Tracking the Deployment of the Integrated Metropolitan ITS Infrastructure in Grand Rapids

FY99 Results

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Table of Contents

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 Grand Rapids 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 Grand Rapids region was 93% 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 Grand Rapids 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).

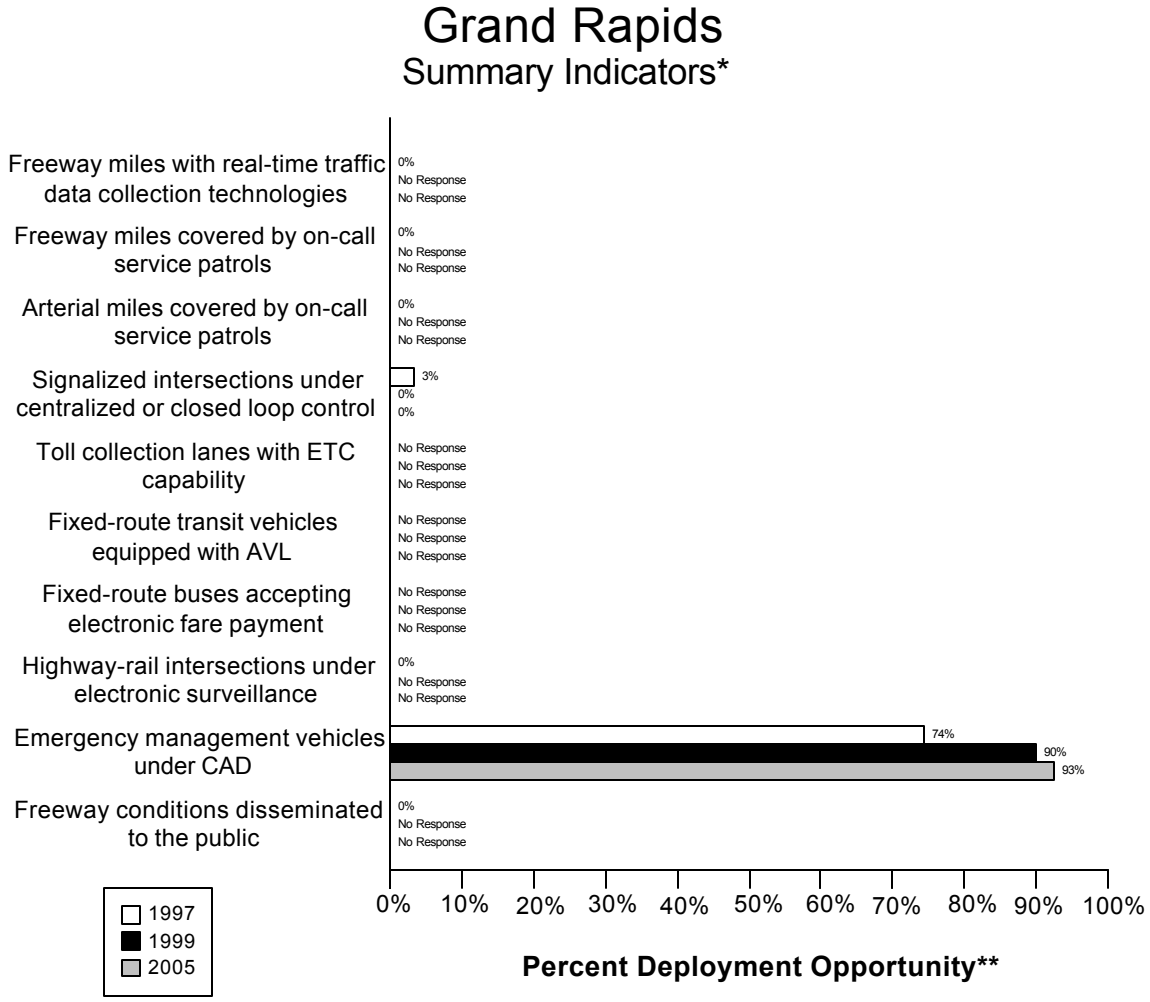
Each component indicator was selected to reflect a critical function of the individual components. For example, in the case of Freeway Management, three basic functions were defined: surveillance, traffic control, and information display. The three indicators developed to reflect these functions are: 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."

Data as of 5/1/00

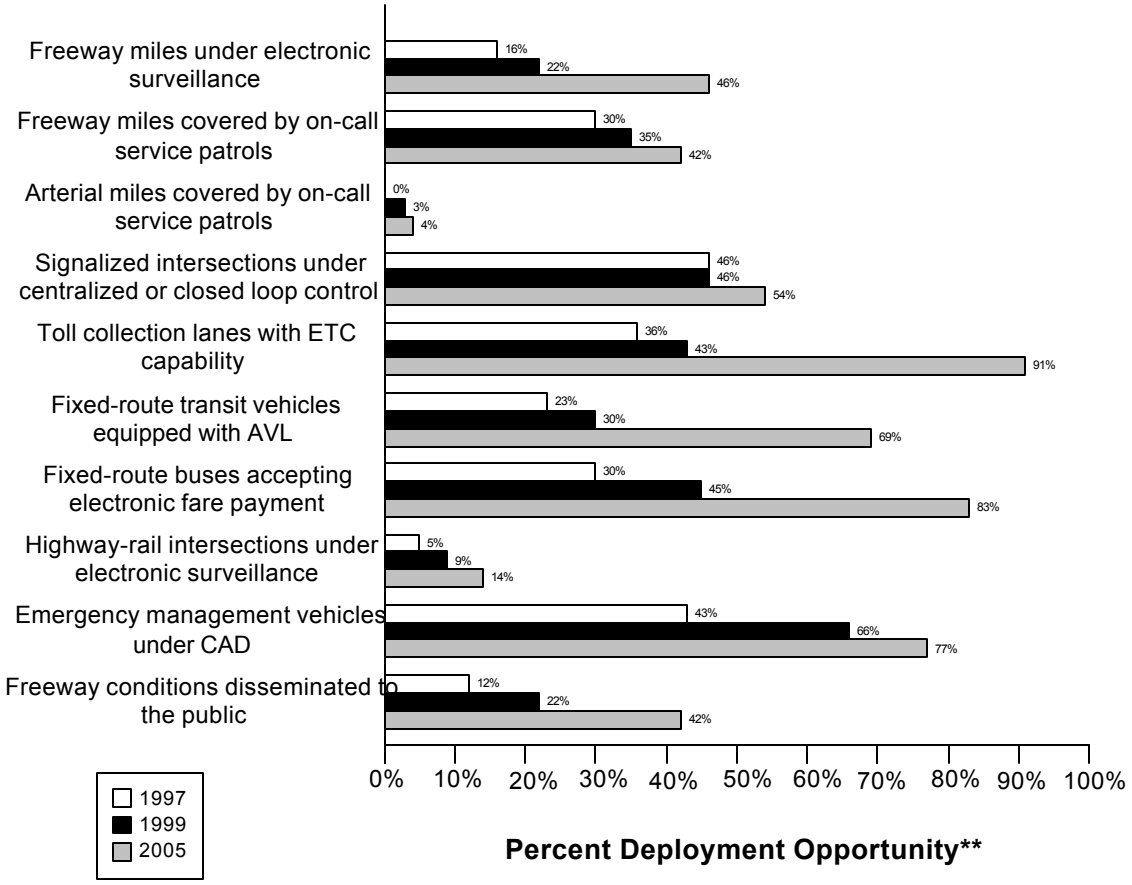


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Data as of 5/1/00

National

Summary Indicators*



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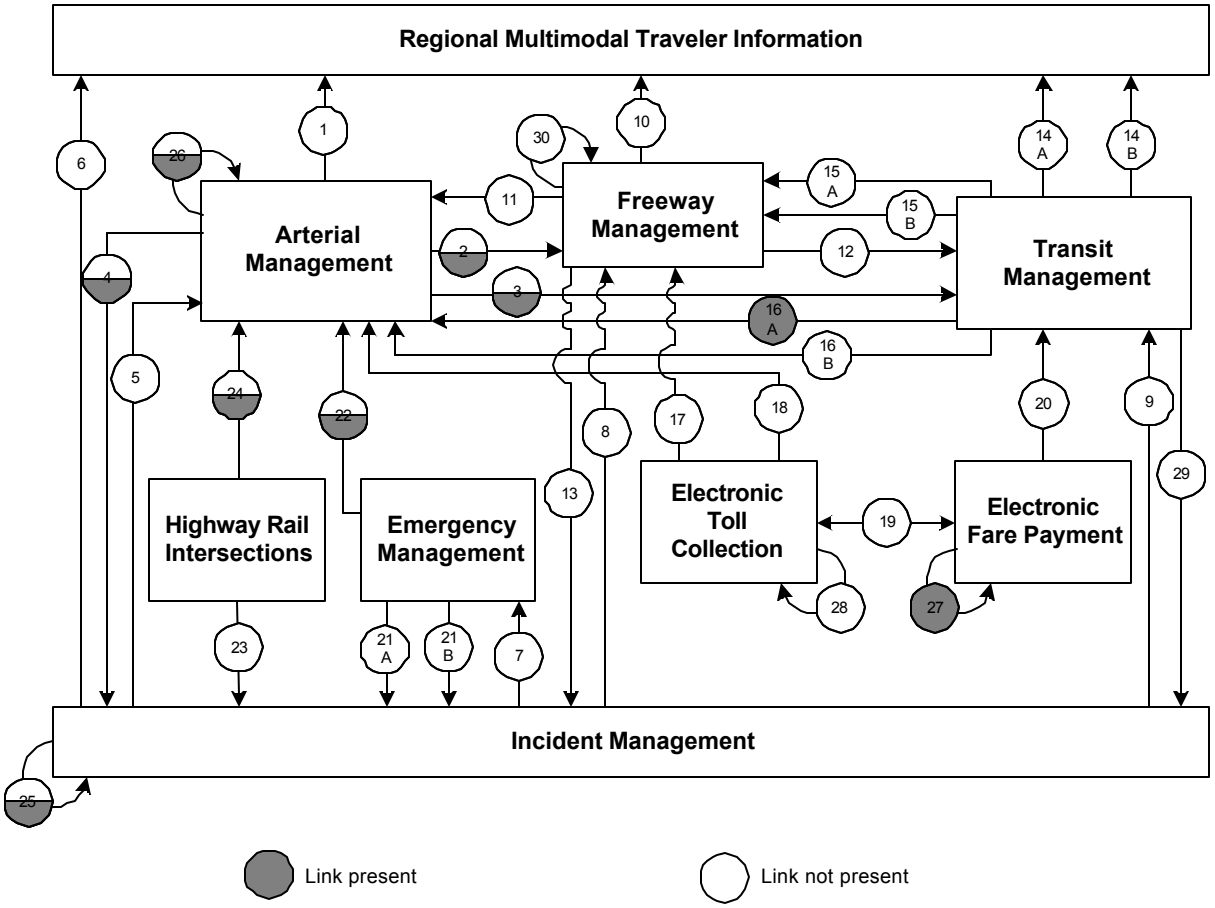
Grand Rapids Integration Links



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 Grand Rapids 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%.

