Tracking the Deployment of the Integrated Metropolitan ITS Infrastructure in Denver, Boulder

FY99 Results

For additional information, please contact:

Joseph I. Peters, Ph.D.
ITS Program Assessment Coordinator
ITS Joint Program Office, Room 3416
400 Seventh St., S.W.
Washington, D.C. 20590
(202) 366-2202
FAX: (202) 493-2027
E-mail: joe.peters@fhwa.dot.gov

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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 Denver, Boulder 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 Denver, Boulder region was 71% in 1997 and 92% 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:

Steve Gordon
Oak Ridge National Laboratory
P.O. Box 2008, 4500N, MS-6207
Oak Ridge, TN 37831-6207
(865) 576-8416 (voice)
(865) 574-3895 (fax)
gordonsr@ornl.gov

Jeff Trombly
Science Applications International Corporation
301 Laboratory Road
Oak Ridge, TN 37831-2501
(865) 481-8563 (voice)
(865) 481-2941 (fax)
jeffrey.w.trombly@saic.com

[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 Denver, Boulder 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).

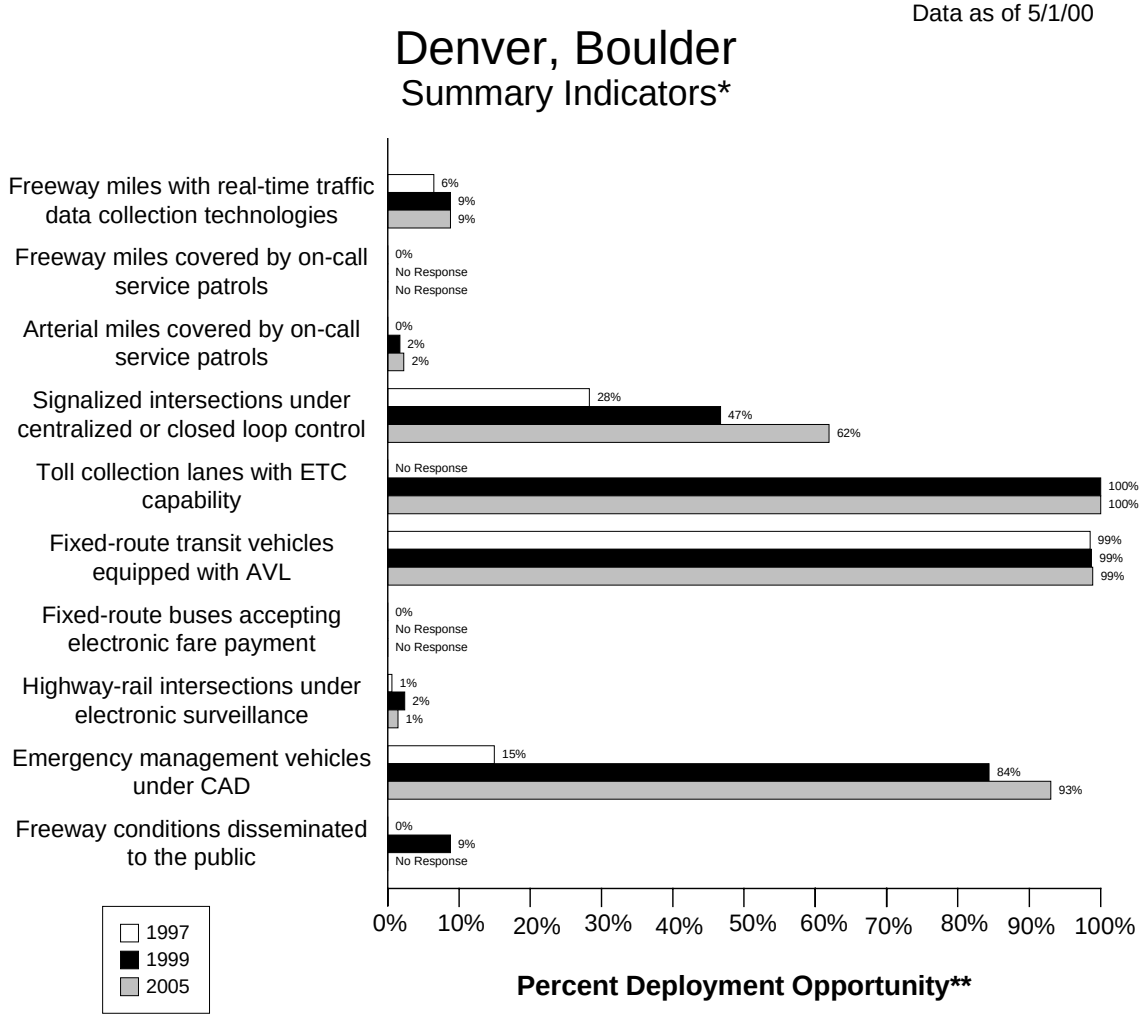
Each component indicator was selected to reflect a critical function of the individual components. For example, in the case of Freeway Management, three basic functions were defined: surveillance, traffic control, and information display. The three indicators developed to reflect these functions are: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

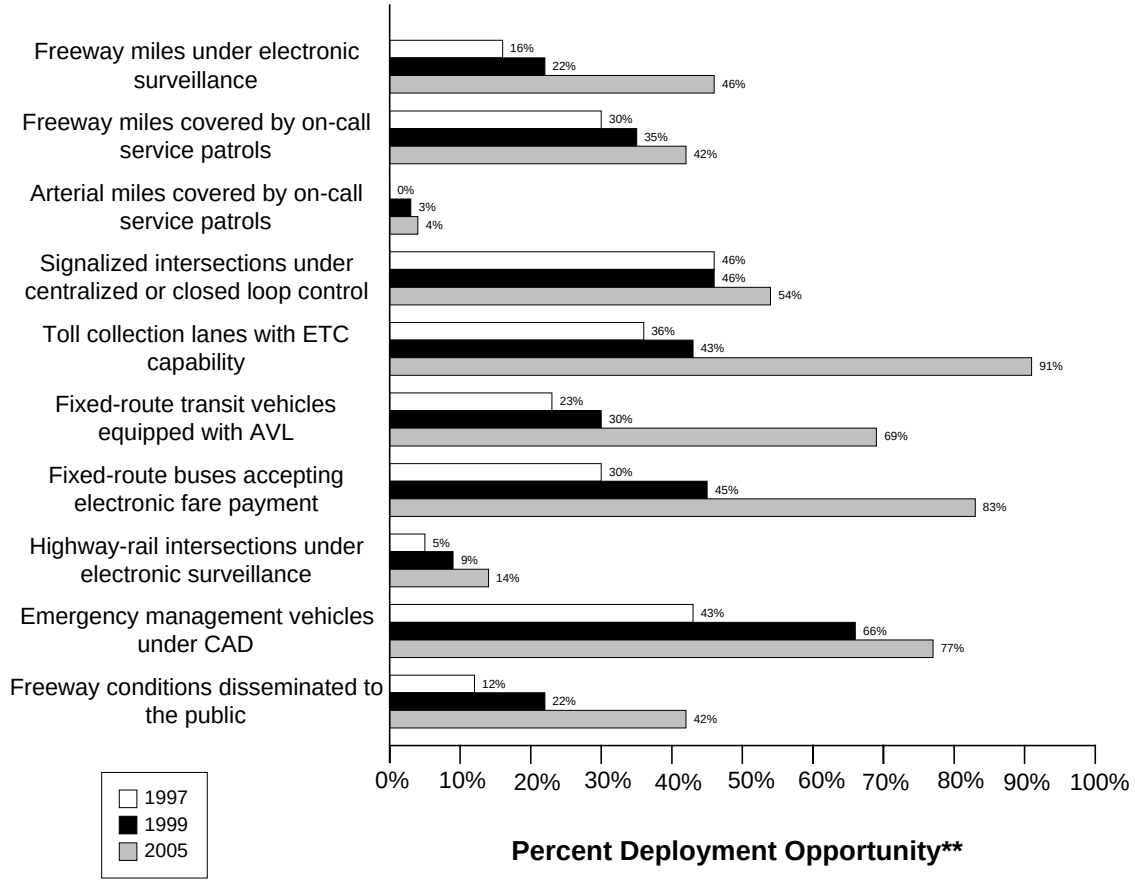
Data as of 5/1/00



* 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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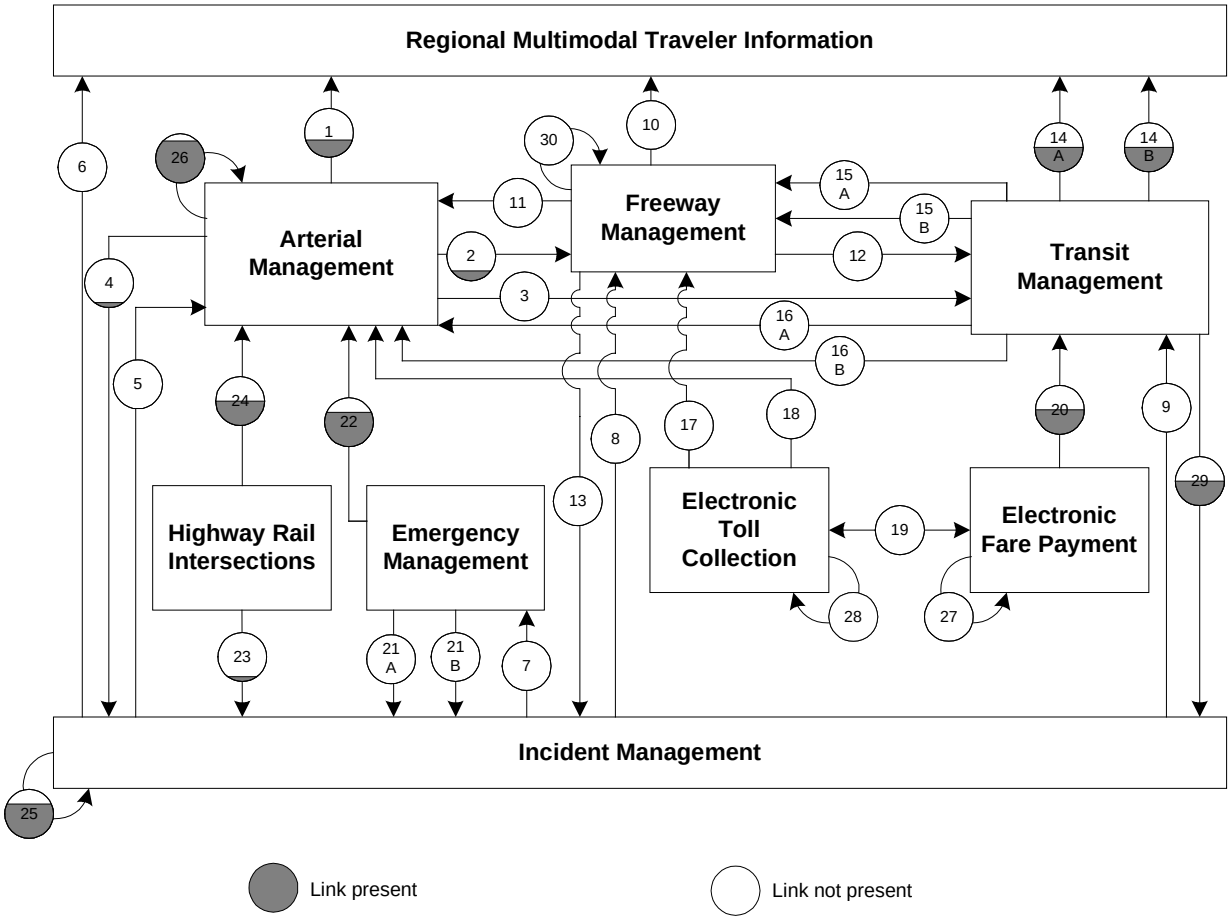
Denver, Boulder Integration Links



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 Denver, Boulder 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%.

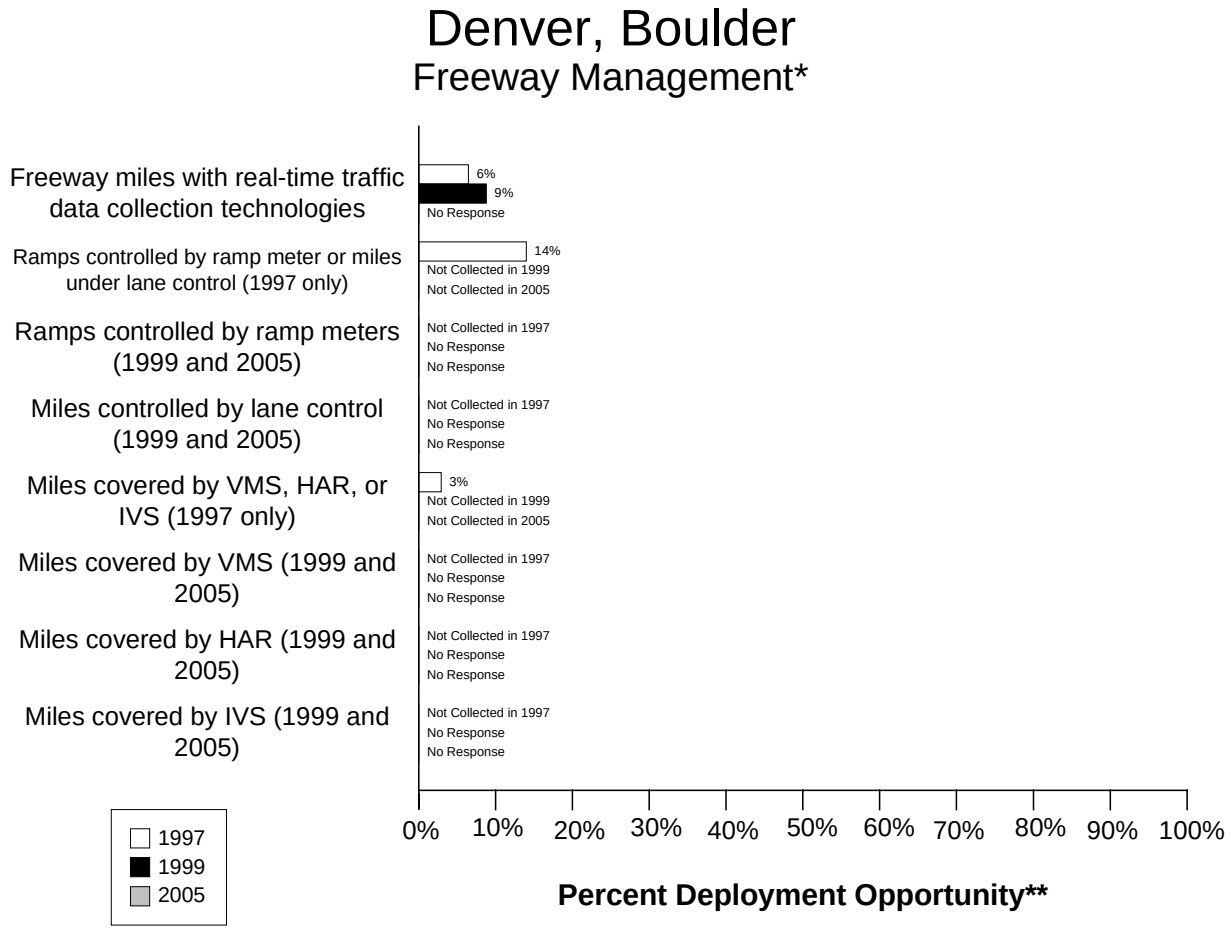
The figures summarizing the integration indicators consist of a diagram for each of the nine metropolitan ITS components portraying the integration level for 1999 (*italic*) and 2005 (**bold**), accompanied by tables providing an explanation of the data and calculations performed to develop each integration 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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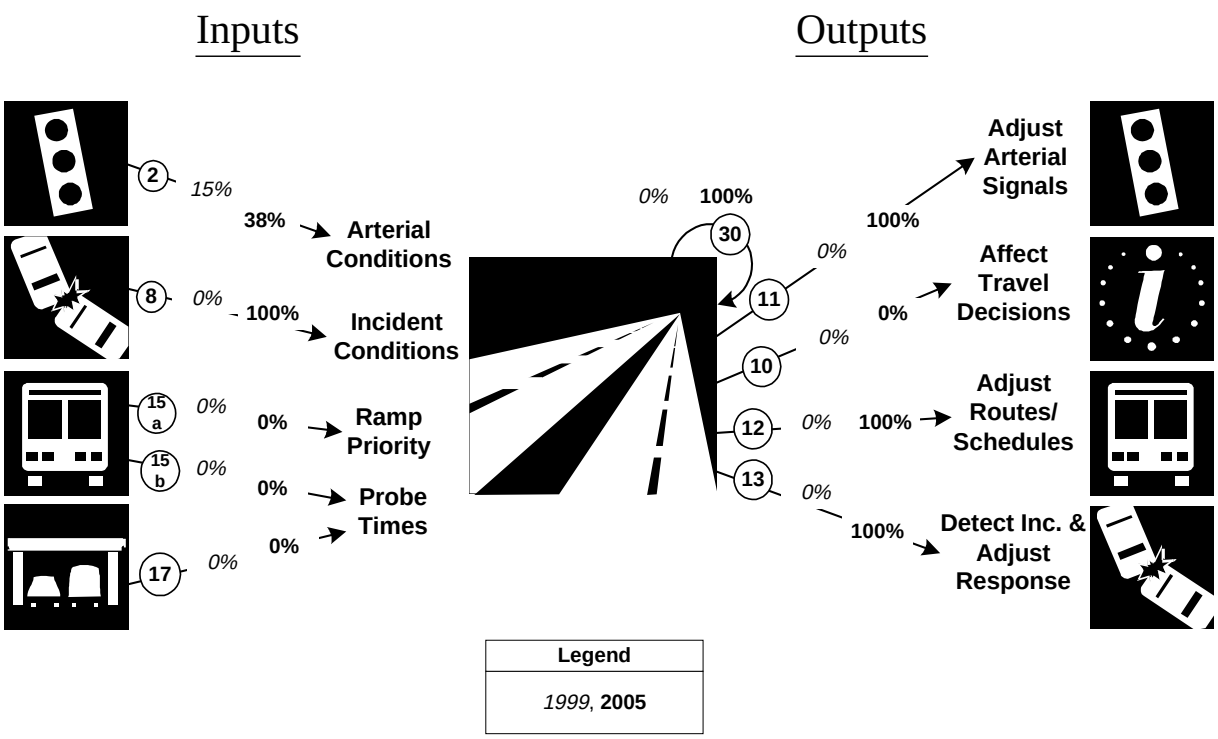
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Freeway centerline miles are under electronic surveillance for monitoring traffic flow	22	341	6%	30	341	9%		341	
Freeway entrance ramps are controlled by ramp meters or miles under lane control	28	200	14%						

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway entrance ramps are controlled by ramp meters					200			200	
Freeway centerline miles will be controlled by lane control					341			341	
Freeway miles are covered by VMS, HAR, or IVS	10	341	3%						
Freeway miles are covered by VMS					341			341	
Freeway miles are covered by HAR					341			341	
Freeway miles are covered by IVS					341			341	

