

# Metropolitan Intelligent Transportation Systems (ITS) Infrastructure 2004 Electronic Toll Collection Survey

Preliminary Results

Prepared for:

ITS Joint Program Office  
Federal Highway Administration  
Washington, D.C.

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**ELECTRONIC TOLL COLLECTION FACILITIES:**

Total number of toll collection agencies:

	Total in 2004	Estimated Total by 2005
1. Total number of toll collection plazas operated.....	<input type="text" value="807"/>	<input type="text" value="806"/>
2. Total number of toll collection plazas with Electronic Toll Collection (ETC) capabilities.....	<input type="text" value="772"/>	<input type="text" value="770"/>
3. Total number of toll collection lanes.....	<input type="text" value="4,901"/>	<input type="text" value="4,845"/>
4. Total number of toll collection lanes with Electronic Toll Collection (ETC) capabilities.....	<input type="text" value="3,789"/>	<input type="text" value="3,952"/>

**INTEGRATION:**

5. Are your tags used by other toll operators in your metropolitan area?	Yes	<input type="text" value="44"/>
	No	<input type="text" value="23"/>

**NATIONAL ITS STANDARDS**

List of standards to consider when deploying toll collection projects:

**Traffic Management**

Number of agencies

Using    Considering

<input type="text" value="0"/>	<input type="text" value="3"/>	NTCIP 1202 - Object Definitions for Actuated Traffic Signal Controller Units
<input type="text" value="0"/>	<input type="text" value="3"/>	NTCIP 1210 - Objects for Signal Systems Master
<input type="text" value="0"/>	<input type="text" value="2"/>	NTCIP 1211 - Objects for Signal Control Priority

**Freeway Management**

Using    Considering

<input type="text" value="15"/>	<input type="text" value="2"/>	NTCIP 1203 - Object Definitions for Dynamic Message Signs
<input type="text" value="7"/>	<input type="text" value="2"/>	NTCIP 1204 - Object Definitions for Environmental Sensor Stations
<input type="text" value="12"/>	<input type="text" value="6"/>	NTCIP 1205 - Objects for CCTV Camera Control
<input type="text" value="7"/>	<input type="text" value="2"/>	NTCIP 1206 - Object Definitions for Data Collection and Monitoring (DCM) Devices
<input type="text" value="0"/>	<input type="text" value="1"/>	NTCIP 1207 - Object Definitions for Ramp Meter Control
<input type="text" value="2"/>	<input type="text" value="3"/>	NTCIP 1208 - Object Definitions for Video Switches
<input type="text" value="0"/>	<input type="text" value="3"/>	NTCIP 1209 - Object Definitions for Transportation Sensor System
<input type="text" value="0"/>	<input type="text" value="3"/>	NTCIP 1213 - Electrical and Lighting Mgmt System Interoperability & Intercommunications Std
<input type="text" value="2"/>	<input type="text" value="2"/>	NTCIP 1301 - Weather Report Message Set for ESS

**Advanced Transportation Controller**

Using    Considering

<input type="text" value="0"/>	<input type="text" value="1"/>	ITE 9603-1 - Application Programming Interface (API) Standard for the Advanced Transportation Controller (ATC)
<input type="text" value="1"/>	<input type="text" value="0"/>	ITE 9603-2 - Advanced Transportation Controller (ATC) Cabinet
<input type="text" value="1"/>	<input type="text" value="0"/>	ITE 9603-3 - Advanced Transportation Controller (ATC) Standard Specification for the Type 2070 Controller

## NATIONAL ITS STANDARDS (cont.)

### Profiles and Base Standards

Using    Considering

3	2	NTCIP 1201 - Global Object Definitions
0	1	NTCIP 1102 - Octet Encoding Rules (OER)
0	1	NTCIP 1103 - Transportation Management Protocol
0	1	NTCIP 1104 - CORBA Naming Convention Specification
0	0	NTCIP 1105 - CORBA Security Service Specification
0	1	NTCIP 1106 - CORBA Near-Real Time Data Service Specification
5	2	NTCIP 2101 - Point to Multi-Point Protocol Using RS-232 Subnetwork Profile
1	1	NTCIP 2102 - Subnetwork Profile for PMPP using FSK Modems
5	2	NTCIP 2103 - Subnet Profile for Point-to-Point Protocol using RS 232
5	2	NTCIP 2104 - Subnetwork Profile for Ethernet
0	1	NTCIP 2201 - Transportation Transport Profile
5	4	NTCIP 2202 - Transport Profile for Internet (TCP/IP and UDP)
0	1	NTCIP 2301 - Application Profile for Simple Transportation Management Framework (STMF)
0	1	NTCIP 2302 - Application Profile for Trivial File Transfer Protocol
5	3	NTCIP 2303 - Application Profile for File Transfer Protocol (FTP)
0	0	NTCIP 2304 - Application Profile for Data Exchange ASN.1 (DATEX)
0	1	NTCIP 2305 - Application Profile for Common Object Request Broker Architecture (CORBA)

