

Tracking the Deployment of the Integrated Metropolitan ITS Infrastructure in Greensboro, Winston- Salem, High Point

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 75¹ 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 Greensboro, Winston-Salem, High Point 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 Greensboro, Winston-Salem, High Point region was 93% in 1997 and 89% 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 Greensboro, Winston-Salem, High Point and the same indicators at the national level. These are judged to be the single best representative of a component and are being used as summary indicator for component. The summary indicators are expressed as a percentage; however, because deployment goals have yet to be established, these indicators should not be read as a comparison of what is deployed versus eventual deployment goals. Instead, they only reflect what is deployed compared to full market saturation (i.e., opportunity for deployment).

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

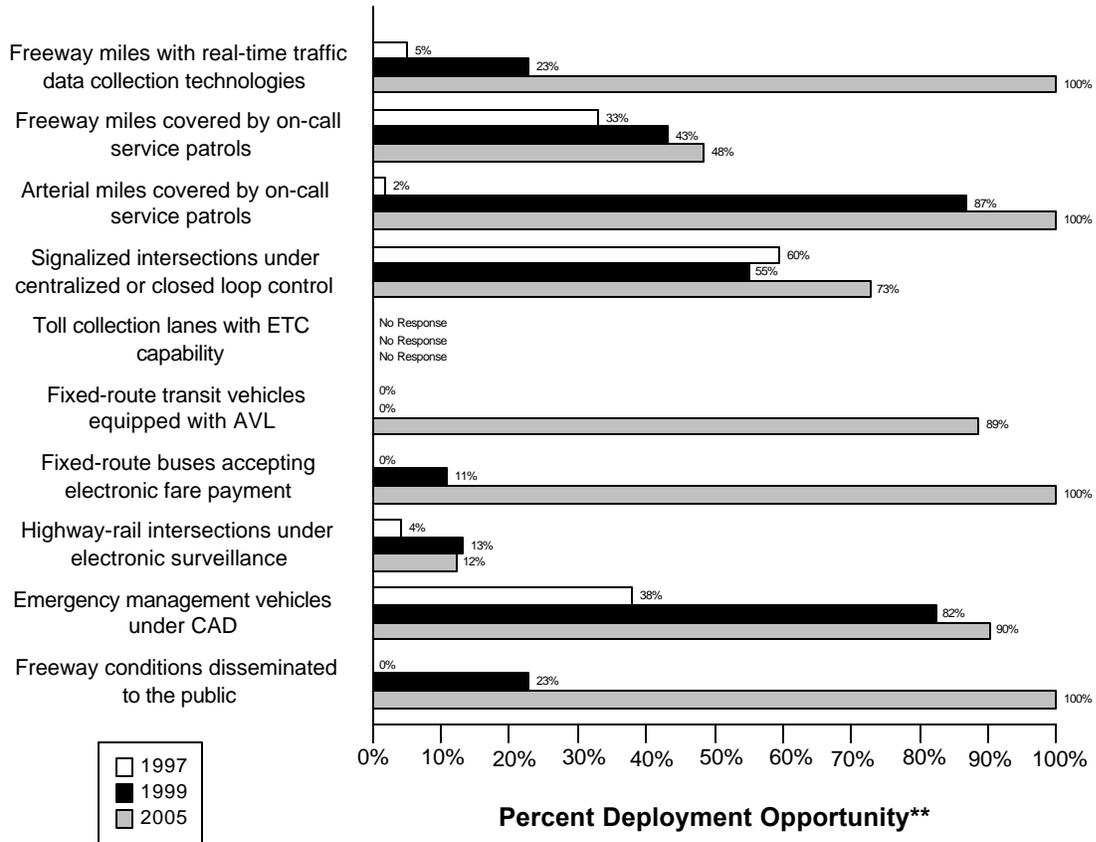
A critical aspect of ITS that provides much of its capability is the integration of individual components to form a unified regional traffic control system. Individual ITS components routinely collect information that is used for purposes internal to that component. For example, the Arterial Management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

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

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

Data as of 5/1/00

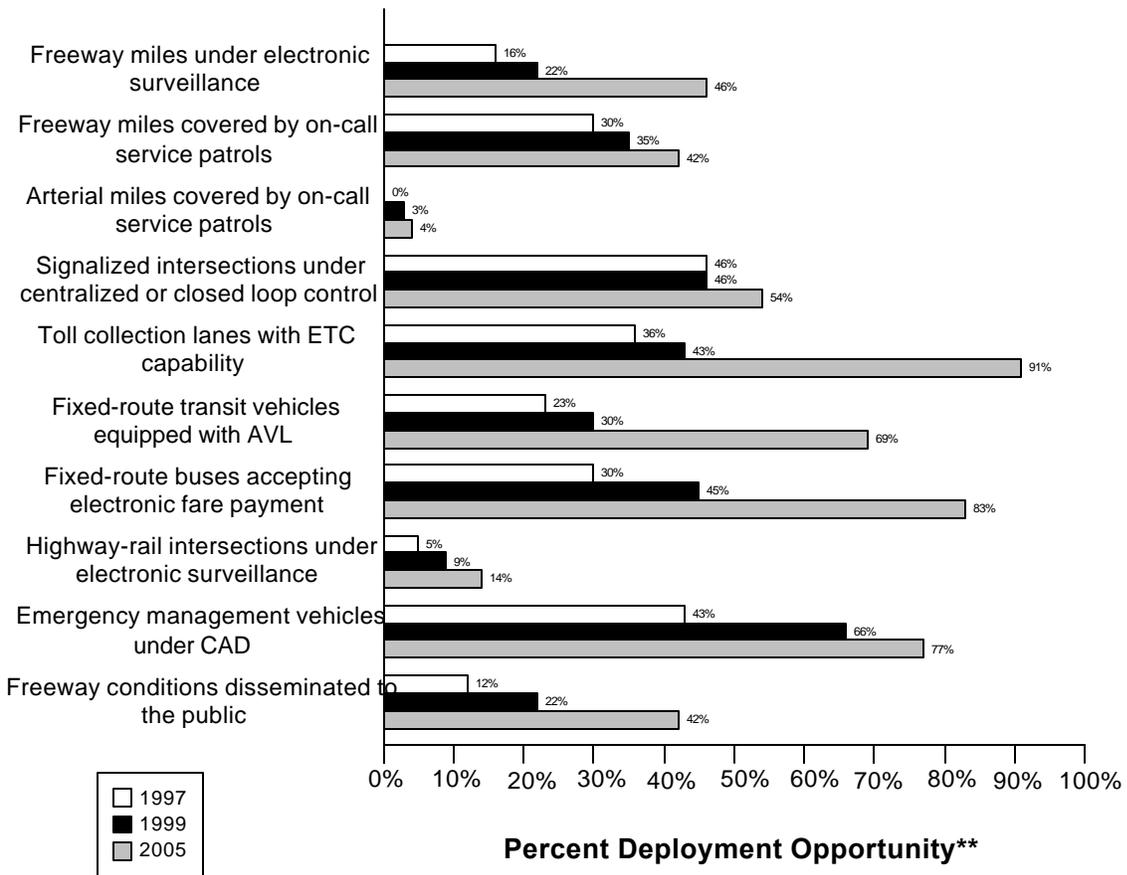
Greensboro, Winston-Salem, High Point Summary Indicators*



* 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.

National Summary Indicators*

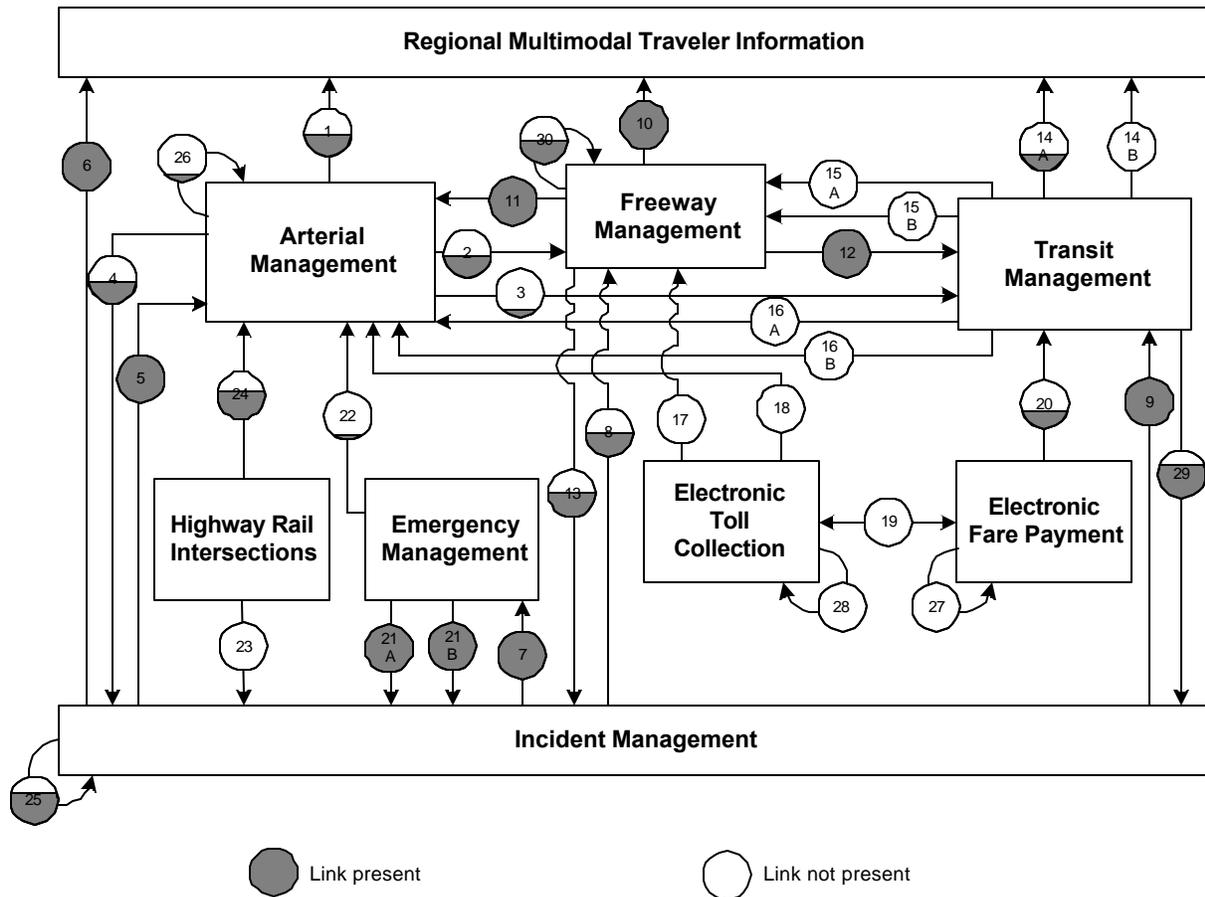
Data as of 5/1/00



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Greensboro, Winston-Salem, High Point Integration Links



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

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

Link	Description	Link	Description
13	Freeway Management to Incident Management	14a	Transit Management to Regional Multimodal Traveler Information (static route information)
		14b	Transit Management to Regional Multimodal Traveler Information (schedule adherence information)
15a	Transit Management to Freeway Management	16a	Transit Management to Arterial Management
15b	Transit Management to Freeway Management (transit vehicle probes)	16b	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	Emergency Management to Incident Management (incident notification)	22	Emergency Management to Arterial Management
21b	Emergency Management to Incident Management (incident clearance)		
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 Greensboro, Winston-Salem, High Point 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).

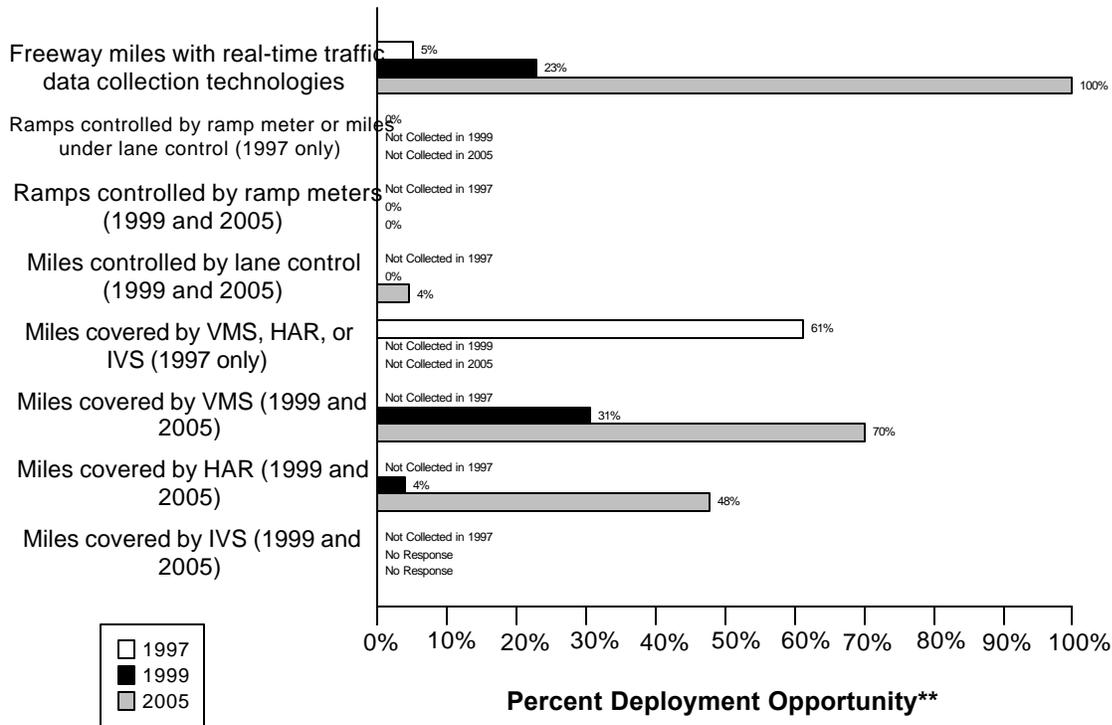
Example: Calculating Integration between Arterial Management and Regional Multimodal Traveler Information

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

Greensboro, Winston-Salem, High Point Freeway Management*



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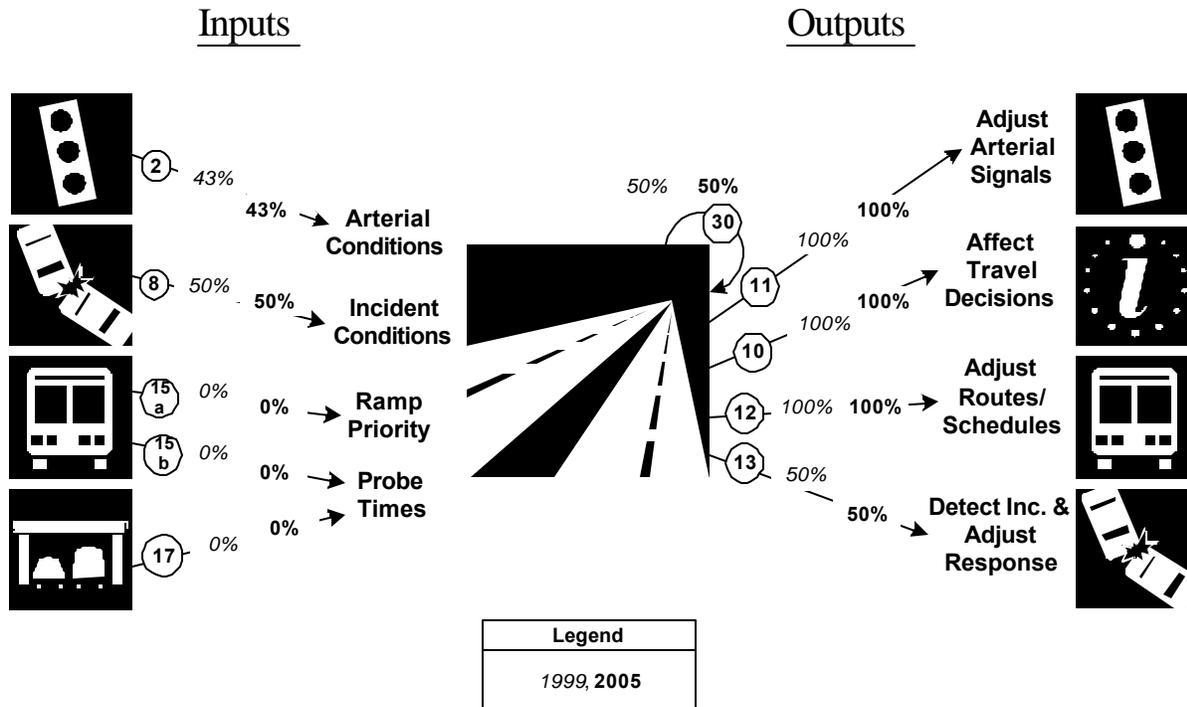
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway centerline miles are under electronic surveillance for monitoring traffic flow	8	157	5%	36	157	23%	157	157	100%
Freeway entrance ramps are controlled by ramp meters or miles under lane control	0	157	0%						
Freeway entrance ramps are controlled by ramp meters				0	412	0%	0	412	0%

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway centerline miles will be controlled by lane control				0	157	0%	7	157	4%
Freeway miles are covered by VMS, HAR, or IVS	96	157	61%						
Freeway miles are covered by VMS				48	157	31%	110	157	70%
Freeway miles are covered by HAR				6	157	4%	75	157	48%
Freeway miles are covered by IVS					157			157	