Freeway Management Integration Indicators

Denver, Boulder
Freeway Management Integration*



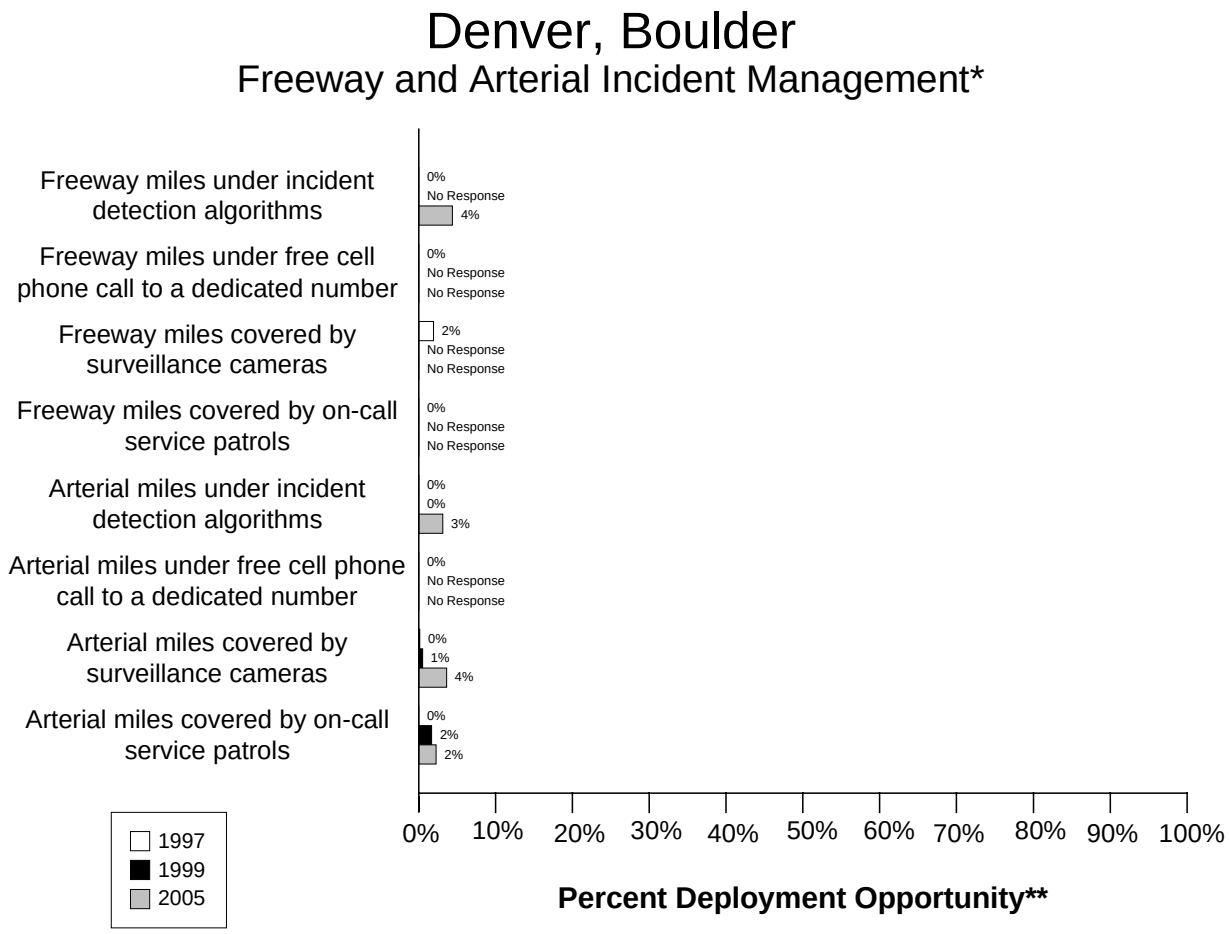
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
2. Arterial Management agencies sending information to Freeway Management	(2/ 13) 15%	(5/ 13) 38%
8. Incident Management agencies sending information to Freeway Management	(0/ 1) 0%	(1/ 1) 100%
15a. Transit management agencies with vehicles equipped with ramp meter priority	(0/ 2) 0%	(0/ 2) 0%
15b. Transit Management agencies with vehicles equipped as probes	(0/ 2) 0%	(0/ 2) 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%	(1/ 1) 100%
11. Freeway Management agencies sending information to Arterial Management	(0/ 1) 0%	(1/ 1) 100%

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

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.

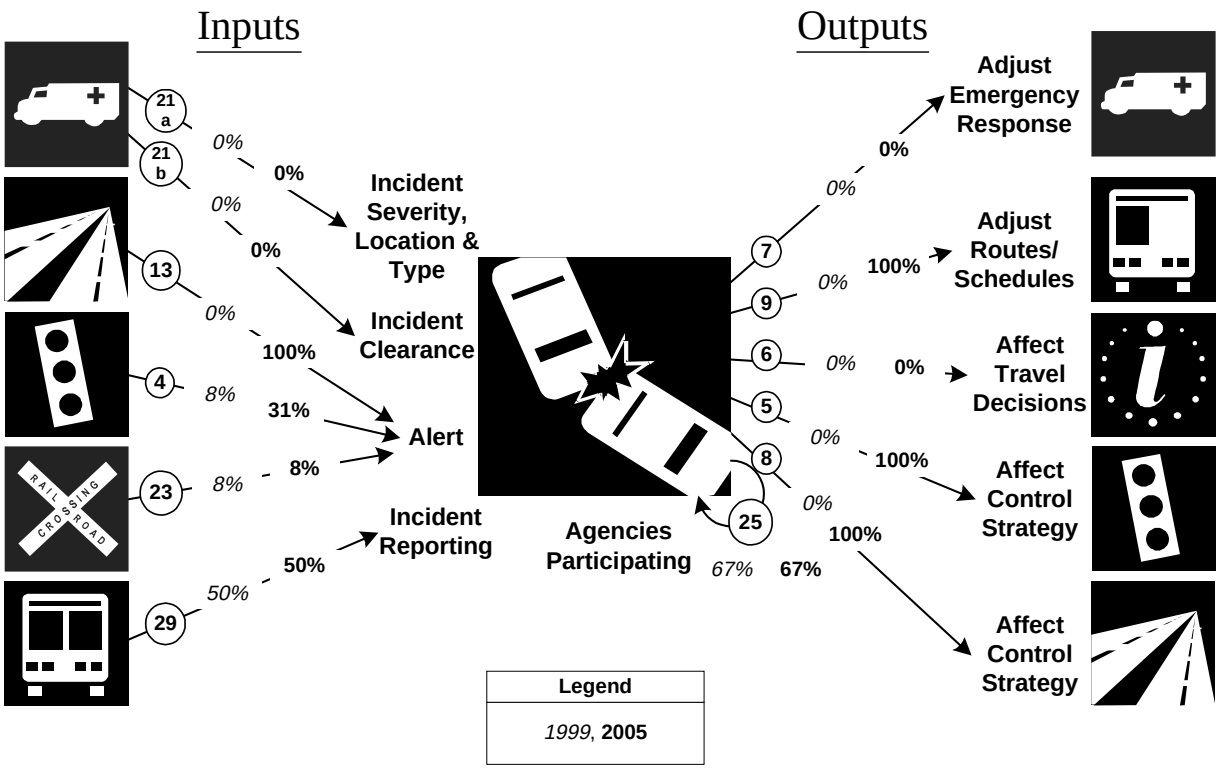
	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Freeway miles are covered by incident detection algorithms	0	341	0%		341		15	341	4%
Freeway miles are covered by free cellular phone calls to a dedicated number	0	341	0%		341			341	

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway miles are covered by surveillance cameras.	6.6	341	2%		341			341	
Freeway miles are covered by on-call publicly-sponsored service patrol or towing services.	0	341	0%		341			341	
Arterial miles are covered by incident detection algorithms	0	1763	0%	0	1763	0%	55	1763	3%
Arterial miles are covered by free cellular phone calls to a dedicated number	0	1763	0%		1763			1763	
Arterial miles are covered by surveillance cameras	2	1763	0%	9	1763	1%	64	1763	4%
Arterial miles are covered by on-call publicly-sponsored service patrol or towing services	0	1763	0%	30	1763	2%	40	1763	2%

Incident Management Integration Indicators

Denver, Boulder

Incident Management Integration*



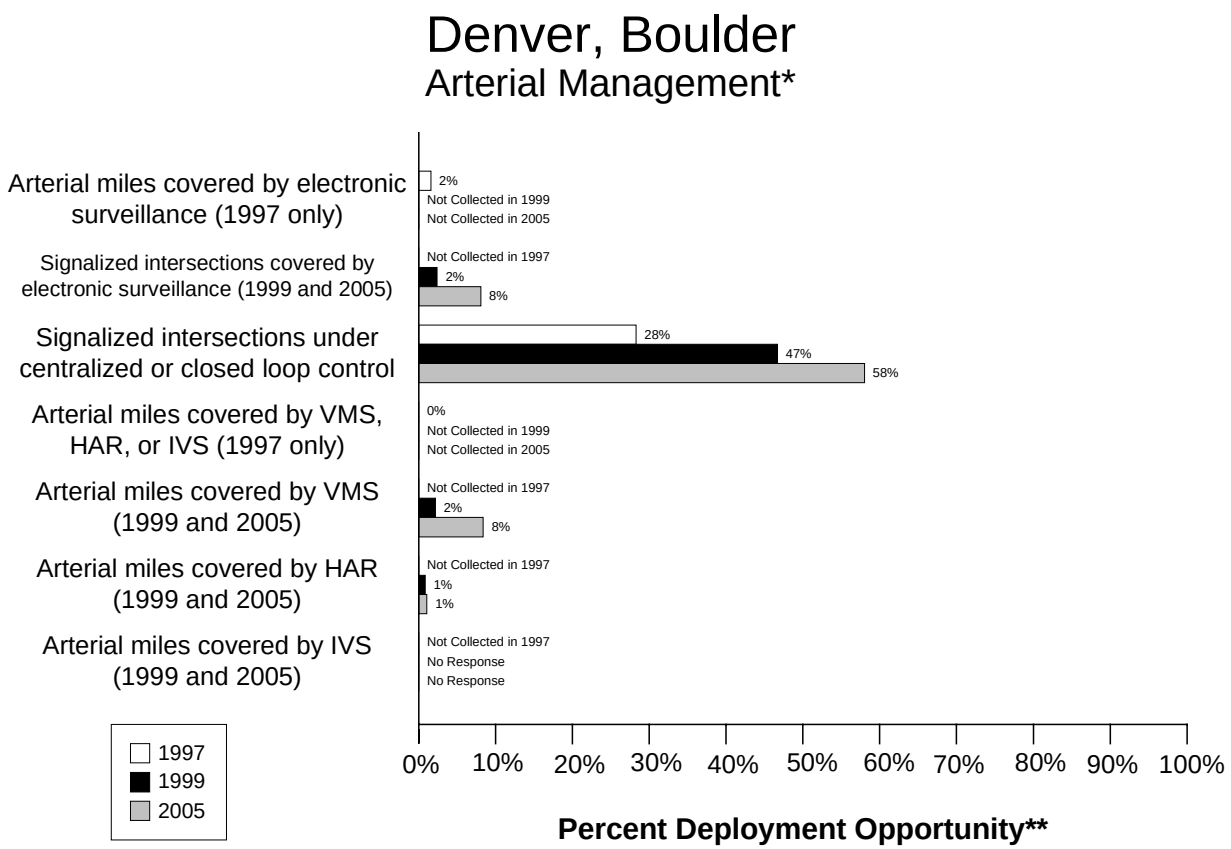
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

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%	(1/ 1) 100%
4. Arterial Management agencies sending arterial conditions to Incident Management	(1/ 13) 8%	(4/ 13) 31%
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(1/ 13) 8%	(1/ 13) 8%
29. Transit Management agencies report traffic incidents as part of an organized regional incident management program	(1/ 2) 50%	(1/ 2) 50%

Link Description	1999	2005
7. Incident management agencies transfer information describing incident severity, location, and type to Emergency Management agencies	(0/ 1) 0%	(0/ 1) 0%
9. Incident Management agencies transfer information describing incident severity, location, and type to Transit Management agencies	(0/ 1) 0%	(1/ 1) 100%
6. Incident Management agencies disseminate information describing incident severity, location, and type to the public	(0/ 1) 0%	(0/ 1) 0%
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%	(1/ 1) 100%
25. Police, fire, and EMS agencies participating in a formal incident management plan/team	(4/ 6) 67%	(4/ 6) 67%

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.

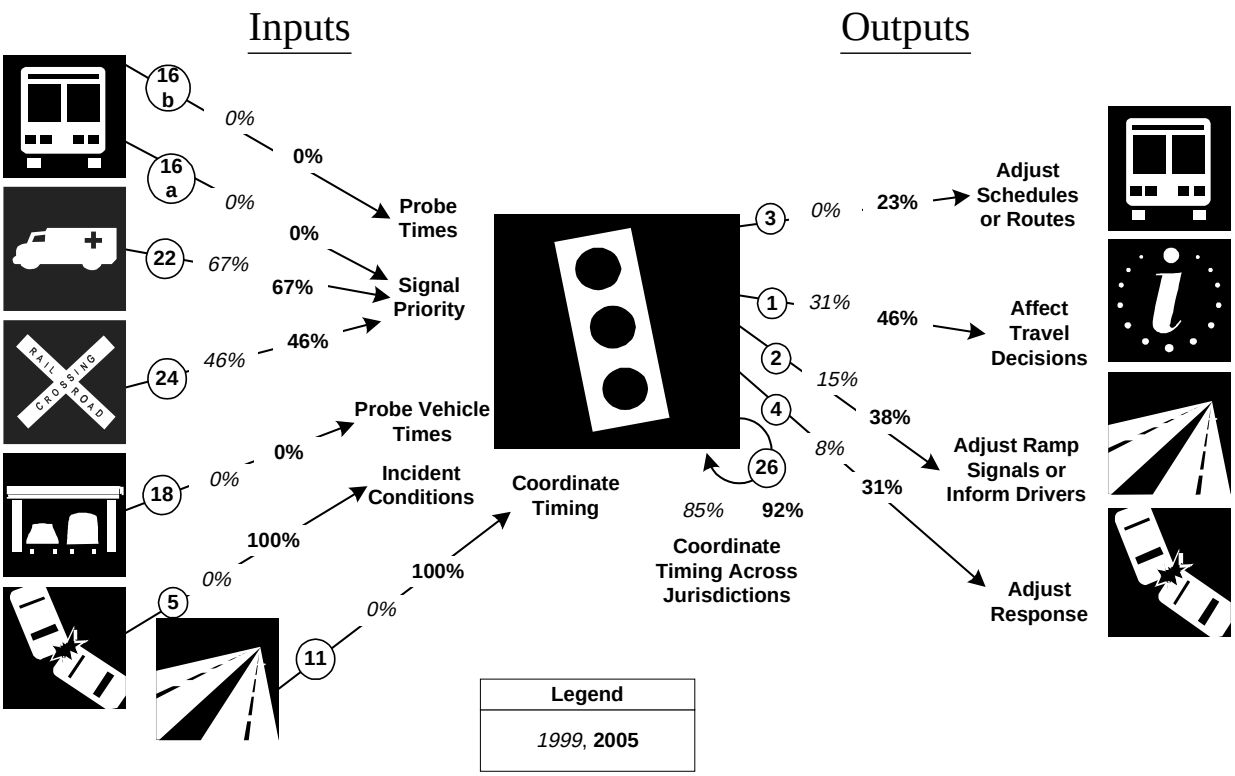
	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles covered by electronic surveillance	28	1763	2%						
Signalized intersections are covered by electronic surveillance for monitoring traffic flow				61	2560	2%	172	2124	8%
Signalized intersections are under centralized or closed loop control	607	2146	28%	1195	2560	47%	1232	2124	58%

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles are covered by VMS, HAR, or IVS	0	1763	0%						
Arterial miles are covered by VMS				38	1763	2%	148	1763	8%
Arterial miles are covered by HAR				15	1763	1%	19	1763	1%
Arterial miles are covered by IVS					1763			1763	

Arterial Management Integration Indicators

Denver, Boulder

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/ 2) 0%	(0/ 2) 0%
16b. Transit Management agencies have vehicles equipped as probes on arterials	(0/ 2) 0%	(0/ 2) 0%
22. Emergency Management agencies have vehicles equipped with traffic signal preemption capability	(4/ 6) 67%	(4/ 6) 67%
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	(6/ 13) 46%	(6/ 13) 46%
18. Number of Arterial Management agencies receiving information from vehicle probes	(0/ 13) 0%	(0/ 13) 0%
5. Incident Management agencies transfer information describing incident severity, location, and type to Arterial Management	(0/ 1) 0%	(1/ 1) 100%
11. Freeway Management agencies transfer freeway travel times, speeds, and conditions to Arterial Management agencies	(0/ 1) 0%	(1/ 1) 100%

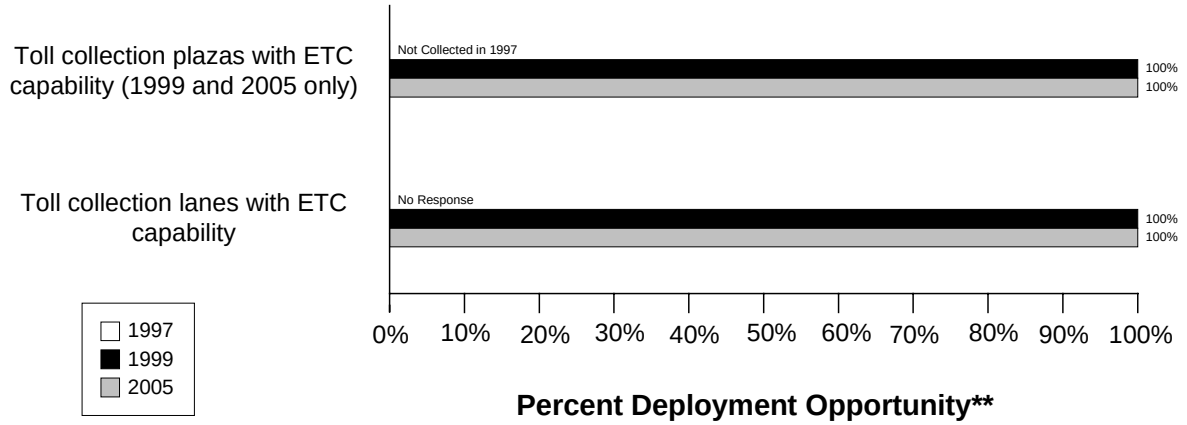
Link Description	1999	2005
3. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Transit Management	(0/ 13) 0%	(3/ 13) 23%
1. Arterial Management agencies disseminate arterial travel times, speeds, and conditions to the public	(4/ 13) 31%	(6/ 13) 46%
2. Arterial Management agencies send traffic condition information to Freeway Management	(2/ 13) 15%	(5/ 13) 38%
4. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Incident Management	(1/ 13) 8%	(4/ 13) 31%
26. Arterial Management agencies under cooperative agreement to share traffic signal timing for coordinated response	(11/ 13) 85%	(12/ 13) 92%

