Tracking the Deployment of the Integrated Metropolitan ITS Infrastructure in Charlotte, Gastonia, Rock Hill

FY99 Results

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Part 1 - Background and Purpose

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

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

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

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

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

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

the methodology are explained elsewhere.[3]

During the summer and fall of 1999, the U.S. DOT undertook a new data collection effort for the purpose of examining ITS deployment progress in the nation's largest metropolitan areas. The Charlotte, Gastonia, Rock Hill 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 Charlotte, Gastonia, Rock Hill region was 100% in 1997 and 95% in 1999.

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

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

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

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

Part 2 - Summary 1999 Survey Results

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

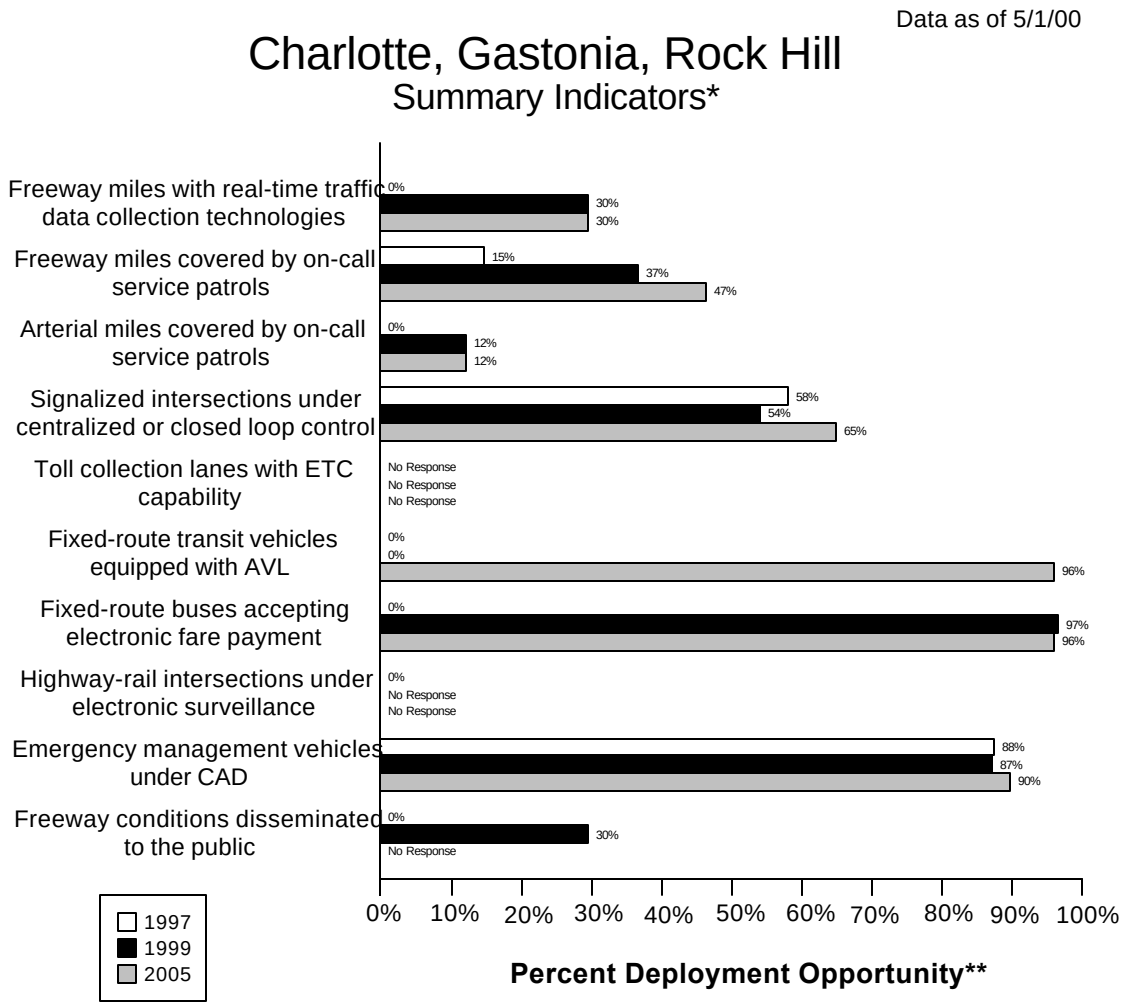
The following two figures portray the surrogate indicators for each of the nine components in Charlotte, Gastonia, Rock Hill and the same indicators at the national level. These are judged to be the single best representative of a component and are being used as summary indicator for component. The summary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

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

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

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

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

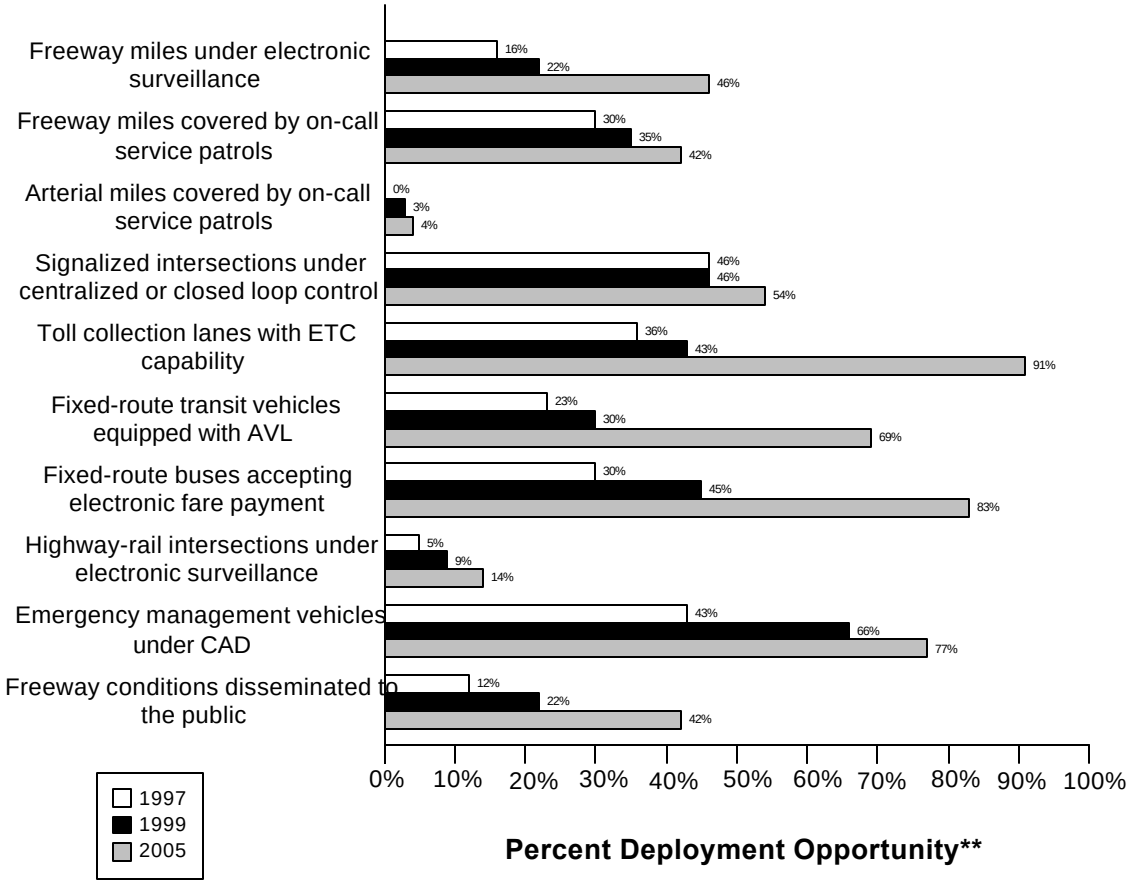


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Data as of 5/1/00

National

Summary Indicators*



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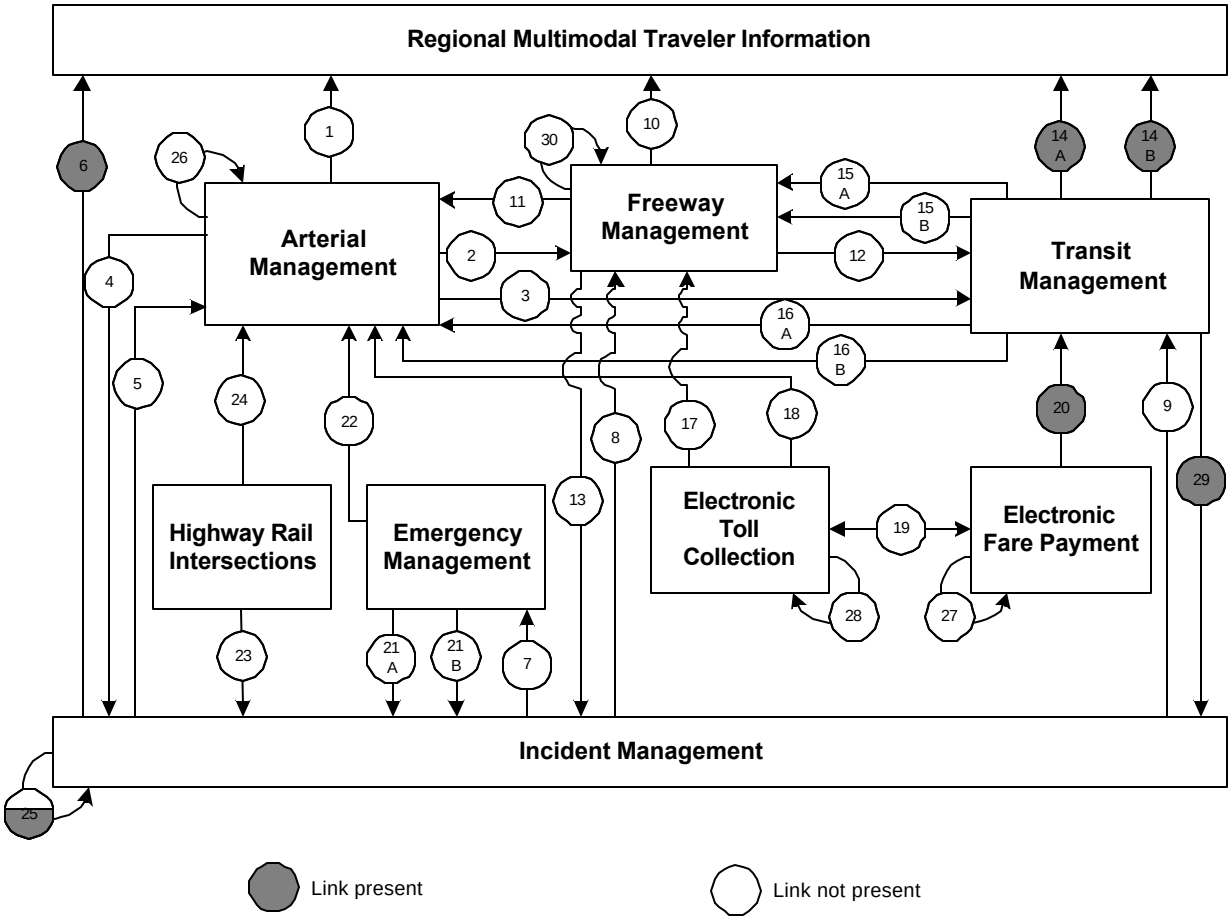
Charleston Integration Links



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

Link	Description	Link	Description
11	Freeway Management to Arterial Management	12	Freeway Management to Transit Management
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 Charlotte, Gastonia, Rock Hill 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

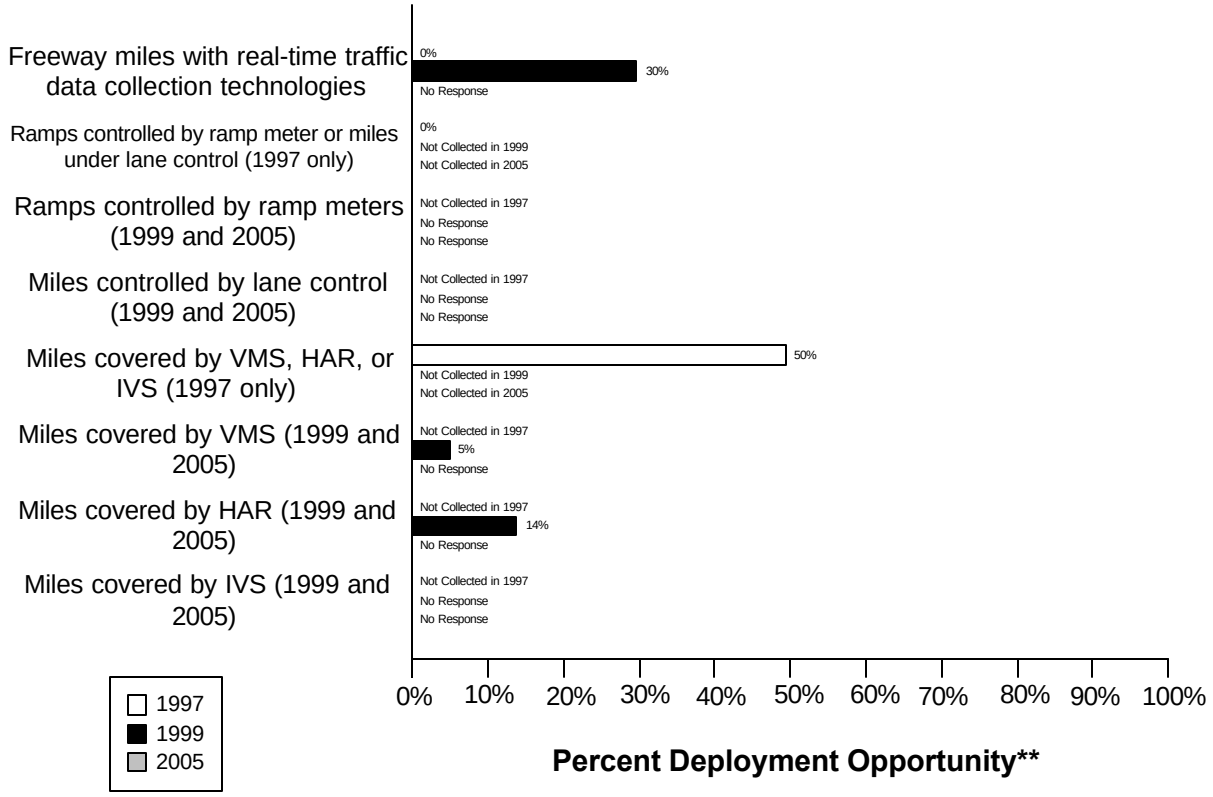
Consider a metropolitan area with three arterial management agencies. One out of three provides information to the public using a Regional Multimodal Traveler Information Media (e.g., internet, kiosk, pager, etc...). The integration indicator is 1/3 or 33%.

