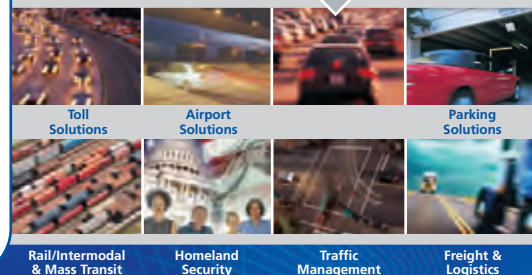
**South America:**

- Argentina
- Brazil
- Chile
- Colombia
- Ecuador
- Peru
- Uruguay

Electronic vehicle registration is the natural next step in leveraging today's wireless technology to improve public safety and security...with added benefits for motorists, government agencies and law enforcement alike.

**Contact TransCore today to find out how we can help you take that step toward safer, more efficient mobility in your region.**

### Electronic Vehicle Registration



For more information:

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