Tracking the Deployment of the Integrated Metropolitan ITS Infrastructure in Hampton Roads

FY99 Results

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Part 1 - Background and Purpose

In January 1996, Secretary Peña set a goal of deploying the integrated metropolitan Intelligent Transportation System (ITS) infrastructure in 75[1] of the nation's largest metropolitan areas by 2006:

> *"I'm setting a national goal: to build an intelligent transportation infrastructure across the United States to save time and lives, and improve the quality of life for Americans. I believe that what we do, we must measure . . . Let us set a very tangible target that will focus our attention . . . I want 75 of our largest metropolitan areas outfitted with a complete intelligent transportation infrastructure in 10 years."*[2]
>
> -- *Secretary Peña, 1996*

In 1997, the U.S. Department of Transportation initiated an effort to track progress toward fulfillment of this goal by conducting a survey of deployment in the nation's largest metropolitan areas. Traditionally, the product of a transportation infrastructure investment consists of a fixed asset such as a highway, bridge, or public transportation vehicle developed, constructed, or purchased by a single agency. Tracking the level of deployment for such traditional fixed assets can be accomplished by simply counting the number of such assets deployed. Measuring the deployment of the metropolitan ITS infrastructure is more complex because it consists of a set of systems, often deployed by multiple agencies, and integrated through a combination of complex institutional and technical arrangements. In brief, it is often difficult to simply count the number of systems deployed without first devising a measurement approach that captures the essential features of such systems in a consistent fashion across many deployment environments.

In order to track progress toward fulfillment of the Secretary's goal for deployment, the U.S. Department of Transportation ITS Joint Program Office developed the metropolitan ITS deployment tracking methodology. This methodology tracks deployment of the nine components that make up the Metropolitan ITS infrastructure: Freeway Management; Incident Management; Arterial Management; Emergency Management; Transit Management; Electronic Toll Collection; Electronic Fare Payment; Highway-Rail Intersections; and Regional Multimodal Traveler Information. Through a set of indicators tied to the major functions of each component, the level of deployment is tracked for the nation's largest metropolitan areas. In addition, the integration links between agencies operating the infrastructure are also tracked. The details of

[1] Since Secretary Peña's speech, the number of metropolitan areas that DOT will measure has been increased from 75 to 78. However, to maintain reporting consistency across the 10-year goal period, this report considers only the original 75 metropolitan areas.

[2] Excerpt of a speech delivered by Secretary of Transportation Peña at the Transportation Research Board in Washington, DC on January 10, 1996.

the methodology are explained elsewhere.[3]

During the summer and fall of 1999, the U.S. DOT undertook a new data collection effort for the purpose of examining ITS deployment progress in the nation's largest metropolitan areas. The Hampton Roads metropolitan area was among the areas surveyed in 1997 and again in 1999. This report presents the results of the 1999 survey efforts and compares the results of the 1997 survey against those observed in 1999. The overall response rate for the surveys administered in the Hampton Roads region was 95% in 1997 and 80% in 1999.

Part 2 contains a summary of the 1999 survey results, and Part 3 provides a comparison of 1999 survey results and the 1997 survey results.

The report also contains a set of appendices containing a map of the survey area, the list of local contacts surveyed along with a status of their response to the survey and a summary of the data collected from the surveys.

Agencies are encouraged to review the data presented in this report for completeness and accuracy and to direct any comments or corrections to the data provided to the contacts listed below:

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[3] Additional Resources: "Measuring ITS Deployment and Integration" (Electronic Document Number: 4372). U.S. Department of Transportation, Joint Program Office for Intelligent Transportation Systems, 400 Seventh St., SW (HVH-1), Washington, DC 20590, Phone: 202-366-9536, Fax: 202-366-3302, Web: http://www.its.dot.gov.

Part 2 - Summary 1999 Survey Results

Deployment indicators have been developed for two broad areas of interest: (1) the individual components, including their basic functions and characteristics and (2) integration of components, including how these components work together to provide coordinated regional service. As mentioned earlier, these indicators are expressed as percentages of the possible deployment opportunity and not necessarily what should be deployed based on local needs. Requirements for deployment and integration between each component will vary based on local conditions and cannot be assigned without extensive coordination with individual metropolitan areas.

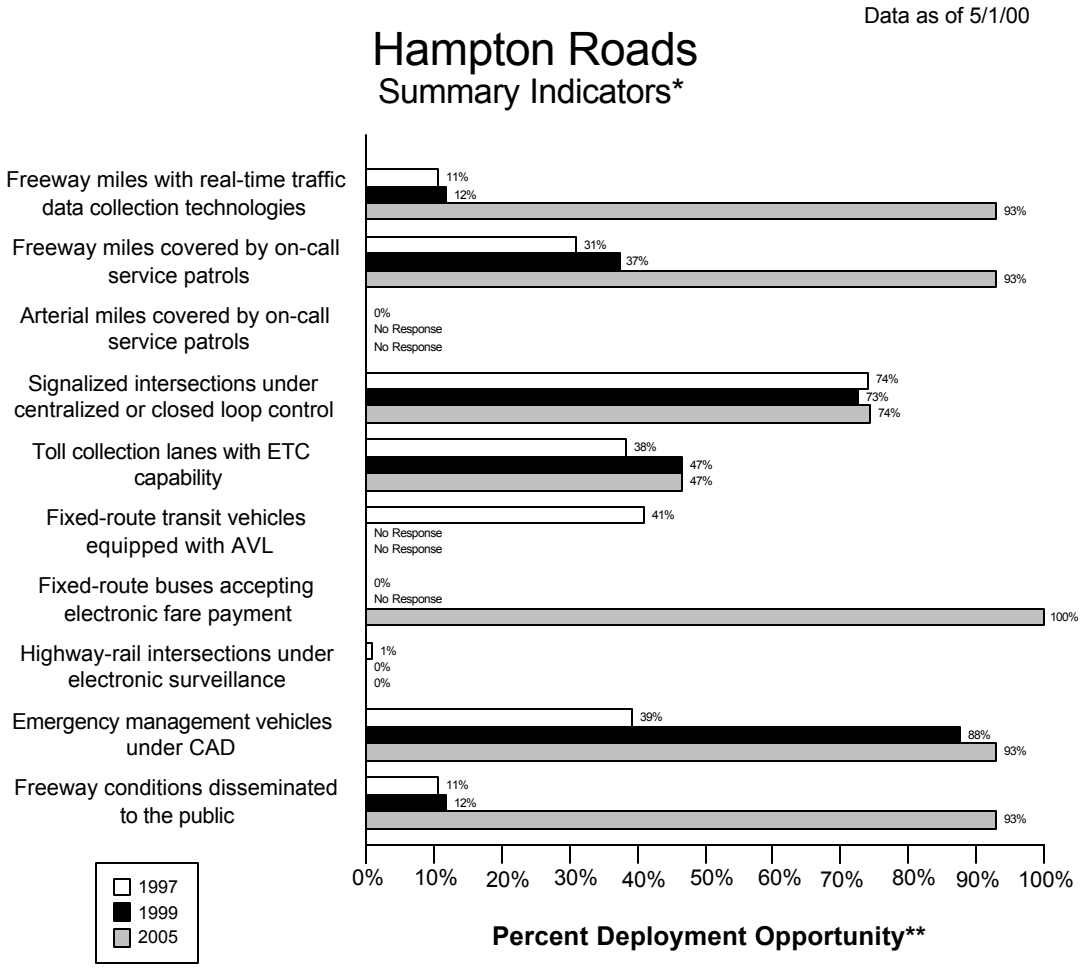
The following two figures portray the surrogate indicators for each of the nine components in Hampton Roads and the same indicators at the national level. These are judged to be the single best representative of a component and are being used as summary indicator for component. The summary indicators are expressed as a percentage; however, because deployment goals have yet to be established, these indicators should not be read as a comparison of what is deployed versus eventual deployment goals. Instead, they only reflect what is deployed compared to full market saturation (i.e., opportunity for deployment).

Each component indicator was selected to reflect a critical function of the individual components. For example, in the case of Freeway Management, three basic functions were defined: surveillance, traffic control, and information display. The three indicators developed to reflect these functions are: percentage of freeway centerline miles under electronic surveillance (surveillance function), percentage of freeway entrance ramps managed by ramp meters (traffic control function), and percentage of freeway centerline miles covered by permanent VMS, HAR, or in-vehicle signing (information display function). The indicators are surrogates that do not necessarily reflect the full breadth of metropolitan ITS deployment activity.

A critical aspect of ITS that provides much of its capability is the integration of individual components to form a unified regional traffic control system. Individual ITS components routinely collect information that is used for purposes internal to that component. For example, the Arterial Management component monitors arterial conditions to revise signal timing and to convey these conditions to travelers through such technologies as variable message signs and highway advisory radio. Other ITS components can make use of this information in formulating their control strategies. For example, Transit Management may alter routes and schedules based on real-time information on arterial traffic conditions, and Freeway Management may alter ramp metering or diversion recommendations based on the same information.

As with the component indicators, definitions for inter- and intra-component integration were developed for each component, and indicators, derived from these definitions, were produced for each component. A total of 34 individual integration indicators was specified and is portrayed in the third figure which follows. Each integration indicator has been assigned a number and an origin/destination path from one ITS infrastructure component to another. For example, the

integration of information from the Freeway Management component to the Regional Multimodal Traveler Information component is identified by the number "10."

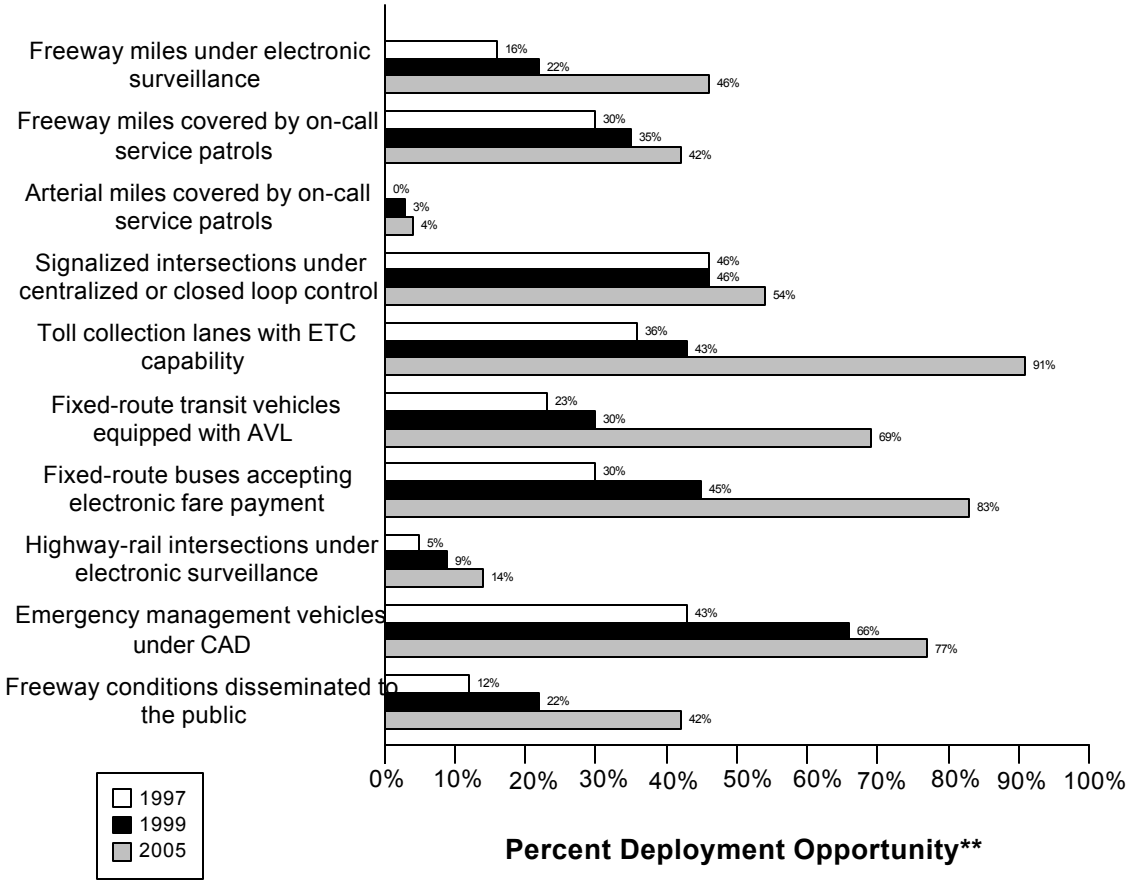


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Data as of 5/1/00

National

Summary Indicators*



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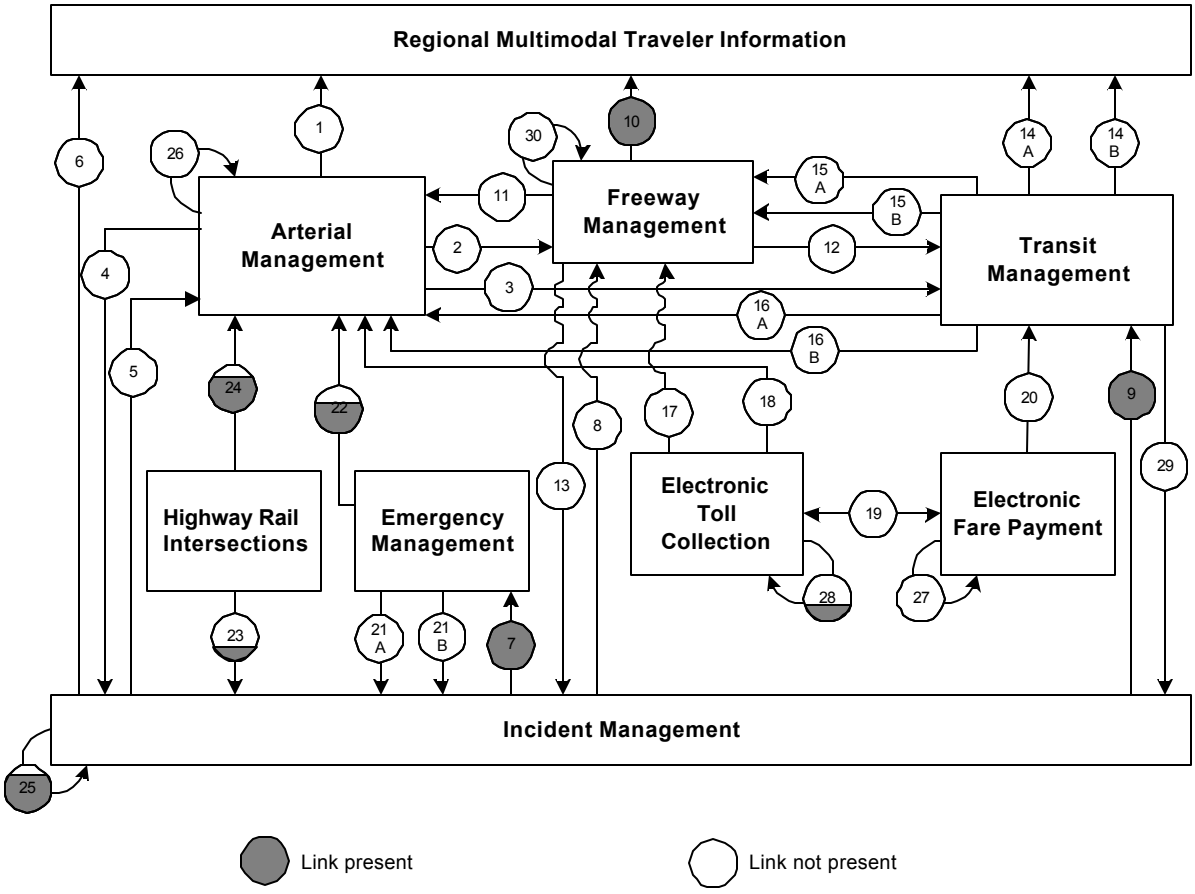
Hampton Roads Integration Links



Note: Shading indicates the value of the link. For example a circle half shaded equals 50%

Link	Description	Link	Description
1	Arterial Management to Regional Multimodal Traveler Information	2	Arterial Management to Freeway Management
3	Arterial Management to Transit Management	4	Arterial Management to Incident Management
5	Incident Management to Arterial Management	6	Incident Management to Regional Multimodal Traveler Information
7	Incident Management to Emergency Management.	8	Incident Management to Freeway Management
9	Incident Management to Transit Management	10	Freeway Management to Regional Multimodal Traveler Information
11	Freeway Management to Arterial Management	12	Freeway Management to Transit Management

Link	Description	Link	Description
13	Freeway Management to Incident Management	14a 14b	Transit Management to Regional Multimodal Traveler Information (static route information) Transit Management to Regional Multimodal Traveler Information (schedule adherence information)
15a 15b	Transit Management to Freeway Management Transit Management to Freeway Management (transit vehicle probes)	16a 16b	Transit Management to Arterial Management Transit Management to Arterial Management (transit vehicle probes)
17	Electronic Toll Collection to Freeway Management (ETC equipped probes)	18	Electronic Toll Collection to Arterial Management (ETC equipped probes)
19	Electronic Fare Payment and Electronic Toll Collection	20	Electronic Fare Payment to Transit Management
21a 21b	Emergency Management to Incident Management (incident notification) Emergency Management to Incident Management (incident clearance)	22	Emergency Management to Arterial Management
23	Highway-rail intersections to Incident Management (crossing status)	24	Highway-rail intersections to Arterial Management (crossing status)
25	Incident Management intra component	26	Arterial Management intra component
27	Electronic Fare Payment intra component.	28	Electronic Toll Collection intra component
29	Transit Management to Incident Management (incident reporting)	30	Freeway Management intra component

Part 3 - Detailed 1999 Survey Results

The following figures and tables summarize the complete set of component and integration indicators developed for the Hampton Roads metropolitan area. The figures summarizing the component indicators consist of a bar chart portraying the deployment levels for 1997, 1999, and 2005 accompanied by detailed tables of the data used to calculate each component indicator value (*Num* stands for numerator and *Den* stands for denominator; blank space indicates that no response was received.)

Example: Calculating Component Indicators for Freeway Management

Consider a metropolitan area with 100 miles of freeway and 25 freeway entrance ramps. The area has no ramp meters, 10 freeway miles for which traffic data are collected electronically, and 5 freeway miles, which are covered by highway advisory radio.

The component indicator for electronic surveillance is calculated as (10/100) or 10%.

The component indicator for ramp meter control is calculated as (0/25) or 0%.

The component indicator for HAR coverage is calculated as (5/100) or 5%.

The summary indicator for the metropolitan area is calculated as (10%+0%+5%)/3 = 5%.