Freeway Management Component Indicators

Data as of 5/1/00

Charlotte, Gastonia, Rock Hill

Freeway Management*



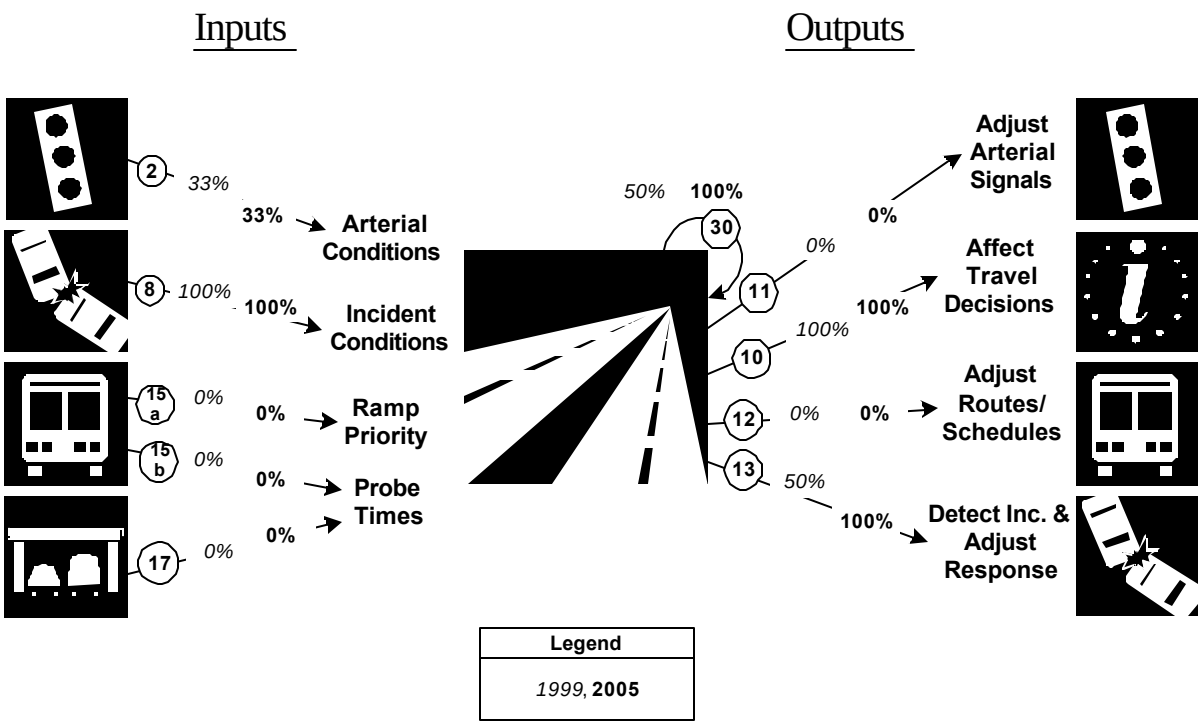
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway centerline miles are under electronic surveillance for monitoring traffic flow	0	101	0%	30	101	30%		101	
Freeway entrance ramps are controlled by ramp meters or miles under lane control	0	101	0%						

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway entrance ramps are controlled by ramp meters					238			238	
Freeway centerline miles will be controlled by lane control					101			101	
Freeway miles are covered by VMS, HAR, or IVS	50	101	50%						
Freeway miles are covered by VMS				5	101	5%		101	
Freeway miles are covered by HAR				14	101	14%		101	
Freeway miles are covered by IVS					101			101	

Freeway Management Integration Indicators

Charlotte, Gastonia, Rock Hill
Freeway Management Integration*



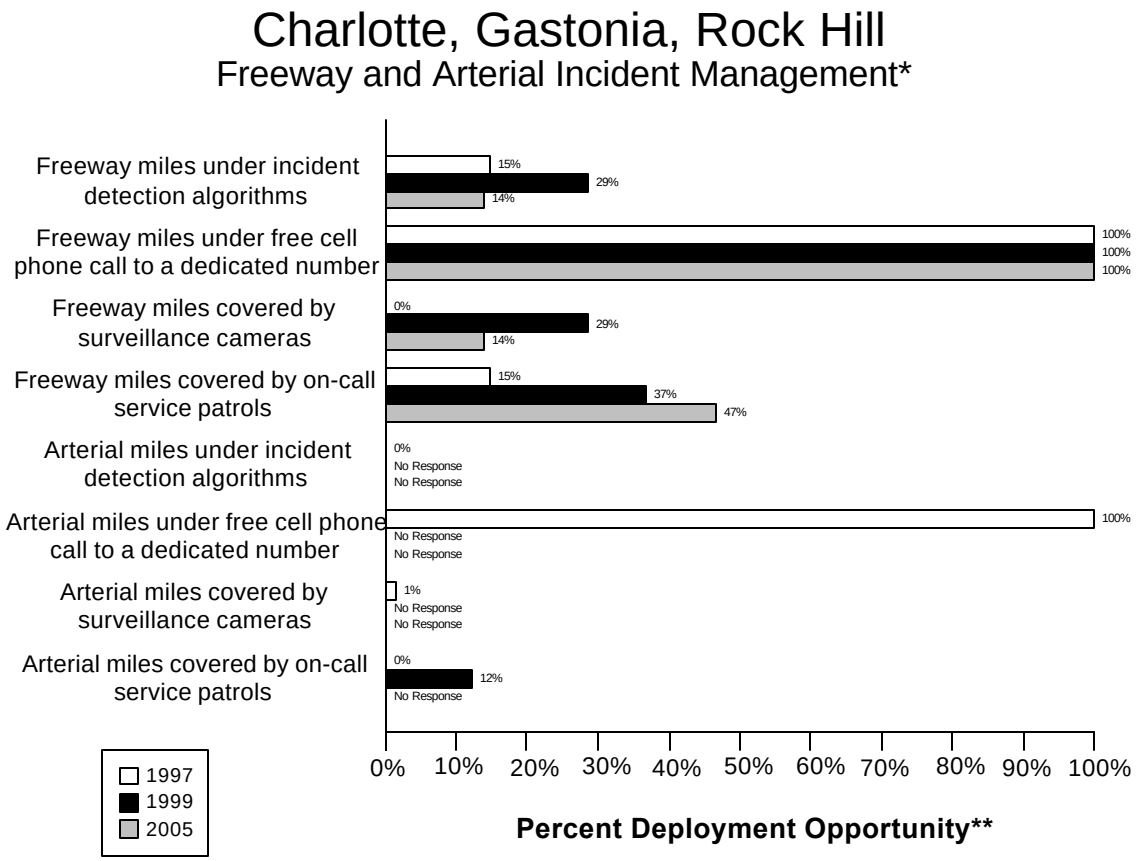
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
2. Arterial Management agencies sending information to Freeway Management	(1/ 3) 33%	(1/ 3) 33%
8. Incident Management agencies sending information to Freeway Management	(2/ 2) 100%	(2/ 2) 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/ 2) 0%	(0/ 2) 0%
30. Freeway Management agencies sending information to another Freeway Management agency	(1/ 2) 50%	(2/ 2) 100%
11. Freeway Management agencies sending information to Arterial Management	(0/ 2) 0%	(0/ 2) 0%

Link Description	1999	2005
10. Freeway Management agencies disseminating freeway conditions to the public	(2/ 2) 100%	(2/ 2) 100%
12. Freeway Management agencies sending freeway conditions to Transit Management	(0/ 2) 0%	(0/ 2) 0%
13. Freeway Management agencies sending freeway conditions to Incident Management	(1/ 2) 50%	(2/ 2) 100%

Incident Management Component Indicators

Data as of 5/1/00



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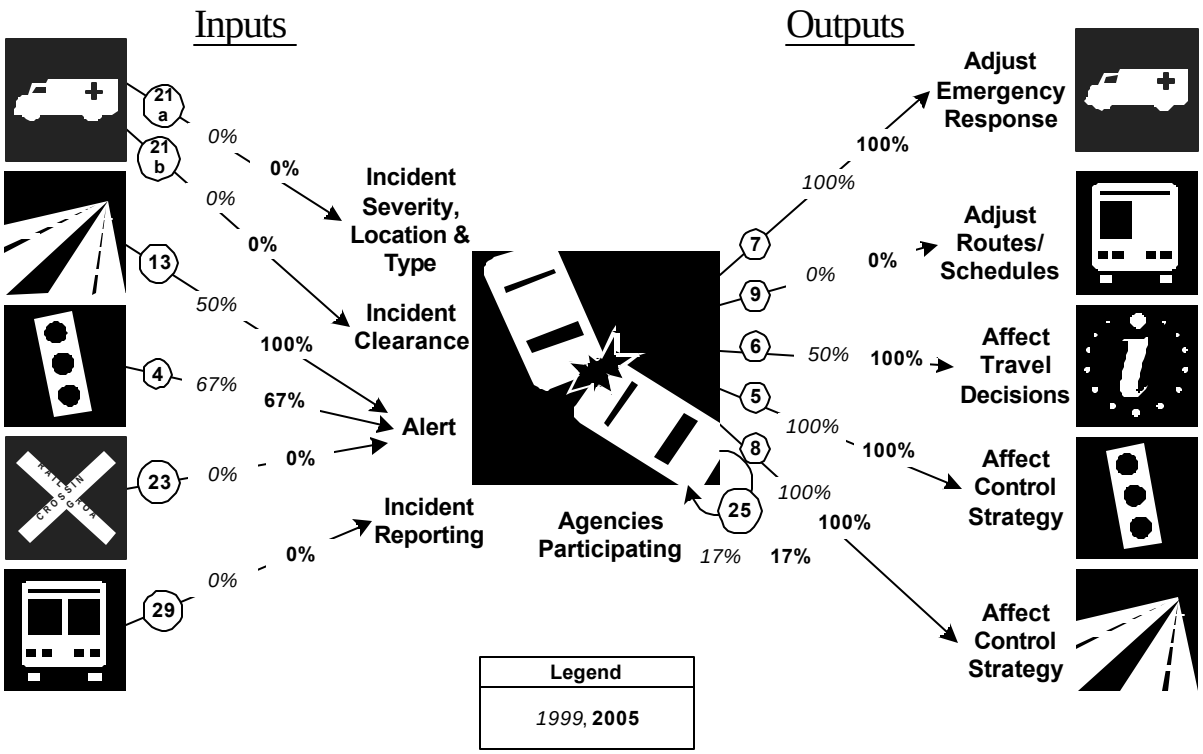
	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Freeway miles are covered by incident detection algorithms	15	101	15%	29	101	29%	14	101	14%
Freeway miles are covered by free cellular phone calls to a dedicated number	101	101	100%	101	101	100 %	101	101	100%
Freeway miles are covered by surveillance cameras.	0	101	0%	29	101	29%	14	101	14%

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway miles are covered by on-call publicly-sponsored service patrol or towing services.	15	101	15%	37	101	37%	47	101	47%
Arterial miles are covered by incident detection algorithms	0	410	0%		410			410	
Arterial miles are covered by free cellular phone calls to a dedicated number	410	410	100%		410			410	
Arterial miles are covered by surveillance cameras	6	410	1%		410			410	
Arterial miles are covered by on-call publicly-sponsored service patrol or towing services	0	410	0%	50	410	12%		410	

Incident Management Integration Indicators

Charlotte, Gastonia, Rock Hill

Incident Management Integration*



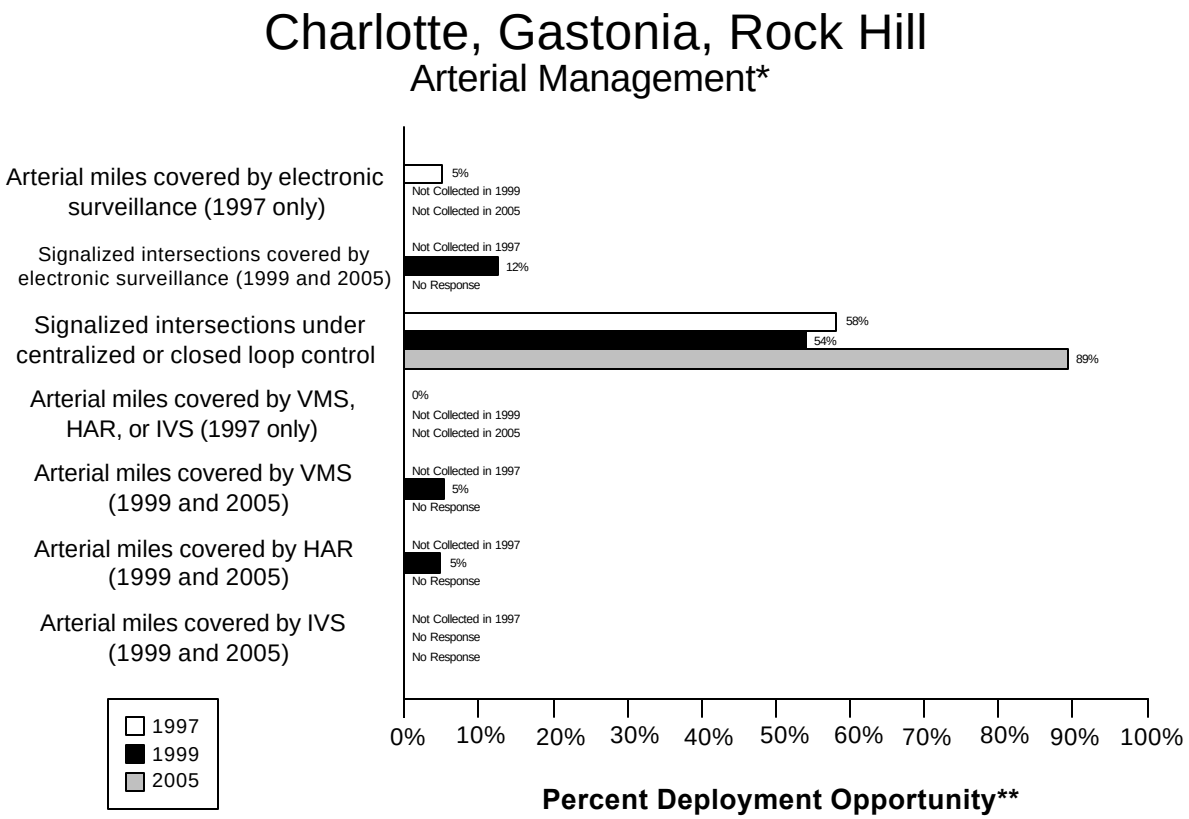
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
21a. Incident management agencies receiving incident severity from Emergency Management	(0/ 2) 0%	(0/ 2) 0%
21b. Incident management agencies receiving incident clearance activities from Emergency Management	(0/ 2) 0%	(0/ 2) 0%
13. Freeway Management agencies sending freeway conditions to Incident Management	(1/ 2) 50%	(2/ 2) 100%
4. Arterial Management agencies sending arterial conditions to Incident Management	(2/ 3) 67%	(2/ 3) 67%
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(0/ 3) 0%	(0/ 3) 0%
29. Transit Management agencies report traffic incidents as part of an organized regional incident management program	(0/ 2) 0%	(0/ 2) 0%

Link Description	1999	2005
7. Incident management agencies transfer information describing incident severity, location, and type to Emergency Management agencies	(2/ 2) 100%	(2/ 2) 100%
9. Incident Management agencies transfer information describing incident severity, location, and type to Transit Management agencies	(0/ 2) 0%	(0/ 2) 0%
6. Incident Management agencies disseminate information describing incident severity, location, and type to the public	(1/ 2) 50%	(2/ 2) 100%
5. Incident Management agencies transfer information describing incident severity, location, and type to Arterial Management agencies	(2/ 2) 100%	(2/ 2) 100%
8. Incident Management agencies transfer information describing incident severity, location, and type to Freeway Management agencies	(2/ 2) 100%	(2/ 2) 100%
25. Police, fire, and EMS agencies participating in a formal incident management plan/team	(2/ 12) 17%	(2/ 12) 17%

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.

