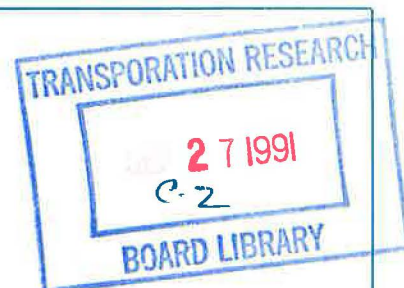


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Freeway Operations Projects Summary

FREEWAY OPERATIONS PROJECTS SUMMARY

Sponsored by

COMMITTEE ON FREEWAY OPERATIONS

TRANSPORTATION RESEARCH BOARD
NATIONAL RESEARCH COUNCIL

in cooperation with

Federal Highway Administration
U.S. Department of Transportation

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INTRODUCTION

This document provides an up-to-date summary of Freeway Operations projects in the United States and Canada. The complete inventory, "Freeway Operations Projects", is available from:

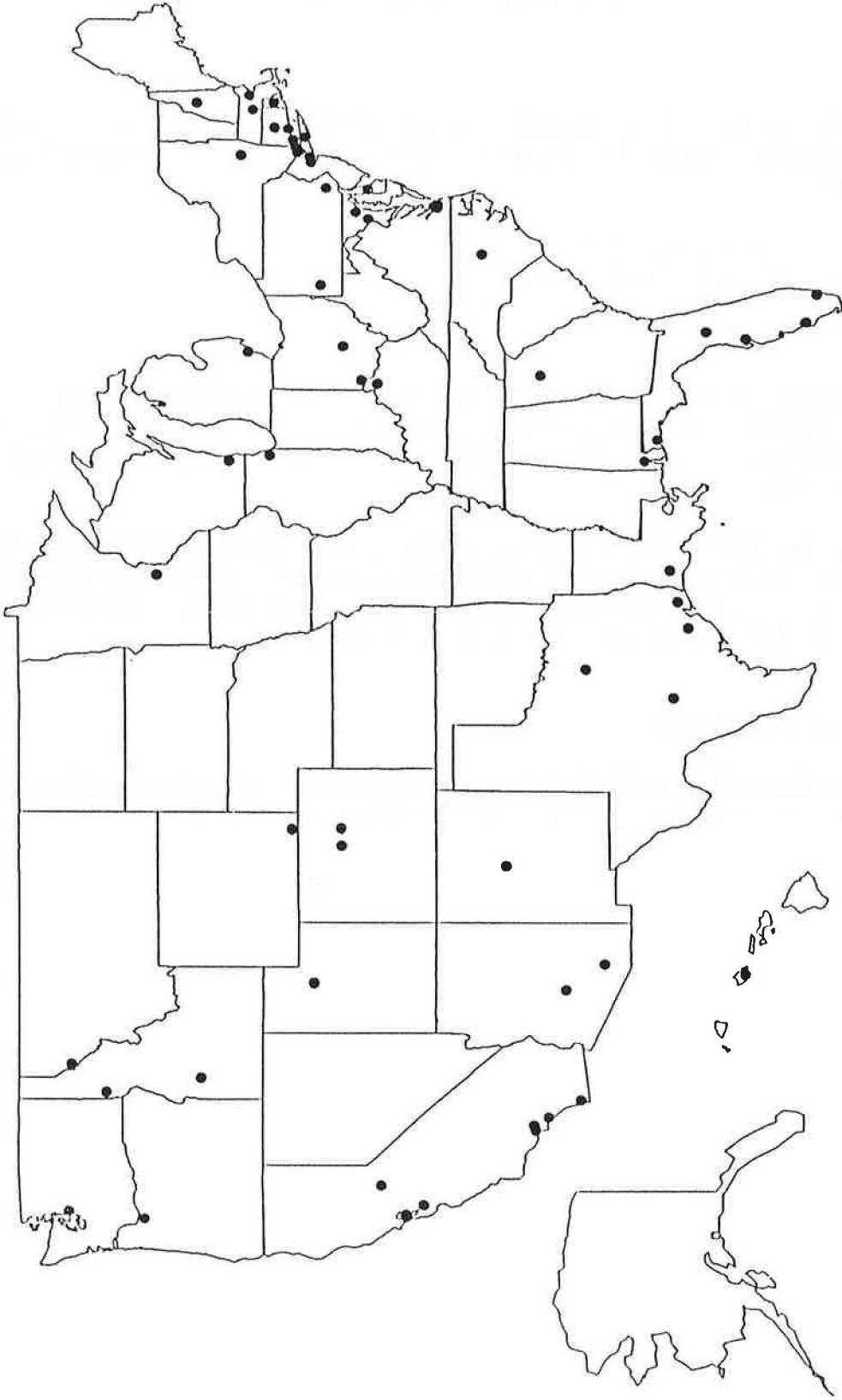
Federal Highway Administration
Office of Traffic Operations and IVHS
HTV-31
Washington, D.C. 20590