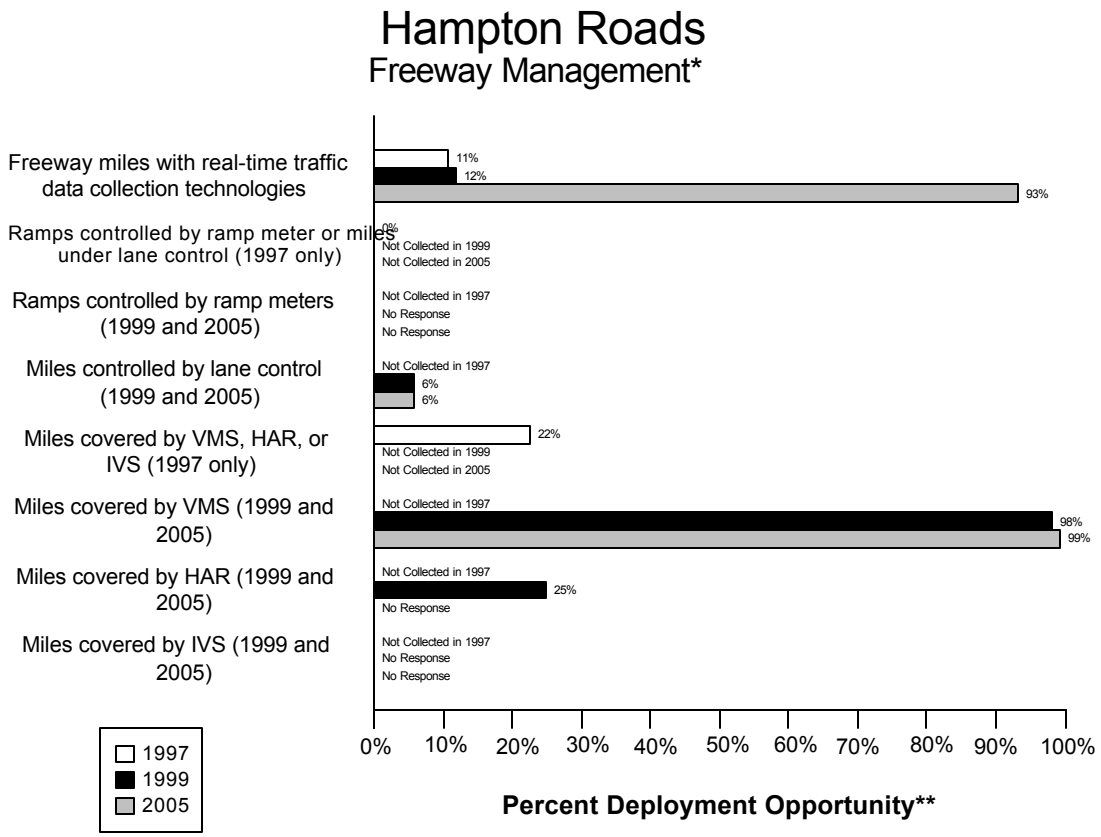
The figures summarizing the integration indicators consist of a diagram for each of the nine metropolitan ITS components portraying the integration level for 1999 (*italic*) and 2005 (**bold**), accompanied by tables providing an explanation of the data and calculations performed to develop each integration indicator value for 1999 and 2005. Each diagram portrays the proportion of agencies providing information to a component (e.g., the flow of incident information from Incident Management to Freeway Management) and the proportion of agencies providing information from one component to other components (e.g., the flow of freeway travel condition information from Freeway Management to Arterial Management).

Example: Calculating Integration between Arterial Management and Regional Multimodal Traveler Information

Consider a metropolitan area with three arterial management agencies. One out of three provides information to the public using a Regional Multimodal Traveler Information Media (e.g., internet, kiosk, pager, etc...). The integration indicator is 1/3 or 33%.

Freeway Management Component Indicators

Data as of 5/1/00



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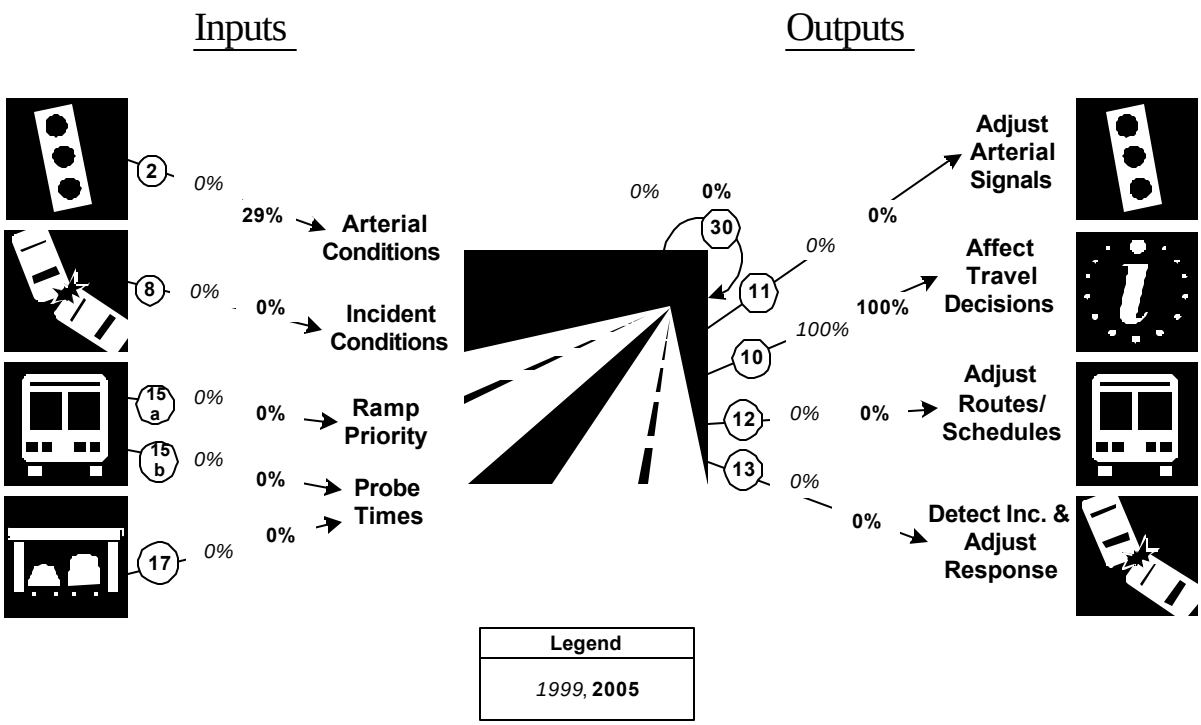
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Freeway centerline miles are under electronic surveillance for monitoring traffic flow	17	161	11%	19	161	12%	150	161	93%
Freeway entrance ramps are controlled by ramp meters or miles under lane control	0	161	0%						
Freeway entrance ramps are controlled by ramp meters					182			182	

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway centerline miles will be controlled by lane control				9	161	6%	9	161	6%
Freeway miles are covered by VMS, HAR, or IVS	36	161	22%						
Freeway miles are covered by VMS				158	161	98%	160	161	99%
Freeway miles are covered by HAR				40	161	25%		161	
Freeway miles are covered by IVS					161			161	

Freeway Management Integration Indicators

Hampton Roads
Freeway Management Integration*



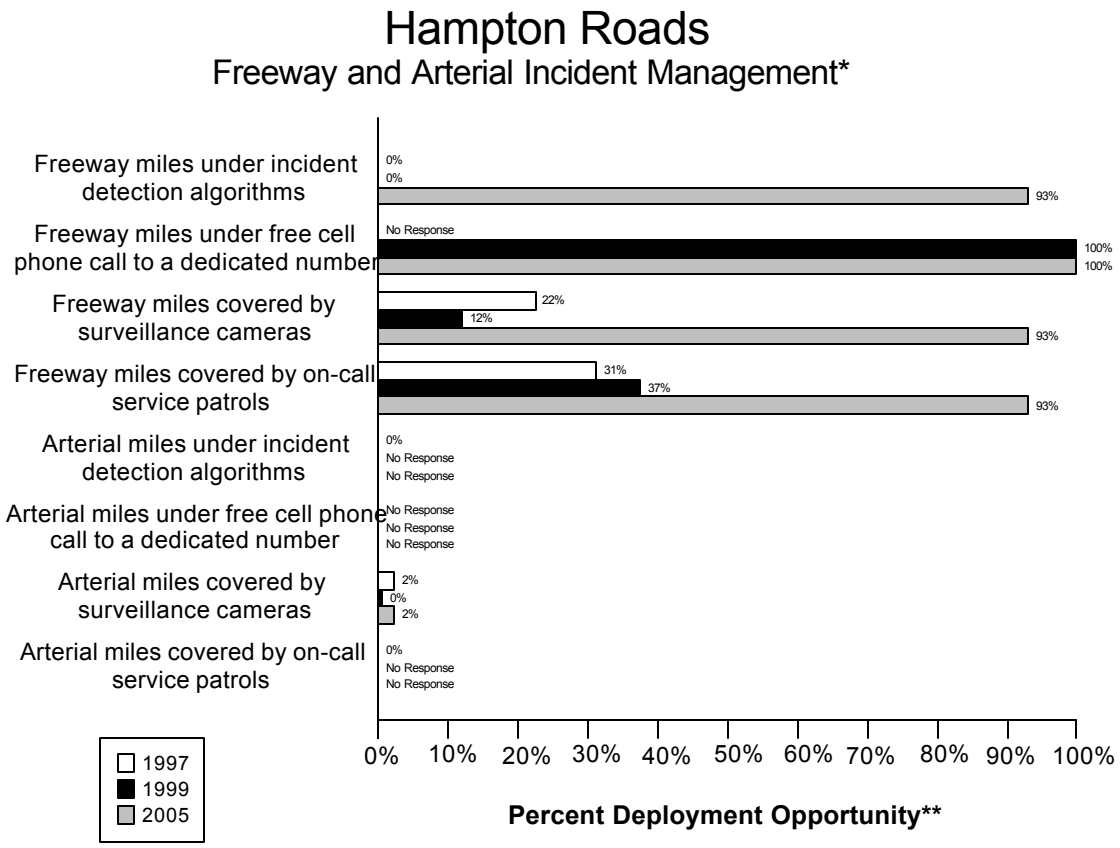
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
2. Arterial Management agencies sending information to Freeway Management	(0/ 7) 0%	(2/ 7) 29%
8. Incident Management agencies sending information to Freeway Management	(0/ 1) 0%	(0/ 1) 0%
15a. Transit management agencies with vehicles equipped with ramp meter priority	(0/ 1) 0%	(0/ 1) 0%
15b. Transit Management agencies with vehicles equipped as probes	(0/ 1) 0%	(0/ 1) 0%
17. Freeway Management agencies receiving freeway conditions from vehicle probes	(0/ 1) 0%	(0/ 1) 0%
30. Freeway Management agencies sending information to another Freeway Management agency	(0/ 1) 0%	(0/ 1) 0%
11. Freeway Management agencies sending information to Arterial Management	(0/ 1) 0%	(0/ 1) 0%

Link Description	1999	2005
10. Freeway Management agencies disseminating freeway conditions to the public	(1/ 1) 100%	(1/ 1) 100%
12. Freeway Management agencies sending freeway conditions to Transit Management	(0/ 1) 0%	(0/ 1) 0%
13. Freeway Management agencies sending freeway conditions to Incident Management	(0/ 1) 0%	(0/ 1) 0%

Incident Management Component Indicators

Data as of 5/1/00



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** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

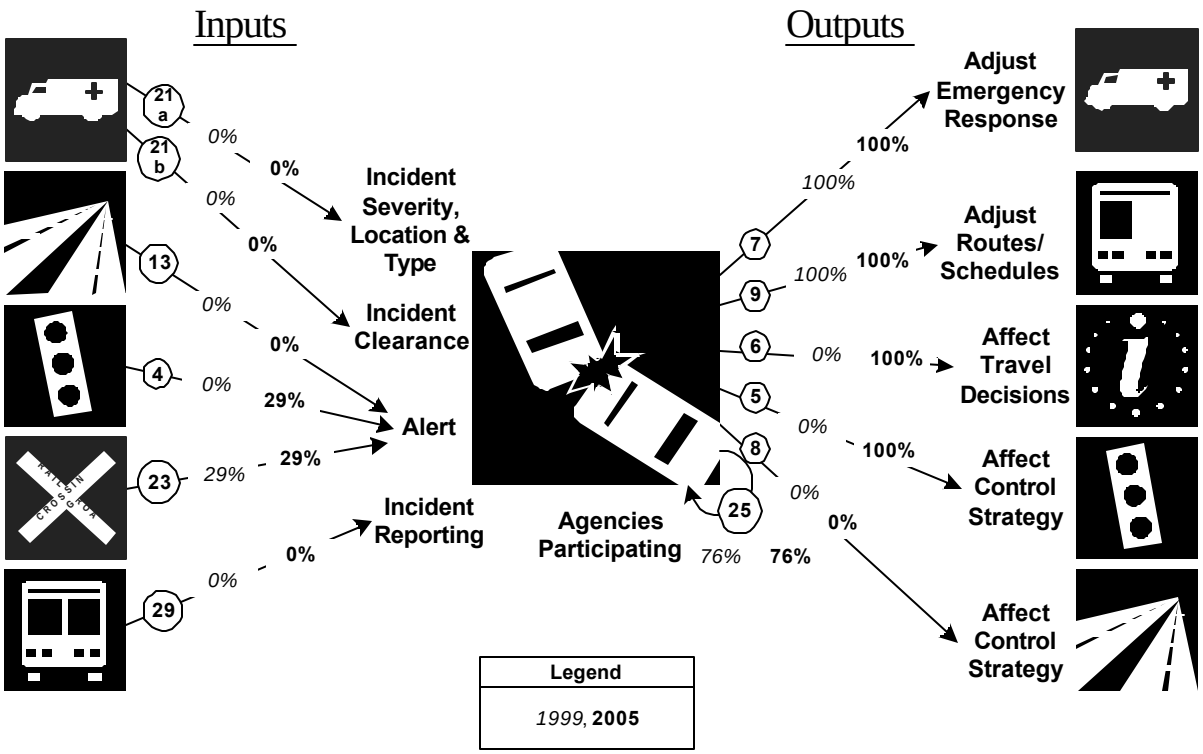
	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Freeway miles are covered by incident detection algorithms	0	161	0%	0	161	0%	150	161	93%
Freeway miles are covered by free cellular phone calls to a dedicated number		161		161	161	100 %	161	161	100%
Freeway miles are covered by surveillance cameras.	36	161	22%	19	161	12%	150	161	93%

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway miles are covered by on-call publicly-sponsored service patrol or towing services.	50	161	31%	60	161	37%	150	161	93%
Arterial miles are covered by incident detection algorithms	0	886	0%		886			886	
Arterial miles are covered by free cellular phone calls to a dedicated number		886			886			886	
Arterial miles are covered by surveillance cameras	19	886	2%	4	886	0%	20	886	2%
Arterial miles are covered by on-call publicly-sponsored service patrol or towing services	0	886	0%		886			886	

Incident Management Integration Indicators

Hampton Roads

Incident Management Integration*



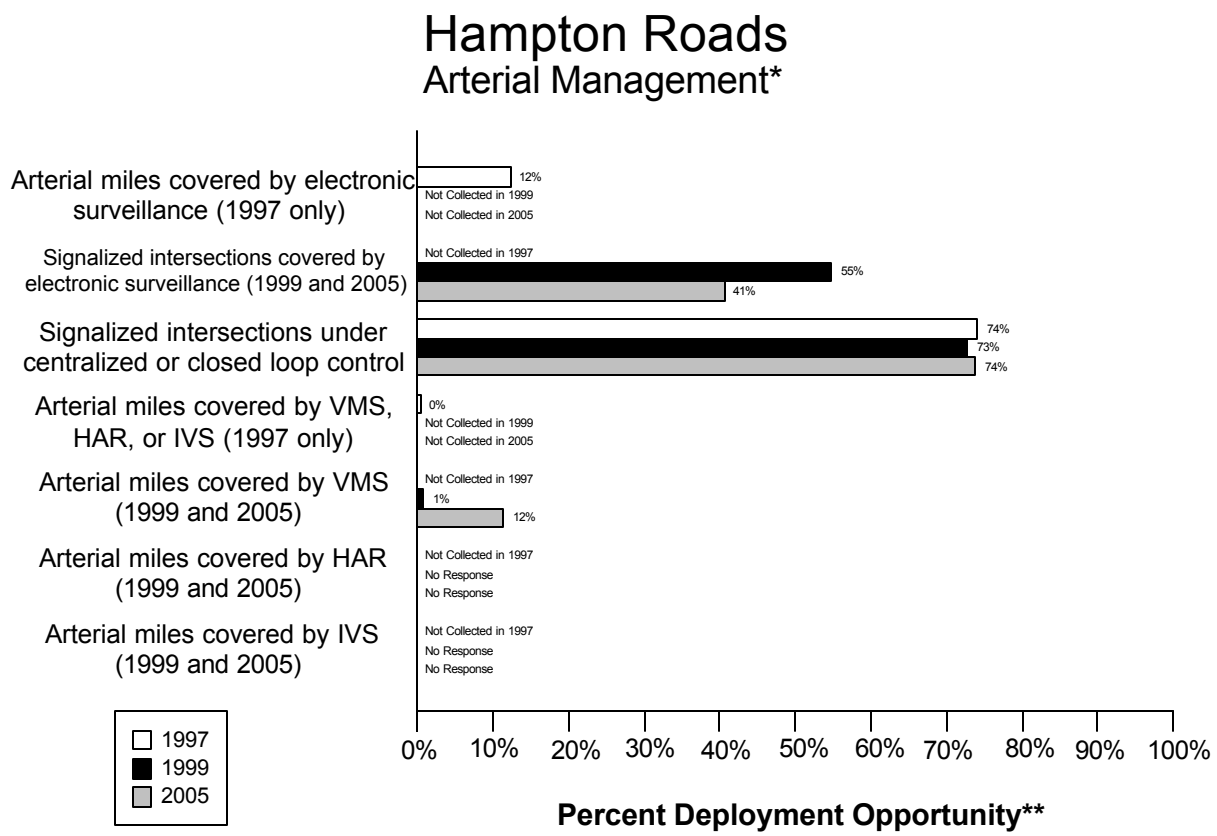
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
21a. Incident management agencies receiving incident severity from Emergency Management	(0/ 1) 0%	(0/ 1) 0%
21b. Incident management agencies receiving incident clearance activities from Emergency Management	(0/ 1) 0%	(0/ 1) 0%
13. Freeway Management agencies sending freeway conditions to Incident Management	(0/ 1) 0%	(0/ 1) 0%
4. Arterial Management agencies sending arterial conditions to Incident Management	(0/ 7) 0%	(2/ 7) 29%
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(2/ 7) 29%	(2/ 7) 29%
29. Transit Management agencies report traffic incidents as part of an organized regional incident management program	(0/ 1) 0%	(0/ 1) 0%

Link Description	1999	2005
7. Incident management agencies transfer information describing incident severity, location, and type to Emergency Management agencies	(1/ 1) 100%	(1/ 1) 100%
9. Incident Management agencies transfer information describing incident severity, location, and type to Transit Management agencies	(1/ 1) 100%	(1/ 1) 100%
6. Incident Management agencies disseminate information describing incident severity, location, and type to the public	(0/ 1) 0%	(1/ 1) 100%
5. Incident Management agencies transfer information describing incident severity, location, and type to Arterial Management agencies	(0/ 1) 0%	(1/ 1) 100%
8. Incident Management agencies transfer information describing incident severity, location, and type to Freeway Management agencies	(0/ 1) 0%	(0/ 1) 0%
25. Police, fire, and EMS agencies participating in a formal incident management plan/team	(13/ 17) 76%	(13/ 17) 76%

Arterial Management Component Indicators

Data as of 5/1/00



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** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