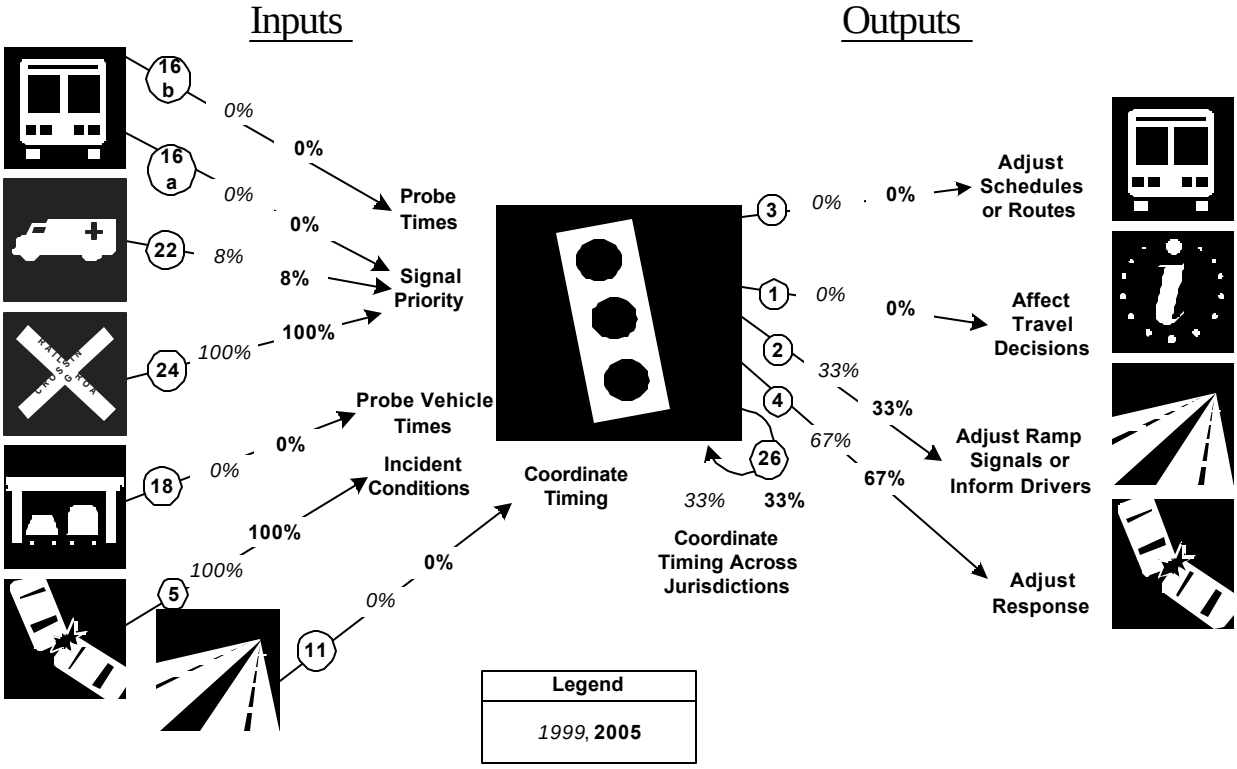
	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles covered by electronic surveillance	21	410	5%						
Signalized intersections are covered by electronic surveillance for monitoring traffic flow				108	865	12%		700	
Signalized intersections are under centralized or closed loop control	499	857	58%	467	865	54%	625	700	89%

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles are covered by VMS, HAR, or IVS	0	410	0%						
Arterial miles are covered by VMS				22	410	5%		410	
Arterial miles are covered by HAR				20	410	5%		410	
Arterial miles are covered by IVS					410			410	

Arterial Management Integration Indicators

Charlotte, Gastonia, Rock Hill

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	(1/ 12) 8%	(1/ 12) 8%
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	(3/ 3) 100%	(3/ 3) 100%
18. Number of Arterial Management agencies receiving information from vehicle probes	(0/ 3) 0%	(0/ 3) 0%
5. Incident Management agencies transfer information describing incident severity, location, and type to Arterial Management	(2/ 2) 100%	(2/ 2) 100%

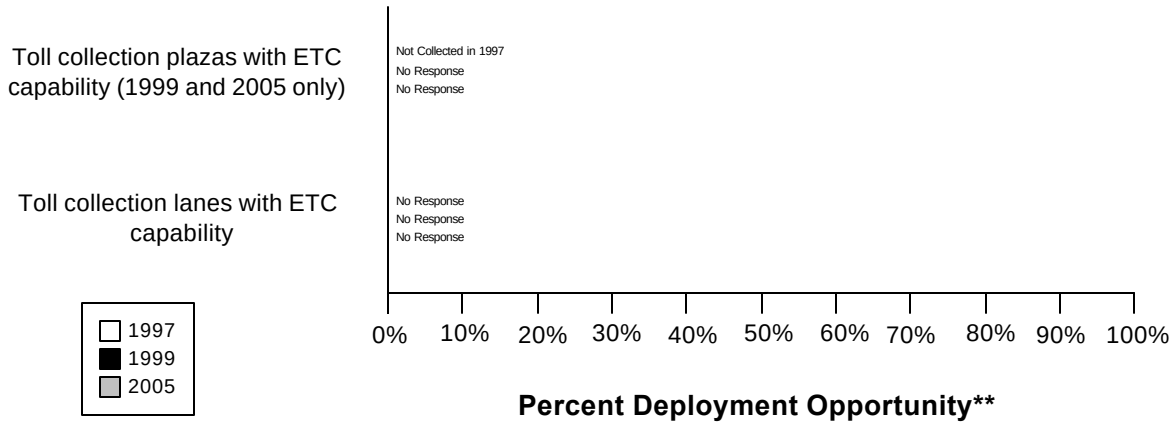
Link Description	1999	2005
11. Freeway Management agencies transfer freeway travel times, speeds, and conditions to Arterial Management agencies	(0/ 2) 0%	(0/ 2) 0%
3. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Transit Management	(0/ 3) 0%	(0/ 3) 0%
1. Arterial Management agencies disseminate arterial travel times, speeds, and conditions to the public	(0/ 3) 0%	(0/ 3) 0%
2. Arterial Management agencies send traffic condition information to Freeway Management	(1/ 3) 33%	(1/ 3) 33%
4. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Incident Management	(2/ 3) 67%	(2/ 3) 67%
26. Arterial Management agencies under cooperative agreement to share traffic signal timing for coordinated response	(1/ 3) 33%	(1/ 3) 33%

Electronic Toll Collection Component Indicators

Data as of 5/1/00

Charlotte, Gastonia, Rock Hill

Electronic Toll Collection*



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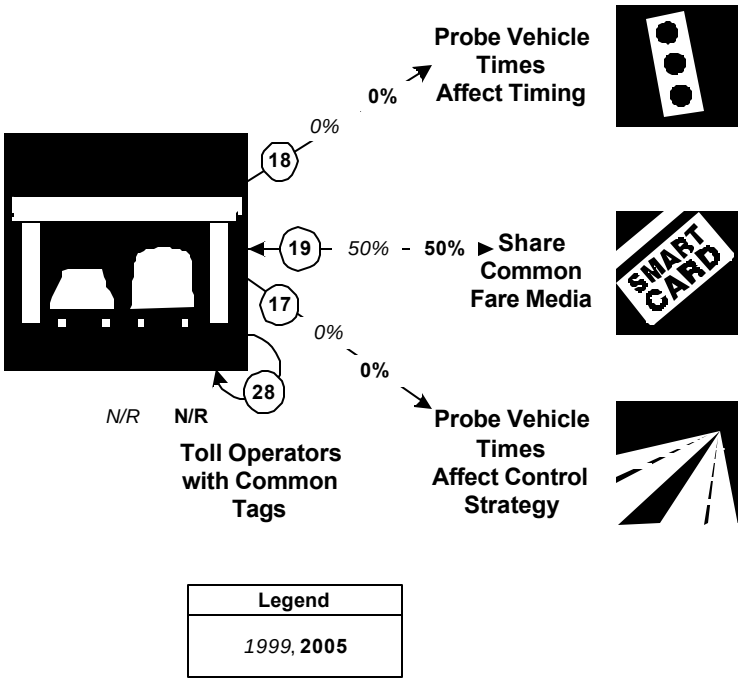
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

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

Electronic Toll Collection Integration Indicators

Charlotte, Gastonia, Rock Hill
Electronic Toll Collection Integration*

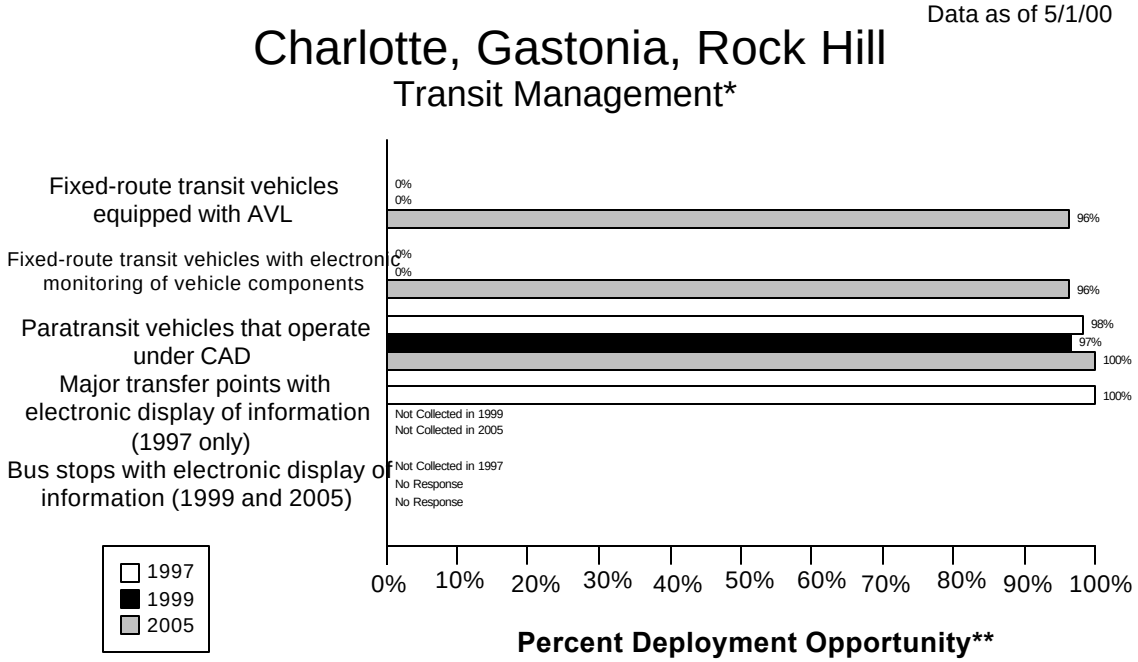


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
18. Number of Arterial Management agencies receiving information from vehicle probes	(0/ 3) 0%	(0/ 3) 0%
19. Transit agencies that accept electronic payment through the use of electronic toll collection media	(1/ 2) 50%	(1/ 2) 50%
17. Freeway Management agencies receiving information from vehicle probes	(0/ 2) 0%	(0/ 2) 0%
28. Toll operators using common toll tag technology	(0/)	(0/)

Transit Management Component Indicators

Data as of 5/1/00



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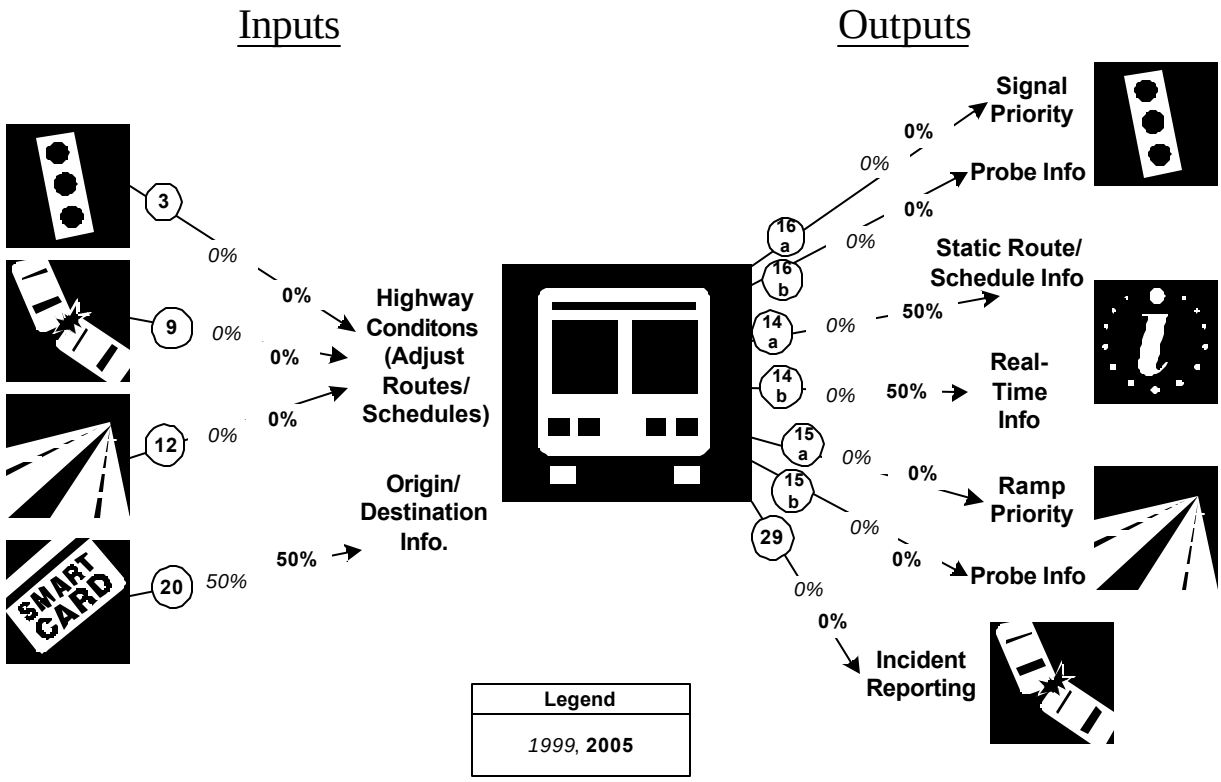
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles are equipped with AVL	0	166	0%	0	179	0%	200	208	96%
Fixed-route transit vehicles are equipped with electronic monitoring of vehicle component	0	166	0%	0	179	0%	200	208	96%
Paratransit vehicles operate under computer-aided dispatch	58	59	98%	58	60	97%	3	3	100%
Percent fixed-route transfer locations with electronic display of information	1	1	100%						
Bus stops display information to the public									

