

7. STUDY FINDINGS - TRAFFIC CONTROL AND COMMERCIAL VEHICLE ELECTRONIC CLEARANCE SYSTEMS

The Group C ITI (Traffic Control/Commercial Vehicle Electronic Clearance Systems) include the following:

1. **Portable Traffic Signals** are trailer-mounted traffic signals that are temporarily deployed wherever they are needed. Multiple signals can be linked together in a variety of configurations. Thus far, these signals have been deployed only to meet temporary local needs.



(Dunklin County, MO. ADDCO)



(VER-MAC Signal)

Figure 13: Portable Traffic Signals

2. **Commercial Vehicle Electronic Clearance systems (such as PrePass)** are port-of-entry based systems that automatically determine whether a passing commercial vehicle is required to pull into the port; the vehicle is given a “pull-in” or “bypass” signal. These systems have been deployed statewide.



Figure 14: PrePass Detection on VMS in Arizona

3. **Expedited Processing at International Crossings (EPIC)** is a system providing tracking of commercial vehicle and driver movements through the complex series of inspections and other processes required at the Nogales Port of Entry. The system provides detailed information for internal agency use (both ADOT and other agencies) and publicizes general information such as queue wait times). Thus far this system has been deployed only on a local basis; it may expand to other international ports of entry in the future.

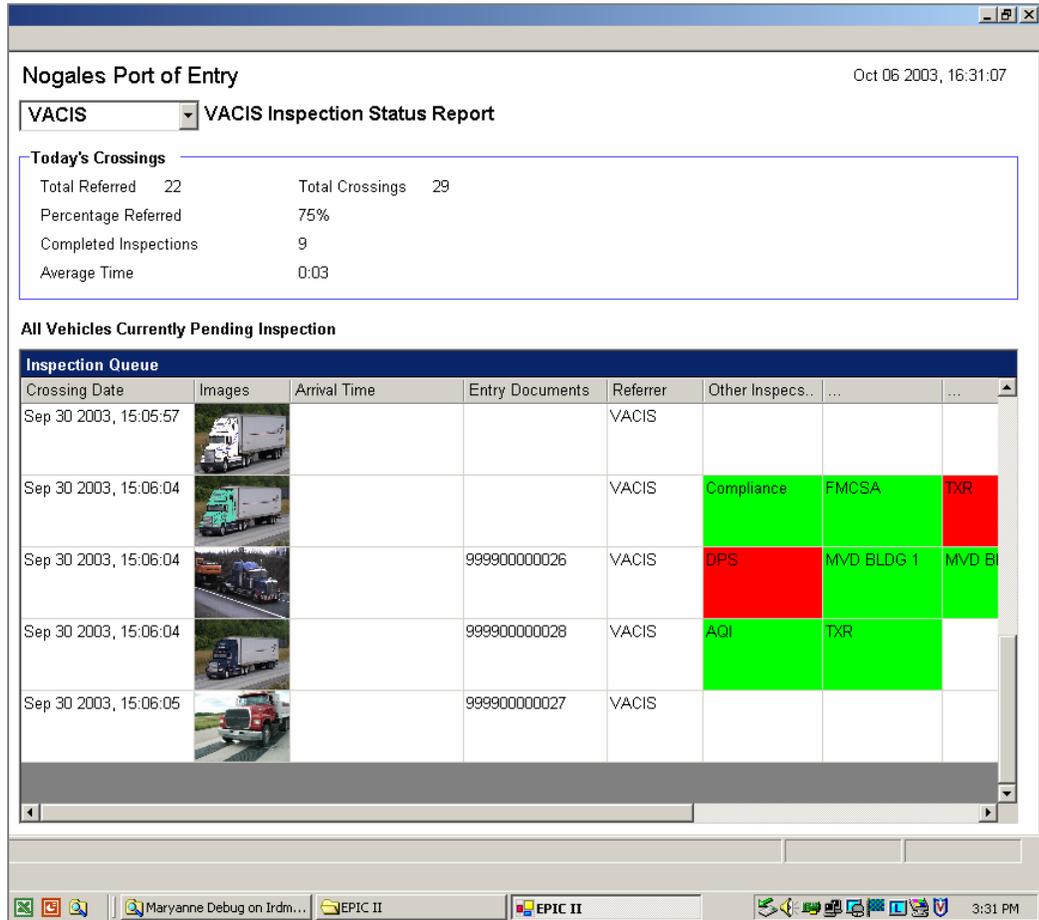


Figure 15: EPIC Operator Interface (Partial)

Table 20 summarizes typical installation components and system functions/outputs associated with ADOT’s traffic control/commercial vehicle electronic clearance systems.