Freeway Management Integration Indicators

Greensboro, Winston-Salem, High Point Freeway Management Integration*



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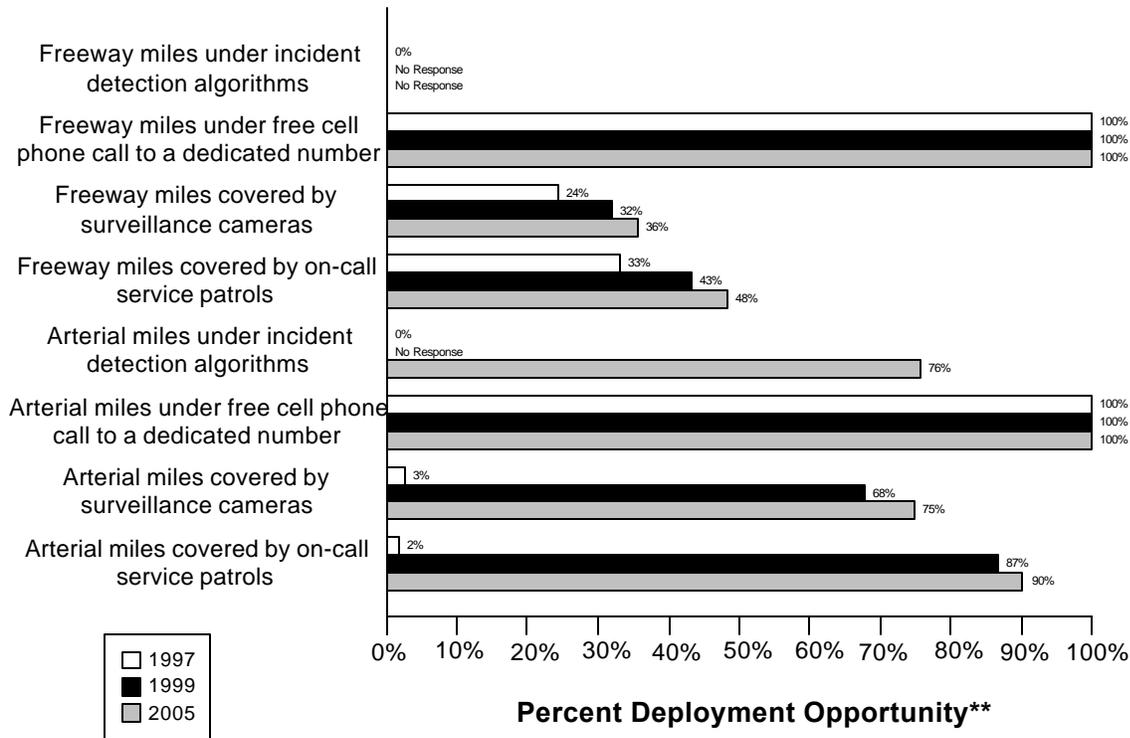
Link Description	1999	2005
2. Arterial Management agencies sending information to Freeway Management	(3/ 7) 43%	(3/ 7) 43%
8. Incident Management agencies sending information to Freeway Management	(1/ 2) 50%	(1/ 2) 50%
15a. Transit management agencies with vehicles equipped with ramp meter priority	(0/ 3) 0%	(0/ 3) 0%
15b. Transit Management agencies with vehicles equipped as probes	(0/ 3) 0%	(0/ 3) 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%	(1/ 2) 50%
11. Freeway Management agencies sending information to Arterial Management	(2/ 2) 100%	(2/ 2) 100%

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	(2/ 2) 100%	(2/ 2) 100%
13. Freeway Management agencies sending freeway conditions to Incident Management	(1/ 2) 50%	(1/ 2) 50%

Incident Management Component Indicators

Data as of 5/1/00

Greensboro, Winston-Salem, High Point Freeway and Arterial Incident Management*



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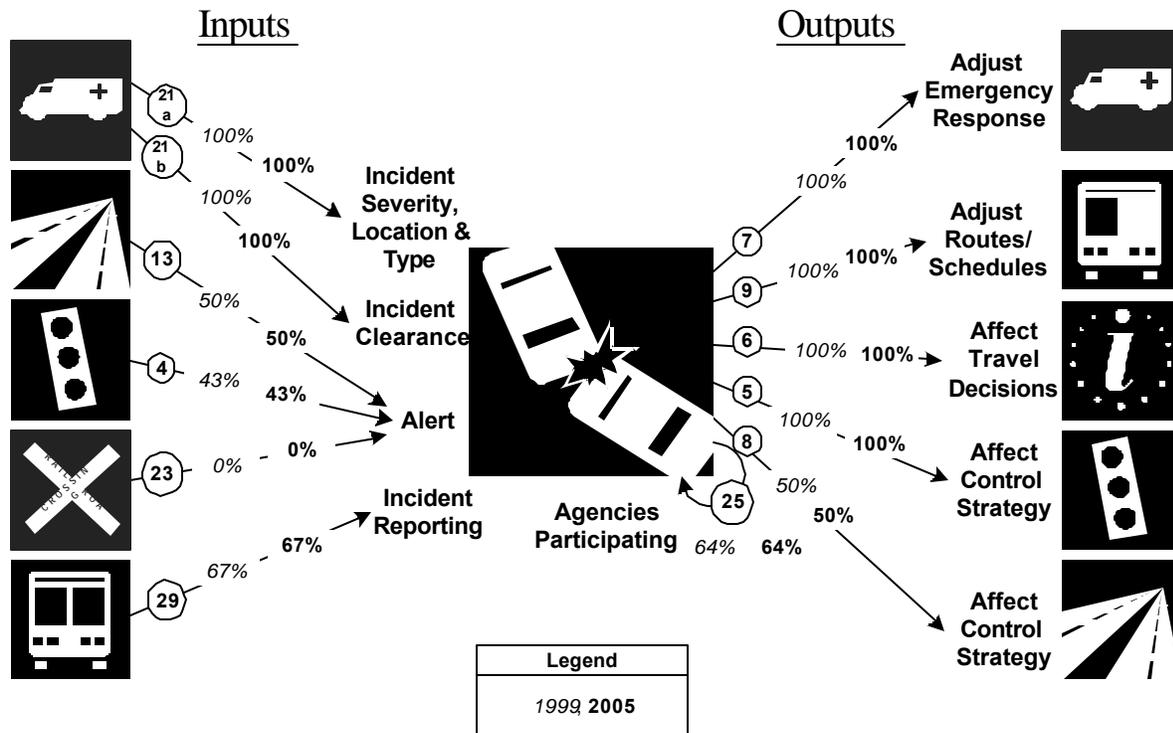
Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway miles are covered by incident detection algorithms	0	157	0%		157			157	
Freeway miles are covered by free cellular phone calls to a dedicated number	157	157	100%	157	157	100%	157	157	100%
Freeway miles are covered by surveillance cameras.	38	157	24%	50	157	32%	56	157	36%

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway miles are covered by on-call publicly-sponsored service patrol or towing services.	52	157	33%	68	157	43%	76	157	48%
Arterial miles are covered by incident detection algorithms	0	554	0%		554		420	554	76%
Arterial miles are covered by free cellular phone calls to a dedicated number	554	554	100%	554	554	100%	554	554	100%
Arterial miles are covered by surveillance cameras	15	554	3%	375	554	68%	414	554	75%
Arterial miles are covered by on-call publicly-sponsored service patrol or towing services	10	554	2%	481	554	87%	500	554	90%

Incident Management Integration Indicators

Greensboro, Winston-Salem, High Point

Incident Management Integration*



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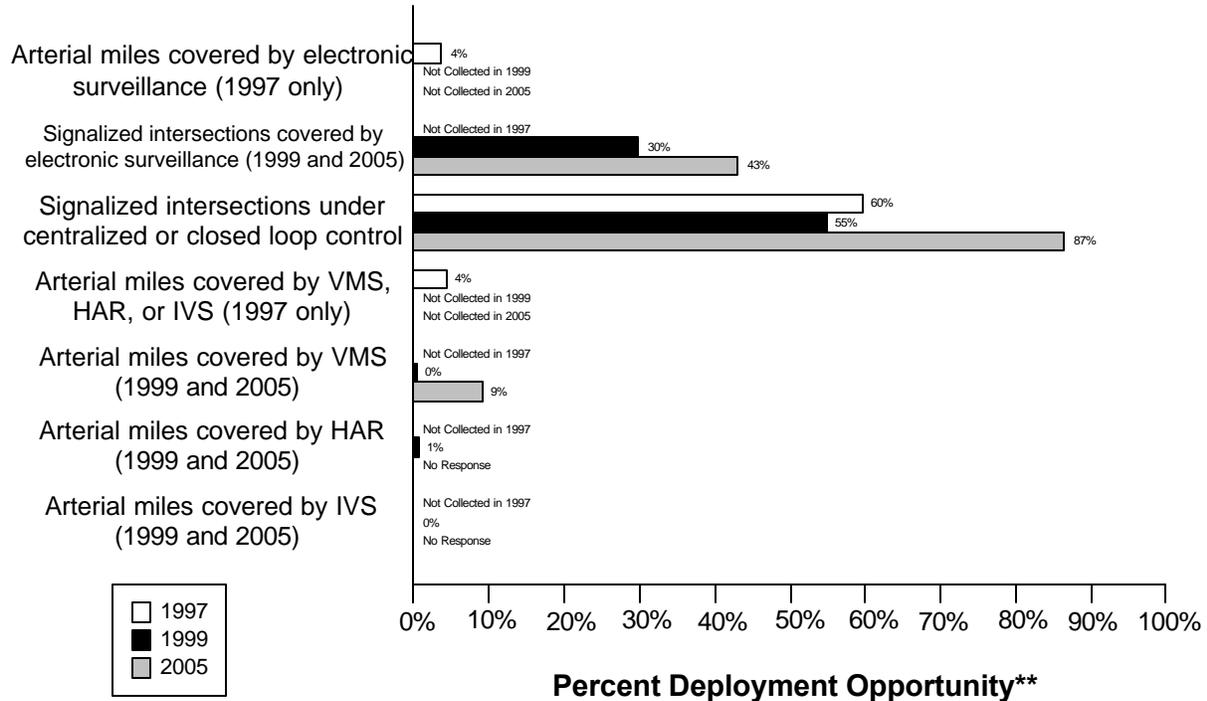
Link Description	1999	2005
21a. Incident management agencies receiving incident severity from Emergency Management	(2 / 2) 100%	(2 / 2) 100%
21b. Incident management agencies receiving incident clearance activities from Emergency Management	(2 / 2) 100%	(2 / 2) 100%
13. Freeway Management agencies sending freeway conditions to Incident Management	(1 / 2) 50%	(1 / 2) 50%
4. Arterial Management agencies sending arterial conditions to Incident Management	(3 / 7) 43%	(3 / 7) 43%
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(0 / 7) 0%	(0 / 7) 0%
29. Transit Management agencies report traffic incidents as part of an organized regional incident management program	(2 / 3) 67%	(2 / 3) 67%

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	(2/ 2) 100%	(2/ 2) 100%
6. Incident Management agencies disseminate information describing incident severity, location, and type to the public	(2/ 2) 100%	(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	(1/ 2) 50%	(1/ 2) 50%
25. Police, fire, and EMS agencies participating in a formal incident management plan/team	(9/ 14) 64%	(9/ 14) 64%

Arterial Management Component Indicators

Data as of 5/1/00

Greensboro, Winston-Salem, High Point Arterial Management*



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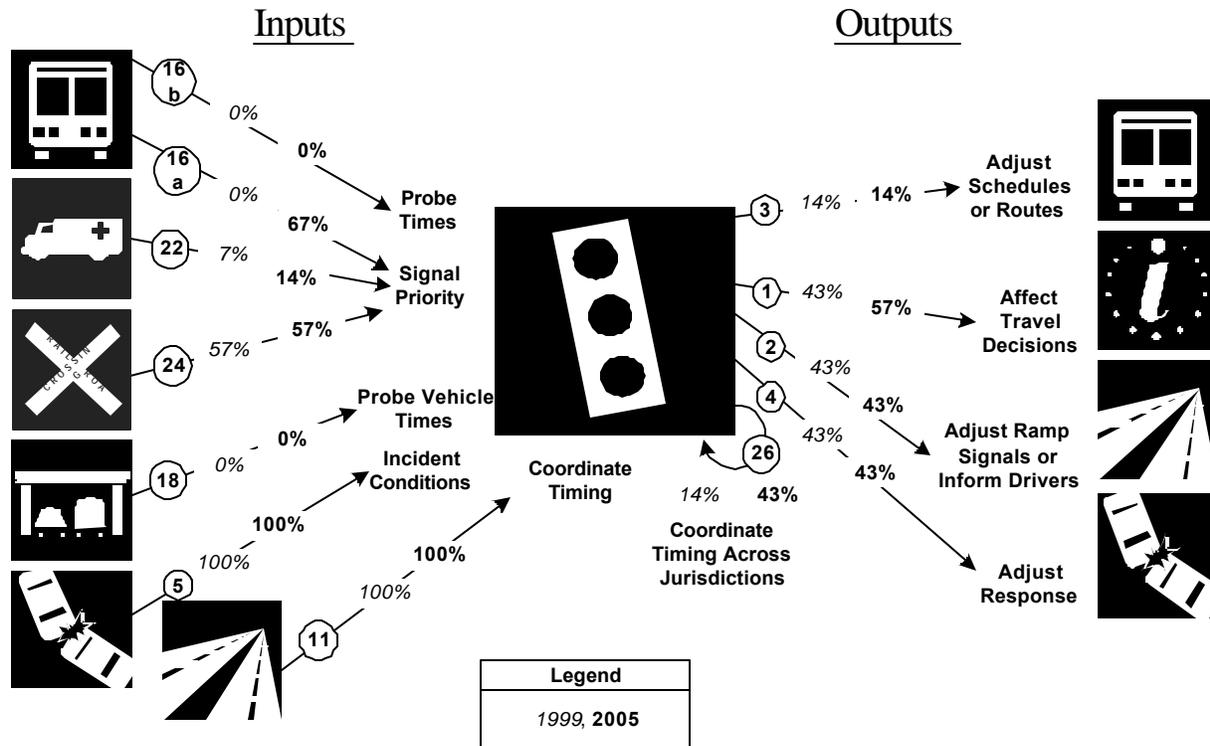
Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles covered by electronic surveillance	20	554	4%						
Signalized intersections are covered by electronic surveillance for monitoring traffic flow				362	1214	30%	470	1091	43%
Signalized intersections are under centralized or closed loop control	593	996	60%	667	1214	55%	944	1091	87%

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Arterial miles are covered by VMS, HAR, or IVS	24	554	4%						
Arterial miles are covered by VMS				2	554	0%	50	554	9%
Arterial miles are covered by HAR				3	554	1%		554	
Arterial miles are covered by IVS				0	554	0%		554	

Arterial Management Integration Indicators

Greensboro, Winston-Salem, High Point

Arterial Management Integration*



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

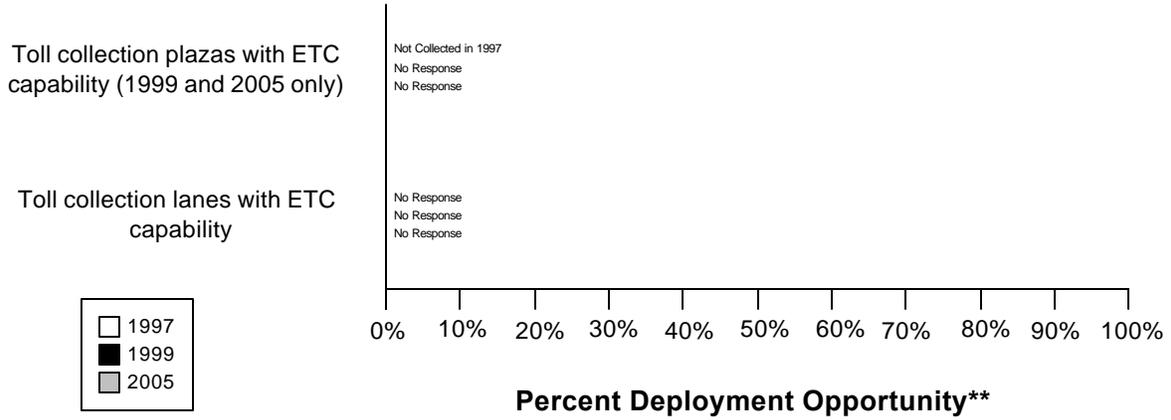
Link Description	1999	2005
16a. Transit management agencies with vehicles equipped with traffic signal priority	(0 / 3) 0%	(2 / 3) 67%
16b. Transit Management agencies have vehicles equipped as probes on arterials	(0 / 3) 0%	(0 / 3) 0%
22. Emergency Management agencies have vehicles equipped with traffic signal preemption capability	(1 / 14) 7%	(2 / 14) 14%
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	(4 / 7) 57%	(4 / 7) 57%
18. Number of Arterial Management agencies receiving information from vehicle probes	(0 / 7) 0%	(0 / 7) 0%
5. Incident Management agencies transfer information describing incident severity, location, and type to Arterial Management	(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	(2/ 2) 100%	(2/ 2) 100%
3. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Transit Management	(1/ 7) 14%	(1/ 7) 14%
1. Arterial Management agencies disseminate arterial travel times, speeds, and conditions to the public	(3/ 7) 43%	(4/ 7) 57%
2. Arterial Management agencies send traffic condition information to Freeway Management	(3/ 7) 43%	(3/ 7) 43%
4. Arterial Management agencies transfer arterial travel times, speeds, and conditions to Incident Management	(3/ 7) 43%	(3/ 7) 43%
26. Arterial Management agencies under cooperative agreement to share traffic signal timing for coordinated response	(1/ 7) 14%	(3/ 7) 43%

Electronic Toll Collection Component Indicators

Data as of 5/1/00

**Greensboro, Winston-Salem, High Point
Electronic Toll Collection***



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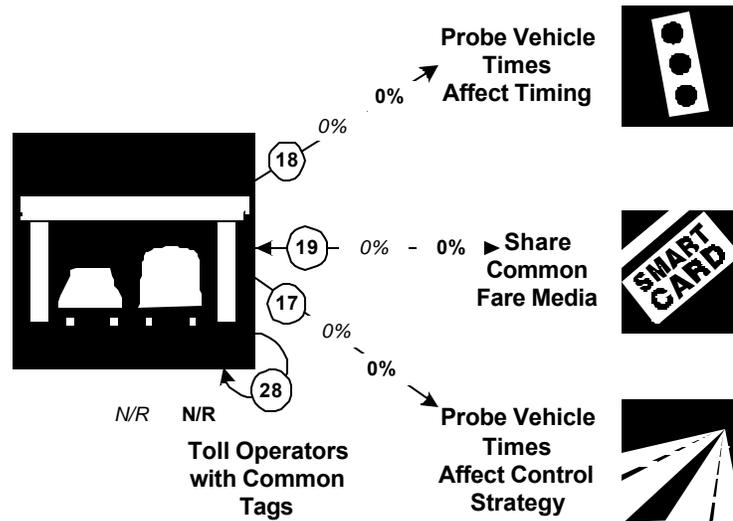
Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Toll collection plazas with ETC capability									
Toll collection lanes with ETC capability									