Transit Management Integration Indicators

Charlotte, Gastonia, Rock Hill
Transit Management Integration*



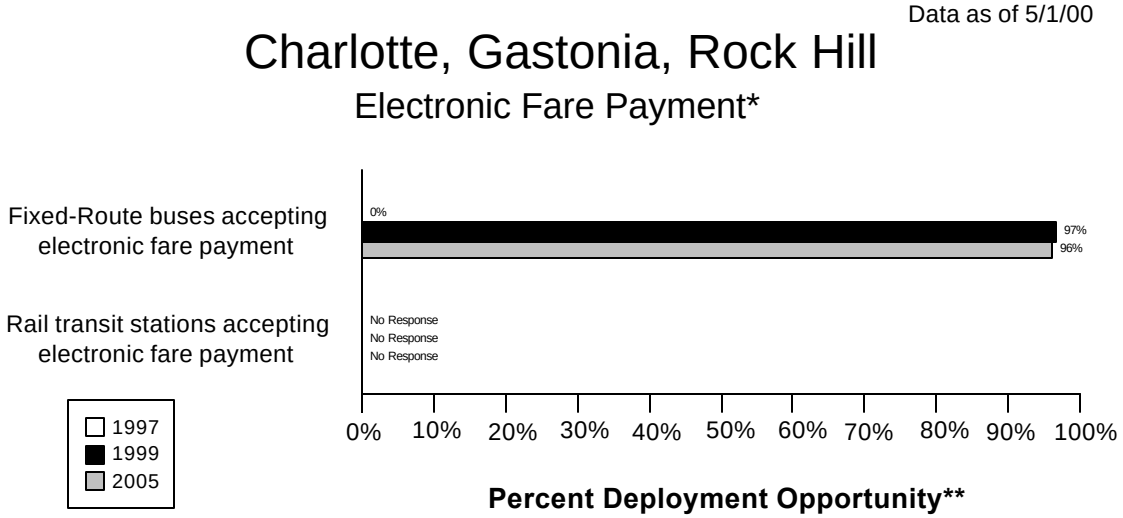
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

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

Link Description	1999	2005
14b. Transit Management agencies disseminate information describing schedule/route adherence to travelers	(0/ 2) 0%	(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	(0/ 2) 0%	(0/ 2) 0%

Electronic Fare Payment Component Indicators

Data as of 5/1/00



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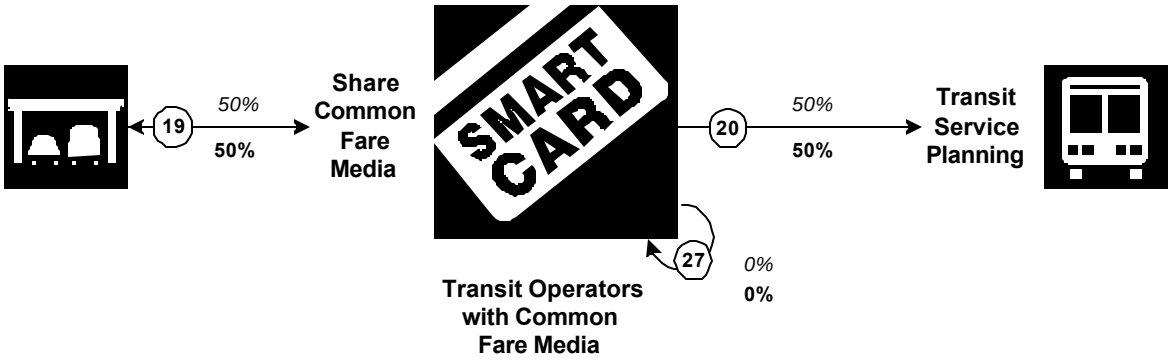
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles that accept electronic payment	0	166	0%	173	179	97%	200	208	96%
Rail transit stations that accept electronic payment	0	0							

Electronic Fare Payment Integration Indicators

Charlotte, Gastonia, Rock Hill
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

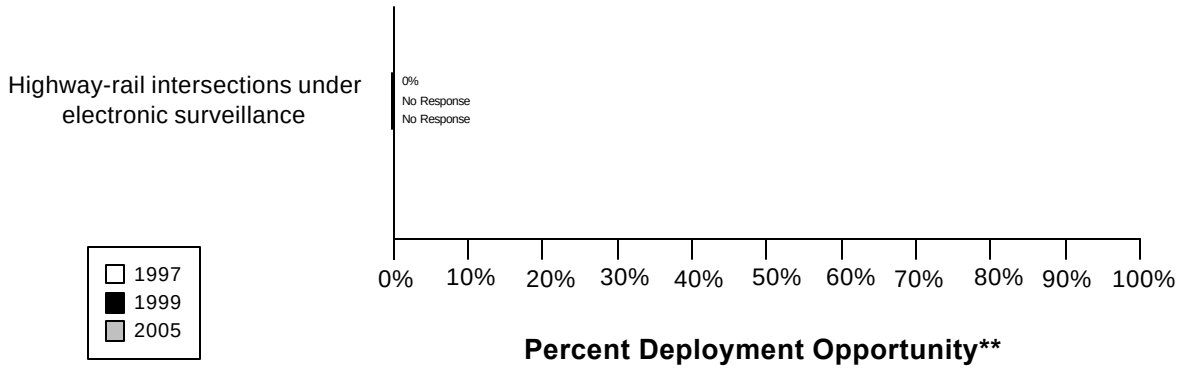
Link Description	1999	2005
19. Transit agencies that accept electronic payment through the use of electronic toll collection media	(1/ 2) 50%	(1/ 2) 50%
20. Transit Management agencies use Electronic Fare Payment data in transit service planning	(1/ 2) 50%	(1/ 2) 50%
27. Transit Management agencies that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

Highway Rail Intersection Component Indicators

Data as of 5/1/00

Charlotte, Gastonia, Rock Hill

Highway-Rail Intersections*



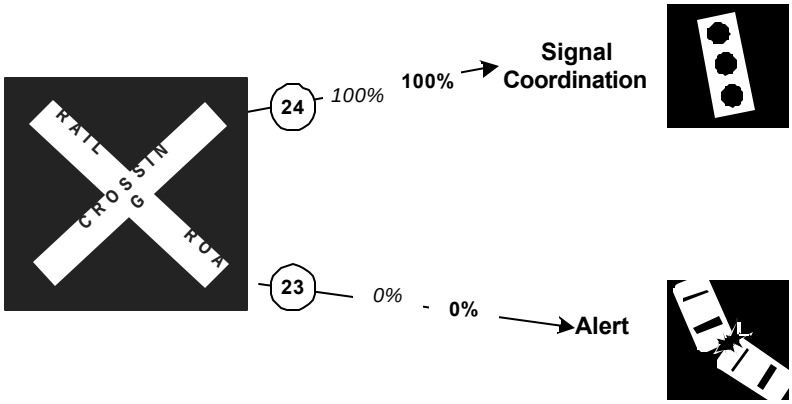
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Highway-rail intersections are under electronic surveillance	0	20	0%		0			0	

Highway Rail Intersection Integration Indicators

Charlotte, Gastonia, Rock Hill
Highway Rail Intersections Integration*

Inputs Outputs



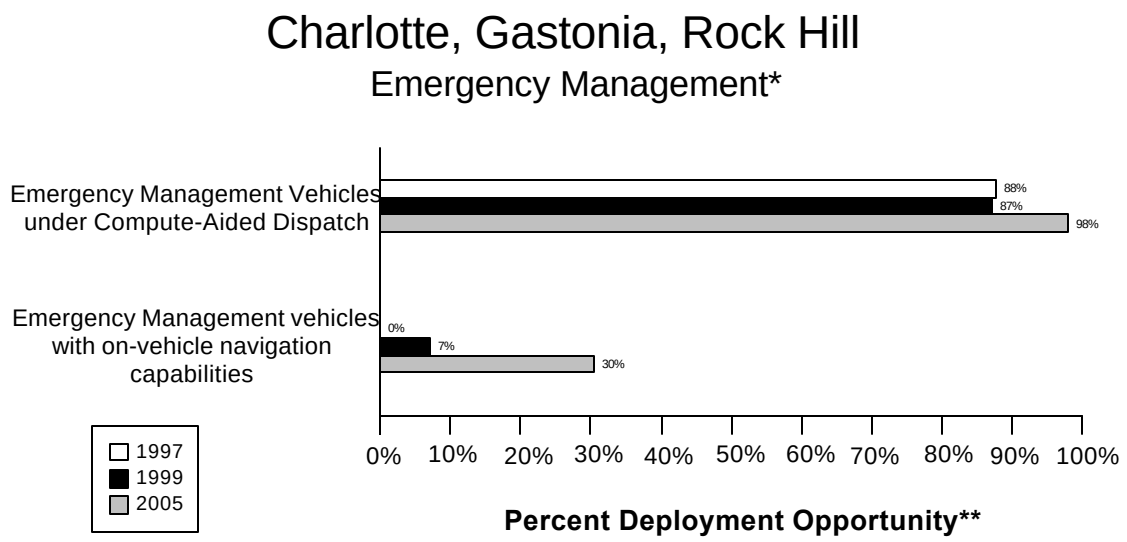
Legend
1999, **2005**

* 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	(3/ 3) 100%	(3/ 3) 100%
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(0/ 3) 0%	(0/ 3) 0%

Emergency Management Component Indicators

Data as of 5/1/00



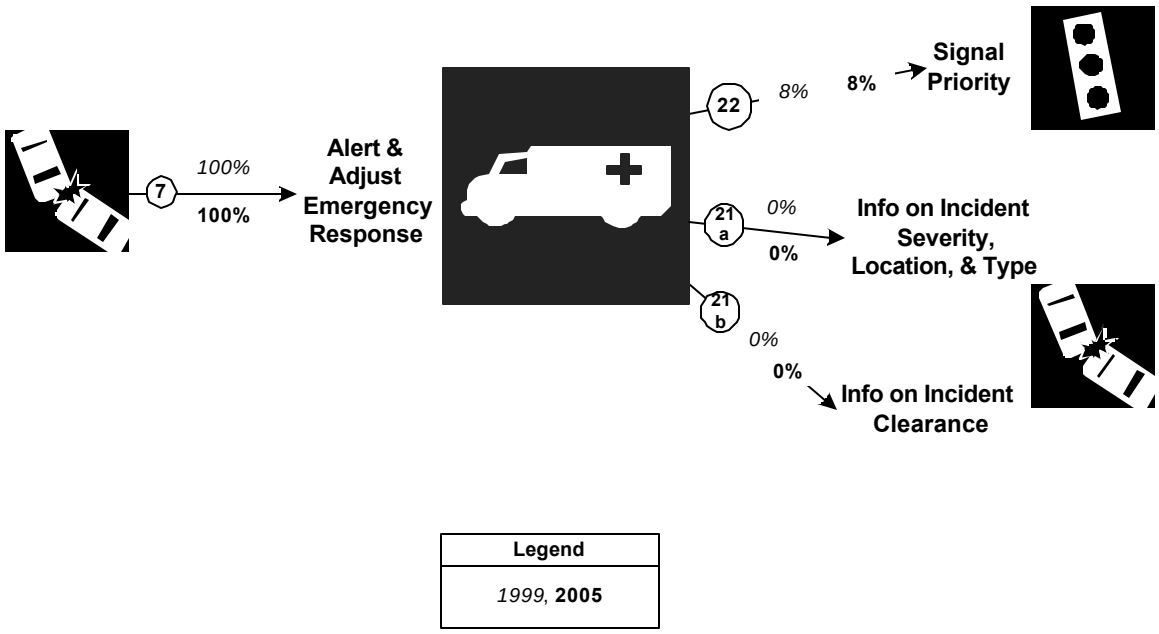
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

	1997			1999			2005		
Description	Num	Den	%	Num	Den	%	Num	Den	%
Public sector emergency vehicles that operate under computer-aided dispatch	827	944	88%	982	1126	87%	1159	1182	98%
Public sector emergency vehicles that have in-vehicle route guidance capability	0	944	0%	80	1126	7%	360	1182	30%

Emergency Management Integration Indicators

Charlotte, Gastonia, Rock Hill
Emergency Management Integration*

Inputs Outputs



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

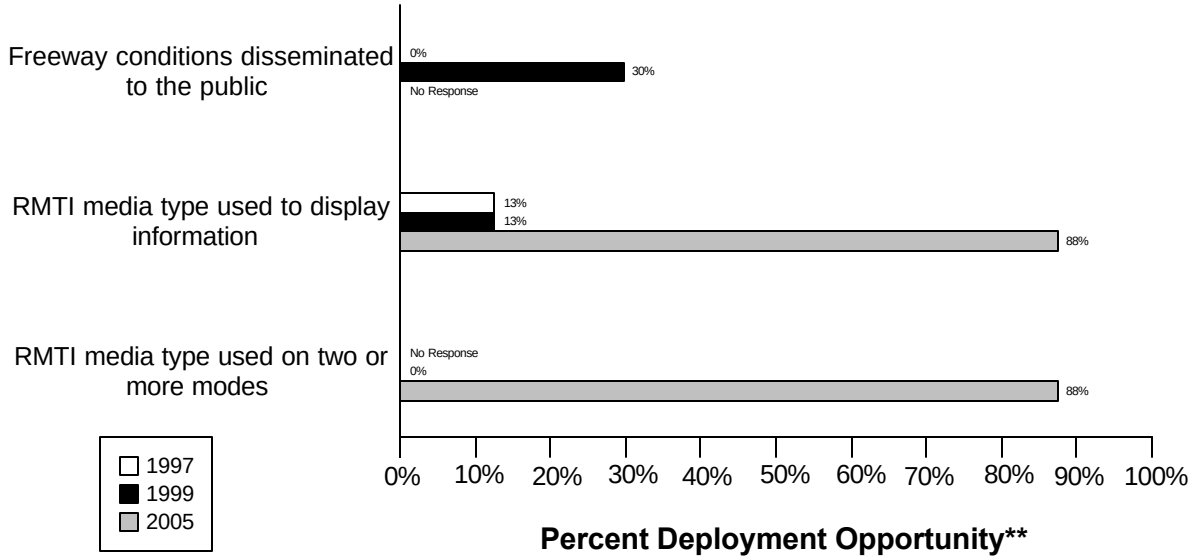
Link Description	1999	2005
7. Freeway Management agencies transfer information describing incident severity, location, and type to Emergency Management agencies	(2/ 2) 100%	(2/ 2) 100%
22. Emergency Management agencies have vehicles equipped with traffic signal preemption capability	(1/ 12) 8%	(1/ 12) 8%
21a. Freeway Management agencies receive incident severity, location, and type data from Emergency Management agencies	(0/ 2) 0%	(0/ 2) 0%
21b. Freeway Management agencies receive incident clearance activities information from Emergency Management agencies	(0/ 2) 0%	(0/ 2) 0%