Electronic Toll Collection Component Indicators

Data as of 5/1/00

Denver, Boulder

Electronic Toll Collection*



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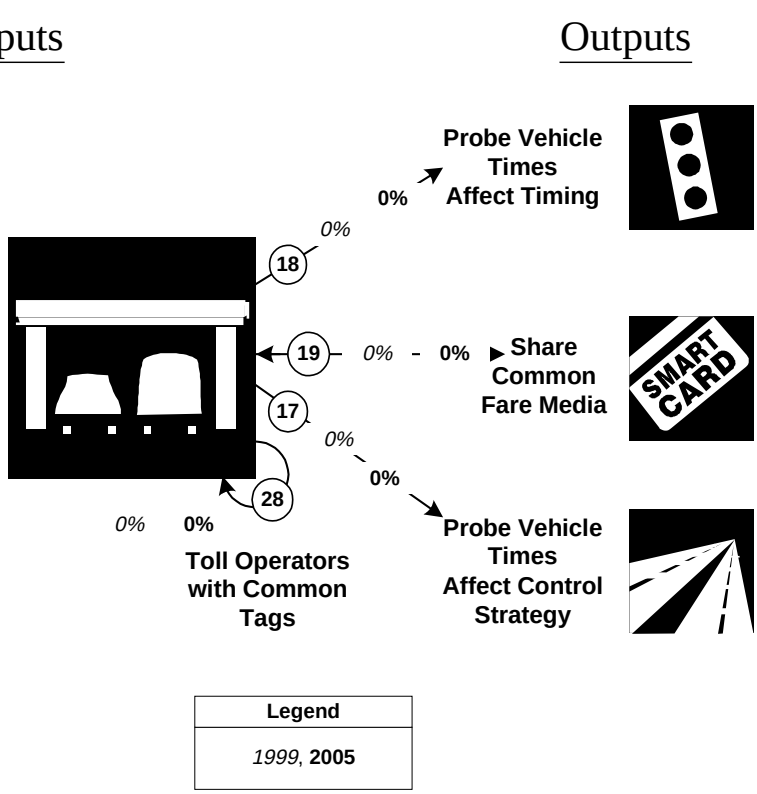
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Toll collection plazas with ETC capability				4	4	100%	5	5	100%
Toll collection lanes with ETC capability				60	60	100%	81	81	100%

Electronic Toll Collection Integration Indicators

Denver, Boulder
Electronic Toll Collection Integration*

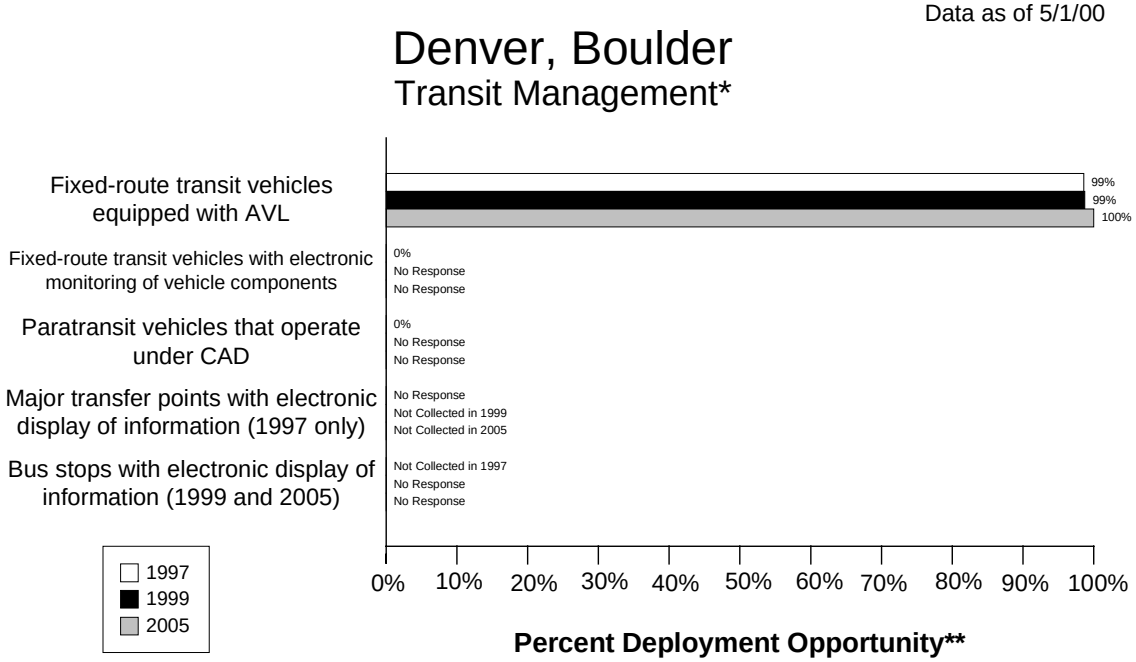


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
18. Number of Arterial Management agencies receiving information from vehicle probes	(0/ 13) 0%	(0/ 13) 0%
19. Transit agencies that accept electronic payment through the use of electronic toll collection media	(0/ 2) 0%	(0/ 2) 0%
17. Freeway Management agencies receiving information from vehicle probes	(0/ 1) 0%	(0/ 1) 0%
28. Toll operators using common toll tag technology	(0/ 1) 0%	(0/ 1) 0%

Transit Management Component Indicators

Data as of 5/1/00



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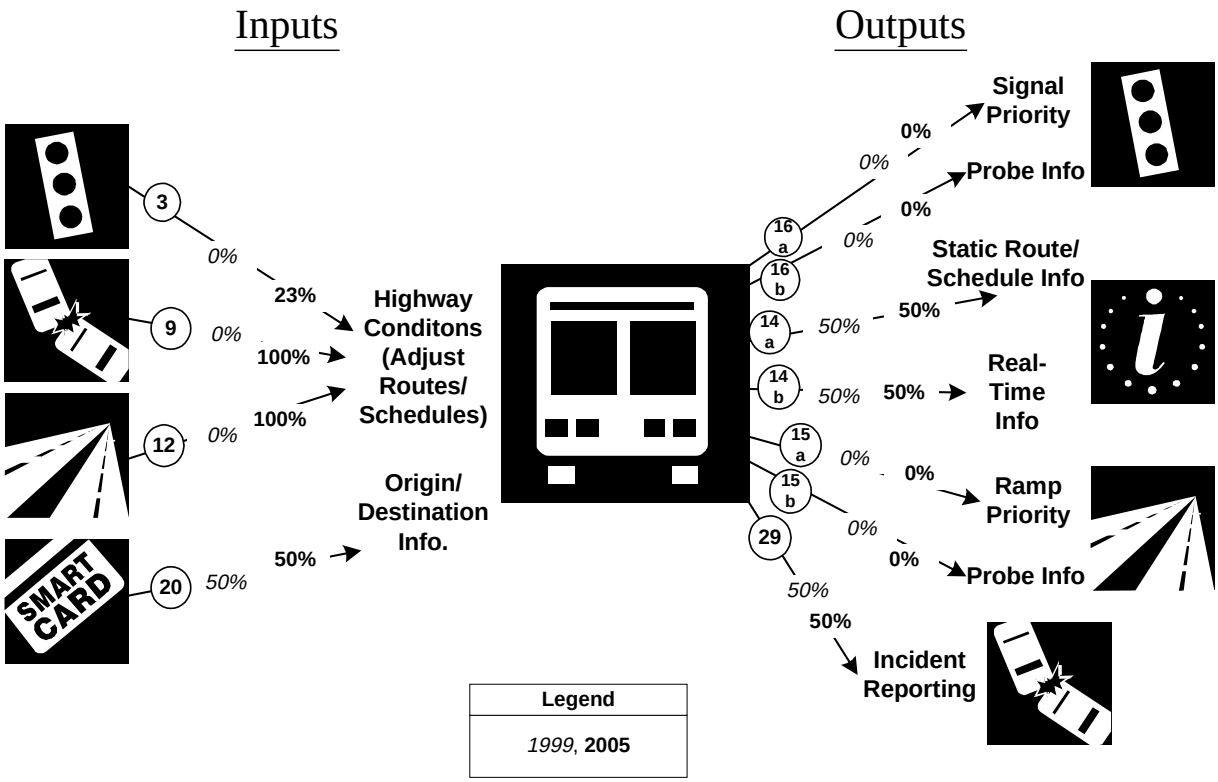
	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles are equipped with AVL	888	901	99%	945	957	99%	1095	1095	100%
Fixed-route transit vehicles are equipped with electronic monitoring of vehicle component	0	884	0%		957			1095	
Paratransit vehicles operate under computer-aided dispatch	0	153	0%		181			210	
Percent fixed-route transfer locations with electronic display of information	0	0							
Bus stops display information to the public									

Transit Management Integration Indicators

Denver, Boulder
Transit Management Integration*



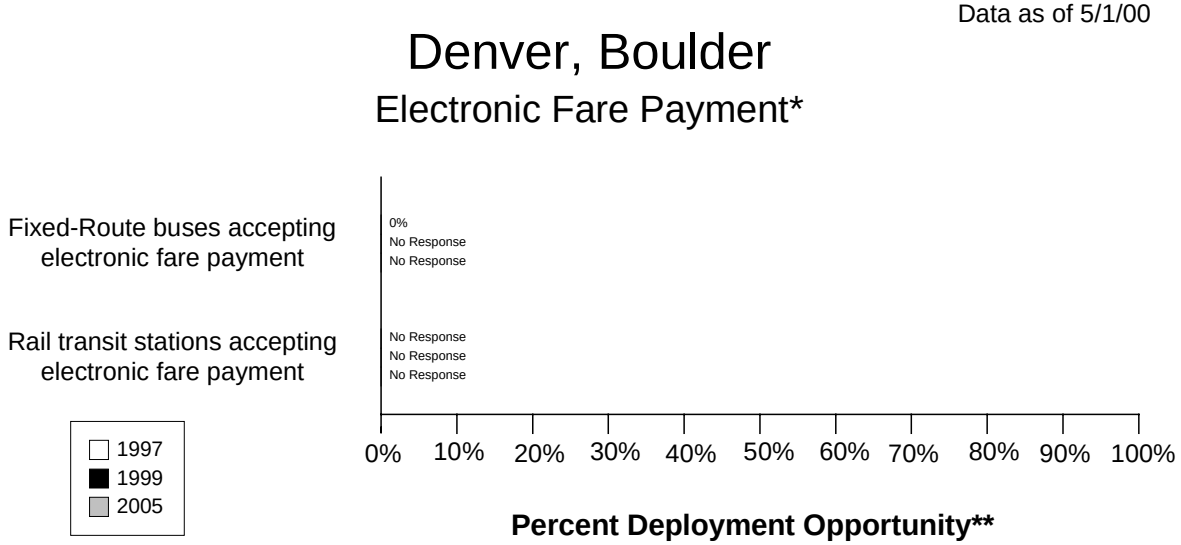
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
3. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Transit Management	(0/ 13) 0%	(3/ 13) 23%
9. Incident management agencies transfer information describing incident severity, location, and type to Transit Management	(0/ 1) 0%	(1/ 1) 100%
12. Freeway Management agencies transfer freeway travel times, speeds, and conditions to Transit Management	(0/ 1) 0%	(1/ 1) 100%
20. Transit Management agencies using Electronic Fare Payment data in transit service planning	(1/ 2) 50%	(1/ 2) 50%
16a. Transit Management agencies have vehicles equipped with traffic signal priority capability	(0/ 2) 0%	(0/ 2) 0%
16b. Transit Management agencies have vehicles equipped as probes on arterials	(0/ 2) 0%	(0/ 2) 0%
14a. Transit Management agencies disseminate information describing transit routes, schedules, and fares to travelers	(1/ 2) 50%	(1/ 2) 50%

Link Description	1999	2005
14b. Transit Management agencies disseminate information describing schedule/route adherence to travelers	(1/ 2) 50%	(1/ 2) 50%
15a. Transit Management agencies have vehicles equipped with ramp meter priority capability	(0/ 2) 0%	(0/ 2) 0%
15b. Transit Management agencies have vehicles equipped as probes on freeways	(0/ 2) 0%	(0/ 2) 0%
29. Transit Management agencies that report traffic incidents as part of an organized regional Incident Management program	(1/ 2) 50%	(1/ 2) 50%

Electronic Fare Payment Component Indicators

Data as of 5/1/00



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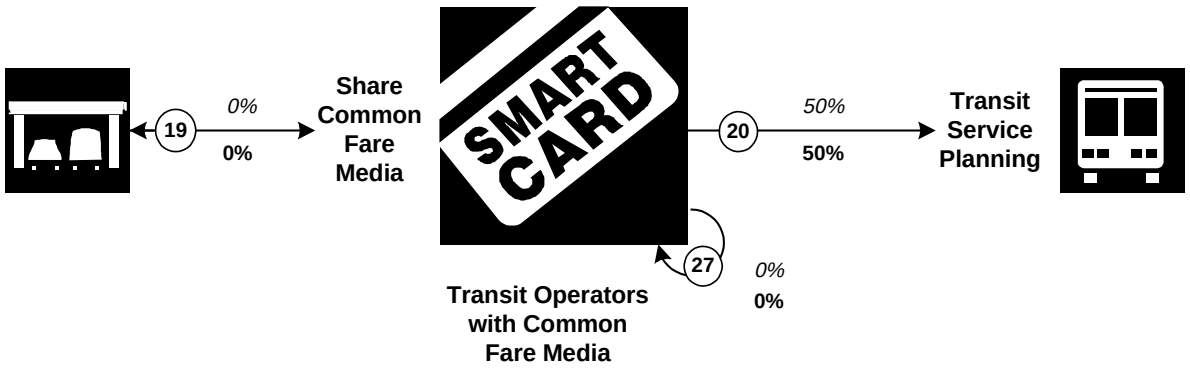
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles that accept electronic payment	0	901	0%		957			1095	
Rail transit stations that accept electronic payment	0	0							

Electronic Fare Payment Integration Indicators

Denver, Boulder
Electronic Fare Payment Integration*

Inputs Outputs



Legend
1999
2005

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

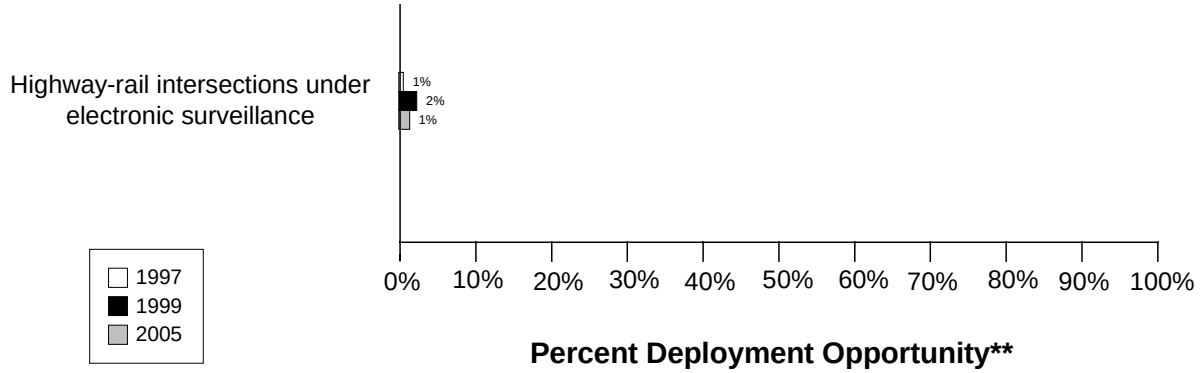
Link Description	1999	2005
19. Transit agencies that accept electronic payment through the use of electronic toll collection media	(0/ 2) 0%	(0/ 2) 0%
20. Transit Management agencies use Electronic Fare Payment data in transit service planning	(1/ 2) 50%	(1/ 2) 50%
27. Transit Management agencies that use the same electronic payment system	(0/ 2) 0%	(0/ 2) 0%

Highway Rail Intersection Component Indicators

Data as of 5/1/00

Denver, Boulder

Highway-Rail Intersections*



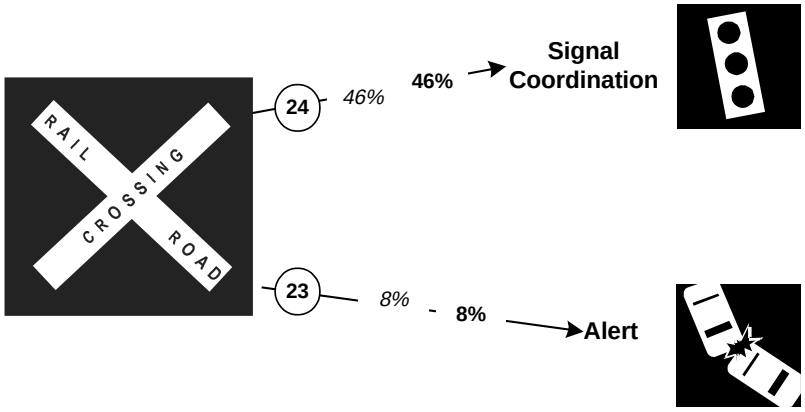
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Highway-rail intersections are under electronic surveillance	5	817	1%	5	211	2%	3	211	1%

Highway Rail Intersection Integration Indicators

Denver, Boulder
Highway Rail Intersections Integration*

Inputs Outputs



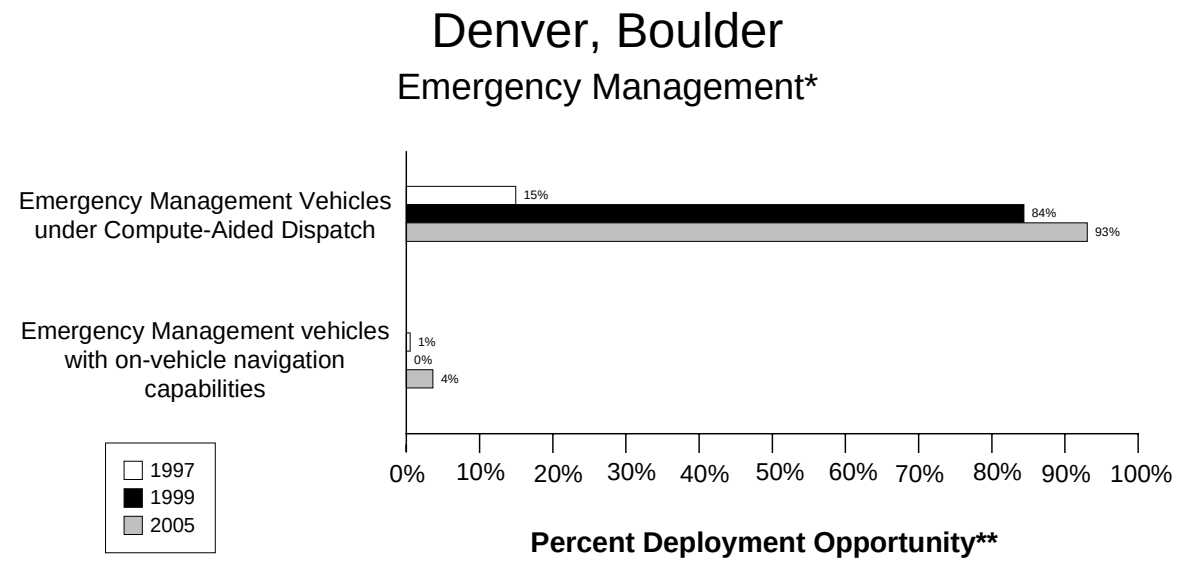
Legend
1999, **2005**

* 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	(6/ 13) 46%	(6/ 13) 46%
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(1/ 13) 8%	(1/ 13) 8%