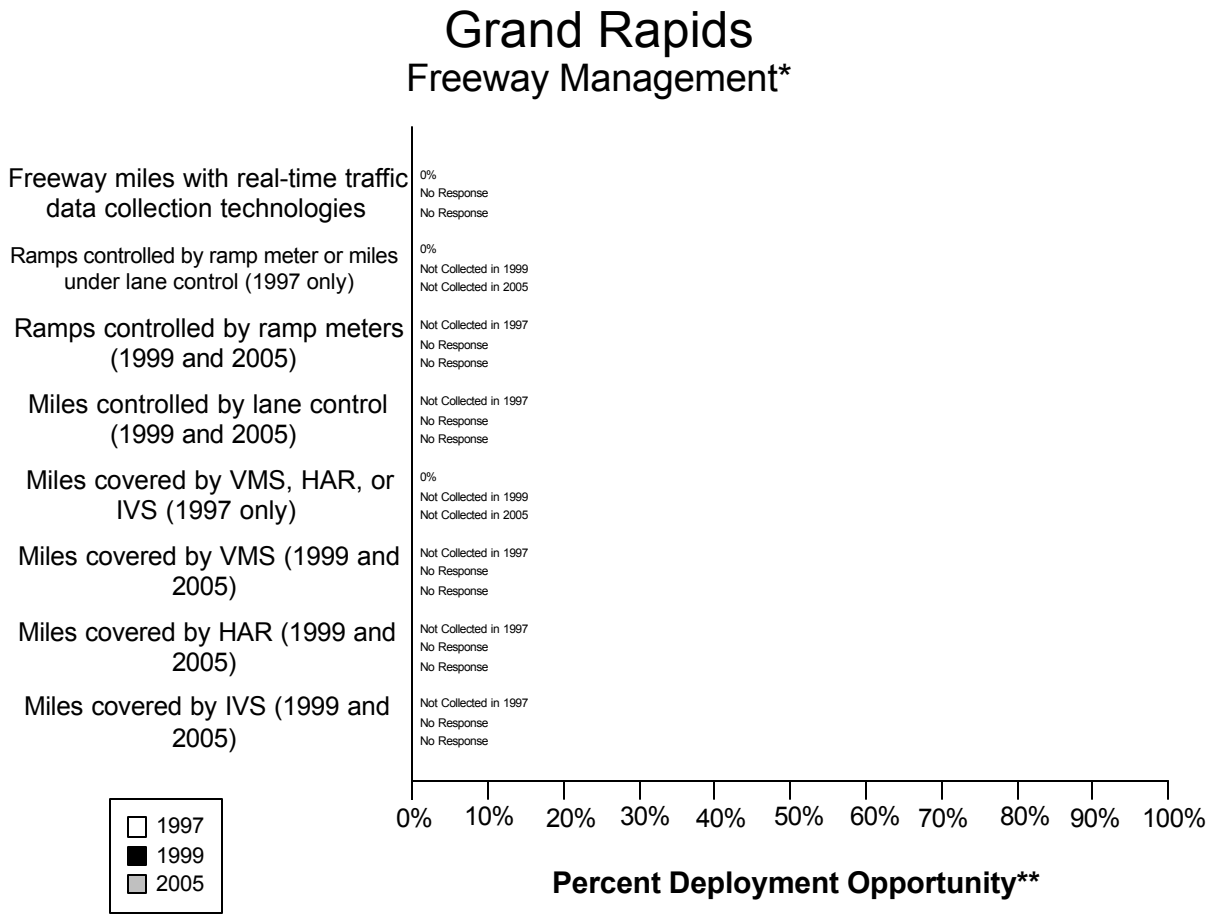
The figures summarizing the integration indicators consist of a diagram for each of the nine metropolitan ITS components portraying the integration level for 1999 (*italic*) and 2005 (**bold**), accompanied by tables providing an explanation of the data and calculations performed to develop each integration 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



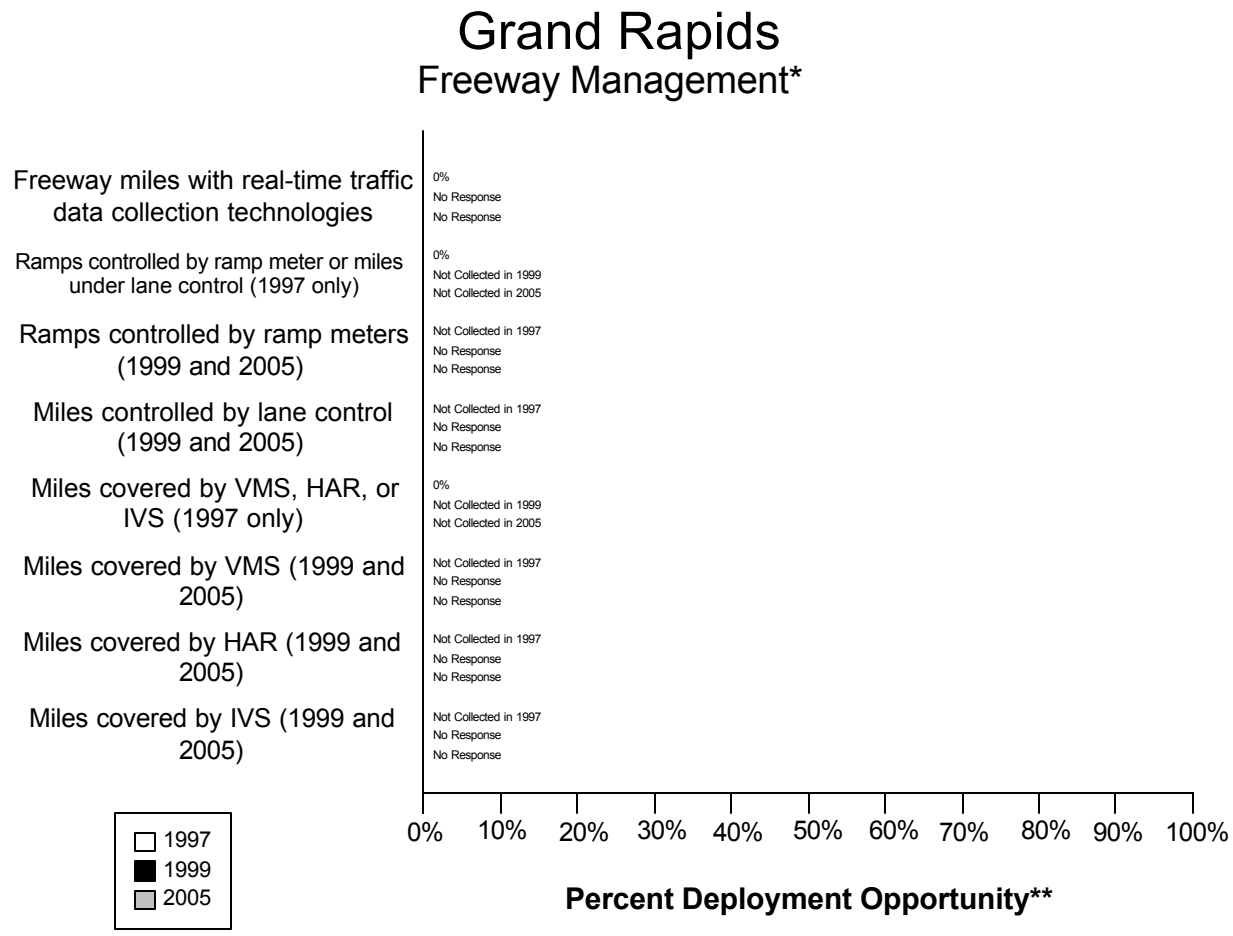
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway centerline miles are under electronic surveillance for monitoring traffic flow	0	82	0%						
Freeway entrance ramps are controlled by ramp meters or miles under lane control	0	82	0%						

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway entrance ramps are controlled by ramp meters									
Freeway centerline miles will be controlled by lane control									
Freeway miles are covered by VMS, HAR, or IVS	0	82	0%						
Freeway miles are covered by VMS									
Freeway miles are covered by HAR									
Freeway miles are covered by IVS									

Freeway Management Integration Indicators

Data as of 5/1/00



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

Link Description	1999	2005
2. Arterial Management agencies sending information to Freeway Management	(1/ 2) 50%	(1/ 2) 50%
8. Incident Management agencies sending information to Freeway Management	(0/)	(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/)	(0/)

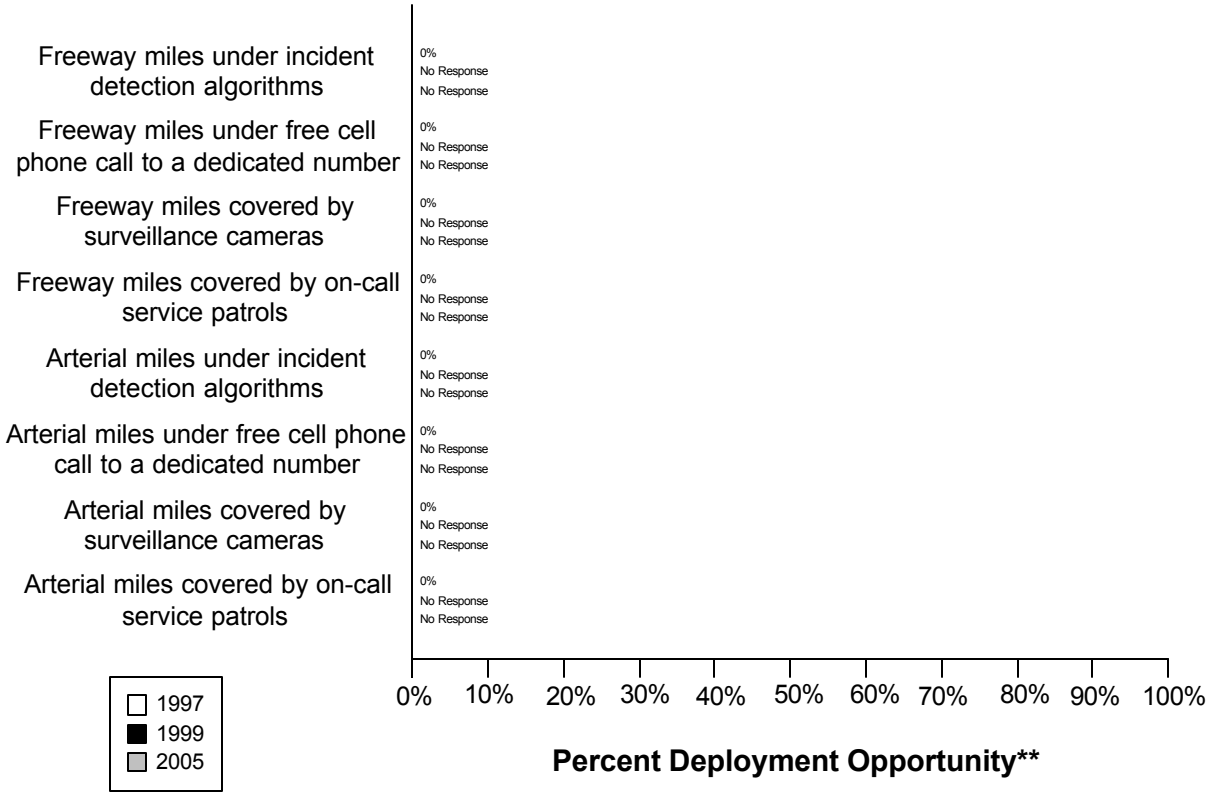
Link Description	1999	2005
30. Freeway Management agencies sending information to another Freeway Management agency	(0/)	(0/)
11. Freeway Management agencies sending information to Arterial Management	(0/)	(0/)
10. Freeway Management agencies disseminating freeway conditions to the public	(0/)	(0/)
12. Freeway Management agencies sending freeway conditions to Transit Management	(0/)	(0/)
13. Freeway Management agencies sending freeway conditions to Incident Management	(0/)	(0/)