Electronic Toll Collection Integration Indicators

**Greensboro, Winston-Salem, High Point
Electronic Toll Collection Integration***

Inputs

Outputs



Legend
1999, 2005

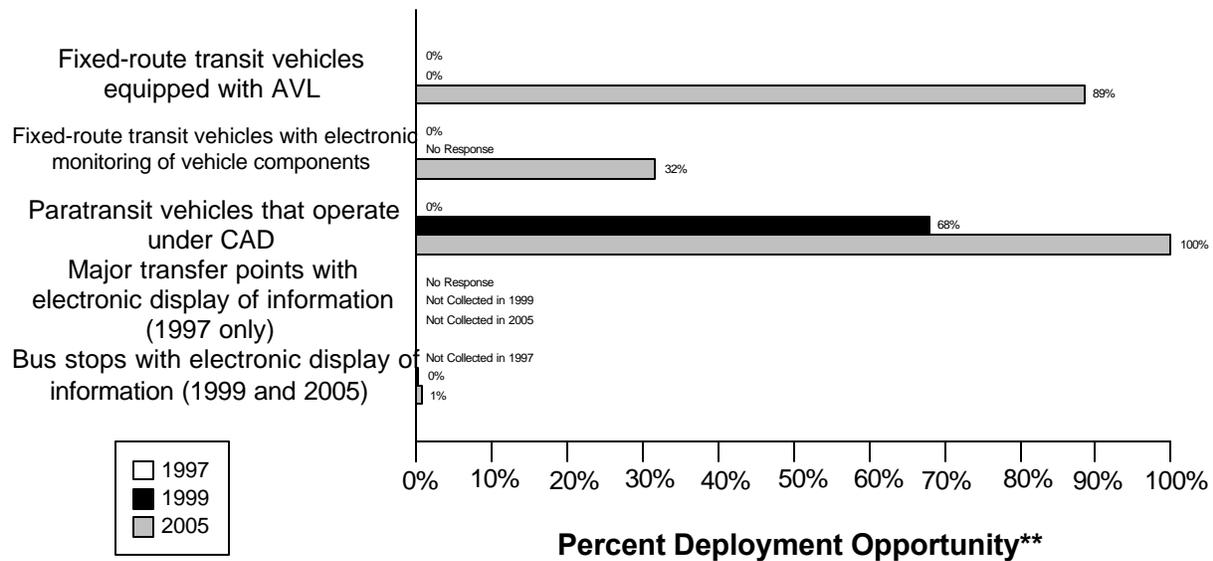
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
18. Number of Arterial Management agencies receiving information from vehicle probes	(0 / 7) 0%	(0 / 7) 0%
19. Transit agencies that accept electronic payment through the use of electronic toll collection media	(0 / 3) 0%	(0 / 3) 0%
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

Greensboro, Winston-Salem, High Point Transit Management*

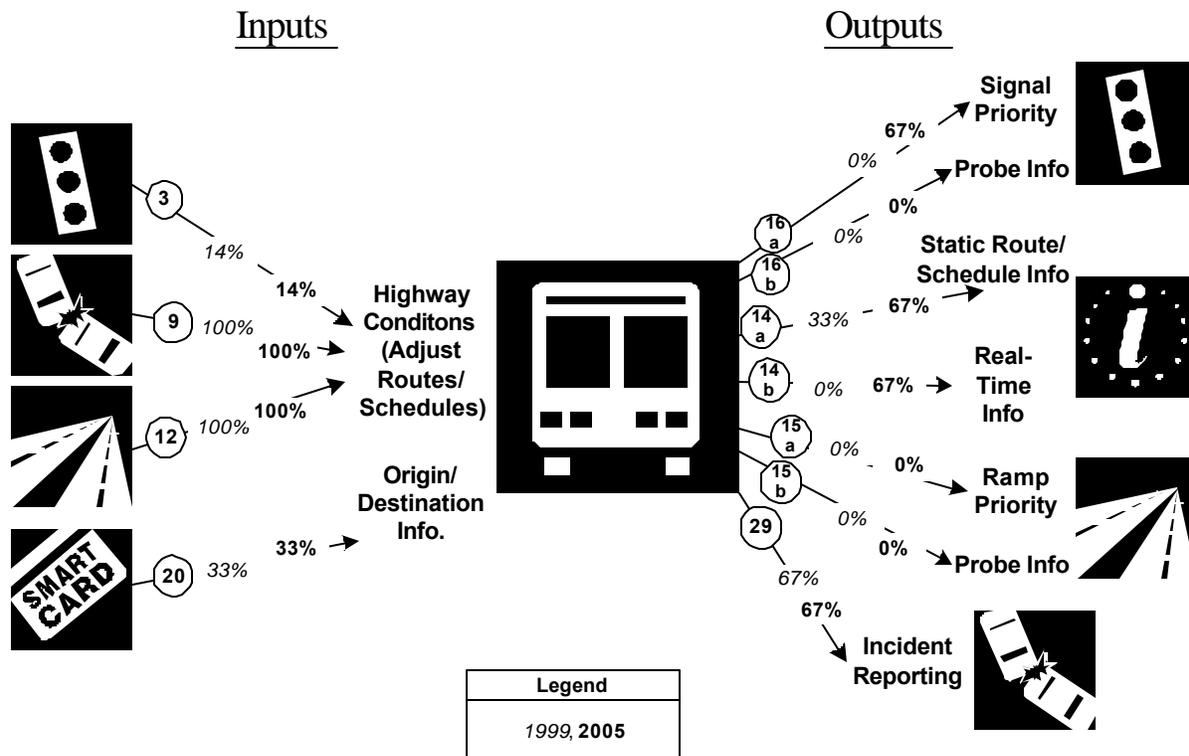


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Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles are equipped with AVL	0	99	0%	0	74	0%	70	79	89%
Fixed-route transit vehicles are equipped with electronic monitoring of vehicle component	0	99	0%		74		25	79	32%
Paratransit vehicles operate under computer-aided dispatch	0	47	0%	19	28	68%	31	31	100%
Percent fixed-route transfer locations with electronic display of information	0	0							
Bus stops display information to the public				4	1500	0%	10	1500	1%

Transit Management Integration Indicators

Greensboro, Winston-Salem, High Point 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	(1 / 7) 14%	(1 / 7) 14%
9. Incident management agencies transfer information describing incident severity, location, and type to Transit Management	(2 / 2) 100%	(2 / 2) 100%
12. Freeway Management agencies transfer freeway travel times, speeds, and conditions to Transit Management	(2 / 2) 100%	(2 / 2) 100%
20. Transit Management agencies using Electronic Fare Payment data in transit service planning	(1 / 3) 33%	(1 / 3) 33%
16a. Transit Management agencies have vehicles equipped with traffic signal priority capability	(0 / 3) 0%	(2 / 3) 67%
16b. Transit Management agencies have vehicles equipped as probes on arterials	(0 / 3) 0%	(0 / 3) 0%
14a. Transit Management agencies disseminate information describing transit routes, schedules, and fares to travelers	(1 / 3) 33%	(2 / 3) 67%

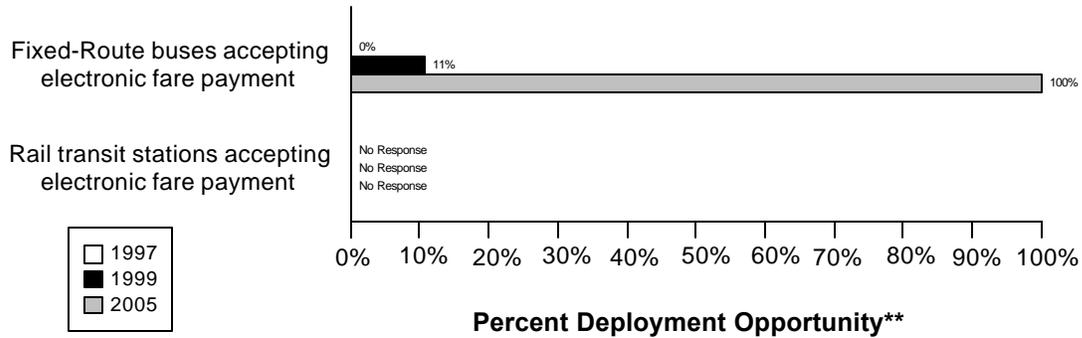
Link Description	1999	2005
14b. Transit Management agencies disseminate information describing schedule/route adherence to travelers	(0/ 3) 0%	(2/ 3) 67%
15a. Transit Management agencies have vehicles equipped with ramp meter priority capability	(0/ 3) 0%	(0/ 3) 0%
15b. Transit Management agencies have vehicles equipped as probes on freeways	(0/ 3) 0%	(0/ 3) 0%
29. Transit Management agencies that report traffic incidents as part of an organized regional Incident Management program	(2/ 3) 67%	(2/ 3) 67%

Electronic Fare Payment Component Indicators

Data as of 5/1/00

Greensboro, Winston-Salem, High Point

Electronic Fare Payment*



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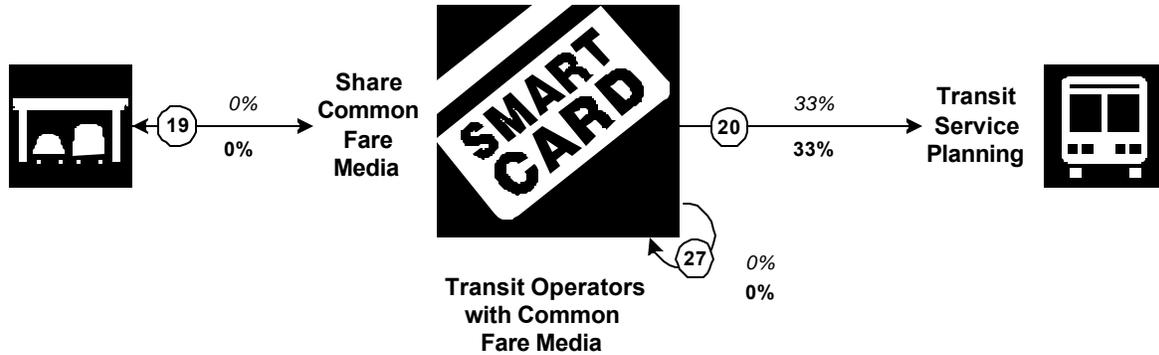
Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Fixed-route transit vehicles that accept electronic payment	0	99	0%	8	74	11%	87	79	110%
Rail transit stations that accept electronic payment	0	0							

Electronic Fare Payment Integration Indicators

**Greensboro, Winston-Salem, High Point
Electronic Fare Payment Integration***

Inputs

Outputs



Legend
1999
2005

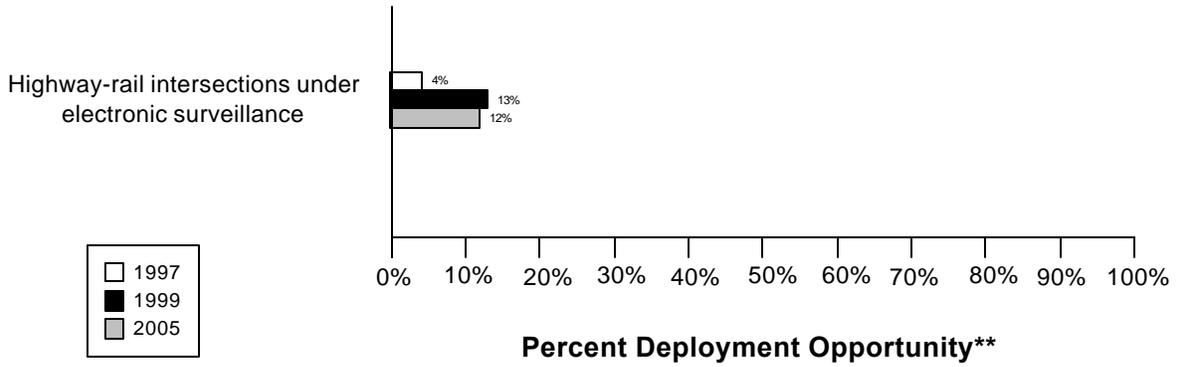
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
19. Transit agencies that accept electronic payment through the use of electronic toll collection media	(0 / 3) 0%	(0 / 3) 0%
20. Transit Management agencies use Electronic Fare Payment data in transit service planning	(1 / 3) 33%	(1 / 3) 33%
27. Transit Management agencies that use the same electronic payment system	(0 / 3) 0%	(0 / 3) 0%

Highway Rail Intersection Component Indicators

Data as of 5/1/00

Greensboro, Winston-Salem, High Point 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.

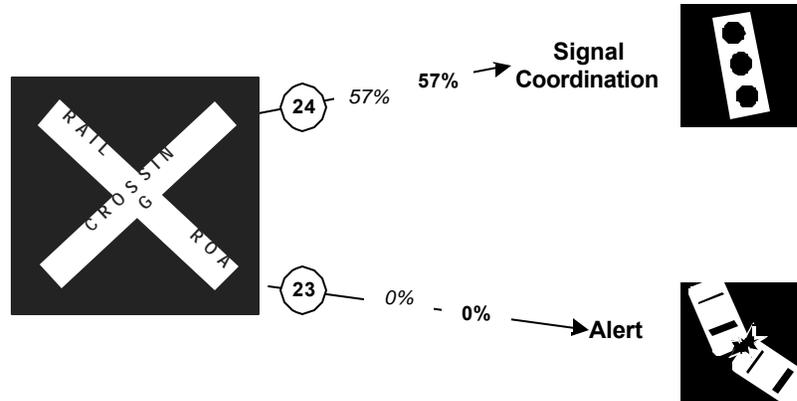
Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Highway-rail intersections are under electronic surveillance	15	348	4%	14	107	13%	13	107	12%

Highway Rail Intersection Integration Indicators

Greensboro, Winston-Salem, High Point Highway Rail Intersections Integration*

Inputs

Outputs



Legend
1999, 2005

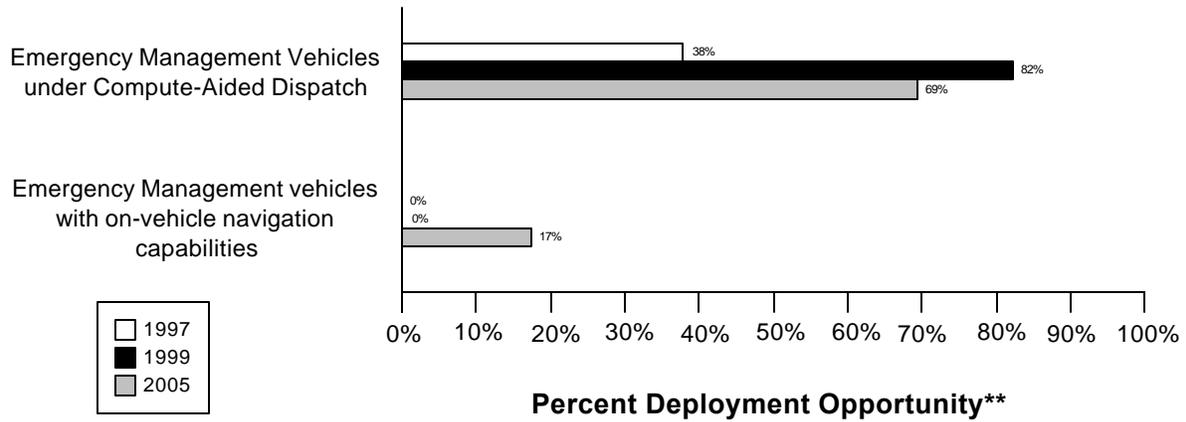
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

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	(4/ 7) 57%	(4/ 7) 57%
23. Arterial Management agencies receive information on highway-rail intersection crossing blockages for the purpose of managing incident response	(0/ 7) 0%	(0/ 7) 0%

Emergency Management Component Indicators

Data as of 5/1/00

Greensboro, Winston-Salem, High Point Emergency Management*



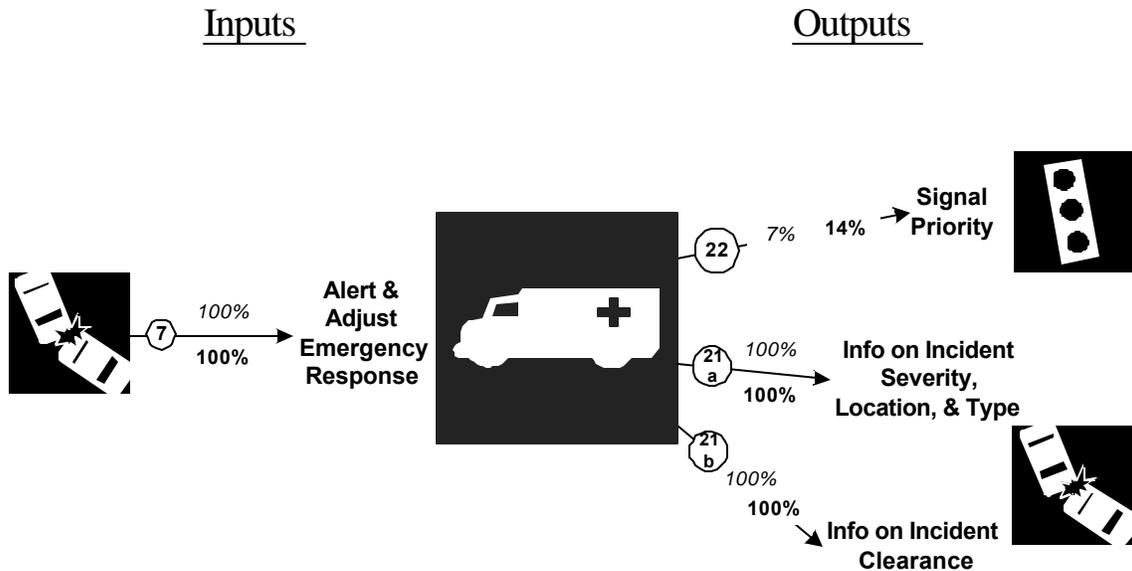
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity.