Table 20: Group C ITI – Components and Functions

ITI	Typical Installation Components	System Functions / Outputs
C1. Portable Traffic Signals	A single unit typically consists of two traffic signal heads mounted on a trailer, hydraulics for extension of the overhead signal head support, solar power panels and equipment for intra-signal and remote control communications.	Portable traffic signals are frequently used in pairs as a means of controlling traffic through a one-way section of roadway (for instance, across a narrow bridge or through a roadwork zone). However, signals can also be used singly or in other configurations, to replace a damaged permanent signal or for other reasons.
C2. Commercial Vehicle Electronic Clearance (PrePass)	A typical PrePass system includes a tag reader, communication equipment, and a computer server. The eight ports of entry at which PrePass is installed also rely on weigh-in-motion (WIM) devices, which are sometimes located in the mainline and sometimes located in the exit ramp to the port.	The tag reader reads identification information stored on transponders carried in participating trucks. Upon identification of a passing truck, the PrePass computer checks a database to verify the truck’s permits; the truck may also be asked to pull in on the basis of weight issues identified via mainline WIM or for random testing.
C3. Expedited Processing at International Crossings (EPIC)	The system consists of a large array of hardware and software components, including Radio Frequency Identification (RFID) tags and readers, Closed-Circuit Television (CCTV), Variable Message Signs (VMS), computer workstations, a remote broker system, a fiber optic Limited-Area Network (LAN), a central server system, and software interfaces and databases.	The second generation of this system, the EPIC II system, provides expedited processing, compliance monitoring, and traffic management at the Nogales international border crossing.

Table 21 summarizes the quantity of deployed ITI, deployment plans and maintenance arrangements associated with ADOT’s traffic control/commercial vehicle electronic clearance systems.

Table 21: Group C ITI – Quantity Deployed/Planned and Maintenance Arrangements

ITI	Quantity Deployed/Planned	Maintenance Arrangements
C1. Portable Traffic Signals	There are no known uses or planned uses of portable traffic signals by ADOT at this time. Most Districts have used them in the past.	The construction contractor is typically responsible for maintenance of the signals.
C2. Commercial Vehicle Electronic Clearance (PrePass)	PrePass systems are installed at eight sites. No known planned deployments or system enhancements.	The equipment vendor is responsible for maintenance of local computer and field equipment.
C3. Expedited Processing at International Crossings (EPIC)	EPIC II is operating at one site. No known deployment plans for other sites.	The Information Technology Group (ITG) and the equipment vendor are responsible for system maintenance.

See Appendix K for maps of deployed ITI in Group C.

Table 22 summarizes planned system enhancements and integration and standardization attributes or issues associated with ADOT’s traffic control / commercial vehicle electronic clearance systems.

Table 22: Group C ITI – Enhancements, Integration and Standardization

ITI	Planned System Enhancements/Integration/Standardization
C1. Portable Traffic Signals	Portable traffic signals are designed to work together in multiple-unit configurations as needed. Most rural applications would not require any broader integration than a multiple-unit setup at an intersection or relatively short roadway section.
C2. Commercial Vehicle Electronic Clearance (PrePass)	The local PrePass database housed on computer servers at individual ports of entry are periodically refreshed via information stored in remote databases.
C3. Expedited Processing at International Crossings (EPIC)	Similar to PrePass, the EPIC II system depends on a local database that is periodically refreshed via information from remote databases. The system is also integrated in the sense that it satisfies needs shared by multiple agencies and by Commercial Vehicle Operators at the Nogales port of entry. Future improvements under consideration or development include mobile vehicle identification systems; increased sensor reliability; greater system integration at state, national and international levels; use of barcodes; central administration of multiple ports of entry; and integration of transponder technology with toll, weigh station, and sea transportation.

Table 23 summarizes stakeholder awareness and usage of ADOT’s traffic control/commercial vehicle electronic clearance systems.

Table 23: Group C ITI – Stakeholder Awareness and Usage

ITI	Awareness	Usage
C1. Portable Traffic Signals	ADOT staff is generally familiar with Portable Traffic Signals.	Nearly all ADOT Districts have used the signals in the past.
C2. Commercial Vehicle Electronic Clearance (PrePass)	ADOT MVD staff is very familiar with PrePass. The Districts have general familiarity with PrePass. 79% of CVO survey respondents reported being aware of ADOT’s PrePass.	PrePass is used primarily at ports of entry (POEs) located on interstates at state borders. The Kingman port of entry is an exception, located at the junction of US 93 and SR 68. August 2004 statistics indicate that 87% of PrePass-eligible truck traffic passed by or through the POEs during times the POE was open. Some PrePass POEs are operated 24 hours a day. 48% of CVO survey respondents reported using ADOT’s PrePass often or rarely.
C3. Expedited Processing at International Crossings (EPIC)	Some ADOT staff (especially the Information Technology Group and the Motor Vehicle Division) are familiar with EPIC II.	The EPIC II system is now operational. Some trucking companies are participating.

Table 24 summarizes the costs and perceived and reported benefits associated with ADOT’s traffic control/commercial vehicle electronic clearance systems.