Incident Management Component Indicators

Data as of 5/1/00

Grand Rapids

Freeway and Arterial Incident Management*



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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	%
Freeway miles are covered by incident detection algorithms	0	82	0%						
Freeway miles are covered by free cellular phone calls to a dedicated number	0	82	0%						
Freeway miles are covered by surveillance cameras.	0	82	0%						

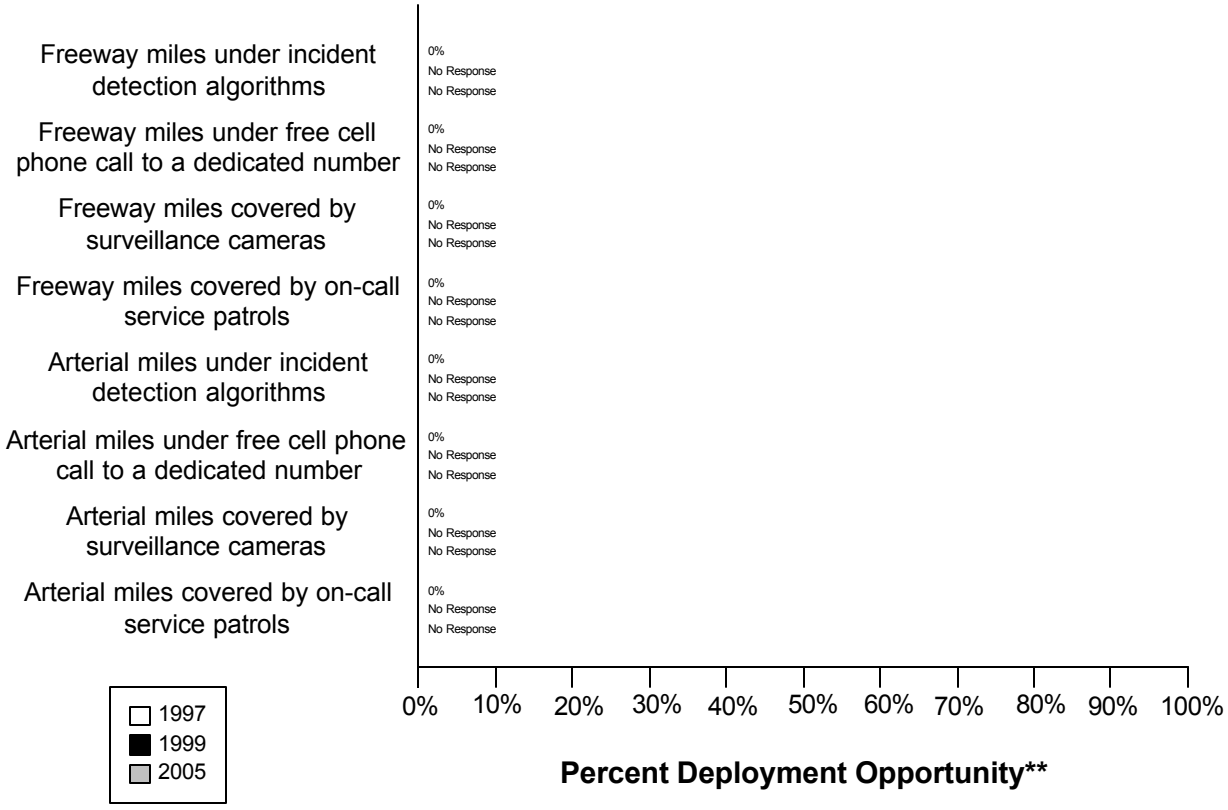
Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway miles are covered by on-call publicly-sponsored service patrol or towing services.	0	82	0%						
Arterial miles are covered by incident detection algorithms	0	629	0%		629			629	
Arterial miles are covered by free cellular phone calls to a dedicated number	0	629	0%		629			629	
Arterial miles are covered by surveillance cameras	0	629	0%		629			629	
Arterial miles are covered by on-call publicly-sponsored service patrol or towing services	0	629	0%		629			629	

Incident Management Integration Indicators

Data as of 5/1/00

Grand Rapids

Freeway and Arterial Incident Management*



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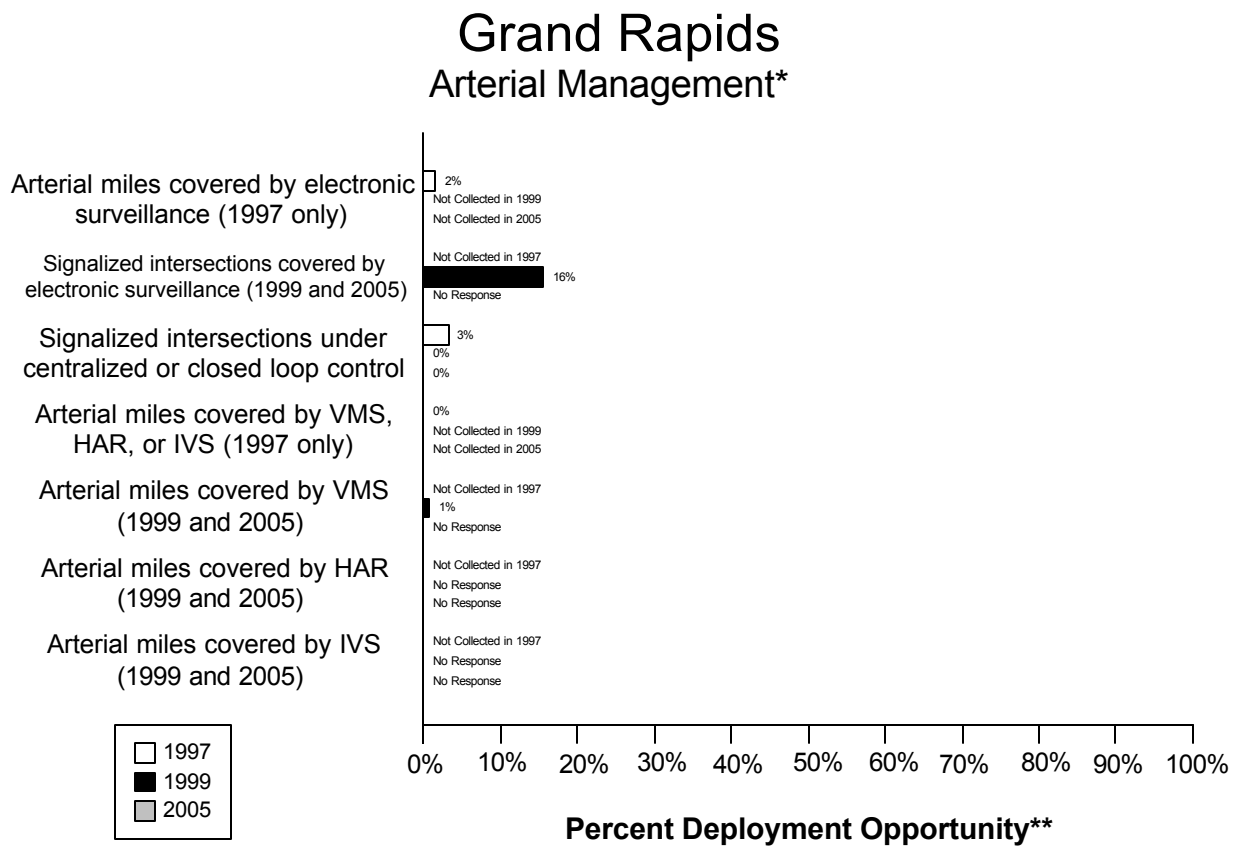
Link Description	1999	2005
21a. Incident management agencies receiving incident severity from Emergency Management	(0/)	(0/)
21b. Incident management agencies receiving incident clearance activities from Emergency Management	(0/)	(0/)
13. Freeway Management agencies sending freeway conditions to Incident Management	(0/)	(0/)
4. Arterial Management agencies sending arterial conditions to Incident Management	(1/ 2) 50%	(1/ 2) 50%

Link Description	1999	2005
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(0/ 2) 0%	(0/ 2) 0%
29. Transit Management agencies report traffic incidents as part of an organized regional incident management program	(0/ 1) 0%	(0/ 1) 0%
7. Incident management agencies transfer information describing incident severity, location, and type to Emergency Management agencies	(0/)	(0/)
9. Incident Management agencies transfer information describing incident severity, location, and type to Transit Management agencies	(0/)	(0/)
6. Incident Management agencies disseminate information describing incident severity, location, and type to the public	(0/)	(0/)
5. Incident Management agencies transfer information describing incident severity, location, and type to Arterial Management agencies	(0/)	(0/)
8. Incident Management agencies transfer information describing incident severity, location, and type to Freeway Management agencies	(0/)	(0/)
25. Police, fire, and EMS agencies participating in a formal incident management plan/team	(4/ 8) 50%	(4/ 8) 50%

Arterial Management Component Indicators

Data as of 5/1/00



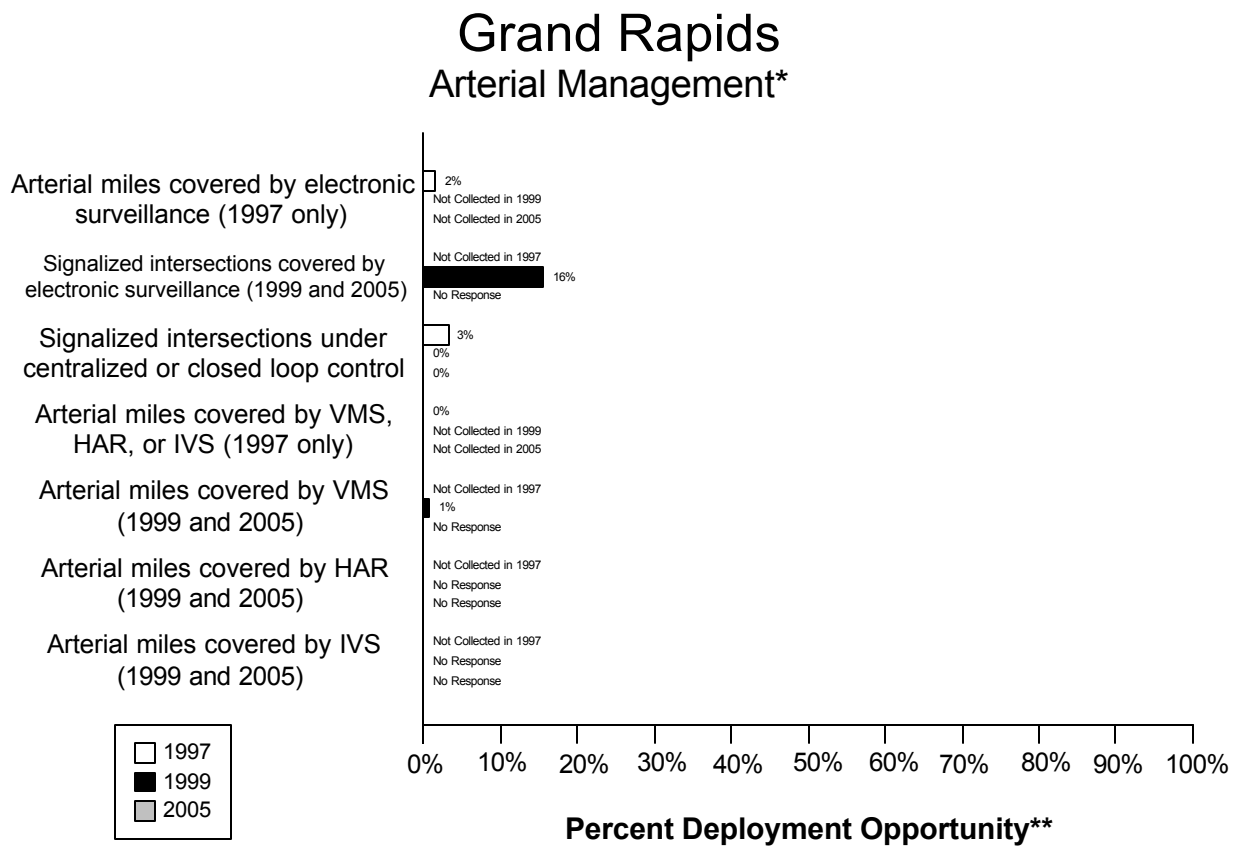
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles covered by electronic surveillance	10	629	2%						
Signalized intersections are covered by electronic surveillance for monitoring traffic flow				83	530	16%		12	
Signalized intersections are under centralized or closed loop control	16	488	3%	0	530	0%	0	12	0%