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

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Public sector emergency vehicles that operate under computer-aided dispatch	623	1643	38%	1289	1567	82%	610	879	69%
Public sector emergency vehicles that have in-vehicle route guidance capability	0	1643	0%	1	1567	0%	152	879	17%

Emergency Management Integration Indicators

Greensboro, Winston-Salem, High Point Emergency Management Integration*



Legend
1999, 2005

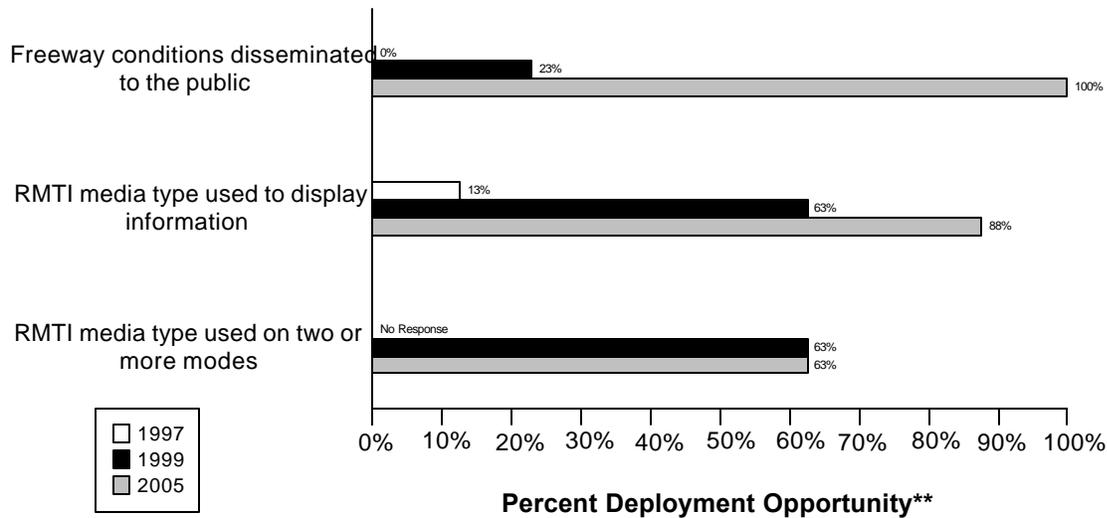
* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
7. Freeway Management agencies transfer information describing incident severity, location, and type to Emergency Management agencies	(2/ 2) 100%	(2/ 2) 100%
22. Emergency Management agencies have vehicles equipped with traffic signal preemption capability	(1/ 14) 7%	(2/ 14) 14%
21a. Freeway Management agencies receive incident severity, location, and type data from Emergency Management agencies	(2/ 2) 100%	(2/ 2) 100%
21b. Freeway Management agencies receive incident clearance activities information from Emergency Management agencies	(2/ 2) 100%	(2/ 2) 100%

Regional Multimodal Traveler Information Component Indicators

Data as of 5/1/00

Greensboro, Winston-Salem, High Point Regional Multimodal Traveler Information*



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

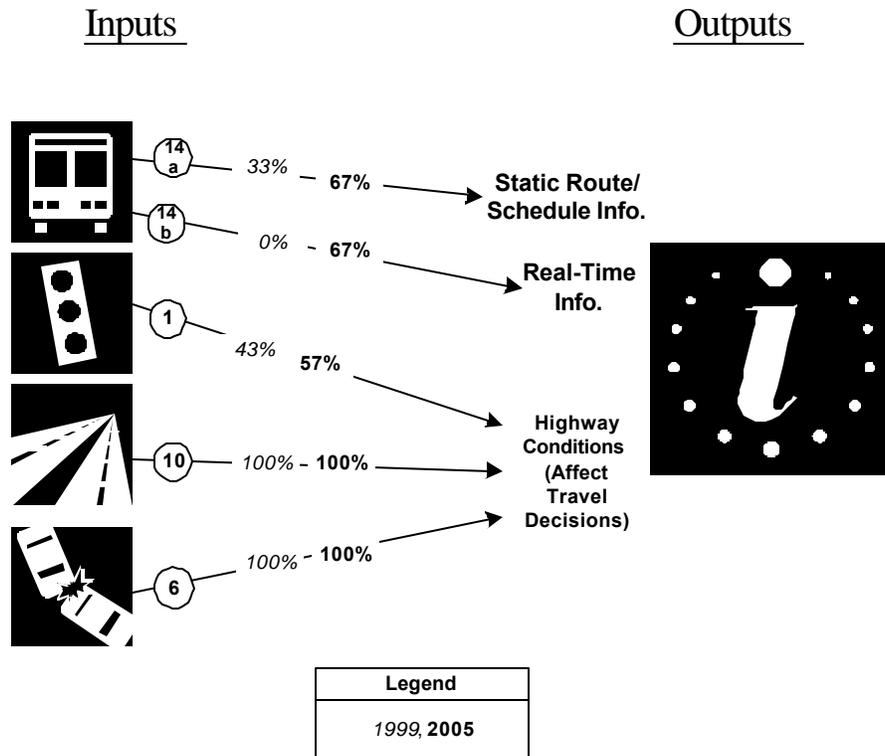
** Deployment opportunity reflects potential totals that do not necessarily reflect actual need.

Description	1997			1999			2005		
	Num	Den	%	Num	Den	%	Num	Den	%
Freeway conditions disseminated to travelers	0	157	0%	36	157	23%	157	157	100%
Possible RMTI media types are used to display information to travelers	1	8	13%	5	8	63%	7	8	88%
Possible RMTI media are used to display information on <i>two or more modes</i> to travelers				5	8	63%	5	8	63%

Regional Multimodal Traveler Information Integration Indicators

Greensboro, Winston-Salem, High Point

Regional Multimodal Traveler Information Integration*

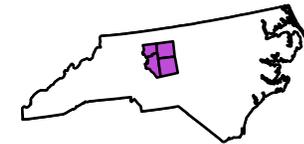


* Indicators are single surrogates that do not necessarily reflect the full breadth of ITS deployment activity

Link Description	1999	2005
14a. Transit Management agencies that disseminate information describing transit routes, schedules, and fares to travelers	(1 / 3) 33%	(2 / 3) 67%
14b. Transit Management agencies that disseminate information describing schedule/route adherence to travelers	(0 / 3) 0%	(2 / 3) 67%
1. Arterial Management agencies that disseminate arterial travel times, speeds, and conditions to the public	(3 / 7) 43%	(4 / 7) 57%
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	(2 / 2) 100%	(2 / 2) 100%

Appendix A
Survey Coverage Area

**GREENSBORO TRANSPORTATION ADVISORY COMMITTEE,
HIGH POINT TRANSPORTATION ADVISORY COMMITTEE,
WINSTON-SALEM TRANSPORTATION ADVISORY COMMITTEE, NC**



- City Included in Surveys
 - ⚡ Metropolitan Planning Area Boundary
 - ⚡ County Boundary
 - Urbanized 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
GREENSBORO, WINSTON-SALEM, HIGH POINT						
Arterial Management						
Winston-Salem City	(336) 727-2707	(336) 748-3370	7/29/1999	8/20/1999	8/13/1997	9/11/1997
High Point City	(336) 883-3225	(336) 883-8568	7/29/1999	9/23/1999	8/14/1997	
Davidson County	336.761.2200	(336) 761-2347	7/29/1999	12/23/1999	8/14/1997	
Guilford County	(336) 334-3161	(336) 334-3637	7/29/1999	9/7/1999	8/14/1997	9/2/1997
Randolph County	(910) 944-2344	(910) 944-5623	7/29/1999	8/11/1999	8/14/1997	10/20/1997
Greensboro City	(336) 373-2860	(336) 412-6171	7/29/1999	9/20/1999	8/14/1997	10/14/1997
Forsyth County	336.761.2200	(336) 761-2347	7/29/1999	12/23/1999	8/14/1997	10/9/1997
Emergency Management						
Davidson County Emergency Medical Services	336-242-2270	336-249-7863	6/4/1999	9/1/1999	8/13/1997	8/14/1997
Davidson County Fire Departments	336-242-2270	336-249-7863	6/4/1999	9/1/1999	8/13/1997	8/14/1997
Randolph County Sheriffs Department	(336) 318-6699	(336) 318-6951	6/4/1999	7/27/1999	8/14/1997	5/15/1998
Forsyth County Sheriffs Department	336-748-4100	336-727-8070	6/4/1999		8/14/1997	5/15/1998
Forsyth County Fire Department	336-727-8084	336-727-2078	6/4/1999	7/27/1999	8/13/1997	8/14/1997
Davidson County Sheriffs Department	(910) 242-2908	(910) 249-6968	6/4/1999	7/28/1999	8/13/1997	9/29/1997
Davidson County Sheriff Departments (more	336-242-2270	336-249-7863	6/4/1999	9/1/1999	8/13/1997	9/29/1997
Davidson County Rescue Squad	336-242-2270	336-249-7863	6/4/1999	9/1/1999	8/13/1997	9/29/1997
Winston-Salem Fire Department	(336) 773-7951	(336) 773-7974	6/7/1999	6/8/1999	8/14/1997	8/28/1997
High Point City Police Department	336- 887-7970	336-887-7972	6/4/1999	8/26/1999	8/14/1997	9/2/1997
High Point City Fire Department	336-883-3372	336-883-3550	6/4/1999	8/31/1999	8/14/1997	6/22/1998
Greensboro City Police Department	336-373-2018	336-335-5474	6/4/1999	8/9/1999	8/14/1997	8/18/1997
Guilford County Sheriff Department	336-373-3694	336-333-6729			8/14/1997	
Thomasville Rescue Squad	336-242-2270	336-249-7863	6/4/1999	9/1/1999		
Greensboro City Fire Department	(910) 373-2161	(910) 373-2936	6/4/1999	6/21/1999	8/14/1997	5/15/1998
Winston-Salem Police Department	336- 773-7700	336-773-7957	6/4/1999	7/30/1999	8/14/1997	10/3/1997
Freeway Management						
North Carolina Department of Transportation-	(910) 334-3192	(910) 334-3637	7/29/1999	9/22/1999	8/14/1997	8/29/1997
North Carolina Department of Transportation-	(336) 761-2200	(336) 761-2347	7/29/1999	8/26/1999	8/14/1997	8/22/1997
MPO						
Greensboro Transportation Advisory Committee	(336) 373-2332	(336) 412-6171	7/15/1999	8/19/1999		
Winston-Salem Department of Transportation	(336) 727-2707	(336) 748-3370	7/15/1999	8/20/1999		
High Point Transportation Advisory Committee	(336) 883-3233	(336) 883-8568	7/15/1999	8/19/1999		

Agency Name	Phone	Fax	1999		1997	
			Out	In	Out	In
Transit Management						
Winston-Salem Transit Authority	(336) 727-2648	(336) 727-8104	8/9/1999	8/19/1999	7/21/1997	8/6/1997
High Point Transit	(336) 883-3424	(336) 883-3425	8/9/1999	9/10/1999	7/21/1997	9/25/1997
Greensboro Transit Authority	(336) 373-2820	(336) 373-2809	8/9/1999	9/22/1999	7/21/1997	8/5/1997

Appendix C
Freeway Management Components

Freeway Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	North Carolina Department of Transportation-Greensboro		North Carolina Department of Transportation-Winston-Salem		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	79		41		120	
Number of freeway centerline miles that is used for planning	79		134		213	
Number of freeway entrance ramps that agency owns, operates or maintains	28		37		65	
Number of freeway entrance ramps that is used for planning	28		76		104	
Type of facilities used to conduct freeway/incident management activities						
Activities housed in a free-standing dedicated building?	No		Yes		1	
Activities housed in a building shared with other activities?	Yes		Yes		2	
Activities conducted in a dedicated control room?	Yes		Yes		2	
Control room contains operator console(s)?	Yes		Yes		2	
Control room contains electronic wall map?	Yes		No		1	
Control room contains CCTV display(s)?	Yes		Yes		2	
Activities conducted in a room containing workstations or PCs that manage traffic?	Yes		Yes		2	
Facilities are electronically linked to other transportation mgt facilities?	No		Yes		1	
Staffing and hours of operation of freeway/incident management activities						
Number of full-time agency staff members	7		11		18	
Number of full time contractor staff members	NR		0		0	
Number of part-time agency staff members	NR		5		5	
Number of part-time contractor staff members	NR		0		0	
Staffed 24 hours day by agency staff or by others	NR		NR		0	
Staffed during peak hours only by agency staff or by others	NR		NR		0	
Staffed by others during off-peak hours	No		No		0	
Agency staff perform transportation management as an ancillary duty	No		No		0	
Agency staff dedicated to transportation management duty	Yes		Yes		2	
Types of operations conducted for freeway/incident management						
Incident detection and management?	No		Yes		1	
This metropolitan area?	Yes		Yes		2	
Other metropolitan area?	No		Yes		1	
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?	No		Yes		1	

Freeway Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	North Carolina Department of Transportation-Greensboro		North Carolina Department of Transportation-Winston-Salem		Totals	
	1999	2005	1999	2005	1999	2005
Real-Time Traffic Data Collection Technologies						
Total number of miles under surveillance with real-time data collection tech.	0	25	36	143	36	168
<u>Number of Stations with data collection technologies</u>						
Loop detectors	0	0	0	0	0	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	0	0	NR	143	0	143
Other (e.g., acoustic detectors)	0	0	0	0	0	0
<u>Number of Miles covered with data collection technologies</u>						
Loop detectors	0	0	0	0	0	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	0	0	NR	28	0	28
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	16	36	3	8	19	44
Candidate locations for deployment of VMS	16	36	3	8	19	44
Roadside Technologies used to Distribute Traveler Information						
Total number of miles where information is distributed	6	30	0	45	6	75
<u>Number deployed</u>						
Highway advisory radio	1	5	0	4	1	9
In-vehicle signing	0	0	0	0	0	0
Portable variable message signs	7	10	4	0	11	10
Other	0	0	0	0	0	0
<u>Miles covered</u>						
Highway advisory radio	6	30	0	45	6	75
In-vehicle signing	0	0	0	0	0	0
Portable variable message signs	NR	NR	0	0	0	0
Other	0	0	0	0	0	0
Ramp Meters on Freeways						
Number of entrance ramp meters operated under isolated control	NR	NR	0	0	0	0
Number of entrance ramp meters operated under central control	NR	NR	0	0	0	0
Number of entrance ramp meters that provide preemption for emergency vehicles	NR	NR	0	0	0	0
Number of entrance ramp meters that provide priority for transit vehicles	NR	NR	0	0	0	0
Total number of metered ramps	NR	NR	0	0	0	0
Freeway centerline miles under lane control	NR	NR	0	7	0	7
Communication Links						
<u>Freeway centerline miles covered by the following type of communication</u>						
Twisted pair cable	0	0	0	0	0	0
Coaxial cable	0	0	0	0	0	0

Freeway Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	North Carolina Department of Transportation-Greensboro		North Carolina Department of Transportation-Winston-Salem		Totals	
	1999	2005	1999	2005	1999	2005
Fiber-optic cable	12	35	10	41	22	76
Microwave radio	0	0	1	0	1	0
Other	0	0	0	51	0	51
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	
NTCIP Object Definitions for Dynamic Message Signs (AASHTO TS 3.6)	No		Yes		1	
NTCIP Object Definitions for Highway Advisory Radio (AASHTO TS 3.HAR)	No		No		0	
NTCIP Object Definitions for Ramp Meter Control (AASHTO TS 3.RMC)	No		No		0	
NTCIP Object Definitions for Transportation Sensor Systems (AASHTO TS 3.TSS)	No		No		0	
NTCIP 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		Yes		1	
INCIDENT MANAGEMENT SECTION						
Use of Service Patrols to Assist in Detection and Response to Incidents						
Publicly operated service patrol vehicles	No		Yes		1	
Privately operated service patrol vehicles operated under public contract	No		No		0	
Total number of freeway miles patrolled by these services	36	56	32	20	68	76
Miles Covered by Methods to Detect and Verify Incidents						
Free cellular phone call to a dedicated phone number other than 911	NR	NR	32	20	32	20
Police patrols	36	36	32	20	68	56
Computer algorithms linked to traffic surveillance equipment	NR	NR	NR	NR	0	0
CCTV	18	36	32	20	50	56
Private sector sources (e.g., Shadow Traffic, SmartRoutes)	NR	NR	32	20	32	20
Other (e.g., free cell phone call to an area radio system, etc.)	NR	NR	32	20	32	20
Procedures in place for Freeway Incident Response?						
Working agreement(s)/arrangement(s) with other agencies	Yes		Yes		2	
Inter-agency incident management admin. team that meets regularly	Yes		Yes		2	
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		Yes		2	
Central focal point for facilitating the two-way flow of information among agencies responding to an incident?						
The central focal point is a Freeway or Traffic Management Center	No		Yes		1	

Freeway Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	North Carolina Department of Transportation-Greensboro		North Carolina Department of Transportation-Winston-Salem		Totals	
	1999	2005	1999	2005	1999	2005
The central focal point is a Police, Fire or joint dispatch center	Yes		No		1	
The central focal point is another center	No		No		0	
Methods of Communication Used On-Site at an Incident						
<u>Police</u>						
Two-way radio	No		Yes		1	
800 MHz trunked radio	Yes		Yes		2	
Cellular telephone	Yes		Yes		2	
Hand-held (i.e., walkie-talkie)	No		No		0	
Automated data systems (i.e., CAD)	Yes		Yes		2	
<u>Fire</u>						
Two-way radio	No		Yes		1	
800 MHz trunked radio	Yes		Yes		2	
Cellular telephone	Yes		Yes		2	
Hand-held (i.e., walkie-talkie)	No		No		0	
Automated data systems (i.e., CAD)	Yes		Yes		2	
<u>DOT</u>						
Two-way radio	Yes		Yes		2	
800 MHz trunked radio	Yes		Yes		2	
Cellular telephone	Yes		Yes		2	
Hand-held (i.e., walkie-talkie)	No		No		0	
Automated data systems (i.e., CAD)	No		Yes		1	
<u>Towing</u>						
Two-way radio	Yes		No		1	
800 MHz trunked radio	No		No		0	
Cellular telephone	Yes		Yes		2	
Hand-held (i.e., walkie-talkie)	No		No		0	
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	Yes		Yes		2	
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		Yes		2	