The Administration and Systems Coordination Subcommittee of the Freeway Operations Committee of the Transportation Research Board has prepared two previous editions of Freeway Operations Projects (1962 and 1986). This report updates and expands on those documents.

Various agencies in the United States and Canada were contacted to provide the latest available information regarding each project. Inquiries were also made to other states and provinces via contacts provided by the Transportation Research Board and the American Association of State Highway and Transportation Officials.

LOCATION OF PROJECTS

The locations in which inventory forms were completed and returned are presented in the following figures, for the United States and Canada, respectively.



**LOCATION OF FREEWAY OPERATIONS
PROJECTS IN THE UNITED STATES**



**LOCATION OF FREEWAY OPERATIONS
PROJECTS IN CANADA**

TRENDS AND DEVELOPMENTS

Over the last several years, research efforts and new technological advances have resulted in new techniques being included in freeway traffic management systems. Some of these recent trends are presented below.

DEVELOPMENT OF FREEWAY OPERATIONS PROJECTS

- Large scale integrated freeway management systems are being developed to maximize total system efficiency. Examples include San Francisco, Long Island IN-FORM, and Connecticut.
- Incident management appears to be increasingly emphasized as more agencies recognize this critically important activity.

INCIDENT DETECTION

- Electronic surveillance in the form of inductance loop detectors is still the primary means of detection on most freeway management projects.
- Increasingly, incidents are being detected from other information sources including: cellular phone 911; police patrols; maintenance vehicles; service patrols; and fleet dispatchers.

INCIDENT VERIFICATION

- CCTV is being increasingly utilized as a means of verifying incidents. Because of lower maintenance, solid state cameras are beginning to supplant conventional vidicon tubes.
- The use of remote CB radio monitoring sites is being used as a low cost incident verification technique in Chicago and Long Island.

INCIDENT RESPONSE

- Owned service patrol vehicles and tow trucks are used by several jurisdictions to expedite response to incidents.
- Franchised tow truck operations are being utilized in several freeway management systems to reduce maintenance and operations costs. By franchising, the agencies can avoid having to purchase the equipment and employ staff to operate these vehicles.
- The private sector (e.g., Samaritan) is becoming increasingly involved with response to disabled vehicles. These services are oriented to assisting individual motorists.

BRIDGE/TUNNEL SURVEILLANCE SYSTEMS

- Freeway management systems continue to be installed at bridge and tunnel locations to efficiently manage the flow of traffic at these bottleneck facilities. Rapid incident detection and response is typically the paramount consideration at these facilities due to lack of shoulders and ventilation constraints. Service vehicles and tow trucks are normally agency owned at these facilities. A new pincer type tow vehicle is being used in Virginia.

RAMP METERING SYSTEMS

- Microprocessors (e.g., Type 170) are being utilized as ramp controllers due to their lower costs and the availability of software programs. For instance, these microprocessors are being utilized in the freeway management systems in Los Angeles, California and Ontario Highway 401.
- At present, mainline metering is being utilized at the San Francisco/Oakland Bay Bridge in California as part of a toll/merge lane operation and is being planned for the Third Harbor Tunnel in Boston.

HOV PREFERENTIAL FACILITIES

- HOV lanes, in conjunction with freeway management systems, are increasingly being used in California, Houston, Northern Virginia and other locations.
- The use of HOV by-pass lanes at ramp metering sites is increasing.

DRIVER INFORMATION SIGNING

- The number of disk matrix variable message signs is increasing on existing and new freeway management projects. However, new technologies such as LED and fiber-optic are beginning to appear. See Ontario Highway 401 for example.

HIGHWAY ADVISORY RADIO

- The use of highway advisory radio is increasing. This technique is being used successfully in construction zones to provide up to the minute information to motorists.
- Highway advisory radio is being considered as an attractive alternative to variable message signs in large metropolitan areas that have extensive signing on short sections of highways.