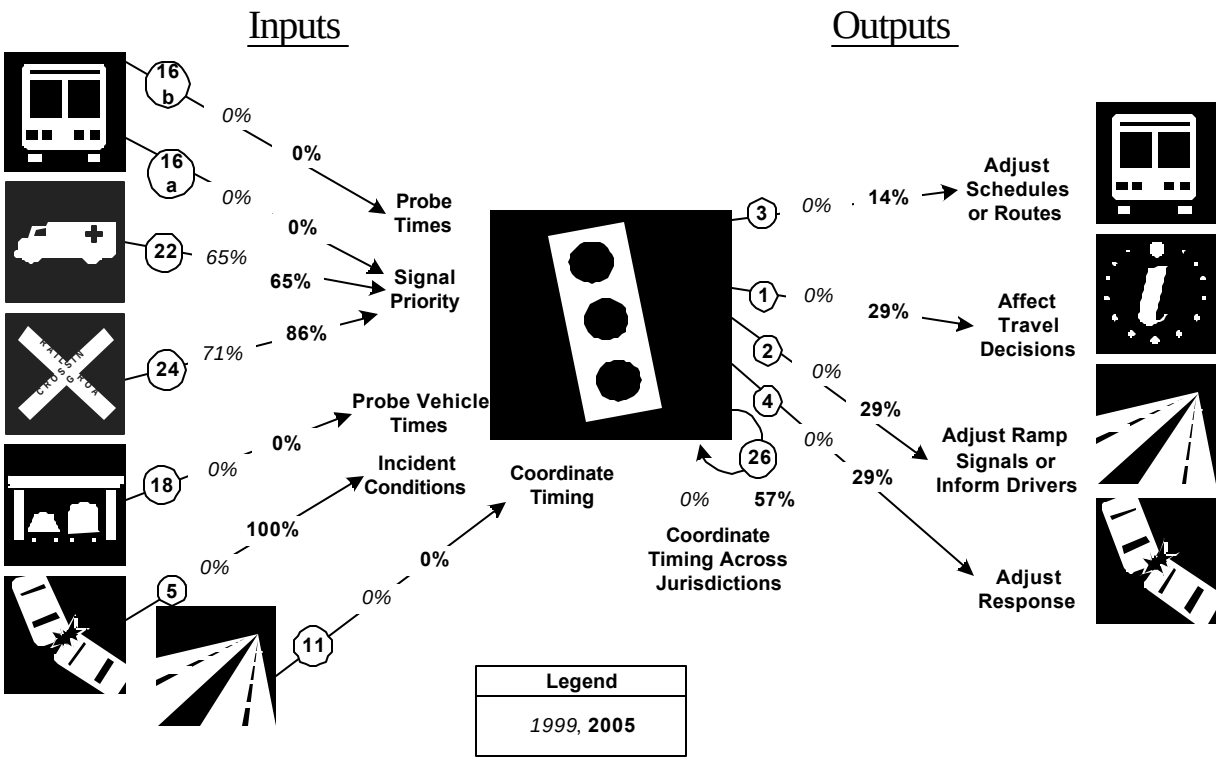
Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles covered by electronic surveillance	110.5	886	12%						
Signalized intersections are covered by electronic surveillance for monitoring traffic flow				685	1249	55%	409	1004	41%
Signalized intersections are under centralized or closed loop control	863	1164	74%	909	1249	73%	742	1004	74%

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles are covered by VMS, HAR, or IVS	4	886	0%						
Arterial miles are covered by VMS				8	886	1%	102	886	12%
Arterial miles are covered by HAR					886			886	
Arterial miles are covered by IVS					886			886	

Arterial Management Integration Indicators

Hampton Roads

Arterial Management Integration*



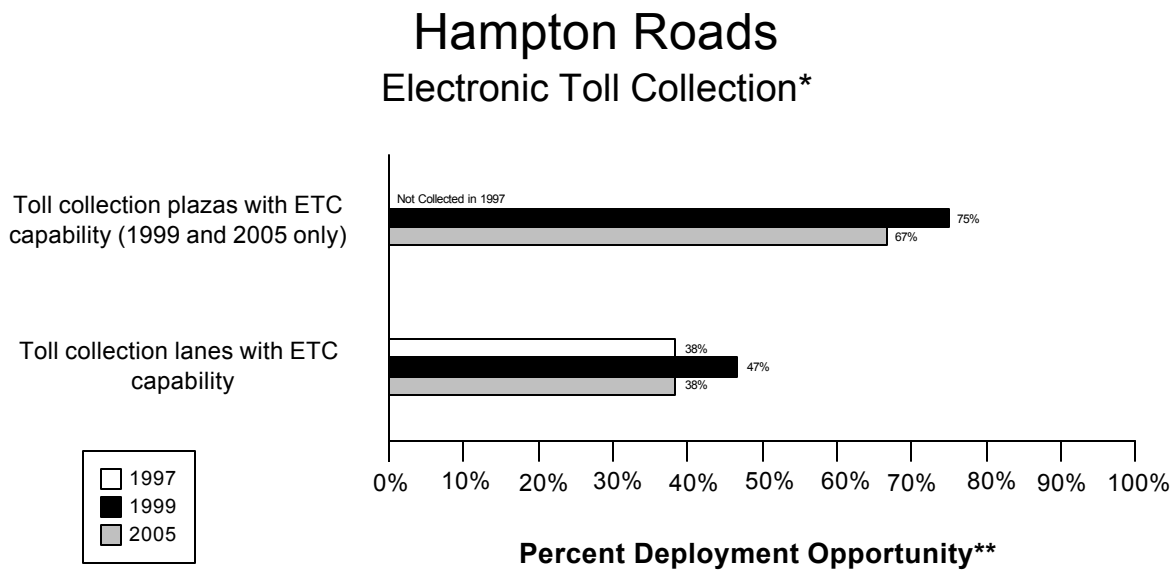
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
16a. Transit management agencies with vehicles equipped with traffic signal priority	(0/ 1) 0%	(0/ 1) 0%
16b. Transit Management agencies have vehicles equipped as probes on arterials	(0/ 1) 0%	(0/ 1) 0%
22. Emergency Management agencies have vehicles equipped with traffic signal preemption capability	(11/ 17) 65%	(11/ 17) 65%
24. Arterial Management agencies have traffic signals within 200 feet of a highway rail intersection with the capability of having their signal timing adjusted in response to a train crossing	(5/ 7) 71%	(6/ 7) 86%
18. Number of Arterial Management agencies receiving information from vehicle probes	(0/ 7) 0%	(0/ 7) 0%
5. Incident Management agencies transfer information describing incident severity, location, and type to Arterial Management	(0/ 1) 0%	(1/ 1) 100%

Link Description	1999	2005
11. Freeway Management agencies transfer freeway travel times, speeds, and conditions to Arterial Management agencies	(0/ 1) 0%	(0/ 1) 0%
3. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Transit Management	(0/ 7) 0%	(1/ 7) 14%
1. Arterial Management agencies disseminate arterial travel times, speeds, and conditions to the public	(0/ 7) 0%	(2/ 7) 29%
2. Arterial Management agencies send traffic condition information to Freeway Management	(0/ 7) 0%	(2/ 7) 29%
4. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Incident Management	(0/ 7) 0%	(2/ 7) 29%
26. Arterial Management agencies under cooperative agreement to share traffic signal timing for coordinated response	(0/ 7) 0%	(4/ 7) 57%

Electronic Toll Collection Component Indicators

Data as of 5/1/00



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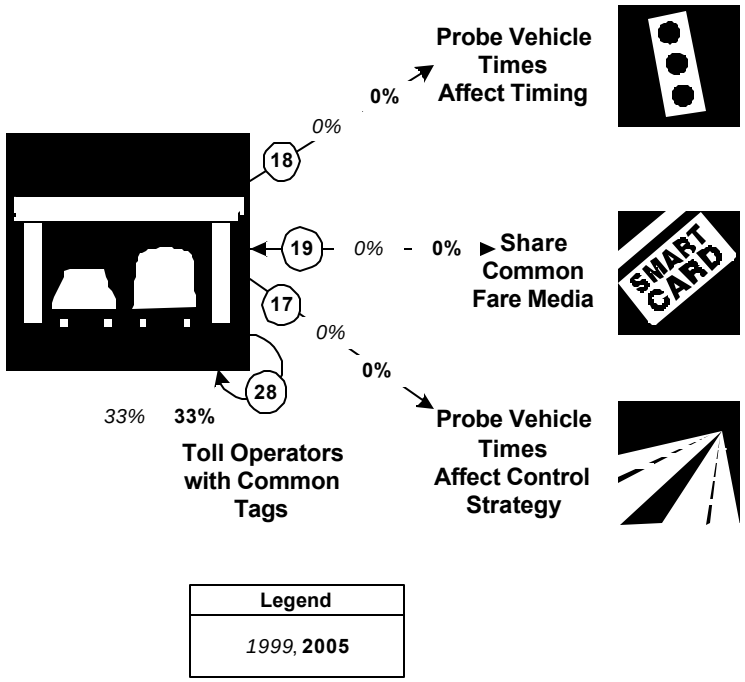
	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Toll collection plazas with ETC capability				3	4	75%	2	3	67%
Toll collection lanes with ETC capability	5	13	38%	7	15	47%	5	13	38%

Electronic Toll Collection Integration Indicators

Hampton Roads
Electronic Toll Collection Integration*

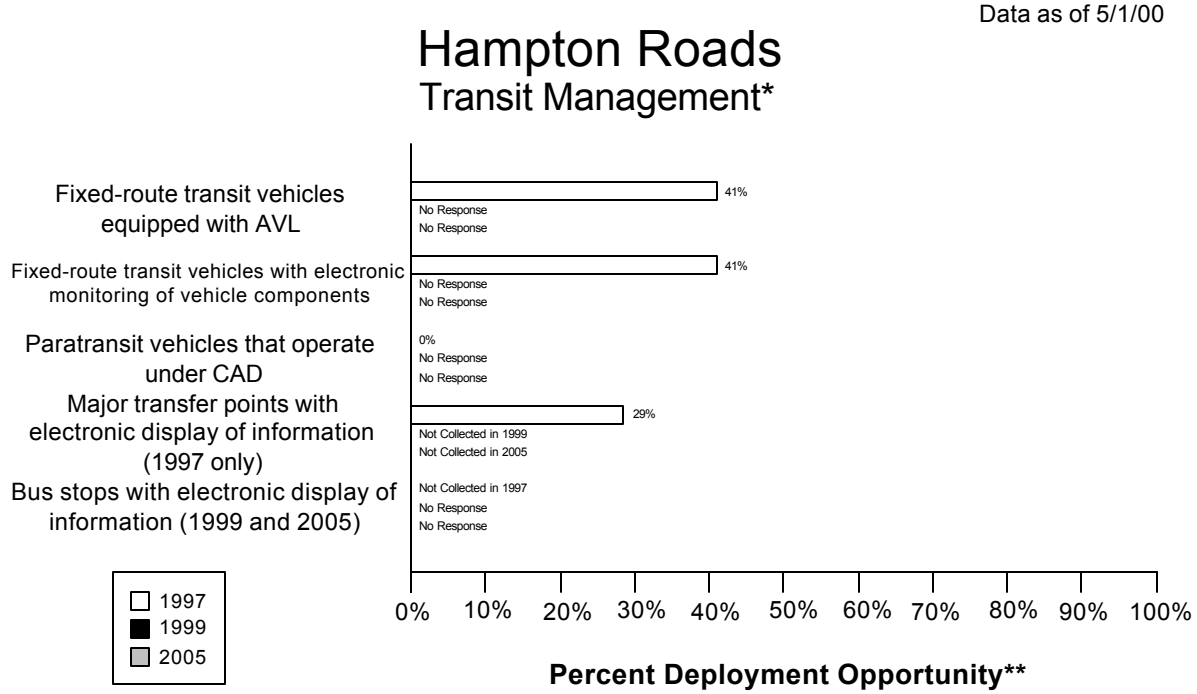


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
18. Number of Arterial Management agencies receiving information from vehicle probes	(0/ 7) 0%	(0/ 7) 0%
19. Transit agencies that accept electronic payment through the use of electronic toll collection media	(0/ 1) 0%	(0/ 1) 0%
17. Freeway Management agencies receiving information from vehicle probes	(0/ 1) 0%	(0/ 1) 0%
28. Toll operators using common toll tag technology	(1/ 3) 33%	(1/ 3) 33%

Transit Management Component Indicators

Data as of 5/1/00



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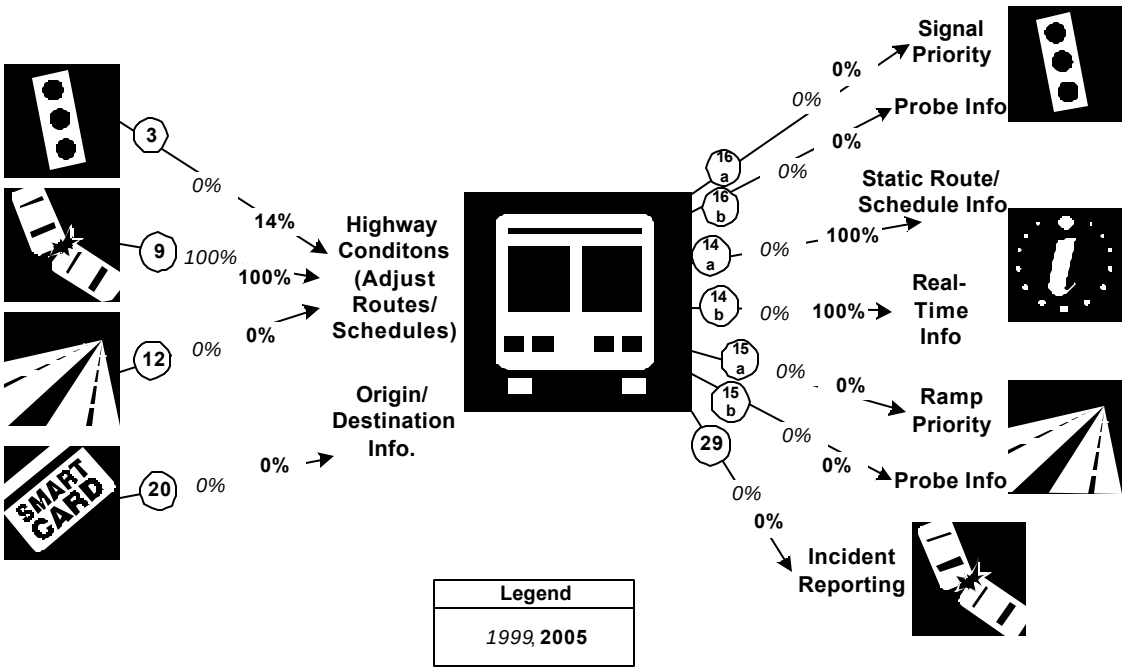
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles are equipped with AVL	117	285	41%		285				
Fixed-route transit vehicles are equipped with electronic monitoring of vehicle component	117	285	41%		285				
Paratransit vehicles operate under computer-aided dispatch	0	83	0%		90				
Percent fixed-route transfer locations with electronic display of information	2	7	29%						
Bus stops display information to the public									

Transit Management Integration Indicators

Hampton Roads
Transit Management Integration*



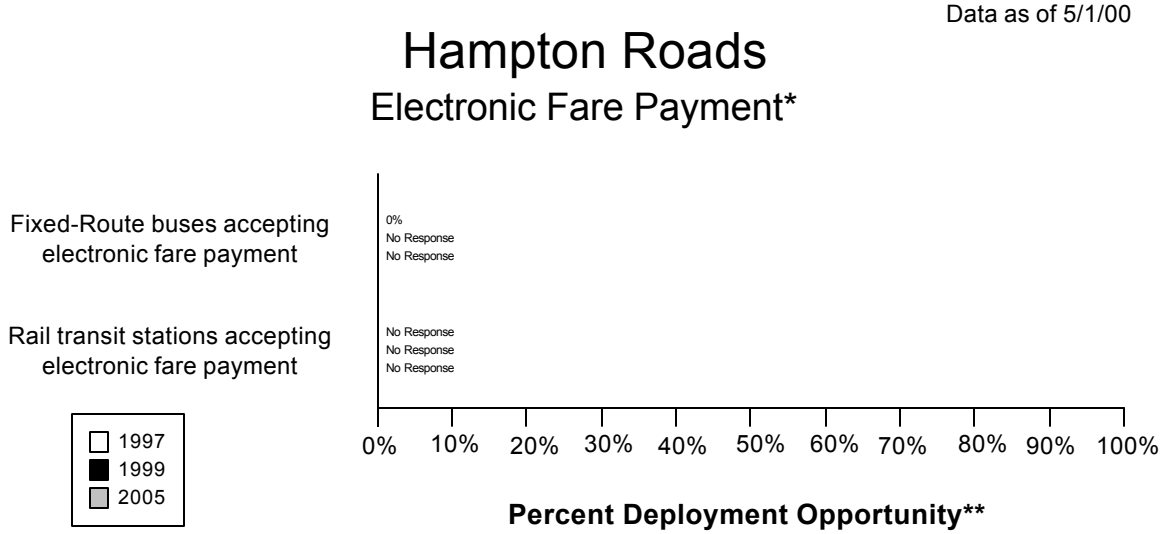
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
3. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Transit Management	(0/ 7) 0%	(1/ 7) 14%
9. Incident management agencies transfer information describing incident severity, location, and type to Transit Management	(1/ 1) 100%	(1/ 1) 100%
12. Freeway Management agencies transfer freeway travel times, speeds, and conditions to Transit Management	(0/ 1) 0%	(0/ 1) 0%
20. Transit Management agencies using Electronic Fare Payment data in transit service planning	(0/ 1) 0%	(0/ 1) 0%
16a. Transit Management agencies have vehicles equipped with traffic signal priority capability	(0/ 1) 0%	(0/ 1) 0%
16b. Transit Management agencies have vehicles equipped as probes on arterials	(0/ 1) 0%	(0/ 1) 0%
14a. Transit Management agencies disseminate information describing transit routes, schedules, and fares to travelers	(0/ 1) 0%	(1/ 1) 100%

Link Description	1999	2005
14b. Transit Management agencies disseminate information describing schedule/route adherence to travelers	(0/ 1) 0%	(1/ 1) 100%
15a. Transit Management agencies have vehicles equipped with ramp meter priority capability	(0/ 1) 0%	(0/ 1) 0%
15b. Transit Management agencies have vehicles equipped as probes on freeways	(0/ 1) 0%	(0/ 1) 0%
29. Transit Management agencies that report traffic incidents as part of an organized regional Incident Management program	(0/ 1) 0%	(0/ 1) 0%

Electronic Fare Payment Component Indicators

Data as of 5/1/00



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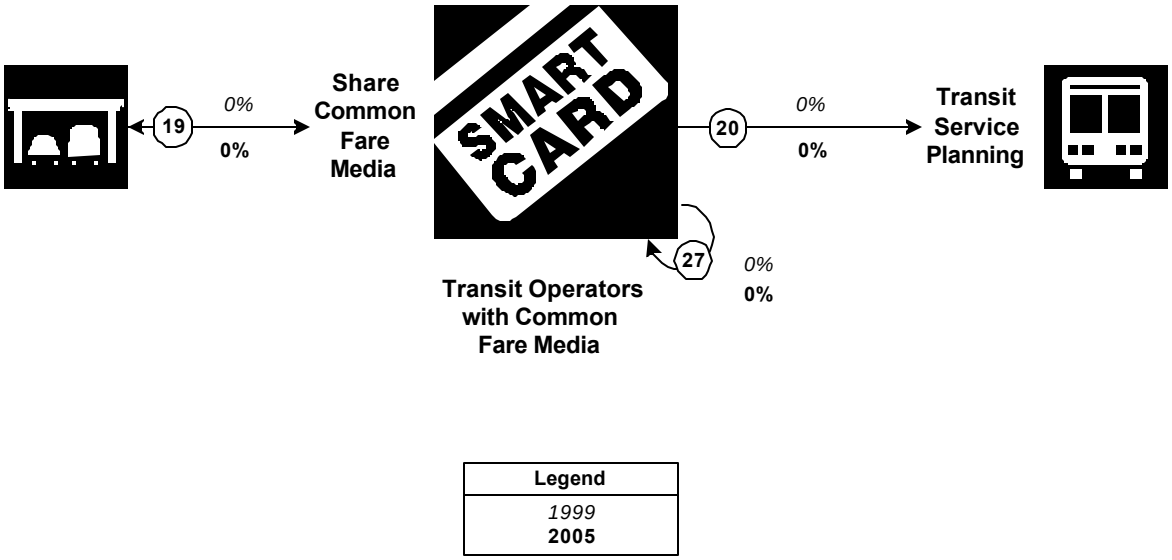
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles that accept electronic payment	0	285	0%		285		285		
Rail transit stations that accept electronic payment	0	0							