Emergency Management Component Indicators

Data as of 5/1/00



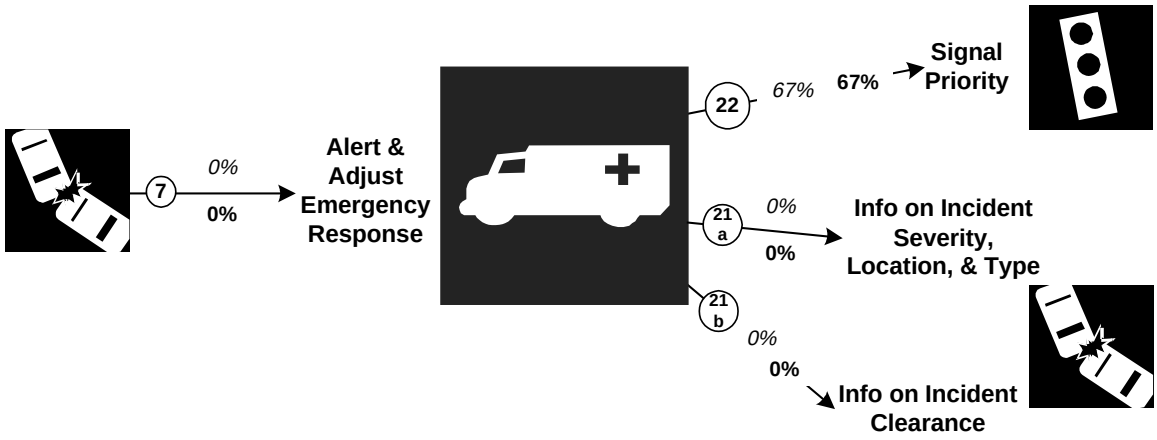
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Public sector emergency vehicles that operate under computer-aided dispatch	58	388	15%	454	538	84%	535	575	93%
Public sector emergency vehicles that have in-vehicle route guidance capability	2	388	1%	0	538	0%	21	575	4%

Emergency Management Integration Indicators

Denver, Boulder
Emergency Management Integration*

Inputs Outputs



Legend
1999, **2005**

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

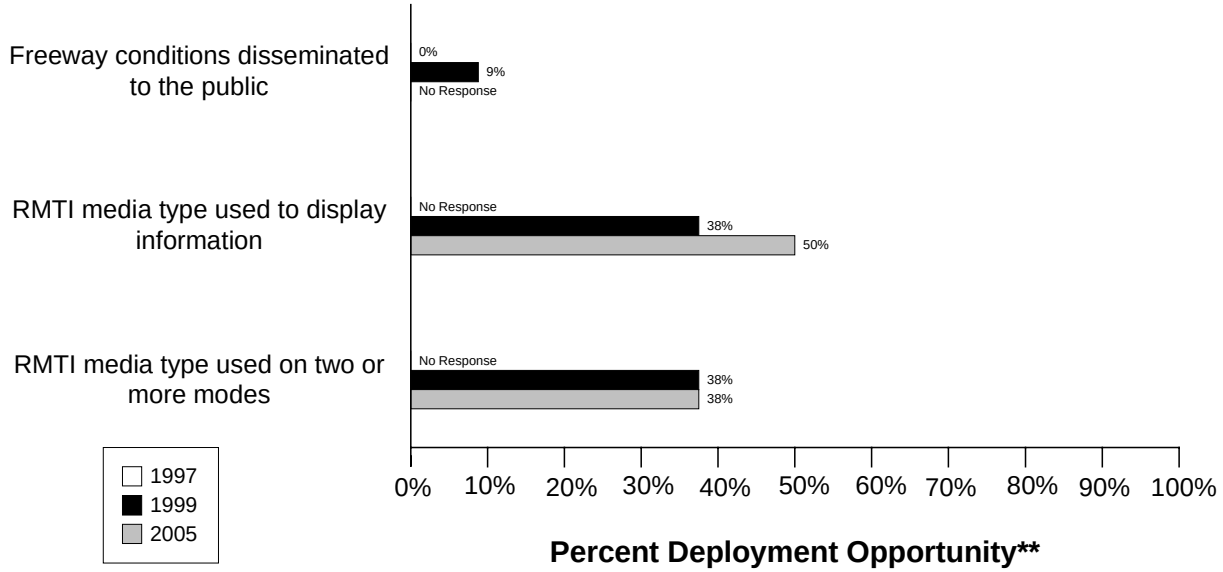
Link Description	1999	2005
7. Freeway Management agencies transfer information describing incident severity, location, and type to Emergency Management agencies	(0/ 1) 0%	(0/ 1) 0%
22. Emergency Management agencies have vehicles equipped with traffic signal preemption capability	(4/ 6) 67%	(4/ 6) 67%
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

Denver, Boulder

Regional Multimodal Traveler Information*

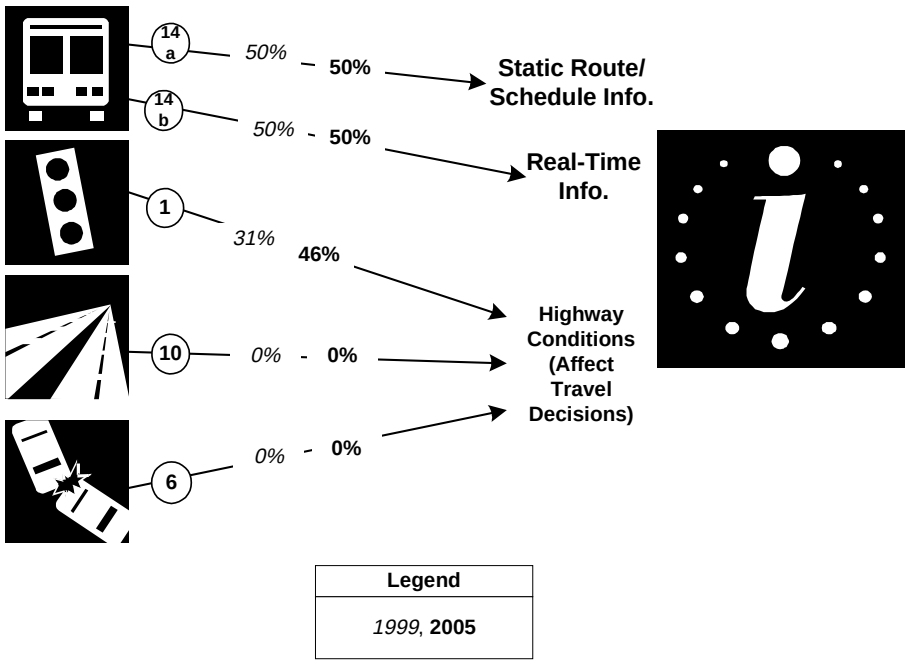


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Freeway conditions disseminated to travelers	0	341	0%	30	341	9%		341	
Possible RMTI media types are used to display information to travelers				3	8	38%	4	8	50%
Possible RMTI media are used to display information on *two or more modes* to travelers				3	8	38%	3	8	38%

Regional Multimodal Traveler Information Integration Indicators

Denver, Boulder
Regional Multimodal Traveler Information Integration*

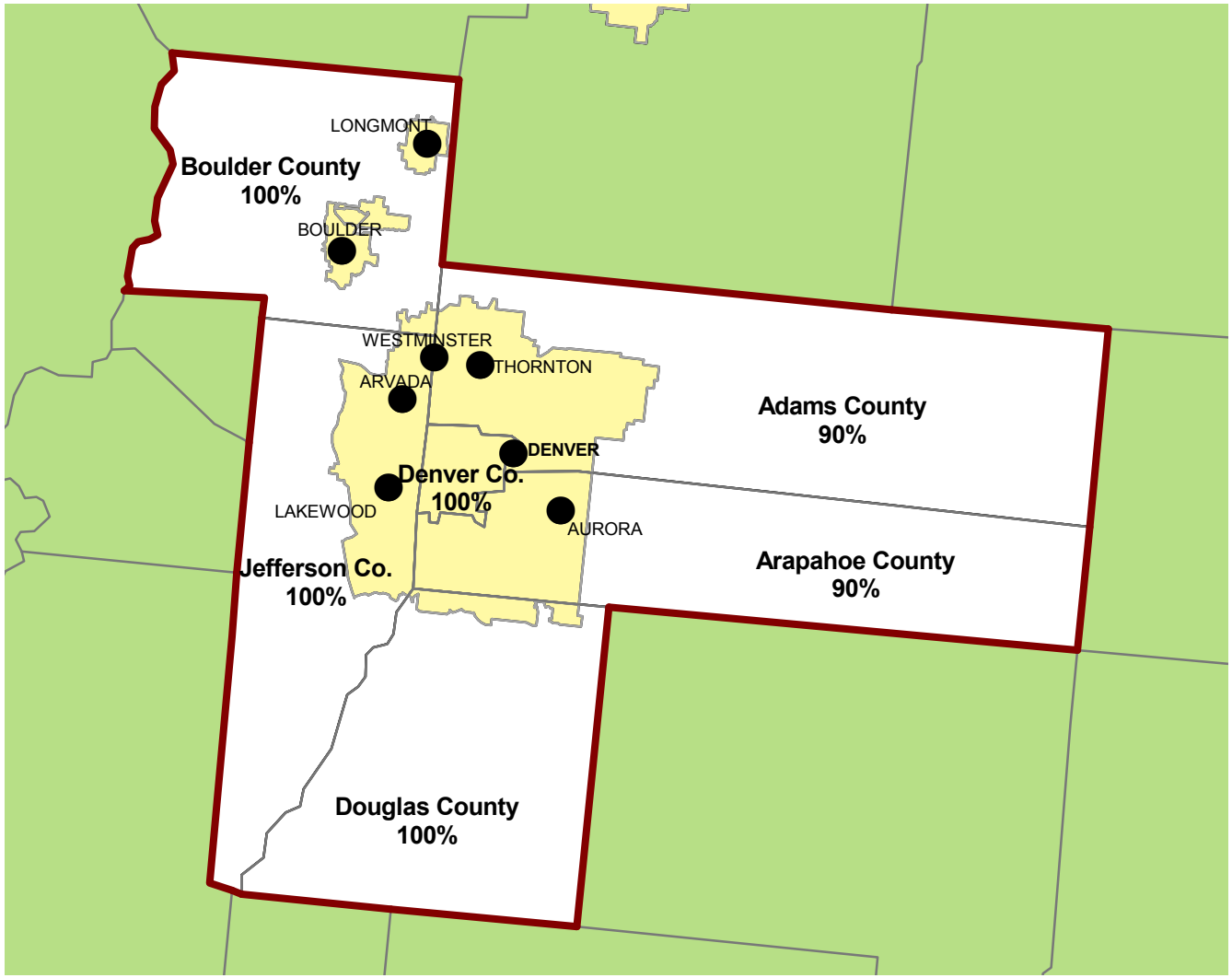


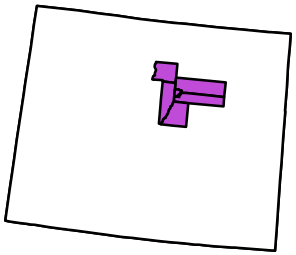
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
14a. Transit Management agencies that disseminate information describing transit routes, schedules, and fares to travelers	(1/ 2) 50%	(1/ 2) 50%
14b. Transit Management agencies that disseminate information describing schedule/route adherence to travelers	(1/ 2) 50%	(1/ 2) 50%
1. Arterial Management agencies that disseminate arterial travel times, speeds, and conditions to the public	(4/ 13) 31%	(6/ 13) 46%
10. Freeway Management agencies that disseminate freeway travel times, speeds, and conditions to travelers	(0/ 1) 0%	(0/ 1) 0%
6. Incident Management agencies that disseminate information describing incident severity, location, and type to the public	(0/ 1) 0%	(0/ 1) 0%

Appendix A
Survey Coverage Area

DENVER REGIONAL
COUNCIL OF GOVERNMENTS, CO





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
DENVER, BOULDER						
Arterial Management						
Aurora City	(303) 739-7300	(303) 739-7485	7/29/1999	10/25/1999	08/05/1997	
Arapahoe County	(303) 795-4640	(303) 794-3201	7/29/1999	9/13/1999	08/05/1997	
Colorado Department of Transportation	(303) 757-9511	(303) 757-9907	7/29/1999	9/14/1999	08/05/1997	09/16/1997
Thornton City	(303) 538-7333	(303) 538-7373	7/29/1999	8/16/1999	08/05/1997	08/08/1997
Longmont City	(303) 651-8323	(303) 651-8696	7/29/1999		08/05/1997	
Lakewood City	(303) 987-7985	(303) 987-9452	7/29/1999	8/23/1999	08/05/1997	09/08/1997
Adams County	(303) 853-7114	(303) 287-3648	7/29/1999	10/18/1999	08/05/1997	
Boulder City	(303) 441-3266	(303) 441-4271	7/29/1999	9/20/1999	08/05/1997	09/16/1997
Westminster City	(303) 430-2400	(303) 426-5857	7/29/1999	8/23/1999	08/05/1997	
Arvada City	(303) 431-3040	(303) 431-3969	7/29/1999	9/17/1999	08/05/1997	08/29/1997
Denver City	(303) 289-5499	(303) 289-6479	7/29/1999	9/27/1999	08/05/1997	08/26/1997
Douglas County	(303) 660-7371	(303) 688-9343	7/29/1999	10/11/1999	08/05/1997	
Jefferson County	(303) 271-8461	(303) 271-8490	7/29/1999	10/21/1999	08/05/1997	09/15/1997
Boulder County	(303) 441-3900	(303) 441-4594	7/29/1999	9/15/1999	08/05/1997	08/05/1997
Electronic Toll Collection						
E-470 Public Highway Authority	303-537-3470	303-537-3472	9/8/1999	9/23/1999		
Emergency Management						
Denver City Fire Department	303-640-3788	303-640-2525	8/13/1999	8/23/1999		
Denver City Police Department	303-640-2816	303-640-3608	8/13/1999	8/26/1999		
Aurora Fire Department	(303) 739-7110	(303) 739-7566	6/25/1999	7/22/1999	09/17/1997	09/25/1997
Denver Sheriff Department	303-640-3141	303-640-2616	8/13/1999			
Westminster Fire Department	(303) 430-2400	(303) 429-6433	6/25/1999	6/30/1999	09/17/1997	01/08/1998
Thornton Police Department	(303) 538-7478	(303) 538-7369	6/25/1999	7/1/1999	08/07/1997	09/16/1997
Boulder Fire Department	(303) 441-3360	(303) 441-4350	6/25/1999	6/25/1999	08/07/1997	09/16/1997
Freeway Management						
Colorado Department of Transportation	(303) 757-9511	(303) 757-9907	7/29/1999	9/14/1999	08/05/1997	09716/1997
MPO						
Denver Regional Council of Governments	(303) 455-1000	(303) 480-6790	7/15/1999	7/28/1999		
Transit Management						
Regional Transportation District (RTD)	(303) 299-4146	(303) 299-6060	8/9/1999	9/17/1999	07/17/1997	07/25/1997
Greeley City-The Bus	(970) 350-9751	(970) 336-4019	8/9/1999	8/27/1999	07/17/1997	07/22/1997

Appendix C
Freeway Management Components

Freeway Management
Agencies for Metropolitan Area: Denver, Boulder

	Colorado Department of Transportation	
	1999	**2005**
Agency Returned Survey?	Yes	
FREEWAY MANAGEMENT SECTION		
Number of freeway centerline miles that agency owns or maintains	354	
Number of freeway centerline miles that is used for planning	170	
Number of freeway entrance ramps that agency owns, operates or maintains	317	
Number of freeway entrance ramps that is used for planning	130	
Type of facilities used to conduct freeway/incident management activities		
Activities housed in a free-standing dedicated building?	No	
Activities housed in a building shared with other activities?	Yes	
Activities conducted in a dedicated control room?	Yes	
Control room contains operator console(s)?	Yes	
Control room contains electronic wall map?	Yes	
Control room contains CCTV display(s)?	Yes	
Activities conducted in a room containing workstations or PCs that manage traffic?	No	
Facilities are electronically linked to other transportation mgt facilities?	No	
Staffing and hours of operation of freeway/incident management activities		
Number of full-time agency staff members	5	
Number of full time contractor staff members	4	
Number of part-time agency staff members	0	
Number of part-time contractor staff members	2	
Staffed 24 hours day by agency staff or by others	NR	
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	Yes	
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?	Yes	
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.	30	NR

Freeway Management
Agencies for Metropolitan Area: Denver, Boulder

	Colorado Department of Transportation	
	1999	**2005**
Number of Stations with data collection technologies		
Loop detectors	59	NR
Video imaging detectors	0	0
Probe readers (elec. toll tags, transit vehicles, other technology)	0	0
Microwave radar	4	NR
Other (e.g., acoustic detectors)	0	0
Number of Miles covered with data collection technologies		
Loop detectors	30	NR
Video imaging detectors	0	0
Probe readers (elec. toll tags, transit vehicles, other technology)	0	0
Microwave radar	NR	NR
Other (e.g., acoustic detectors)	0	0
Variable Message Signs (VMS) on Freeways		
Candidate locations for deployment of VMS where VMS has been deployed	NR	NR
Candidate locations for deployment of VMS	NR	NR
Roadside Technologies used to Distribute Traveler Information		
Total number of miles where information is distributed	NR	NR
Number deployed		
Highway advisory radio	0	0
In-vehicle signing	0	0
Portable variable message signs	0	0
Other	0	0
Miles covered		
Highway advisory radio	0	0
In-vehicle signing	0	0
Portable variable message signs	0	0
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	NR	NR
Communication Links		
Freeway centerline miles covered by the following type of communication		
Twisted pair cable	0	0
Coaxial cable	0	0
Fiber-optic cable	10	NR
Microwave radio	0	0
Other	0	0
ITS Standards Used Related to Freeway Management		