Freeway Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	North Carolina Department of Transportation-Greensboro		North Carolina Department of Transportation-Winston-Salem		Totals	
	1999	2005	1999	2005	1999	2005
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 is "in charge" at the incident scene?						
Specified by state law?	Yes		No		1	
Formal agreement?	No		No		0	
Not specified or don't know?	No		Yes		1	
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		Yes		2	
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		Yes		2	
Respondents protected through law or court opinion for liability claims for damages to vehicles or cargoes during clearance activities?	Yes		DK		1	
Are overturned tank trucks, which are intact and not leaking, uprighted without first off-loading?	Yes		No		1	
Does your state or local jurisdiction have a law that requires drivers involved in property-damage-only accidents to move the vehicles from travel lanes to a safe location to exchange info and wait for police?	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		0-24		0	
Have policies or procedures for quick removal of vehicles?	Yes		Yes		2	
Is Total Station equipment used to investigate major incidents?	Yes		Yes		2	
Handling of Towing Responses to Incidents						
Formal contract based on qualifications?	Yes		Yes		2	
Rotation with companies under contract?	Yes		No		1	
Separate lists kept for light and heavy response and for specialty recovery?	Yes		Yes		2	
Rotation list with minimal qualifications?	No		Yes		1	
In towing qualifications, do you require towers to be certified under the Towing and Recovery Ass. of America's National Drivers Cert. Program?	Yes		No		1	
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: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Greensboro	
	1999	2005
Agency Returned Survey?	Yes	
Freeway Management Section		
Agencies your agency provides freeway travel times, speeds, and conditions information, share infrastructure or coordinates operation		
<i>Freeway Management Agencies</i>		
Provide Information	Greensboro City	None listed
Share Infrastructure	Greensboro City	None listed
Coordinate Operation	Greensboro City	None listed
<i>Incident Management Agencies</i>		
Provide Information	Greensboro City	None listed
Share Infrastructure	Greensboro City	None listed
Coordinate Operation	Greensboro City	None listed
<i>Arterial Management Agencies</i>		
Provide Information	Greensboro City, High Point City	None listed
Share Infrastructure	Greensboro City, High Point City	None listed
Coordinate Operation	Greensboro City, High Point City	None listed
<i>Public Transit Operators</i>		
Provide Information	Greensboro Transit Authority	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
<u>Receiving real-time information via electronic means from others</u>		
<i>Incident Management agencies from which your agency receives incident severity, location, and type information</i>	Greensboro City, Guilford County	None listed
<i>Arterial Management agencies from which your agency receives</i>		

Freeway Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Greensboro	
	1999	2005
<i>arterial travel times, speeds, and conditions</i>	Greensboro City, High Point City	None listed
<i>Public Transit operators from which your agency receives freeway travel times derived from vehicle probes</i>	None listed	None listed
<i>Toll Collection agencies from which your agency receives freeway travel times derived from vehicles probes</i>	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	Greensboro City, High Point City	None listed
Share Infrastructure	Greensboro City, High Point City	None listed
Coordinate Operation	Greensboro City, High Point City	None listed
Emergency Management Agencies		
Provide Information	Greensboro City Fire Department, Greensboro City Police Department, High Point City Fire Department, High Point City Police Department, Guilford County Sheriffs Office, Guilford County Emergency Medical Services, Guilford County Fire Department	None listed

Freeway Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Greensboro	
	1999	2005
Share Infrastructure	Greensboro City Fire Department, Greensboro City Police Department, High Point City Fire Department, High Point City Police Department, Guilford County Sheriffs Office, Guilford County Emergency Medical Services, Guilford County Fire Department	None listed
Coordinate Operation	Greensboro City Fire Department, Greensboro City Police Department, High Point City Fire Department, High Point City Police Department, Guilford County Sheriffs Office, Guilford County Emergency Medical Services, Guilford County Fire Department	None listed
Freeway Management Agencies		
Provide Information	Greensboro City	None listed
Share Infrastructure	Greensboro City	None listed
Coordinate Operation	Greensboro City	None listed
Public Transit Operators		

Freeway Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Greensboro	
	1999	2005
Provide Information	Greensboro Transit Authority	None listed
Share Infrastructure	Greensboro Transit Authority	None listed
Coordinate Operation	Greensboro Transit Authority	None listed
<u>Receiving real-time information via electronic means from others</u>		
<i>Emergency Management agencies from which your agency receives incident clearance and/or incident severity and type</i>		
Receive Arterial Incident Clearance Information	Greensboro City Fire Department, Greensboro City Police Department, High Point City Fire Department, High Point City Police Department, Guilford County Sheriffs Office, Guilford County EMS, Guilford County Fire Department	None listed
Receive Arterial Incident Severity Information	Greensboro City Fire Department, Greensboro City Police Department, High Point City Fire Department, High Point City Police Department, Guilford County Sheriffs Office, Guilford County EMS, Guilford County Fire Department	None listed
<i>Arterial Management agencies from which your agency receives arterial travel times, speeds, and conditions</i>		
	High Point City, Greensboro City	None listed
<i>Freeway Management agencies from which your agency receives</i>		

Freeway Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Greensboro	
<i>freeway travel times, speeds, and conditions</i>	1999	2005
	North Carolina Department of Transportation-Greens, Law Enforcement, Fire, EMS, DMV	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.

Freeway Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Winston-Salem	
	1999	2005
Agency Returned Survey?	Yes	
Freeway Management Section		
Agencies your agency provides freeway travel times, speeds, and conditions information, share infrastructure or coordinates operation		
<i>Freeway Management Agencies</i>		
Provide Information	North Carolina Department of Transportation	None listed
Share Infrastructure	North Carolina Department of Transportation	None listed
Coordinate Operation	North Carolina Department of Transportation	None listed
<i>Incident Management Agencies</i>		
Provide Information	North Carolina Department of Transportation	None listed
Share Infrastructure	North Carolina Department of Transportation	None listed
Coordinate Operation	North Carolina Department of Transportation	None listed
<i>Arterial Management Agencies</i>		
Provide Information	North Carolina Department of Transportation, Winston-Salem City	Greensboro City, High Point City
Share Infrastructure	North Carolina Department of Transportation, Winston-Salem City	Greensboro City, High Point City
Coordinate Operation	North Carolina Department of Transportation, Winston-Salem City	Greensboro City, High Point City
<i>Public Transit Operators</i>		
Provide Information	Winston-Salem Transit Authority	None listed
Share Infrastructure	Winston-Salem Transit Authority	None listed
Coordinate Operation	Winston-Salem Transit Authority	None listed
<u>Receiving real-time information via electronic means from others</u>		
<i>Incident Management agencies from which your agency receives incident severity, location, and type information</i>	North Carolina Department of Transportation	None listed
<i>Arterial Management agencies from which your agency receives</i>		

Freeway Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Winston-Salem	
	1999	2005
<i>arterial travel times, speeds, and conditions</i>	North Carolina Department of Transportation, Winston-Salem City	Greensboro City, High Point City
<i>Public Transit operators from which your agency receives freeway travel times derived from vehicle probes</i>	Winston-Salem Transit Authority	Greensboro Transit Authority, High Point Transit
<i>Toll Collection agencies from which your agency receives freeway travel times derived from vehicles probes</i>	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	North Carolina Department of Transportation, Winston-Salem City	Greensboro City, High Point City
Share Infrastructure	North Carolina Department of Transportation, Winston-Salem City	Greensboro City, High Point City
Coordinate Operation	North Carolina Department of Transportation, Winston-Salem City	Greensboro City, High Point City
Emergency Management Agencies		
Provide Information	Davidson County Emergency Medical Services, Davidson County Fire Departments, Davidson County Rescue Squad, Davidson County Sheriffs Department, Forsyth County Fire Department, Forsyth County Sheriffs Department, Greensboro City Police Department, High Point City Police Department, Randolph County Sheriffs Department, Thomasville Rescue Squad, Winston-Salem Fire Department, Winston-Salem Police Department, State Highway Patrol	None listed

Freeway Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Winston-Salem	
	1999	2005
Share Infrastructure	None listed	Davidson County Emergency Medical Services, Davidson County Fire Departments, Davidson County Rescue Squad, Davidson County Sheriffs Department, Forsyth County Fire Department, Forsyth County Sheriffs Department, Greensboro City Police Department, High Point City Police Department, Randolph County Sheriffs Department, Thomasville Rescue Squad, Winston-Salem Fire Department, Winston-Salem Police Department, State Highway Patrol
Coordinate Operation	None listed	Davidson County Emergency Medical Services, Davidson County Fire Departments, Davidson County Rescue Squad, Davidson County Sheriffs Department, Forsyth County Fire Department, Forsyth County Sheriffs Department, Greensboro City Police Department, High Point City Police Department, Randolph County Sheriffs Department, Thomasville Rescue Squad, Winston-Salem Fire Department, Winston-Salem Police Department, State Highway Patrol
Freeway Management Agencies		
Provide Information	North Carolina Department of Transportation	None listed
Share Infrastructure	North Carolina Department of Transportation	None listed
Coordinate Operation	North Carolina Department of Transportation	None listed
Public Transit Operators		

Freeway Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Winston-Salem	
	1999	2005
Provide Information	Winston-Salem Transit Authority	None listed
Share Infrastructure	None listed	Winston-Salem Transit Authority
Coordinate Operation	None listed	Winston-Salem Transit Authority
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	Davidson County Emergency Medical Services, Davidson County Fire Departments, Davidson County Rescue Squad, Davidson County Sheriffs Department, Forsyth County Fire Department, Forsyth County Sheriffs Department, Greensboro City Police Department, Randolph County Sheriffs Department, Thomasville Rescue Squad, Winston-Salem Fire Department, Winston-Salem Police Department, State Highway Patrol	High Point City Police Department
Receive Arterial Incident Severity Information	Davidson County Emergency Medical Services, Davidson County Fire Departments, Davidson County Rescue Squad, Davidson County Sheriffs Department, Forsyth County Fire Department, Forsyth County Sheriffs Department, Greensboro City Police Department, Randolph County Sheriffs Department, Thomasville Rescue Squad, Winston-Salem Fire Department, Winston-Salem Police Department, State Highway Patrol	High Point City Police Department
Arterial Management agencies from which your agency receives arterial travel times, speeds, and conditions		
Freeway Management agencies from which your agency receives	North Carolina Department of Transportation, Winston-Salem City	Greensboro City, High Point City

Freeway Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation-Winston-Salem	
	1999	2005
<i>freeway travel times, speeds, and conditions</i>	North Carolina Department of Transportation	None listed

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

Appendix E
Freeway Management Information Collection and Dissemination

Data Collection and Dissemination: Freeway Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation- Greensboro		North Carolina Department of Transportation-Winston- Salem	
	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, Incidents, Current work zones, Scheduled work zones, Intermodal (air, rail, water) connections, Emergency/evacuation routes and procedures, Highway operations coordination information	NR	Traffic volumes, Road conditions, Incidents, Scheduled work zones, Current work zones, Emergency/evacuation routes and procedures, Highway operations coordination information	Lane occupancy
Archived by your agency	Traffic volumes, Current work zones, Scheduled work zones, Intermodal (air, rail, water) connections, Emergency/evacuation routes and procedures, Highway operations coordination information	NR	Traffic volumes, Road conditions, Incidents, Scheduled work zones, Current work zones, Emergency/evacuation routes and procedures, Highway operations coordination information	Lane occupancy
Transferred to another agency by your agency	Current work zones, Scheduled work zones, Intermodal (air, rail, water) connections, Emergency/evacuation routes and procedures, Highway operations coordination information	NR	Traffic volumes, Road conditions, Incidents, Scheduled work zones, Current work zones, Emergency/evacuation routes and procedures, Highway operations coordination information	Lane occupancy
Importance of making information available to the public				
Ranked High	Current work zones, Scheduled work zones, Intermodal (air, rail, water) connections, Emergency/evacuation routes and procedures, Highway operations coordination information		Traffic volumes, Lane occupancy, Road conditions, Incidents, Scheduled work zones, Emergency/evacuation routes and procedures, Highway operations coordination information	
Ranked Medium	Traffic volumes		Current work zones	

Data Collection and Dissemination: Freeway Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation- Greensboro		North Carolina Department of Transportation-Winston- Salem	
	1999	2005	1999	2005
Ranked Low				
	NR		NR	
Groups that make requests for the data	Universities, State DOT personnel, Federal DOT personnel, Media (I.e., TV stations, radio stations), MPOs, Consultants, Municipalities		Universities, State DOT personnel, Media (I.e., TV stations, radio stations), Advanced Traveler Information Systems (ATIS) provi	
What is the data used for?	Traffic analysis, Construction impact determination, Planning, Dissemination to the public		Do not know, Traffic analysis, Construction impact determination, Planning, Accident prediction models, Dissemination to the public	
Methods used to disseminate freeway information to the public				
Technologies your agency uses to disseminate:	Dedicated cable TV, Telephone system, Pagers or personal data assistants, E-mail or other direct PC communication, Cell phone/voice, Cell phone/data, Facsimile	NR	Telephone system, Pagers or personal data assistants, E-mail or other direct PC communication, Cell phone/voice, Cell phone/data	Dedicated cable TV, Internet Web sites, Kiosks, Facsimile
Technologies your agency (through another agency or org.) uses to disseminate:	Dedicated cable TV	Internet Web sites	Telephone system, Internet Web sites, Pagers or personal data assistants, E-mail or other direct PC communication, Cell phone/voice, Cell phone/data	Kiosks, Facsimile
Internet web site reporting freeway conditions	NR		NR	
Telephone system for reporting freeway information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	Broadcast Stations Radio Municipalities Wire Services Newspapers		Local TV news group Local FM Radio	
Freeway Incident Management Section				
Methods used to distribute incident location and severity information to the public				

Data Collection and Dissemination: Freeway Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	North Carolina Department of Transportation- Greensboro		North Carolina Department of Transportation-Winston- Salem	
	1999	2005	1999	2005
Technologies your agency uses to disseminate:	Dedicated cable TV, Telephone system, Pagers or personal data assistants, E-mail or other direct PC communication, Cell phone/voice, Cell phone/data, Facsimile	NR	Telephone system, Internet Web sites, Pagers or personal data assistants, E-mail or other direct PC communication, Cell phone/voice, Cell phone/data	Dedicated cable TV, Interactive TV, Kiosks, In- vehicle navigation systems, Facsimile
Technologies your agency (through another agency or org.) uses to disseminate:	Dedicated cable TV	Internet Web sites, Kiosks	Telephone system, Internet Web sites, Pagers or personal data assistants, E-mail or other direct PC communication, Cell phone/voice, Cell phone/data	Dedicated cable TV, Interactive TV, Kiosks, In- vehicle navigation systems, Facsimile
Internet web site reporting incident information	NR		NR	
Telephone system for reporting incident information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	Broadcast Stations Radio Municipalities Wire Services Newspapers		NR	

Appendix F
Arterial Management Components

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Davidson County		Forsyth County		Greensboro City		Guilford County	
	1999	2005	1999	2005	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes		Yes		Yes	
ARTERIAL MANAGEMENT SECTION								
Number of arterial miles that agency owns or maintains	NR		NR		844		NR	
Number of arterial miles that is used for planning	NR		NR		14		NR	
Number of highway-rail intersections that agency maintains	NR		NR		NR		NR	
Number of highway-rail intersections that is used for planning	NR		NR		NR		NR	
Type of facilities used to conduct arterial management activities								
Activities housed in a free-standing dedicated building?	No		No		No		No	
Activities housed in a building shared with other activities?	No		No		Yes		No	
Activities conducted in a dedicated control room?	No		No		Yes		No	
Control room contains operator console(s)?	No		No		No		No	
Control room contains electronic wall map?	No		No		No		No	
Control room contains CCTV display(s)?	No		No		No		No	
Activities conducted in a room containing workstations or PCs that manage traffic?	No		No		Yes		No	
Facilities are electronically linked to other transportation mgt facilities?	No		No		No		No	
Staffing and hours of operation of arterial management activities								
Number of full-time agency staff members	NR		NR		NR		NR	
Number of full time contractor staff members	NR		NR		NR		NR	
Number of part-time agency staff members	NR		NR		3		NR	
Number of part-time contractor staff members	NR		NR		NR		NR	
Staffed 24 hours day by agency staff or by others	NR		NR		NR		NR	
Staffed during peak hours only by agency staff or by others	NR		NR		agency		NR	
Staffed by others during off-peak hours	No		No		No		No	
Agency staff perform transportation management as an ancillary duty	No		No		No		No	
Agency staff dedicated to transportation management duty	No		No		No		No	
Types of operations conducted for arterial management								
Incident detection and management?	No		No		Yes		No	
This metropolitan area?	No		No		Yes		No	
Other metropolitan area?	No		No		No		No	
Monitoring and troubleshooting status of system components?	No		No		No		No	
Radio communications with other agencies?	No		No		Yes		No	
Exchange of electronic data with other agencies such as computer aided dispatch?	No		No		No		No	
Manual override of traffic signal timing plans	No		No		Yes		No	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	No		No		Yes		No	

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Davidson County		Forsyth County		Greensboro City		Guilford County	
	1999	2005	1999	2005	1999	2005	1999	2005
Describe agency's role in traffic signal control	NR		NR		All roads with c/l and some intersections outside c/l but in very close proximity.		NR	
Traffic Signals Operated by Agency								
Number of signalized intersections operated and owned by agency	NR	NR	NR	NR	113	125	NR	NR
Number of signalized intersections operated by agency but owned by another	NR	NR	NR	NR	282	300	NR	NR
Total number of signalized intersections operated by agency	120	NR	100	NR	395	425	NR	NR
<i>Characteristics of signalized intersections that agency operates</i>								
Under closed loop or central system control	0	NR	9	NR	341	375	NR	NR
Under real-time traffic adaptive control using advanced software	0	NR	0	NR	0	NR	NR	NR
Using SCOOT	No		No		No		No	
Using SCATS	No		No		No		No	
Name of software	NR		NR		NR		NR	
Allow signal preemption for emergency vehicles	0	NR	0	NR	130	150	NR	NR
Allow signal priority for transit vehicles	0	NR	0	NR	0	NR	NR	NR
Within 200 feet of a highway-rail intersection	3	NR	2	NR	21	22	NR	NR
Within 200 feet of a highway-rail intersection that adjust signal timing	0	NR	0	NR	19	20	NR	NR
Software used to control the signals agency operates								
Date of last upgrade to traffic signal control system software?	NR		NR		1994		NR	
How often do you update signal timing?	NR		NR		Every 2 years		NR	
Software used and number of signalized intersections under control (1999, 2005)	NR		NR		SYNCHRO PRO, NR, NR TRANSYT 7F, NR, NR PASSER, NR, NR		NR	
Controllers used to control signals								
NEMA	0	0	0	0	395	NR	0	0
170/179	0	0	0	0	0	0	0	0
2070 controller	0	0	0	0	NR	425	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	1	NR	NR	NR	NR	NR
<i>Highway-Rail intersection capabilities</i>								
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