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles are covered by VMS, HAR, or IVS	0	629	0%						
Arterial miles are covered by VMS				5	629	1%		629	
Arterial miles are covered by HAR					629			629	
Arterial miles are covered by IVS					629			629	

Arterial Management Integration 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.

Link Description	1999	2005
16a. Transit management agencies with vehicles equipped with traffic signal priority	(1/ 1) 100%	(1/ 1) 100%
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	(4/ 8) 50%	(4/ 8) 50%
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	(1/ 2) 50%	(1/ 2) 50%
18. Number of Arterial Management agencies receiving information from vehicle probes	(0/ 2) 0%	(0/ 2) 0%
5. Incident Management agencies transfer information describing incident severity, location, and type to Arterial Management	(0/)	(0/)

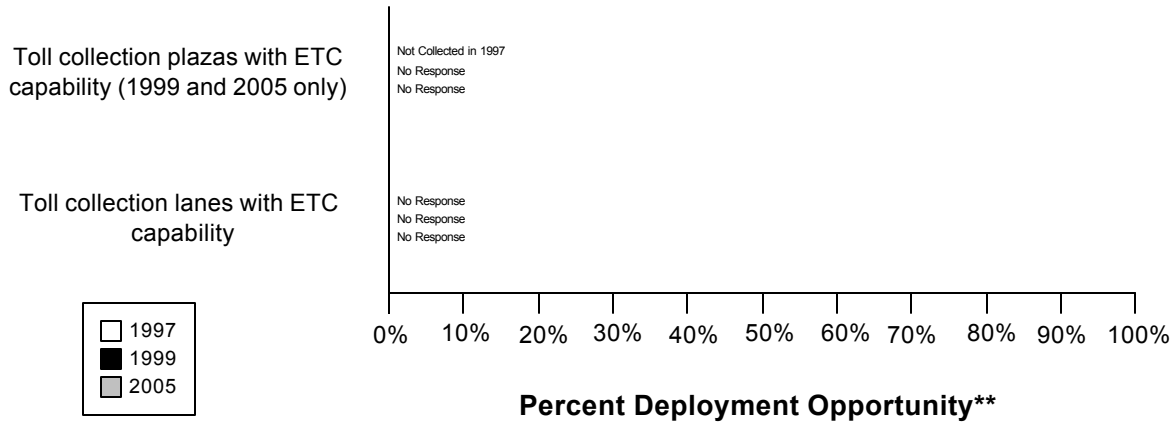
Link Description	1999	2005
11. Freeway Management agencies transfer freeway travel times, speeds, and conditions to Arterial Management agencies	(0/)	(0/)
3. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Transit Management	(1/ 2) 50%	(1/ 2) 50%
1. Arterial Management agencies disseminate arterial travel times, speeds, and conditions to the public	(0/ 2) 0%	(1/ 2) 50%
2. Arterial Management agencies send traffic condition information to Freeway Management	(1/ 2) 50%	(1/ 2) 50%
4. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Incident Management	(1/ 2) 50%	(1/ 2) 50%
26. Arterial Management agencies under cooperative agreement to share traffic signal timing for coordinated response	(1/ 2) 50%	(1/ 2) 50%

Electronic Toll Collection Component Indicators

Data as of 5/1/00

Grand Rapids

Electronic Toll Collection*



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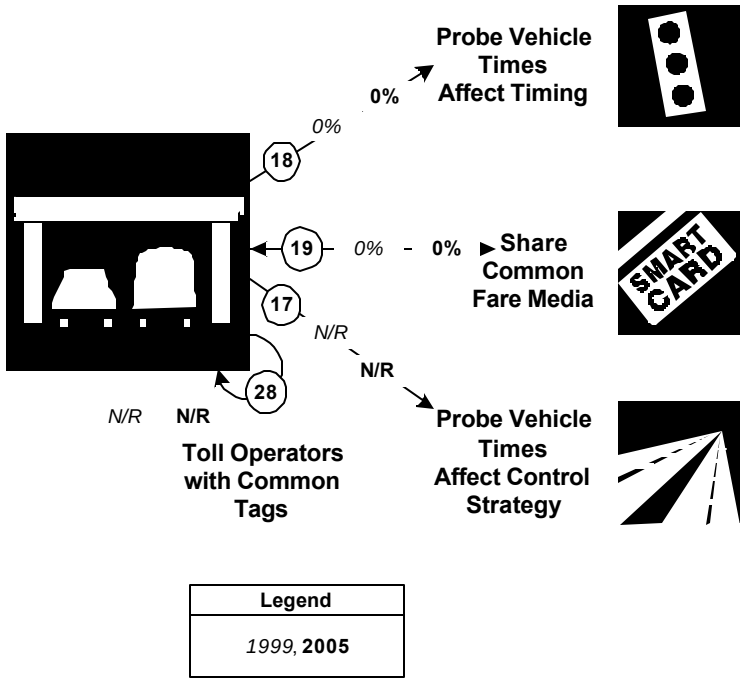
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Toll collection plazas with ETC capability									
Toll collection lanes with ETC capability									

Electronic Toll Collection Integration Indicators

Grand Rapids
Electronic Toll Collection Integration*

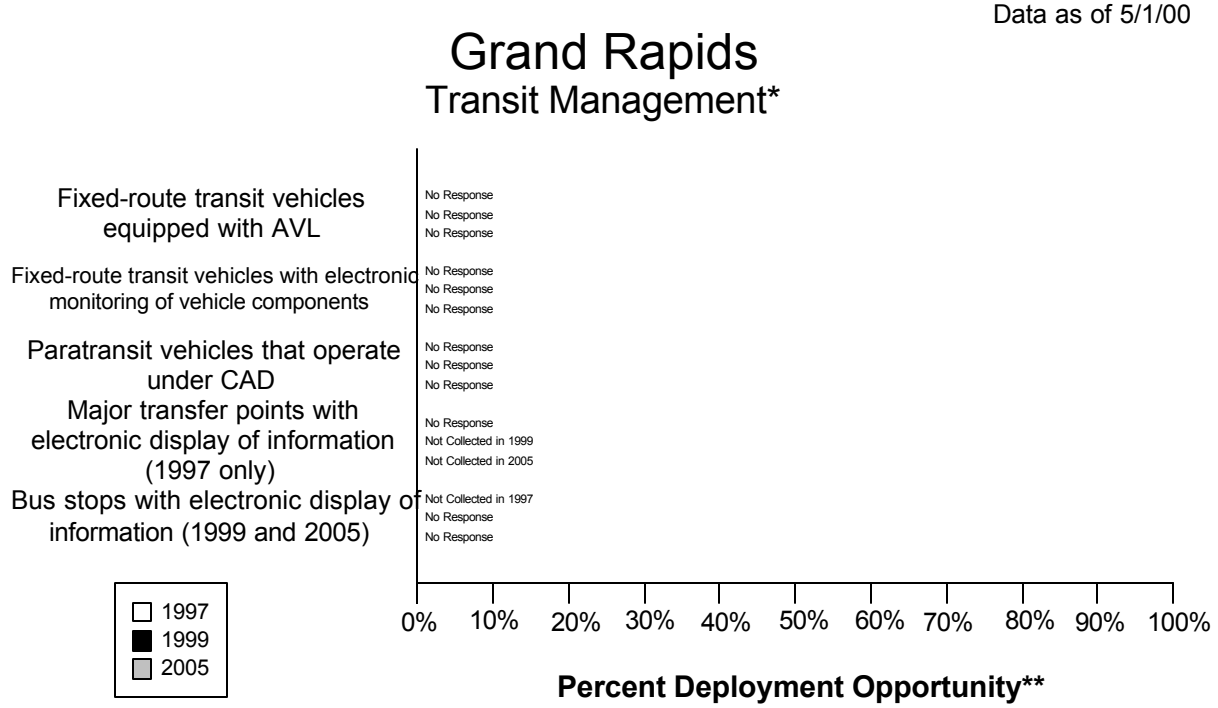


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
18. Number of Arterial Management agencies receiving information from vehicle probes	(0/ 2) 0%	(0/ 2) 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/)	(0/)
28. Toll operators using common toll tag technology	(0/)	(0/)