Number of agencies

Using    Considering

0	0	NTCIP 8003 - Profiles - Framework and Classification of Profiles
1	4	NTCIP 9010 - XML Standard for Center-to-Center Communications
4	0	IEEE P1488 - IEEE Standard for Message Set Template for Intelligent Transportation Systems
3	1	IEEE P1489 - IEEE Standard for Data Dictionaries for Intelligent Transportation Systems - Part 1 Functional Area Data Dictionaries

### Center-to-Center Communications

Using    Considering

3	3	ITE TM 1.03 - Standard for Functional Level Traffic Management Data Dictionary (TMDD)
3	3	ITE TM 2.01 - Message Sets for External TMC Communication (MS/ETMCC)
0	3	NTCIP 1602 - Generic Reference Model for C2C Communications

### Incident Management

Using    Considering

2	4	IEEE 1512-2000 Standard for Common Incident Management Message Sets for use by Emergency Management Centers
0	4	IEEE P1512.1 - Standard for Traffic Incident Management Message Sets for Use by EMCs
0	3	IEEE P1512.2 - Standard for Public Safety Incident Management Message Sets for Use by EMCs
2	2	IEEE 1512.3-2000 - Standard for Hazardous Material Incident Management Message Sets for Use by Emergency Management Centers
0	3	IEEE 1512.4 - Standard for Emergency Management to Emergency Vehicle Subsystems Use by Emergency Management Centers
0	1	IEEE P1556 - Standard for Security and Privacy of Vehicle/Roadside Communication Including Smart Card Comm.

## NATIONAL ITS STANDARDS (cont.)

### Advanced Traveler Information System

Using Considering

2	2	SAE J2354 - Message Set for Advanced Traveler Information System (ATIS)
0	2	SAE J2540-2 - ITIS Phrase Lists (International Traveler Information Systems)
0	1	SAE J2630 - Converting ATIS Message Standards from ASN.1 to XML

### Transit

Using Considering

0	0	APTA - TCIP Dialogs
3	0	NTCIP 1400 - TCIP - Framework Standard
0	0	NTCIP 1401 - TCIP - Common Public Transportation (CPT) Business Area Standard
2	1	NTCIP 1402 - TCIP - Incident Management (IM) Business Area Standard
0	0	NTCIP 1403 - TCIP - Passenger Information (PI) Business Area Standard
0	0	NTCIP 1404 - TCIP - Scheduling/Runcutting (SCH) Business Area Standard
0	0	NTCIP 1405 - TCIP - Spatial Representation (SP) Business Area Standard
0	0	NTCIP 1406 - TCIP - Onboard (OB) Business Area Standard
0	0	NTCIP 1407 - TCIP - Control Center (CC) Business Area Standard
0	1	NTCIP 1408 - TCIP - Fare Collection (FC) Business Area Standard

### Commercial Vehicle Operations

Using Considering

0	1	ANSI TS284 - Commercial Vehicle Safety Reports
0	0	ANSI TS285 - Commercial Vehicle Safety and Credentials Information Exchange
0	0	ANSI TS286 - Commercial Vehicle Credentials

### Dedicated Short Range Communications

Number of agencies

Using Considering

0	4	IEEE 1609.1 - Standard for Dedicated Short Range Communications (DSRC) Resource Manager
0	4	IEEE 1609-2 - Standard for Dedicated Short Range Communications (DSRC) Application Layer
2	4	IEEE 1609.3 - Standard for IP Interface for Dedicated Short Range Communications (DSRC)
0	4	IEEE 1609.4 - Standard for Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) Layer
0	4	E2213-02 Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems - 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications
2	4	SAE J2xxx - Standard for Data Dictionary and Message Sets for Dedicated Short Range Communications (DSRC)
0	3	E2158-01 Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902 to 928 MHz Band
1	3	ASTM E17.54.00.1 - Standard Guidelines for Archiving ITS-Generated Data
0	3	PS 105-99: Standard Provisional Specification for Dedicated Short Range Communication (DSRC) Data Link Layer

### Location Referencing

Using Considering

0	2	SAE J2266 - Location Referencing Message Specification
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**NATIONAL ITS STANDARDS (cont.)**

**Archived Data User Service (ADUS)**

Using    Considering

2	2	ASTM E2259-03 -Standard Guidelines for Archiving
0	2	ASTM E-17.54.02.1 Standard Specifications for Metadata Content for ITS-Generated Data
2	2	ASTM E-17.54.02.2 Standard Specifications for Archiving ITS-Related Traffic Monitoring Data

7. What factors helped your agency decide to use ITS standards? Please pick top three factors, check only one item in each column.