Electronic Fare Payment Integration Indicators

Hampton Roads
Electronic Fare Payment Integration*

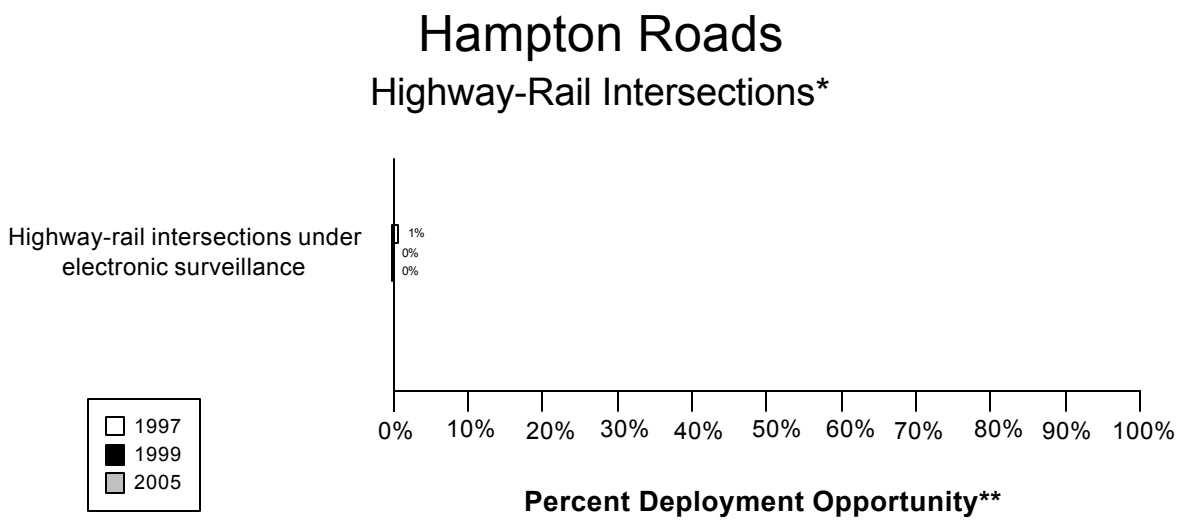


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
19. Transit agencies that accept electronic payment through the use of electronic toll collection media	(0/ 1) 0%	(0/ 1) 0%
20. Transit Management agencies use Electronic Fare Payment data in transit service planning	(0/ 1) 0%	(0/ 1) 0%
27. Transit Management agencies that use the same electronic payment system	(0/ 1) 0%	(0/ 1) 0%

Highway Rail Intersection Component Indicators

Data as of 5/1/00



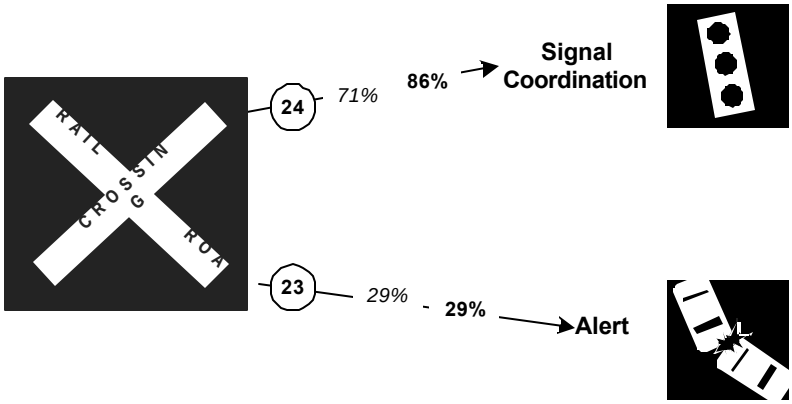
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Highway-rail intersections are under electronic surveillance	1	134	1%	0	172	0%	0	172	0%

Highway Rail Intersection Integration Indicators

Hampton Roads
Highway Rail Intersections Integration*

Inputs Outputs



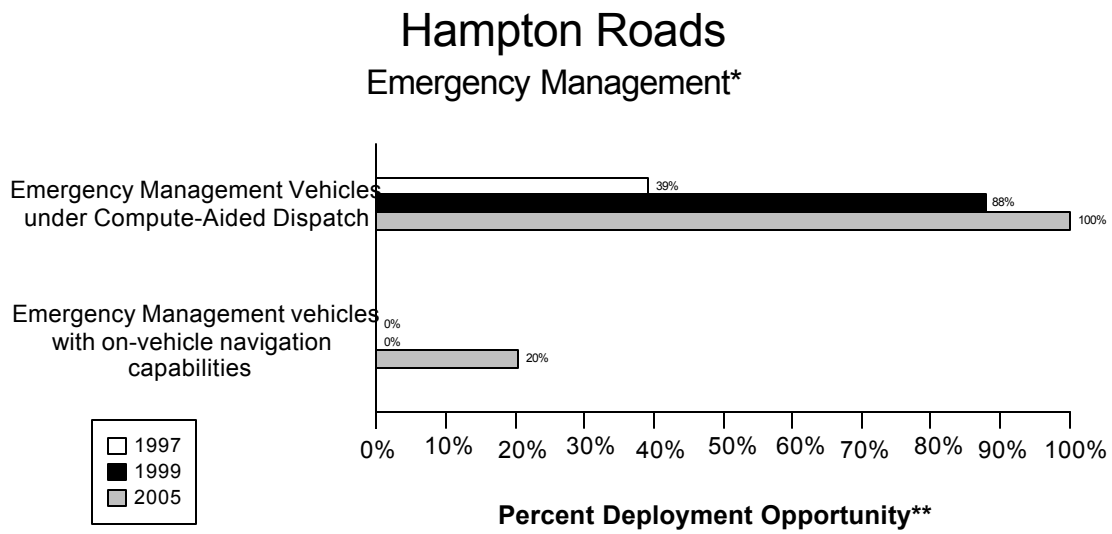
Legend
1999, **2005**

* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
24. Arterial Management agencies with traffic signals within 200 feet of a highway rail intersection with the capability of having their signal timing adjusted in response to a train crossing	(5/ 7) 71%	(6/ 7) 86%
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(2/ 7) 29%	(2/ 7) 29%

Emergency Management Component Indicators

Data as of 5/1/00



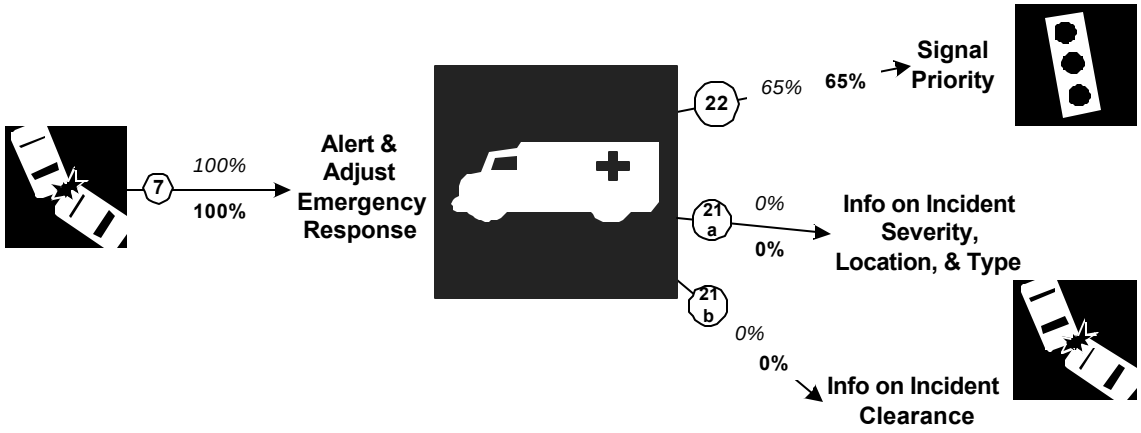
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Public sector emergency vehicles that operate under computer-aided dispatch	899	2299	39%	1864	2123	88%	1289	1289	100%
Public sector emergency vehicles that have in-vehicle route guidance capability	0	2299	0%	0	2123	0%	264	1289	20%

Emergency Management Integration Indicators

Hampton Roads
Emergency Management Integration*

Inputs Outputs



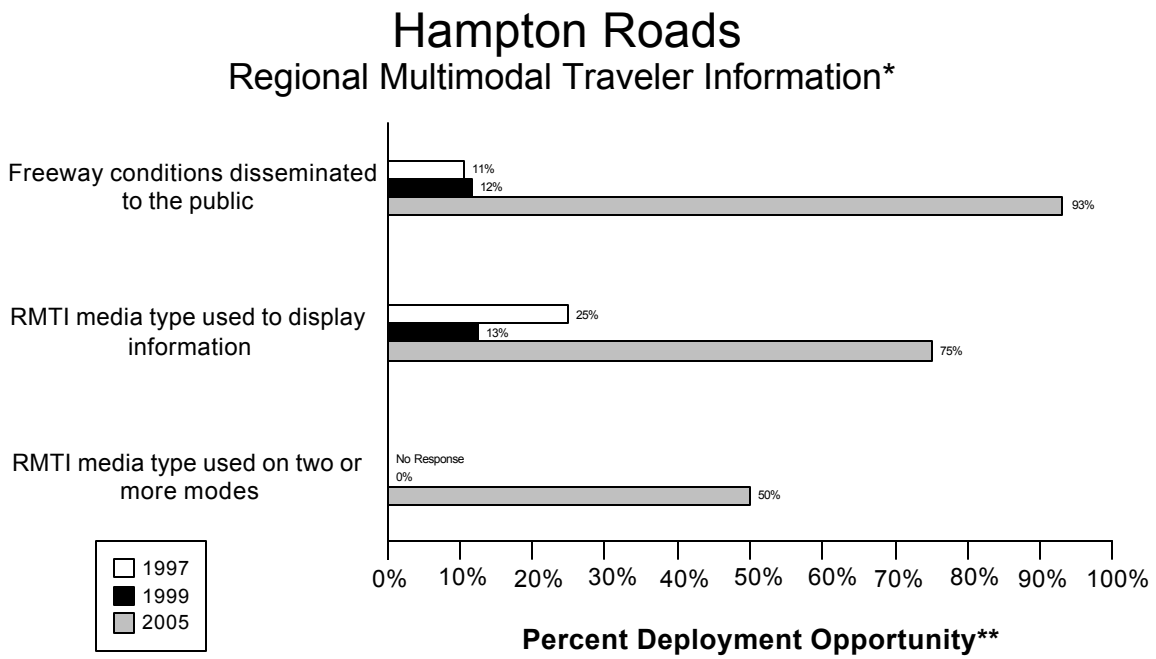
Legend
1999, **2005**

* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
7. Freeway Management agencies transfer information describing incident severity, location, and type to Emergency Management agencies	(1/ 1) 100%	(1/ 1) 100%
22. Emergency Management agencies have vehicles equipped with traffic signal preemption capability	(11/ 17) 65%	(11/ 17) 65%
21a. Freeway Management agencies receive incident severity, location, and type data from Emergency Management agencies	(0/ 1) 0%	(0/ 1) 0%
21b. Freeway Management agencies receive incident clearance activities information from Emergency Management agencies	(0/ 1) 0%	(0/ 1) 0%

Regional Multimodal Traveler Information Component Indicators

Data as of 5/1/00

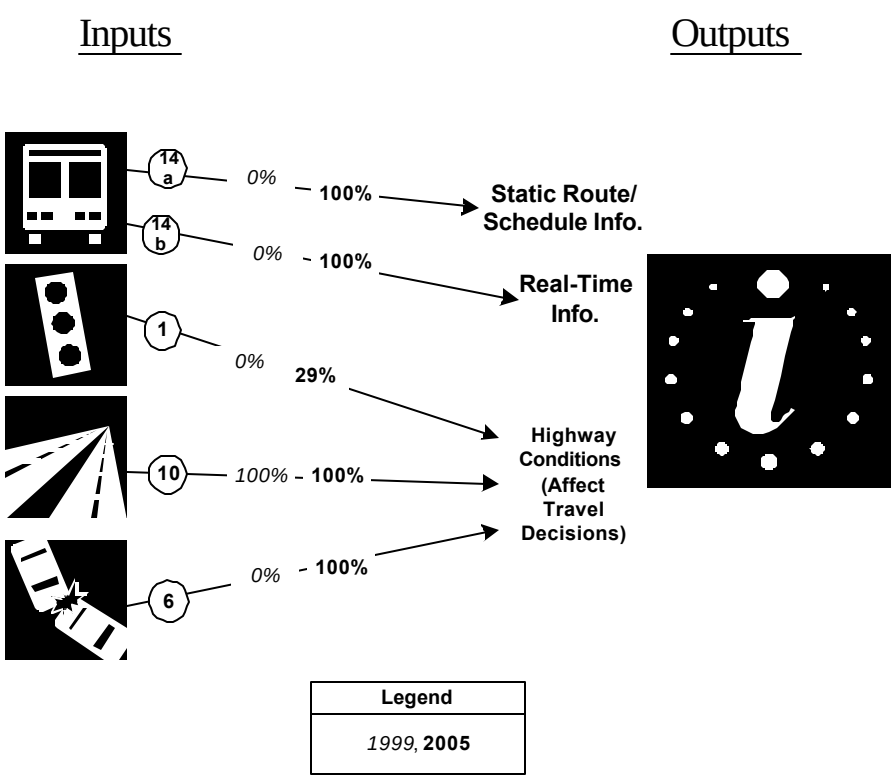


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway conditions disseminated to travelers	17	161	11%	19	161	12%	150	161	93%
Possible RMTI media types are used to display information to travelers	2	8	25%	1	8	13%	6	8	75%
Possible RMTI media are used to display information on *two or more modes* to travelers				0	8	0%	4	8	50%

Regional Multimodal Traveler Information Integration Indicators

Hampton Roads
Regional Multimodal Traveler Information Integration*

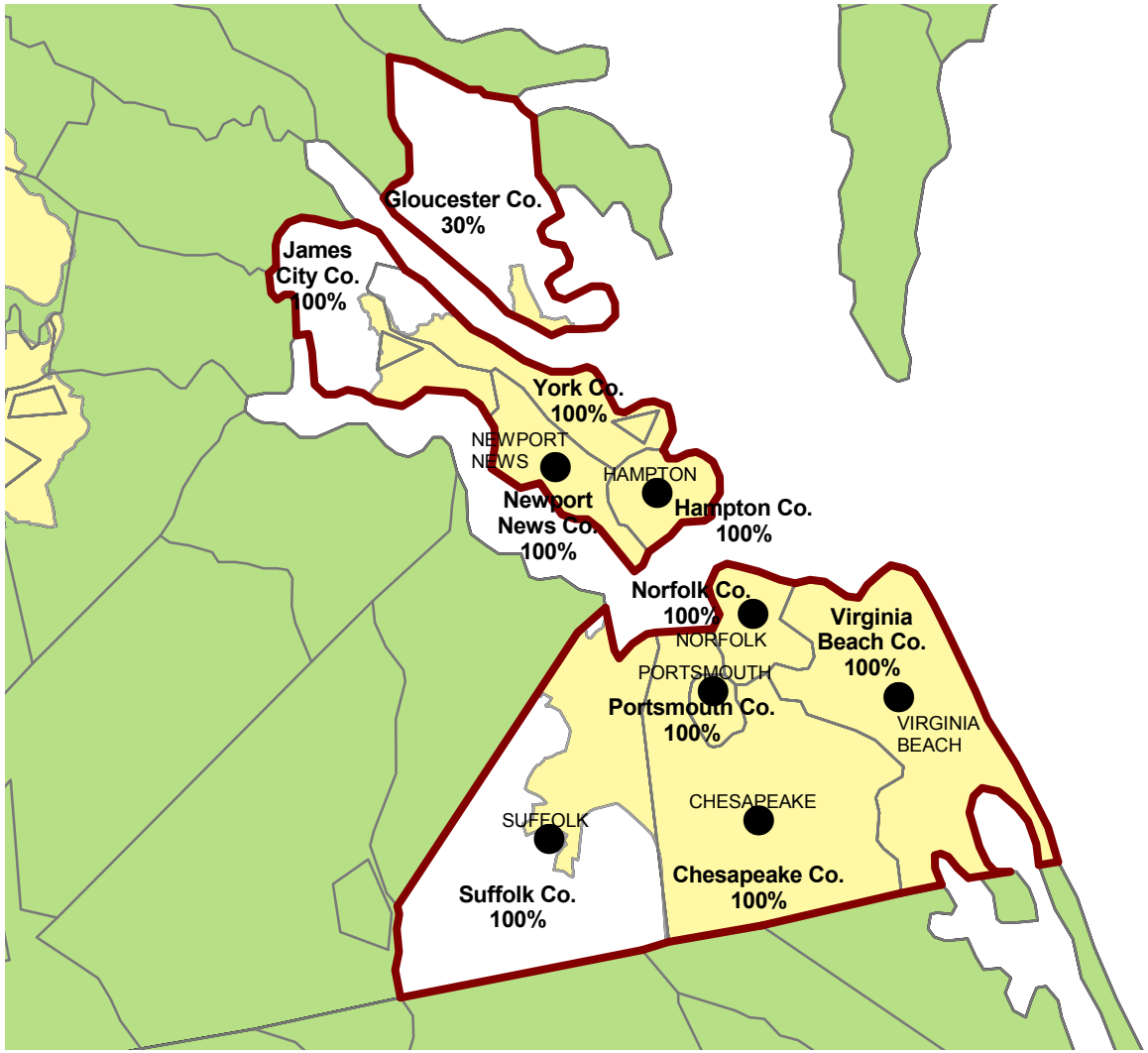


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
14a. Transit Management agencies that disseminate information describing transit routes, schedules, and fares to travelers	(0/ 1) 0%	(1/ 1) 100%
14b. Transit Management agencies that disseminate information describing schedule/route adherence to travelers	(0/ 1) 0%	(1/ 1) 100%
1. Arterial Management agencies that disseminate arterial travel times, speeds, and conditions to the public	(0/ 7) 0%	(2/ 7) 29%
10. Freeway Management agencies that disseminate freeway travel times, speeds, and conditions to travelers	(1/ 1) 100%	(1/ 1) 100%
6. Incident Management agencies that disseminate information describing incident severity, location, and type to the public	(0/ 1) 0%	(1/ 1) 100%

Appendix A
Survey Coverage Area

HAMPTON ROADS
METROPOLITAN PLANNING ORGANIZATION, VA



City Included in Surveys

Metropolitan Planning Area Boundary

County Boundary

Urbanlized Area

Outside Survey Area

Percentage on the Map Represents Percentage of County Population Included within MPO Boundary