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Davidson County		Forsyth County		Greensboro City		Guilford County	
	1999	2005	1999	2005	1999	2005	1999	2005
Equipped with electronic traffic violator devices	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Real-Time Electronic Traffic Data Collection Technologies								
Total number of signalized intersections covered by electronic surveillance	NR	NR	NR	NR	62	100	NR	NR
<i>Number of signalized intersections with data collection technologies</i>								
Loop detectors	0	0	0	0	62	100	0	0
Video detection cameras	0	0	0	0	14	25	0	0
Probe readers reading toll tags	0	0	0	0	0	0	0	0
Probe readers reading license plates	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Roadside Technologies used to Distribute Traveler Information								
<i>Number deployed</i>								
Highway Advisory Radio	NR	NR	NR	NR	NR	NR	NR	NR
In-Vehicle Signing (IVS)	NR	NR	NR	NR	NR	NR	NR	NR
VMS controlling parking access	NR	NR	NR	NR	NR	NR	NR	NR
<i>Miles covered</i>								
Highway Advisory Radio	3	NR	NR	NR	NR	NR	NR	NR
In-Vehicle Signing (IVS)	0	NR	NR	NR	NR	NR	NR	NR
Variable Message Signs (VMS) on Arterials								
Candidate locations for deployment of VMS where VMS has been deployed	1	NR	NR	NR	NR	NR	NR	NR
Candidate locations for deployment of VMS	1	NR	NR	NR	NR	NR	NR	NR
Communication Technologies								
<i>Signalized intersections communicated with by each type of communication</i>								
Twisted pair cable	0	0	0	0	341	NR	0	0
Coaxial cable	0	0	0	0	0	0	0	0
Fiber-optic cable	0	0	0	0	NR	390	0	0
Other (e.g., wireless, dial-up modems, leased lines, etc.)	0	0	0	0	0	0	0	0
Does agency convey information on highway-rail intersection crossing status to travelers via roadside media such as VMS or HAR?	No		No		No		No	
ITS Standards Used Related to Traffic Signal Control								
Advanced Transportation Controller (ATC) Software Application Interface (ITE 9603-1)	No		No		No		No	
ATC Physical Cabinet Functional Design (ITE-9603-2)	No		No		No		No	
ATC Functionality and Interface Definitions (ITE-9603-3)	No		No		No		No	
Natl. Trans. Communications for ITS Protocol (NTCIP) Class B Profile (AASHTO TS 3.3)	No		No		No		No	
NTCIP Data Collection and Monitoring Devices (AASHTO TS 3.DCM)	No		No		No		No	
NTCIP Object Definitions for Video Camera Control (AASHTO TS 3.VCC)	No		No		No		No	
NTCIP Object Definitions for Actuated Traffic Signal Controller Units (AASHTO TS 3.5)	No		No		No		No	
Would agency be willing to participate in testing of ITS Standards?	NR		NR		No		No	
Have agreements in place with other agencies to use similar hardware and software to aid maintenance and interoperability?	NR		NR		No		No	
INCIDENT MANAGEMENT ON ARTERIAL STREETS								
Receive information on highway-rail intersection crossing blockages for the purpose of managing incident response?	No		No		No		No	

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Davidson County		Forsyth County		Greensboro City		Guilford County	
	1999	2005	1999	2005	1999	2005	1999	2005
Use of Service Patrols to Assist in Detection and Response to Incidents								
Publicly operated service patrol vehicles	Yes		Yes		Yes		Yes	
Privately operated service patrol vehicles operated under public contract	No		No		No		No	
Total number of arterial miles patrolled by these services	6	NR	40	NR	16	NR	NR	NR
Miles Covered by Methods to Detect and Verify Incidents								
Free cellular phone call to a dedicated phone number other than 911	0	0	0	0	0	0	35	NR
Free cellular phone call to an area radio station	0	0	0	0	0	0	0	0
Police patrols	10	10	10	10	0	0	20	NR
Computer algorithms linked to traffic surveillance equipment	0	0	0	0	0	0	0	0
CCTV	20	32	20	32	0	0	35	NR
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		Yes		Yes	
Inter-agency incident management admin. team that meets regularly	No		No		Yes		Yes	
Major incident response team that responds to major incidents	No		No		No		No	
Set of goals/objectives for incident mgt that has been adopted by agencies in region	No		No		No		Yes	
Methods of Communication Used On-Site at an Incident								
<u>Police</u>								
Two-way radio	No		No		No		No	
800 MHz trunked radio	No		No		No		Yes	
Cellular telephone	No		No		No		Yes	
Hand-held (i.e., walkie-talkie)	No		No		No		No	
Automated data systems (i.e., CAD)	No		No		No		Yes	
Other	No		No		No		No	
<u>Fire</u>								
Two-way radio	No		No		No		No	
800 MHz trunked radio	No		No		No		Yes	
Cellular telephone	No		No		No		Yes	
Hand-held (i.e., walkie-talkie)	No		No		No		No	
Automated data systems (i.e., CAD)	No		No		No		Yes	
Other	No		No		No		No	
<u>DOT</u>								
Two-way radio	No		No		No		No	
800 MHz trunked radio	No		No		Yes		Yes	
Cellular telephone	No		No		Yes		Yes	
Hand-held (i.e., walkie-talkie)	No		No		No		No	
Automated data systems (i.e., CAD)	No		No		No		No	
Other	No		No		No		No	
<u>Towing</u>								
Two-way radio	No		No		No		No	

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Davidson County		Forsyth County		Greensboro City		Guilford County	
	1999	2005	1999	2005	1999	2005	1999	2005
800 MHz trunked radio	No		No		No		No	
Cellular telephone	No		No		No		Yes	
Hand-held (i.e., walkie-talkie)	No		No		No		No	
Automated data systems (i.e., CAD)	No		No		No		No	
Other	No		No		No		No	
Which police agencies typically respond to incidents on arterials?								
State Police	No		No		No		Yes	
County Police or Sheriff	No		No		No		No	
City Police	No		No		Yes		Yes	
Who provides on-site emergency medical response?								
Fire	No		No		No		Yes	
Emergency Management Service Agency	No		No		Yes		Yes	
Private hospital	No		No		No		No	
Has a multi-agency contact list been developed in area containing the names, phone numbers, etc. for the appropriate response personnel?	NR		NR		DK		Yes	
Is the Incident Command System used to manage incident scenes?	NR		NR		No		Yes	
Is there a legal specification by state law or formal agreement as to who is "in charge" at the incident scene?								
Specified by state law?	No		No		No		No	
Formal agreement?	No		No		No		Yes	
Not specified or don't know?	No		No		Yes		No	
On-scene command post used to manage activities of responding agencies?	NR		NR		DK		Yes	
Are there communication linkages to a communications traffic/freeway mgt center?	NR		NR		NR		Yes	
Plan developed and adopted by responding agencies for staging and parking response vehicles and equip. at incident site that minimizes lane blockage and facilitates the re-opening of lanes?	NR		NR		DK		Yes	
Respondents protected through law or court opinion for liability claims for damages to vehicles or cargoes during clearance activities?	NR		NR		DK		DK	
Are overturned tank trucks, which are intact and not leaking, uprighted without first off-loading?	NR		NR		No		No	
Does your state or local jurisdiction have a law that requires drivers involved in property-damage-only accidents to move the vehicles from travel lanes to a safe location to exchange info and wait for police?	NR		NR		No		No	
Have laws or policies regarding the removal of stalled/abandoned vehicles from freeway shoulders?	NR		NR		No		Yes	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	NR		NR		25-36		0-24	
Have policies or procedures for quick removal of vehicles?	NR		NR		No		Yes	
Is Total Station equipment used to investigate major incidents?	NR		NR		No		Yes	
Handling of Towing Responses to Incidents								
Formal contract based on qualifications?	No		No		No		No	
Rotation with companies under contract?	No		No		No		Yes	
Separate lists kept for light and heavy response and for specialty recovery?	NR		NR		Yes		NR	
Rotation list with minimal qualifications?	No		No		Yes		No	

Arterial Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Davidson County		Forsyth County		Greensboro City		Guilford County	
	1999	2005	1999	2005	1999	2005	1999	2005
In towing qualifications, do you require towers to be certified under the								
Towing and Recovery Ass. of America's National Drivers Cert. Program?	NR		NR		DK		DK	
DK: Don't know								
NR: No Response								
Leg: Legislation or action being planned								

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	High Point City		Randolph County		Winston-Salem City		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes		Yes		7	
ARTERIAL MANAGEMENT SECTION								
Number of arterial miles that agency owns or maintains	419		1,674		320		3,257	
Number of arterial miles that is used for planning	50		NR		320		384	
Number of highway-rail intersections that agency maintains	7		50		50		107	
Number of highway-rail intersections that is used for planning	4		NR		30		34	
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?	Yes		No		Yes		3	
Activities conducted in a dedicated control room?	No		No		Yes		2	
Control room contains operator console(s)?	Yes		No		Yes		2	
Control room contains electronic wall map?	No		No		No		0	
Control room contains CCTV display(s)?	Yes		No		Yes		2	
Activities conducted in a room containing workstations or PCs that manage traffic?	No		No		Yes		2	
Facilities are electronically linked to other transportation mgt facilities?	No		No		Yes		1	
Staffing and hours of operation of arterial management activities								
Number of full-time agency staff members	3		NR		2		5	
Number of full time contractor staff members	NR		NR		0		0	
Number of part-time agency staff members	NR		NR		NR		0	
Number of part-time contractor staff members	NR		NR		NR		0	
Staffed 24 hours day by agency staff or by others	NR		NR		NR		0	
Staffed during peak hours only by agency staff or by others	agency		NR		NR		0	
Staffed by others during off-peak hours	No		No		No		0	
Agency staff perform transportation management as an ancillary duty	No		No		No		0	
Agency staff dedicated to transportation management duty	No		No		Yes		1	
Types of operations conducted for arterial management								
Incident detection and management?	Yes		No		Yes		3	
This metropolitan area?	Yes		No		Yes		3	
Other metropolitan area?	No		No		No		0	
Monitoring and troubleshooting status of system components?	Yes		No		Yes		2	
Radio communications with other agencies?	Yes		No		Yes		3	
Exchange of electronic data with other agencies such as computer aided dispatch?	No		No		No		0	
Manual override of traffic signal timing plans	Yes		No		Yes		3	
Operating transportation mgt roadside devices (e.g., VMS, CCTV, etc.)	Yes		No		Yes		3	

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	High Point City		Randolph County		Winston-Salem City		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
Describe agency's role in traffic signal control	All roads in incorporated area		All roads in county		All roads in incorporated area			
Traffic Signals Operated by Agency								
Number of signalized intersections operated and owned by agency	20	25	NR	NR	150	160	283	310
Number of signalized intersections operated by agency but owned by another	160	185	NR	NR	181	196	623	681
Total number of signalized intersections operated by agency	180	215	88	95	331	356	1,214	1,091
<i>Characteristics of signalized intersections that agency operates</i>								
Under closed loop or central system control	NR	215	9	14	308	340	667	944
Under real-time traffic adaptive control using advanced software	0	0	NR	NR	0	NR	0	0
Using SCOOT	No		No		No		0	
Using SCATS	No		No		No		0	
Name of software	NR		NR		NR		0	0
Allow signal preemption for emergency vehicles	5	8	NR	NR	331	356	466	514
Allow signal priority for transit vehicles	0	0	NR	NR	0	NR	0	0
Within 200 feet of a highway-rail intersection	7	9	6	8	17	18	56	57
Within 200 feet of a highway-rail intersection that adjust signal timing	7	9	5	7	13	16	44	52
Software used to control the signals agency operates								
Date of last upgrade to traffic signal control system software?	under progress now		August 1999		1996			
How often do you update signal timing?	once every 3 months		3-4 years		Semi Annually			
Software used and number of signalized intersections under control (1999, 2005)	SMARTWAYS, 170, NR TRACONEX, NR, NR HONEYWELL, NR, NR		TRANSYT, 0, 4 AIRES V 1.51, 9, 10		ECONOLITE CONTROLLER TIME BASED, 8, 20 COMPUTRAN TRAFFIC CONTROL-MTCS, 300, 320			
Controllers used to control signals								
NEMA	0	0	88	95	331	356	814	451
170/179	NR	NR	0	0	0	0	0	0
2070 controller	0	0	0	0	0	0	0	425
Other	175	200	0	0	0	0	175	200
Technologies Associated with Highway-Rail Intersections								
Total number of highway-rail intersections under electronic surveillance	NR	NR	NR	NR	13	13	14	13
<i>Highway-Rail intersection capabilities</i>								
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	13	13	13	13

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	High Point City		Randolph County		Winston-Salem City		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
Equipped with electronic traffic violator devices	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Real-Time Electronic Traffic Data Collection Technologies								
Total number of signalized intersections covered by electronic surveillance	60	100	9	14	231	256	362	470
<i>Number of signalized intersections with data collection technologies</i>								
Loop detectors	NR	1,000	9	14	243	256	314	1,370
Video detection cameras	17	22	0	0	4	10	35	57
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								
<i>Number deployed</i>								
Highway Advisory Radio	NR	NR	NR	NR	NR	NR	0	0
In-Vehicle Signing (IVS)	NR	NR	NR	NR	NR	NR	0	0
VMS controlling parking access	NR	NR	NR	NR	NR	NR	0	0
<i>Miles covered</i>								
Highway Advisory Radio	NR	NR	NR	NR	NR	NR	3	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	20	NR	NR	NR	NR	1	20
Candidate locations for deployment of VMS	10	25	NR	NR	NR	NR	11	25
Communication Technologies								
<i>Signalized intersections communicated with by each type of communication</i>								
Twisted pair cable	NR	NR	0	0	0	0	341	0
Coaxial cable	0	0	0	0	0	0	0	0
Fiber-optic cable	180	200	9	14	0	0	189	604
Other (e.g., wireless, dial-up modems, leased lines, etc.)	0	0	1	2	8	20	9	22
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)	Yes		No		No		1	
NTCIP Object Definitions for Actuated Traffic Signal Controller Units (AASHTO TS 3.5)	Yes		No		No		1	
Would agency be willing to participate in testing of ITS Standards?	Yes		No		Yes		2	
Have agreements in place with other agencies to use similar hardware and software to aid maintenance and interoperability?	No		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	

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	High Point City		Randolph County		Winston-Salem City		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
Use of Service Patrols to Assist in Detection and Response to Incidents								
Publicly operated service patrol vehicles	Yes		No		No		5	
Privately operated service patrol vehicles operated under public contract	No		No		No		0	
Total number of arterial miles patrolled by these services	419	500	NR	NR	NR	NR	481	500
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	35	0
Free cellular phone call to an area radio station	100	150	0	0	0	0	100	150
Police patrols	300	400	0	0	0	0	340	420
Computer algorithms linked to traffic surveillance equipment	NR	420	0	0	0	0	0	420
CCTV	300	350	0	0	0	0	375	414
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		2	
Inter-agency incident management admin. team that meets regularly	No		No		No		2	
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		Yes		No		2	
Methods of Communication Used On-Site at an Incident								
<u>Police</u>								
Two-way radio	Yes		No		No		1	
800 MHz trunked radio	No		No		No		1	
Cellular telephone	No		No		No		1	
Hand-held (i.e., walkie-talkie)	Yes		No		No		1	
Automated data systems (i.e., CAD)	No		No		No		1	
Other	No		No		No		0	
<u>Fire</u>								
Two-way radio	Yes		No		No		1	
800 MHz trunked radio	No		No		No		1	
Cellular telephone	No		No		No		1	
Hand-held (i.e., walkie-talkie)	Yes		No		No		1	
Automated data systems (i.e., CAD)	No		No		No		1	
Other	No		No		No		0	
<u>DOT</u>								
Two-way radio	Yes		Yes		No		2	
800 MHz trunked radio	No		No		No		2	
Cellular telephone	No		Yes		No		3	
Hand-held (i.e., walkie-talkie)	Yes		No		No		1	
Automated data systems (i.e., CAD)	No		No		No		0	
Other	No		No		No		0	
<u>Towing</u>								
Two-way radio	Yes		No		No		1	

Arterial Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	High Point City		Randolph County		Winston-Salem City		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
800 MHz trunked radio	No		No		No		0	
Cellular telephone	No		No		No		1	
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		Yes		No		2	
County Police or Sheriff	Yes		No		No		1	
City Police	Yes		Yes		No		4	
Who provides on-site emergency medical response?								
Fire	Yes		No		No		2	
Emergency Management Service Agency	Yes		Yes		No		4	
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?	No		No		NR		1	
Is the Incident Command System used to manage incident scenes?	No		No		NR		1	
Is there a legal specification by state law or formal agreement as to who is "in charge" at the incident scene?								
Specified by state law?	No		No		No		0	
Formal agreement?	No		No		No		1	
Not specified or don't know?	Yes		Yes		No		3	
On-scene command post used to manage activities of responding agencies?	No		DK		NR		1	
Are there communication linkages to a communications traffic/freeway mgt center?	NR		NR		NR		1	
Plan developed and adopted by responding agencies for staging and parking response vehicles and equip. at incident site that minimizes lane blockage and facilitates the re-opening of lanes?	DK		Yes		NR		2	
Respondents protected through law or court opinion for liability claims for damages to vehicles or cargoes during clearance activities?	DK		DK		NR		0	
Are overturned tank trucks, which are intact and not leaking, uprighted without first off-loading?	No		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?	No		No		NR		0	
Have laws or policies regarding the removal of stalled/abandoned vehicles from freeway shoulders?	No		NR		NR		1	
Hours abandoned vehicles are allowed to remain on a freeway shoulder?	DK		NR		NR		0	
Have policies or procedures for quick removal of vehicles?	No		No		NR		1	
Is Total Station equipment used to investigate major incidents?	No		DK		NR		1	
Handling of Towing Responses to Incidents								
Formal contract based on qualifications?	No		No		No		0	
Rotation with companies under contract?	No		Yes		No		2	
Separate lists kept for light and heavy response and for specialty recovery?	NR		NR		NR		1	
Rotation list with minimal qualifications?	No		No		No		1	