	Colorado 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)	No	
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?	Yes	
INCIDENT MANAGEMENT SECTION		
Use of Service Patrols to Assist in Detection and Response to Incidents		
Publicly operated service patrol vehicles	No	
Privately operated service patrol vehicles operated under public contract	Yes	
Total number of freeway miles patrolled by these services	NR	NR
Miles Covered by Methods to Detect and Verify Incidents		
Free cellular phone call to a dedicated phone number other than 911	NR	NR
Police patrols	NR	NR
Computer algorithms linked to traffic surveillance equipment	NR	15
CCTV	NR	NR
Private sector sources (e.g., Shadow Traffic, SmartRoutes)	NR	NR
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	Yes	
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	No	
The central focal point is a Police, Fire or joint dispatch center	Yes	
The central focal point is another center	No	
Methods of Communication Used On-Site at an Incident		
Police		
Two-way radio	No	

Freeway Management
Agencies for Metropolitan Area: Denver, Boulder

	Colorado Department of Transportation	
	1999	**2005**
800 MHz trunked radio	No	
Cellular telephone	Yes	
Hand-held (i.e., walkie-talkie)	No	
Automated data systems (i.e., CAD)	No	
Fire		
Two-way radio	No	
800 MHz trunked radio	No	
Cellular telephone	No	
Hand-held (i.e., walkie-talkie)	No	
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	No	
County Police or Sheriff	No	
City Police	Yes	
Who provides on-site emergency medical response?		
Fire	Yes	
Emergency Management Service Agency	No	
Private hospital	No	
Has a multi-agency contact list been developed in area containing the		
names, phone numbers, etc. for the appropriate response personnel?	Yes	
Is the Incident Command System used to manage incident scenes?	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	
Formal agreement?	No	
Not specified or don't know?	No	
On-scene command post used to manage activities of responding agencies?	Yes	

Freeway Management
Agencies for Metropolitan Area: Denver, Boulder

	Colorado Department of Transportation	
	1999	**2005**
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		
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?	25-36	
Have policies or procedures for quick removal of vehicles?	Yes	
Is Total Station equipment used to investigate major incidents?	Yes	
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?	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	
_____		
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: Denver, Boulder

Agency Name	Colorado 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	Colorado Department of Transportation, C&C of Denver, Lakewood/Douglas County
Share Infrastructure	None listed	Colorado Department of Transportation, C&C of Denver, Lakewood/Douglas County
Coordinate Operation	None listed	Colorado Department of Transportation, C&C of Denver, Lakewood/Douglas County
Incident Management Agencies		
Provide Information	None listed	Colorado Department of Transportation, Denver City Police Department, C&C of Denver & Lakewood Traffic
Share Infrastructure	None listed	Colorado Department of Transportation, C&C of Denver & Lakewood Traffic
Coordinate Operation	None listed	Colorado Department of Transportation, Denver City Police Department, C&C of Denver & Lakewood Traffic
Arterial Management Agencies		

Agency Name	Colorado Department of Transportation	
	1999	**2005**
Provide Information	None listed	Colorado Department of Transportation, Aurora City, Lakewood City, Douglas County
Share Infrastructure	None listed	Colorado Department of Transportation, Lakewood City, Douglas County
Coordinate Operation	None listed	Colorado Department of Transportation, Lakewood City, Douglas County
Public Transit Operators		
Provide Information	None listed	Regional Transportation District (RTD)
Share Infrastructure	None listed	Regional Transportation District (RTD)
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	Colorado Department of Transportation
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	Regional Transportation District (RTD)
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	Colorado Department of Transportation, Lakewood City, Denver City, Douglas County

Freeway Management Integration
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Colorado Department of Transportation	
	1999	**2005**
Share Infrastructure	None listed	Colorado Department of Transportation, Lakewood City, Denver City, Douglas County
Coordinate Operation	None listed	Colorado Department of Transportation, Lakewood City, Denver City, Douglas County
Emergency Management Agencies		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
Freeway Management Agencies		
Provide Information	None listed	Colorado Department of Transportation
Share Infrastructure	None listed	Colorado Department of Transportation
Coordinate Operation	None listed	Colorado Department of Transportation
Public Transit Operators		
Provide Information	None listed	Regional Transportation District (RTD)
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
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	None listed
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: Denver, Boulder

Agency Name	Colorado 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, Vehicle classification, Road conditions, Route designations (snow emergency, etc.), Current work zones, Scheduled work zones	Traffic volumes, Traffic speeds, Lane occupancy, Vehicle classification, Probe vehicles, Road conditions, Route designations (snow emergency, etc.), Current work zones, Scheduled work zones
Archived by your agency	Traffic volumes, Vehicle classification	Traffic volumes, Vehicle classification, Probe vehicles
Transferred to another agency by your agency	Traffic volumes, Traffic speeds, Vehicle classification, Road conditions, Route designations (snow emergency, etc.), Current work zones, Scheduled work zones	Traffic volumes, Traffic speeds, Vehicle classification, Probe vehicles, Road conditions, Route designations (snow emergency, etc.), Current work zones, Scheduled work zones
Importance of making information available to the public		
Ranked High	Road conditions, Route designations (snow emergency, etc.), Current work zones	
Ranked Medium	Traffic speeds, Scheduled work zones	
Ranked Low	Traffic volumes, Lane occupancy, Vehicle classification, Probe vehicles	
Groups that make requests for the data	Federal DOT personnel, Media (I.e., TV stations, radio stations)	
What is the data used for?	Do not know, Construction impact determination, Planning, Dissemination to the public	
Methods used to disseminate freeway 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 freeway conditions	www.cotrip.org	
Telephone system for reporting freeway information to the public	303-639-1111 Roadway conditions 303-573-ROAD - construction delays a new phone system will be in place by the end of the year toll free in Colorado providing more information	
Organizations your agency sends information for dissemination to the public	through website; RTD public transit; DIA-Denver International Airport;Tourist Information	
Freeway Incident Management Section		
Methods used to distribute incident location and severity 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 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 F
Arterial Management Components

Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

	Adams County		Arapahoe County		Arvada City		Aurora 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	NR		60		40		NR	
Number of arterial miles that is used for planning	NR		25		0		NR	
Number of highway-rail intersections that agency maintains	28		0		20		NR	
Number of highway-rail intersections that is used for planning	NR		0		0		NR	
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?	No		No		No		No	
Activities conducted in a dedicated control room?	No		No		No		No	
Control room contains operator console(s)?	No		No		No		No	
Control room contains electronic wall map?	No		No		No		No	
Control room contains CCTV display(s)?	No		No		No		No	
Activities conducted in a room containing workstations or PCs that manage traffic?	No		Yes		Yes		Yes	
Facilities are electronically linked to other transportation mgt facilities?	No		No		No		No	
Staffing and hours of operation of arterial management activities								
Number of full-time agency staff members	NR		NR		25		NR	
Number of full time contractor staff members	NR		NR		NR		NR	
Number of part-time agency staff members	NR		NR		NR		1	
Number of part-time contractor staff members	NR		NR		NR		0	
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		agency	
Staffed by others during off-peak hours	No		No		No		No	
Agency staff perform transportation management as an ancillary duty	No		No		No		Yes	
Agency staff dedicated to transportation management duty	No		Yes		No		No	
Types of operations conducted for arterial management								
Incident detection and management?	No		No		No		No	
This metropolitan area?	No		No		No		No	
Other metropolitan area?	No		No		No		No	
Monitoring and troubleshooting status of system components?	No		Yes		No		Yes	
Radio communications with other agencies?	No		No		No		No	
Exchange of electronic data with other agencies such as computer aided dispatch?	No		No		No		No	
Manual override of traffic signal timing plans	No		Yes		Yes		Yes	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	No		No		No		No	

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Agencies for Metropolitan Area: Denver, Boulder

	Adams County		Arapahoe County		Arvada City		Aurora City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Describe agency's role in traffic signal control	NR		All roads in county except state routes		All roads in incorporated area except state routes		All roads in incorporated area	
Traffic Signals Operated by Agency								
Number of signalized intersections operated and owned by agency	NR	NR	50	62	79	95	168	NR
Number of signalized intersections operated by agency but owned by another	NR	NR	4	6	0	0	62	NR
Total number of signalized intersections operated by agency	42	45	54	68	79	95	230	NR
Characteristics of signalized intersections that agency operates								
Under closed loop or central system control	23	24	26	40	37	50	185	NR
Under real-time traffic adaptive control using advanced software	0	0	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	8	8	35	45	65	80	126	NR
Allow signal priority for transit vehicles	0	0	0	0	0	0	0	NR
Within 200 feet of a highway-rail intersection	0	0	0	0	3	3	3	NR
Within 200 feet of a highway-rail intersection that adjust signal timing	0	0	0	0	3	3	3	NR
Software used to control the signals agency operates								
Date of last upgrade to traffic signal control system software?	NR		9/1999		1998		1996	
How often do you update signal timing?	NR		2-3 years		5 years		4 years	
Software used and number of signalized intersections under control (1999, 2005)	NR		ECONOLITE ZONE MONITOR IV, 26, 40		ECONOLITE ARIES, 15, 50 IDC VMS, 27, 0		Siemens/Eagle Monarc, 185, NR	
Controllers used to control signals								
NEMA	0	0	54	68	79	95	185	NR
170/179	0	0	0	0	0	0	0	0
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

	Adams County		Arapahoe County		Arvada City		Aurora City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
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	10	34	NR	20	NR	NR
Number of signalized intersections with data collection technologies								
Loop detectors	0	0	10	24	NR	10	0	0
Video detection cameras	0	0	0	10	NR	10	0	0
Probe readers reading toll tags	0	0	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	10	12	NR	NR	NR	NR
Candidate locations for deployment of VMS	NR	NR	10	12	NR	NR	NR	NR
Communication Technologies								
Signalized intersections communicated with by each type of communication								
Twisted pair cable	0	0	20	30	34	NR	19	NR
Coaxial cable	0	0	0	0	0	0	0	0
Fiber-optic cable	0	0	0	0	0	0	0	0
Other (e.g., wireless, dial-up modems, leased lines, etc.)	0	0	6	5	0	0	166	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		No	
ATC Physical Cabinet Functional Design (ITE-9603-2)	No		No		No		No	
ATC Functionality and Interface Definitions (ITE-9603-3)	No		No		No		No	
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)	No		No		No		No	
Would agency be willing to participate in testing of ITS Standards?	NR		No		Yes		No	
Have agreements in place with other agencies to use similar hardware								
and software to aid maintenance and interoperability?	NR		Yes		No		No	
INCIDENT MANAGEMENT ON ARTERIAL STREETS								
Receive information on highway-rail intersection crossing blockages for								

	Adams County		Arapahoe County		Arvada City		Aurora City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
the purpose of managing incident response?	No		No		No		No	
Use of Service Patrols to Assist in Detection and Response to Incidents								
Publicly operated service patrol vehicles	No		Yes		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	30	40	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
Police patrols	0	0	30	40	0	0	0	0
Computer algorithms linked to traffic surveillance equipment	0	0	0	0	0	0	0	0
CCTV	0	0	NR	10	0	0	0	0
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		Yes		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		Yes		No		No	
Set of goals/objectives for incident mgt that has been adopted by agencies in region	No		Yes		No		No	
Methods of Communication Used On-Site at an Incident								
Police								
Two-way radio	No		Yes		No		No	
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		Yes		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	
Fire								
Two-way radio	No		Yes		No		No	
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		Yes		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	
DOT								
Two-way radio	No		Yes		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	

	Adams County		Arapahoe County		Arvada City		Aurora City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Towing								
Two-way radio	No		Yes		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		Yes		No		No	
County Police or Sheriff	No		No		No		No	
City Police	No		No		No		No	
Who provides on-site emergency medical response?								
Fire	No		Yes		No		No	
Emergency Management Service Agency	No		No		No		No	
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		Yes		NR		NR	
Is the Incident Command System used to manage incident scenes?	NR		DK		NR		NR	
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		No	
Formal agreement?	No		No		No		No	
Not specified or don't know?	No		Yes		No		No	
On-scene command post used to manage activities of responding agencies?	NR		DK		NR		NR	
Are there communication linkages to a communications traffic/freeway mgt center?	NR		NR		NR		NR	
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		Yes		NR		NR	
Respondents protected through law or court opinion for liability claims								
for damages to vehicles or cargoes during clearance activities?	NR		Yes		NR		NR	
Are overturned tank trucks, which are intact and not leaking, uprighted								
without first off-loading?	NR		NR		NR		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		Yes		NR		NR	
Have laws or policies regarding the removal of stalled/abandoned vehicles								
from freeway shoulders?	NR		NR		NR		NR	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	NR		DK		NR		NR	
Have policies or procedures for quick removal of vehicles?	NR		No		NR		NR	
Is Total Station equipment used to investigate major incidents?	NR		DK		NR		NR	
Handling of Towing Responses to Incidents								
Formal contract based on qualifications?	No		No		No		No	

Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

	Adams County		Arapahoe County		Arvada City		Aurora City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
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		No		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		DK		NR		NR	
_____								
DK: Don't know								
NR: No Response								
Leg: Legislation or action being planned								

Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

	Boulder City		Boulder County		Colorado Department of Transportation		Denver 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	NR		84		651		300	
Number of arterial miles that is used for planning	NR		3		300		300	
Number of highway-rail intersections that agency maintains	6		27		80		20	
Number of highway-rail intersections that is used for planning	NR		0		0		NR	
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?	No		Yes		Yes		Yes	
Activities conducted in a dedicated control room?	No		No		Yes		Yes	
Control room contains operator console(s)?	No		No		Yes		Yes	
Control room contains electronic wall map?	No		No		Yes		No	
Control room contains CCTV display(s)?	No		No		Yes		Yes	
Activities conducted in a room containing workstations or PCs that manage traffic?	No		Yes		No		Yes	
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	NR		NR		5		0	
Number of full time contractor staff members	NR		NR		4		0	
Number of part-time agency staff members	NR		NR		0		2	
Number of part-time contractor staff members	NR		NR		2		0	
Staffed 24 hours day by agency staff or by others	NR		NR		agency		NR	
Staffed during peak hours only by agency staff or by others	NR		NR		agency		NR	
Staffed by others during off-peak hours	No		No		No		No	
Agency staff perform transportation management as an ancillary duty	No		Yes		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		No	
This metropolitan area?	No		No		No		No	
Other metropolitan area?	No		No		No		No	
Monitoring and troubleshooting status of system components?	No		Yes		Yes		Yes	
Radio communications with other agencies?	No		No		Yes		Yes	
Exchange of electronic data with other agencies such as computer aided dispatch?	No		No		No		No	
Manual override of traffic signal timing plans	No		Yes		No		No	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	No		No		Yes		Yes	

Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

	Boulder City		Boulder County		Colorado Department of Transportation		Denver City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Describe agency's role in traffic signal control	All roads in incorporated area		County routes only		State routes only		All roads in incorporated area, and roads in another local jurisdiction	
Traffic Signals Operated by Agency								
Number of signalized intersections operated and owned by agency	64	67	16	20	338	NR	875	920
Number of signalized intersections operated by agency but owned by another	68	71	0	0	0	NR	330	335
Total number of signalized intersections operated by agency	132	138	16	20	338	NR	1,205	1,255
Characteristics of signalized intersections that agency operates								
Under closed loop or central system control	117	138	5	10	300	NR	300	600
Under real-time traffic adaptive control using advanced software	0	0	0	0	NR	NR	0	0
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	125	130	16	20	150	NR	275	300
Allow signal priority for transit vehicles	0	40	0	0	NR	NR	30	30
Within 200 feet of a highway-rail intersection	0	0	0	0	10	NR	17	20
Within 200 feet of a highway-rail intersection that adjust signal timing	0	0	0	0	10	NR	12	14
Software used to control the signals agency operates								
Date of last upgrade to traffic signal control system software?	9/1999		summer 1999		March 1999		1999	
How often do you update signal timing?	varies by group: every 3-10 years		once a year or as needed		Bi-Annually		continuous; corridors 2-5 years	
Software used and number of signalized intersections under control (1999, 2005)	TCS-II, 117, 138		ARIES, 5, 10		WAPITI W41KS/TRANSLINK, 338, NR		ECONOLITE ICONS, 0, 600 PEEK-TRANSYT, SMARTWAYS, ECONOLITE ARIES, 300, NR	
Controllers used to control signals								
NEMA	1	NR	9	8	0	0	1,200	NR
170/179	131	132	7	12	338	NR	0	0
2070 controller	NR	6	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

	Boulder City		Boulder County		Colorado Department of Transportation		Denver City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
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	0	15	16	20	NR	NR	21	45
Number of signalized intersections with data collection technologies								
Loop detectors	0	10	16	20	0	0	15	30
Video detection cameras	0	5	0	0	0	0	6	15
Probe readers reading toll tags	0	0	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	1	1
In-Vehicle Signing (IVS)	NR	NR	NR	NR	NR	NR	NR	NR
VMS controlling parking access	NR	NR	NR	NR	NR	NR	3	3
Miles covered								
Highway Advisory Radio	NR	NR	NR	NR	NR	NR	15	15
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	NR	NR	3	3
Candidate locations for deployment of VMS	NR	4	NR	NR	NR	NR	NR	NR
Communication Technologies								
Signalized intersections communicated with by each type of communication								
Twisted pair cable	0	0	0	0	40	NR	130	50
Coaxial cable	0	0	0	0	0	0	0	0
Fiber-optic cable	0	0	0	0	20	NR	104	490
Other (e.g., wireless, dial-up modems, leased lines, etc.)	117	138	5	10	260	0	66	60
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		No	
ATC Physical Cabinet Functional Design (ITE-9603-2)	No		No		No		No	
ATC Functionality and Interface Definitions (ITE-9603-3)	No		No		No		No	
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)	No		No		No		No	
Would agency be willing to participate in testing of ITS Standards?	No		Yes		No		Yes	
Have agreements in place with other agencies to use similar hardware								
and software to aid maintenance and interoperability?	No		Yes		No		Yes	
INCIDENT MANAGEMENT ON ARTERIAL STREETS								
Receive information on highway-rail intersection crossing blockages for								

	Boulder City		Boulder County		Colorado Department of Transportation		Denver City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
the purpose of managing incident response?	No		No		No		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
Police patrols	0	0	0	0	0	0	NR	NR
Computer algorithms linked to traffic surveillance equipment	0	0	0	0	0	0	NR	25
CCTV	0	0	0	0	0	0	3	10
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		Yes	
Major incident response team that responds to major incidents	No		No		No		Yes	
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		No		No	
800 MHz trunked radio	No		No		No		Yes	
Cellular telephone	No		No		No		Yes	
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	
Fire								
Two-way radio	No		No		No		No	
800 MHz trunked radio	No		No		No		Yes	
Cellular telephone	No		No		No		Yes	
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	
DOT								
Two-way radio	No		No		No		No	
800 MHz trunked radio	No		No		No		Yes	
Cellular telephone	No		No		No		Yes	
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	