Regional Multimodal Traveler Information Component Indicators

Data as of 5/1/00

Charlotte, Gastonia, Rock Hill

Regional Multimodal Traveler Information*

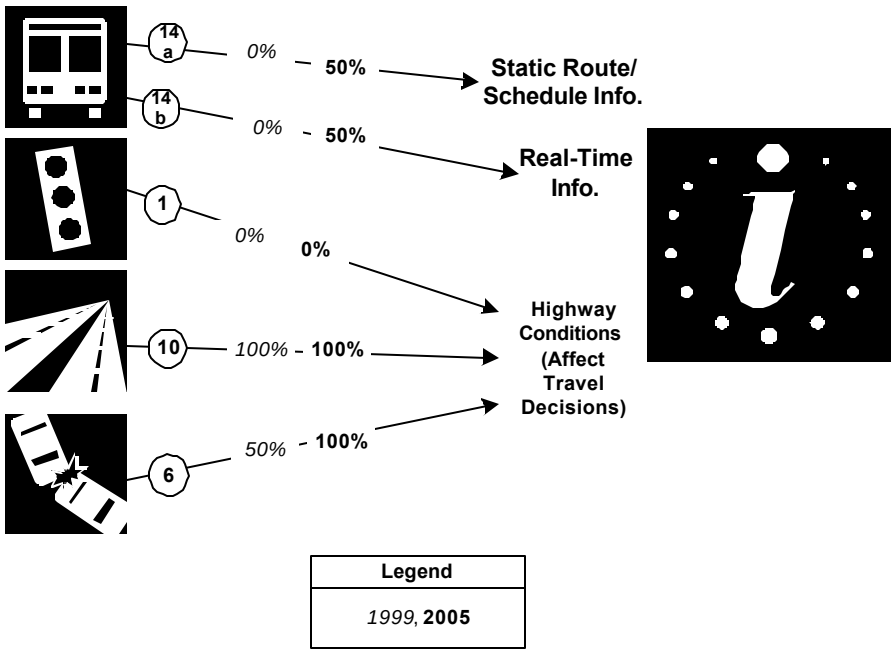


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway conditions disseminated to travelers	0	101	0%	30	101	30%		101	
Possible RMTI media types are used to display information to travelers	1	8	13%	1	8	13%	7	8	88%
Possible RMTI media are used to display information on *two or more modes* to travelers				0	8	0%	7	8	88%

Regional Multimodal Traveler Information Integration Indicators

Charlotte, Gastonia, Rock Hill
Regional Multimodal Traveler Information Integration*

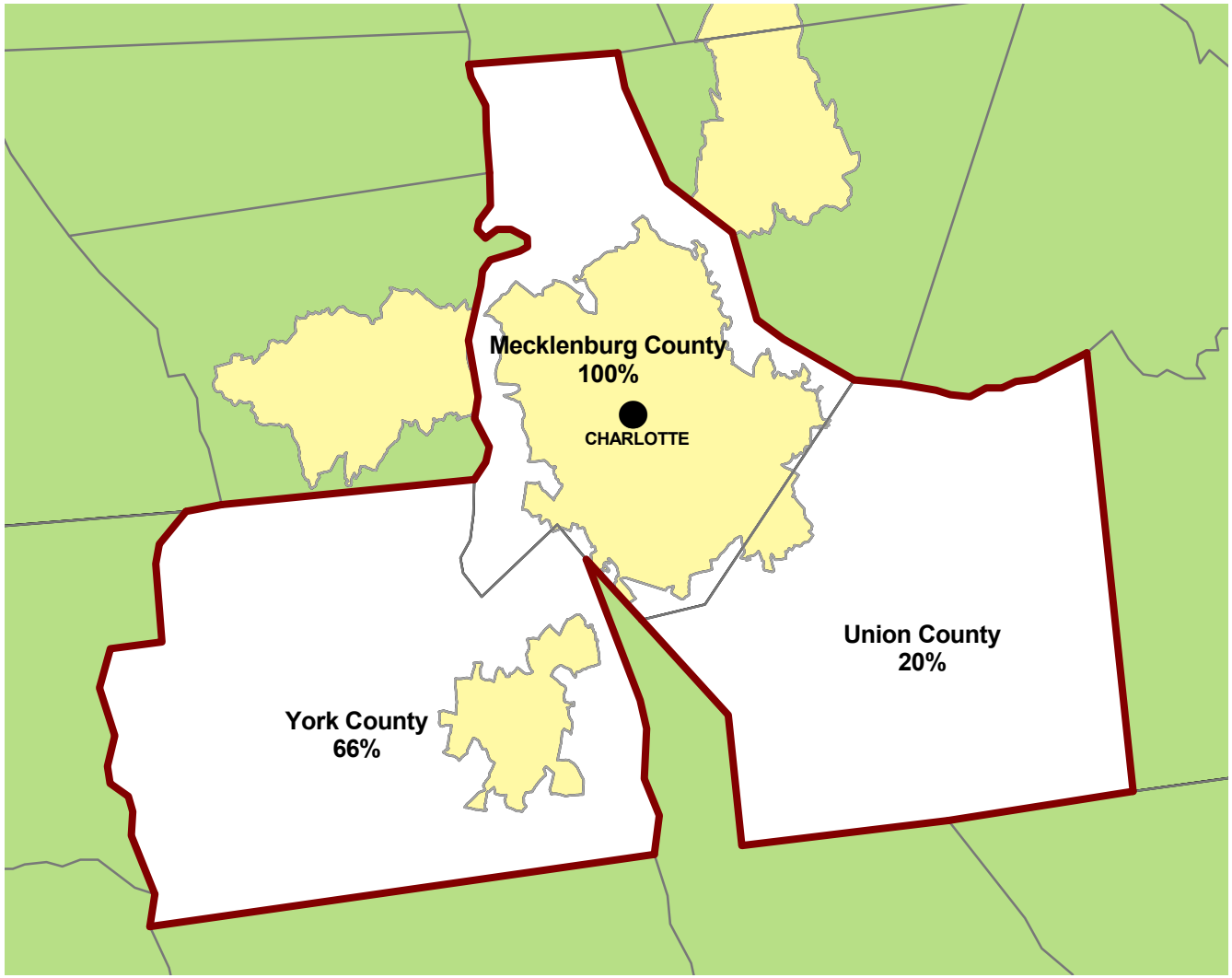


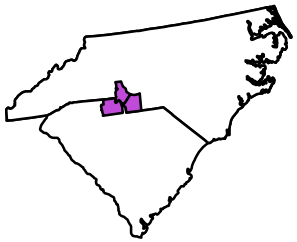
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
14a. Transit Management agencies that disseminate information describing transit routes, schedules, and fares to travelers	(0/ 2) 0%	(1/ 2) 50%
14b. Transit Management agencies that disseminate information describing schedule/route adherence to travelers	(0/ 2) 0%	(1/ 2) 50%
1. Arterial Management agencies that disseminate arterial travel times, speeds, and conditions to the public	(0/ 3) 0%	(0/ 3) 0%
10. Freeway Management agencies that disseminate freeway travel times, speeds, and conditions to travelers	(2/ 2) 100%	(2/ 2) 100%
6. Incident Management agencies that disseminate information describing incident severity, location, and type to the public	(1/ 2) 50%	(2/ 2) 100%