Table 24: Group C ITI – Costs and Benefits

ITI	Costs	Perceived and Reported Benefits
C1. Portable Traffic Signals	A single portable signal costs about \$70,000 to \$75,000 to purchase. For a single signal, short-term rental rates from equipment rental companies are about \$300 per day; longer-term rates are about \$200 per day.	<ul style="list-style-type: none"> - The ability of portable traffic signals to replace flaggers has potential safety and cost benefits to ADOT and contractors. Contractor employees who might otherwise be called on for flagger duties can be used more effectively. Signals are larger than flaggers and therefore should be more visible to motorists; this improves work zone safety. The traveling public will benefit by traversing the construction area more safely. - Portable traffic signals may also be used to quickly replace a permanent signal that has been damaged or destroyed.
C2. Commercial Vehicle Electronic Clearance (PrePass)	Because the company that invented the PrePass system receives a fee for every bypassed vehicle, the company charges no costs to ADOT for PrePass equipment installation or maintenance. ADOT has incurred costs in integrating the PrePass system into its overall commercial vehicle information systems and networks (CVISN) plan.	<ul style="list-style-type: none"> - PrePass improves ADOT’s ability to enforce Commercial Vehicle Operator (CVO) compliance with safety regulations, which improves safety for everyone on the ADOT roadways. ADOT is better able to collect monies from motor carriers to compensate for truck impacts on Arizona roads. The automation of these and other functions also provides a better business environment, reducing consumer costs for goods. - CVO benefits include fuel savings, reduction in parts wear and tear, better on-time performance, improved scheduling, and ease of use. - The traveling public passing by ports of entry benefits as it is safer for trucks to bypass ports of entry than to go through deceleration on exiting and acceleration on re-entering the roadway.
C3. Expedited Processing at International Crossings (EPIC)	Construction costs for EPIC II totaled about \$700,000. System integration cost nearly \$275,000. Annual operations and maintenance costs are \$30,000.	<ul style="list-style-type: none"> - EPIC II increases the ability of ADOT and its partner agencies at the Nogales compound to process and verify compliance of drivers, tractors and trailers, and to manage traffic within the compound. Border crossing security, screening efficiency and port management are improved. - CVO benefit from having access to information about queue wait times at various places within the compound. The public benefits from improved truck safety via enforcement of regulations.

Table 25 summarizes the key issues and operational status/element-specific performance measures associated with ADOT’s traffic control/commercial vehicle electronic clearance systems.

Table 25: Group C ITI – Key Issues and Operational Status

ITI	Key Issues	Operational Status/ Element-Specific Performance Measures
C1. Portable Traffic Signals	<ul style="list-style-type: none"> - Driver compliance with portable traffic signals improves with the nearby presence of Department of Public Safety (DPS) or construction staff. - Some people feel that in spite of lesser visibility, flaggers provide more effective traffic control. - High-profile vehicles sometimes collide with the overhead traffic head. - The Districts consider the signals most suitable for longer-term construction projects, not for maintenance. - Battery-operated signals are perceived as unreliable. - Signal rental costs are steep. <p>Temporary signals as a replacement for damaged permanent signals may make more sense than renting a portable unit.</p>	Not applicable.
C2. Commercial Vehicle Electronic Clearance (PrePass)	<ul style="list-style-type: none"> - To protect Commercial Vehicle Operator (CVO) privacy, timestamp information (the precise time at which vehicles pass the reader) is no longer collected by the PrePass system. - It can be difficult to receive service from the vendor when the system malfunctions. - CVO non-compliance with pull-in requests vary from port to port. Not all ports know how to report non-compliance events/violations to the equipment vendor. - It is believed that many overweight trucks take advantage of ports without mainline weigh-in-motion. This is a particularly sensitive issue at the St. George port of entry. 	63% of CVO survey respondents reported strongly or moderately agreeing that PrePass contributes to travel safety. The figure was 50% for PrePass contribution to cost savings.
C3. Expedited Processing at International Crossings (EPIC)	<ul style="list-style-type: none"> - Future plans for system improvements will greatly aid in global tracking of shipments and closely related homeland security issues. 	System is operational. No performance information available at this time.

Table 26 summarizes the performance evaluation of ADOT’s traffic control/commercial vehicle electronic clearance systems, based on universal performance measure composite scores.

Table 26: Group C ITI –Evaluation Based on Universal Performance Measures

ITI	Composite Goal Area Scores				Composite Overall Score (Overall / Group Rankings)
	Safety	Mobility	Costs	Reliability/Usefulness	
C1. Portable Traffic Signals	100	100	92	40	332 (3 of 18 / 1 of 3)
C2. Commercial Vehicle Electronic Clearance (PrePass)	67	80	92	69	308 (6 of 18 / 3 of 3)
C3. Expedited Processing at International Crossings (EPIC)	67	80	92	75	314 (5 of 18 / 2 of 3)