	Boulder City		Boulder County		Colorado Department of Transportation		Denver City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Towing								
Two-way radio	No		No		No		No	
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		No		No		Yes	
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	
County Police or Sheriff	No		No		No		No	
City Police	No		No		No		Yes	
Who provides on-site emergency medical response?								
Fire	No		No		No		Yes	
Emergency Management Service Agency	No		No		No		No	
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		NR		Yes	
Is the Incident Command System used to manage incident scenes?	NR		NR		NR		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		No		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		NR		Yes	
Are there communication linkages to a communications traffic/freeway mgt center?	NR		NR		NR		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		NR		DK	
Respondents protected through law or court opinion for liability claims								
for damages to vehicles or cargoes during clearance activities?	NR		NR		NR		Yes	
Are overturned tank trucks, which are intact and not leaking, uprighted								
without first off-loading?	NR		NR		NR		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		NR		No	
Have laws or policies regarding the removal of stalled/abandoned vehicles								
from freeway shoulders?	NR		NR		NR		NR	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	NR		NR		NR		DK	
Have policies or procedures for quick removal of vehicles?	NR		NR		NR		NR	
Is Total Station equipment used to investigate major incidents?	NR		NR		NR		DK	
Handling of Towing Responses to Incidents								
Formal contract based on qualifications?	No		No		No		Yes	

Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

	Boulder City		Boulder County		Colorado Department of Transportation		Denver City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
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		No		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		NR		DK	
_____								
DK: Don't know								
NR: No Response								
Leg: Legislation or action being planned								

Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

	Douglas County		Jefferson County		Lakewood City		Thornton 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	NR		NR		137		33	
Number of arterial miles that is used for planning	NR		NR		137		22	
Number of highway-rail intersections that agency maintains	5		5		3		8	
Number of highway-rail intersections that is used for planning	NR		NR		3		5	
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?	No		No		No		No	
Activities conducted in a dedicated control room?	No		No		Yes		No	
Control room contains operator console(s)?	No		No		Yes		No	
Control room contains electronic wall map?	No		No		No		No	
Control room contains CCTV display(s)?	No		No		Yes		No	
Activities conducted in a room containing workstations or PCs that manage traffic?	No		No		Yes		Yes	
Facilities are electronically linked to other transportation mgt facilities?	No		No		Yes		No	
Staffing and hours of operation of arterial management activities								
Number of full-time agency staff members	NR		NR		2		NR	
Number of full time contractor staff members	NR		NR		0		NR	
Number of part-time agency staff members	NR		NR		NR		1	
Number of part-time contractor staff members	NR		NR		NR		0	
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		agency		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		No	
This metropolitan area?	No		No		Yes		No	
Other metropolitan area?	No		No		No		No	
Monitoring and troubleshooting status of system components?	No		No		Yes		No	
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	No		No		Yes		No	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	No		No		Yes		No	

	Douglas County		Jefferson County		Lakewood City		Thornton City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Describe agency's role in traffic signal control	NR		NR		All roads in incorporated area		State routes only	
Traffic Signals Operated by Agency								
Number of signalized intersections operated and owned by agency	NR	NR	NR	NR	110	140	75	NR
Number of signalized intersections operated by agency but owned by another	NR	NR	NR	NR	61	65	6	NR
Total number of signalized intersections operated by agency	64	135	71	80	171	205	81	NR
Characteristics of signalized intersections that agency operates								
Under closed loop or central system control	10	135	40	50	102	130	0	NR
Under real-time traffic adaptive control using advanced software	0	0	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	64	135	50	60	33	45	81	NR
Allow signal priority for transit vehicles	0	12	0	0	0	0	0	NR
Within 200 feet of a highway-rail intersection	0	0	2	2	3	3	4	NR
Within 200 feet of a highway-rail intersection that adjust signal timing	0	0	2	2	0	0	0	NR
Software used to control the signals agency operates								
Date of last upgrade to traffic signal control system software?	NR		NR		1994		1999-Traffic View	
How often do you update signal timing?	NR		NR		review annually update as needed		try 2 years	
Software used and number of signalized intersections under control (1999, 2005)	NR		NR		JHK/TRANSCORE SERIES 2000, 13, 130 IDC/MULTISONCIS VMS 330, 102, 0		NR	
Controllers used to control signals								
NEMA	0	0	0	0	167	193	0	0
170/179	0	0	0	0	0	0	81	NR
2070 controller	0	0	0	0	4	12	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	3	5	NR
Highway-Rail intersection capapbilities								
Video surveillance	0	0	0	0	NR	3	0	0
Electronic surveillance other than video	0	0	0	0	NR	3	2	NR
Ability to predict train arrival electronically	0	0	0	0	NR	3	5	NR

	Douglas County		Jefferson County		Lakewood City		Thornton City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
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	2	18	NR	NR
Number of signalized intersections with data collection technologies								
Loop detectors	0	0	0	0	149	180	0	0
Video detection cameras	0	0	0	0	2	24	0	0
Probe readers reading toll tags	0	0	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	0	4	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	0	30	NR	NR	2	14	NR	NR
Candidate locations for deployment of VMS	0	0	NR	NR	2	14	NR	NR
Communication Technologies								
Signalized intersections communicated with by each type of communication								
Twisted pair cable	0	0	0	0	0	0	22	NR
Coaxial cable	0	0	0	0	0	0	0	0
Fiber-optic cable	0	0	0	0	8	185	0	0
Other (e.g., wireless, dial-up modems, leased lines, etc.)	0	0	0	0	165	20	59	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		No	
ATC Physical Cabinet Functional Design (ITE-9603-2)	No		No		No		No	
ATC Functionality and Interface Definitions (ITE-9603-3)	No		No		No		No	
Natl. Trans. Communications for ITS Protocol (NTCIP) Class B Profile (AASHTO TS 3.3)	No		No		Yes		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)	No		No		Yes		No	
Would agency be willing to participate in testing of ITS Standards?	NR		NR		Yes		Yes	
Have agreements in place with other agencies to use similar hardware								
and software to aid maintenance and interoperability?	NR		NR		Yes		No	
INCIDENT MANAGEMENT ON ARTERIAL STREETS								
Receive information on highway-rail intersection crossing blockages for								

	Douglas County		Jefferson County		Lakewood City		Thornton City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
the purpose of managing incident response?	No		No		No		Yes	
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
Police patrols	0	0	0	0	0	0	0	0
Computer algorithms linked to traffic surveillance equipment	0	30	0	0	0	0	0	0
CCTV	4	20	0	0	2	24	0	0
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		Yes		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		Yes		No	
Cellular telephone	No		No		Yes		No	
Hand-held (i.e., walkie-talkie)	No		No		No		No	
Automated data systems (i.e., CAD)	No		No		Yes		No	
Other	No		No		No		No	
Fire								
Two-way radio	No		No		Yes		Yes	
800 MHz trunked radio	No		No		Yes		No	
Cellular telephone	No		No		Yes		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	
DOT								
Two-way radio	No		No		Yes		No	
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		No		Yes		Yes	
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	

	Douglas County		Jefferson County		Lakewood City		Thornton City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Towing								
Two-way radio	No		No		Yes		No	
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		No		Yes		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		Yes		No	
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		Yes	
Emergency Management Service Agency	No		No		No		No	
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		Yes		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		DK		DK	
Are there communication linkages to a communications traffic/freeway mgt center?	NR		NR		NR		NR	
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		DK		DK	
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		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?	NR		NR		Yes		No	
Have laws or policies regarding the removal of stalled/abandoned vehicles								
from freeway shoulders?	NR		NR		Yes		NR	
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		No		NR	
Is Total Station equipment used to investigate major incidents?	NR		NR		No		NR	
Handling of Towing Responses to Incidents								
Formal contract based on qualifications?	No		No		Yes		No	

Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

	Douglas County		Jefferson County		Lakewood City		Thornton City	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Rotation with companies under contract?	No		No		No		No	
Separate lists kept for light and heavy response and for specialty recovery?	NR		NR		No		NR	
Rotation list with minimal qualifications?	No		No		No		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		NR	
_____								
DK: Don't know								
NR: No Response								
Leg: Legislation or action being planned								

Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

	Westminster City		Totals	
	1999	2005	1999	2005
Agency Returned Survey?	Yes		13	
ARTERIAL MANAGEMENT SECTION				
Number of arterial miles that agency owns or maintains	48		1353	
Number of arterial miles that is used for planning	48		835	
Number of highway-rail intersections that agency maintains	9		211	
Number of highway-rail intersections that is used for planning	9		17	
Type of facilities used to conduct arterial management activities				
Activities housed in a free-standing dedicated building?	No		0	
Activities housed in a building shared with other activities?	No		3	
Activities conducted in a dedicated control room?	No		3	
Control room contains operator console(s)?	No		3	
Control room contains electronic wall map?	No		1	
Control room contains CCTV display(s)?	No		3	
Activities conducted in a room containing workstations or PCs that manage traffic?	Yes		8	
Facilities are electronically linked to other transportation mgt facilities?	No		2	
Staffing and hours of operation of arterial management activities				
Number of full-time agency staff members	1		33	
Number of full time contractor staff members	0		4	
Number of part-time agency staff members	NR		0	
Number of part-time contractor staff members	NR		0	
Staffed 24 hours day by agency staff or by others	others		0	
Staffed during peak hours only by agency staff or by others	agency		0	
Staffed by others during off-peak hours	No		0	
Agency staff perform transportation management as an ancillary duty	No		6	
Agency staff dedicated to transportation management duty	Yes		2	
Types of operations conducted for arterial management				
Incident detection and management?	No		2	
This metropolitan area?	No		1	
Other metropolitan area?	No		0	
Monitoring and troubleshooting status of system components?	Yes		7	
Radio communications with other agencies?	No		3	
Exchange of electronic data with other agencies such as computer aided dispatch?	No		0	
Manual override of traffic signal timing plans	Yes		6	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	No		3	

	Westminster City		Totals	
	1999	**2005**	**1999**	**2005**
Describe agency's role in traffic signal control	All roads in incorporated area except state routes			
Traffic Signals Operated by Agency				
Number of signalized intersections operated and owned by agency	70	76	1845	1380
Number of signalized intersections operated by agency but owned by another	7	7	538	484
Total number of signalized intersections operated by agency	77	83	2560	2124
Characteristics of signalized intersections that agency operates				
Under closed loop or central system control	50	55	1195	1232
Under real-time traffic adaptive control using advanced software	NR	NR	0	0
Using SCOOT	No		0	
Using SCATS	No		0	
Name of software	NR			
Allow signal preemption for emergency vehicles	51	65	1079	888
Allow signal priority for transit vehicles	NR	NR	30	82
Within 200 feet of a highway-rail intersection	1	1	43	29
Within 200 feet of a highway-rail intersection that adjust signal timing	1	1	31	20
Software used to control the signals agency operates				
Date of last upgrade to traffic signal control system software?	1996			
How often do you update signal timing?	every 3 years			
Software used and number of signalized intersections under control (1999, 2005)	ECONOLITE CONTROL PRODUCTS-ARIES, 50, 55			
Controllers used to control signals				
NEMA	76	82	1771	446
170/179	1	1	558	145
2070 controller	0	0	4	18
Other	0	0	0	0
Technologies Associated with Highway-Rail Intersections				
Total number of highway-rail intersections under electronic surveillance	NR	NR	5	3
Highway-Rail intersection capapbilities				
Video surveillance	0	0	0	3
Electronic surveillance other than video	0	0	2	3
Ability to predict train arrival electronically	0	0	5	3

	Westminster City		Totals	
	1999	**2005**	**1999**	**2005**
Equipped with electronic traffic violator devices	0	0	0	0
Other	0	0	0	0
Real-Time Electronic Traffic Data Collection Technologies				
Total number of signalized intersections covered by electronic surveillance	12	20	61	172
Number of signalized intersections with data collection technologies				
Loop detectors	NR	NR	190	274
Video detection cameras	12	20	20	84
Probe readers reading toll tags	0	0	0	0
Probe readers reading license plates	0	0	0	0
Other	0	0	0	0
Roadside Technologies used to Distribute Traveler Information				
Number deployed				
Highway Advisory Radio	NR	NR	1	1
In-Vehicle Signing (IVS)	NR	NR	0	0
VMS controlling parking access	NR	NR	3	3
Miles covered				
Highway Advisory Radio	NR	NR	15	19
In-Vehicle Signing (IVS)	NR	NR	0	0
Variable Message Signs (VMS) on Arterials				
Candidate locations for deployment of VMS where VMS has been deployed	NR	NR	15	59
Candidate locations for deployment of VMS	NR	NR	12	30
Communication Technologies				
Signalized intersections communicated with by each type of communication				
Twisted pair cable	43	46	308	126
Coaxial cable	0	0	0	0
Fiber-optic cable	5	9	137	684
Other (e.g., wireless, dial-up modems, leased lines, etc.)	2	7	846	240
Does agency convey information on highway-rail intersection crossing				
status to travelers via roadside media such as VMS or HAR?	No		0	
ITS Standards Used Related to Traffic Signal Control				
Advanced Transportation Controller (ATC) Software Application Interface (ITE 9603-1)	No		0	
ATC Physical Cabinet Functional Design (ITE-9603-2)	No		0	
ATC Functionality and Interface Definitions (ITE-9603-3)	No		0	
Natl. Trans. Communications for ITS Protocol (NTCIP) Class B Profile (AASHTO TS 3.3)	No		1	
NTCIP Data Collection and Monitoring Devices (AASHTO TS 3.DCM)	No		0	
NTCIP Object Definitions for Video Camera Control (AASHTO TS 3.VCC)	No		0	
NTCIP Object Definitions for Actuated Traffic Signal Controller Units (AASHTO TS 3.5)	No		1	
Would agency be willing to participate in testing of ITS Standards?	Yes		6	
Have agreements in place with other agencies to use similar hardware				
and software to aid maintenance and interoperability?	No		4	
INCIDENT MANAGEMENT ON ARTERIAL STREETS				
Receive information on highway-rail intersection crossing blockages for				

	Westminster City		Totals	
	1999	**2005**	**1999**	**2005**
the purpose of managing incident response?	No		1	
Use of Service Patrols to Assist in Detection and Response to Incidents				
Publicly operated service patrol vehicles	No		1	
Privately operated service patrol vehicles operated under public contract	No		0	
Total number of arterial miles patrolled by these services	NR	NR	30	40
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
Free cellular phone call to an area radio station	0	0	0	0
Police patrols	0	0	30	40
Computer algorithms linked to traffic surveillance equipment	0	0	0	55
CCTV	0	0	9	64
Private sector sources (e.g., Shadow Traffic, Smart Routes)	0	0	0	0
Other	0	0	0	0
Procedures in place for Arterial Incident Response?				
Working agreement(s)/arrangement(s) with other agencies	No		1	
Inter-agency incident management admin. team that meets regularly	No		2	
Major incident response team that responds to major incidents	Yes		3	
Set of goals/objectives for incident mgt that has been adopted by agencies in region	No		1	
Methods of Communication Used On-Site at an Incident			0	
Police				
Two-way radio	No		3	
800 MHz trunked radio	Yes		3	
Cellular telephone	Yes		4	
Hand-held (i.e., walkie-talkie)	Yes		1	
Automated data systems (i.e., CAD)	No		1	
Other	No		0	
Fire				
Two-way radio	No		3	
800 MHz trunked radio	Yes		3	
Cellular telephone	Yes		4	
Hand-held (i.e., walkie-talkie)	Yes		1	
Automated data systems (i.e., CAD)	No		0	
Other	No		0	
DOT				
Two-way radio	No		2	
800 MHz trunked radio	No		1	
Cellular telephone	No		3	
Hand-held (i.e., walkie-talkie)	No		0	
Automated data systems (i.e., CAD)	No		0	
Other	No		0	

	Westminster City		Totals	
	1999	2005	1999	2005
Towing				
Two-way radio	No		2	
800 MHz trunked radio	No		0	
Cellular telephone	No		2	
Hand-held (i.e., walkie-talkie)	No		0	
Automated data systems (i.e., CAD)	No		0	
Other	No		0	
Which police agencies typically respond to incidents on arterials?				
State Police	No		2	
County Police or Sheriff	No		0	
City Police	Yes		4	
Who provides on-site emergency medical response?				
Fire	Yes		5	
Emergency Management Service Agency	No		0	
Private hospital	No		0	
Has a multi-agency contact list been developed in area containing the				
names, phone numbers, etc. for the appropriate response personnel?	Yes		4	
Is the Incident Command System used to manage incident scenes?	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		1	
Formal agreement?	No		0	
Not specified or don't know?	Yes		4	
On-scene command post used to manage activities of responding agencies?	DK		1	
Are there communication linkages to a communications traffic/freeway mgt center?	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?	DK		1	
Respondents protected through law or court opinion for liability claims				
for damages to vehicles or cargoes during clearance activities?	DK		2	
Are overturned tank trucks, which are intact and not leaking, uprighted				
without first off-loading?	Yes		1	
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		3	
Have laws or policies regarding the removal of stalled/abandoned vehicles				
from freeway shoulders?	Yes		2	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	DK		0	
Have policies or procedures for quick removal of vehicles?	No		0	
Is Total Station equipment used to investigate major incidents?	No		0	
Handling of Towing Responses to Incidents				
Formal contract based on qualifications?	No		2	

	Westminster City		Totals	
	1999	**2005**	**1999**	**2005**
Rotation with companies under contract?	No		0	
Separate lists kept for light and heavy response and for specialty recovery?	NR		0	
Rotation list with minimal qualifications?	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?	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: Denver, Boulder

Agency Name	Adams County		Arapahoe County	
	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	short survey	None listed	Colorado Department of Transportation, Denver City	Greenwood Village
Coordinate Changes to Timing Plans	short survey	None listed	Colorado Department of Transportation, Denver City	Aurora City, Douglas County, Greenwood Village
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	None listed
Share Infrastructure	None listed	None listed	None listed	None listed

Agency Name	Adams County		Arapahoe County	
	1999	**2005**	**1999**	**2005**
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
Coordinate Operation	None listed	None listed	None listed	None listed
Arterial Management Agencies				

Agency Name	Adams County		Arapahoe County	
	1999	**2005**	**1999**	**2005**
Provide Information	None listed	None listed	None listed	Colorado Department of Transportation, Denver City, Douglas County, Greenwood Village
Share Infrastructure	None listed	None listed	None listed	Colorado Department of Transportation, Denver City, Douglas County, Greenwood Village
Coordinate Operation	None listed	None listed	Colorado Department of Transportation, Denver City, Douglas County, Greenwood Village	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	Colorado 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				
Receive information on Incident Clearance	None listed	None listed	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	None listed	Colorado Department of Transportation	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.				

Agency Name	Adams County		Arapahoe County	
	1999	**2005**	**1999**	**2005**
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				
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 Management Integration
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Adams County		Arapahoe County	
	1999	**2005**	**1999**	**2005**
arterial travel times, speeds, and conditions	None listed	None listed	None listed	Aurora City, Colorado Department of Transportation, Denver City, Douglas County
Freeway Management agencies from which your agency receives				
freeway travel times, speeds, and conditions	None listed	None listed	None listed	Colorado 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.