Arterial Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	High Point City		Randolph County		Winston-Salem City		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
In towing qualifications, do you require towers to be certified under the								
Towing and Recovery Ass. of America's National Drivers Cert. Program?	DK		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: Greensboro, Winston-Salem, High Point

Agency Name	Davidson County		Forsyth County	
	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
<u>Arterial Mgt. agencies in metropolitan area with which you share info.</u>				
Share Timing Plans Information	None listed	None listed	None listed	None listed
Coordinate Changes to Timing Plans	None listed	None listed	None listed	None listed
Turn over Control of Signals	None listed	None listed	None listed	None listed
<u>Agencies your agency provides arterial travel times, speeds, and conditions information, share infrastructure or coordinates operation</u>				
<i>Freeway Management Agencies</i>				
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
<i>Incident Management Agencies</i>				
Provide Information	short survey	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
<i>Public Transit Operators Agencies</i>				

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Davidson County		Forsyth County	
	1999	2005	1999	2005
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Arterial Management Agencies				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Receiving real-time information via electronic means from others				
Freeway Management agencies from which your agency receives				
<i>freeway travel times, speeds, and conditions</i>	None listed	None listed	None listed	None listed
Public Transit operators from which your agency receives				
<i>arterial travel times derived from vehicle probes</i>	None listed	None listed	None listed	None listed
Incident Management agencies from which your agency receives				
<i>incident clearance and/or incident severity, location, and type information</i>				
Receive information on Incident Clearance	None listed	None listed	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	None listed	None listed	None listed
Toll Collection agencies from which your agency receives arterial travel				
<i>times derived from vehicles probes</i>	None listed	None listed	None listed	None listed
Arterial Incident Management Section				
Agencies your agency provides incident severity, location, and type info.				
<u>and/or shares infrastructure and/or coordinates operation</u>				
Emergency Management Agencies				

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Davidson County		Forsyth County	
	1999	2005	1999	2005
Provide Information	short survey	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
<i>Freeway Management Agencies</i>				
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
<i>Public Transit Operators</i>				
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
<i>Receiving real-time information via electronic means from others</i>				
<i>Emergency Management agencies from which your agency receives arterial incident clearance and/or arterial incident severity</i>				
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
<i>Arterial Management agencies from which your agency receives arterial travel times, speeds, and conditions</i>				
	None listed	None listed	None listed	None listed

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Davidson County		Forsyth County	
	1999	2005	1999	2005
<i>Freeway Management agencies from which your agency receives</i>				
<i>freeway travel times, speeds, and conditions</i>	None listed	None listed	None listed	None listed

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

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Greensboro City		Guilford County	
	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
<u>Arterial Mgt. agencies in metropolitan area with which you share info.</u>				
Share Timing Plans Information	None listed	High Point City	None listed	None listed
Coordinate Changes to Timing Plans	None listed	Greensboro City, High Point City	None listed	None listed
Turn over Control of Signals	None listed	None listed	None listed	None listed
Agencies your agency provides arterial travel times, speeds, and conditions information, share infrastructure or coordinates operation				
<i>Freeway Management Agencies</i>				
Provide Information	None listed	None listed	North Carolina Department of Transportation-Winston-Salem	None listed
Share Infrastructure	North Carolina Department of Transportation-Greensboro	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	North Carolina Department of Transportation-Winston-Salem	None listed
<i>Incident Management Agencies</i>				
Provide Information	None listed	None listed	North Carolina Department of Transportation-Winston-Salem	None listed
Share Infrastructure	North Carolina Department of Transportation-Greensboro	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	North Carolina Department of Transportation-Winston-Salem	None listed
<i>Public Transit Operators Agencies</i>				

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Greensboro City		Guilford County	
	1999	2005	1999	2005
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	Authority, High Point Transit	None listed	None listed	None listed
Arterial Management Agencies				
Provide Information	None listed	None listed	Greensboro City, High Point City	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	Greensboro City, High Po	Greensboro City, High Point City	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	North Carolina Department of	None listed	None listed	None listed
Public Transit operators from which your agency receives				
arterial travel times derived from vehicle probes	None listed	None listed	None listed	None listed
Incident Management agencies from which your agency receives				
incident clearance and/or incident severity, location, and type information				
Receive information on Incident Clearance	North Carolina Department of Transportation-Greensboro	None listed	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	None listed	None listed	None listed
Toll Collection agencies from which your agency receives arterial travel				
times derived from vehicles probes	None listed	None listed	None listed	None listed
Arterial Incident Management Section				
Agencies your agency provides incident severity, location, and type info.				
and/or shares infrastructure and/or coordinates operation				
Emergency Management Agencies				

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Greensboro City		Guilford County	
	1999	2005	1999	2005
Provide Information	None listed	None listed	Greensboro City Fire Department, Greensboro City Police Department	None listed
Share Infrastructure	None listed	None listed	Greensboro City Police Department	None listed
Coordinate Operation	None listed	None listed	Greensboro City Fire Department, Greensboro City Police Department	None listed
<i>Freeway Management Agencies</i>				
Provide Information	North Carolina Department of Transportation-Greensboro	None listed	North Carolina Department of Transportation-Winston-Salem	None listed
Share Infrastructure	Department of	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	North Carolina Department of Transportation-Winston-Salem	None listed
<i>Public Transit Operators</i>				
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
<i>Receiving real-time information via electronic means from others</i>				
<i>Emergency Management agencies from which your agency receives arterial incident clearance and/or arterial incident severity</i>				
Receive Arterial Incident Clearance Information	None listed	None listed	Greensboro City Police Department	None listed
Receive Arterial Incident Severity Information	None listed	None listed	Greensboro City Police Department	None listed
<i>Arterial Management agencies from which your agency receives arterial travel times, speeds, and conditions</i>				
	None listed	High Point City	None listed	None listed

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Greensboro City		Guilford County	
	1999	2005	1999	2005
<i>Freeway Management agencies from which your agency receives</i>				
<i>freeway travel times, speeds, and conditions</i>	None listed	Department of	None listed	None listed

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

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	High Point City		Randolph County	
	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
<u>Arterial Mgt. agencies in metropolitan area with which you share info.</u>				
Share Timing Plans Information	North Carolina Department of Transportation	North Carolina Department of Transportation	High Point City	None listed
Coordinate Changes to Timing Plans	None listed	None listed	High Point City	None listed
Turn over Control of Signals	None listed	None listed	High Point City	None listed
Agencies your agency provides arterial travel times, speeds, and conditions information, share infrastructure or coordinates operation				
<i>Freeway Management Agencies</i>				
Provide Information	North Carolina Department of Transportation-Greensboro	North Carolina Department of Transportation-Greensboro	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
<i>Incident Management Agencies</i>				
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
<i>Public Transit Operators Agencies</i>				

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	High Point City		Randolph County	
	1999	2005	1999	2005
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Arterial Management Agencies				
Provide Information	None listed	None listed	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
Receiving real-time information via electronic means from others				
Freeway Management agencies from which your agency receives				
freeway travel times, speeds, and conditions	None listed	None listed	None listed	None listed
Public Transit operators from which your agency receives				
arterial travel times derived from vehicle probes	None listed	None listed	None listed	None listed
Incident Management agencies from which your agency receives				
incident clearance and/or incident severity, location, and type information				
Receive information on Incident Clearance	None listed	None listed	None listed	None listed
Receive information on Incident Severity, Location, and Type	None listed	None listed	None listed	None listed
Toll Collection agencies from which your agency receives arterial travel				
times derived from vehicles probes	None listed	None listed	None listed	None listed
Arterial Incident Management Section				
Agencies your agency provides incident severity, location, and type info.				
and/or shares infrastructure and/or coordinates operation				
Emergency Management Agencies				

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	High Point City		Randolph County	
	1999	2005	1999	2005
Provide Information	High Point City Fire Department, High Point City Police Department, Guilford County Emergency Medical Services	High Point City Fire Department, High Point City Police Department, Guilford County Emergency Medical Services	Randolph County Sheriffs Department, Asheboro Police Department, Archdale Police Department	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	High Point City Fire Department, High Point City Police Department, Guilford County Emergency Medical Services	High Point City Fire Department, High Point City Police Department, Guilford County Emergency Medical Services	None listed	None listed
<i>Freeway Management Agencies</i>				
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
<i>Public Transit Operators</i>				
Provide Information	High Point Transit	High Point Transit	None listed	None listed
Share Infrastructure	None listed	None listed	None listed	None listed
Coordinate Operation	None listed	None listed	None listed	None listed
<i>Receiving real-time information via electronic means from others</i>				
<i>Emergency Management agencies from which your agency receives arterial incident clearance and/or arterial incident severity</i>				
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
<i>Arterial Management agencies from which your agency receives arterial travel times, speeds, and conditions</i>				
	High Point City	Greensboro City, High Point City, North Carolina Department of Transportation	None listed	None listed

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	High Point City		Randolph County	
	1999	2005	1999	2005
<i>Freeway Management agencies from which your agency receives</i>				
<i>freeway travel times, speeds, and conditions</i>	None listed	None listed	None listed	None listed

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

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Winston-Salem City	
	1999	2005
Agency Returned Survey?	Yes	
Arterial Management Section		
<u>Arterial Mgt. agencies in metropolitan area with which you share info.</u>		
Share Timing Plans Information	North Carolina Department of Transportation	None listed
Coordinate Changes to Timing Plans	North Carolina Department of Transportation	None listed
Turn over Control of Signals	None listed	North Carolina Department of Transportation
Agencies your agency provides arterial travel times, speeds, and conditions information, share infrastructure or coordinates operation		
<i>Freeway Management Agencies</i>		
Provide Information	North Carolina Department of Transportation-Winston-Salem	None listed
Share Infrastructure	North Carolina Department of Transportation-Winston-Salem	None listed
Coordinate Operation	North Carolina Department of Transportation-Winston-Salem	None listed
<i>Incident Management Agencies</i>		
Provide Information	North Carolina Department of Transportation-Winston-Salem	None listed
Share Infrastructure	North Carolina Department of Transportation-Winston-Salem	None listed
Coordinate Operation	North Carolina Department of Transportation-Winston-Salem	None listed
<i>Public Transit Operators Agencies</i>		

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Winston-Salem City	
	1999	2005
Provide Information	Winston-Salem Transit Authority	None listed
Share Infrastructure	Winston-Salem Transit Authority	None listed
Coordinate Operation	None listed	Winston-Salem Transit Authority
Arterial Management Agencies		
Provide Information	North Carolina Department of Transportation	None listed
Share Infrastructure	North Carolina Department of Transportation	None listed
Coordinate Operation	North Carolina Department of Transportation	None listed
Receiving real-time information via electronic means from others		
Freeway Management agencies from which your agency receives		
<i>freeway travel times, speeds, and conditions</i>	None listed	None listed
Public Transit operators from which your agency receives		
<i>arterial travel times derived from vehicle probes</i>	None listed	Winston-Salem Transit Authority
Incident Management agencies from which your agency receives		
<i>incident clearance and/or incident severity, location, and type information</i>		
Receive information on Incident Clearance	North Carolina Department of Transportation-Winston-Salem	None listed
Receive information on Incident Severity, Location, and Type	North Carolina Department of Transportation-Winston-Salem	None listed
Toll Collection agencies from which your agency receives arterial travel		
<i>times derived from vehicles probes</i>	None listed	None listed
Arterial Incident Management Section		
Agencies your agency provides incident severity, location, and type info.		
<u>and/or shares infrastructure and/or coordinates operation</u>		
Emergency Management Agencies		

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Winston-Salem City	
	1999	2005
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
<i>Freeway Management Agencies</i>		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
<i>Public Transit Operators</i>		
Provide Information	None listed	None listed
Share Infrastructure	None listed	None listed
Coordinate Operation	None listed	None listed
<i>Receiving real-time information via electronic means from others</i>		
<i>Emergency Management agencies from which your agency receives arterial incident clearance and/or arterial incident severity</i>		
Receive Arterial Incident Clearance Information	None listed	None listed
Receive Arterial Incident Severity Information	None listed	None listed
<i>Arterial Management agencies from which your agency receives arterial travel times, speeds, and conditions</i>		
	None listed	None listed

Arterial Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Winston-Salem City	
	1999	2005
<i>Freeway Management agencies from which your agency receives</i>		
<i>freeway travel times, speeds, and conditions</i>	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: Greensboro, Winston-Salem, High Point

Agency Name	Davidson County		Forsyth County	
	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
Data collected, archived, and/or transferred to another agency				
Collected by your agency	NR	NR	NR	NR
Archived by your agency	NR	NR	NR	NR
Transferred to another agency by your agency	NR	NR	NR	NR
Importance of making information available to the public				
Ranked High	NR		NR	
Ranked Medium	NR		NR	
Ranked Low	NR		NR	
Groups that make requests for the data	NR		NR	
What is the data used for?	NR		NR	
Methods used to disseminate arterial information to the public				

Data Collection and Dissemination: Arterial Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Davidson County		Forsyth County	
	1999	2005	1999	2005
Technologies your agency uses to disseminate:	Pagers or personal data assistants	NR	Dedicated cable TV, Pagers or personal data assistants	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR
Internet web site reporting arterial conditions	NR		NR	
Telephone system for reporting arterial information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	
Arterial Incident Management Section				
Methods used to distribute incident location and severity information to the public				
Technologies your agency uses to disseminate:	NR	NR	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR
Internet web site reporting incident information	NR		NR	
Telephone system for reporting incident information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	

Data Collection and Dissemination: Arterial Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Greensboro City		Guilford County	
	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
Data collected, archived, and/or transferred to another agency				
Collected by your agency	Traffic volumes, Turning movements, Phasing/cycle lengths	NR	NR	NR
Archived by your agency	Traffic volumes, Turning movements, Phasing/cycle lengths	NR	NR	NR
Transferred to another agency by your agency	NR	NR	NR	NR
Importance of making information available to the public				
Ranked High	Traffic volumes, Turning movements, Phasing/cycle lengths		NR	
Ranked Medium	NR		NR	
Ranked Low	NR		NR	
Groups that make requests for the data	Universities, State DOT personnel, Media (I.e., TV stations, radio stations), Consultants, Land Developers		NR	
What is the data used for?	Traffic analysis, Construction impact determination, Planning, Roadway impact analysis, Dissemination to the public		NR	
Methods used to disseminate arterial information to the public				

Data Collection and Dissemination: Arterial Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Greensboro City		Guilford County	
	1999	2005	1999	2005
Technologies your agency uses to disseminate:	Dedicated cable TV	NR	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR
Internet web site reporting arterial conditions	NR		NR	
Telephone system for reporting arterial information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	
Arterial Incident Management Section				
Methods used to distribute incident location and severity information to the public				
Technologies your agency uses to disseminate:	Dedicated cable TV	NR	Telephone system, Pagers or personal data assistants, Cell phone/voice	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	Telephone system, Pagers or personal data assistants, Cell phone/voice	NR
Internet web site reporting incident information	NR		NR	
Telephone system for reporting incident information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	

Data Collection and Dissemination: Arterial Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	High Point City		Randolph County	
	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes	
Arterial Management Section				
Data collected, archived, and/or transferred to another agency				
Collected by your agency	Traffic volumes, Turning movements, Phasing/cycle lengths, Emergency vehicle signal preemption, Highway operations coordination information	Traffic volumes, Phasing/cycle lengths	NR	NR
Archived by your agency	Traffic volumes, Turning movements, Phasing/cycle lengths	NR	NR	NR
Transferred to another agency by your agency	NR	NR	NR	NR
Importance of making information available to the public				
Ranked High	Traffic volumes, Turning movements, Phasing/cycle lengths, Highway operations coordination information		Road conditions	
Ranked Medium	Emergency vehicle signal preemption		Traffic volumes, Traffic speeds, Vehicle classification, Emergency vehicle signal preemption, Incidents, Current work zones, Scheduled work zones, Emergency/evacuation routes and procedures, Highway operations coordination information	
Ranked Low	NR		Lane occupancy, Probe vehicles, Turning movements, Queues, Queues, Phasing/cycle lengths, Route designations (snow emergency, etc.), Weather conditions, Intermodal (air, rail, water) connections	
Groups that make requests for the data	Media (I.e., TV stations, radio stations), Consultants, Lawyers whose clients are involved in accidents		State DOT personnel, Media (I.e., TV stations, radio stations), Consultants, Citizens	
What is the data used for?	Traffic analysis, Planning, To find who is at fault (accidents)		Do not know, Traffic analysis, Planning, Dissemination to the public	
Methods used to disseminate arterial information to the public				

Data Collection and Dissemination: Arterial Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	High Point City		Randolph County	
	1999	2005	1999	2005
Technologies your agency uses to disseminate:	NR	NR	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR
Internet web site reporting arterial conditions	NR		NR	
Telephone system for reporting arterial information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	
Arterial Incident Management Section				
Methods used to distribute incident location and severity information to the public				
Technologies your agency uses to disseminate:	Internet Web sites	Dedicated cable TV, Internet Web sites	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR	NR	NR
Internet web site reporting incident information	NCDOT has a site, I do not know the web address.		NR	
Telephone system for reporting incident information to the public	NR		NR	
Organizations your agency sends information for dissemination to the public	NR		NR	

Data Collection and Dissemination: Arterial Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Winston-Salem City	
	1999	2005
Agency Returned Survey?	Yes	
Arterial Management Section		
Data collected, archived, and/or transferred to another agency		
Collected by your agency	Traffic volumes, Traffic spe	NR
Archived by your agency	Traffic volumes, Turning m	NR
Transferred to another agency by your agency	Traffic volumes	NR
Importance of making information available to the public		
Ranked High	Traffic volumes, Incidents, Current work zones, Scheduled work zones	
Ranked Medium	Turning movements	
Ranked Low	Traffic speeds	
Groups that make requests for the data	State DOT personnel, Consultants, Developers	
What is the data used for?	Traffic analysis, Construction impact determination, Planning, Incident detection algorithm development, Roadway impact analysis	
Methods used to disseminate arterial information to the public		