IN-VEHICLE GUIDANCE SYSTEMS

- In-vehicle guidance systems are not presently in operation in North America, but experiments such as the Pathfinder and Travtek projects point to their future use.

PRE-TRIP PLANNING SYSTEMS

- Several projects include the use of pre-trip planning techniques. For instance, dial-in telephone numbers are being utilized successfully in Mississauga and Chicago.
- Up-to-the-minute traffic information is being provided from the freeway management system center to radio stations in Chicago via computer telephone links and CRT displays.
- Up-to-the-minute traffic information can be provided from the control center directly to individuals prior to the initiation of their trip. A local TV station (or a cable channel) can graphically display traffic information (e.g., network conditions, special alerts) to assist individuals in planning the best travel route or perhaps delaying their trip.

ARTERIAL SIGNAL SYSTEMS

- Freeway management systems are being integrated with existing computerized traffic signal systems to improve the traffic flow on the freeway and on the adjacent arterial roadways. For instance, the INFORM project on Long Island, New York controls surface street signals on parallel arterials.

COMMUNICATIONS SYSTEMS

- Agency owned communications systems are often preferred over leased systems since they offer tighter control over the overall cost. For instance, at several locations the monthly cost of a leased telephone line system increased to the extent where it was no longer feasible for the government agency to utilize the system.
- Fiber optics is becoming the communications medium of choice in most projects now in the planning stage. Operational projects in Northern Virginia and Houston utilize a fiber optics backbone.

CENTRALIZED COMPUTER CONTROL FACILITIES

- In place of large fixed map displays in control centers, computer graphic displays are being designed using large size TV projection screens.
- In at least one system, daily operation of the system is the responsibility of an outside contractor.

S U M M A R Y T A B L E S

The information on various aspects of each of the freeway operations projects is summarized according to the following classifications:

- **Spot Location Projects** (Single location or group of isolated locations.)
- **Linear Projects** (Section of freeway or surface street.)
- **Mini-Corridor Projects** (Freeway with one parallel surface street facility.)
- **Corridor Projects** (System of parallel roadways both limited access and surface street.)
- **Area Projects** (Regional system comprising several freeways both parallel and intersecting.)
- **Projects in Operation**
- **Projects in Design or Planning Stages**
- **Projects Under Construction**
- **Projects No Longer in Operation**
- **Bridge/Tunnel Surveillance Projects**
- **HOV Projects**
- **Ramp Metering Projects**
- **CCTV Projects**
- **Changeable Message Sign Projects**
- **HAR Projects**
- **In-Vehicle Guidance Projects**
- **Service Patrol Projects**

An overall table is presented in matrix format, showing, by project, which of the above classifications apply.

SYSTEM ELEMENTS

STATUS

CLASSIFICATION

SYSTEM	CLASSIFICATION		STATUS		SYSTEM ELEMENTS															
	Spot	Linear	Mini-Corridor	Corridor Area	Operational	Design/Planning	Construction	No Longer In Operation	LOOP DETECTORS	COMMUNICATIONS	ARTERIAL SIGNALS	BRIDGE/TUNNEL SURVEILLANCE	HOV	RAMP METERING	CCTV	CHANGEABLE MESSAGE SIGN	HAR	IN-VEHICLE GUIDANCE	SERVICE PATROL	
ALABAMA																				
• Tunnel Surveillance and Control System, Mobile				S	O							•			•					
ARIZONA																				
• Black Canyon Freeway Surveillance, Phoenix				L	O			206	TP					16						
• Phoenix Freeway Management System (FUTURE), Phoenix				A	D			3000	FO TP			•	•	80	65	33	•			•
• Arizona Ramp Control Systems, Tucson				S	O									1						
CALIFORNIA																				
• Los Angeles Metropolitan Area Management System, Los Angeles				A	O			•	TP				•	900	12	48	•	•	•	•
• Arteria Freeway HOV Commuter Lane System, South Los Angeles County				L	O							•	•							
• El Monte Busway, Los Angeles				L	O							•								
• Ventura Freeway Commuter Lanes, Los Angeles				L	N							•								
• Pathfinder, Los Angeles				A	D															•