Agency Name	Arvada City		Aurora 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	Colorado Department of Transportation, Westminster City	Westminster City	Colorado Department of Transportation, Denver City	None listed
Coordinate Changes to Timing Plans	Colorado Department of Transportation, Westminster City	Colorado Department of Transportation, Westminster City	Colorado Department of Transportation, Denver City	None listed
Turn over Control of Signals	None listed	None listed	Colorado Department of Transportation	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

Agency Name	Arvada City		Aurora City	
	1999	**2005**	**1999**	**2005**
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
Coordinate Operation	None listed	None listed	None listed	None listed
Arterial Management Agencies				

Agency Name	Arvada City		Aurora 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
Coordinate Operation	Colorado Department of Transportation, Westminster City	Colorado Department of Transportation, Westminster City	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	Colorado Department of Transportation	None listed	None listed
Public Transit operators from which your agency receives				
arterial travel times derived from vehicle probes	None listed	Regional Transportation District (RTD)	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	Colorado Department of Transportation	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	Colorado 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.				

Agency Name	Arvada City		Aurora City	
	1999	**2005**	**1999**	**2005**
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				
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 Management Integration
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Arvada City		Aurora City	
	1999	**2005**	**1999**	**2005**
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.

Agency Name	Boulder City		Boulder County	
	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	Colorado Department of Transportation	Colorado Department of Transportation	Boulder City, Colorado Department of Transportation, Louisville	None listed
Coordinate Changes to Timing Plans	Colorado Department of Transportation	Boulder County, Colorado Department of Transportation	Boulder City, Colorado Department of Transportation	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	None listed	None listed	Colorado Department of Transportation	None listed
Share Infrastructure	None listed	None listed	None listed	None listed

Agency Name	Boulder City		Boulder County	
	1999	**2005**	**1999**	**2005**
Coordinate Operation	None listed	None listed	Colorado Department of Transportation	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
Coordinate Operation	None listed	None listed	None listed	None listed
Arterial Management Agencies				

Agency Name	Boulder City		Boulder County	
	1999	**2005**	**1999**	**2005**
Provide Information	None listed	None listed	Boulder City, Colorado Department of Transportation, Longmont City	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	Boulder City, Colorado Department of Transportation	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	Colorado 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				
Receive information on Incident Clearance	None listed	None listed	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	None listed	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.				

Agency Name	Boulder City		Boulder County	
	1999	**2005**	**1999**	**2005**
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				
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 Management Integration
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Boulder City		Boulder County	
	1999	**2005**	**1999**	**2005**
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.

Agency Name	Colorado Department of Transportation		Denver 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	Adams County, Arapahoe County, Aurora City, Colorado Department of Transportation, Lakewood City, Glendale, Greenwood Village	Englewood
Coordinate Changes to Timing Plans	None listed	None listed	Adams County, Arapahoe County, Aurora City, Colorado Department of Transportation, Lakewood City, Glendale, Greenwood Village	Adams County, Arapahoe County, Englewood
Turn over Control of Signals	None listed	None listed	Greenwood Village	Colorado Department of Transportation
Agencies your agency provides arterial travel times, speeds, and				
conditions information, share infrastructure or coordinates operation				
Freeway Management Agencies				
Provide Information	None listed	Colorado Department of Transportation, Denver City and County, Lakewood	None listed	Colorado Department of Transportation, Lakewood, Aurora, Glendale, Greenwood Village, DIA
Share Infrastructure	None listed	Colorado Department of Transportation, Denver City and County, Lakewood	Colorado Department of Transportation, Lakewood, Glendale	Aurora, Greenwood Village, DIA

Agency Name	Colorado Department of Transportation		Denver City	
	1999	**2005**	**1999**	**2005**
Coordinate Operation	None listed	Colorado Department of Transportation, Denver City and County, Lakewood	Lakewood, Aurora, Glendale, Greenwood Village	Colorado Department of Transportation, DIA
Incident Management Agencies				
Provide Information	None listed	Colorado Department of Transportation, Denver City Police Department, Denver City and Lakewood Traffic	None listed	Colorado Department of Transportation, Lakewood, Aurora
Share Infrastructure	None listed	Colorado Department of Transportation, Denver City Police Department, Denver City and Lakewood Traffic	None listed	Colorado Department of Transportation, Lakewood, Aurora
Coordinate Operation	None listed	Colorado Department of Transportation, Denver City Police Department, Denver City and Lakewood Traffic	None listed	Colorado Department of Transportation, Lakewood, Aurora
Public Transit Operators Agencies				
Provide Information	None listed	Regional Transportation District (RTD)	None listed	Regional Transportation District (RTD)
Share Infrastructure	None listed	None listed	Regional Transportation District (RTD)	None listed
Coordinate Operation	None listed	Regional Transportation District (RTD)	Regional Transportation District (RTD)	None listed
Arterial Management Agencies				

Agency Name	Colorado Department of Transportation		Denver City	
	1999	**2005**	**1999**	**2005**
Provide Information	None listed	Aurora City, Colorado Department of Transportation, Denver City, Douglas County, Lakewood City	Adams County, Arapahoe County	Adams County, Arapahoe County, Aurora City, Colorado Department of Transportation, Lakewood City, Greenwood Village, Glendale
Share Infrastructure	None listed	Aurora City, Colorado Department of Transportation, Denver City, Douglas County, Lakewood City	Colorado Department of Transportation, Lakewood City, Glendale	Aurora City, Greenwood Village
Coordinate Operation	None listed	Aurora City, Colorado Department of Transportation, Denver City, Douglas County, Lakewood City	Colorado Department of Transportation, Lakewood City, Greenwood Village, Glendale	Aurora 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	Colorado Department of Transportation	Colorado Department of Transportation	None listed
Public Transit operators from which your agency receives				
arterial travel times derived from vehicle probes	None listed	Regional Transportation District (RTD)	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	Colorado Department	Colorado Department of Transportation	None listed	None listed
Receive information on Incident Severity, Location, and Type	Colorado Department	Colorado 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.				

Agency Name	Colorado Department of Transportation		Denver City	
	1999	**2005**	**1999**	**2005**
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	Denver City Fire Department, Denver City Police Department	None listed
Coordinate Operation	None listed	None listed	Denver City Fire Department, Denver City Police Department	None listed
Freeway Management Agencies				
Provide Information	None listed	None listed	Colorado Department of Transportation	Colorado Department of Transportation
Share Infrastructure	None listed	None listed	Colorado Department of Transportation	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Public Transit Operators				
Provide Information	None listed	None listed	None listed	Regional Transportation District (RTD)
Share Infrastructure	None listed	None listed	Regional Transportation District (RTD)	None listed
Coordinate Operation	None listed	None listed	Regional Transportation District (RTD)	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	Denver City Fire Department	None listed
Receive Arterial Incident Severity Information	None listed	None listed	None listed	None listed
Arterial Management agencies from which your agency receives				

Arterial Management Integration
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Colorado Department of Transportation		Denver City	
	1999	**2005**	**1999**	**2005**
arterial travel times, speeds, and conditions	None listed	None listed	None listed	Aurora City, Colorado Department of Transportation, Lakewood City
Freeway Management agencies from which your agency receives				
freeway travel times, speeds, and conditions	None listed	None listed	Colorado Department of Transportation	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.

Agency Name	Douglas County		Jefferson County	
	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	short survey	None listed	short survey	None listed
Coordinate Changes to Timing Plans	short survey	None listed	short survey	None listed
Turn over Control of Signals	short survey	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	short survey	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed

Agency Name	Douglas County		Jefferson County	
	1999	**2005**	**1999**	**2005**
Coordinate Operation	None listed	None listed	None listed	None listed
Incident Management Agencies				
Provide Information	short survey	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
Coordinate Operation	None listed	None listed	None listed	None listed
Arterial Management Agencies				

Agency Name	Douglas County		Jefferson County	
	1999	**2005**	**1999**	**2005**
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	short survey	None listed	None listed	None listed
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				
Receive information on Incident Clearance	short survey	None listed	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	None listed	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.				

Agency Name	Douglas County		Jefferson County	
	1999	**2005**	**1999**	**2005**
and/or shares infrastructure and/or coordinates operation				
Emergency Management Agencies				
Provide Information	short survey	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				
Provide Information	short survey	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	short survey	None listed	None listed	None listed
Receive Arterial Incident Severity Information	short survey	None listed	None listed	None listed
Arterial Management agencies from which your agency receives				

Arterial Management Integration
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Douglas County		Jefferson County	
	1999	**2005**	**1999**	**2005**
arterial travel times, speeds, and conditions	short survey	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.

Agency Name	Lakewood City		Thornton 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	Denver City	Colorado Department of Transportation, Northglenn	Northglenn
Coordinate Changes to Timing Plans	None listed	Colorado Department of Transportation, Denver City	Colorado Department of Transportation, Northglenn	None listed
Turn over Control of Signals	None listed	Colorado 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	Colorado Department of Transportation	None listed	None listed
Share Infrastructure	None listed	Colorado Department of Transportation	None listed	None listed

Agency Name	Lakewood City		Thornton City	
	1999	**2005**	**1999**	**2005**
Coordinate Operation	None listed	Colorado Department of Transportation	None listed	None listed
Incident Management Agencies				
Provide Information	None listed	Colorado Department of Transportation	None listed	None listed
Share Infrastructure	None listed	Colorado Department of Transportation	None listed	None listed
Coordinate Operation	None listed	Colorado Department of Transportation	None listed	None listed
Public Transit Operators Agencies				
Provide Information	None listed	Regional Transportation District (RTD)	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Arterial Management Agencies				

Agency Name	Lakewood City		Thornton City	
	1999	**2005**	**1999**	**2005**
Provide Information	None listed	Colorado Department of Transportation, Denver City, Jefferson County	None listed	None listed
Share Infrastructure	None listed	Colorado Department of Transportation	None listed	None listed
Coordinate Operation	None listed	Colorado Department of Transportation	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	Colorado Department of Transportation	None listed	None listed
Public Transit operators from which your agency receives				
arterial travel times derived from vehicle probes	None listed	Regional Transportation District (RTD)	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	Colorado Department of Transportation	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	Colorado 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.				

Agency Name	Lakewood City		Thornton City	
	1999	2005	1999	2005
and/or shares infrastructure and/or coordinates operation				
Emergency Management Agencies				
Provide Information	None listed	Denver City Police Department	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	Denver City Police Department	None listed	None listed
Freeway Management Agencies				
Provide Information	None listed	Colorado Department of Transportation, Denver Traffic	None listed	None listed
Share Infrastructure	None listed	Colorado Department of Transportation, Denver Traffic	None listed	None listed
Coordinate Operation	None listed	Colorado Department of Transportation, Denver Traffic	None listed	None listed
Public Transit Operators				
Provide Information	None listed	Regional Transportation District (RTD)	None listed	None listed
Share Infrastructure	None listed	Regional Transportation District (RTD)	None listed	None listed
Coordinate Operation	None listed	Regional Transportation District (RTD)	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	Denver City Police Department	None listed	None listed
Receive Arterial Incident Severity Information	None listed	Denver City Police Department	None listed	None listed
Arterial Management agencies from which your agency receives				

Arterial Management Integration
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Lakewood City		Thornton City	
	1999	**2005**	**1999**	**2005**
arterial travel times, speeds, and conditions	Lakewood City	Arvada City, Colorado Department of Transportation, Jefferson County, Lakewood City	None listed	None listed
Freeway Management agencies from which your agency receives				
freeway travel times, speeds, and conditions	None listed	Colorado Department of Transportation	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.

Agency Name	Westminster City	
	1999	**2005**
Agency Returned Survey?	Yes	
Arterial Management Section		
Arterial Mgt. agencies in metropolitan area with which you share info.		
Share Timing Plans Information	Arvada City, Colorado Department of Transportation	None listed
Coordinate Changes to Timing Plans	Arvada City, Colorado Department of Transportation	None listed
Turn over Control of Signals	Arvada City	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
Share Infrastructure	None listed	None listed

Agency Name	Westminster City	
	1999	**2005**
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
Public Transit Operators Agencies		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
Arterial Management Agencies		

Agency Name	Westminster City	
	1999	**2005**
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		
Freeway Management agencies from which your agency receives		
freeway travel times, speeds, and conditions	None listed	None listed
Public Transit operators from which your agency receives		
arterial travel times derived from vehicle probes	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	None listed
Receive information on Incident Severity, Location, and Type	None listed	None listed
Toll Collection agencies from which your agency receives arterial travel		
times derived from vehicles probes	None listed	None listed
Arterial Incident Management Section		
Agencies your agency provides incident severity, location, and type info.		

Agency Name	Westminster City	
	1999	**2005**
and/or shares infrastructure and/or coordinates operation		
Emergency Management Agencies		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	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	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		
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
Receive Arterial Incident Severity Information	None listed	None listed
Arterial Management agencies from which your agency receives		

Agency Name	Westminster City	
	1999	**2005**
arterial travel times, speeds, and conditions	None listed	None listed
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 H
Arterial Management Information Collection and Dissemination

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Adams County		Arapahoe 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	NR	NR	Traffic volumes, Turning movements, Phasing/cycle lengths, Current work zones, Scheduled work zones	Vehicle classification, Incidents, Emergency/evacuation routes and procedures
Archived by your agency	NR	NR	Traffic volumes, Turning movements, Phasing/cycle lengths	Vehicle classification, Incidents, Emergency/evacuation routes and procedures
Transferred to another agency by your agency	NR	NR	Phasing/cycle lengths, Current work zones, Scheduled work zones	Traffic volumes, Vehicle classification, Turning movements, Incidents, Emergency/evacuation routes and procedures
Importance of making information available to the public				
Ranked High	NR		Traffic volumes, Phasing/cycle lengths, Road conditions, Route designations (snow emergency, etc.), Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures, Highway operations coordination information	

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Adams County		Arapahoe County	
	1999	**2005**	**1999**	**2005**
Ranked Medium	NR		Traffic speeds, Lane occupancy, Vehicle classification, Turning movements, Weather conditions	
Ranked Low	NR		Probe vehicles, Queues, Emergency vehicle signal preemption, Transit vehicle signal priority, Intermodal (air, rail, water) connections	
Groups that make requests for the data	NR		State DOT personnel, Consultants	
What is the data used for?	NR		Traffic analysis, Construction impact determination, Roadway impact analysis	
Methods used to disseminate arterial information to the public				
Technologies your agency uses to disseminate:	NR	NR	Internet Web sites	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				
to the public				

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Adams County		Arapahoe County	
	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: Denver, Boulder

Agency Name	Arvada City		Aurora 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, Turning movements, Route designations (snow emergency, etc.)	Traffic volumes, Traffic speeds, Lane occupancy, Turning movements, Route designations (snow emergency, etc.)	NR	NR
Archived by your agency	Traffic volumes, Traffic speeds, Turning movements, Route designations (snow emergency, etc.)	Traffic volumes, Traffic speeds, Turning movements, Route designations (snow emergency, etc.)	NR	NR
Transferred to another agency by your agency	NR	NR	NR	NR
Importance of making information available to the public				
Ranked High	Traffic volumes, Route designations (snow emergency, etc.)		NR	

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Arvada City		Aurora City	
	1999	**2005**	**1999**	**2005**
Ranked Medium	Traffic speeds, Lane occupancy, Turning movements		NR	
Ranked Low	NR		NR	
Groups that make requests for the data	Consultants, Developers		NR	
What is the data used for?	Traffic analysis, Construction impact determination, Planning, Roadway impact analysis, Dissemination to the public		NR	
Methods used to disseminate arterial information to the public				
Technologies your agency uses to disseminate:	NR	Dedicated cable TV, Internet Web sites	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				
to the public				

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Arvada City		Aurora 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: Denver, Boulder

Agency Name	Boulder City		Boulder 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	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption	Traffic volumes, Traffic speeds, Lane occupancy, Vehicle classification, Turning movements, Queues, Phasing/cycle lengths, Road conditions, Emergency vehicle signal preemption, Transit vehicle signal priority, Weather conditions	Traffic volumes, Traffic speeds, Vehicle classification, Phasing/cycle lengths, Emergency vehicle signal preemption	NR
Archived by your agency	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption	Traffic volumes, Traffic speeds, Lane occupancy, Vehicle classification, Turning movements, Queues, Phasing/cycle lengths, Road conditions, Emergency vehicle signal preemption, Transit vehicle signal priority, Weather conditions	Traffic volumes, Traffic speeds, Vehicle classification, Phasing/cycle lengths	NR
Transferred to another agency by your agency	Traffic volumes	Traffic volumes	NR	Traffic volumes, Traffic speeds, Vehicle classification, Phasing/cycle lengths
Importance of making information available to the public				
Ranked High	NR		NR	

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Boulder City		Boulder County	
	1999	**2005**	**1999**	**2005**
Ranked Medium	NR		Traffic volumes, Traffic speeds	
Ranked Low	NR		Vehicle classification, Phasing/cycle lengths, Emergency vehicle signal preemption	
Groups that make requests for the data	State DOT personnel, MPOs, Consultants		State DOT personnel	
What is the data used for?	Traffic analysis, Construction impact determination, Planning, Roadway impact analysis, Dissemination to the public		Do not know, Traffic analysis, Construction impact determination, Planning	
Methods used to disseminate arterial information to the public				
Technologies your agency uses to disseminate:	NR	Internet Web sites	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				
to the public				

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Boulder City		Boulder County	
	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: Denver, Boulder

Agency Name	Colorado Department of Transportation		Denver City		Douglas County	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes		Yes	
Arterial Management Section						
Data collected, archived, and/or transferred to another agency						
Collected by your agency	NR	NR	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Transit vehicle signal priority	Vehicle classification, Road conditions, Current work zones, Scheduled work zones, Highway operations coordination information	NR	NR
Archived by your agency	NR	NR	Traffic volumes, Turning movements, Phasing/cycle lengths	Vehicle classification, Transit vehicle signal priority, Current work zones, Scheduled work zones	NR	NR
Transferred to another agency by your agency	NR	NR	Traffic volumes	Vehicle classification, Road conditions, Transit vehicle signal priority, Current work zones, Scheduled work zones, Highway operations coordination information	NR	NR
Importance of making information available to the public						
Ranked High	NR		Vehicle classification		NR	

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Colorado Department of Transportation		Denver City		Douglas County	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Ranked Medium	NR		Traffic volumes		NR	
Ranked Low	NR		Traffic speeds, Lane occupancy		NR	
Groups that make requests for the data	NR		Universities, State DOT personnel, Media (I.e., TV stations, radio stations), MPOs, Consultants		NR	
What is the data used for?	NR		Traffic analysis, Planning, Incident detection algorithm development, Roadway impact analysis, Dissemination to the public		NR	
Methods used to disseminate arterial information to the public						
Technologies your agency uses to disseminate:	NR	NR	HAR, Comml. AM Radio	Internet Web sites, Kiosks	Telephone system	Dedicated cable TV, Internet Web sites, Kiosks
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	HAR, Comml. AM Radio	Internet Web sites, Kiosks	NR	NR
Internet web site reporting arterial conditions	WWW.COTRIP.COM		www.corip.org/road/road.html□ www.kcncnews4.com/prd1		NR	
Telephone system for reporting arterial information to the public	303-639-111 Roadway□ 303-573-ROAD		NR		NR	
Organizations your agency sends information for dissemination to the public	NR		Colorado Department of Transportation□ Police Department□ Commercial TV and Radio		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: Denver, Boulder