Appendix A
Survey Coverage Area

MECKLENBURG-UNION MPO, ROCK HILL-FORT MILL AREA TRANSPORTATION STUDY, NC-SC





City Included in Surveys

Metropolitan Planning Area Boundary

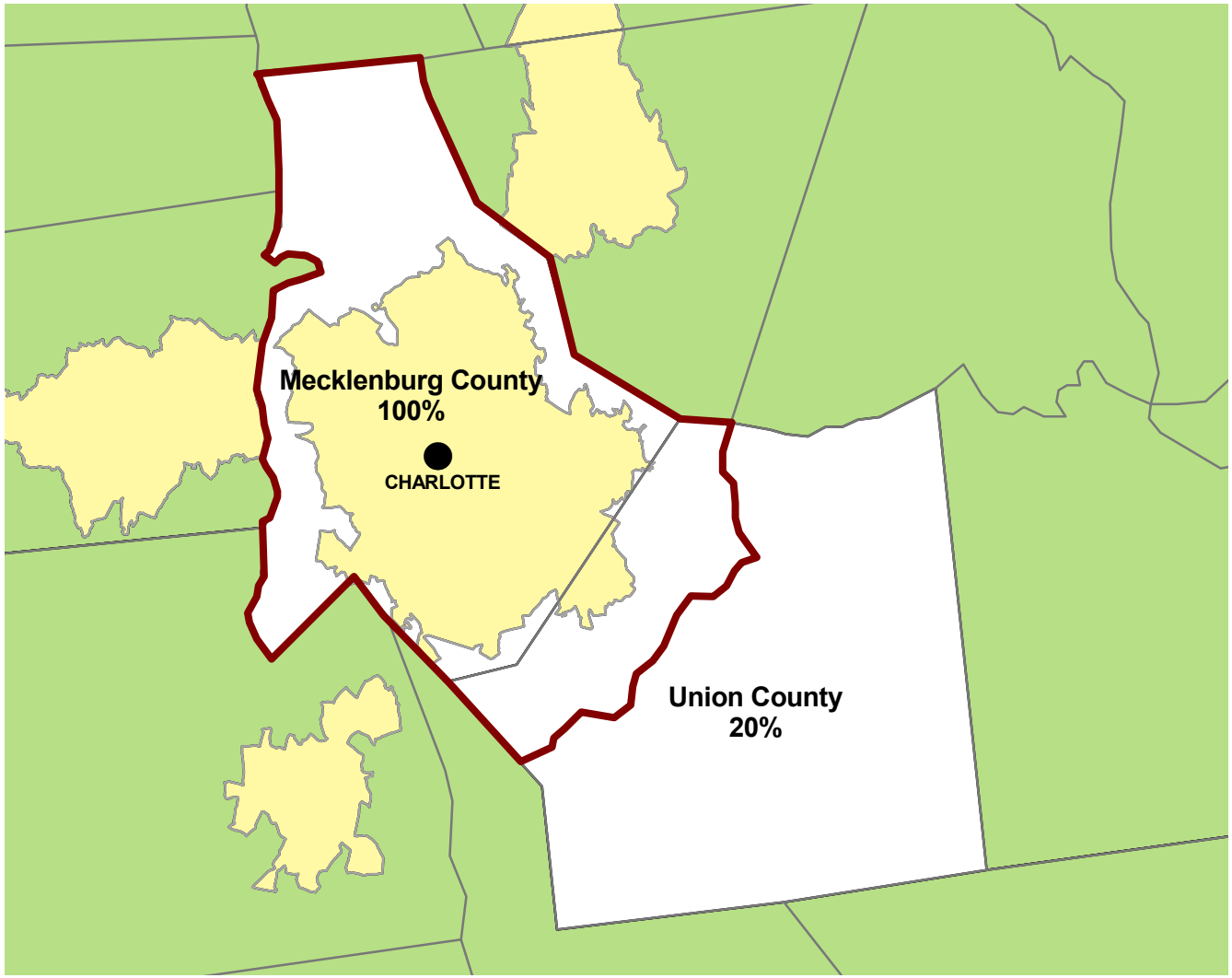
County Boundary

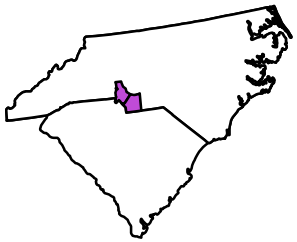
Urbanlized Area

Outside Survey Area

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

MECKLENBURG-UNION
METROPOLITAN PLANNING ORGANIZATION, NC





City Included in Surveys

Metropolitan Planning Area Boundary

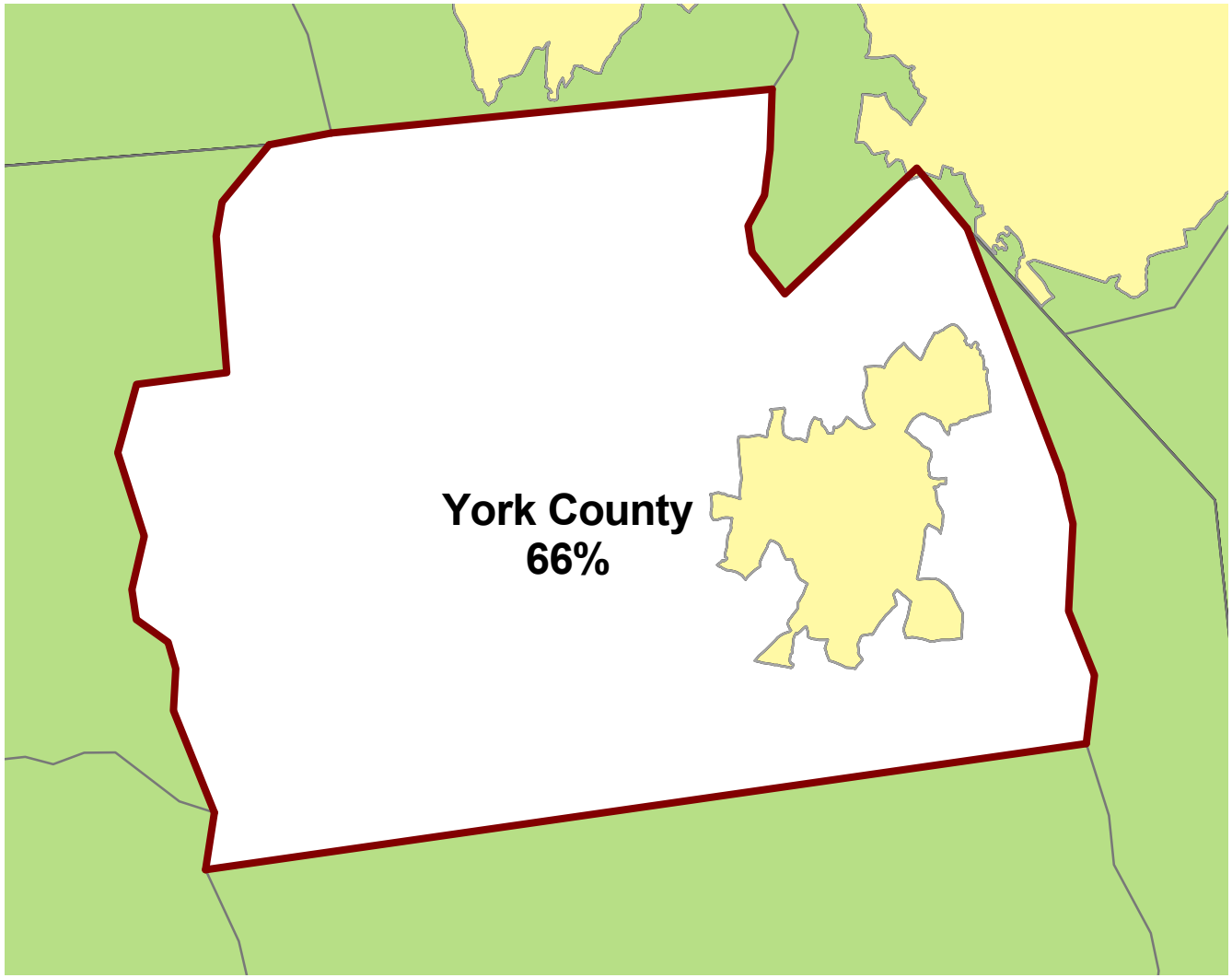
County Boundary

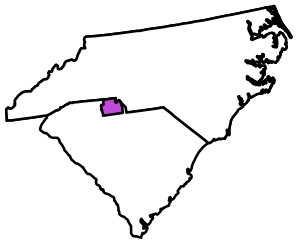
Urbanlized Area

Outside Survey Area

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

ROCK HILL-FORT MILL AREA TRANSPORTATION STUDY, SC





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
CHARLOTTE, GASTONIA, ROCK HILL						
Arterial Management						
Charlotte Department of Transportation	(704) 336-3912	(704) 336-4400	7/29/1999	10/18/1999	08/14/1997	09/05/1997
South Carolina Department of Transportation	(803) 377-4155	(803) 581-2088	7/29/1999	8/27/1999	09/29/1997	10/20/1997
North Carolina Department of Transportation	(704) 342-6814	(704) 342-6967	7/29/1999	9/7/1999	08/14/1997	10/14/1997
Emergency Management						
York County Rescue Service	(803) 329-7270	(803) 324-7420	6/2/1999	6/17/1999		
York Police Department	(803) 329-7270	(803) 324-7420	6/2/1999	6/17/1999		
York County Sheriff	(803) 329-7270	(803) 324-7420	6/2/1999	6/17/1999		
Charlotte City Police Department	(704) 336-4043	(704) 336-7799	8/13/1999	8/30/1999	08/14/1997	09/11/1997
Fort Mill Police Department	(803) 329-7270	(803) 324-7420	6/2/1999	6/17/1999		
Clower Police Department	(803) 329-7270	(803) 324-7420	6/2/1999	6/17/1999		
Rock Hill City Police Department	(803) 329-7270	(803) 324-7420	6/2/1999	6/17/1999		
Tega Cay Police Department	(803) 329-7270	(803) 324-7420	6/2/1999	6/17/1999		
Mecklenburg County Sheriff's Office	(704) 336-2543	(704) 336-6118	6/2/1999	6/9/1999	08/14/1997	08/27/1997
Piedmont Emergency Medical Services	(803) 329-7270	(803) 324-7420	6/2/1999	6/17/1999		
York County Fire Service	(803) 329-7270	(803) 324-7420	6/2/1999	6/17/1999		
Charlotte City Fire Department	(704) 336-2791	(704) 336-4170	6/3/1999	6/4/1999	08/14/1997	08/19/1997
Freeway Management						
North Carolina Department of Transportation	(704) 342-6814	(704) 342-6967	7/29/1999	9/7/1999	08/14/1997	10/14/1997
South Carolina Department of Transportation	(803) 377-4155	(803) 581-2088	7/29/1999	8/27/1999	09/29/1997	10/20/1997
MPO						
Charlotte Department of Transportation	(704) 336-6900	(704) 336-5123	7/15/1999	10/5/1999		
Rock Hill City Planning & Development	(803) 329-7080	(803) 329-7228	7/15/1999	9/30/1999		
Transit Management						
Gastonia Transit	(704) 866-6854	(704) 866-6047	8/9/1999	8/20/1999	07/21/1997	07/25/1997
Charlotte Department of Transportation	(704) 336-3902	(704) 336-4400	8/9/1999	12/6/1999	07/22/1997	07/28/1997

Appendix C
Freeway Management Components

Freeway Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes		2	
FREEWAY MANAGEMENT SECTION						
Number of freeway centerline miles that agency owns or maintains	64		18		82	
Number of freeway centerline miles that is used for planning	64		18		82	
Number of freeway entrance ramps that agency owns, operates or maintains	53		20		73	
Number of freeway entrance ramps that is used for planning	53		20		73	
Type of facilities used to conduct freeway/incident management activities						
Activities housed in a free-standing dedicated building?	Yes		Yes		2	
Activities housed in a building shared with other activities?	No		No		0	
Activities conducted in a dedicated control room?	Yes		Yes		2	
Control room contains operator console(s)?	No		Yes		1	
Control room contains electronic wall map?	No		Yes		1	
Control room contains CCTV display(s)?	No		Yes		1	
Activities conducted in a room containing workstations or PCs that manage traffic?	No		No		0	
Facilities are electronically linked to other transportation mgt facilities?	Yes		No		1	
Staffing and hours of operation of freeway/incident management activities						
Number of full-time agency staff members	21		2		23	
Number of full time contractor staff members	0		NR		0	
Number of part-time agency staff members	0		NR		0	
Number of part-time contractor staff members	0		NR		0	
Staffed 24 hours day by agency staff or by others	NR		NR			
Staffed during peak hours only by agency staff or by others	agency		agency			
Staffed by others during off-peak hours	No		No		0	
Agency staff perform transportation management as an ancillary duty	No		No		0	
Agency staff dedicated to transportation management duty	Yes		No		1	
Types of operations conducted for freeway/incident management						
Incident detection and management?	Yes		Yes		2	
This metropolitan area?	Yes		Yes		2	
Other metropolitan area?	No		No		0	
Statewide?	No		No		0	
Monitoring and troubleshooting status of system components?	Yes		Yes		2	
Manual override of ramp metering rates at freeway on-ramps?	No		No		0	
Operating transportation management roadside devices?	Yes		Yes		2	
Radio communications with other agencies?	Yes		Yes		2	
Exchange of electronic data with other agencies such as computer aided dispatch?	Yes		No		1	
Real-Time Traffic Data Collection Technologies						

Freeway Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Total number of miles under surveillance with real-time data collection tech.	16	NR	14	NR	30	0
Number of Stations with data collection technologies						
Loop detectors	24	NR	2	NR	26	0
Video imaging detectors	0	0	0	0	0	0
Probe readers (elec. toll tags, transit vehicles, other technology)	0	0	0	0	0	0
Microwave radar	30	NR	30	NR	60	0
Other (e.g., acoustic detectors)	0	0	0	0	0	0
Number of Miles covered with data collection technologies						
Loop detectors	6	NR	2	NR	8	0
Video imaging detectors	0	0	0	0	0	0
Probe readers (elec. toll tags, transit vehicles, other technology)	0	0	0	0	0	0
Microwave radar	10	NR	14	NR	24	0
Other (e.g., acoustic detectors)	0	0	0	0	0	0
Variable Message Signs (VMS) on Freeways						
Candidate locations for deployment of VMS where VMS has been deployed	NR	NR	2	NR	2	0
Candidate locations for deployment of VMS	10	NR	2	NR	12	0
Roadside Technologies used to Distribute Traveler Information						
Total number of miles where information is distributed	NR	NR	14	NR	14	0
Number deployed						
Highway advisory radio	NR	NR	2	NR	2	0
In-vehicle signing	0	0	0	0	0	0
Portable variable message signs	8	NR	4	NR	12	0
Other	0	0	0	0	0	0
Miles covered						
Highway advisory radio	NR	NR	14	NR	14	0
In-vehicle signing	0	0	0	0	0	0
Portable variable message signs	NR	NR	NR	NR	0	0
Other	0	0	0	0	0	0
Ramp Meters on Freeways						
Number of entrance ramp meters operated under isolated control	NR	NR	NR	NR	0	0
Number of entrance ramp meters operated under central control	NR	NR	NR	NR	0	0
Number of entrance ramp meters that provide preemption for emergency vehicles	NR	NR	NR	NR	0	0
Number of entrance ramp meters that provide priority for transit vehicles	NR	NR	NR	NR	0	0
Total number of metered ramps	NR	NR	NR	NR	0	0
Freeway centerline miles under lane control	NR	NR	NR	NR	0	0
Communication Links						
Freeway centerline miles covered by the following type of communication						
Twisted pair cable	0	0	0	0	0	0
Coaxial cable	0	NR	0	0	0	0
Fiber-optic cable	16	NR	14	NR	30	0
Microwave radio	0	0	0	0	0	0

Freeway Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	2005	1999	2005	1999	2005
Other	0	0	0	0	0	0
ITS Standards Used Related to Freeway Management						
ATMS Data Dictionary Sections 1 and 2 (ITE TM 1.01)	No		No		0	
ATMS Data Dictionary Sections 3 and 4 (ITE TM 1.02)	No		No		0	
Message Set for External TMC Communication (ITE-9604-1)	No		No		0	
NTCIP Class B Profile (AASHTO TS 3.3)	No		No		0	
NTCIP Data Collection and Monitoring Devices (AASHTO TS 3.DCM)	No		No		0	
NTCIP Object Definitions for Environmental Sensor Stations (AASHTO TS 3.7)	No		No		0	
NTICP Object Definitions for Dynamic Message Signs (AASHTO TS 3.6)	No		No		0	
NTICP Object Definitions for Highway Advisory Radio (AASHTO TS 3.HAR)	No		No		0	
NTICP Object Definitions for Ramp Meter Control (AASHTO TS 3.RMC)	No		No		0	
NTICP Object Definitions for Transportation Sensor Systems (AASHTO TS 3.TSS)	No		No		0	
NTICP Object Definitions for Video Camera Control (AASHTO TS 3.VCC)	No		No		0	
Would agency be willing to participate in testing of ITS Standards?	Yes		Yes		2	
Have agreements in place with other agencies to use similar hardware						
and software to aid maintenance and interoperability?	No		No		0	
INCIDENT MANAGEMENT SECTION						
Use of Service Patrols to Assist in Detection and Response to Incidents						
Publicly operated service patrol vehicles	Yes		Yes		2	
Privately operated service patrol vehicles operated under public contract	No		No		0	
Total number of freeway miles patrolled by these services	23	33	14	14	37	
Miles Covered by Methods to Detect and Verify Incidents						
Free cellular phone call to a dedicated phone number other than 911	NR	NR	14	14	14	14
Police patrols	NR	NR	14	14	14	14
Computer algorithms linked to traffic surveillance equipment	15	NR	14	14	29	14
CCTV	15	NR	14	14	29	14
Private sector sources (e.g., Shadow Traffic, SmartRoutes)	NR	NR	NR	NR	0	0
Other (e.g., free cell phone call to an area radio system, etc.)	NR	NR	0	14	0	14
Procedures in place for Freeway Incident Response?						
Working agreement(s)/arrangement(s) with other agencies	Yes		No		1	
Inter-agency incident management admin. team that meets regularly	Yes		No		1	
Major incident response team that responds to major incidents	No		No		0	
Set of goals/objectives for incident mgt that has been adopted by agencies in region	Yes		No		1	
Central focal point for facilitating the two-way flow of information						
among agencies responding to an incident?						
The central focal point is a Freeway or Traffic Management Center	Yes		No		1	
The central focal point is a Police, Fire or joint dispatch center	No		No		0	
The central focal point is another center	No		No		0	

	North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Methods of Communication Used On-Site at an Incident						
Police						
Two-way radio	Yes		Yes		2	
800 MHz trunked radio	Yes		No		1	
Cellular telephone	No		No		0	
Hand-held (i.e., walkie-talkie)	Yes		No		1	
Automated data systems (i.e., CAD)	Yes		No		1	
Fire						
Two-way radio	No		No		0	
800 MHz trunked radio	Yes		No		1	
Cellular telephone	No		No		0	
Hand-held (i.e., walkie-talkie)	Yes		No		1	
Automated data systems (i.e., CAD)	Yes		No		1	
DOT						
Two-way radio	Yes		Yes		2	
800 MHz trunked radio	Yes		Yes		2	
Cellular telephone	Yes		Yes		2	
Hand-held (i.e., walkie-talkie)	Yes		No		1	
Automated data systems (i.e., CAD)	No		No		0	
Towing						
Two-way radio	No		No		0	
800 MHz trunked radio	No		No		0	
Cellular telephone	No		No		0	
Hand-held (i.e., walkie-talkie)	Yes		No		1	
Automated data systems (i.e., CAD)	No		No		0	
Which police agencies typically respond to incidents on freeways?						
State Police	Yes		Yes		2	
County Police or Sheriff	No		Yes		1	
City Police	Yes		Yes		2	
Who provides on-site emergency medical response?						
Fire	Yes		Yes		2	
Emergency Management Service Agency	No		Yes		1	
Private hospital	No		No		0	
Has a multi-agency contact list been developed in area containing the						
names, phone numbers, etc. for the appropriate response personnel?	Yes		DK		1	
Is the Incident Command System used to manage incident scenes?	Yes		Yes		2	
Is there a legal specification by state law or formal agreement as to who						

Freeway Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
is "in charge" at the incident scene?						
Specified by state law?	No		No		0	
Formal agreement?	No		No		0	
Not specified or don't know?	Yes		Yes		2	
On-scene command post used to manage activities of responding agencies?	Yes		DK		1	
Are there communication linkages to a communications traffic/freeway mgt center?	Yes		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?	Yes		DK		1	
Respondents protected through law or court opinion for liability claims						
for damages to vehicles or cargoes during clearance activities?	No		Yes		1	
Are overturned tank trucks, which are intact and not leaking, uprighted						
without first off-loading?	No		NR		0	
Does your state or local jurisdiction have a law that requires drivers						
involved in property-damage-only accidents to move the vehicles						
from travel lanes to a safe location to exchange info and wait for police?	No		Yes		1	
Have laws or policies regarding the removal of stalled/abandoned vehicles						
from freeway shoulders?	Yes		Yes		2	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	>36		>36			
Have policies or procedures for quick removal of vehicles?	Yes		No		1	
Is Total Station equipment used to investigate major incidents?	No		No		0	
Handling of Towing Responses to Incidents						
Formal contract based on qualifications?	Yes		Yes		2	
Rotation with companies under contract?	Yes		Yes		2	
Separate lists kept for light and heavy response and for specialty recovery?	Yes		Yes		2	
Rotation list with minimal qualifications?	No		No		0	
In towing qualifications, do you require towers to be certified under the						
Towing and Recovery Ass. of America's National Drivers Cert. Program?	DK		Considered		0	
_____						
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: Charlotte, Gastonia, Rock Hill