Number of agencies			
1	2	3	
0	0	1	Options offered in the standards
9	1	1	Products employ standards
1	7	1	Regional architecture document requirements
0	2	0	Additional funding provided
5	2	5	Integration opportunities
6	5	2	Consultant or integrator's recommendation
0	0	0	My agency's participation on standard committees
0	1	0	Training and Technical Assistance support provided by US DOT
0	1	3	Responding to the rule to use ITS Standards
0	2	7	Compliance testing is readily available

8. Do you feel that using the standards helped with the integration needs for your agency? Please list project name(s) next to each option.

Absolutely        See Appendix A

Somewhat        See Appendix B

Not exactly       See Appendix C

9. If no ITS standards are currently used, what factors will ensure that your agency uses ITS standards? Please pick top three factors, check only one item in each column (if your are using standards, please move to the next question).

Number of agencies			
1	2	3	
13	1	1	We are already committed to using standards when they are complete
9	3	2	Vendors provide standard-compliant products
5	9	7	Standards being accepted by the ITS community and being used in deployments
0	2	2	Training and technical support being provided to my agency
2	3	6	Standards are developed that apply to my system
1	0	4	Additional funding being provided to use the standards
3	13	8	Standards use enables interoperability of systems

10. What tool, resource, or support mechanism was/would be most helpful for implementing the standards? Please pick top three, check only one item in each column.

Number of agencies			
1	2	3	
12	1	2	Training courses
6	3	1	Published standards provided for free
10	1	8	Published standards are easily available
2	11	3	Support documents (i.e. procurement and implementation guides) are available
2	6	2	Workshops
6	1	4	Standards Web site
1	0	0	Standards forum
1	2	7	Software tools to assist with correctly specifying and procuring the standard
0	5	1	E-mail bulletins
0	2	0	Resource documents (i.e., user guides and reference notebooks)
0	5	1	Testing tools
2	3	10	Case studies of other similar projects that used standards successfully

11. May FHWA follow up with this agency contact for possible peer networking?

Yes	38
No	6

### EMERGENCY PREPAREDNESS

12. Does your agency participate in a statewide disaster planning program?

Yes	36
No	8
Don't know	7

## Appendix A: Projects where using standards absolutely helped with integration needs of the agency

Agency	Project name
Boston, Lawrence, Salem	
Massachusetts Turnpike Authority	variable message sign standards aided in completing a rapid deployment and upgrade of software
Chicago, Gary, Lake County	
ISHTA/I-90 Northwest Toll Way	Traffic Incident Management System (TIMS)
ISTHA/I-294 Tri-State Tollway	Traffic Incident Management System (TIMS)
ISTHA/I-355 North-South Tollway	Traffic Incident Management System (TIMS)
ISTHA/I-88 East West Tollway	Traffic Incident Management System (TIMS)
Pittsburgh, Beaver Valley	
Pennsylvania Turnpike Commission-Entire PA Turnpike	PTC EAST / WEST ITS deployment project 4-VMS, 4- RWIS, 8 CCTV, 32 TFDS, 1 TRWS, 16 HAR roadway flashing signs. Having NTCIP DMS standards helped greatly reduce costs during our deployment of an ATIS Central software system. It will also help with future deployments.
Scranton, Wilkes-Barre	
Pennsylvania Turnpike Commission	PTC EAST / WEST ITS deployment projects 4-VMS, 4- RWIS, 8CCTV, 32 TFDS, 16 HAR roadway flashing signs. Having NTCIP DMS standards helped reduce costs during our deployment of an ATIS Central software system. It will also help with future deployments.



## Appendix B: Projects where using standards somewhat helped with integration needs of the agency

Agency	Project name
Chicago, Gary, Lake County	
Indiana Department of Transportation La Porte District	We have not started to use these standards since we maintain legacy systems. We are investigating upgrading those systems and are interested in being more compatible with other transportation agencies.
Orlando	
Florida Department of Transportation-Florida Turnpike	NTCIP integration is still a developmental standard that is difficult to test and integrate. We are using this for District 4 DMS and future Vicon cameras along the Mainline.

## Appendix C: Projects where using standards did not exactly helped with integration needs of the agency

Agency	Project name
Detroit, Ann Arbor	
Detroit and Canada Tunnel Corporation	no
Orlando	
Florida Department of Transportation-Florida Turnpike	ANSI standards asked in survey are not required due to other standards already present in our database.
Orlando Orange County Expressway Authority	ETC system was originally developed before standards were fully developed. In general, most ITS Standards are significantly lagging behind the pace of technology growth.