Agency Name	Colorado Department of Transportation		Denver City		Douglas County	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Technologies your agency uses to disseminate:	NR	NR	Commercial Radio/TV	NR	Telephone system	Dedicated cable TV, Internet Web sites, Kiosks
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	Internet Web sites, Facsimile, Commercial Radio/TV	Kiosks	NR	NR
Internet web site reporting incident information	NR		see page 9		NR	
Telephone system for reporting incident information to the public	NR		n/a		NR	
Organizations your agency sends information for dissemination to the public	NR		Department of Public Works - PIO		NR	

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Jefferson County		Lakewood 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	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption
Archived by your agency	NR	NR	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption
Transferred to another agency by your agency	NR	NR	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption	Traffic volumes, Traffic speeds, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption
Importance of making information available to the public				
Ranked High	NR		Traffic volumes, Traffic speeds	

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Jefferson County		Lakewood City	
	1999	**2005**	**1999**	**2005**
Ranked Medium	NR		Turning movements, Phasing/cycle lengths	
Ranked Low	NR		Emergency vehicle signal preemption	
Groups that make requests for the data	NR		State DOT personnel, MPOs, Consultants, Developers	
What is the data used for?	NR		Traffic analysis, Construction impact determination, Planning, Roadway impact analysis	
Methods used to disseminate arterial information to the public				
Technologies your agency uses to disseminate:	NR	NR	Facsimile	Internet Web sites, Kiosks, E-mail or other direct PC communication, Facsimile
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	Facsimile	Internet Web sites, E-mail or other direct PC communication, Facsimile
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: Denver, Boulder

Agency Name	Jefferson County		Lakewood City	
	1999	**2005**	**1999**	**2005**
Technologies your agency uses to disseminate:	NR	NR	Cell phone/voice, Facsimile	Dedicated cable TV, Internet Web sites, Kiosks, In-vehicle navigation systems, Cell phone/voice, Facsimile
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	Dedicated cable TV, Cell phone/voice, Facsimile	Dedicated cable TV, Internet Web sites, Kiosks, In-vehicle navigation systems, Cell phone/voice, Facsimile
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: Denver, Boulder

Agency Name	Thornton City		Westminster 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	Traffic volumes, Traffic speeds	NR	Traffic volumes
Archived by your agency	NR	NR	NR	Traffic volumes
Transferred to another agency by your agency	NR	NR	NR	Traffic volumes
Importance of making information available to the public				
Ranked High	NR		NR	

Data Collection and Dissemination: Arterial Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Thornton City		Westminster City	
	1999	**2005**	**1999**	**2005**
Ranked Medium	Traffic volumes, Traffic speeds, Turning movements, Weather conditions		Traffic volumes	
Ranked Low	Lane occupancy, Vehicle classification, Probe vehicles, Queues, Phasing/cycle lengths, Road conditions, Emergency vehicle signal preemption, Transit vehicle signal priority, Route designations (snow emergency, etc.), Incidents, Current work zones, Scheduled work zones, Intermodal (air, rail, water) connections, Emergency/evacuation routes and procedures, Highway operations coordination information		NR	
Groups that make requests for the data	State DOT personnel, MPOs, Consultants		MPOs, Consultants, Developers, Realtors, Economic Development Staff	
What is the data used for?	Traffic analysis, Planning, Roadway impact analysis		Traffic analysis, Construction impact determination, Planning, Pavement Management Program, Prioritization of Cap	
Methods used to disseminate arterial information 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 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: Denver, Boulder

Agency Name	Thornton City		Westminster 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	

Appendix I
Transit Management Components

Transit Management
Agencies for Metropolitan Area: Denver, Boulder

	Greeley City-The Bus		Regional Transportation District (RTD)		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes		2	
Number of vehicles used in revenue service						
Fixed Route Bus	12	NR	945	1,095	957	1095
Heavy or Rapid Rail	NR	NR	0	0	0	0
Light Rail	NR	NR	17	35	17	35
Demand Responsive	6	NR	175	210	181	210
Commuter Rail	NR	NR	0	0	0	0
Ferry Boat	NR	NR	0	0	0	0
Have of plan to have an Automated Vehicle Location System?	No		Yes		1	
Primary and Secondary Location Technologies Used						
Primary Technologies						
GPS	No	No	No	No	0	0
Sign/Odometer	No	No	No	No	0	0
Dead-Reckoning	No	No	No	No	0	0
LORAN C	No	No	No	No	0	0
Other	No	No	Yes	No	1	0
Backup Technologies						
GPS	No	No	No	No	0	0
Sign/Odometer	No	No	No	No	0	0
Dead-Reckoning	No	No	No	No	0	0
LORAN C	No	No	No	No	0	0
Other	No	No	No	No	0	0
Number of Vehicles Equipped with AVL						
Fixed Route Bus	NR	NR	945	1,095	945	1095
Heavy or Rapid Rail	NR	NR	0	0	0	0
Light Rail	NR	NR	17	35	17	35
Demand Responsive	NR	NR	0	0	0	0
Commuter Rail	NR	NR	0	0	0	0
Ferry Boat	NR	NR	0	0	0	0
Motor Buses Operated as Vehicle Probes						
Number of Motor Buses equipped as probes on freeways?	NR		NR		0	
Number of Motor Buses equipped as probes on arterials?	NR		NR		0	
Have Organized Regional Incident Management Program?	No		Yes		1	
Have Automated Traveler Information System?	No		Yes		1	

Transit Management
Agencies for Metropolitan Area: Denver, Boulder

	Greeley City-The Bus		Regional Transportation District (RTD)		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Services Automated Traveler Info. System Applies:						
Fixed Route	No		Yes		1	
Heavy Rail	No		No		0	
Light Rail	No		Yes		1	
Demand Responsive	No		No		0	
Commuter Rail	No		No		0	
Ferry	No		No		0	
Locations where traveler information is displayed to public						
Number of bus stops on fixed transit routes	NR	NR	NR	NR	0	0
Bus stops on fixed transit routes that display traveler info to the public	NR	NR	NR	NR	0	0
Number of rail stations	NR	NR	NR	NR	0	0
Number of rail stations that display traveler information	NR	NR	NR	NR	0	0
Number of other locations that display traveler information to public	NR	NR	NR	NR	0	0
Number of vehicles the traveler information system has available						
Fixed Route Bus	NR	NR	NR	NR	0	0
Heavy or Rapid Rail	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	0	0
Commuter Rail	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	0	0
Deployment of Communications Technology						
Attributes of Radio System:						
Digital?	No		No		0	
Analog?	Yes		Yes		2	
Trunked?	No		No		0	
Regular?	Yes		Yes		2	
Services that use a Digital or Trunked Radio System						
Digital Only						
Fixed Route Bus	No	No	No	No	0	0
Heavy or Rapid Rail	No	No	No	No	0	0
Light Rail	No	No	No	No	0	0
Demand Responsive	No	No	No	No	0	0
Commuter Rail	No	No	No	No	0	0
Ferry Boat	No	No	No	No	0	0
Trunked Only						
Fixed Route Bus	No	No	No	No	0	0
Heavy or Rapid Rail	No	No	No	No	0	0
Light Rail	No	No	No	No	0	0

Transit Management
Agencies for Metropolitan Area: Denver, Boulder

	Greeley City-The Bus		Regional Transportation District (RTD)		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Demand Responsive	No	No	No	No	0	0
Commuter Rail	No	No	No	No	0	0
Ferry Boat	No	No	No	No	0	0
Have of plan to have Automatic Passenger Counters (APCs)?	No		Yes		1	
Methods used to count passengers						
Treadle Mats	No		No		0	
Infrared Beams	No		No		0	
Primary and Secondary Location Technologies Used						
Primary Technologies						
GPS	No	No	No	No	0	0
Differential GPS	No	No	Yes	No	1	0
Signpost/Odometer	No	No	Yes	No	1	0
Dead_Reckoning	No	No	Yes	No	1	0
LORAN C	No	No	No	No	0	0
Other	No	No	No	No	0	0
Backup Technologies						
GPS	No	No	No	No	0	0
Differential GPS	No	No	No	No	0	0
Signpost/Odometer	No	No	No	No	0	0
Dead_Reckoning	No	No	No	No	0	0
LORAN C	No	No	No	No	0	0
Other	No	No	No	No	0	0
Number of Vehicles with APCs						
Fixed Route Bus	NR	NR	NR	219	0	219
Heavy or Rapid Rail	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	31	0	31
Demand Responsive	NR	NR	NR	NR	0	0
Commuter Rail	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	0	0
Remote Real-Time Monitoring and Computer Assisted Dispatching						
Remote Real-Time Monitoring						
Fixed Route Bus	NR	NR	NR	NR	0	0
Heavy or Rapid Rail	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	0	0
Commuter Rail	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	0	0
Automated Dispatching or Control Software						

Transit Management
Agencies for Metropolitan Area: Denver, Boulder

	Greeley City-The Bus		Regional Transportation District (RTD)		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Fixed Route Bus	NR	NR	945	1,095	945	1095
Heavy or Rapid Rail	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	0	0
Commuter Rail	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	0	0
Coordinate or plan to coordinate travel request and vehicle						
dispatching for multiple agencies?	No		No		0	
Is there or will there be a Transportation Management Center						
(TMC) in the region that controls transit and highway modes?	No		Yes		1	
Modes that TMC currently controls:						
Highways	No	No	Yes	No	1	0
Fixed Route Bus	No	No	No	No	0	0
Heavy or Rapid Rail	No	No	No	No	0	0
Light Rail	No	No	No	No	0	0
Demand Responsive	No	No	No	No	0	0
Commuter Rail	No	No	No	No	0	0
Ferry Boat	No	No	No	No	0	0
Other	No	No	No	No	0	0
Priority at Traffic Signals and Ramp Meter Priority						
Priority at Traffic Signals						
Fixed Route Bus	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	0	0
Ramp Meter Priority						
Fixed Route Bus	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	0	0
Number of Vehicles Equipped with Navigation Aids						
Fixed Route Bus	NR	NR	NR	NR	0	0
Heavy or Rapid Rail	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	0	0
Demand Responsive	NR	6	NR	NR	0	6
Commuter Rail	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	0	0
ITS Standards Used Related to Transit Management						
TCIP On Boad Objects (TCIP-OB)	No		No		0	

Transit Management
Agencies for Metropolitan Area: Denver, Boulder

	Greeley City-The Bus		Regional Transportation District (RTD)		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
TCIP Traffic Management Objects (TCIP-TM)	No		No		0	
TCIP Common Public Transportation Objects (TCIP-CPT)	No		No		0	
TCIP Passenger Information Objects (TCIP-PI)	No		Yes		1	
TCIP Incident Management Objects (TCIP-IM)	No		No		0	
TCIP Fare Collection Objects (TCIP-FC)	No		Yes		1	
TCIP Spatial Representation Objects (TCIP-SP)	No		No		0	
TCIP Control Center Objects (TCIP-CC)	No		No		0	
TCIP Scheduling/Runcutting Objects (TCIP-SCH)	No		No		0	
Send data communication between micro computer and heavy duty vehicle applications (SAE J1708)	No		No		0	
Would agency be willing to participate in testing of ITS Standards?	No		Yes		1	
Have agreements in place with other agencies to use similar hardware and software to aid maintenance and interoperability?	No		Yes		1	
Electronic Fare Payment						
Have full operational Electronic Fare Payment System?	No		Yes		1	
Methods of Fare Payment						
Stored value card with fare deducted for each trip						
Magnetic Stripe	No		No		0	
Smart Card	No		No		0	
Debit Card	No		No		0	
Billed by the month for trips taken						
Magnetic Stripe	No		No		0	
Smart Card	No		No		0	
Credit Card	No		No		0	
Monthly Pass						
Magnetic Stripe	No		No		0	
Smart Card	No		No		0	
Vehicles/Stations Equipped with Automated Payment Mechanism						
Magnetic Stripe Readers						
Fixed Route Bus Vehicles	NR	NR	NR	NR	0	0
Heavy or Rapid Rail Stations	NR	NR	NR	NR	0	0
Light Rail Stations	NR	NR	NR	NR	0	0
Demand Responsive Vehicles	NR	NR	NR	NR	0	0
Commuter Rail Stations	NR	NR	NR	NR	0	0
Ferry Boat Landings	NR	NR	NR	NR	0	0
Smart Card Readers						
Fixed Route Bus Vehicles	NR	NR	NR	NR	0	0
Heavy or Rapid Rail Stations	NR	NR	NR	NR	0	0
Light Rail Stations	NR	NR	NR	NR	0	0

Transit Management
Agencies for Metropolitan Area: Denver, Boulder

	Greeley City-The Bus		Regional Transportation District (RTD)		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Demand Responsive Vehicles	NR	NR	NR	NR	0	0
Commuter Rail Stations	NR	NR	NR	NR	0	0
Ferry Boat Landings	NR	NR	NR	NR	0	0
Credit Card						
Fixed Route Bus Vehicles	NR	NR	NR	NR	0	0
Heavy or Rapid Rail Stations	NR	NR	NR	NR	0	0
Light Rail Stations	NR	NR	NR	NR	0	0
Demand Responsive Vehicles	NR	NR	NR	NR	0	0
Commuter Rail Stations	NR	NR	NR	NR	0	0
Ferry Boat Landings	NR	NR	NR	NR	0	0
Debit Card						
Fixed Route Bus Vehicles	NR	NR	NR	NR	0	0
Heavy or Rapid Rail Stations	NR	NR	NR	NR	0	0
Light Rail Stations	NR	NR	NR	NR	0	0
Demand Responsive Vehicles	NR	NR	NR	NR	0	0
Commuter Rail Stations	NR	NR	NR	NR	0	0
Ferry Boat Landings	NR	NR	NR	NR	0	0
NR: No Response						

Appendix J
Transit Management Integration

Transit Management Integration
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Greeley City-The Bus		Regional Transportation District (RTD)	
	1999	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes	
Transit operators in the region that use the same electronic payment system	None listed		None listed	
Toll operators from whom you accept electronic payment of transit				
fare through the use of ETC media	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				
Receive Information	None listed	None listed	None listed	Colorado Department of Transportation
Share Infrastructure	None listed	None listed	Colorado Department of Transportation	None listed
Arterial Management agencies from which your agency receives				
arterial travel times, speeds, and conditions				
Receive Information	None listed	None listed	None listed	Aurora City, Denver City, DIA, Denver County, Colorado Department of Transportation
Share Infrastructure	None listed	None listed	Aurora City, Denver City, DIA, Denver County, Colorado Department of Transportation	None listed
Incident Management agencies from which your agency receives				
incident severity, location, and type				
Receive Information	None listed	None listed	None listed	Colorado Department of Transportation
Share Infrastructure	None listed	None listed	Colorado Department of Transportation	None listed

Appendix K
Transit Management Information Collection and Dissemination

Data Collection and Dissemination: Transit Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Greeley City-The Bus		Regional Transportation District (RTD)	
	1999	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes	
Methods used to disseminate transit information to the public				
Technologies your agency uses to disseminate:				
Transit routes, schedules and fares	NR	NR	Kiosks, Internet Web Sites, Telephone System	NR
Real-time transit schedule adherence or arrival and departure times	NR	NR	Kiosks, Internet Web Sites, Telephone System	NR
Technologies employed by other organization receiving your data				
Transit routes, schedules and fares	NR	NR	NR	NR
Real-time transit schedule adherence or arrival and departure times	NR	NR	Kiosks, Internet Web Sites	NR
Internet web site reporting transit routes, schedules and fare, etc.	NR		www.rtd-denver.com	
Telephone system for reporting transit information to the public	NR		303-299-6000	
Organizations your agency sends information for dissemination to the public	NR		CDOT	
Data collected, archived, and/or transferred to another agency				
Collected by your agency	NR	NR	Scheduled roadway work zones for transit, Transit operations coordination information, Weather conditions, Incidents, Road conditions, Passenger information (e.g., surveys, O/D), Vehicle time and location	NR
Archived by your agency	NR	NR	Transit operations coordination information, Weather conditions, Incidents, Road conditions, Passenger information (e.g., surveys, O/D), Vehicle time and location	NR
Transferred to another agency by your agency	NR	NR	Vehicle time and location	NR
Importance of making information available to the public				

Data Collection and Dissemination: Transit Management
Agencies for Metropolitan Area: Denver, Boulder

Agency Name	Greeley City-The Bus		Regional Transportation District (RTD)	
	1999	**2005**	**1999**	**2005**
Ranked High	NR		Weather conditions, Incidents, Road conditions, Vehicle time and location	
Ranked Medium	NR		Transit operations coordination information, Passenger information (e.g., surveys, O/D)	
Ranked Low	NR		NR	
Groups that make requests for the data	NR		Lawyers/Court, Advanced Traveler Information Systems (ATIS) providers, Consultants, Federal DOT personnel, State DOT personnel, Universities	
What is the data used for?	NR		Court and Lawsuits, Accident prediction models, Roadway impact analysis, Traffic analysis	

Appendix L
Emergency Management

Emergency Management Agencies for Metropolitan Area: Denver, Boulder

	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			
Aurora Fire Department	37	43	0	0	0	43	37	43	31	40	31	40	Yes	Yes	None listed
Boulder Fire Department	20	21	0	21	0	21	20	21	0	21	13	13	Yes	Yes	Colorado State Division of Public Safety
Denver City Fire Department	50	53	0	NR	0	NR	0	53	0	NR	50	53	No	No	None listed
Denver City Police Department	380	400	0	0	0	0	380	400	380	400	0	0	Yes	No	None listed
Thornton Police Department	34	40	0	0	0	0	0	0	0	0	0	0	No	No	None listed
Westminster Fire Department	17	18	0	0	0	0	17	18	0	0	15	16	Yes	Yes	None listed

Appendix M
Electronic Toll Collection

Electronic Toll Collection
Agencies for Metropolitan Area: Denver, Boulder

	E-470 Public Highway Authority	
	1999	**2005**
Agency Returned Survey?	Yes	
Number of toll Collection Plazas operated	4	5
Number of toll collection plazas with dedicated ETC	4	5
Number of toll collection plazas with both manual and ETC	4	5
Number of toll collection lanes operated	60	81
Number of toll collection lanes with dedicated ETC	60	81
Number of toll collection lanes with both manual and ETC	60	81
Number of toll collection tags issued	38,500	200,000
Antennae Location Technologies		
In-Pavement?	No	
Focused Beam?	Yes	
Distributed Overhead?	No	
In-Vehicle Equipment Technologies		
Tag-based?	Yes	
Integrated circuit card-based?	No	
Are toll tags used by other toll operations in metro area?	No	
List of toll operators that use tags	None	
Are toll tags used by operators of public transit to pay transit fares		
in metro area?	Yes	
List of transit operators that use tags	Regional Transportation District	
_____		
NR: No Response		