Transit Management Component Indicators

Data as of 5/1/00

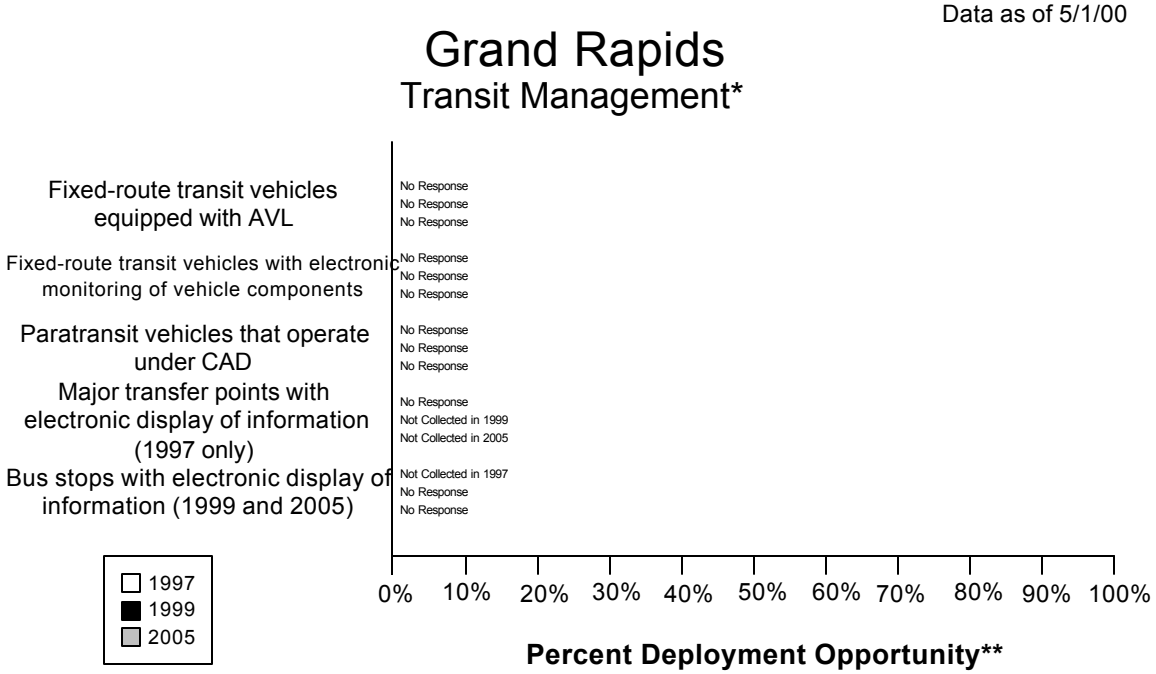


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles are equipped with AVL	0	0			66			100	
Fixed-route transit vehicles are equipped with electronic monitoring of vehicle component	0	0			66			100	
Paratransit vehicles operate under computer-aided dispatch	0	0			56			90	
Percent fixed-route transfer locations with electronic display of information	0	0							
Bus stops display information to the public									

Transit Management Integration Indicators

Data as of 5/1/00



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

Link Description	1999	2005
3. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Transit Management	(1/ 2) 50%	(1/ 2) 50%
9. Incident management agencies transfer information describing incident severity, location, and type to Transit Management	(0/)	(0/)
12. Freeway Management agencies transfer freeway travel times, speeds, and conditions to Transit Management	(0/)	(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	(1/ 1) 100%	(1/ 1) 100%
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%	(0/ 1) 0%
14b. Transit Management agencies disseminate information describing schedule/route adherence to travelers	(0/ 1) 0%	(0/ 1) 0%
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%

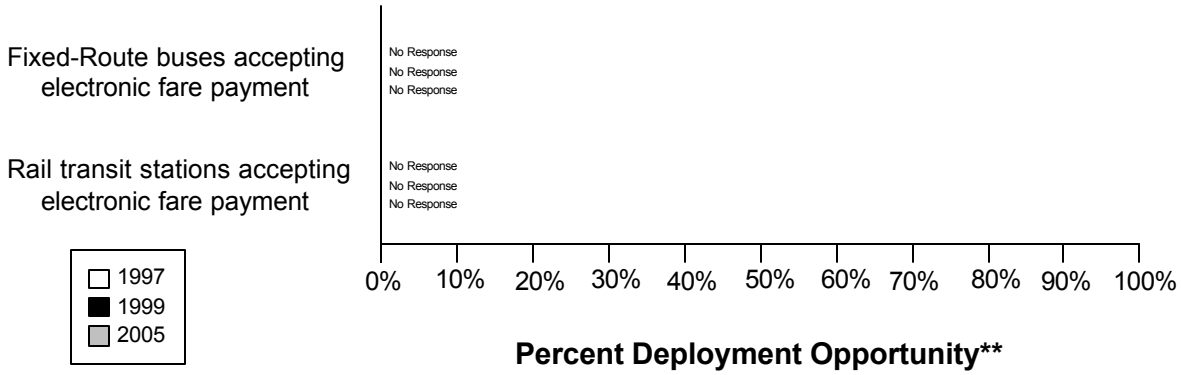
Link Description	1999	2005
29. Transit Management agencies that report traffic incidents as part of an organized regional Incident Management program	(0/ 1) 0%	(0/ 1) 0%

Electronic Fare Payment Component Indicators

Data as of 5/1/00

Grand Rapids

Electronic Fare Payment*



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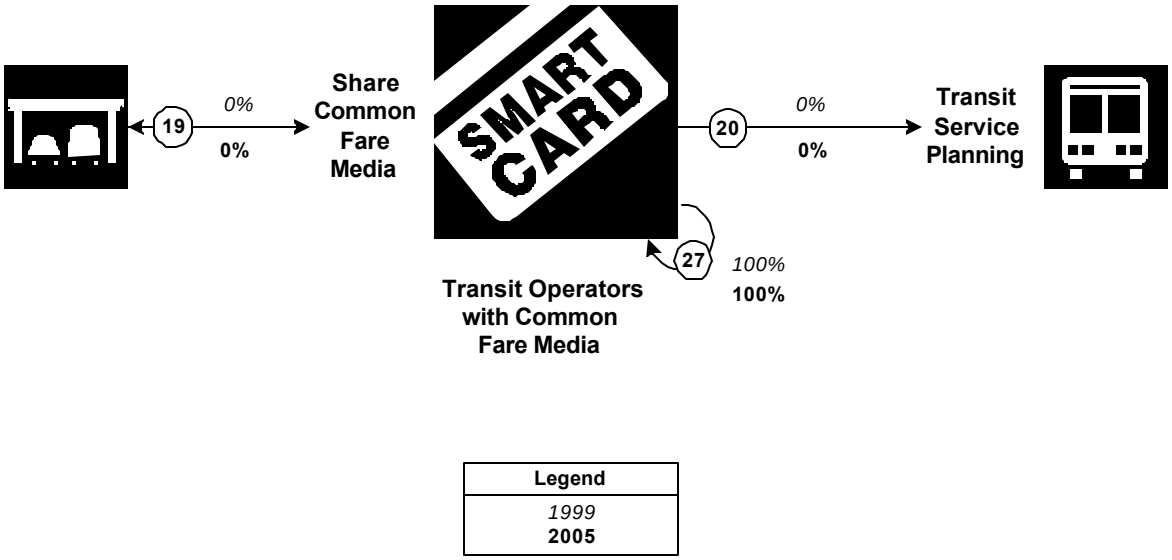
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles that accept electronic payment	0	0			66			100	
Rail transit stations that accept electronic payment	0	0							

Electronic Fare Payment Integration Indicators

Grand Rapids
Electronic Fare Payment Integration*

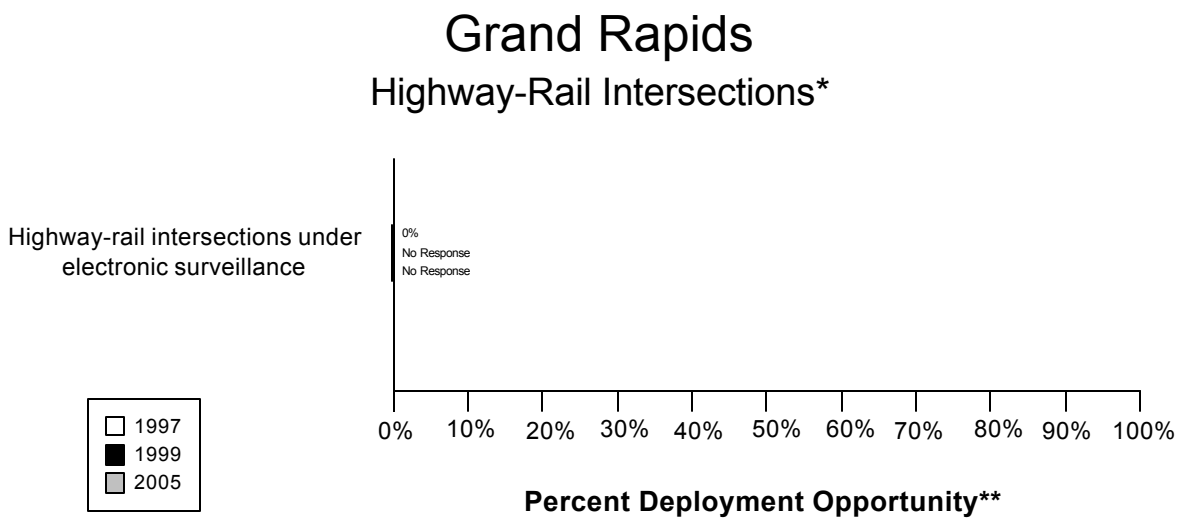


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

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	(1/ 1) 100%	(1/ 1) 100%

Highway Rail Intersection Component Indicators

Data as of 5/1/00



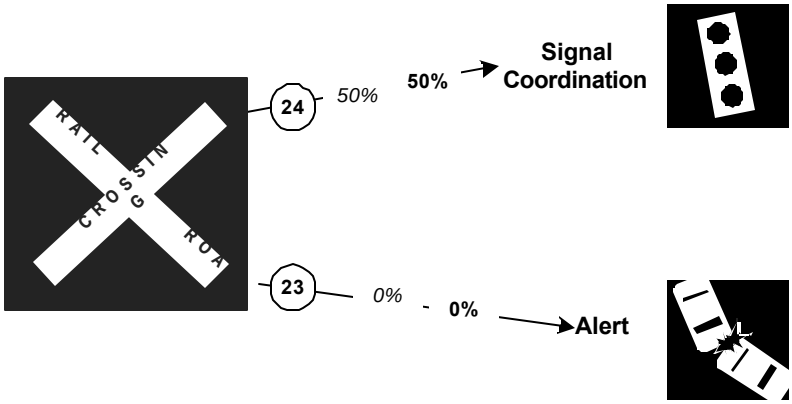
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Highway-rail intersections are under electronic surveillance	0	72	0%	12	0			0	

Highway Rail Intersection Integration Indicators

Grand Rapids
Highway Rail Intersections Integration*

Inputs Outputs



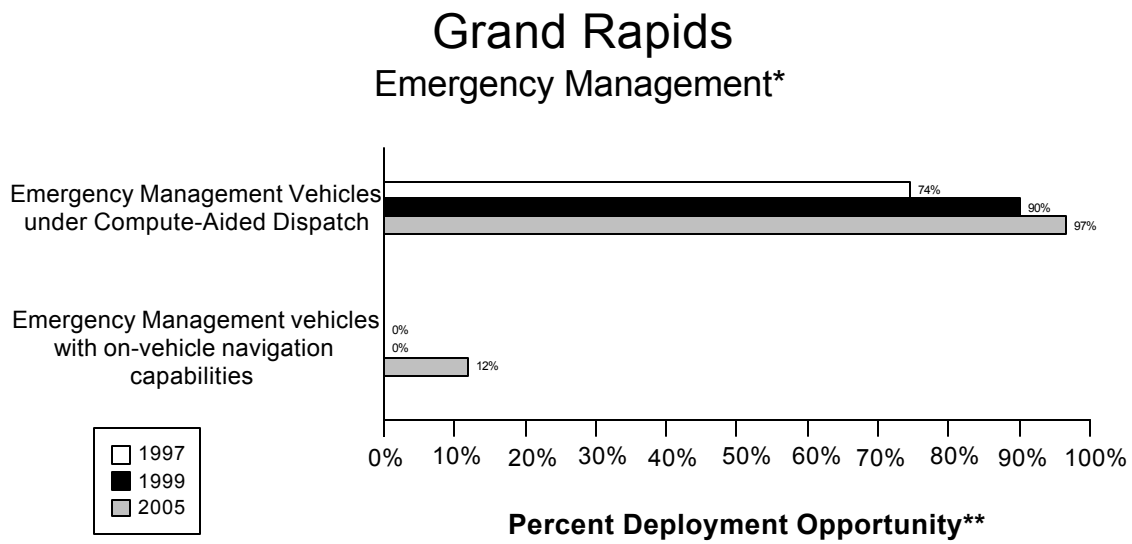
Legend
1999, **2005**

* 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	(1/ 2) 50%	(1/ 2) 50%
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(0/ 2) 0%	(0/ 2) 0%