Appendix B
Surveyed Agencies

Surveyed Agencies

Agency Name	Phone	Fax	1999		1997	
			Out	In	Out	In
HAMPTON ROADS						
Arterial Management						
Virginia Beach City	(757) 427-4491	(757) 427-4913	8/5/1999	10/15/1999	8/5/1997	8/24/1998
Hampton City	(757) 726-2930	(757) 726-2829	8/5/1999	8/16/1999	8/5/1997	11/14/1997
Norfolk City	(757) 664-7304	(757) 664-7311	8/5/1999	9/15/1999	8/5/1997	8/24/1998
Newport News City	(757) 926-8611	(757) 926-8300	8/5/1999	8/19/1999	8/5/1997	11/14/1997
Portsmouth City	(757) 393-8592	(757) 393-5148	8/5/1999	10/15/1999	8/5/1997	12/15/1997
Suffolk City	757-923-2085	757-923-2091	8/5/1999	12/1/1999	8/5/1997	
Chesapeake City	(757) 382-6501	(757) 382-8537	8/5/1999	9/17/1999	8/5/1997	12/15/1997
Electronic Toll Collection						
Virginia Department of Transportation Coleman	804-642-1300	804-642-2207	6/30/1999	7/8/1999	8/5/1997	11/14/1997
Chesapeake City DP W (ETC)-Jordan Bridge	(757) 382-6501	(757) 382-8537	6/30/1999	7/12/1999	8/5/1997	11/14/1997
Chesapeake Bay Bridge and Tunnel District	757-331-2960	757-331-4565	6/30/1999	8/16/1999	8/5/1997	11/14/1997
Emergency Management						
Virginia State Police	(804) 674-2095	(804) 674-2234	6/23/1999	7/9/1999	8/5/1997	11/14/1997
Norfolk City Fire & Paramedical Department	757-441-2171	757-624-6832	8/26/1999	9/9/1999	8/5/1997	3/1/1998
Chesapeake City Fire & Emergency Medical	(757) 382-6501	(757) 382-8537	6/23/1999	6/30/1999	8/5/1997	3/1/1998
Chesapeake City Police Department	(757) 382-6501	(757) 382-8537	6/23/1999	6/30/1999	8/5/1997	3/1/1998
Suffolk City Police Department	(757) 923-2110	757-538-0351	6/23/1999	6/25/1999	8/5/1997	3/1/1998
Virginia Beach City Fire Department	757-427-4228	757-000-0000	8/26/1999	8/27/1999	8/5/1997	3/1/1998
Hampton City Fire & Rescue Department	757-727-6580	757-727-6094	8/26/1999	9/23/1999	8/5/1997	11/14/1997
Newport News City Fire Department	757-926-8404	757-926-8602	6/23/1999	6/28/1999	8/5/1997	11/14/1997
Virginia Beach City Emergency Medical Services	757-437-4850	757-425-7864	8/26/1999	8/26/1999	8/5/1997	3/1/1998
Suffolk City Emergency Medical Services	(757) 923-2110	757-538-0351	6/23/1999	6/25/1999	8/5/1997	3/1/1998
Newport News City Police Department	757-926-3882	757-247-2977	6/23/1999	9/23/1999	8/5/1997	11/14/1997
Suffolk City Fire Department	(757) 923-2110	757-538-0351	6/23/1999	6/25/1999	8/5/1997	3/1/1998
Virginia Beach City Police Department	757-427-4216	757-426-5688	8/26/1999	9/13/1999	8/5/1997	3/1/1998
Portsmouth City Police Department	757-393-8257		8/26/1999	9/3/1999	8/5/1997	3/1/1998
Portsmouth City Fire & EMS Department	757-393-8765	757-393-5161	8/26/1999	8/26/1999	8/5/1997	3/1/1998
Norfolk City Police Department	757-441-2628	757-441-2788	8/26/1999		8/5/1997	3/1/1998
Newport News City Emergency Medical	757-926-8404	757-926-8602	6/23/1999		8/5/1997	11/14/1997
Hampton City Police Department	757-727-6510	757-727-6774	8/26/1999		8/5/1997	11/14/1997
Freeway Management						
Virginia Department of Transportation	(757) 424-9907	(757) 424-9911	7/29/1999	8/24/1999	8/5/1997	11/14/1997

Agency Name	Phone	Fax	1999		1997	
			Out	In	Out	In
MPO						
Hampton Roads Planning District Commission	(757) 420-8300	(757) 523-4881	7/15/1999	7/28/1999		
Transit Management						
Hampton Roads Transit	(757) 222-6086	(757) 222-6114	8/9/1999	12/13/1999	7/7/1997	10/17/1997

Appendix C
Freeway Management Components

Freeway Management
Agencies for Metropolitan Area: Hampton Roads

	Virginia Department of Transportation	
	1999	**2005**
Agency Returned Survey?	Yes	
FREEWAY MANAGEMENT SECTION		
Number of freeway centerline miles that agency owns or maintains	164	
Number of freeway centerline miles that is used for planning	150	
Number of freeway entrance ramps that agency owns, operates or maintains	290	
Number of freeway entrance ramps that is used for planning	0	
Type of facilities used to conduct freeway/incident management activities		
Activities housed in a free-standing dedicated building?	Yes	
Activities housed in a building shared with other activities?	No	
Activities conducted in a dedicated control room?	Yes	
Control room contains operator console(s)?	Yes	
Control room contains electronic wall map?	No	
Control room contains CCTV display(s)?	Yes	
Activities conducted in a room containing workstations or PCs that manage traffic?	Yes	
Facilities are electronically linked to other transportation mgt facilities?	Yes	
Staffing and hours of operation of freeway/incident management activities		
Number of full-time agency staff members	8	
Number of full time contractor staff members	55	
Number of part-time agency staff members	0	
Number of part-time contractor staff members	0	
Staffed 24 hours day by agency staff or by others	others	
Staffed during peak hours only by agency staff or by others	NR	
Staffed by others during off-peak hours	No	
Agency staff perform transportation management as an ancillary duty	No	
Agency staff dedicated to transportation management duty	No	
Types of operations conducted for freeway/incident management		
Incident detection and management?	Yes	
This metropolitan area?	Yes	
Other metropolitan area?	No	
Statewide?	No	
Monitoring and troubleshooting status of system components?	Yes	
Manual override of ramp metering rates at freeway on-ramps?	No	
Operating transportation management roadside devices?	Yes	
Radio communications with other agencies?	Yes	
Exchange of electronic data with other agencies such as computer aided dispatch?	No	
Real-Time Traffic Data Collection Technologies		
Total number of miles under surveillance with real-time data collection tech.	19	150

Freeway Management
Agencies for Metropolitan Area: Hampton Roads

	Virginia Department of Transportation	
	1999	**2005**
Number of Stations with data collection technologies		
Loop detectors	140	475
Video imaging detectors	0	0
Probe readers (elec. toll tags, transit vehicles, other technology)	0	0
Microwave radar	27	27
Other (e.g., acoustic detectors)	1	150
Number of Miles covered with data collection technologies		
Loop detectors	19	150
Video imaging detectors	0	0
Probe readers (elec. toll tags, transit vehicles, other technology)	0	0
Microwave radar	27	27
Other (e.g., acoustic detectors)	1	150
Variable Message Signs (VMS) on Freeways		
Candidate locations for deployment of VMS where VMS has been deployed	63	64
Candidate locations for deployment of VMS	63	64
Roadside Technologies used to Distribute Traveler Information		
Total number of miles where information is distributed	40	NR
Number deployed		
Highway advisory radio	2	4
In-vehicle signing	0	0
Portable variable message signs	8	8
Other	0	0
Miles covered		
Highway advisory radio	40	NR
In-vehicle signing	0	0
Portable variable message signs	NR	NR
Other	0	0
Ramp Meters on Freeways		
Number of entrance ramp meters operated under isolated control	NR	NR
Number of entrance ramp meters operated under central control	NR	NR
Number of entrance ramp meters that provide preemption for emergency vehicles	NR	NR
Number of entrance ramp meters that provide priority for transit vehicles	NR	NR
Total number of metered ramps	NR	NR
Freeway centerline miles under lane control	9	9
Communication Links		
Freeway centerline miles covered by the following type of communication		
Twisted pair cable	0	0
Coaxial cable	0	0
Fiber-optic cable	19	150
Microwave radio	0	0
Other	0	0
ITS Standards Used Related to Freeway Management		

Freeway Management
Agencies for Metropolitan Area: Hampton Roads

	Virginia Department of Transportation	
	1999	**2005**
ATMS Data Dictionary Sections 1 and 2 (ITE TM 1.01)	No	
ATMS Data Dictionary Sections 3 and 4 (ITE TM 1.02)	No	
Message Set for External TMC Communication (ITE-9604-1)	No	
NTCIP Class B Profile (AASHTO TS 3.3)	Yes	
NTCIP Data Collection and Monitoring Devices (AASHTO TS 3.DCM)	No	
NTCIP Object Definitions for Environmental Sensor Stations (AASHTO TS 3.7)	No	
NTICP Object Definitions for Dynamic Message Signs (AASHTO TS 3.6)	Yes	
NTICP Object Definitions for Highway Advisory Radio (AASHTO TS 3.HAR)	No	
NTICP Object Definitions for Ramp Meter Control (AASHTO TS 3.RMC)	No	
NTICP Object Definitions for Transportation Sensor Systems (AASHTO TS 3.TSS)	No	
NTICP Object Definitions for Video Camera Control (AASHTO TS 3.VCC)	No	
Would agency be willing to participate in testing of ITS Standards?	Yes	
Have agreements in place with other agencies to use similar hardware		
and software to aid maintenance and interoperability?	No	
INCIDENT MANAGEMENT SECTION		
Use of Service Patrols to Assist in Detection and Response to Incidents		
Publicly operated service patrol vehicles	Yes	
Privately operated service patrol vehicles operated under public contract	No	
Total number of freeway miles patrolled by these services	60	150
Miles Covered by Methods to Detect and Verify Incidents		
Free cellular phone call to a dedicated phone number other than 911	60	150
Police patrols	150	150
Computer algorithms linked to traffic surveillance equipment	0	150
CCTV	19	150
Private sector sources (e.g., Shadow Traffic, SmartRoutes)	0	150
Other (e.g., free cell phone call to an area radio system, etc.)	NR	NR
Procedures in place for Freeway Incident Response?		
Working agreement(s)/arrangement(s) with other agencies	No	
Inter-agency incident management admin. team that meets regularly	Yes	
Major incident response team that responds to major incidents	No	
Set of goals/objectives for incident mgt that has been adopted by agencies in region	No	
Central focal point for facilitating the two-way flow of information		
among agencies responding to an incident?		
The central focal point is a Freeway or Traffic Management Center	Yes	
The central focal point is a Police, Fire or joint dispatch center	No	
The central focal point is another center	No	
Methods of Communication Used On-Site at an Incident		
Police		
Two-way radio	Yes	
800 MHz trunked radio	Yes	
Cellular telephone	Yes	

Freeway Management
Agencies for Metropolitan Area: Hampton Roads

	Virginia Department of Transportation	
	1999	**2005**
Hand-held (i.e., walkie-talkie)	Yes	
Automated data systems (i.e., CAD)	Yes	
Fire		
Two-way radio	Yes	
800 MHz trunked radio	No	
Cellular telephone	Yes	
Hand-held (i.e., walkie-talkie)	Yes	
Automated data systems (i.e., CAD)	No	
DOT		
Two-way radio	Yes	
800 MHz trunked radio	No	
Cellular telephone	Yes	
Hand-held (i.e., walkie-talkie)	No	
Automated data systems (i.e., CAD)	No	
Towing		
Two-way radio	Yes	
800 MHz trunked radio	No	
Cellular telephone	Yes	
Hand-held (i.e., walkie-talkie)	No	
Automated data systems (i.e., CAD)	No	
Which police agencies typically respond to incidents on freeways?		
State Police	Yes	
County Police or Sheriff	No	
City Police	No	
Who provides on-site emergency medical response?		
Fire	No	
Emergency Management Service Agency	Yes	
Private hospital	No	
Has a multi-agency contact list been developed in area containing the		
names, phone numbers, etc. for the appropriate response personnel?	DK	
Is the Incident Command System used to manage incident scenes?	Yes	
Is there a legal specification by state law or formal agreement as to who		
is "in charge" at the incident scene?		
Specified by state law?	No	
Formal agreement?	No	
Not specified or don't know?	Yes	
On-scene command post used to manage activities of responding agencies?	Yes	
Are there communication linkages to a communications traffic/freeway mgt center?	Yes	
Plan developed and adopted by responding agencies for staging and parking		
response vehicles and equip. at incident site that minimizes lane blockage		
and facilitates the re-opening of lanes?	Yes	
Respondents protected through law or court opinion for liability claims		

Freeway Management
Agencies for Metropolitan Area: Hampton Roads

	Virginia Department of Transportation	
	1999	**2005**
for damages to vehicles or cargoes during clearance activities?	Yes	
Are overturned tank trucks, which are intact and not leaking, uprighted		
without first off-loading?	No	
Does your state or local jurisdiction have a law that requires drivers		
involved in property-damage-only accidents to move the vehicles		
from travel lanes to a safe location to exchange info and wait for police?	Yes	
Have laws or policies regarding the removal of stalled/abandoned vehicles		
from freeway shoulders?	Yes	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	0-24	
Have policies or procedures for quick removal of vehicles?	Yes	
Is Total Station equipment used to investigate major incidents?	DK	
Handling of Towing Responses to Incidents		
Formal contract based on qualifications?	Yes	
Rotation with companies under contract?	No	
Separate lists kept for light and heavy response and for specialty recovery?	NR	
Rotation list with minimal qualifications?	Yes	
In towing qualifications, do you require towers to be certified under the		
Towing and Recovery Ass. of America's National Drivers Cert. Program?	Considered	
_____		
DK: Don't know		
NR: No Response		
Leg: Legislation or action being planned		

Appendix D
Freeway Management Integration

Freeway Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Virginia Department of Transportation	
	1999	**2005**
Agency Returned Survey?	Yes	
Freeway Management Section		
Agencies your agency provides freeway travel times, speeds, and		
conditions information, share infrastructure or coordinates operation		
Freeway Management Agencies		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
Incident Management Agencies		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
Arterial Management Agencies		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
Public Transit Operators		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
Receiving real-time information via electronic means from others		
Incident Management agencies from which your agency receives		
incident severity, location, and type information	None listed	None listed
Arterial Management agencies from which your agency receives		
arterial travel times, speeds, and conditions	None listed	None listed
Public Transit operators from which your agency receives		
freeway travel times derived from vehicle probes	None listed	None listed
Toll Collection agencies from which your agency receives freeway travel		
times derived from vehicles probes	None listed	None listed
Freeway Incident Management Section		
Agencies your agency provides incident severity, location, and type info.		
and/or shares infrastructure and/or coordinates operation		
Arterial Management Agencies		
Provide Information	None listed	Chesapeake City Department of Public Works, Hampton City, Newport News City, Norfolk City, Portsmouth City, Virginia Beach City

Freeway Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Virginia Department of Transportation	
	1999	**2005**
Share Infrastructure	None listed	Hampton City, Norfolk City, Portsmouth City
Coordinate Operation	None listed	Chesapeake City Department of Public Works, Hampton City, Newport News City, Norfolk City, Portsmouth City, Virginia Beach City
Emergency Management Agencies		
Provide Information	Virginia Beach City Fire Department, Virginia State Police	Chesapeake City Fire & Emergency Medical (Fire), Chesapeake City Police Department, Newport News City Emergency Medical Services, Hampton City Fire & Rescue Department, Hampton City Police Department, Newport News City Emergency Medical Services, Newport News City Fire Department, Newport News City Police Department, Norfolk City Fire & Paramedical Department, Norfolk City Police Department, Portsmouth City Fire & EMS Department, Portsmouth City Police Department, Suffolk City Emergency Medical Services, Suffolk City Fire Department, Suffolk City Police Department, Virginia Beach City Emergency Medical Services, Virginia Beach City Police Department
Share Infrastructure	None listed	None listed

Freeway Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Virginia Department of Transportation	
	1999	**2005**
Coordinate Operation	Chesapeake City Fire & Emergency Medical (Fire), Chesapeake City Police Department, Newport News City Emergency Medical Services, Hampton City Fire & Rescue Department, Hampton City Police Department, Newport News City Emergency Medical Services, Newport News City Fire Department, Newport News City Police Department, Norfolk City Fire & Paramedical Department, Norfolk City Police Department, Portsmouth City Fire & EMS Department, Portsmouth City Police Department, Suffolk City Emergency Medical Services, Suffolk City Fire Department, Suffolk City Police Department, Virginia Beach City Emergency Medical Services, Virginia Beach City Fire Department, Virginia State Police, Virginia Beach City Police Department	None listed
Freeway Management Agencies		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
Public Transit Operators		
Provide Information	Tidewater Transportation District Commission	Peninsula TDC
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	Peninsula TDC, Tidewater Transportation District Commission
Receiving real-time information via electronic means from others		
Emergency Management agencies from which your agency receives		
incident clearance and/or incident severity and type		
Receive Arterial Incident Clearance Information	None listed	None listed
Receive Arterial Incident Severity Information	None listed	None listed
Arterial Management agencies from which your agency receives		
arterial travel times, speeds, and conditions	None listed	Hampton City, Norfolk City
Freeway Management agencies from which your agency receives		
freeway travel times, speeds, and conditions	None listed	None listed

*short survey: Agency responded using a short survey. The survey did not include names of individual agencies, but only identified whether integration exists.