CLASSIFICATION STATUS SYSTEM ELEMENTS

SYSTEM	CLASSIFICATION		STATUS		SYSTEM ELEMENTS																	
	Spot	Linear	Mini-Corridor	Corridor	Area	Operational	Design/Planning	Construction	No Longer In	Operation	LOOP DETECTORS	COMMUNICATIONS	ARTERIAL SIGNALS	BRIDGE/TUNNEL SURVEILLANCE	HOV	RAMP METERING	CCTV	CHANGEABLE MESSAGE SIGN	HAR	IN-VEHICLE GUIDANCE	SERVICE PATROL	
<i>CALIFORNIA (Cont'd.)</i>																						
• Santa Monica Freeway Smart Corridor Demonstration, Los Angeles	C					D						FO	•		•	•	12	•	•	•	•	•
• Marin County High Occupancy Vehicle Lanes, Marin County	L					O								•	•							
• Orange County Carpool Lane, Orange County	L					O								•	•							
• Costa Mesa Freeway HOV Commuter Lane System, Orange County	L					O								•	•							
• Sacramento Area Ramp Control System, Sacramento	L					O										14		9	•		•	•
• San Diego Area Management System, San Diego	A					O				•				•	•	78	•		•		•	•
• I-15 HOV Reversible Lane Facility, San Diego	L					O									•	•		•				
• San Francisco-Oakland Bay Bridge, San Francisco	S					O								•	•	•	17	15			•	•
• San Francisco Bay Area Traffic Operations Management System, San Francisco	A					D				•				•	•	45	•	50	•		•	•
• San Francisco Bay Area Ramp Control System, San Francisco	S					O										11						

SYSTEM ELEMENTS

STATUS

CLASSIFICATION

SYSTEM	Spot Linear Mini-Corridor Corridor Area	STATUS				SYSTEM ELEMENTS																										
		Operational Design/Planning Construction No Longer in Operation	Loop Detectors	Communications	Arterial Signals	Bridge/Tunnel Surveillance	HOV	Ramp Metering	CCTV	Changeable Message Sign	HAR	In-Vehicle Guidance	Service Patrol																			
COLORADO																																
• Denver Area Ramp Metering Control System, Denver	A	O				•	28																									
• Eisenhower Memorial/Johnson Memorial Tunnels, Idaho Springs	S	O	28			•				•			28	22									•									
CONNECTICUT																																
• Statewide Traffic Management	A	D	•	FO	•		70	178	•	•													•									
• Connecticut National Bank Samaritan Service Patrol Program, New Haven	A	O																					•									
• Connecticut National Bank Samaritan Service Patrol Program, Hartford	A	O																					•									
• CBT Samaritan Service Patrol Program, Bridgeport	A	O																					•									
• CBT Samaritan Service Patrol Program, Stamford	A	O																					•									
DELAWARE																																
• Delaware Wireless Emergency Phone System	M	O																														

SYSTEM ELEMENTS

STATUS

CLASSIFICATION

SYSTEM	CLASSIFICATION		STATUS		SYSTEM ELEMENTS										
	Spot	Lineal	Operational	Design/Planning	Loop Detectors	Communications	Arterial Signals	Bridge/Tunnel Surveillance	HOV	Ramp Metering	CCTV	Changeable Message Sign	HAR	In-Vehicle Guidance	Service Patrol
FLORIDA															
• Motorist Aid System I-10 / I-75	L		O												
• Alligator Alley Motorist Aid System, Naples to Andytown	L		D												
• Florida Turnpike Motorist Aid System, Wildwood to Homestead	L		O												
• Escambia Bay Bridge Surveillance and Control System, Pensacola	S		O					•			2				
• I-75 Ramp Control System, Tampa	S		N							1					
• Sunshine Skyway Bridge, I-275, Tampa to St. Petersburg	S		O			CX		•			13	6			
• FLAMINGO, Dade County	A		D		•	FO			•		•	•		•	
• TRAVTEK, Orlando	A		D											•	
GEORGIA															
• Atlanta Ramp Control System, Atlanta	S		N												16