Emergency Management Component Indicators

Data as of 5/1/00



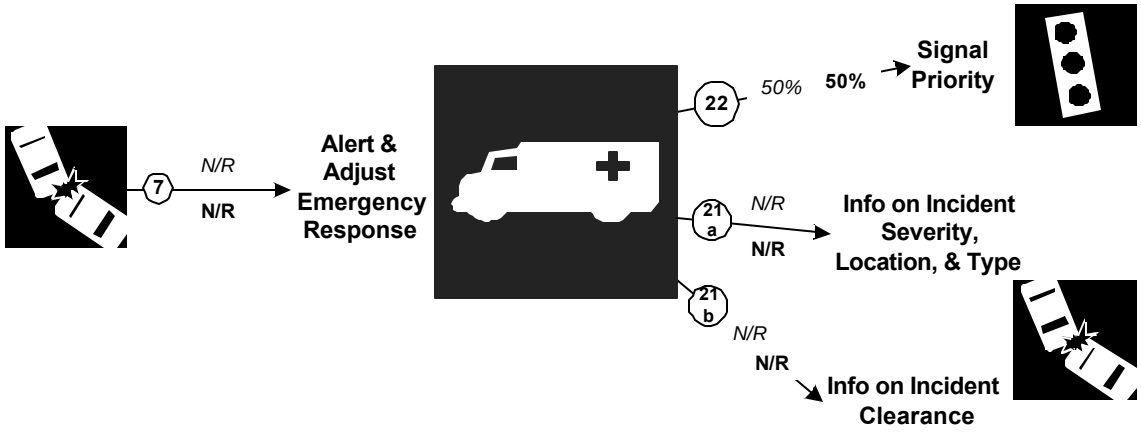
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Public sector emergency vehicles that operate under computer-aided dispatch	244	328	74%	280	311	90%	295	305	97%
Public sector emergency vehicles that have in-vehicle route guidance capability	0	328	0%	0	311	0%	36	305	12%

Emergency Management Integration Indicators

Grand Rapids
Emergency Management Integration*

Inputs Outputs



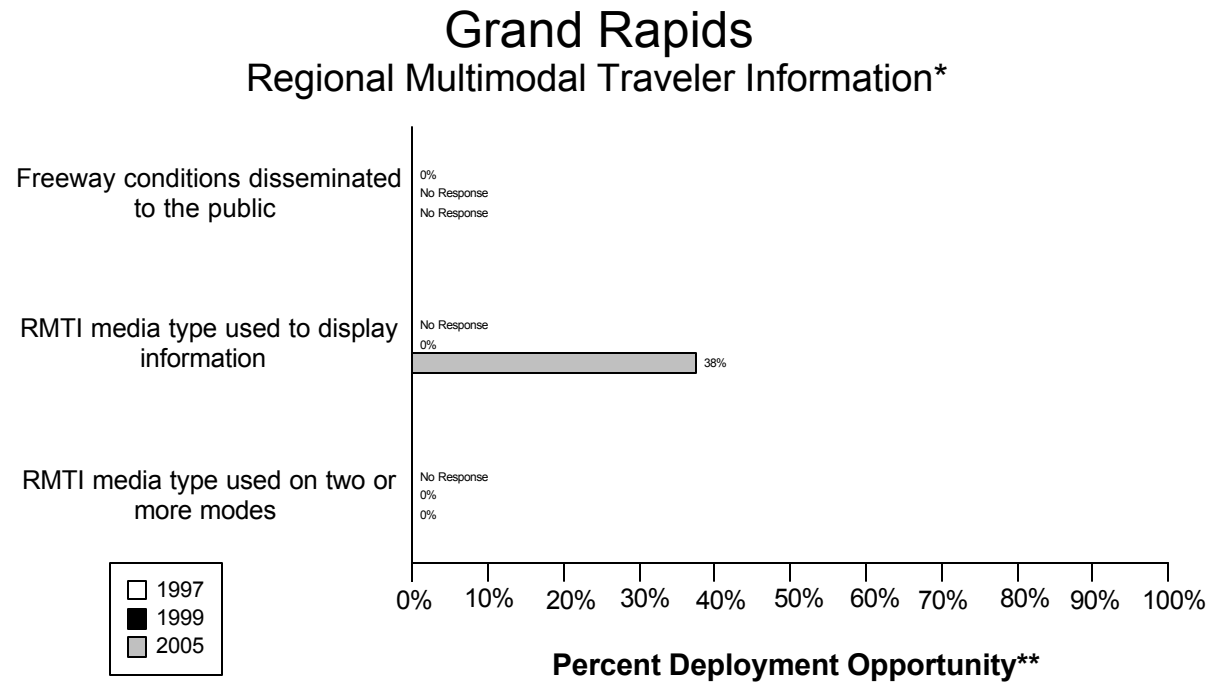
Legend
1999, **2005**

* 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	(0/)	(0/)
22. Emergency Management agencies have vehicles equipped with traffic signal preemption capability	(4/ 8) 50%	(4/ 8) 50%
21a. Freeway Management agencies receive incident severity, location, and type data from Emergency Management agencies	(0/)	(0/)
21b. Freeway Management agencies receive incident clearance activities information from Emergency Management agencies	(0/)	(0/)

Regional Multimodal Traveler Information Component Indicators

Data as of 5/1/00

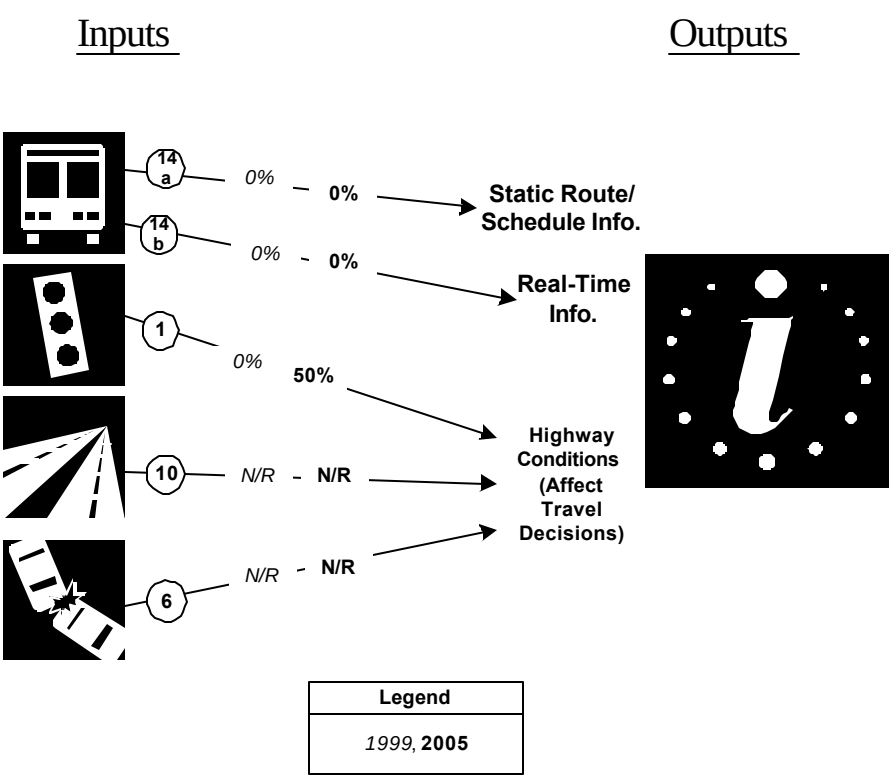


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Freeway conditions disseminated to travelers	0	82	0%				0		
Possible RMTI media types are used to display information to travelers				0	8	0%	3	8	38%
Possible RMTI media are used to display information on *two or more modes* to travelers				0	8	0%	0	8	0%

Regional Multimodal Traveler Information Integration Indicators

Grand Rapids
Regional Multimodal Traveler Information Integration*

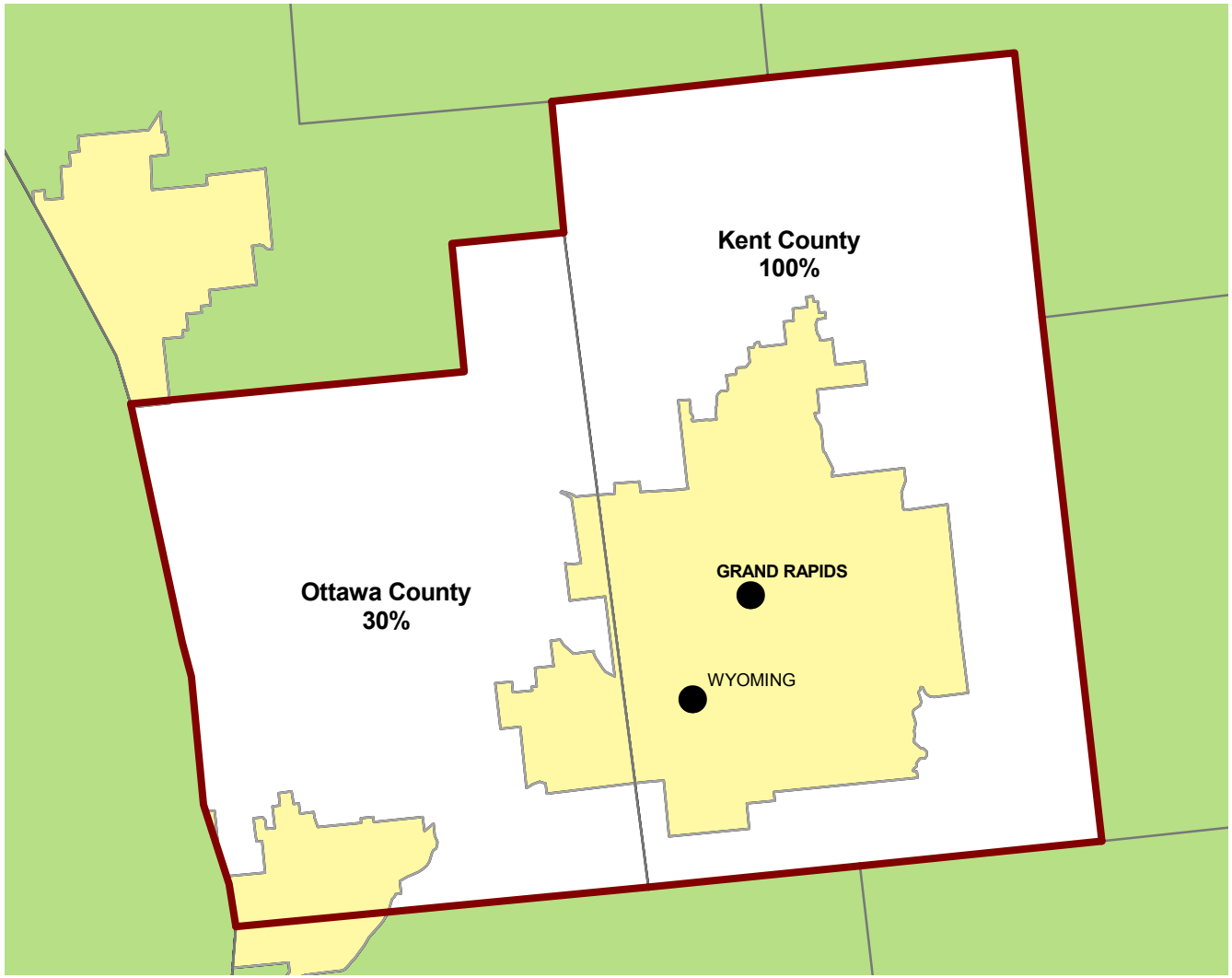


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
14a. Transit Management agencies that disseminate information describing transit routes, schedules, and fares to travelers	(0/ 1) 0%	(0/ 1) 0%
14b. Transit Management agencies that disseminate information describing schedule/route adherence to travelers	(0/ 1) 0%	(0/ 1) 0%
1. Arterial Management agencies that disseminate arterial travel times, speeds, and conditions to the public	(0/ 2) 0%	(1/ 2) 50%
10. Freeway Management agencies that disseminate freeway travel times, speeds, and conditions to travelers	(0/)	(0/)
6. Incident Management agencies that disseminate information describing incident severity, location, and type to the public	(0/)	(0/)