Appendix E
Freeway Management Information Collection and Dissemination

Data Collection and Dissemination: Freeway Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Virginia Department of Transportation	
	1999	**2005**
Agency Returned Survey?	Yes	
Freeway Management Section		
Data collected, archived, and/or transferred to another agency		
Collected by your agency	Traffic volumes, Traffic speeds, Lane occupancy, Road conditions, Route designations (snow emergency, etc.), Weather conditions, Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures, Highway operations coordination information	Vehicle classification, Intermodal (air, rail, water) connections
Archived by your agency	Traffic volumes, Traffic speeds, Lane occupancy, Road conditions, Incidents, Emergency/evacuation routes and procedures	Vehicle classification, Weather conditions, Current work zones, Scheduled work zones, Intermodal (air, rail, water) connections, Highway operations coordination information
Transferred to another agency by your agency	Traffic volumes, Traffic speeds, Lane occupancy, Road conditions, Route designations (snow emergency, etc.), Weather conditions, Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures, Highway operations coordination information	Vehicle classification, Intermodal (air, rail, water) connections
Importance of making information available to the public		
Ranked High	Road conditions, Route designations (snow emergency, etc.), Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures	
Ranked Medium	Traffic volumes, Traffic speeds, Lane occupancy, Vehicle classification, Weather conditions, Intermodal (air, rail, water) connections, Highway operations coordination information	
Ranked Low	NR	
Groups that make requests for the data	Universities, Media (I.e., TV stations, radio stations), MPOs, Consultants, Advanced Traveler Information Systems (ATIS) provi	
What is the data used for?	Traffic analysis, Incident detection algorithm development, Roadway impact analysis, Accident prediction models, Dissemination to the public	
Methods used to disseminate freeway information to the public		
Technologies your agency uses to disseminate:	Pagers or personal data assistants	Telephone system, Internet Web sites, Kiosks, E-mail or other direct PC communication, In-vehicle navigation systems
Technologies your agency (through another agency or org.) uses to disseminate:	Telephone system, Internet Web sites	Dedicated cable TV, Pagers or personal data assistants, Kiosks, E-mail or other direct PC communication, In-vehicle navigation systems, Facsimile
Internet web site reporting freeway conditions	www.gohamptonroads.com www.hamptonroads.com	

Data Collection and Dissemination: Freeway Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Virginia Department of Transportation	
	1999	**2005**
Telephone system for reporting freeway information to the public	NR	
Organizations your agency sends information for dissemination to the public	All three local TV stations Cox Interactive Internet Pilot-Online Internet	
Freeway Incident Management Section		
Methods used to distribute incident location and severity information		
to the public		
Technologies your agency uses to disseminate:	NR	Telephone system, Internet Web sites
Technologies your agency (through another agency or org.) uses to disseminate:	Telephone system, Internet Web sites	NR
Internet web site reporting incident information	see Question No. 15	
Telephone system for reporting incident information to the public	NR	
Organizations your agency sends information for dissemination to the public	NR	

Appendix F
Arterial Management Components

Arterial Management
Agencies for Metropolitan Area: Hampton Roads

	Chesapeake City		Hampton City		Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes		Yes		Yes	
ARTERIAL MANAGEMENT SECTION								
Number of arterial miles that agency owns or maintains	1,957		75		65		124	
Number of arterial miles that is used for planning	397		25		65		30	
Number of highway-rail intersections that agency maintains	75		6		16		64	
Number of highway-rail intersections that is used for planning	26		0		10		0	
Type of facilities used to conduct arterial management activities								
Activities housed in a free-standing dedicated building?	No		No		No		No	
Activities housed in a building shared with other activities?	Yes		No		Yes		No	
Activities conducted in a dedicated control room?	No		No		No		Yes	
Control room contains operator console(s)?	No		No		No		Yes	
Control room contains electronic wall map?	No		No		No		Yes	
Control room contains CCTV display(s)?	No		No		No		Yes	
Activities conducted in a room containing workstations or PCs that manage traffic?	Yes		No		No		No	
Facilities are electronically linked to other transportation mgt facilities?	No		No		No		Yes	
Staffing and hours of operation of arterial management activities								
Number of full-time agency staff members	1		NR		NR		2	
Number of full time contractor staff members	NR		NR		NR		NR	
Number of part-time agency staff members	NR		NR		NR		NR	
Number of part-time contractor staff members	NR		NR		NR		NR	
Staffed 24 hours day by agency staff or by others	NR		NR		NR		NR	
Staffed during peak hours only by agency staff or by others	NR		NR		NR		NR	
Staffed by others during off-peak hours	No		No		No		No	
Agency staff perform transportation management as an ancillary duty	No		No		Yes		Yes	
Agency staff dedicated to transportation management duty	No		No		No		No	
Types of operations conducted for arterial management								
Incident detection and management?	No		No		Yes		Yes	
This metropolitan area?	No		No		Yes		No	
Other metropolitan area?	No		No		No		No	
Monitoring and troubleshooting status of system components?	Yes		No		Yes		Yes	
Radio communications with other agencies?	No		No		No		Yes	
Exchange of electronic data with other agencies such as computer aided dispatch?	No		No		No		No	
Manual override of traffic signal timing plans	Yes		No		Yes		Yes	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	No		No		No		Yes	
Describe agency's role in traffic signal control	All roads in incorporated area		All roads in county		All roads in incorporated area		All roads in incorporated area	
Traffic Signals Operated by Agency								

Arterial Management
Agencies for Metropolitan Area: Hampton Roads

	Chesapeake City		Hampton City		Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Number of signalized intersections operated and owned by agency	128	150	160	175	224	239	278	285
Number of signalized intersections operated by agency but owned by another	NR	NR	NR	NR	0	0	0	0
Total number of signalized intersections operated by agency	128	150	160	175	224	239	278	285
Characteristics of signalized intersections that agency operates								
Under closed loop or central system control	128	150	30	5	214	224	215	260
Under real-time traffic adaptive control using advanced software	0	NR	0	0	0	0	0	NR
Using SCOOT	No		No		No		No	
Using SCATS	No		No		No		No	
Name of software	NR		NR		NR		NR	
Allow signal preemption for emergency vehicles	5	50	30	100	29	NR	23	46
Allow signal priority for transit vehicles	0	NR	0	50	0	0	0	0
Within 200 feet of a highway-rail intersection	2	2	6	6	0	1	20	20
Within 200 feet of a highway-rail intersection that adjust signal timing	2	2	5	5	0	1	6	12
Software used to control the signals agency operates								
Date of last upgrade to traffic signal control system software?	November 1998		1997		1988		March 1999	
How often do you update signal timing?	yearly		every 3 years		3 years		3 years	
Software used and number of signalized intersections under control (1999, 2005)	ECONOLITE ZONE MONITOR, 128, NR		PEEK MATTS, 0, 175 PEEK/TCT CLOSED LOOP, 30, 0		TCT CLOSED LOOP SYSTEM, 214, 224		BITRAN QUICKLOOK, 8, NR SONEX CLOSED LOOP, 30, NR BITRAN QUICKNET, 215, NR	
Controllers used to control signals								
NEMA	128	150	160	175	224	239	55	NR
170/179	0	0	0	0	0	0	223	285
2070 controller	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Technologies Associated with Highway-Rail Intersections								
Total number of highway-rail intersections under electronic surveillance	NR	NR	NR	NR	NR	NR	NR	NR
Highway-Rail intersection capapbilities								
Video surveillance	0	0	0	0	0	0	0	0
Electronic surveillance other than video	0	0	0	0	0	0	0	0
Ability to predict train arrival electronically	0	0	0	0	0	0	0	0
Equipped with electronic traffic violator devices	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Real-Time Electronic Traffic Data Collection Technologies								
Total number of signalized intersections covered by electronic surveillance	128	NR	50	140	134	149	52	120
Number of signalized intersections with data collection technologies								
Loop detectors	124	NR	50	140	134	149	50	100
Video detection cameras	4	NR	0	0	0	0	2	20

Arterial Management
Agencies for Metropolitan Area: Hampton Roads

	Chesapeake City		Hampton City		Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Probe readers reading toll tags	NR	1	0	0	0	0	0	0
Probe readers reading license plates	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Roadside Technologies used to Distribute Traveler Information								
Number deployed								
Highway Advisory Radio	NR	NR	NR	NR	NR	NR	NR	NR
In-Vehicle Signing (IVS)	NR	NR	NR	NR	NR	NR	NR	NR
VMS controlling parking access	NR	NR	NR	NR	NR	NR	NR	NR
Miles covered								
Highway Advisory Radio	NR	NR	NR	NR	NR	NR	NR	NR
In-Vehicle Signing (IVS)	NR	NR	NR	NR	NR	NR	NR	NR
Variable Message Signs (VMS) on Arterials								
Candidate locations for deployment of VMS where VMS has been deployed	NR	NR	NR	NR	0	18	2	20
Candidate locations for deployment of VMS	NR	NR	NR	NR	0	18	10	20
Communication Technologies								
Signalized intersections communicated with by each type of communication								
Twisted pair cable	0	0	30	0	215	225	20	NR
Coaxial cable	0	0	0	0	0	0	0	0
Fiber-optic cable	NR	150	0	170	0	0	215	260
Other (e.g., wireless, dial-up modems, leased lines, etc.)	128	0	0	5	216	226	8	0
Does agency convey information on highway-rail intersection crossing								
status to travelers via roadside media such as VMS or HAR?	No		No		No		No	
ITS Standards Used Related to Traffic Signal Control								
Advanced Transportation Controller (ATC) Software Application Interface (ITE 9603-1)	No		No		No		Yes	
ATC Physical Cabinet Functional Design (ITE-9603-2)	No		No		No		Yes	
ATC Functionality and Interface Definitions (ITE-9603-3)	No		No		No		Yes	
Natl. Trans. Communications for ITS Protocol (NTCIP) Class B Profile (AASHTO TS 3.3)	No		No		No		No	
NTCIP Data Collection and Monitoring Devices (AASHTO TS 3.DCM)	No		No		No		No	
NTCIP Object Definitions for Video Camera Control (AASHTO TS 3.VCC)	No		No		No		No	
NTCIP Object Definitions for Actuated Traffic Signal Controller Units (AASHTO TS 3.5)	Yes		No		No		No	
Would agency be willing to participate in testing of ITS Standards?	Yes		Yes		Yes		Yes	
Have agreements in place with other agencies to use similar hardware								
and software to aid maintenance and interoperability?	No		No		Yes		No	
INCIDENT MANAGEMENT ON ARTERIAL STREETS								
Receive information on highway-rail intersection crossing blockages for								
the purpose of managing incident response?	No		No		Yes		No	
Use of Service Patrols to Assist in Detection and Response to Incidents								
Publicly operated service patrol vehicles	No		No		No		No	
Privately operated service patrol vehicles operated under public contract	No		No		No		No	
Total number of arterial miles patrolled by these services	NR	NR	NR	NR	NR	NR	NR	NR
Miles Covered by Methods to Detect and Verify Incidents								
Free cellular phone call to a dedicated phone number other than 911	0	0	0	0	0	0	0	0
Free cellular phone call to an area radio station	0	0	0	0	0	0	0	0

Arterial Management
Agencies for Metropolitan Area: Hampton Roads

	Chesapeake City		Hampton City		Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Police patrols	0	0	0	0	65	66	0	0
Computer algorithms linked to traffic surveillance equipment	0	0	0	0	0	0	0	0
CCTV	0	0	0	0	0	0	4	20
Private sector sources (e.g., Shadow Traffic, Smart Routes)	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Procedures in place for Arterial Incident Response?								
Working agreement(s)/arrangement(s) with other agencies	No		No		No		No	
Inter-agency incident management admin. team that meets regularly	No		No		No		No	
Major incident response team that responds to major incidents	No		No		No		No	
Set of goals/objectives for incident mgt that has been adopted by agencies in region	No		No		No		No	
Methods of Communication Used On-Site at an Incident								
Police								
Two-way radio	No		No		Yes		Yes	
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		No		No		No	
Hand-held (i.e., walkie-talkie)	No		No		No		Yes	
Automated data systems (i.e., CAD)	No		No		No		No	
Other	No		No		No		Yes	
Fire								
Two-way radio	No		No		Yes		Yes	
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		No		No		No	
Hand-held (i.e., walkie-talkie)	No		No		No		Yes	
Automated data systems (i.e., CAD)	No		No		No		No	
Other	No		No		No		Yes	
DOT								
Two-way radio	No		No		No		No	
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		No		No		No	
Hand-held (i.e., walkie-talkie)	No		No		No		No	
Automated data systems (i.e., CAD)	No		No		No		No	
Other	No		No		No		No	
Towing								
Two-way radio	No		No		No		No	
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		No		No		No	
Hand-held (i.e., walkie-talkie)	No		No		No		No	
Automated data systems (i.e., CAD)	No		No		No		No	
Other	No		No		No		No	
Which police agencies typically respond to incidents on arterials?								
State Police	No		No		No		No	

Arterial Management
Agencies for Metropolitan Area: Hampton Roads

	Chesapeake City		Hampton City		Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
County Police or Sheriff	No		No		No		No	
City Police	No		No		Yes		Yes	
Who provides on-site emergency medical response?								
Fire	No		No		Yes		No	
Emergency Management Service Agency	No		No		No		Yes	
Private hospital	No		No		No		No	
Has a multi-agency contact list been developed in area containing the								
names, phone numbers, etc. for the appropriate response personnel?	NR		NR		DK		DK	
Is the Incident Command System used to manage incident scenes?	NR		NR		DK		DK	
Is there a legal specification by state law or formal agreement as to who								
is "in charge" at the incident scene?								
Specified by state law?	No		No		Yes		No	
Formal agreement?	No		No		No		No	
Not specified or don't know?	No		No		No		Yes	
On-scene command post used to manage activities of responding agencies?	NR		NR		Yes		Yes	
Are there communication linkages to a communications traffic/freeway mgt center?	NR		NR		No		Yes	
Plan developed and adopted by responding agencies for staging and parking								
response vehicles and equip. at incident site that minimizes lane blockage								
and facilitates the re-opening of lanes?	NR		NR		No		No	
Respondents protected through law or court opinion for liability claims								
for damages to vehicles or cargoes during clearance activities?	NR		NR		DK		DK	
Are overturned tank trucks, which are intact and not leaking, uprighted								
without first off-loading?	NR		NR		No		NR	
Does your state or local jurisdiction have a law that requires drivers								
involved in property-damage-only accidents to move the vehicles								
from travel lanes to a safe location to exchange info and wait for police?	NR		NR		No		No	
Have laws or policies regarding the removal of stalled/abandoned vehicles								
from freeway shoulders?	NR		NR		Yes		No	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	NR		NR		0-24		DK	
Have policies or procedures for quick removal of vehicles?	NR		NR		Yes		No	
Is Total Station equipment used to investigate major incidents?	NR		NR		No		No	
Handling of Towing Responses to Incidents								
Formal contract based on qualifications?	No		No		No		Yes	
Rotation with companies under contract?	No		No		No		No	
Separate lists kept for light and heavy response and for specialty recovery?	NR		NR		NR		NR	
Rotation list with minimal qualifications?	No		No		Yes		No	
In towing qualifications, do you require towers to be certified under the								
Towing and Recovery Ass. of America's National Drivers Cert. Program?	NR		NR		DK		DK	
_____								
DK: Don't know								
NR: No Response								
Leg: Legislation or action being planned								

Arterial Management
Agencies for Metropolitan Area: Hampton Roads

	Portsmouth City		Suffolk City		Virginia Beach City		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes		Yes		7	
ARTERIAL MANAGEMENT SECTION								
Number of arterial miles that agency owns or maintains	NR		NR		NR		2,221	
Number of arterial miles that is used for planning	NR		NR		NR		517	
Number of highway-rail intersections that agency maintains	NR		11		NR		172	
Number of highway-rail intersections that is used for planning	NR		NR		NR		36	
Type of facilities used to conduct arterial management activities								
Activities housed in a free-standing dedicated building?	No		No		Yes		1	
Activities housed in a building shared with other activities?	No		No		No		2	
Activities conducted in a dedicated control room?	Yes		No		No		2	
Control room contains operator console(s)?	No		No		No		1	
Control room contains electronic wall map?	No		No		No		1	
Control room contains CCTV display(s)?	No		No		No		1	
Activities conducted in a room containing workstations or PCs that manage traffic?	No		No		No		1	
Facilities are electronically linked to other transportation mgt facilities?	No		No		No		1	
Staffing and hours of operation of arterial management activities								
Number of full-time agency staff members	1		NR		6		10	
Number of full time contractor staff members	NR		NR		0		0	
Number of part-time agency staff members	NR		NR		NR		0	
Number of part-time contractor staff members	NR		NR		NR		0	
Staffed 24 hours day by agency staff or by others	NR		NR		agency		0	
Staffed during peak hours only by agency staff or by others	agency		NR		NR		0	
Staffed by others during off-peak hours	No		No		No		0	
Agency staff perform transportation management as an ancillary duty	No		No		No		2	
Agency staff dedicated to transportation management duty	No		No		No		0	
Types of operations conducted for arterial management								
Incident detection and management?	No		No		No		2	
This metropolitan area?	No		No		No		1	
Other metropolitan area?	No		No		No		0	
Monitoring and troubleshooting status of system components?	Yes		No		No		4	
Radio communications with other agencies?	No		No		No		1	
Exchange of electronic data with other agencies such as computer aided dispatch?	No		No		No		0	
Manual override of traffic signal timing plans	Yes		No		No		4	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	No		No		No		1	
Describe agency's role in traffic signal control	All roads in incorporated area		NR		All roads in incorporated area			
Traffic Signals Operated by Agency								

Arterial Management
Agencies for Metropolitan Area: Hampton Roads

	Portsmouth City		Suffolk City		Virginia Beach City		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Number of signalized intersections operated and owned by agency	NR	NR	NR	NR	321	NR	1,111	849
Number of signalized intersections operated by agency but owned by another	NR	NR	NR	NR	0	NR	0	0
Total number of signalized intersections operated by agency	115	120	23	35	321	NR	1,249	1,004
Characteristics of signalized intersections that agency operates								
Under closed loop or central system control	54	68	23	35	245	NR	909	742
Under real-time traffic adaptive control using advanced software	0	5	0	10	0	NR	0	15
Using SCOOT	No		No		No		0	
Using SCATS	No		No		No		0	
Name of software	NR		NR		NR		0	0
Allow signal preemption for emergency vehicles	4	5	0	5	20	NR	111	206
Allow signal priority for transit vehicles	0	0	0	0	0	NR	0	50
Within 200 feet of a highway-rail intersection	6	6	3	3	8	NR	45	38
Within 200 feet of a highway-rail intersection that adjust signal timing	1	3	0	0	8	NR	22	23
Software used to control the signals agency operates								
Date of last upgrade to traffic signal control system software?	1999		NR		NR			
How often do you update signal timing?	When there is a need		NR		NR			
Software used and number of signalized intersections under control (1999, 2005)	CL MATS, 37, 71		NR		NR			
Controllers used to control signals								
NEMA	0	0	0	0	321	NR	888	564
170/179	0	0	0	0	0	0	223	285
2070 controller	0	0	0	0	0	0	0	0
Other	111	0	0	0	0	0	111	0
Technologies Associated with Highway-Rail Intersections								
Total number of highway-rail intersections under electronic surveillance	NR	NR	0	0	NR	NR	0	0
Highway-Rail intersection capapbilities								
Video surveillance	0	0	0	0	0	0	0	0
Electronic surveillance other than video	0	0	0	0	0	0	0	0
Ability to predict train arrival electronically	0	0	0	0	0	0	0	0
Equipped with electronic traffic violator devices	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Real-Time Electronic Traffic Data Collection Technologies								
Total number of signalized intersections covered by electronic surveillance	NR	NR	NR	NR	321	NR	685	409
Number of signalized intersections with data collection technologies								
Loop detectors	0	0	0	0	318	NR	676	389
Video detection cameras	0	0	0	0	3	NR	9	20

	Portsmouth City		Suffolk City		Virginia Beach City		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Probe readers reading toll tags	0	0	0	0	0	0	0	1
Probe readers reading license plates	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Roadside Technologies used to Distribute Traveler Information								
Number deployed								
Highway Advisory Radio	NR	NR	NR	NR	NR	NR	0	0
In-Vehicle Signing (IVS)	NR	NR	NR	NR	NR	NR	0	0
VMS controlling parking access	NR	NR	NR	NR	NR	NR	0	0
Miles covered								
Highway Advisory Radio	NR	NR	NR	NR	NR	NR	0	0
In-Vehicle Signing (IVS)	NR	NR	NR	NR	NR	NR	0	0
Variable Message Signs (VMS) on Arterials								
Candidate locations for deployment of VMS where VMS has been deployed	NR	NR	1	3	NR	NR	3	41
Candidate locations for deployment of VMS	NR	NR	1	6	NR	NR	11	44
Communication Technologies								
Signalized intersections communicated with by each type of communication								
Twisted pair cable	0	0	0	0	250	NR	515	225
Coaxial cable	0	0	0	0	0	0	0	0
Fiber-optic cable	NR	11	0	0	0	0	215	591
Other (e.g., wireless, dial-up modems, leased lines, etc.)	37	71	0	0	0	0	389	302
Does agency convey information on highway-rail intersection crossing								
status to travelers via roadside media such as VMS or HAR?	No		No		No		0	
ITS Standards Used Related to Traffic Signal Control								
Advanced Transportation Controller (ATC) Software Application Interface (ITE 9603-1)	No		No		No		1	
ATC Physical Cabinet Functional Design (ITE-9603-2)	No		No		No		1	
ATC Functionality and Interface Definitions (ITE-9603-3)	No		No		No		1	
Natl. Trans. Communications for ITS Protocol (NTCIP) Class B Profile (AASHTO TS 3.3)	Yes		No		No		1	
NTCIP Data Collection and Monitoring Devices (AASHTO TS 3.DCM)	No		No		No		0	
NTCIP Object Definitions for Video Camera Control (AASHTO TS 3.VCC)	Yes		No		No		1	
NTCIP Object Definitions for Actuated Traffic Signal Controller Units (AASHTO TS 3.5)	Yes		No		No		2	
Would agency be willing to participate in testing of ITS Standards?	Yes		NR		Yes		6	
Have agreements in place with other agencies to use similar hardware								
and software to aid maintenance and interoperability?	No		NR		No		1	
INCIDENT MANAGEMENT ON ARTERIAL STREETS								
Receive information on highway-rail intersection crossing blockages for								
the purpose of managing incident response?	No		No		Yes		2	
Use of Service Patrols to Assist in Detection and Response to Incidents								
Publicly operated service patrol vehicles	No		No		No		0	
Privately operated service patrol vehicles operated under public contract	No		No		No		0	
Total number of arterial miles patrolled by these services	NR	NR	NR	NR	NR	NR	0	0
Miles Covered by Methods to Detect and Verify Incidents								
Free cellular phone call to a dedicated phone number other than 911	0	0	0	0	0	0	0	0
Free cellular phone call to an area radio station	0	0	0	0	0	0	0	0