SYSTEM ELEMENTS

STATUS

CLASSIFICATION

SYSTEM	CLASSIFICATION			STATUS			SYSTEM ELEMENTS										
	Spot	Linear	Mini-Corridor	Operational	Design/Planning	Construction	Loop Detectors	Communications	Arterial Signals	Bridge/Tunnel	HOV	Ramp Metering	CCTV	Changeable Message Sign	HAR	In-Vehicle Guidance	Service Patrol
GEORGIA (Cont'd.)																	
• Driver Information Signing, Atlanta	M			N										2			
• Highway Advisory Radio, Atlanta	A			N											•		
HAWAII																	
• Trans-Koolau Tunnels, Honolulu	M			D						•							
IDAHO																	
• Ice Warning System, Boise	S			D													
• U.S. 95 T.V. Surveillance System, Lewiston	S			N			CX						1				
• I-90 Motorist Warning System, Northern Idaho	S			O											•		
ILLINOIS																	
• Chicago Area Freeway Traffic Management Program, Chicago and Suburbs	A			O			1800 TP				•	95			•		•

CLASSIFICATION STATUS SYSTEM ELEMENTS

SYSTEM	CLASSIFICATION		STATUS		SYSTEM ELEMENTS										
	Spot Linear Mini-Corridor Corridor Area	Operational Design/Planning Construction No Longer In Operation	Loop Detectors	Communications	Arterial Signals	Bridge/Tunnel Surveillance	HOV	Ramp Metering	CCTV	Changeable Message Sign	HAR	In-Vehicle Guidance	Service Patrol		
KENTUCKY															
• I-75 Reconstruction Projects Traffic Management Program, Covington	C	O				•									
LOUISIANA															
• Lake Charles Interstate Routes Changeable Message Signs, Lake Charles	L	O				•		2	4						
MARYLAND															
• Baltimore Area Surveillance and Route Diversion System, Baltimore	L	C							13						
• Fort McHenry Tunnel Surveillance, Baltimore	S	O				•		69	•	•		•			
• Jones Falls Surveillance and Control Project, Baltimore	L	N		TP					11						
• CHART	A	D			•			•	19	•					
MASSACHUSETTS															
• Central Artery/Third Harbor Tunnel, Boston	A	D	800	FO		•	•	20	500	210	•		•		

SYSTEM ELEMENTS

STATUS

CLASSIFICATION

SYSTEM	Spot Linear Mini-Corridor Corridor Area	Operational Design/Planning Construction No Longer In Operation	LOOP DETECTORS	COMMUNICATIONS	ARTERIAL SIGNALS	BRIDGE/TUNNEL SURVEILLANCE	HOV	RAMP METERING	CCTV	CHANGEABLE MESSAGE SIGN	HAR	IN-VEHICLE GUIDANCE	SERVICE PATROL
MASSACHUSETTS (Cont'd.)													
• Dewey Square Tunnel Highway Advisory Radio, Boston	S	O									•		
• CVS Samaritan Service Patrol Program, Boston	L	O											•
• CVS Samaritan Service Patrol Program, Route 128 Beltway	L	O						•					•
• Massachusetts Ramp Control System, Woburn	S	N						1					
• BNE Samaritan Service Patrol Program, Worcester	A	O						•					•
• I-93, I-95, I-91 Motorist Aid Call Box System	S	O											
MICHIGAN													
• Detroit Freeway Operations, Detroit	A	O	1350	CX				49	10	•			
MINNESOTA													
• Twin City Traffic Management System, Minneapolis	A	O	900	TP CX	•	•	•	111	46	11			•

CLASSIFICATION STATUS SYSTEM ELEMENTS

SYSTEM	CLASSIFICATION			STATUS			SYSTEM ELEMENTS											
	Spot	Linear	Mini-Corridor Area	Operational	Design/Planning	Construction	No Longer in Operation	LOOP DETECTORS	COMMUNICATIONS	ARTERIAL SIGNALS	BRIDGE/TUNNEL SURVEILLANCE	HOV	RAMP METERING	CCTV	CHANGEABLE MESSAGE SIGN	HAR	IN-VEHICLE GUIDANCE	SERVICE PATROL
MINNESOTA (Cont'd.)																		
• Twin Cities Metro Area Freeway System, Minneapolis	A			D								•	70	6		•		
MONTANA																		
• I-90 Motorist Aid Warning System, Saltse	S			O											1			
• I-90 Speed Check System	S			O											•			
• Speed Monitoring System	S			O														
NEW HAMPSHIRE																		
• I-93 Franconia Notch Highway Advisory Radio, Franconia Notch	S			O												•		
NEW JERSEY																		
• N.J. Turnpike Automatic Traffic Surveillance and Control System	M			O				875	TP						108			•