Agency Name	North Carolina Department of Transportation		South Carolina Department of Transportation District Office	
	1999	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		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	South Carolina Department of Transportation Distri, Charlotte Department of Transportation	North Carolina Department of Transportation	North Carolina Department of Transportation
Share Infrastructure	None listed	South Carolina Department of Transportation District	None listed	None listed
Coordinate Operation	South Carolina Department of Transportation District, Charlotte Department of Transportation	None listed	North Carolina Department of Transportation	North Carolina Department of Transportation
Incident Management Agencies				
Provide Information	None listed	South Carolina Department of Transportation Distri, Charlotte Department of Transportation	North Carolina Department of Transportation	North Carolina Department of Transportation
Share Infrastructure	None listed	South Carolina Department of Transportation District, Charlotte Department of Transportation	None listed	None listed
Coordinate Operation	South Carolina Department of Transportation Distri, Charlotte Department of Transportation	None listed	North Carolina Department of Transportation	North Carolina Department of Transportation
Arterial Management Agencies				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	Charlotte Department of Transportation	None listed	None listed

Freeway Management Integration
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

Agency Name	North Carolina Department of Transportation		South Carolina Department of Transportation District Office	
	1999	**2005**	**1999**	**2005**
Coordinate Operation	None listed	Charlotte Department of Transportation	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				
Incident Management agencies from which your agency receives				
incident severity, location, and type information	None listed	North Carolina State Highway Patrol	None listed	None listed
Arterial Management agencies from which your agency receives				
arterial travel times, speeds, and conditions	None listed	Charlotte Department of Transportation	None listed	None listed
Public Transit operators from which your agency receives				
freeway travel times derived from vehicle probes	None listed	None listed	None listed	None listed
Toll Collection agencies from which your agency receives freeway travel				
times derived from vehicles probes	None listed	None listed	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	Charlotte Department of Transportation, South Carolina Department of Transportation District	None listed	North Carolina Department of Transportation	North Carolina Department of Transportation
Share Infrastructure	None listed	Charlotte Department of Transportation, South Carolina Department of Transportation District	None listed	None listed
Coordinate Operation	Charlotte Department of Transportation	South Carolina Department of Transportation Distri	North Carolina Department of Transportation	North Carolina Department of Transportation
Emergency Management Agencies				

Agency Name	North Carolina Department of Transportation		South Carolina Department of Transportation District Office	
	1999	2005	1999	2005
Provide Information	Charlotte City Fire Department, Piedmont Emergency Medical Services, North Carolina State Highway Patrol	None listed	York Police Department, Fort Mill Police Department, York County Rescue Service, Rock Hill City Police Department, York County Sheriff, York County Fire Service	York Police Department, Fort Mill Police Department, York County Rescue Service, Rock Hill City Police Department, York County Sheriff, York County Fire Service
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	Charlotte City Fire Department, Piedmont Emergency Medical Services, North Carolina State Highway Patrol	None listed	York Police Department, Fort Mill Police Department, York County Rescue Service, Rock Hill City Police Department, York County Sheriff, York County Fire Service	York Police Department, Fort Mill Police Department, York County Rescue Service, Rock Hill City Police Department, York County Sheriff, York County Fire Service
Freeway Management Agencies				
Provide Information	South Carolina Department of Transportation District	None listed	North Carolina Department of Transportation	North Carolina Department of Transportation
Share Infrastructure	None listed	South Carolina Department of Transportation District	None listed	None listed
Coordinate Operation	None listed	South Carolina Department of Transportation District	North Carolina Department of Transportation	North Carolina Department of Transportation
Public Transit Operators				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Receiving real-time information via electronic means from others				
Emergency Management agencies from which your agency receives				
incident clearance and/or incident severity and type				
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				

Freeway Management Integration
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

Agency Name	North Carolina Department of Transportation		South Carolina Department of Transportation District Office	
	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	South Carolina Department of Transportation District	North Carolina Department of Transportation	North Carolina Department of Transportation

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

Appendix E
Freeway Management Information Collection and Dissemination

Data Collection and Dissemination: Freeway Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

Agency Name	North Carolina Department of Transportation		South Carolina Department of Transportation District Office	
	1999	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		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, Incidents, Current work zones, Scheduled work zones	NR	Traffic volumes	Traffic volumes
Archived by your agency	NR	NR	Traffic volumes	Traffic volumes
Transferred to another agency by your agency	NR	NR	NR	NR
Importance of making information available to the public				
Ranked High	Traffic speeds, Road conditions, Incidents, Current work zones, Scheduled work zones		Traffic volumes	
Ranked Medium	NR		NR	
Ranked Low	Traffic volumes, Lane occupancy, Vehicle classification		NR	
Groups that make requests for the data	State DOT personnel, Media (I.e., TV stations, radio stations)		NR	
What is the data used for?	Traffic analysis, Construction impact determination, Planning, Accident prediction models, Dissemination to the public		NR	
Methods used to disseminate freeway information to the public				
Technologies your agency uses to disseminate:	Internet Web sites	NR	Internet Web sites	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR
Internet web site reporting freeway conditions	still under development, on-line later this year		NR	
Telephone system for reporting freeway information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	currently, metro networks-ISP-Info Service Provider near future - 3 local TV stations		NR	
Freeway Incident Management Section				
Methods used to distribute incident location and severity information				
to the public				
Technologies your agency uses to disseminate:	TV, Radio, Media	Internet Web sites, TV, Radio, Media	NR	Internet Web sites
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR
Internet web site reporting incident information	under development, implemented by end of this year		NR	
Telephone system for reporting incident information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	metro networks (info service provider)		NR	

Appendix F
Arterial Management Components

Arterial Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes		Yes		3	
ARTERIAL MANAGEMENT SECTION								
Number of arterial miles that agency owns or maintains	NR		1,000		NR		1,000	
Number of arterial miles that is used for planning	NR		124		20		144	
Number of highway-rail intersections that agency maintains	NR		0		NR		0	
Number of highway-rail intersections that is used for planning	NR		0		NR		0	
Type of facilities used to conduct arterial management activities								
Activities housed in a free-standing dedicated building?	No		No		No		0	
Activities housed in a building shared with other activities?	No		No		No		0	
Activities conducted in a dedicated control room?	No		Yes		No		1	
Control room contains operator console(s)?	No		No		No		0	
Control room contains electronic wall map?	No		No		No		0	
Control room contains CCTV display(s)?	No		No		No		0	
Activities conducted in a room containing workstations or PCs that manage traffic?	No		No		No		0	
Facilities are electronically linked to other transportation mgt facilities?	No		No		No		0	
Staffing and hours of operation of arterial management activities								
Number of full-time agency staff members	NR		8		NR		8	
Number of full time contractor staff members	NR		0		NR		0	
Number of part-time agency staff members	NR		NR		NR		0	
Number of part-time contractor staff members	NR		NR		NR		0	
Staffed 24 hours day by agency staff or by others	NR		NR		NR		0	
Staffed during peak hours only by agency staff or by others	NR		NR		NR		0	
Staffed by others during off-peak hours	No		No		No		0	
Agency staff perform transportation management as an ancillary duty	No		No		No		0	
Agency staff dedicated to transportation management duty	No		No		No		0	
Types of operations conducted for arterial management								
Incident detection and management?	No		Yes		No		1	
This metropolitan area?	No		No		No		0	
Other metropolitan area?	No		No		No		0	
Monitoring and troubleshooting status of system components?	No		No		No		0	
Radio communications with other agencies?	No		No		No		0	
Exchange of electronic data with other agencies such as computer aided dispatch?	No		No		No		0	
Manual override of traffic signal timing plans	No		No		Yes		1	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	No		No		No		0	

Arterial Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Describe agency's role in traffic signal control	NR		All roads in county		State routes only			
Traffic Signals Operated by Agency								
Number of signalized intersections operated and owned by agency	NR	NR	NR	NR	57	NR	57	0
Number of signalized intersections operated by agency but owned by another	NR	NR	NR	NR	93	NR	93	0
Total number of signalized intersections operated by agency	575	700	140	NR	150	NR	865	700
Characteristics of signalized intersections that agency operates								
Under closed loop or central system control	450	625	1	NR	16	NR	467	625
Under real-time traffic adaptive control using advanced software	0	0	0	NR	NR	NR	0	0
Using SCOOT	No		No		No		0	
Using SCATS	No		No		No		0	
Name of software	NR		NR		NR			
Allow signal preemption for emergency vehicles	30	60	0	NR	2	NR	32	60
Allow signal priority for transit vehicles	16	25	0	NR	NR	NR	16	25
Within 200 feet of a highway-rail intersection	25	30	20	NR	2	NR	47	30
Within 200 feet of a highway-rail intersection that adjust signal timing	25	30	20	NR	2	NR	47	30
Software used to control the signals agency operates								
Date of last upgrade to traffic signal control system software?	NR		1996		July 1999			
How often do you update signal timing?	NR		as needed		as necessary			
Software used and number of signalized intersections under control (1999, 2005)	NR		NR		Wapiti/DMJM TCS II, 8, 24 BiTran Systems, 8, NR			
Controllers used to control signals								
NEMA	0	0	140	NR	25	NR	165	0
170/179	0	0	0	0	32	NR	32	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	0	0
Highway-Rail intersection capapbilities								
Video surveillance	0	0	0	0	0	0	0	0
Electronic surveillance other than video	0	0	0	0	0	0	0	0
Ability to predict train arrival electronically	0	0	0	0	0	0	0	0
Equipped with electronic traffic violator devices	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Real-Time Electronic Traffic Data Collection Technologies								
Total number of signalized intersections covered by electronic surveillance	NR	NR	100	NR	8	NR	108	0
Number of signalized intersections with data collection technologies								
Loop detectors	0	0	100	NR	8	NR	108	0
Video detection cameras	0	0	0	0	0	0	0	0

	Charlotte Department of Transportation		North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
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	2	NR	NR	NR	2	0
In-Vehicle Signing (IVS)	NR	NR	NR	NR	NR	NR	0	0
VMS controlling parking access	NR	NR	NR	NR	NR	NR	0	0
Miles covered								
Highway Advisory Radio	NR	NR	20	NR	NR	NR	20	0
In-Vehicle Signing (IVS)	NR	NR	NR	NR	NR	NR	0	0
Variable Message Signs (VMS) on Arterials								
Candidate locations for deployment of VMS where VMS has been deployed	NR	NR	9	NR	NR	NR	9	0
Candidate locations for deployment of VMS	NR	NR	0	NR	NR	NR	0	0
Communication Technologies								
Signalized intersections communicated with by each type of communication								
Twisted pair cable	0	0	0	0	8	NR	8	0
Coaxial cable	0	0	0	0	0	0	0	0
Fiber-optic cable	0	0	0	0	NR	7	0	7
Other (e.g., wireless, dial-up modems, leased lines, etc.)	0	0	40	0	4	1	44	1
Does agency convey information on highway-rail intersection crossing								
status to travelers via roadside media such as VMS or HAR?	No		No		No		0	
ITS Standards Used Related to Traffic Signal Control								
Advanced Transportation Controller (ATC) Software Application Interface (ITE 9603-1)	No		No		No		0	
ATC Physical Cabinet Functional Design (ITE-9603-2)	No		No		No		0	
ATC Functionality and Interface Definitions (ITE-9603-3)	No		No		No		0	
Natl. Trans. Communications for ITS Protocol (NTCIP) Class B Profile (AASHTO TS 3.3)	No		No		No		0	
NTCIP Data Collection and Monitoring Devices (AASHTO TS 3.DCM)	No		No		No		0	
NTCIP Object Definitions for Video Camera Control (AASHTO TS 3.VCC)	No		No		No		0	
NTCIP Object Definitions for Actuated Traffic Signal Controller Units (AASHTO TS 3.5)	No		No		No		0	
Would agency be willing to participate in testing of ITS Standards?	NR		No		Yes		1	
Have agreements in place with other agencies to use similar hardware								
and software to aid maintenance and interoperability?	NR		No		Yes		1	
INCIDENT MANAGEMENT ON ARTERIAL STREETS								
Receive information on highway-rail intersection crossing blockages for								
the purpose of managing incident response?	No		No		No		0	
Use of Service Patrols to Assist in Detection and Response to Incidents								
Publicly operated service patrol vehicles	No		Yes		No		1	

Arterial Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Privately operated service patrol vehicles operated under public contract	No		No		No		0	
Total number of arterial miles patrolled by these services	NR	NR	50	NR	NR	NR	50	0
Miles Covered by Methods to Detect and Verify Incidents								
Free cellular phone call to a dedicated phone number other than 911	0	0	0	0	0	0	0	0
Free cellular phone call to an area radio station	0	0	0	0	0	0	0	0
Police patrols	0	0	0	0	0	0	0	0
Computer algorithms linked to traffic surveillance equipment	0	0	0	0	0	0	0	0
CCTV	0	0	0	0	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		No		No		0	
Inter-agency incident management admin. team that meets regularly	No		No		No		0	
Major incident response team that responds to major incidents	No		No		No		0	
Set of goals/objectives for incident mgt that has been adopted by agencies in region	No		No		No		0	
Methods of Communication Used On-Site at an Incident								
Police								
Two-way radio	No		No		No		0	
800 MHz trunked radio	No		No		No		0	
Cellular telephone	No		No		No		0	
Hand-held (i.e., walkie-talkie)	No		No		No		0	
Automated data systems (i.e., CAD)	No		No		No		0	
Other	No		No		No		0	
Fire								
Two-way radio	No		No		No		0	
800 MHz trunked radio	No		No		No		0	
Cellular telephone	No		No		No		0	
Hand-held (i.e., walkie-talkie)	No		No		No		0	
Automated data systems (i.e., CAD)	No		No		No		0	
Other	No		No		No		0	
DOT								
Two-way radio	No		No		No		0	
800 MHz trunked radio	No		No		No		0	
Cellular telephone	No		No		No		0	
Hand-held (i.e., walkie-talkie)	No		No		No		0	
Automated data systems (i.e., CAD)	No		No		No		0	
Other	No		No		No		0	