Arterial Management
Agencies for Metropolitan Area: Hampton Roads

	Portsmouth City		Suffolk City		Virginia Beach City		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Police patrols	0	0	0	0	0	0	65	66
Computer algorithms linked to traffic surveillance equipment	0	0	0	0	0	0	0	0
CCTV	0	0	0	0	0	0	4	20
Private sector sources (e.g., Shadow Traffic, Smart Routes)	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Procedures in place for Arterial Incident Response?								
Working agreement(s)/arrangement(s) with other agencies	No		No		No		0	
Inter-agency incident management admin. team that meets regularly	No		No		No		0	
Major incident response team that responds to major incidents	No		No		Yes		1	
Set of goals/objectives for incident mgt that has been adopted by agencies in region	No		No		Yes		1	
Methods of Communication Used On-Site at an Incident								
Police								
Two-way radio	No		No		Yes		3	
800 MHz trunked radio	No		No		Yes		1	
Cellular telephone	No		No		Yes		1	
Hand-held (i.e., walkie-talkie)	No		No		Yes		2	
Automated data systems (i.e., CAD)	No		No		No		0	
Other	No		No		No		1	
Fire								
Two-way radio	No		No		Yes		3	
800 MHz trunked radio	No		No		Yes		1	
Cellular telephone	No		No		Yes		1	
Hand-held (i.e., walkie-talkie)	No		No		Yes		2	
Automated data systems (i.e., CAD)	No		No		No		0	
Other	No		No		No		1	
DOT								
Two-way radio	No		No		No		0	
800 MHz trunked radio	No		No		No		0	
Cellular telephone	No		No		No		0	
Hand-held (i.e., walkie-talkie)	No		No		No		0	
Automated data systems (i.e., CAD)	No		No		No		0	
Other	No		No		No			
Towing								
Two-way radio	No		No		No		0	
800 MHz trunked radio	No		No		No		0	
Cellular telephone	No		No		No		0	
Hand-held (i.e., walkie-talkie)	No		No		No		0	
Automated data systems (i.e., CAD)	No		No		No		0	
Other	No		No		No		0	
Which police agencies typically respond to incidents on arterials?								
State Police	No		No		No		0	

Arterial Management
Agencies for Metropolitan Area: Hampton Roads

	Portsmouth City		Suffolk City		Virginia Beach City		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
County Police or Sheriff	No		No		No		0	
City Police	No		No		Yes		3	
Who provides on-site emergency medical response?								
Fire	No		No		Yes		2	
Emergency Management Service Agency	No		No		No		1	
Private hospital	No		No		No		0	
Has a multi-agency contact list been developed in area containing the								
names, phone numbers, etc. for the appropriate response personnel?	NR		NR		Yes		1	
Is the Incident Command System used to manage incident scenes?	NR		NR		Yes		1	
Is there a legal specification by state law or formal agreement as to who								
is "in charge" at the incident scene?								
Specified by state law?	No		No		No		1	
Formal agreement?	No		No		No		0	
Not specified or don't know?	No		No		Yes		2	
On-scene command post used to manage activities of responding agencies?	NR		NR		DK		2	
Are there communication linkages to a communications traffic/freeway mgt center?	NR		NR		NR		1	
Plan developed and adopted by responding agencies for staging and parking								
response vehicles and equip. at incident site that minimizes lane blockage								
and facilitates the re-opening of lanes?	NR		NR		No		0	
Respondents protected through law or court opinion for liability claims								
for damages to vehicles or cargoes during clearance activities?	NR		NR		Yes		1	
Are overturned tank trucks, which are intact and not leaking, uprighted								
without first off-loading?	NR		NR		No		0	
Does your state or local jurisdiction have a law that requires drivers								
involved in property-damage-only accidents to move the vehicles								
from travel lanes to a safe location to exchange info and wait for police?	NR		NR		Yes		1	
Have laws or policies regarding the removal of stalled/abandoned vehicles								
from freeway shoulders?	NR		NR		Yes		2	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	NR		NR		>36		0	
Have policies or procedures for quick removal of vehicles?	NR		NR		No		1	
Is Total Station equipment used to investigate major incidents?	NR		NR		No		0	
Handling of Towing Responses to Incidents								
Formal contract based on qualifications?	No		No		No		1	
Rotation with companies under contract?	No		No		Yes		1	
Separate lists kept for light and heavy response and for specialty recovery?	NR		NR		Yes		1	
Rotation list with minimal qualifications?	No		No		No		1	
In towing qualifications, do you require towers to be certified under the								
Towing and Recovery Ass. of America's National Drivers Cert. Program?	NR		NR		DK		0	
_____								
DK: Don't know								
NR: No Response								
Leg: Legislation or action being planned								

Appendix G
Arterial Management Integration

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
Arterial Mgt. agencies in metropolitan area with which you share info.				
Share Timing Plans Information	None listed	None listed	None listed	Newport News City
Coordinate Changes to Timing Plans	None listed	None listed	None listed	Newport News City
Turn over Control of Signals	None listed	None listed	None listed	None listed
Agencies your agency provides arterial travel times, speeds, and				
conditions information, share infrastructure or coordinates operation				
Freeway Management Agencies				
Provide Information	None listed	None listed	None listed	Virginia Department of Transportation
Share Infrastructure	None listed	None listed	None listed	Virginia Department of Transportation
Coordinate Operation	None listed	None listed	None listed	Virginia Department of Transportation
Incident Management Agencies				
Provide Information	None listed	None listed	None listed	Virginia Department of Transportation
Share Infrastructure	None listed	None listed	None listed	Virginia Department of Transportation
Coordinate Operation	None listed	None listed	None listed	Virginia Department of Transportation
Public Transit Operators Agencies				
Provide Information	None listed	None listed	None listed	Peninsula TDC, Tidewater Transportation District Commission
Share Infrastructure	None listed	None listed	None listed	None listed

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	**2005**	**1999**	**2005**
Coordinate Operation	None listed	None listed	None listed	Peninsula TDC, Tidewater Transportation District Commission
Arterial Management Agencies				
Provide Information	None listed	None listed	None listed	Chesapeake City Department of Public Works, Hampton City, Newport News City, Norfolk City, Portsmouth City, Suffolk City, Virginia Beach City
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	Chesapeake City Department of Public Works, Hampton City, Newport News City, Norfolk City, Portsmouth City, Suffolk City
Receiving real-time information via electronic means from others				
Freeway Management agencies from which your agency receives				
freeway travel times, speeds, and conditions	None listed	None listed	None listed	Virginia Department of Transportation
Public Transit operators from which your agency receives				
arterial travel times derived from vehicle probes	None listed	None listed	None listed	None listed
Incident Management agencies from which your agency receives				
incident clearance and/or incident severity, location, and type information				

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	**2005**	**1999**	**2005**
Receive information on Incident Clearance	None listed	None listed	None listed	Virginia Department of Transportation
Receive information on Incident Severity, Location, and Type	None listed	None listed	None listed	Virginia Department of Transportation
Toll Collection agencies from which your agency receives arterial travel				
times derived from vehicles probes	None listed	None listed	None listed	None listed
Arterial Incident Management Section				
Agencies your agency provides incident severity, location, and type info.				
and/or shares infrastructure and/or coordinates operation				

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	**2005**	**1999**	**2005**
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	**2005**	**1999**	**2005**
Coordinate Operation	None listed	None listed	None listed	None listed
Freeway Management Agencies				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Public Transit Operators				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Receiving real-time information via electronic means from others				
Emergency Management agencies from which your agency receives				
arterial incident clearance and/or arterial incident severity				

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	**2005**	**1999**	**2005**
Receive Arterial Incident Clearance Information	None listed	None listed	None listed	None listed

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	**2005**	**1999**	**2005**
Receive Arterial Incident Severity Information	None listed	None listed	None listed	None listed
Arterial Management agencies from which your agency receives				
arterial travel times, speeds, and conditions	None listed	None listed	None listed	None listed
Freeway Management agencies from which your agency receives				
freeway travel times, speeds, and conditions	None listed	None listed	None listed	None listed

*short survey: Agency responded using a short survey. The survey did not include names of individual agencies, but only identified whether integration exists.

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Newport News City		Norfolk City	
	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
Arterial Mgt. agencies in metropolitan area with which you share info.				
Share Timing Plans Information	None listed	Virginia Department of Transportation	None listed	Virginia Beach City
Coordinate Changes to Timing Plans	None listed	Hampton City, Virginia Department of Transportation	None listed	Chesapeake City Department of Public Works, Virginia Beach City
Turn over Control of Signals	None listed	Hampton City, Virginia Department of Transportation	None listed	None listed
Agencies your agency provides arterial travel times, speeds, and				
conditions information, share infrastructure or coordinates operation				
Freeway Management Agencies				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Incident Management Agencies				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Public Transit Operators Agencies				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**
Coordinate Operation	None listed	None listed	None listed	None listed
Arterial Management Agencies				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Receiving real-time information via electronic means from others				
Freeway Management agencies from which your agency receives				
freeway travel times, speeds, and conditions	None listed	None listed	None listed	Virginia Department of Transportation
Public Transit operators from which your agency receives				
arterial travel times derived from vehicle probes	None listed	None listed	None listed	Tidewater Transportation District Commission
Incident Management agencies from which your agency receives				
incident clearance and/or incident severity, location, and type information				

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**
Receive information on Incident Clearance	None listed	None listed	None listed	Virginia Department of Transportation, Police/Fire Rescue, Virginia Beach, Hampton Roads Cities
Receive information on Incident Severity, Location, and Type	None listed	None listed	None listed	Virginia Department of Transportation, Police/Fire Rescue, Virginia Beach, Hampton Roads Cities
Toll Collection agencies from which your agency receives arterial travel				
times derived from vehicles probes	None listed	None listed	None listed	None listed
Arterial Incident Management Section				
Agencies your agency provides incident severity, location, and type info.				
and/or shares infrastructure and/or coordinates operation				

Agency Name	Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**
Provide Information	Hampton City Fire & Rescue Department, Hampton City Police Department	Hampton City Fire & Rescue Department, Hampton City Police Department	None listed	Chesapeake City Fire & Emergency Medical (Fire), Chesapeake City Police Department, Hampton City Fire & Rescue Department, Hampton City Police Department, Newport News City Fire Department, Newport News City Emergency Medical Services, Newport News City Police Department, Portsmouth City Fire & EMS Department, Portsmouth City Fire & EMS Department, Suffolk City Emergency Medical Services, Suffolk City Fire Department, Suffolk City Police Department, Virginia Beach City Emergency Medical Services, Virginia Beach City Fire Department, Virginia Beach City Police Department, Virginia State Police, Virginia Department of Transportation, NAVY, Norfolk City Police Department, Norfolk City Fire & Paramedical Department
Share Infrastructure	Hampton City Fire & Rescue Department, Hampton City Police Department	Hampton City Fire & Rescue Department, Hampton City Police Department	None listed	Norfolk City Police Department

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**
Coordinate Operation	Hampton City Fire & Rescue Department, Hampton City Police Department	Hampton City Fire & Rescue Department, Hampton City Police Department	None listed	Norfolk City Police Department, Norfolk City Fire & Paramedical Department
Freeway Management Agencies				
Provide Information	None listed	None listed	None listed	Virginia Department of Transportation
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	Virginia Department of Transportation
Public Transit Operators				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Receiving real-time information via electronic means from others				
Emergency Management agencies from which your agency receives				
arterial incident clearance and/or arterial incident severity				

Agency Name	Newport News City		Norfolk City	
	1999	2005	1999	2005
Receive Arterial Incident Clearance Information	None listed	None listed	None listed	Chesapeake City Fire & Emergency Medical (Fire), Chesapeake City Police Department, Hampton City Fire & Rescue Department, Hampton City Police Department, Newport News City Emergency Medical Services, Newport News City Fire Department, Newport News City Police Department, Norfolk City Fire & Paramedical Department, Norfolk City Police Department, Portsmouth City Fire & EMS Department, Portsmouth City Police Department, Suffolk City Emergency Medical Services, Suffolk City Fire Department, Suffolk City Police Department, Virginia Beach City Emergency Medical Services, Virginia Beach City Fire Department, Virginia Beach City Police Department, Virginia State Police, Virginia Department of Transportation, Navy

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**
Receive Arterial Incident Severity Information	None listed	None listed	None listed	Chesapeake City Fire & Emergency Medical (Fire), Chesapeake City Police Department, Hampton City Fire & Rescue Department, Hampton City Police Department, Newport News City Emergency Medical Services, Newport News City Fire Department, Newport News City Police Department, Norfolk City Fire & Paramedical Department, Norfolk City Police Department, Portsmouth City Fire & EMS Department, Portsmouth City Police Department, Suffolk City Emergency Medical Services, Suffolk City Fire Department, Suffolk City Police Department, Virginia Beach City Emergency Medical Services, Virginia Beach City Fire Department, Virginia Beach City Police Department, Virginia State Police, Virginia Department of Transportation, Navy
Arterial Management agencies from which your agency receives				
arterial travel times, speeds, and conditions	None listed	None listed	None listed	None listed
Freeway Management agencies from which your agency receives				
freeway travel times, speeds, and conditions	None listed	Virginia Department of Transportation	None listed	Virginia Department of Transportation

*short survey: Agency responded using a short survey. The survey did not include names of individual agencies, but only identified whether integration exists.

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City		Suffolk City		Virginia Beach City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes		Yes	
Arterial Management Section						
Arterial Mgt. agencies in metropolitan area with which you share info.						
Share Timing Plans Information	None listed	None listed	None listed	None listed	None listed	Norfolk City
Coordinate Changes to Timing Plans	None listed	None listed	None listed	None listed	None listed	Chesapeake City Department of Public Works, Norfolk City
Turn over Control of Signals	None listed	None listed	None listed	None listed	None listed	None listed
Agencies your agency provides arterial travel times, speeds, and						
conditions information, share infrastructure or coordinates operation						
Freeway Management Agencies						
Provide Information	None listed	None listed	None listed	None listed	None listed	Virginia Department of Transportation
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	Virginia Department of Transportation
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	Virginia Department of Transportation
Incident Management Agencies						
Provide Information	None listed	None listed	None listed	None listed	None listed	Virginia Department of Transportation
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	Virginia Department of Transportation
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	Virginia Department of Transportation
Public Transit Operators Agencies						
Provide Information	None listed	None listed	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City		Suffolk City		Virginia Beach City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	None listed
Arterial Management Agencies						
Provide Information	None listed	None listed	None listed	None listed	None listed	Chesapeake City Department of Public Works, Norfolk City
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	Chesapeake City Department of Public Works, Norfolk City
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	Chesapeake City Department of Public Works, Norfolk City
Receiving real-time information via electronic means from others						
Freeway Management agencies from which your agency receives						
freeway travel times, speeds, and conditions	None listed	None listed	None listed	None listed	None listed	Virginia Department of Transportation
Public Transit operators from which your agency receives						
arterial travel times derived from vehicle probes	None listed	None listed	None listed	None listed	None listed	None listed
Incident Management agencies from which your agency receives						
incident clearance and/or incident severity, location, and type information						

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City		Suffolk City		Virginia Beach City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Receive information on Incident Clearance	None listed	None listed	short survey	None listed	None listed	Virginia Department of Transportation
Receive information on Incident Severity, Location, and Type	None listed	None listed	short survey	None listed	None listed	Virginia Department of Transportation
Toll Collection agencies from which your agency receives arterial travel						
times derived from vehicles probes	None listed	None listed	None listed	None listed	None listed	None listed
Arterial Incident Management Section						
Agencies your agency provides incident severity, location, and type info.						
and/or shares infrastructure and/or coordinates operation						

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City		Suffolk City		Virginia Beach City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Provide Information	None listed	None listed	short survey	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City		Suffolk City		Virginia Beach City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	Chesapeake City Fire & Emergency Medical (Fire), Chesapeake City Police Department, Norfolk City Fire & Paramedical Department, Norfolk City Police Department
Freeway Management Agencies						
Provide Information	None listed	None listed	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	Virginia Department of Transportation
Public Transit Operators						
Provide Information	None listed	None listed	None listed	None listed	Tidewater Transportation District Commission	None listed
Share Infrastructure	None listed	None listed	None listed	None listed	Tidewater Transportation District Commission	None listed
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	Tidewater Transportation District Commission
Receiving real-time information via electronic means from others						
Emergency Management agencies from which your agency receives						
arterial incident clearance and/or arterial incident severity						

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City		Suffolk City		Virginia Beach City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Receive Arterial Incident Clearance Information	None listed	None listed	short survey	None listed	None listed	None listed

Arterial Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City		Suffolk City		Virginia Beach City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Receive Arterial Incident Severity Information	None listed	None listed	short survey	None listed	None listed	None listed
Arterial Management agencies from which your agency receives						
arterial travel times, speeds, and conditions	None listed	None listed	None listed	None listed	None listed	None listed
Freeway Management agencies from which your agency receives						
freeway travel times, speeds, and conditions	None listed	None listed	None listed	None listed	Virginia Department of Transportation	Virginia Department of Transportation

*short survey: Agency responded using a short survey. The survey did not include names of individual agencies, but only identified whether integration exists.