Appendix A
Survey Coverage Area

GRAND VALLEY
METRO COUNCIL, MI



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
GRAND RAPIDS						
Arterial Management						
Grand Rapids including Kent County	(616) 456-4639	(616) 456-3665	7/29/1999	9/17/1999	08/12/1997	08/06/1998
Michigan Department of Transportation-Grand	(616) 451-3091	(616) 451-0707	8/12/1999			
Ottawa County	(616) 850-7220	(616) 850-7237	7/29/1999	8/9/1999	08/12/1997	08/26/1997
Wyoming City	(616) 530-7262	(616) 249-3434	7/29/1999		08/12/1997	08/26/1997
Emergency Management						
Grand Rapids Fire Department	(616) 456-3900	(616) 456-3898	6/29/1999	6/30/1999	08/12/1997	05/15/1998
Grand Rapids Police Department	(616) 456-3412	(616) 456-3406	6/29/1999	7/12/1999	08/12/1997	05/15/1998
Kent County Sheriffs Department	(616) 336-3121	(616) 336-2122	6/29/1999	9/7/1999	08/12/1997	05/20/1998
Michigan State Police Emergency Management	(517) 333-5043	(517) 333-4987	6/29/1999	7/8/1999	08/12/1997	05/15/1998
Ottawa County Sheriff	(616) 739-4000	(616) 738-4062	6/29/1999	8/18/1999	08/12/1997	06/17/1998
Wyoming City Fire Department	(616) 530-7250	(616) 249-3435	6/29/1999	6/29/1999	08/12/1997	08/14/1997
Wyoming City Fire Department (Emergency	(616) 530-7250	(616) 249-3435	6/29/1999	6/29/1999	08/12/1997	08/14/1997
Wyoming City Fire Department (Other)	(616) 530-7250	(616) 249-3435	6/28/1999	6/29/1999	08/12/1997	08/14/1997
Wyoming City Police Department	(616) 530-7333	(616) 261-7116	6/29/1999	6/30/1999	08/12/1997	05/20/1998
Freeway Management						
Michigan Department of Transportation	(616)-451-3091	(616)-451-0707	7/30/1999		08/12/1997	09/26/1997
MPO						
Grand Valley Metropolitan Council	(616) 776-3876	(616) 774-9292	7/15/1999	9/20/1999		
Transit Management						
Grand Rapids Area Transit Authority	(616) 774-1187	(616) 456-1941	8/9/1999	9/10/1999	08/14/1997	08/15/1997

Appendix C
Freeway Management Components

Appendix D
Freeway Management Integration

Appendix E
Freeway Management Information Collection and Dissemination

Appendix F
Arterial Management Components

Arterial Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids including Kent County		Ottawa County		Totals	
	1999	2005	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes		2	
ARTERIAL MANAGEMENT SECTION						
Number of arterial miles that agency owns or maintains	NR		NR		0	
Number of arterial miles that is used for planning	NR		0		0	
Number of highway-rail intersections that agency maintains	NR		0		0	
Number of highway-rail intersections that is used for planning	NR		0		0	
Type of facilities used to conduct arterial management activities						
Activities housed in a free-standing dedicated building?	No		No		0	
Activities housed in a building shared with other activities?	Yes		No		1	
Activities conducted in a dedicated control room?	No		No		0	
Control room contains operator console(s)?	Yes		No		1	
Control room contains electronic wall map?	Yes		No		1	
Control room contains CCTV display(s)?	Yes		No		1	
Activities conducted in a room containing workstations or PCs that manage traffic?	Yes		No		1	
Facilities are electronically linked to other transportation mgt facilities?	No		No		0	
Staffing and hours of operation of arterial management activities						
Number of full-time agency staff members	3		NR		3	
Number of full time contractor staff members	NR		NR		0	
Number of part-time agency staff members	NR		NR		0	
Number of part-time contractor staff members	NR		NR		0	
Staffed 24 hours day by agency staff or by others	NR		NR		0	
Staffed during peak hours only by agency staff or by others	agency		NR		0	
Staffed by others during off-peak hours	No		No		0	
Agency staff perform transportation management as an ancillary duty	No		No		0	
Agency staff dedicated to transportation management duty	Yes		No		1	
Types of operations conducted for arterial management						
Incident detection and management?	Yes		No		1	
This metropolitan area?	No		No		0	
Other metropolitan area?	No		No		0	
Monitoring and troubleshooting status of system components?	Yes		No		1	
Radio communications with other agencies?	Yes		No		1	
Exchange of electronic data with other agencies such as computer aided dispatch?	Yes		No		1	
Manual override of traffic signal timing plans	Yes		No		1	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	Yes		No		1	

Arterial Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids including Kent County		Ottawa County		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Describe agency's role in traffic signal control	We operate traffic signals on all roads in the county except Wyoming.		County routes only			
Traffic Signals Operated by Agency						
Number of signalized intersections operated and owned by agency	NR	NR	10	12	10	12
Number of signalized intersections operated by agency but owned by another	NR	NR	0	0	0	0
Total number of signalized intersections operated by agency	520	NR	10	12	530	12
Characteristics of signalized intersections that agency operates						
Under closed loop or central system control	0	NR	0	0	0	0
Under real-time traffic adaptive control using advanced software	0	NR	0	0	0	0
Using SCOOT	No		No		0	
Using SCATS	No		No		0	
Name of software	NR		NR			
Allow signal preemption for emergency vehicles	107	NR	1	0	108	0
Allow signal priority for transit vehicles	0	NR	0	0	0	0
Within 200 feet of a highway-rail intersection	12	NR	1	0	13	0
Within 200 feet of a highway-rail intersection that adjust signal timing	12	NR	0	0	12	0
Software used to control the signals agency operates						
Date of last upgrade to traffic signal control system software?	August 1999		NR			
How often do you update signal timing?	2 years unless required		NR			
Software used and number of signalized intersections under control (1999, 2005)	NR		NR			
Controllers used to control signals						
NEMA	520	NR	10	0	530	0
170/179	0	0	0	0	0	0
2070 controller	0	0	0	0	0	0
Other	0	0	0	0	0	0
Technologies Associated with Highway-Rail Intersections						
Total number of highway-rail intersections under electronic surveillance	12	NR	NR	NR	12	0
Highway-Rail intersection capapbilities						
Video surveillance	0	0	0	0	0	0
Electronic surveillance other than video	0	0	0	0	0	0
Ability to predict train arrival electronically	12	NR	0	0	12	0
Equipped with electronic traffic violator devices	0	0	0	0	0	0
Other	0	0	0	0	0	0
Real-Time Electronic Traffic Data Collection Technologies						
Total number of signalized intersections covered by electronic surveillance	83	NR	NR	NR	83	0
Number of signalized intersections with data collection technologies						
Loop detectors	83	NR	0	0	83	0
Video detection cameras	0	0	0	0	0	0
Probe readers reading toll tags	0	0	0	0	0	0

	Grand Rapids including Kent County		Ottawa County		Totals	
	1999	2005	1999	2005	1999	2005
Probe readers reading license plates	0	0	0	0	0	0
Other	0	0	0	0	0	0
Roadside Technologies used to Distribute Traveler Information						
Number deployed						
Highway Advisory Radio	NR	NR	NR	NR	0	0
In-Vehicle Signing (IVS)	NR	NR	NR	NR	0	0
VMS controlling parking access	NR	NR	NR	NR	0	0
Miles covered						
Highway Advisory Radio	NR	NR	NR	NR	0	0
In-Vehicle Signing (IVS)	NR	NR	NR	NR	0	0
Variable Message Signs (VMS) on Arterials						
Candidate locations for deployment of VMS where VMS has been deployed	2	NR	NR	NR	2	0
Candidate locations for deployment of VMS	6	NR	NR	NR	6	0
Communication Technologies						
Signalized intersections communicated with by each type of communication						
Twisted pair cable	6	20	0	0	6	20
Coaxial cable	10	20	0	0	10	20
Fiber-optic cable	0	60	0	0	0	60
Other (e.g., wireless, dial-up modems, leased lines, etc.)	0	420	0	0	0	420
Does agency convey information on highway-rail intersection crossing						
status to travelers via roadside media such as VMS or HAR?	No		No		0	
ITS Standards Used Related to Traffic Signal Control						
Advanced Transportation Controller (ATC) Software Application Interface (ITE 9603-1)	No		No		0	
ATC Physical Cabinet Functional Design (ITE-9603-2)	No		No		0	
ATC Functionality and Interface Definitions (ITE-9603-3)	No		No		0	
Natl. Trans. Communications for ITS Protocol (NTCIP) Class B Profile (AASHTO TS 3.3)	No		No		0	
NTCIP Data Collection and Monitoring Devices (AASHTO TS 3.DCM)	No		No		0	
NTCIP Object Definitions for Video Camera Control (AASHTO TS 3.VCC)	No		No		0	
NTCIP Object Definitions for Actuated Traffic Signal Controller Units (AASHTO TS 3.5)	No		No		0	
Would agency be willing to participate in testing of ITS Standards?	NR		No		0	
Have agreements in place with other agencies to use similar hardware						
and software to aid maintenance and interoperability?	Yes		No		1	
INCIDENT MANAGEMENT ON ARTERIAL STREETS						
Receive information on highway-rail intersection crossing blockages for						
the purpose of managing incident response?	No		No		0	
Use of Service Patrols to Assist in Detection and Response to Incidents						
Publicly operated service patrol vehicles	No		No		0	
Privately operated service patrol vehicles operated under public contract	No		No		0	
Total number of arterial miles patrolled by these services	NR	NR	NR	NR	0	0
Miles Covered by Methods to Detect and Verify Incidents						