Data Collection and Dissemination: Arterial Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Winston-Salem City	
	1999	2005
Technologies your agency uses to disseminate:	NR	Dedicated cable TV, Internet Web sites
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR
Internet web site reporting arterial conditions	NR	
Telephone system for reporting arterial information to the public	NR	
Organizations your agency sends information for dissemination to the public	NR	
Arterial Incident Management Section		
Methods used to distribute incident location and severity information to the public		
Technologies your agency uses to disseminate:	NR	NR
Technologies your agency (through another agency or org.) uses to disseminate:	NR	NR
Internet web site reporting incident information	NR	
Telephone system for reporting incident information to the public	NR	
Organizations your agency sends information for dissemination to the public	NR	

Appendix I
Transit Management Components

Transit Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Greensboro Transit Authority		High Point Transit		Winston-Salem Transit Authority		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
Agency Returned Survey?	Yes		Yes		Yes		3	
Number of vehicles used in revenue service								
Fixed Route Bus	NR	NR	16	17	58	62	74	79
Heavy or Rapid Rail	NR	NR	0	0	0	0	0	0
Light Rail	NR	NR	0	0	0	0	0	0
Demand Responsive	NR	NR	6	6	22	25	28	31
Commuter Rail	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	NR	NR	0	0
Have of plan to have an Automated Vehicle Location System?	No		Yes		Yes		2	
Primary and Secondary Location Technologies Used								
<u>Primary Technologies</u>								
GPS	No	Yes	No	No	No	Yes	0	2
Sign/Odometer	No	No	No	No	No	No	0	0
Dead-Reckoning	No	No	No	No	No	No	0	0
LORAN C	No	No	No	No	No	No	0	0
Other	No	No	No	Yes	No	No	0	1
<u>Backup Technologies</u>								
GPS	No	No	No	Yes	No	No	0	1
Sign/Odometer	No	No	No	No	No	No	0	0
Dead-Reckoning	No	No	No	No	No	No	0	0
LORAN C	No	No	No	No	No	No	0	0
Other	No	No	No	No	No	Yes	0	1
Number of Vehicles Equipped with AVL								
Fixed Route Bus	NR	8	NR	NR	0	62	0	70
Heavy or Rapid Rail	NR	NR	NR	NR	0	0	0	0
Light Rail	NR	NR	NR	NR	0	0	0	0
Demand Responsive	NR	NR	NR	NR	3	25	3	25
Commuter Rail	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	NR	NR	0	0
Motor Buses Operated as Vehicle Probes								
Number of Motor Buses equipped as probes on freeways?	NR		NR		NR		0	
Number of Motor Buses equipped as probes on arterials?	NR		NR		NR		0	
Have Organized Regional Incident Management Program?	Yes		No		Yes		2	
Have Automated Traveler Information System?	Yes		Yes		Yes		3	

Transit Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Greensboro Transit Authority		High Point Transit		Winston-Salem Transit Authority		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
<i>Services Automated Traveler Info. System Applies:</i>								
Fixed Route	Yes		Yes		Yes		3	
Heavy Rail	No		No		No		0	
Light Rail	No		No		No		0	
Demand Responsive	Yes		No		Yes		2	
Commuter Rail	No		No		No		0	
Ferry	No		No		No		0	
Locations where traveler information is displayed to public								
Number of bus stops on fixed transit routes	1,500	1,500	NR	NR	NR	NR	1500	1500
Bus stops on fixed transit routes that display traveler info to the public	4	10	NR	NR	NR	NR	4	10
Number of rail stations	NR	NR	NR	NR	NR	NR	0	0
Number of rail stations that display traveler information	NR	NR	NR	NR	NR	NR	0	0
Number of other locations that display traveler information to public	NR	NR	NR	NR	NR	NR	0	0
Number of vehicles the traveler information system has available								
Fixed Route Bus	25	26	NR	NR	NR	62	25	88
Heavy or Rapid Rail	NR	NR	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive	0	15	NR	NR	3	25	3	40
Commuter Rail	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	NR	NR	0	0
Deployment of Communications Technology								
<i>Attributes of Radio System:</i>								
Digital?	No		Yes		No		1	
Analog?	No		No		Yes		1	
Trunked?	Yes		Yes		Yes		3	
Regular?	No		No		No		0	
Services that use a Digital or Trunked Radio System								
<i>Digital Only</i>								
Fixed Route Bus	No	Yes	Yes	No	No	No	1	1
Heavy or Rapid Rail	No	No	No	No	No	No	0	0
Light Rail	No	No	No	No	No	No	0	0
Demand Responsive	No	No	Yes	No	No	No	1	0
Commuter Rail	No	No	No	No	No	No	0	0
Ferry Boat	No	No	No	No	No	No	0	0
<i>Trunked Only</i>								
Fixed Route Bus	No	No	Yes	No	No	No	1	0
Heavy or Rapid Rail	No	No	No	No	No	No	0	0
Light Rail	No	No	No	No	No	No	0	0

Transit Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Greensboro Transit Authority		High Point Transit		Winston-Salem Transit Authority		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
Demand Responsive	No	No	Yes	No	No	No	1	0
Commuter Rail	No	No	No	No	No	No	0	0
Ferry Boat	No	No	No	No	No	No	0	0
Have of plan to have Automatic Passenger Counters (APCs)?	Yes		Yes		No		2	
Methods used to count passengers								
Treadle Mats	No		No		No		0	
Infrared Beams	No		No		No		0	
Primary and Secondary Location Technologies Used								
<i>Primary Technologies</i>								
GPS	No	No	No	No	No	No	0	0
Differential GPS	No	No	No	Yes	No	No	0	1
Signpost/Odometer	No	No	No	No	No	No	0	0
Dead_Reckoning	No	No	No	No	No	No	0	0
LORAN C	No	No	No	No	No	No	0	0
Other	No	No	No	No	No	No	0	0
<i>Backup Technologies</i>								
GPS	No	No	No	Yes	No	No	0	1
Differential GPS	No	No	No	No	No	No	0	0
Signpost/Odometer	No	No	No	No	No	No	0	0
Dead_Reckoning	No	No	No	No	No	No	0	0
LORAN C	No	No	No	No	No	No	0	0
Other	No	No	No	No	No	No	0	0
Number of Vehicles with APCs								
Fixed Route Bus	NR	NR	NR	17	NR	NR	0	17
Heavy or Rapid Rail	NR	NR	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	NR	NR	0	0
Commuter Rail	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	NR	NR	0	0
Remote Real-Time Monitoring and Computer Assisted Dispatching								
<i>Remote Real-Time Monitoring</i>								
Fixed Route Bus	NR	8	NR	17	NR	NR	0	25
Heavy or Rapid Rail	NR	NR	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	NR	NR	0	0
Commuter Rail	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	NR	NR	0	0
<i>Automated Dispatching or Control Software</i>								

Transit Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Greensboro Transit Authority		High Point Transit		Winston-Salem Transit Authority		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
Fixed Route Bus	NR	NR	NR	NR	NR	62	0	62
Heavy or Rapid Rail	NR	NR	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive	19	19	NR	NR	NR	25	19	44
Commuter Rail	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	NR	NR	0	0
Coordinate or plan to coordinate travel request and vehicle dispatching for multiple agencies?	Yes		No		No		1	
Is there or will there be a Transportation Management Center (TMC) in the region that controls transit and highway modes?	No		No		Yes		1	
Modes that TMC currently controls:								
Highways	No	No	No	No	No	Yes	0	1
Fixed Route Bus	No	No	No	No	No	Yes	0	1
Heavy or Rapid Rail	No	No	No	No	No	No	0	0
Light Rail	No	No	No	No	No	No	0	0
Demand Responsive	No	No	No	No	No	Yes	0	1
Commuter Rail	No	No	No	No	No	No	0	0
Ferry Boat	No	No	No	No	No	No	0	0
Other	No	No	No	No	No	No	0	0
Priority at Traffic Signals and Ramp Meter Priority								
<i>Priority at Traffic Signals</i>								
Fixed Route Bus	NR	NR	NR	17	NR	10	0	27
Light Rail	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	NR	NR	0	0
<i>Ramp Meter Priority</i>								
Fixed Route Bus	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	NR	NR	0	0
Number of Vehicles Equipped with Navigation Aids								
Fixed Route Bus	NR	NR	NR	NR	NR	NR	0	0
Heavy or Rapid Rail	NR	NR	NR	NR	NR	NR	0	0
Light Rail	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive	NR	NR	NR	NR	NR	NR	0	0
Commuter Rail	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat	NR	NR	NR	NR	NR	NR	0	0
ITS Standards Used Related to Transit Management								
TCIP On Board Objects (TCIP-OB)	No		No		No		0	

Transit Management
Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Greensboro Transit Authority		High Point Transit		Winston-Salem Transit Authority		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
TCIP Traffic Management Objects (TCIP-TM)	No		No		No		0	
TCIP Common Public Transportation Objects (TCIP-CPT)	No		No		No		0	
TCIP Passenger Information Objects (TCIP-PI)	No		No		No		0	
TCIP Incident Management Objects (TCIP-IM)	No		No		No		0	
TCIP Fare Collection Objects (TCIP-FC)	No		No		No		0	
TCIP Spatial Representation Objects (TCIP-SP)	No		No		No		0	
TCIP Control Center Objects (TCIP-CC)	No		No		No		0	
TCIP Scheduling/Runcutting Objects (TCIP-SCH)	No		No		No		0	
Send data communication between micro computer and heavy duty vehicle applications (SAE J1708)	No		No		No		0	
Would agency be willing to participate in testing of ITS Standards?	Yes		Yes		Yes		3	
Have agreements in place with other agencies to use similar hardware and software to aid maintenance and interoperability?	No		No		No		0	
Electronic Fare Payment								
Have full operational Electronic Fare Payment System?	Yes		Yes		Yes		3	
Methods of Fare Payment								
<i>Stored value card with fare deducted for each trip</i>								
Magnetic Stripe	Yes		No		No		1	
Smart Card	Yes		No		Yes		2	
Debit Card	No		No		Yes		1	
<i>Billed by the month for trips taken</i>								
Magnetic Stripe	Yes		No		No		1	
Smart Card	Yes		No		No		1	
Credit Card	No		No		Yes		1	
<i>Monthly Pass</i>								
Magnetic Stripe	No		No		No		0	
Smart Card	No		No		Yes		1	
Vehicles/Stations Equipped with Automated Payment Mechanism								
<i>Magnetic Stripe Readers</i>								
Fixed Route Bus Vehicles	8	25	NR	NR	NR	NR	8	25
Heavy or Rapid Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Light Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive Vehicles	NR	NR	NR	NR	0	0	0	0
Commuter Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat Landings	NR	NR	NR	NR	NR	NR	0	0
<i>Smart Card Readers</i>								
Fixed Route Bus Vehicles	8	25	NR	NR	NR	62	8	87
Heavy or Rapid Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Light Rail Stations	NR	NR	NR	NR	NR	NR	0	0

Transit Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

	Greensboro Transit Authority		High Point Transit		Winston-Salem Transit Authority		Totals	
	1999	2005	1999	2005	1999	2005	1999	2005
Demand Responsive Vehicles	NR	NR	NR	NR	3	25	3	25
Commuter Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat Landings	NR	NR	NR	NR	NR	NR	0	0
<u>Credit Card</u>								
Fixed Route Bus Vehicles	NR	NR	NR	NR	NR	NR	0	0
Heavy or Rapid Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Light Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive Vehicles	NR	NR	NR	NR	NR	NR	0	0
Commuter Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat Landings	NR	NR	NR	NR	NR	NR	0	0
<u>Debit Card</u>								
Fixed Route Bus Vehicles	NR	NR	NR	NR	NR	62	0	62
Heavy or Rapid Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Light Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Demand Responsive Vehicles	NR	NR	NR	NR	NR	25	0	25
Commuter Rail Stations	NR	NR	NR	NR	NR	NR	0	0
Ferry Boat Landings	NR	NR	NR	NR	NR	NR	0	0
NR: No Response								

Appendix J
Transit Management Integration

Transit Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

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

Transit Management Integration
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Winston-Salem Transit Authority	
	1999	2005
Agency Returned Survey?	Yes	
<u>Transit operators in the region that use the same electronic payment system</u>	None listed	
<u>Toll operators from whom you accept electronic payment of transit fare through the use of ETC media</u>	None listed	
<u>Receiving real-time information via electronic means from others</u>		
<i>Freeway Management agencies from which your agency receives freeway travel times, speeds, and conditions</i>		
<i>Receive Information</i>	North Carolina Department of Transportation-Greensboro, North Carolina Department of Transportation-Winston-Salem	None listed
<i>Share Infrastructure</i>	None listed	North Carolina Department of Transportation-Greensboro, North Carolina Department of Transportation-Winston-Salem
<i>Arterial Management agencies from which your agency receives arterial travel times, speeds, and conditions</i>		
<i>Receive Information</i>	Winston-Salem City	None listed
<i>Share Infrastructure</i>	None listed	Winston-Salem City
<i>Incident Management agencies from which your agency receives incident severity, location, and type</i>		
<i>Receive Information</i>	North Carolina Department of Transportation-Greensboro, North Carolina Department of Transportation-Winston-Salem	None listed
<i>Share Infrastructure</i>	None listed	North Carolina Department of Transportation-Greensboro, North Carolina Department of Transportation-Winston-Salem

Appendix K
Transit Management Information Collection and Dissemination

Data Collection and Dissemination: Transit Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Greensboro Transit Authority		High Point 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	Telephone System	Kiosks, Telephone System, Dedicated cable TV	NR	Audible Enunciators, Internet Web Sites
Real-time transit schedule adherence or arrival and departure times	NR	NR	NR	Audible Enunciators, Monitors/VMS (not in vehicle), Internet Web Sites
Technologies employed by other organization receiving your data				
Transit routes, schedules and fares	NR	NR	NR	NR
Real-time transit schedule adherence or arrival and departure times	NR	NR	NR	NR
Internet web site reporting transit routes, schedules and fare, etc.	NR		NR	
Telephone system for reporting transit information to the public	automated telephone system		NR	
Organizations your agency sends information for dissemination to the public	Public libraries, human service agencies, local banks, grocery stores, colleges and universities.		NR	
Data collected, archived, and/or transferred to another agency				
Collected by your agency	Scheduled roadway work zones for transit, Current roadway work zones for transit, Incidents, Weather conditions, Road conditions, Passenger information (e.g., surveys, O/D), Passenger count, Vehicle time and location	NR	Passenger count	Passenger count

Data Collection and Dissemination: Transit Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Greensboro Transit Authority		High Point Transit	
	1999	2005	1999	2005
Archived by your agency	NR	NR	NR	NR
Transferred to another agency by your agency	NR	NR	NR	NR
Importance of making information available to the public				
Ranked High	NR		NR	
Ranked Medium	NR		Passenger count	
Ranked Low	NR		NR	
Groups that make requests for the data	Consultants, Media (i.e., TV stations, radio stations), Federal DOT personnel, State DOT personnel, Universities		Consultants, State DOT personnel	
What is the data used for?	Dissemination to the public, Accident prediction models, Roadway impact analysis, Planning, Traffic analysis		Funding calculations, Dissemination to the public, Planning	

Data Collection and Dissemination: Transit Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	Winston-Salem Transit Authority	
	1999	2005
Agency Returned Survey?	Yes	
Methods used to disseminate transit information to the public		
Technologies your agency uses to disseminate:		
Transit routes, schedules and fares	NR	NR
Real-time transit schedule adherence or arrival and departure times	NR	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
Technologies employed by other organization receiving your data		
Transit routes, schedules and fares	NR	NR
Real-time transit schedule adherence or arrival and departure times	NR	NR
Internet web site reporting transit routes, schedules and fare, etc.	NR	
Telephone system for reporting transit information to the public	NR	
Organizations your agency sends information for dissemination to the public		
	NR	
Data collected, archived, and/or transferred to another agency		
Collected by your agency	Passenger count, Passenger information (e.g., surveys, O/D), Vehicle monitoring status, Route designations (snow emergency, etc)	Trip itinerary planning records, Vehicle time and location, Transit operations coordination information, Transit vehicle signal priority

Data Collection and Dissemination: Transit Management
 Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

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

Appendix L
Emergency Management

Emergency Management Agencies for Metropolitan Area: Greensboro, Winston-Salem, High Point

Agency Name	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
	1999	2005	1999	2005	1999	2005	1999	2005	1999	2005	1999	2005			
Davidson County Emergency Medical Services	15	16	1	2	0	0	15	16	0	NR	0	NR	Yes	No	None listed
Davidson County Fire Departments	130	130	0	NR	0	NR	130	130	0	0	0	0	Yes	No	None listed
Davidson County Rescue Squad	11	10	0	0	0	0	11	10	0	0	0	0	Yes	No	None listed
Davidson County Sheriff Departments (more than one)	110	110	0	NR	0	NR	110	NR	110	NR	NR	NR	No	No	None listed
Davidson County Sheriffs Department	91	NR	0	NR	0	NR	91	NR	2	NR	0	NR	No	No	None listed
Forsyth County Fire Department	139	140	0	0	0	0	0	140	0	50	0	0	Yes	Yes	North Carolina State Fire Marshal
Greensboro City Fire Department	34	40	0	0	0	40	34	40	0	40	34	40	No	Yes	None listed
Greensboro City Police Department	331	NR	0	NR	0	NR	331	NR	180	NR	0	NR	Yes	No	None listed
High Point City Fire Department	27	32	0	0	0	0	27	32	0	0	0	32	Yes	No	None listed
High Point City Police Department	197	205	0	150	0	150	197	205	0	150	0	0	No	No	None listed
Randolph County Sheriffs Department	135	155	0	0	0	0	0	0	0	0	0	0	No	No	None listed
Thomasville Rescue Squad	4	4	0	0	0	0	0	0	0	0	0	0	Yes	No	None listed
Winston-Salem Fire Department	32	37	0	0	0	0	32	37	28	33	0	0	Yes	Yes	Winston-Salem Police Department, Risk Management Department, Emergency Management Department
Winston-Salem Police Department	311	NR	0	NR	0	NR	311	NR	302	NR	0	NR	Yes	No	None listed