CLASSIFICATION STATUS SYSTEM ELEMENTS

SYSTEM	CLASSIFICATION		STATUS		SYSTEM ELEMENTS																					
	Spot Linear Mini-Corridor Corridor Area	Operational Design/Planning Construction No Longer In Operation	Loop Detectors	Communications	Arterial Signals	Bridge/Tunnel Surveillance	HOV	Ramp Metering	CCTV	Changeable Message Sign	HAR	In-Vehicle Guidance	Service Patrol													
NEW MEXICO																										
• Variable Speed Limit System, Albuquerque	S	O												3												
NEW YORK																										
• Tunnel Traffic Control System, Manhattan to New Jersey	S	D		FO		•	•	•	114	•	•															
• INFORM, Long Island	C	O	2100	CX	•				74	•																
• Van Wyck Expressway Surveillance and Control System, Queens	M	O	•						9	19	18															
• Gowanus Expressway HOV Lanes, Brooklyn	L	D					•																			
• Triborough Bridge Variable Message Warning System, New York City	S	D				•					•															
• Computerized Area Tracking System, New York City	A	D	200																							
• Tappan Zee Bridge Variable Message Signs, Tarrytown	L	O												4												
• Northway (I-87) Call Boxes, Clinton, Essex and Warren Counties	L	O																								

SYSTEM ELEMENTS

STATUS

CLASSIFICATION

SYSTEM	Spot L linear Mini-Corridor Corridor Area	Operational Design/Planning Construction No Longer In Operation	LOOP DETECTORS	COMMUNICATIONS	ARTERIAL SIGNALS	BRIDGE/TUNNEL SURVEILLANCE	HOV	RAMP METERING	CCTV	CHANGEABLE MESSAGE SIGN	HAR	IN-VEHICLE GUIDANCE	SERVICE PATROL
NEW YORK (Cont'd.)													
• CVS Samaritan Service Patrol Program, Albany	L	O											•
• Texaco Samaritan Service Patrol Program, Westchester County	L	O											•
OHIO													
• I-75 Traffic Diversion System, Cincinnati	L	N	75	CX					7	19			
• Columbus Ramp Metering, Columbus	S	O		CX	•			7	•				
• Columbus Metro Freeway Operations System, Columbus	A	D		CX TP	•			22	•	11			•
OREGON													
• Portland Freeway Management, Portland	A	D				•		30	•	•			
• Portland Ramp Metering System, Portland	S	O						30					
PENNSYLVANIA													
• Penn-Lincoln Parkway Surveillance and Control System, Pittsburgh	S	N	100	TP		•				3			

SYSTEM ELEMENTS

STATUS

CLASSIFICATION

SYSTEM	CLASSIFICATION			STATUS				SYSTEM ELEMENTS											
	Spot	Linear	Mini-Corridor	Operational	Design/Planning	Construction	No Longer In Operation	LOOP DETECTORS	COMMUNICATIONS	ARTERIAL SIGNALS	BRIDGE/TUNNEL SURVEILLANCE	HOV	RAMP METERING	CCTV	CHANGEABLE MESSAGE SIGN	HAR	IN-VEHICLE GUIDANCE	SERVICE PATROL	
PENNSYLVANIA (Cont'd.)																			
• Lehigh Tunnel Traffic Control and Surveillance System, Lehigh	S			O				•						10	4			•	
• CVS Samaritan Service Patrol, Philadelphia	L			O														•	
• I-376 at Squirrel Hill Tunnel, Pittsburgh	S			D/O						•					3			•	
• I-95 Intermodal Mobility Project, Philadelphia	C			D					•				•		•				
• I-297 at Fort Pitt Tunnel, Philadelphia	S			D/O				•						•	7			•	
• The Liberty Tunnels, Pittsburgh	S			D/O											2			•	
• I-279 HOV Lanes, Pittsburgh	L			O					CX						22			•	
RHODE ISLAND																			
• CVS Samaritan Service Patrol Program, Providence	L			O														•	
TEXAS																			
• Austin IH-35, Austin	S			O									•						2