Appendix H
Arterial Management Information Collection and Dissemination

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
Data collected, archived, and/or transferred to another agency				
Collected by your agency	NR	NR	NR	Traffic volumes, Traffic speeds, Lane occupancy, Emergency vehicle signal preemption, Transit vehicle signal priority, Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures
Archived by your agency	NR	NR	NR	Traffic volumes, Traffic speeds, Lane occupancy, Emergency vehicle signal preemption, Transit vehicle signal priority, Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures
Transferred to another agency by your agency	NR	NR	NR	Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures
Importance of making information available to the public				

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	**2005**	**1999**	**2005**
Ranked High	NR		Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures	
Ranked Medium	NR		NR	
Ranked Low	NR		Traffic volumes, Emergency vehicle signal preemption, Transit vehicle signal priority	
Groups that make requests for the data	Media (I.e., TV stations, radio stations), Consultants, Citizens		State DOT personnel, Media (I.e., TV stations, radio stations), MPOs, Consultants, Advanced Traveler Information Systems (ATIS) provi	
What is the data used for?	Construction impact determination, Planning, Dissemination to the public, Request traffic control		Traffic analysis, Construction impact determination, Planning, Roadway impact analysis, Dissemination to the public	
Methods used to disseminate arterial information to the public				
Technologies your agency uses to disseminate:	NR	NR	NR	Telephone system, Internet Web sites, Kiosks
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	Telephone system, Internet Web sites, Kiosks
Internet web site reporting arterial conditions	NR		NR	
Telephone system for reporting arterial information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	
Arterial Incident Management Section				
Methods used to distribute incident location and severity information				
to the public				

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Chesapeake City		Hampton City	
	1999	**2005**	**1999**	**2005**
Technologies your agency uses to disseminate:	NR	NR	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR
Internet web site reporting incident information	NR		NR	
Telephone system for reporting incident information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
Data collected, archived, and/or transferred to another agency				
Collected by your agency	Traffic volumes, Traffic speeds, Vehicle classification, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption	Traffic volumes, Traffic speeds, Vehicle classification, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Current work zones	Traffic volumes, Traffic speeds, Lane occupancy, Vehicle classification, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption, Transit vehicle signal priority, Incidents, Current work zones, Highway operations coordination information
Archived by your agency	Traffic volumes, Traffic speeds, Vehicle classification, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption	Traffic volumes, Traffic speeds, Vehicle classification, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption	Turning movements, Phasing/cycle lengths, Current work zones	Traffic volumes, Traffic speeds, Lane occupancy, Phasing/cycle lengths, Incidents, Current work zones, Highway operations coordination information
Transferred to another agency by your agency	Traffic volumes, Traffic speeds, Phasing/cycle lengths, Emergency vehicle signal preemption	Traffic volumes, Traffic speeds, Phasing/cycle lengths, Emergency vehicle signal preemption	NR	Traffic volumes, Traffic speeds, Lane occupancy, Emergency vehicle signal preemption, Transit vehicle signal priority, Incidents, Current work zones, Highway operations coordination information
Importance of making information available to the public				

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**
Ranked High	Traffic volumes, Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures		Traffic volumes, Traffic speeds, Turning movements, Incidents, Highway operations coordination information	
Ranked Medium	Intermodal (air, rail, water) connections		Lane occupancy, Vehicle classification, Phasing/cycle lengths, Emergency vehicle signal preemption, Transit vehicle signal priority, Current work zones	
Ranked Low	Traffic speeds, Lane occupancy, Vehicle classification, Probe vehicles, Turning movements, Queues, Phasing/cycle lengths, Road conditions, Emergency vehicle signal preemption, Transit vehicle signal priority, Route designations (snow emergency, etc.), Weather conditions, Highway operations coordination information		Weather conditions	
Groups that make requests for the data	State DOT personnel, Consultants		Consultants, Realtors	
What is the data used for?	Traffic analysis, Planning		Traffic analysis, Planning, development	
Methods used to disseminate arterial information to the public				
Technologies your agency uses to disseminate:	NR	NR	NR	Dedicated cable TV, Internet Web sites, E-mail or other direct PC communication, Facsimile
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	Pagers or personal data assistants, Kiosks, Cell phone/voice, Cell phone/data
Internet web site reporting arterial conditions	NR		NR	
Telephone system for reporting arterial information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	
Arterial Incident Management Section				
Methods used to distribute incident location and severity information				
to the public				

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Newport News City		Norfolk City	
	1999	**2005**	**1999**	**2005**
Technologies your agency uses to disseminate:	NR	NR	NR	Internet Web sites, E-mail or other direct PC communication, Facsimile
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	Internet Web sites, Pagers or personal data assistants, E-mail or other direct PC communication, Cell phone/data
Internet web site reporting incident information	NR		NR	
Telephone system for reporting incident information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City	
	1999	**2005**
Agency Returned Survey?	Yes	
Arterial Management Section		
Data collected, archived, and/or transferred to another agency		
Collected by your agency	Traffic volumes, Traffic speeds, Lane occupancy, Vehicle classification, Turning movements, Queues, Incidents	NR
Archived by your agency	Traffic volumes, Traffic speeds, Lane occupancy, Vehicle classification, Turning movements, Queues, Incidents	NR
Transferred to another agency by your agency	NR	NR
Importance of making information available to the public		

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City	
	1999	**2005**
Ranked High	NR	
Ranked Medium	NR	
Ranked Low	Traffic volumes, Traffic speeds, Lane occupancy, Vehicle classification, Turning movements, Queues, Incidents	
Groups that make requests for the data	Consultants	
What is the data used for?	Traffic analysis, Planning	
Methods used to disseminate arterial information to the public		
Technologies your agency uses to disseminate:	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR
Internet web site reporting arterial conditions	NR	
Telephone system for reporting arterial information to the public	NR	
Organizations your agency sends information for dissemination to the public	NR	
Arterial Incident Management Section		
Methods used to distribute incident location and severity information		
to the public		

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Portsmouth City	
	1999	**2005**
Technologies your agency uses to disseminate:	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR
Internet web site reporting incident information	NR	
Telephone system for reporting incident information to the public	NR	
Organizations your agency sends information for dissemination to the public	NR	

Appendix I
Transit Management Components

Transit Management
Agencies for Metropolitan Area: Hampton Roads

	Hampton Roads Transit	
	1999	**2005**
Agency Returned Survey?	Yes	
Number of vehicles used in revenue service		
Fixed Route Bus	285	NR
Heavy or Rapid Rail	0	NR
Light Rail	0	NR
Demand Responsive	90	NR
Commuter Rail	0	NR
Ferry Boat	2	NR
Have of plan to have an Automated Vehicle Location System?	Yes	
Primary and Secondary Location Technologies Used		
Primary Technologies		
GPS	No	Yes
Sign/Odometer	No	No
Dead-Reckoning	No	No
LORAN C	No	No
Other	No	No
Backup Technologies		
GPS	No	Yes
Sign/Odometer	No	No
Dead-Reckoning	No	No
LORAN C	No	No
Other	No	No
Number of Vehicles Equipped with AVL		
Fixed Route Bus	NR	NR
Heavy or Rapid Rail	NR	NR
Light Rail	NR	NR
Demand Responsive	NR	NR
Commuter Rail	NR	NR
Ferry Boat	NR	NR
Motor Buses Operated as Vehicle Probes		
Number of Motor Buses equipped as probes on freeways?	NR	
Number of Motor Buses equipped as probes on arterials?	NR	
Have Organized Regional Incident Management Program?	No	
Have Automated Traveler Information System?	Yes	
Services Automated Traveler Info. System Applies:		

Transit Management
Agencies for Metropolitan Area: Hampton Roads

	Hampton Roads Transit	
	1999	**2005**
Fixed Route	Yes	
Heavy Rail	No	
Light Rail	Yes	
Demand Responsive	Yes	
Commuter Rail	No	
Ferry	Yes	
Locations where traveler information is displayed to public		
Number of bus stops on fixed transit routes	NR	NR
Bus stops on fixed transit routes that display traveler info to the public	NR	NR
Number of rail stations	NR	NR
Number of rail stations that display traveler information	NR	NR
Number of other locations that display traveler information to public	1	2
Number of vehicles the traveler information system has available		
Fixed Route Bus	NR	NR
Heavy or Rapid Rail	NR	NR
Light Rail	NR	NR
Demand Responsive	NR	NR
Commuter Rail	NR	NR
Ferry Boat	NR	NR
Deployment of Communications Technology		
Attributes of Radio System:		
Digital?	No	
Analog?	Yes	
Trunked?	No	
Regular?	Yes	
Services that use a Digital or Trunked Radio System		
Digital Only		
Fixed Route Bus	No	Yes
Heavy or Rapid Rail	No	No
Light Rail	No	Yes
Demand Responsive	No	Yes
Commuter Rail	No	No
Ferry Boat	No	No
Trunked Only		
Fixed Route Bus	No	Yes
Heavy or Rapid Rail	No	No
Light Rail	No	Yes
Demand Responsive	No	Yes
Commuter Rail	No	No

Transit Management
Agencies for Metropolitan Area: Hampton Roads

	Hampton Roads Transit	
	1999	**2005**
Ferry Boat	No	No
Have of plan to have Automatic Passenger Counters (APCs)?	No	
Methods used to count passengers		
Treadle Mats	No	
Infrared Beams	No	
Primary and Secondary Location Technologies Used		
Primary Technologies		
GPS	No	No
Differential GPS	No	No
Signpost/Odometer	No	No
Dead_Reckoning	No	No
LORAN C	No	No
Other	No	No
Backup Technologies		
GPS	No	No
Differential GPS	No	No
Signpost/Odometer	No	No
Dead_Reckoning	No	No
LORAN C	No	No
Other	No	No
Number of Vehicles with APCs		
Fixed Route Bus	NR	NR
Heavy or Rapid Rail	NR	NR
Light Rail	NR	NR
Demand Responsive	NR	NR
Commuter Rail	NR	NR
Ferry Boat	NR	NR
Remote Real-Time Monitoring and Computer Assisted Dispatching		
Remote Real-Time Monitoring		
Fixed Route Bus	NR	NR
Heavy or Rapid Rail	NR	NR
Light Rail	NR	NR
Demand Responsive	NR	NR
Commuter Rail	NR	NR
Ferry Boat	NR	NR
Automated Dispatching or Control Software		
Fixed Route Bus	NR	NR
Heavy or Rapid Rail	NR	NR

Transit Management
Agencies for Metropolitan Area: Hampton Roads

	Hampton Roads Transit	
	1999	**2005**
Light Rail	NR	NR
Demand Responsive	NR	NR
Commuter Rail	NR	NR
Ferry Boat	NR	NR
Coordinate or plan to coordinate travel request and vehicle		
dispatching for multiple agencies?	No	
Is there or will there be a Transportation Management Center		
(TMC) in the region that controls transit and highway modes?	Yes	
Modes that TMC currently controls:		
Highways	Yes	No
Fixed Route Bus	No	No
Heavy or Rapid Rail	No	No
Light Rail	No	No
Demand Responsive	No	No
Commuter Rail	No	No
Ferry Boat	No	No
Other	No	No
Priority at Traffic Signals and Ramp Meter Priority		
Priority at Traffic Signals		
Fixed Route Bus	NR	NR
Light Rail	NR	NR
Demand Responsive	NR	NR
Ramp Meter Priority		
Fixed Route Bus	NR	NR
Demand Responsive	NR	NR
Number of Vehicles Equipped with Navigation Aids		
Fixed Route Bus	NR	NR
Heavy or Rapid Rail	NR	NR
Light Rail	NR	NR
Demand Responsive	NR	NR
Commuter Rail	NR	NR
Ferry Boat	NR	NR
ITS Standards Used Related to Transit Management		
TCIP On Boad Objects (TCIP-OB)	No	
TCIP Traffic Management Objects (TCIP-TM)	No	
TCIP Common Public Transportation Objects (TCIP-CPT)	No	
TCIP Passenger Information Objects (TCIP-PI)	No	

Transit Management
Agencies for Metropolitan Area: Hampton Roads

	Hampton Roads Transit	
	1999	**2005**
TCIP Incident Management Objects (TCIP-IM)	No	
TCIP Fare Collection Objects (TCIP-FC)	No	
TCIP Spatial Representation Objects (TCIP-SP)	No	
TCIP Control Center Objects (TCIP-CC)	No	
TCIP Scheduling/Runcutting Objects (TCIP-SCH)	No	
Send data communication between micro computer and heavy duty		
vehicle applications (SAE J1708)	No	
Would agency be willing to participate in testing of ITS Standards?	No	
Have agreements in place with other agencies to use similar hardware		
and software to aid maintenance and interoperability?	No	
Electronic Fare Payment		
Have full operational Electronic Fare Payment System?	Yes	
Methods of Fare Payment		
Stored value card with fare deducted for each trip		
Magnetic Stripe	Yes	
Smart Card	No	
Debit Card	No	
Billed by the month for trips taken		
Magnetic Stripe	No	
Smart Card	No	
Credit Card	No	
Monthly Pass		
Magnetic Stripe	No	
Smart Card	No	
Vehicles/Stations Equipped with Automated Payment Mechanism		
Magnetic Stripe Readers		
Fixed Route Bus Vehicles	NR	285
Heavy or Rapid Rail Stations	NR	NR
Light Rail Stations	NR	NR
Demand Responsive Vehicles	NR	NR
Commuter Rail Stations	NR	NR
Ferry Boat Landings	NR	NR
Smart Card Readers		
Fixed Route Bus Vehicles	NR	NR
Heavy or Rapid Rail Stations	NR	NR
Light Rail Stations	NR	NR
Demand Responsive Vehicles	NR	NR
Commuter Rail Stations	NR	NR

Transit Management
Agencies for Metropolitan Area: Hampton Roads

	Hampton Roads Transit	
	1999	**2005**
Ferry Boat Landings	NR	NR
Credit Card		
Fixed Route Bus Vehicles	NR	NR
Heavy or Rapid Rail Stations	NR	NR
Light Rail Stations	NR	NR
Demand Responsive Vehicles	NR	NR
Commuter Rail Stations	NR	NR
Ferry Boat Landings	NR	NR
Debit Card		
Fixed Route Bus Vehicles	NR	NR
Heavy or Rapid Rail Stations	NR	NR
Light Rail Stations	NR	NR
Demand Responsive Vehicles	NR	NR
Commuter Rail Stations	NR	NR
Ferry Boat Landings	NR	NR
NR: No Response		

Appendix J
Transit Management Integration

Transit Management Integration
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Hampton Roads Transit	
	1999	**2005**
Agency Returned Survey?	Yes	
Transit operators in the region that use the same electronic payment system	None listed	
Toll operators from whom you accept electronic payment of transit		
fare through the use of ETC media	None listed	
Receiving real-time information via electronic means from others		
Freeway Management agencies from which your agency receives		
freeway travel times, speeds, and conditions		
Receive Information	None listed	None listed
Share Infrastructure	None listed	None listed
Arterial Management agencies from which your agency receives		
arterial travel times, speeds, and conditions		
Receive Information	None listed	None listed
Share Infrastructure	None listed	None listed
Incident Management agencies from which your agency receives		
incident severity, location, and type		
Receive Information	None listed	None listed
Share Infrastructure	None listed	None listed

Appendix K
Transit Management Information Collection and Dissemination

Data Collection and Dissemination: Transit Management
Agencies for Metropolitan Area: Hampton Roads

Agency Name	Hampton Roads Transit	
	1999	**2005**
Agency Returned Survey?	Yes	
Methods used to disseminate transit information to the public		
Technologies your agency uses to disseminate:		
Transit routes, schedules and fares	NR	Variable Message Signs (in vehicle), Kiosks, Internet Web Sites
Real-time transit schedule adherence or arrival and departure times	NR	Variable Message Signs (in vehicle), Kiosks
Technologies employed by other organization receiving your data		
Transit routes, schedules and fares	NR	NR
Real-time transit schedule adherence or arrival and departure times	NR	NR
Internet web site reporting transit routes, schedules and fare, etc.	www.hrtransit.org	
Telephone system for reporting transit information to the public	NR	
Organizations your agency sends information for dissemination to the public	NR	
Data collected, archived, and/or transferred to another agency		
Collected by your agency	NR	NR
Archived by your agency	NR	NR
Transferred to another agency by your agency	NR	NR
Importance of making information available to the public		
Ranked High	NR	
Ranked Medium	NR	
Ranked Low	NR	
Groups that make requests for the data	NR	
What is the data used for?	NR	

Appendix L
Emergency Management

Emergency Management Agencies for Metropolitan Area: Hampton Roads

	Total Vehicles		Navigation Capabilities		AVL		CAD		CAD Equipped with Mobile Data Terminal		Vehicles Equipped with Preemption		Participate in Formal Incident Mgt Program	Send Incident Info to other agencies	List of agencies receiving data
Agency Name	1999	2005	1999	2005	1999	2005	1999	2005	1999	2005	1999	2005			
Chesapeake City Fire & Emergency Medcial (Fire)	35	35	0	35	0	35	35	35	0	35	10	35	Yes	No	None listed
Chesapeake City Fire & Emergency Medical (EMS)	31	37	0	0	0	0	31	37	0	0	4	37	Yes	No	None listed
Chesapeake City Police Department	343	478	0	50	0	100	500	700	0	300	2	50	No	No	None listed
Hampton City Fire & Rescue Department	63	63	0	0	0	0	63	63	0	0	52	52	No	No	None listed
Newport News City Fire Department	36	38	0	0	0	38	NR	38	0	0	30	38	Yes	No	None listed
Newport News City Police Department	380	NR	0	0	0	0	0	NR	0	NR	0	0	Yes	No	None listed
Norfolk City Fire & Paramedical Department	66	68	0	68	0	68	66	68	6	68	12	68	No	No	None listed
Norfolk City Fire & Paramedical Department (Other)	31	33	0	33	0	33	31	33	2	33	4	31	No	No	None listed
Portsmouth City Fire & EMS Department	47	49	0	NR	0	NR	47	NR	0	NR	0	NR	Yes	No	None listed
Portsmouth City Police Department	224	NR	0	NR	0	NR	224	NR	0	NR	0	NR	Yes	No	None listed
Suffolk City Emergency Medical Services	11	15	0	0	0	0	11	15	0	0	0	0	Yes	No	None listed
Suffolk City Fire Department	50	60	0	0	0	0	50	60	0	0	0	0	Yes	No	None listed
Suffolk City Police Department	110	130	0	0	0	0	110	130	0	0	0	0	Yes	No	None listed
Virginia Beach City Emergency Medical Services	54	57	0	NR	0	NR	54	NR	0	NR	26	40	Yes	No	None listed
Virginia Beach City Fire Department	94	96	0	78	0	78	94	96	63	96	42	78	Yes	No	None listed
Virginia Beach City Police Department	424	NR	0	0	0	424	424	NR	424	NR	66	NR	Yes	No	None listed
Virginia State Police	124	130	0	0	0	0	124	130	0	0	124	130	Yes	Yes	Virginia Department of Transportation

Appendix M
Electronic Toll Collection

Electronic Toll Collection
Agencies for Metropolitan Area: Hampton Roads

	Chesapeake Bay Bridge and Tunnel District		Chesapeake City DP W (ETC)-Jordan Bridge		Virginia Department of Transportation Coleman Bridge Toll Admin.		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes		Yes		3	
Number of toll Collection Plazas operated	2	2	1	0	1	1	4	3
Number of toll collection plazas with dedicated ETC	0	0	0	0	1	1	1	1
Number of toll collection plazas with both manual and ETC	0	0	1	0	1	1	2	1
Number of toll collection lanes operated	8	8	2	0	5	5	15	13
Number of toll collection lanes with dedicated ETC	0	0	0	0	2	2	2	2
Number of toll collection lanes with both manual and ETC	0	0	2	0	3	3	5	3
Number of toll collection tags issued	0	0	0	0	53,500	60,000	53,500	60,000
Antennae Location Technologies								
In-Pavement?	Yes		No		No		1	
Focused Beam?	No		No		No		0	
Distributed Overhead?	No		No		No		0	
In-Vehicle Equipment Technologies								
Tag-based?	No		No		Yes		1	
Integrated circuit card-based?	Yes		No		No		1	
Are toll tags used by other toll operations in metro area?	NR		No		Yes		1	
List of toll operators that use tags	None		None		Richmond Metropolitan Association, Powhite Parkway Extension, Greenway Toll, Dulles Toll Road			
Are toll tags used by operators of public transit to pay transit fares								
in metro area?	NR		No		NR		0	
List of transit operators that use tags	None		None		None			
_____								
NR: No Response								