	Charlotte Department of Transportation		North Carolina Department of Transportation		South Carolina Department of Transportation District Office		Totals	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Towing								
Two-way radio	No		No		No		0	
800 MHz trunked radio	No		No		No		0	
Cellular telephone	No		No		No		0	
Hand-held (i.e., walkie-talkie)	No		No		No		0	
Automated data systems (i.e., CAD)	No		No		No		0	
Other	No		No		No		0	
Which police agencies typically respond to incidents on arterials?								
State Police	No		No		No		0	
County Police or Sheriff	No		No		No		0	
City Police	No		No		No		0	
Who provides on-site emergency medical response?								
Fire	No		No		No		0	
Emergency Management Service Agency	No		No		No		0	
Private hospital	No		No		No		0	
Has a multi-agency contact list been developed in area containing the								
names, phone numbers, etc. for the appropriate response personnel?	NR		NR		NR		0	
Is the Incident Command System used to manage incident scenes?	NR		NR		NR		0	
Is there a legal specification by state law or formal agreement as to who								
is "in charge" at the incident scene?								
Specified by state law?	No		No		No		0	
Formal agreement?	No		No		No		0	
Not specified or don't know?	No		No		No		0	
On-scene command post used to manage activities of responding agencies?	NR		NR		NR		0	
Are there communication linkages to a communications traffic/freeway mgt center?	NR		NR		NR		0	
Plan developed and adopted by responding agencies for staging and parking								
response vehicles and equip. at incident site that minimizes lane blockage								
and facilitates the re-opening of lanes?	NR		NR		NR		0	
Respondents protected through law or court opinion for liability claims								
for damages to vehicles or cargoes during clearance activities?	NR		NR		NR		0	
Are overturned tank trucks, which are intact and not leaking, uprighted								
without first off-loading?	NR		NR		NR		0	
Does your state or local jurisdiction have a law that requires drivers								
involved in property-damage-only accidents to move the vehicles								
from travel lanes to a safe location to exchange info and wait for police?	NR		NR		NR		0	
Have laws or policies regarding the removal of stalled/abandoned vehicles								
from freeway shoulders?	NR		NR		NR		0	

Arterial Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		North Carolina Department of Transportation		South Carolina Department of Transportation District Office		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**	**1999**	**2005**
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	NR		NR		NR		0	
Have policies or procedures for quick removal of vehicles?	NR		NR		NR		0	
Is Total Station equipment used to investigate major incidents?	NR		NR		NR		0	
Handling of Towing Responses to Incidents								
Formal contract based on qualifications?	No		No		No		0	
Rotation with companies under contract?	No		No		No		0	
Separate lists kept for light and heavy response and for specialty recovery?	NR		NR		NR		0	
Rotation list with minimal qualifications?	No		No		No		0	
In towing qualifications, do you require towers to be certified under the								
Towing and Recovery Ass. of America's National Drivers Cert. Program?	NR		NR		NR		0	
_____								
DK: Don't know								
NR: No Response								
Leg: Legislation or action being planned								

Appendix G
Arterial Management Integration

Arterial Management Integration
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

Agency Name	Charlotte Department of Transportation		North Carolina Department of Transportation		South Carolina Department of Transportation District Office	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes		Yes	
Arterial Management Section						
Arterial Mgt. agencies in metropolitan area with which you share info.						
Share Timing Plans Information	short survey	None listed	None listed	None listed	None listed	None listed
Coordinate Changes to Timing Plans	short survey	None listed	None listed	None listed	None listed	None listed
Turn over Control of Signals	None listed	None listed	None listed	None listed	None listed	None listed
Agencies your agency provides arterial travel times, speeds, and						
conditions information, share infrastructure or coordinates operation						
Freeway Management Agencies						
Provide Information	None listed	None listed	None listed	None listed	North Carolina Department of Transportation	North Carolina Department of Transportation
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed	North Carolina Department of Transportation	North Carolina Department of Transportation
Incident Management Agencies						
Provide Information	short survey	None listed	None listed	None listed	North Carolina Department of Transportation	North Carolina Department of Transportation
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed	North Carolina Department of Transportation	North Carolina Department of Transportation
Public Transit Operators Agencies						
Provide Information	None listed	None listed	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	None listed
Arterial Management Agencies						
Provide Information	None listed	None listed	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	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	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	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	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	None listed	None listed	None listed	None listed	None listed

Arterial Management Integration
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

Agency Name	Charlotte Department of Transportation		North Carolina Department of Transportation		South Carolina Department of Transportation District Office	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Toll Collection agencies from which your agency receives arterial travel						
times derived from vehicles probes	None listed	None listed	None listed	None listed	None listed	None listed
Arterial Incident Management Section						
Agencies your agency provides incident severity, location, and type info.						
and/or shares infrastructure and/or coordinates operation						
Emergency Management Agencies						
Provide Information	short survey	None listed	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	None listed
Freeway Management Agencies						
Provide Information	None listed	None listed	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	None listed
Public Transit Operators						
Provide Information	None listed	None listed	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed	None listed	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	None listed	None listed
Receive Arterial Incident Severity Information	short survey	None listed	None listed	None listed	None listed	None listed
Arterial Management agencies from which your agency receives						
arterial travel times, speeds, and conditions	None listed	None listed	None listed	None listed	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	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: Charlotte, Gastonia, Rock Hill

Agency Name	Charlotte Department of Transportation		North Carolina Department of Transportation		South Carolina Department of Transportation District Office	
	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	NR	NR	NR	NR
Archived by your agency	NR	NR	NR	NR	NR	NR
Transferred to another agency by your agency	NR	NR	NR	NR	NR	NR
Importance of making information available to the public						
Ranked High	NR		NR		NR	
Ranked Medium	NR		NR		NR	
Ranked Low	NR		NR		NR	
Groups that make requests for the data	NR		State DOT personnel, Consultants		NR	
What is the data used for?	NR		Traffic analysis, Construction impact determination, Planning		NR	
Methods used to disseminate arterial information to the public						
Technologies your agency uses to disseminate:	NR	NR	NR	NR	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR	NR	NR
Internet web site reporting arterial conditions	NR		NR		NR	
Telephone system for reporting arterial information to the public	NR		NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR		NR	
Arterial Incident Management Section						
Methods used to distribute incident location and severity information						
to the public						
Technologies your agency uses to disseminate:	NR	NR	NR	NR	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR	NR	NR
Internet web site reporting incident information	NR		NR		NR	
Telephone system for reporting incident information to the public	NR		NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR		NR	

Appendix I
Transit Management Components

Transit Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		Gastonia Transit		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Agency Returned Survey?	Yes		Yes		2	
Number of vehicles used in revenue service						
Fixed Route Bus	173	200	6	8	179	208
Heavy or Rapid Rail	NR	NR	0	0	0	0
Light Rail	NR	NR	0	0	0	0
Demand Responsive	58	NR	2	3	60	3
Commuter Rail	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	0	0
Have of plan to have an Automated Vehicle Location System?	Yes		No		1	
Primary and Secondary Location Technologies Used						
Primary Technologies						
GPS	No	Yes	No	No	0	1
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
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	0	200	NR	NR	0	200
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
Motor Buses Operated as Vehicle Probes						
Number of Motor Buses equipped as probes on freeways?	NR		NR			
Number of Motor Buses equipped as probes on arterials?	NR		NR			
Have Organized Regional Incident Management Program?	No		No		0	
Have Automated Traveler Information System?	Yes		No		1	

Transit Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		Gastonia Transit		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Services Automated Traveler Info. System Applies:						
Fixed Route	Yes		No		1	
Heavy Rail	No		No		0	
Light Rail	Yes		No		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	0	200	NR	NR	0	200
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?	Yes		No		1	
Analog?	No		Yes		1	
Trunked?	Yes		No		1	
Regular?	No		Yes		1	
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

Transit Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		Gastonia Transit		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
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
Have of plan to have Automatic Passenger Counters (APCs)?	Yes		No		1	
Methods used to count passengers						
Treadle Mats	No		No		0	
Infrared Beams	Yes		No		1	
Primary and Secondary Location Technologies Used						
Primary Technologies						
GPS	No	Yes	No	No	0	1
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
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	0	200	NR	NR	0	200
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
Remote Real-Time Monitoring and Computer Assisted Dispatching						
Remote Real-Time Monitoring						
Fixed Route Bus	0	200	NR	NR	0	200
Heavy or Rapid Rail	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	0	0
Demand Responsive	0	0	NR	NR	0	0
Commuter Rail	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	0	0

Transit Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		Gastonia Transit		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
Automated Dispatching or Control Software						
Fixed Route Bus	0	200	NR	NR	0	200
Heavy or Rapid Rail	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	0	0
Demand Responsive	58	58	NR	NR	58	58
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?	Yes		No		1	
Modes that TMC currently controls:						
Highways	Yes	No	No	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	0	0	NR	NR	0	0
Heavy or Rapid Rail	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	0	0
Demand Responsive	58	58	NR	NR	58	58
Commuter Rail	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	0	0
ITS Standards Used Related to Transit Management						

Transit Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		Gastonia Transit		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
TCIP On Boad Objects (TCIP-OB)	No		No		0	
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		No		0	
TCIP Incident Management Objects (TCIP-IM)	No		No		0	
TCIP Fare Collection Objects (TCIP-FC)	No		No		0	
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?	Yes		Yes		2	
Have agreements in place with other agencies to use similar hardware						
and software to aid maintenance and interoperability?	No		No		0	
Electronic Fare Payment						
Have full operational Electronic Fare Payment System?	Yes		No		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	173	200	NR	NR	173	200
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

Transit Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

	Charlotte Department of Transportation		Gastonia Transit		**Totals**	
	1999	**2005**	**1999**	**2005**	**1999**	**2005**
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
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: Charlotte, Gastonia, Rock Hill

Agency Name	Charlotte Department of Transportation		Gastonia Transit	
	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	Gen Fare		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	North Carolina Department of Transportation	None listed	None listed
Share Infrastructure	None listed	North Carolina Department of Transportation	None listed	None listed
Arterial Management agencies from which your agency receives				
arterial travel times, speeds, and conditions				
Receive Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Incident Management agencies from which your agency receives				
incident severity, location, and type				
Receive Information	None listed	North Carolina Department of Transportation	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed

Appendix K
Transit Management Information Collection and Dissemination

Data Collection and Dissemination: Transit Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

Agency Name	Charlotte Department of Transportation		Gastonia Transit	
	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	Facsimile, Audible Enunciators, Monitors/VMS (not in vehicle), Variable Message Signs (in vehicle), Cell phone/data, Cell phone/voice, In-vehicle navigation systems, E-mail or other direct PC communication, Kiosks, Interactive TV, Pagers or personal data assistants, Internet Web Sites, Telephone System, Dedicated cable TV	NR	NR
Real-time transit schedule adherence or arrival and departure times	NR	Facsimile, Audible Enunciators, Monitors/VMS (not in vehicle), Variable Message Signs (in vehicle), Cell phone/data, Cell phone/voice, In-vehicle navigation systems, E-mail or other direct PC communication, Kiosks, Interactive TV, Pagers or personal data assistants, Internet Web Sites, Telephone System, Dedicated cable TV	NR	NR
Technologies employed by other organization receiving your data				

Data Collection and Dissemination: Transit Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

Agency Name	Charlotte Department of Transportation		Gastonia Transit	
	1999	**2005**	**1999**	**2005**
Transit routes, schedules and fares	NR	Facsimile, Audible Enunciators, Monitors/VMS (not in vehicle), Variable Message Signs (in vehicle), Cell phone/data, Cell phone/voice, In-vehicle navigation systems, E-mail or other direct PC communication, Kiosks, Interactive TV, Pagers or personal data assistants, Internet Web Sites, Telephone System, Dedicated cable TV	NR	NR
Real-time transit schedule adherence or arrival and departure times	NR	Facsimile, Audible Enunciators, Monitors/VMS (not in vehicle), Variable Message Signs (in vehicle), Cell phone/data, Cell phone/voice, In-vehicle navigation systems, E-mail or other direct PC communication, Kiosks, Interactive TV, Pagers or personal data assistants, Internet Web Sites, Telephone System, Dedicated cable TV	NR	NR
Internet web site reporting transit routes, schedules and fare, etc.	www.ci.charlotte.nc.us (in the works right now)		NR	
Telephone system for reporting transit information to the public	704-336-3366		NR	
Organizations your agency sends information for dissemination to the public	YMCA's, Shopping Centers, Community Colleges, UNCC		NR	

Data Collection and Dissemination: Transit Management
Agencies for Metropolitan Area: Charlotte, Gastonia, Rock Hill

Agency Name	Charlotte Department of Transportation		Gastonia Transit	
	1999	**2005**	**1999**	**2005**
Data collected, archived, and/or transferred to another agency				
Collected by your agency	Passenger count, Passenger information (e.g., surveys, O/D)	Trip itinerary planning records	Passenger count, Passenger information (e.g., surveys, O/D)	NR
Archived by your agency	Passenger count	NR	NR	NR
Transferred to another agency by your agency	NR	NR	NR	NR
Importance of making information available to the public				
Ranked High	Weather conditions, Trip itinerary planning records, Vehicle monitoring status, Road conditions, Vehicle time and location, Route designations (snow emergency, etc), Incidents, Highway operations coordination information		NR	
Ranked Medium	Passenger information (e.g., surveys, O/D), Emergency vehicle signal preemption, Transit operations coordination information, Current roadway work zones for transit, Scheduled roadway work zones for transit, Intermodal (air, rail, water) conditions, Transit vehicle signal priority		Vehicle time and location, Route designations (snow emergency, etc), Current roadway work zones for transit, Scheduled roadway work zones for transit	
Ranked Low	Passenger count, Emergency/evacuation routes and procedures		Weather conditions, Passenger count, Trip itinerary planning records, Passenger information (e.g., surveys, O/D), Vehicle monitoring status, Road conditions, Emergency vehicle signal preemption, Emergency/evacuation routes and procedures, Incidents, Intermodal (air, rail, water) conditions, Highway operations coordination information, Transit operations coordination information, Transit vehicle signal priority	
Groups that make requests for the data	NR		MPOs, Federal DOT personnel, State DOT personnel	
What is the data used for?	NR		Dissemination to the public, Planning	

Appendix L
Emergency Management

	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			
Charlotte City Fire Department	98	108	0	0	0	0	98	108	NR	NR	6	53	Yes	No	None listed
Charlotte City Police Department	477	500	0	0	0	0	468	500	15	0	0	0	No	No	None listed
Clower Police Department	7	8	0	0	0	0	0	0	NR	NR	0	0	No	No	None listed
Fort Mill Police Department	6	8	0	0	0	0	6	8	0	0	0	0	No	No	None listed
Mecklenburg County Sheriff's Office	107	NR	0	NR	0	NR	0	NR	NR	NR	0	NR	Yes	Yes	Charlotte Mecklenburg
Piedmont Emergency Medical Services	10	15	0	10	0	10	7	15	NR	NR	0	0	No	No	None listed
Rock Hill City Police Department	120	160	80	120	80	120	120	160	NR	NR	0	0	No	No	None listed
Tega Cay Police Department	4	8	0	0	0	0	4	8	NR	NR	0	0	No	No	None listed
York County Fire Service	120	140	0	120	0	120	120	140	NR	NR	0	0	No	No	None listed
York County Rescue Service	20	30	0	10	0	10	12	30	NR	NR	0	0	No	No	None listed
York County Sheriff	147	190	0	100	0	100	147	190	NR	NR	0	0	No	No	None listed
York Police Department	10	15	0	0	0	0	0	0	0	0	0	0	No	No	None listed