SYSTEM ELEMENTS

STATUS

CLASSIFICATION

SYSTEM	Spot Linear Mini-Corridor Corridor Area	Operational Design/Planning Construction No Longer in Operation	LOOP DETECTORS	COMMUNICATIONS	ARTERIAL SIGNALS	BRIDGE/TUNNEL SURVEILLANCE	HOV	RAMP METERING	CCTV	CHANGEABLE MESSAGE SIGN	HAR	IN-VEHICLE GUIDANCE	SERVICE PATROL
TEXAS (Cont'd.)													
• Freeway Ramp Closure Gate, Beaumont	S	O						•					
• Highway Advisory Radio, Beaumont	A	O									•		
• North Central Expressway Corridor, Dallas	C	O	225	TP	•		•	34	8	3			
• I-20 and IH-30 Ramp Metering System, Fort Worth	S	N						1					•
• Traffic Management System, Fort Worth	A	C/D	7000	TP	•			207	80	45	•		•
• North and Southwest Freeways, Houston	S	N	4										
• IH-10 and IH-35 Ramp Control System, San Antonio	S	O						2					
UTAH													
• I-15 Corridor System, Salt Lake City	L	D					•	•					
VIRGINIA													
• I-66/I-395 Traffic Management System	C	O	525	CX FO			•	35	•	94			•

SYSTEM ELEMENTS

STATUS

CLASSIFICATION

SYSTEM	CLASSIFICATION		STATUS		SYSTEM ELEMENTS											
	Spot	Lineal	Operational	Design/Planning	Loop Detectors	Communications	Arterial Signals	Bridge/Tunnel	HOV	Ramp Metering	CCTV	Changeable Message Sign	HAR	In-Vehicle Guidance	Service Patrol	
	Minl-Corridor	Corridor	No Longer In Operation	Construction												
VIRGINIA (Cont'd.)																
• Hampton Roads Bridge-Tunnel Surveillance and Control, Hampton	L		O		98	CX		•		•			•			•
• I-664 Bridge/Tunnel Traffic Surveillance and Control System, Newport News	S		C		72	CX FO		•			33	39				•
• Downtown Elizabeth River Tunnels Traffic Surveillance and Control Systems, Norfolk/Portsmouth	S		O		•	CX		•			26	29				•
WASHINGTON																
• The Flow System, Seattle	A		O		200		•	•	•	•	16	15	•			
WISCONSIN																
• Freeway Control Project, Milwaukee	L		D/O						•							
WYOMING																
• Weather Advisory System	L		O													•

CLASSIFICATION STATUS SYSTEM ELEMENTS

SYSTEM	CLASSIFICATION		STATUS		SYSTEM ELEMENTS																
	Spot	Linear	Mini-Corridor	Corridor	Area	Operational	Design/Planning	Construction	No Longer in Operation	LOOP DETECTORS	COMMUNICATIONS	ARTERIAL SIGNALS	BRIDGE/TUNNEL SURVEILLANCE	HOV	RAMP METERING	CCTV	CHANGEABLE MESSAGE SIGN	HAR	IN-VEHICLE GUIDANCE	SERVICE PATROL	
CANADA																					
BRITISH COLUMBIA																					
• Massey Tunnel Surveillance and Control System, Vancouver													•								
ONTARIO																					
• QEW/Burlington Skyway Freeway Traffic Management System, Hamilton													•								•
• QEW Mississauga Freeway Traffic Management System, Mississauga													•								•
• Queensway Freeway Traffic Management System, Ottawa													•								•
• Highway 401 Freeway Traffic Management System, Toronto													•								•
QUEBEC																					
• Montreal Freeway Management System, Montreal													•								•
• Louis-Hippolyte LaFontaine Tunnel-Bridge, Montreal													•								•

SYSTEM	CLASSIFICATION		STATUS		SYSTEM ELEMENTS											
	Spot	L Inear Mini-Corridor Corridor Area	Operational	Design/Planning Construction No Longer In Operation	LOOP DETECTORS	COMMUNICATIONS	ARTERIAL SIGNALS	BRIDGE/TUNNEL SURVEILLANCE	HOV	RAMP METERING	CCTV	CHANGEBABLE MESSAGE SIGN	HAR	IN-VEHICLE GUIDANCE	SERVICE PATROL	
<i>QUEBEC (Cont'd.)</i>																
• Ville-Marie Tunnel, Montreal	S		O				•				82					
• Quebec Freeway Management System, Quebec City	M		D		•		•							•		

KEY

Numbers indicate how many of that element are included in the system.

TP = Twisted Pair

CX = Coax

FO = Fiber Optics