	Grand Rapids including Kent County		Ottawa County		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Free cellular phone call to a dedicated phone number other than 911	0	0	0	0	0	0
Free cellular phone call to an area radio station	0	0	0	0	0	0
Police patrols	0	0	0	0	0	0
Computer algorithms linked to traffic surveillance equipment	0	0	0	0	0	0
CCTV	0	0	0	0	0	0
Private sector sources (e.g., Shadow Traffic, Smart Routes)	0	0	0	0	0	0
Other	0	0	0	0	0	0
Procedures in place for Arterial Incident Response?						
Working agreement(s)/arrangement(s) with other agencies	No		No		0	
Inter-agency incident management admin. team that meets regularly	No		No		0	
Major incident response team that responds to major incidents	No		No		0	
Set of goals/objectives for incident mgt that has been adopted by agencies in region	No		No		0	
Methods of Communication Used On-Site at an Incident						
Police						
Two-way radio	No		No		0	
800 MHz trunked radio	No		No		0	
Cellular telephone	No		No		0	
Hand-held (i.e., walkie-talkie)	No		No		0	
Automated data systems (i.e., CAD)	No		No		0	
Other	No		No		0	
Fire						
Two-way radio	No		No		0	
800 MHz trunked radio	No		No		0	
Cellular telephone	No		No		0	
Hand-held (i.e., walkie-talkie)	No		No		0	
Automated data systems (i.e., CAD)	No		No		0	
Other	No		No		0	
DOT						
Two-way radio	No		No		0	
800 MHz trunked radio	No		No		0	
Cellular telephone	No		No		0	
Hand-held (i.e., walkie-talkie)	No		No		0	
Automated data systems (i.e., CAD)	No		No		0	
Other	No		No		0	
Towing						
Two-way radio	No		No		0	
800 MHz trunked radio	No		No		0	
Cellular telephone	No		No		0	

Arterial Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids including Kent County		Ottawa County		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Hand-held (i.e., walkie-talkie)	No		No		0	
Automated data systems (i.e., CAD)	No		No		0	
Other	No		No		0	
Which police agencies typically respond to incidents on arterials?						
State Police	No		No		0	
County Police or Sheriff	No		No		0	
City Police	No		No		0	
Who provides on-site emergency medical response?						
Fire	No		No		0	
Emergency Management Service Agency	No		No		0	
Private hospital	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		0	
Is the Incident Command System used to manage incident scenes?	NR		NR		0	
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		0	
Formal agreement?	No		No		0	
Not specified or don't know?	No		No		0	
On-scene command post used to manage activities of responding agencies?	NR		NR		0	
Are there communication linkages to a communications traffic/freeway mgt center?	NR		NR		0	
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		0	
Respondents protected through law or court opinion for liability claims						
for damages to vehicles or cargoes during clearance activities?	NR		NR		0	
Are overturned tank trucks, which are intact and not leaking, uprighted						
without first off-loading?	NR		NR		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		0	
Have laws or policies regarding the removal of stalled/abandoned vehicles						
from freeway shoulders?	NR		NR		0	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	NR		NR		0	
Have policies or procedures for quick removal of vehicles?	NR		NR		0	
Is Total Station equipment used to investigate major incidents?	NR		NR		0	
Handling of Towing Responses to Incidents						
Formal contract based on qualifications?	No		No		0	

Arterial Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids including Kent County		Ottawa County		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Rotation with companies under contract?	No		No		0	
Separate lists kept for light and heavy response and for specialty recovery?	NR		NR		0	
Rotation list with minimal qualifications?	No		No		0	
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		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: Grand Rapids

Agency Name	Grand Rapids including Kent County		Ottawa County	
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
Arterial Mgt. agencies in metropolitan area with which you share info.				
Share Timing Plans Information	Grand Rapids including Kent County, Michigan Department of Transportation-Grand Rapids Office, Ottawa County, Wyoming City	None listed	None listed	None listed
Coordinate Changes to Timing Plans	Kent County, Michigan Department of Transportation-Grand Rapids Office, Ottawa County, Wyoming City	None listed	None listed	None listed
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	Michigan Department of Transportation	None listed	None listed	None listed
Share Infrastructure	Michigan Department of Transportation	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Incident Management Agencies				
Provide Information	Michigan Department of Transportation	None listed	None listed	None listed
Share Infrastructure	Michigan Department of Transportation	None listed	None listed	None listed
Coordinate Operation	Michigan Department of Transportation	None listed	None listed	None listed
Public Transit Operators Agencies				
Provide Information	Grand Rapids Area Transit Authority	None listed	None listed	None listed
Share Infrastructure	Grand Rapids Area Transit Authority	None listed	None listed	None listed
Coordinate Operation	Grand Rapids Area Transit Authority	None listed	None listed	None listed
Arterial Management Agencies				

Arterial Management Integration
Agencies for Metropolitan Area: Grand Rapids

Agency Name	Grand Rapids including Kent County		Ottawa County	
Provide Information	Grand Rapids including Kent County, Michigan Department of Transportation-Grand Rapids Office, Ottawa County, Wyoming City	None listed	None listed	None listed
Share Infrastructure	Grand Rapids including Kent County, Michigan Department of Transportation-Grand Rapids Office, Ottawa County, Wyoming City	None listed	None listed	None listed
Coordinate Operation	Grand Rapids including Kent County, Michigan Department of Transportation-Grand Rapids Office, Ottawa County, Wyoming City	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	Michigan Department of Transportation	None listed	None listed
Public Transit operators from which your agency receives				
arterial travel times derived from vehicle probes	None listed	Grand Rapids Area Transit Authority	None listed	None listed
Incident Management agencies from which your agency receives				
incident clearance and/or incident severity, location, and type information				
Receive information on Incident Clearance	None listed	Michigan Department of Transportation	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	Michigan Department of Transportation	None listed	None listed
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				
Emergency 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
Freeway Management Agencies				

Arterial Management Integration
Agencies for Metropolitan Area: Grand Rapids

Agency Name	Grand Rapids including Kent County		Ottawa County	
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				
Receive Arterial Incident Clearance Information	None listed	None listed	None listed	None listed
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.

Appendix H
Arterial Management Information Collection and Dissemination

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Grand Rapids

Agency Name	Grand Rapids including Kent County		Ottawa County	
	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	speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption, Transit vehicle signal priority,	Traffic volumes, Traffic speeds, Lane occupancy, Vehicle classification	NR	NR
Archived by your agency	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption, Transit vehicle signal priority,	NR	NR	NR
Transferred to another agency by your agency	Phasing/cycle lengths	NR	NR	NR
Importance of making information available to the public				
Ranked High	NR		NR	
Ranked Medium	Phasing/cycle lengths		NR	
Ranked Low	Traffic volumes, Traffic speeds, Turning movements, Emergency vehicle signal preemption, Transit vehicle signal priority, Incidents		NR	
Groups that make requests for the data	State DOT personnel, Media (I.e., TV stations, radio stations), MPOs, Consultants, Residents		NR	
What is the data used for?	Traffic analysis, Construction impact determination, Planning, Accident prediction models, Dissemination to the public		NR	
Methods used to disseminate arterial information to the public				
Technologies your agency uses to disseminate:	NR	Telephone system, Internet Web sites, E-mail or other direct PC communication, In-vehicle navigation systems, Facsimile	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR
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				

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Grand Rapids

Agency Name	Grand Rapids including Kent County		Ottawa County	
	1999	**2005**	**1999**	**2005**
to the public				
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	

Appendix I
Transit Management Components

Transit Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids Area Transit Authority	
	1999	**2005**
Agency Returned Survey?	Yes	
Number of vehicles used in revenue service		
Fixed Route Bus	66	100
Heavy or Rapid Rail	0	0
Light Rail	0	0
Demand Responsive	56	90
Commuter Rail	0	0
Ferry Boat	0	0
Have of plan to have an Automated Vehicle Location System?	No	
Primary and Secondary Location Technologies Used		
Primary Technologies		
GPS	No	No
Sign/Odometer	No	No
Dead-Reckoning	No	No
LORAN C	No	No
Other	No	No
Backup Technologies		
GPS	No	No
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?	No	
Services Automated Traveler Info. System Applies:		

Transit Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids Area Transit Authority	
	1999	**2005**
Fixed Route	No	
Heavy Rail	No	
Light Rail	No	
Demand Responsive	No	
Commuter Rail	No	
Ferry	No	
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	NR	NR
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?	Yes	
Regular?	No	
Services that use a Digital or Trunked Radio System		
Digital Only		
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
Trunked Only		
Fixed Route Bus	No	No
Heavy or Rapid Rail	No	No
Light Rail	No	No
Demand Responsive	No	No
Commuter Rail	No	No

Transit Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids Area Transit Authority	
	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
Light Rail	NR	NR

Transit Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids Area Transit Authority	
	1999	**2005**
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?	Yes	
Is there or will there be a Transportation Management Center		
(TMC) in the region that controls transit and highway modes?	No	
Modes that TMC currently controls:		
Highways	No	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	12	80
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	
TCIP Incident Management Objects (TCIP-IM)	No	
TCIP Fare Collection Objects (TCIP-FC)	No	

Transit Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids Area Transit Authority	
	1999	**2005**
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?	Yes	
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?	No	
Methods of Fare Payment		
Stored value card with fare deducted for each trip		
Magnetic Stripe	No	
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	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
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
Ferry Boat Landings	NR	NR
Credit Card		
Fixed Route Bus Vehicles	NR	NR
Heavy or Rapid Rail Stations	NR	NR

Transit Management
Agencies for Metropolitan Area: Grand Rapids

	Grand Rapids Area Transit Authority	
	1999	**2005**
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: Grand Rapids

Agency Name	Grand Rapids Area Transit Authority	
	1999	**2005**
Agency Returned Survey?	Yes	
Transit operators in the region that use the same electronic payment system	Chicago, IL, Windsor, Ont	
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: Grand Rapids

Agency Name	Grand Rapids Area Transit Authority	
	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	NR
Real-time transit schedule adherence or arrival and departure times	NR	NR
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.	NR	
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	Transit operations coordination information	Transit vehicle signal priority
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	Transit operations coordination information	
Ranked Medium	Transit vehicle signal priority	
Ranked Low	NR	
Groups that make requests for the data	Federal DOT personnel	
What is the data used for?	NTD Reporting	

Appendix L
Emergency Management

Emergency Management Agencies for Metropolitan Area: Grand Rapids

	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			
Grand Rapids Fire Department	46	NR	0	NR	0	NR	25	NR	35	NR	36	NR	No	No	None listed
Grand Rapids Police Department	100	200	0	0	0	0	100	200	100	120	0	0	No	No	None listed
Kent County Sheriffs Department	41	45	0	0	0	0	41	45	36	40	0	0	No	Yes	Kentwood Emergency Management
Ottawa County Sheriff	70	NR	0	NR	0	NR	70	NR	67	NR	0	NR	Yes	No	None listed
Wyoming City Fire Department	11	14	0	0	0	0	2	4	0	14	11	14	Yes	No	None listed
Wyoming City Fire Department (Emergency Medical)	3	4	0	0	0	0	3	4	NR	NR	3	4	Yes	No	None listed
Wyoming City Fire Department (Other)	6	6	0	0	0	0	5	6	NR	3	5	6	Yes	No	None listed
Wyoming City Police Department	34	36	0	36	0	36	34	36	32	34	0	0	No	No	None listed